

820
860/880 SX & ELITE
970/980 ELITE
TX760B
TX860B
TX870B
TX970B

Operator's Manual

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THIS SYMBOL MEANS "WARNING ! SAFETY" AND SHOWS IMPORTANT SAFETY MESSAGES. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.



WARNING

IMPROPER OPERATION OF THIS MACHINE OR THE NON-OBSERVANCE OF SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH.

BEFORE USING THIS MACHINE :

1. CAREFULLY READ THIS MANUAL.
2. MAKE SURE THAT THIS MACHINE HAS THE RIGHT ATTACHMENTS AND TOOLS FOR THE TYPE OF WORK TO BE CARRIED OUT.
3. BE AWARE OF CURRENT TRADE AND PRIVATE JOB SITE REGULATIONS.
4. OBSERVE CURRENT ROAD TRAFFIC REGULATIONS DURING TRAVEL ON PUBLIC HIGHWAYS.

760B/820/860/880SX/ELITE/860B/870B Loader Backhoes



DSC04520-4682A

Models shown: **760B** (centremount (axial) backhoe version) and
860 Elite (sideshift (offset) backhoe version)

970/980 ELITE Loader Backhoes



DSC05212A

Model shown: **970 Elite** (sideshift (offset) backhoe version)

To the Owner

The purpose of this Operator's Manual is to enable the owner or the operator to maintain the machines efficiently. If these instructions are followed carefully they will contribute to years of efficient and profitable operation of the machine.

The installation procedure ensures that these instructions are understood. Observe the recommendations and make daily maintenance a routine.

The variations in operating conditions make it impossible for the company to make comprehensive or definite statements in its publications regarding performance and methods of use of its machines or to accept any liability for any loss or damage which may result from these statements, or from any errors or omissions. IT IS THE DUTY OF THE USER WHEN TRAVELLING ON THE PUBLIC HIGHWAY TO ENSURE THAT THE VEHICLE ATTACHMENTS (IF ANY) CONFORM WITH THE LOCAL ROAD TRAFFIC REGULATIONS. Users are strongly advised to make use of the widespread network of local dealers in connection with any service problems and adjustments which may arise. Local dealers are trained and equipped for the purpose of advising users on any special problems arising as a result of local conditions, and are able to call on the Manufactures Technical Staff for advice.

When replacements are required, insist on genuine Aftercare® parts from your Dealer, as extensive damage is liable to result from the use of inferior quality parts.

If you require the name and address of local dealer, in any particular area, write to Fermec/Terex, Customer Service Department, Central Boulevard, Prologis Park, Coventry, CV6 4BX, United Kingdom.

General

In accordance with the Company's policy of continuous improvements to its machines, alterations to the specifications of machines may be made at any time without notice and the Company accepts no responsibility for any discrepancies which may occur between the specifications of its machines and the descriptions thereof contained in its publications.

This Operator's Manual has been written to include all factory fitted options and specifications for world-wide use, but this does not imply that all or any of these options are included in the standard machine configuration. Therefore Local dealers must always be consulted about machine specifications.

Official documents (European Community only)

CE mark

The Machinery Safety directive is intended to harmonise all the machinery safety regulations throughout the community so that there will be no technical barriers to trade.

Compliance with the essential safety requirements of the EEC directives 98/37/EEC (machinery), 2000/14/EEC (Noise) and 89/336/EEC, permits companies to CE mark their products.

The directive affects almost every equipment supplier and user in the community and in particular, applies to this type of machine.

The regulations require that potential hazards from machinery are properly addressed and guarded against.

EC declaration of conformity

The EC declaration of conformity is a requirement of CE marking. The declaration for this machine is included with the documentation pack.

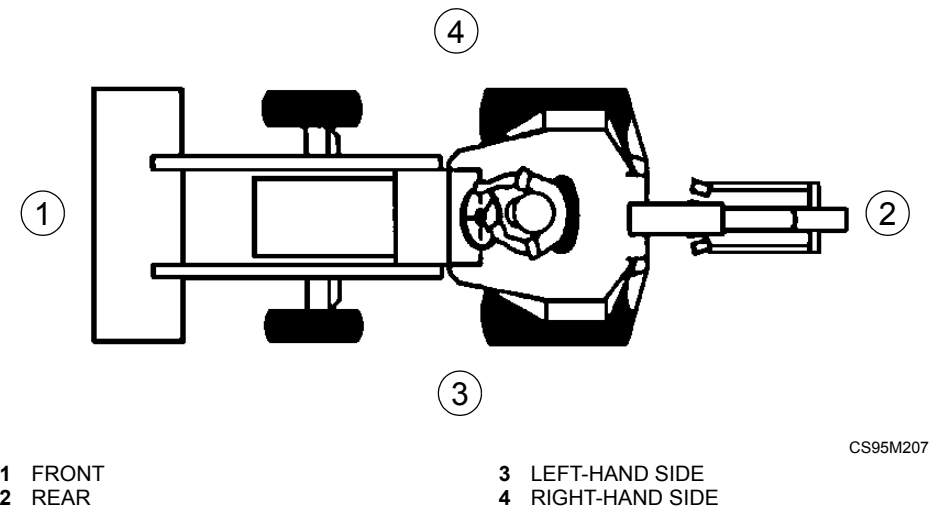
E C DECLARATION OF CONFORMITY	
FERREC MANUFACTURING CERTIFIES THAT THE SPECIFIED EARTH MOVING MACHINE HAS BEEN DESIGNED AND MANUFACTURED IN CONFORMITY WITH THE MACHINERY SAFETY DIRECTIVE AND HARMONISED ESSENTIAL HEALTH AND SAFETY STANDARDS ALLOWING SELF CERTIFICATION BY THE INTRODUCTION OF THE CE MARK ON THE MACHINE SERIAL NO. PLATE.	
1. RESPONSIBLE PERSON:	R E ROBSON MANAGING DIRECTOR
2. MANUFACTURER:	FERREC MANUFACTURING LIMITED BARTON DOCK ROAD STRETTON MANCHESTER M20 0YH ENGLAND
3. MACHINERY DESCRIPTION	
a. MAKE:	_____
b. TYPE:	_____
c. SERIAL NO.:	_____
4. YEAR OF MANUFACTURE:	_____
5. COMPLIANCE WITH DIRECTIVES:	
89/392/EEC 91/368/EEC 93/41/EEC 93/68/EEC 94/C 253/03 89/655/EEC 89/336/EEC	
THE UNDERSIGNED EMPOWERED SIGNATORY _____ HEREBY CERTIFIES THAT THE MACHINE SPECIFIED ABOVE HAS BEEN MANUFACTURED IN CONFORMITY WITH THE EEC SPECIAL DIRECTIVES AND TRANSPOSED HARMONIZED STANDARDS EN 292 1, 2 & 3 AND STEERING, VISIBILITY, LIGHTING AND ROADING PERFORMANCE HAVE BEEN ADOPTED TO SATISFY FRENCH, GERMAN, ITALIAN AND SCANDINAVIAN LEGAL HOMOLOGATION ROAD AUTHORITY REQUIREMENTS.	
EMPOWERED SIGNATORY: _____	
LOCATION: _____	
DATE: _____	
351836062 (UK)	

CS98C038

Right, Left, Front, and Rear of the Machine

The terms “right”, “left”, “front” and “rear”, when used in this manual, indicate the sides of the machine as seen from the operator's seat.

Operator and seat in loader attachment position

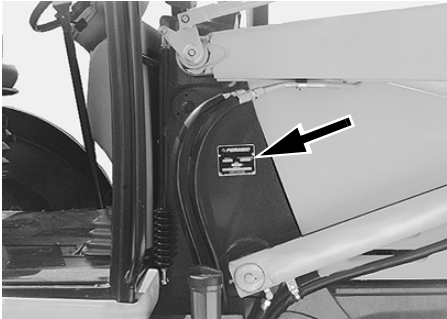


Type, Serial Number and Year of Manufacture of the Machine

When ordering parts, requesting information or assistance, always give your local dealer the model/type and serial number of your machine.

Write the model/type, serial number and year of manufacture of your machine and the serial numbers on the various hydraulic and mechanical components in the spaces provided below.

Machine



CD98F025

Located on right-hand side of machine (with the seat in loader attachment position).

General CE

CENTRAL BOULEVARD, PROLOGIS PARK, COVENTRY, ENGLAND	
SERIAL No. _____	
1 MODEL	2 ENGINE POWER KW
ISO 9249	
BUILD YEAR	MASS Kg
	3

6110378M1A

Germany & Austria

CENTRAL BOULEVARD, PROLOGIS PARK, COVENTRY, ENGLAND	
FAHRZEUG-IDENT.-Nr. _____	
1 TYP	2 MOTORLEISTUNG KW
BAU JAHR	3 PL. GES. GEW. Kg
ZUL. VORDERACHSLAST Kg	ZUL. HINTERACHSLAST Kg

6110381M1A

Italy

CENTRAL BOULEVARD, PROLOGIS PARK, COVENTRY, ENGLAND	
TIPICO	
No. OMOLOGAZIONE	
No. IDENTIFICAZIONE SMF	
MASSA TOTALE AMMISSIBILE (kg)	
CARICO AMMISS. ASSE ANTERIORE (kg)	
CARICO 3 ASSE POSTERIORE (kg)	
MASSE R. AMMISSIBILI	
ANNO DI FABBRICAZIONE	
POTENZA MOTORE KW	
FERREC MANUFACTURING LIMITED WANCHESTER ENGLAND.	

6110382M1A

- (1) Model/Type
-
- (2) Serial number
-
- (3) Year of manufacture
-

Identification Numbers/Machine Components

France

**TEREX**

CENTRAL BOULEVARD, PROLOGIS PARK, COVENTRY, ENGLAND

1

2

3

NUMERO DE SERIE

TYPE

ANNEE DE FABRICATION

DESIGNATION

CHARGEUSE-PELLETEUSE

PUISSANCE DU MOTEUR
ISO 9249

POIDS

NIVEAU SONORE MAXIMAL

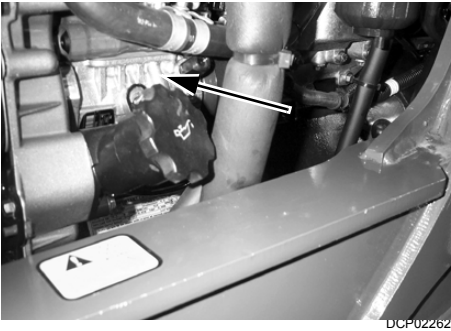
Kw

Kg

dB(A)

6110380M1A

Engine



General

**TEREX**

CENTRAL BOULEVARD, PROLOGIS PARK, COVENTRY, ENGLAND

1

2

3

SERIAL No.

MODEL

BUILD YEAR

ENGINE POWER

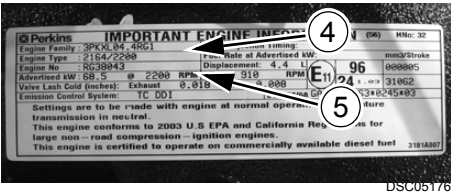
MASS

ISO 9249

Kw

Kg

6110384M1A



Costa Rica

**TEREX**

CF BOULEVARD, PROLOGIS PARK, COVENTRY, ENGLAND

1

2

3

SERIAL No.

MODEL

MASS

6110386M1

- (1) Model/Type
- (2) Serial number.....
- (3) Year of manufacture.....

- (4) Make and model/type.....
- (5) Serial number.....

Component serial numbers

- Hydraulic pump
- Front drive axle (4 wheel drive).....
- Rear axle.....
- Gearbox.....
- Loader attachment control valve
- Backhoe attachment control valve

ROPS/FOPS Cab (or Frame)



ROPS/FOPS serial number

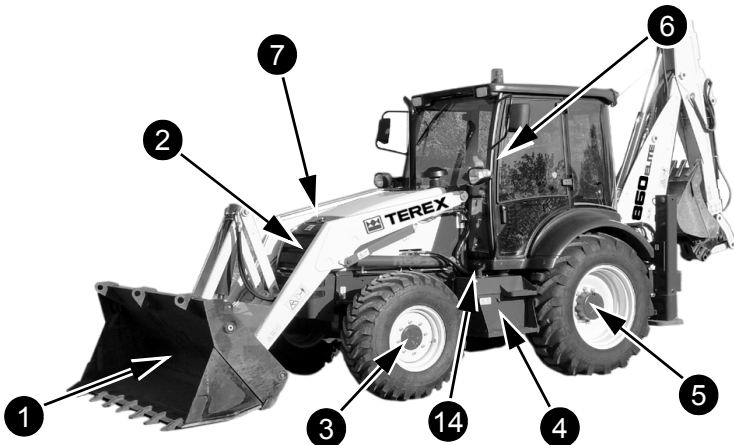
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Maximum machine weight

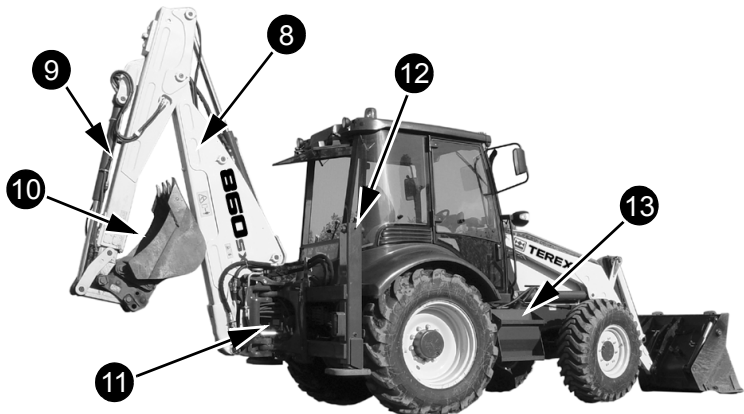
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In conformance with: ISO 3471/1 1996

Identification of Main Components
Sideshift (offset) backhoe version



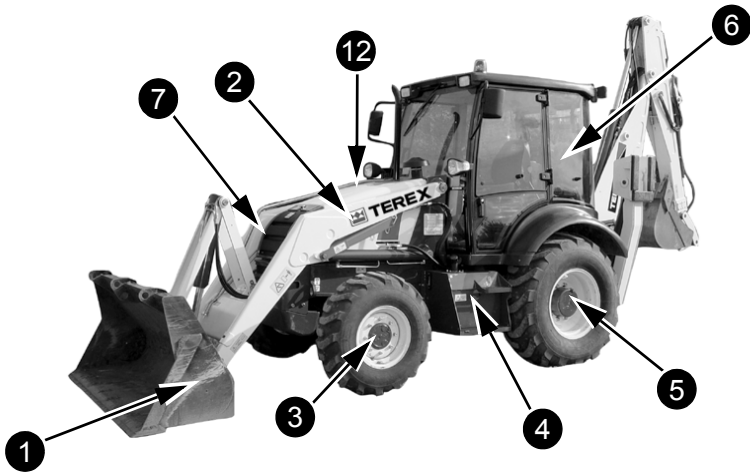
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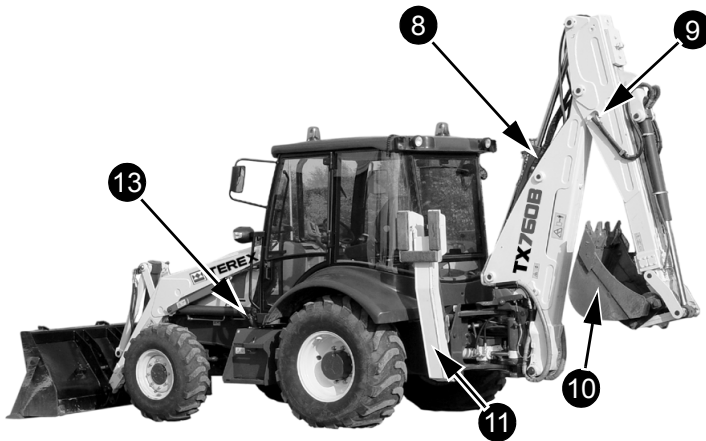
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- | | |
|--|---|
| 1. Loader bucket | 7. Engine bonnet |
| 2. Loader beam | 8. Backhoe boom |
| 3. Front axle (2 wheel drive)/Front drive axle (4 wheel drive) | 9. Backhoe dipper or extendable dipper |
| 4. Battery box | 10. Backhoe bucket |
| 5. Rear axle | 11. Backhoe attachment sideshift carriage |
| 6. Operator's compartment | 12. Stabilizers |
| | 13. Fuel tank |
| | 14. Hydraulic oil tank |

Centremount (axial) backhoe version



DSC04520A



DSC04527A

- | | |
|--|--|
| 1. Loader bucket | 7. Engine bonnet |
| 2. Loader beam | 8. Backhoe boom |
| 3. Front axle (2 wheel drive)/Front drive axle (4 wheel drive) | 9. Backhoe dipper or extendable dipper |
| 4. Battery box | 10. Backhoe bucket |
| 5. Rear axle | 11. Stabilizers |
| 6. Operator's compartment | 12. Fuel tank (right hand side of cab) |
| | 13. Hydraulic oil tank |



Safety Instructions



Your safety and that of people around you depends on you. It is essential that you understand this manual for the correct operation, inspection, lubrication and maintenance of this machine.

Read this manual carefully and check that:

- You understand fully the symbols on the controls and the safety signs used in this manual and on the machine.
- You understand fully the speed, stability, braking and steering characteristics of the machine. If you are in any doubt, consult your local dealer.

The safety messages in this section concern situations which may arise during normal machine operation and servicing. These safety messages also indicate the different ways of coping with these situations. Other safety messages are used throughout the manual to indicate specific dangers.

Whatever type of work is concerned (earth moving, handling, etc.), the safety arrangements applicable to private or public job sites are those which correspond to the regulations in force in the country and in the trade concerned (example: mining, quarries, underground work).

The information given in this chapter is a summary of the basic rules to respect at all times and does not exempt you from observing traffic regulations or the requirements of insurance companies.

Always keep this manual in the storage compartment provided for it. Make sure that it is always complete and in good condition. Consult your local dealer to obtain extra manuals.



Before Using the Machine



On road and job site

- Read and ensure that you understand the instructions and warnings given in this manual before operating the machine.
- The presence of grease, oil, mud or ice on the steps and access handles can cause accidents. Make sure they are always clean.
- Remove anything which might hinder visibility. Clean the windshield, windows (cab version) and rear view mirrors.
- Before travelling or working at night, check that the lighting and signalling systems are operating correctly.
- Make sure the doors (cab version) and the engine bonnet are correctly fastened before undertaking any travel.
- Make sure that no loose object or tool is left on the machine or in the operator's compartment.
- The operator should be the only person on the machine. Make sure there is nobody on or near the machine. Passengers should not be carried.
- When mounting or dismounting from the machine always face the machine and use the steps and access handles on the left-hand side of the machine. The right-hand side is to be used only in case of emergency.
- Be prepared for emergencies. Always keep a first aid kit and a fire extinguisher close at hand on the machine. Make sure that the fire extinguisher is serviced in accordance with the manufacturer's instructions.
- Make sure that you fully understand the location and function of every control. Operating the controls wrongly can cause serious physical injury.
- Always fasten your seat belt before starting the engine. The machine is equipped with a roll over protection structure (ROPS) which ensures your safety. The seat belt will protect you efficiently if you attach it correctly and if you always wear it. The seat belt should not be too loose. It must not be twisted or caught in the seat.
- Make sure you know ways of getting out of the machine (emergency exit via the right-hand side) in case the machine falls over or if access via the left-hand side is not possible. Make sure that the right-hand door (cab version) is not locked.
- Check the condition and pressure of the tyres regularly.
- The integrity of the vehicle electrical installation is paramount to the machines performance, hence in no uncertain terms should the electrical system be modified without written consent from the manufacturers engineering. Fitment of any auxiliary loads is restricted to the available power sockets only.

Road operation

- Check that both the cab doors (cab version) are closed correctly before undertaking any road travel.
- Before undertaking any road travel, lock the working attachments and install the safety systems required by regulations. Raise the stabilizers completely.
- On Four Wheel Steer (4WS) machines do not undertake any road travel unless the steering mode switch is locked in the Two Wheel Steer (2WS) position.



WARNING: *Travel at on-road speeds in 4WS mode can result in loss of control or unexpected swing-out of the rear end. Travel in crab mode will prevent the normal negotiation of bends, corners and intersections.*

On the job site

- Operating the machine requires your full attention. Caution on the part of the operator can prevent accidents. Make sure you know the capabilities and limits of the machine and the space needed for it to operate. There are areas of poor visibility in the machine's working range. Have someone guide you for all jobs which have poor visibility.
- Check all around the machine every day to ensure there are no oil leaks or hydraulic fluid leaks. Tighten connections as necessary and replace any parts as required.
- Make sure you know the hand signals used on your job site so that you can be guided when making delicate manoeuvres or for work where direct visibility is not available.
- Check that all the controls and all the safety devices operate correctly in a safe, clear area before beginning work.
- Keep away from dangerous areas such as ditches, over-hangs, soft areas, etc. Walk around the work site before using the machine and look for hazards.
- Inspect and note all possible risks before driving the machine into a new working area. Holes, obstacles, debris and other hazards in the working area can cause serious physical injury.



Operating the machine



On road and job site

- Do not allow anyone to climb onto the machine. A passenger can fall or cause an accident.
- Never operate any of the machine's controls unless you are seated correctly in the operator's seat.
- Adapt your driving style to suit the conditions of work (sloping ground or rough ground), the state of the road and weather conditions.
- Use all the controls gradually so that the machine works smoothly.
- Stop the engine, engage parking brake and remove the starter switch key even for stops of short duration.
- Never leave the operator's compartment when the engine is running.
- When entering or leaving the operator's compartment, it is essential that the loader attachment controls (if equipped) are locked. Never try to by-pass this basic safety requirement.
- Dust, smoke or fog can reduce visibility and cause an accident. Stop the machine or slow down until visibility returns to normal.
- Never jump down from the machine. When dismounting from the machine always face the machine and use the steps and access handles.
- Whenever parking the machine on sloping ground, use wheel chocks to immobilize the machine (specific to certain countries).
- Never leave the loader bucket raised without installing the safety support strut to the left hand loader cylinder.
- Never travel at full speed with the loader attachment completely raised.
- Never travel at high speed if the loader bucket hinders visibility. You could drive into a hidden object.

Road operation

- It is mandatory to make sure that the brake pedals are locked together before any road travel or travel in 3rd or 4th gear. If this instruction is not observed an accident may occur.

On the job site

- On job sites on the public highway, use regulation signals, taking into account the working range of the machine. National or local regulations define the number, type and location of reflector strips.
- Avoid running the engine in an enclosed space. If it cannot be avoided, ensure good ventilation under all circumstances.
- Do not work close to live overhead electric lines without first making sure that the minimum distances are observed:
- Under 57,000 volts: 3 meters (118 inch).
- Over 57,000 volts: 5 meters (197 inch).
- Make sure you know the location of pipes and cables before starting work. Electrical cables, gas pipes, water pipes or other underground installations can cause serious physical injury.
- Do not allow anyone to stand in the machine working area. If the operator uses the swing or attachment controls wrongly, this could cause an accident. Stop all movement until the person has moved away.
- Before moving the stabilizers make sure that no person is within the working range of the stabilizers.
- When moving the machine onto a trailer, place the gear change lever in first gear. Keep the loader bucket 20 cm (8 inch) from the ground.
- Load lifting must be carried out in accordance with the instructions shown in this manual and in accordance with current regulations.
- Before using the backhoe attachment make sure that the machine is clear of the ground by means of the stabilizers and the loader attachment.
- Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe attachment working position, it is essential to place the direction of travel control lever and the gear change lever (synchroshuttle machines) or the transmission control lever (powershift machines) in the neutral position and to immobilize the machine by means of the parking brake lever.
- If you are using the backhoe attachment or if you are carrying out maintenance operations, use the engine throttle lever. The use of the lever for any other operations can cause accidents.
- In case of any operational problem or damage, move the machine to a place of safety, lower the loader attachment and the backhoe attachment to the ground, stop the engine, engage parking brake, and remove the starter switch key. Find the cause of the defect or inform responsible personnel. Take measures to prevent the use of the machine.
- When the machine is being lifted, nobody must be allowed to remain in the area surrounding the machine.



Parking the machine



When you park the machine, proceed in the following manner:

1. Park the machine on a flat, level surface away from any soft ground, excavations or poorly shored cavity.
2. Lower the loader bucket until it is pressing on the ground.
3. Place the backhoe attachment in the road travel position.
4. Place the direction of travel and gear change levers (synchroshuttle machines) or the transmission control lever (power-shift machines) in the neutral position.
5. Immobilize the machine by means of the parking brake.
6. Raise the stabilizers completely.
7. Stop the engine and remove the starter switch key.
8. Release the hydraulic pressure by operating the control levers in both directions.
9. Lock the loader attachment controls (if equipped).
10. Make sure that the windows (cab version), and the engine bonnet are correctly fastened and lock the operator's compartment doors (cab version).
11. Check that no part of the machine is protruding onto the public highway. If this cannot be avoided, install signs in accordance with regulations.
12. Remove battery isolator key if leaving the backhoe unattended.



Maintenance and Adjustments



- Do not carry out any maintenance operations until you have read and understood the instructions and warnings given in this manual.
- Wear suitable clothing when servicing the machine.
- When servicing the machine, place a "Do not start up" label on the instrument panel.
- Always wear eye protection when using a tool which might project metal particles. Use a hammer with a soft face, such as copper, for installing pins.
- Incorrectly performed maintenance or adjustments can cause serious injury. If you do not understand a maintenance or adjustment procedure, consult your local dealer.
- If the attachment is raised or the machine moves when there is no operator, serious injury can result. Before carrying out any maintenance on this machine, proceed in the following manner:
 1. Park the machine on flat, level ground.
 2. Lower the loader and backhoe attachments until they are resting on the ground.
 3. Stop the engine and remove the starter switch key.
 4. Engage the parking brake.
 5. Lock the loader attachment controls (if equipped).
 6. Block the wheels to prevent any machine movement. If a servicing operation requires the loader attachment to be raised (e.g. working on the engine), install the loader attachment support strut.
 7. Removing the battery isolator key from the switch is recommended, especially when carrying out work on the electrical system
- Unauthorized modifications of the machine can cause serious injuries. Do not carry out

any modification on this machine without obtaining prior authorization from your local dealer. Any modification carried out must be in conformity with the machine's technical specifications and must conform to current safety regulations.

- Do not carry out any welding operation on the machine without prior authorization from your local dealer.
- Some of the machine's components are subject to type approvals. It is mandatory when replacing those components to ensure that they are in conformity with regulations. For safety's sake, always use genuine Aftercare® parts.
- Hydraulic fluid or grease under pressure which penetrates the skin can cause serious injury. Take the necessary safety precautions (protective clothing and face and hand protection) to prevent all such risks. In addition, before handling these products, read the manufacturer's specific instructions for their use. If hydraulic fluid penetrates the skin a doctor must be called immediately.
- When carrying out a welding operation on the machine, as authorized by the manufac-

turer and in accordance with his specifications, disconnect the alternator plug and connect the welding set earth lead to the component on which the welding is to be carried out. Never connect the earth lead to a hydraulic system component.

- A burst tyre can cause serious injury. Regularly check the condition of tyres and always observe the inflation pressures defined in accordance with the type of tyre and ground concerned.
- When checking tyre pressures or during an inflation operation, never stay facing the tyre but always facing the tread surface. Always use an inflation cage when the wheel is removed from the machine. Keep all other persons away from the area. Never weld near a tyre. It is essential to remove the tyre before any welding operation.
- Take the necessary safety measures to protect your face when using compressed air.
- The machine's structure is in conformity with the "FOPS" and "ROPS" protection standards. Any modification (drilling, welding, etc.) may cause that conformity to be invalidated.



Prevention of fire or explosions



- Engine fuel can cause an explosion or a fire.
 - Never re-fuel when the engine is running.
 - Do not smoke during re-fuelling.
 - Take all the necessary safety measures when welding, grinding or when working near a naked flame.
- Use a non-inflammable product for cleaning parts.
- A spark or flame can cause the hydrogen in a battery to explode. To prevent any risk of explosion, observe the following instructions:
 - Remove the battery master switch key (optional).
 - When disconnecting the battery cables, always disconnect the negative (-) cable first.
 - To reconnect the battery cables, always connect the negative (-) cable last.
 - Never short-circuit the battery terminals with metal objects.
 - Do not weld, grind or smoke near a battery.
- The electrical system or the engine exhaust may produce sparks. Before using the machine in an area which may contain inflammable vapours, ensure that there is good ventilation.

- Always keep a fire extinguisher available on the machine. Make sure that it is properly maintained in conformity with the manufacturer's instructions.
- Clean the machine regularly, remove all debris and material which may catch fire.
- Check for leaks. Replace damaged hoses, pipes and unions. Clean the machine after any repair work before operating it.



Prevention of Burns



- Battery electrolyte causes severe burns. The battery contains sulphuric acid. Avoid any contact with the skin, eyes or clothing.
Antidote:
EXTERNAL: Rinse with water.
INTERNAL: Drink large quantities of water or milk. Then drink milk of magnesia, a beaten white of an egg or vegetable oil. Call a doctor immediately.

EYES: Rinse with water for 15 minutes and consult a doctor quickly.
- When the electrolyte of a battery is frozen, it can explode if you attempt to charge the battery or if you try to start the engine using a booster battery. Always keep the battery charged to prevent the electrolyte freezing.
- Batteries produce explosive gases. Keep all flames, sparks and cigarettes away. Provide good ventilation when changing a battery or using a battery in an enclosed space. Always protect your eyes when working near a battery.
- Boiling coolant solution can spray out if the radiator cap is removed while the system is still hot. To remove the cap: allow the system to cool down, turn the cap to the first notch and wait until there is no more pressure. Then remove the cap.



ROPS/FOPS cab (or protective frame)



- Do not try to weld or straighten the ROPS/FOPS cab (or frame).
- Do not modify the ROPS/FOPS cab (or frame) in any manner. Unauthorized modification, such as welding, drilling, cutting and adding attachments, as well as any damage resulting from collisions or the machine rolling over, could weaken the structure and reduce your protection. Replace the ROPS/FOPS cab (or frame) if subjected to roll over or damage. Do not attempt to repair it.
- If you operate this machine without a ROPS/FOPS cab (or frame) and the machine rolls over, you can be seriously injured or killed. Remove the ROPS/FOPS cab only for service or replacement. Do not operate the machine with the ROPS/FOPS cab (or frame) removed.
- Do not install accessories (fixed or otherwise) which can increase the weight of the machine. This could cause serious accidents. Do not exceed the maximum weight shown on the ROPS/FOPS cab (or frame) (identification plate).
- Improper ROPS/FOPS cab (or frame) inspection or maintenance can cause serious injury. Carry out the recommended ROPS/FOPS cab (or frame) inspection procedure shown in this manual. If it is necessary to replace ROPS/FOPS parts or the ROPS/FOPS cab (or frame), use only the replacement parts shown in the Parts Catalogue for your machine.



Ride control system (optional)



- Never operate the ride control system when the machine is raised off the ground by means of the loader beams and the loader bucket. The machine could fall to the ground and cause serious or fatal injury.
- If the ride control system is operated when the starter switch key is in the "ON" position, the loader beams may rise or lower slightly due to the effect of the hydraulic accumulator.
- Never use the ride control system during precise levelling operations or when using the backhoe attachment.



Servo control system (optional)



- Never reposition the backhoe servo controls while the backhoe is in operation.
- Do not use the backhoe servo controls as a footrest.
- Do not reposition the backhoe servo controls using the joysticks, always use provided handles.



Ride control and Servo control Accumulators (optional)



- Release pressure completely in the hydraulic system before disconnecting hydraulic piping or hoses. Hydraulic oil squirting under pressure can cause serious injury.
- Use only dry inert gas to pre-load the accumulator, such as pure nitrogen.
- Completely release pressure in the accumulator before attempting to disassemble the accumulator.
- If the accumulator does not function correctly, replace the accumulator. Never try to carry out any servicing operation on the accumulator to avoid replacing it. If these instructions are not followed, serious or fatal injury can result.

Decals



WARNING: An illegible or missing decal can have far-reaching consequences. Check them everyday.



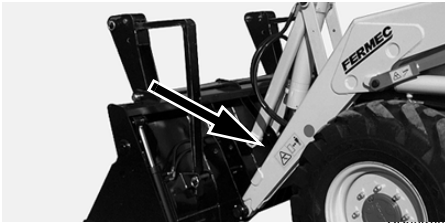
WARNING: Make sure that all decals are perfectly legible. Clean them regularly, replace them with new decals if they are damaged, missing or painted over. If there is a decal on a part that is replaced, make sure you install a new decal on the new part.

NOTE: You can obtain new decals from your local dealer; the part numbers are shown at the bottom of the decal.

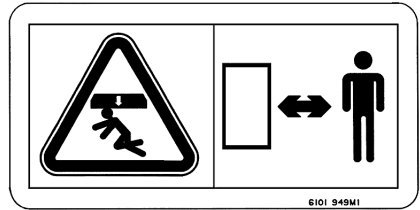
NOTE: This chapter concerns only those decals connected with safety, operation and maintenance of the machine. To see all the decals which exist on the machine, consult the spare parts catalogue.

IMPORTANT: When replacing a decal, make sure it is placed in its correct location.

Keep away from the machine



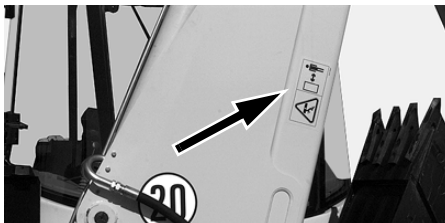
CD98K004



6101 949M1

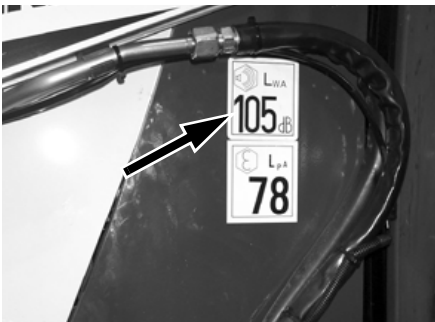
CS98H500

Part number: 6101949M1



CD98K018

External noise level



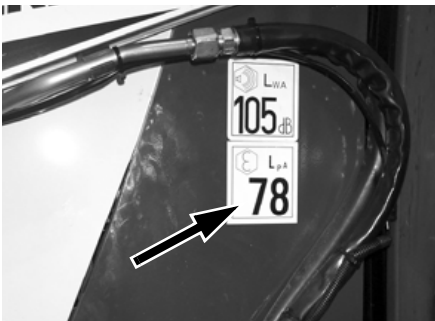
DCP02265

Part number: 105dB - 6109250M1

104dB - 6109249M1

This decal shows the value in decibels of the external noise level of the machine, as guaranteed by the manufacturer. As per european directive EN2000/14/EC.

Internal noise level



DCP02265

Part number: 6009536M1

This decal shows the value in decibels of the internal noise level in the operator's compartment, as guaranteed by the manufacturer. As per european directive EN2000/14/EC.

Battery (specific North America)



PN00026



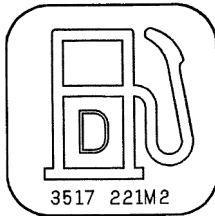
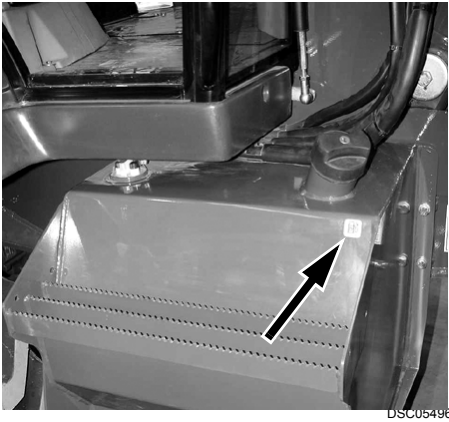
WARNING

BATTERIES CONTAIN ACID AND EXPLOSIVE GAS. EXPLOSION CAN RESULT FROM SPARKS, FLAMES, OR WRONG CABLE CONNECTIONS TO CONNECT JUMPER CABLES OR CHARGER. SEE MANUAL(S) FOR THE CORRECT PROCEDURE. FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS CAN CAUSE SERIOUS INJURY OR DEATH.

CS98G575

Language	Part Number
English	3216714M1
French	35216719M1
German	35216724M1
Italian	35216750M1
Spanish	35216722M1
Dutch	229948A1M1
Danish	35216754M1
Croatian	6111005M1
Czech	6111006M1
Estonian	6111007M1
Greek	6111008M1
Hungarian	6111009M1
Latvian	6111010M1
Lithuania	6111011M1
Polish	6111012M1
Slovakian	6111013M1
Slovenian	6111014M1

Filling the fuel tank

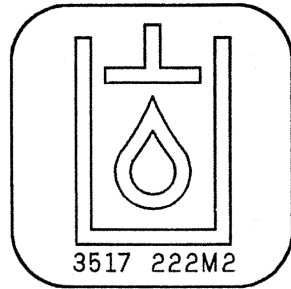
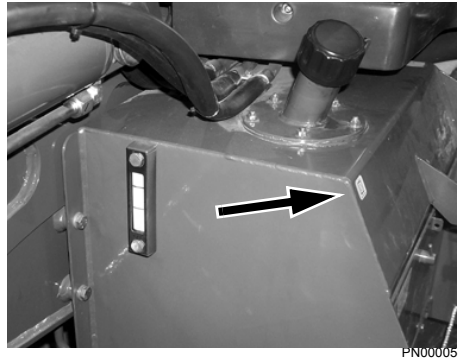


Part number: 3517221M2

This decal shows the location of the fuel tank filler orifice.

CS98C062

Filling the hydraulic reservoir



CS98C210

Part number: 3517222M2

This decal shows the location of the hydraulic reservoir filler orifice.

Instructions for use of the backhoe attachment (Synchroshuttle)



DCP_0024

Load handling (specific North America)



CD98F037



6102 184M1



CS98G508

Part Number : 3216046

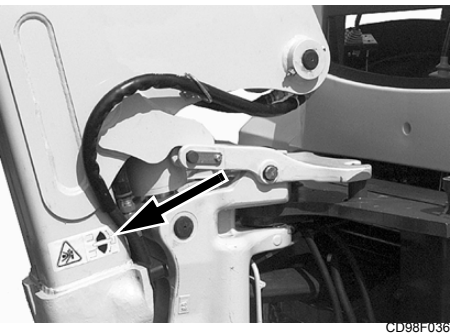
Language	Part Number
English	6102184M1
French	6102185M1
German	6102186M1
Italian	6102190M1
Spanish	6102187M1
Dutch	6102188M1
Danish	6102189M1
Croatian	6110995M1
Czech	6110996M1
Estonian	6110997M1
Greek	6110998M1
Hungarian	6110999M1
Latvian	6111000M1
Lithuania	6111001M1
Polish	6111002M1
Slovakian	6111003M1
Slovenian	6111004M1

CS98J526

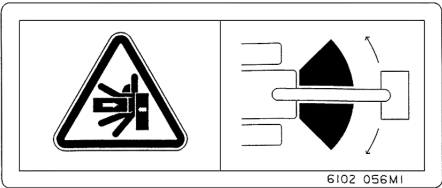
General warning
(specific North America)



Swinging the
backhoe attachment



CS98G580



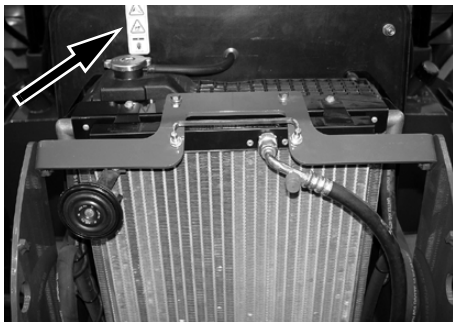
CS98G581

Part Number : 3517689M1

Part number: 6102056M1

This decal shows that the operator must not permit any person to remain within the working area of the backhoe attachment.

Radiator cap



DSC05498

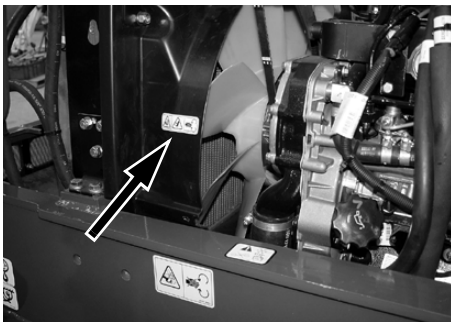


CS96C179

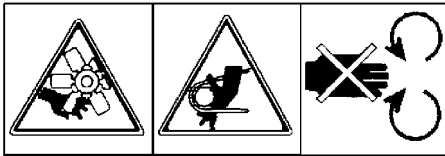
Part number: 6010161M1

This decal shows that the radiator should never be touched nor should the radiator cap be removed while the cooling system is still hot.

Fan



DSC05501

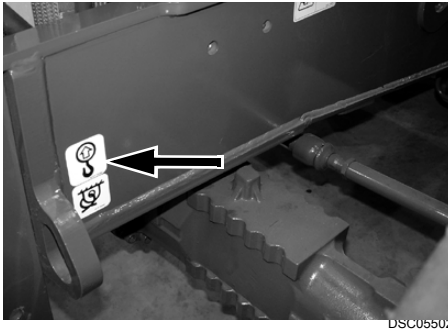


CS98B065

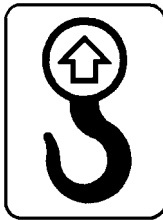
Part number: 6010160M1

This decal shows that no operation should be carried on the fan or the fan belt while the engine is running.

Lifting points



DSC05502

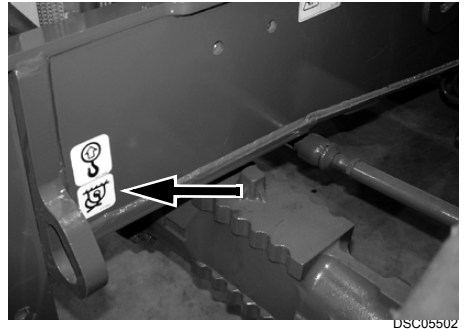


CS96D162

Part number: 3517703M1

This decal shows the lifting points to be used when lifting the machine. Never use any other lifting points than those shown on this decal. See *"Lifting the Machine"*, page 130.

Tie-down points



DSC05502

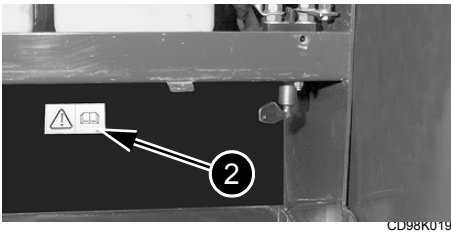
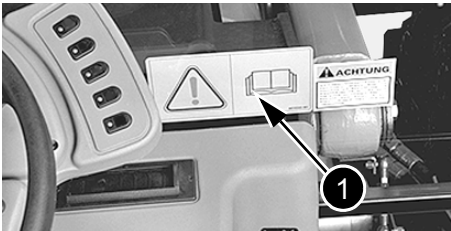


CS98C063

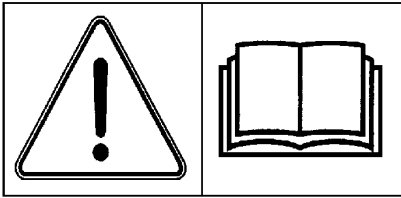
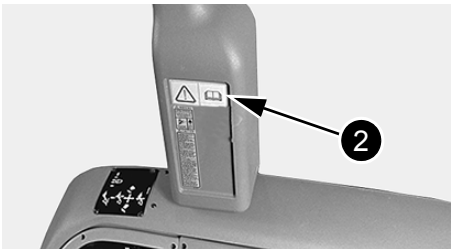
Part number: 3517702M1

This decal shows the tie-down points to be used when transporting the machine. Never use any other tie-down points than those shown on this decal. See *"Transporting the Machine"*, page 128.

Use of the Operator's Manual



(Specific North America)



(1) Part number: 6010245M1

(2) Part number: 6010244M1

These decals show that it is mandatory to read the Operator's Manual before using the machine.

Controls for loader attachment with standard bucket



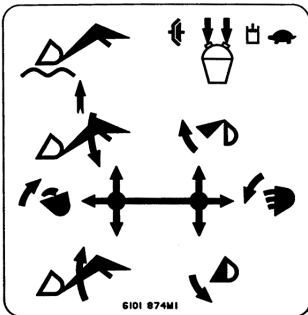
Part number: 6101873M1

This decal shows the operation of loader attachment lever.

Controls for loader attachment with 7 in 1 bucket



CK98K002

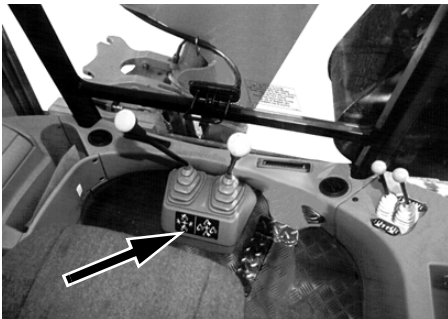


CS98G582

Part number: 6101874M1

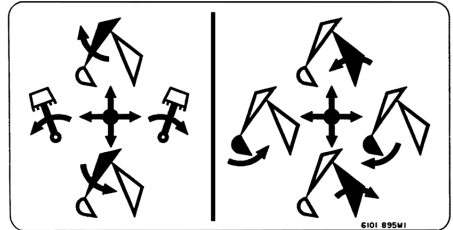
This decal shows the operation of loader attachment levers.

Backhoe attachment mechanical controls



CP98F024

European Community only (ISO controls)

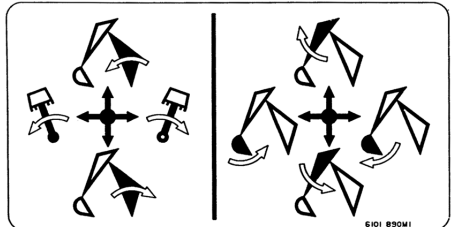


CS98J544

Part number: 6101895M1

These decals show the operation of backhoe attachment levers.

Non-European Community (SAE controls)

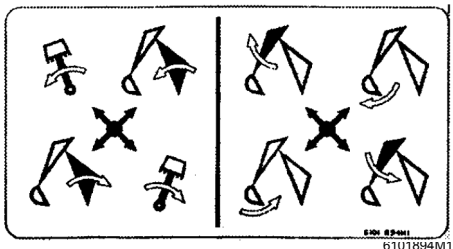


CS98J546

Part number: 6101890M1

This decal shows the operation of backhoe attachment levers.

'X' Pattern



6101894M1

Part number: 6101894M1

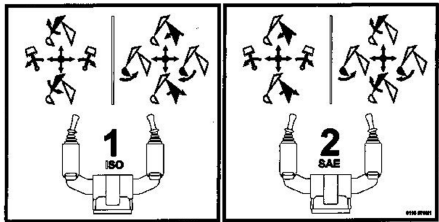
This decal shows the operation of backhoe attachment levers.

Backhoe attachment servo controls

With Cab



TV051155

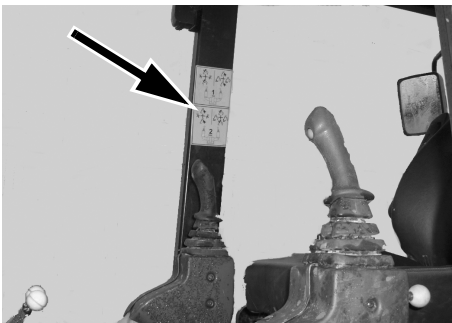


TV051142

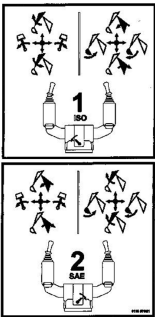
Part number:6110876M1

This decal shows the operation of the backhoe attachment levers in both ISO and SAE configurations.

Without Cab



TV051448



TV051458

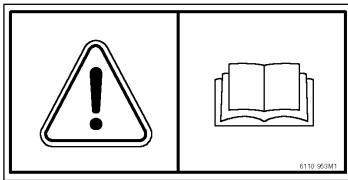
Part number:

This decal shows the operation of the backhoe attachment levers in both ISO and SAE configurations.

Backhoe attachment changeover valve



TV051156

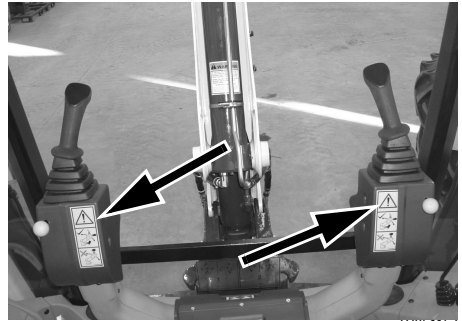


TV051174

Part number:6110953M1

These decals show that it is mandatory to read the Operator's Manual before using the machine.

Servo controls position



TV051157



TV051129

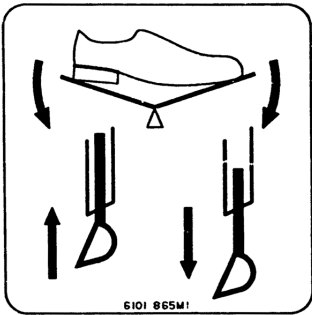
Part number:6110875M1

This decal shows the foot pedal must be depressed before repositioning the servo controls. Do not reposition the servo controls using the joysticks, use the handles provided.

**Extendable dipper (if equipped)
mechanical controls
With Cab**



TV051159

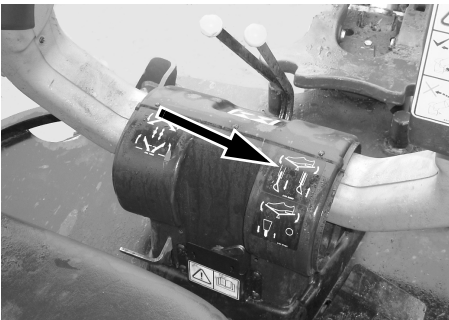


CS98J545

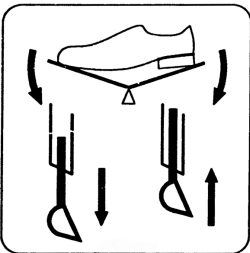
Part number: 6101865M1

This decal shows that the front of the pedal must be pressed to extend the extendable dipper or the rear of the pedal to retract the extendable dipper.

**Extendable dipper (if equipped)
mechanical controls
Without Cab**



TV051450



TV051570

Part number: 6101865M2

This decal shows that the front of the pedal must be pressed to extend the extendable dipper or the rear of the pedal to retract the extendable dipper.



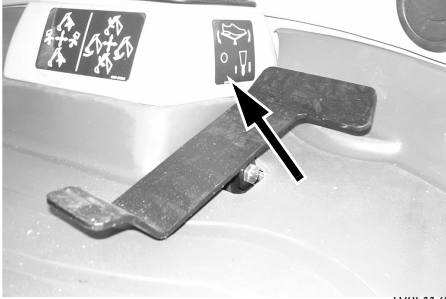
DGP_0084

Part number: 6107907M1

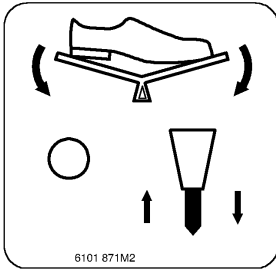
This decal shows the switch position to select auxiliary/extender hydraulic control via the rear pedal.

Auxiliary hydraulic controls (if equipped)

With Cab



IV0511/5



6101 871M2

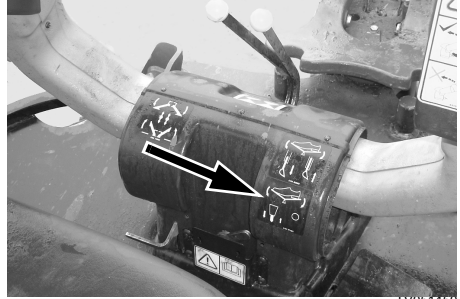
TV051158

Part number: 6101871M2

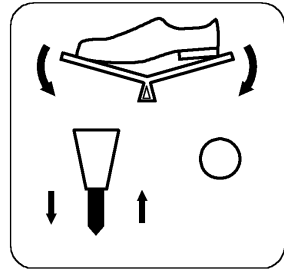
This decal shows that the front of the pedal must be pressed to operate the hydraulic tool.

Auxiliary hydraulic controls (if equipped)

Without Cab



IV051450

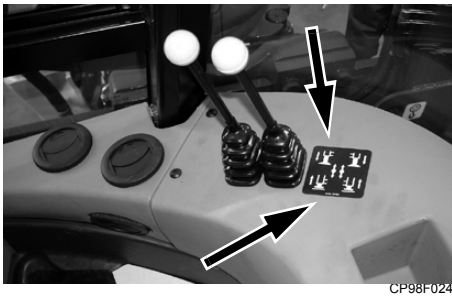


TV051460

Part number: 6101871M1

This decal shows that the front of the pedal must be pressed to operate the hydraulic tool.

**Stabilizer controls (sideshift
(offset) backhoe version)**

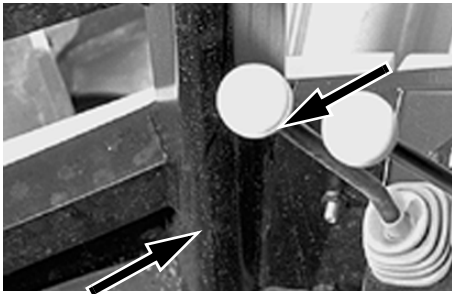


CP98F024

Part number: 6106157M1

**Stabilizer controls (centremount
(axial) backhoe version)**

With Cab

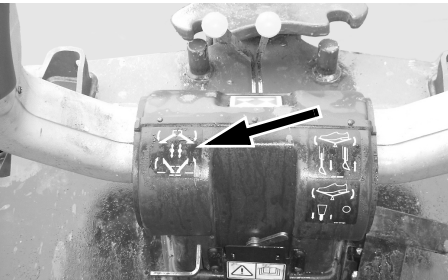


CK98F039

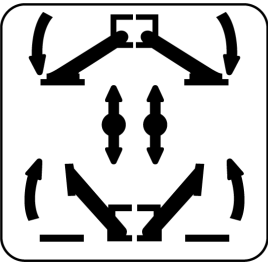
Part number: 6106158M1

**Stabilizer controls (centremount
(axial) backhoe version)**

Without Cab



TV051452



TV051453

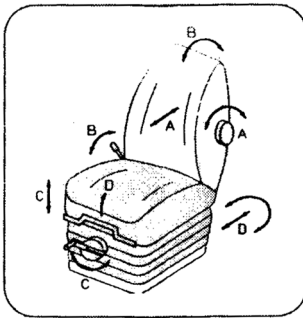
Part number: 6106158M1

This decal shows the levers must be pushed forward to lower the stabilizer legs and pulled backwards to raise the stabilizer legs.

Adjusting the operator's seat



DSC05559

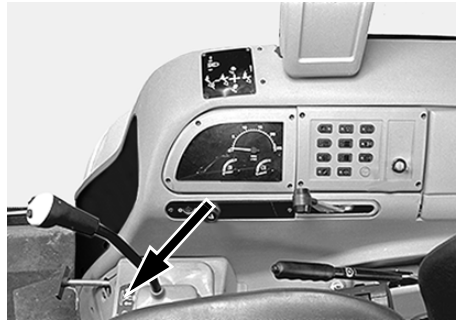


6102191M1

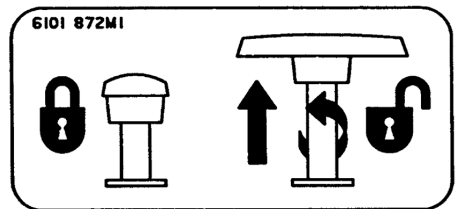
Part number: 6102191M1

This decal shows how to adjust the operator's seat.

Locking the loader controls (if equipped)



CK98F033

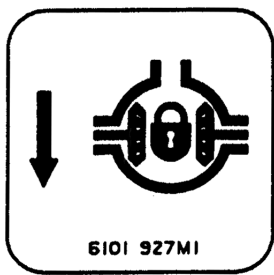


Part number: 6101872M1

CS98G585

This decal shows that the lever must be pushed and turned to lock the loader controls.

Differential lock

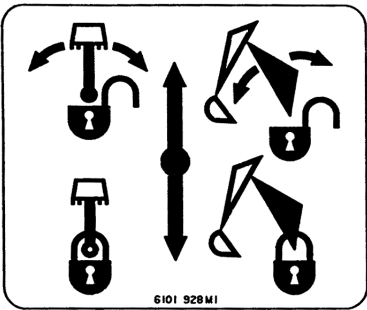
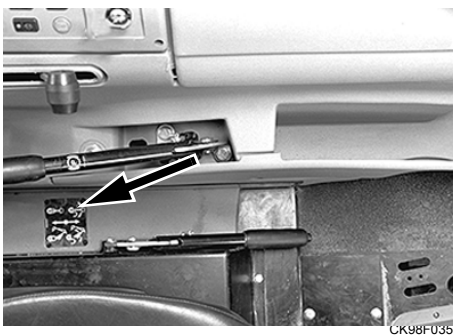


CS98G578

Part number: 6101927M1

This decal shows the operation of differential locking pedal.

Backhoe attachment boom lock



CS98G579

Part number: 6101928M1

This decal shows the operation of transport locking lever.

Maximum speed (specific to certain countries)



CD98K006



CS98G593

Part number: 3509154M1



CS98G594

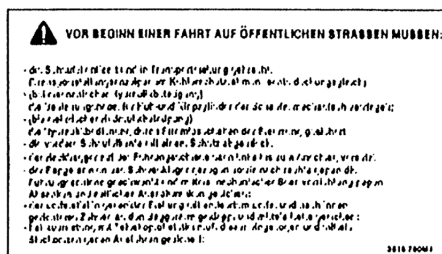
Part number: 3509138M1

These decals show the maximum speed authorized on the road.

Operating instructions (specific to certain countries)



CD98K007

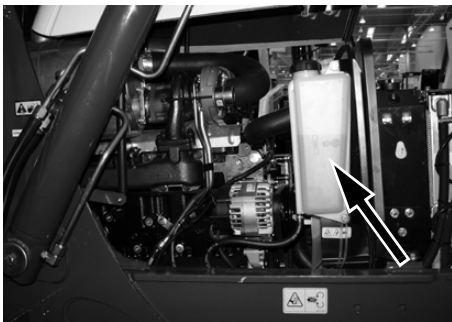


C.S98G596

Language
German

Part Number
3516760M1

Filling the engine coolant



DSC05155

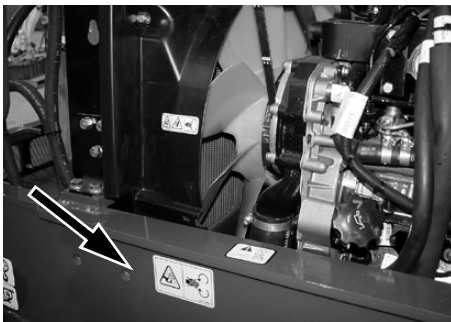


TV051154

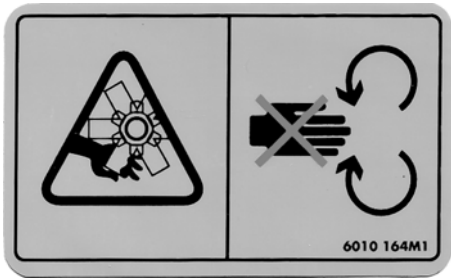
Part number: 3517219M2

This decal shows the location of the engine coolant filler orifice.

Engine cover



DSC05501



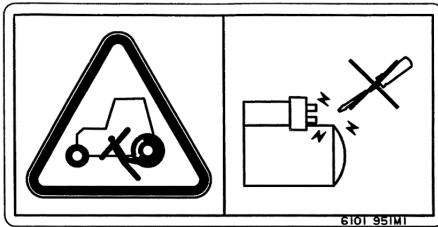
CS98G600

Part number: 6010 164M1

Start engine



DSC05507

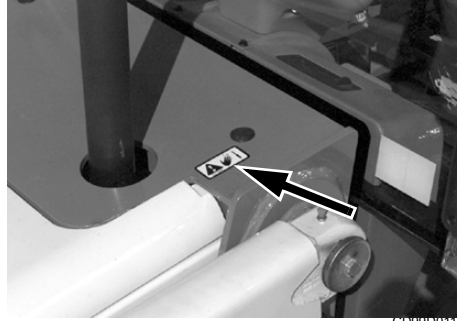


CS98G586

Part number: 6101951M2

This decal warns that it is forbidden to start the engine by any other means than with the starter switch key.

Exhaust



CD99D011

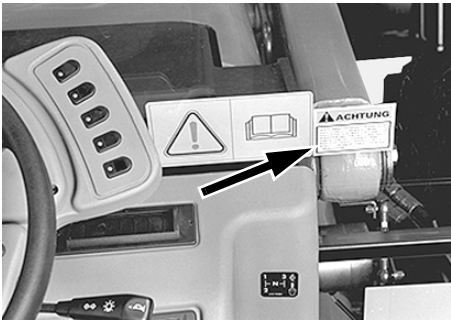


CS98G599

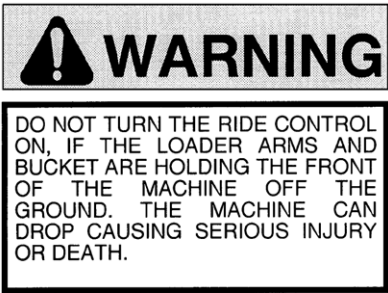
Part number: 3517593M1

This decal shows that the exhaust pipe should not be touched while it is still hot.

Ride control system (optional)



CK98KU07



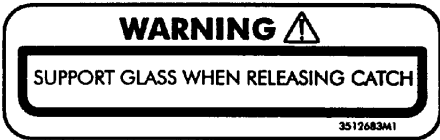
255927A1
CS98J537

Language	Part Number
English	255927A1
French	256464A1
German	256465A1
Italian	256468A1
Spanish	256467A1
Dutch	25647A1
Danish	256466A1
Croatian	6111035M1
Czech	6111036M1
Estonian	6111037M1
Greek	6111038M1
Hungarian	6111039M1
Latvian	6111040M1
Lithuania	6111041M1
Polish	6111042M1
Slovakian	6111043M1
Slovenian	6111044M1

Close window



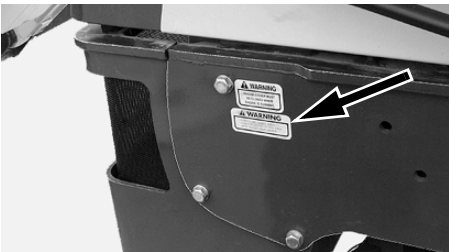
DSC0517



CS98B070

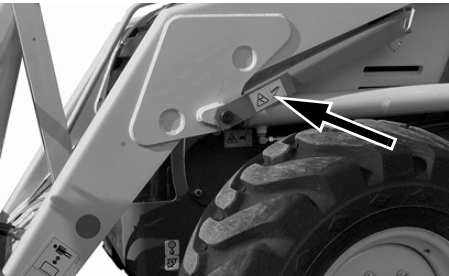
Language	Part Number
English	3512683M1
French	3512686M1
German	3512688M1
Italian	3512687M1
Spanish	3512689M2
Croatian	6110965M1
Czech	6110966M1
Estonian	6110967M1
Greek	6110968M1
Hungarian	6110969M1
Latvian	6110970M1
Lithuania	6110971M1
Polish	6110972M1
Slovakian	6110973M1
Slovenian	6110974M1

Use safety strut (specific North America)

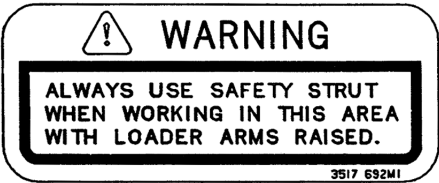


CD98F015

Use the support strut

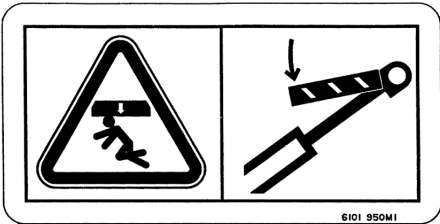


CD98K010



CS98G587

Part number: 6101950M2

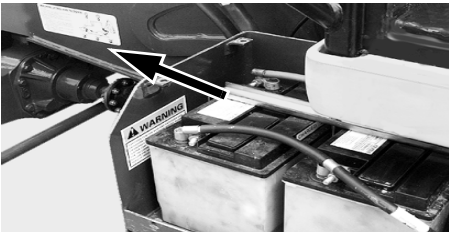


CS98G590

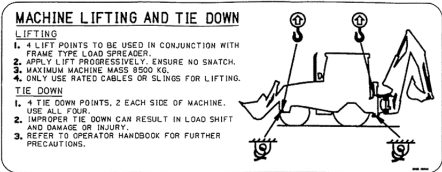
Part number: 6101950M1

This decal shows that it is mandatory to use the safety strut when working in the loader attachment area.

Machine lifting and tie down (specific North America)



CD98F013



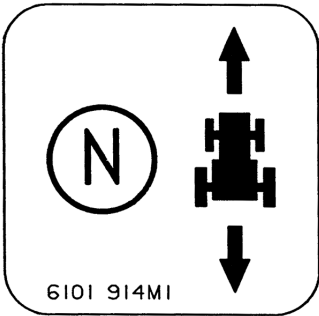
CS98G589

Part number: 6102109M1

Direction of travel



CD98F031



CS98G591

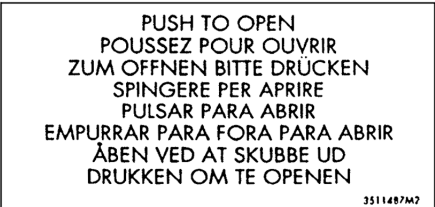
Part number: 6101914M1

This decal shows the operation of direction of travel lever (synchroshuttle only), or transmission control lever (powershift only).

Open rear window



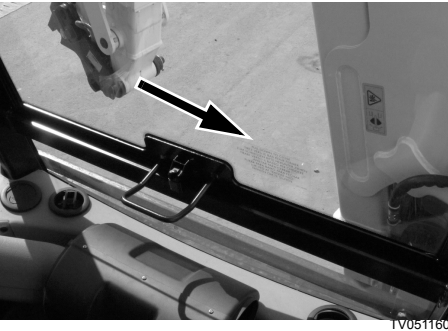
CP98F026



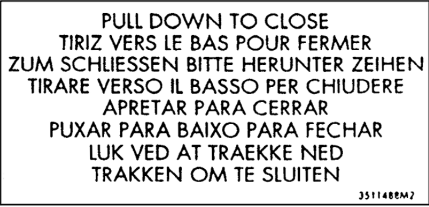
CS98J534

Part number: 3511487M2

Close rear window



IV051180



CS98J535

Part number: 3511488M2

2 or 4 Wheel Braking (if equipped)

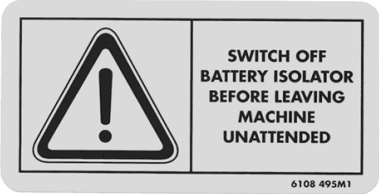
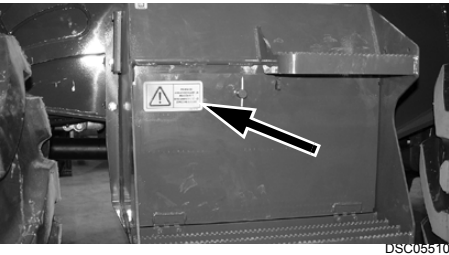


Part number: 6106221M1

This decal shows the “3 position” braking decal;

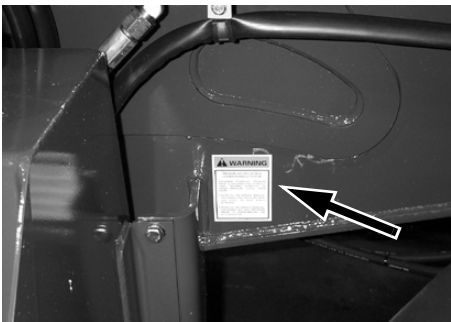
- (1) 2 wheel drive/2 wheel braking.
- (2) 2 wheel drive/4 wheel braking.
- (3) 4 wheel drive/4 wheel braking.

Battery Isolator

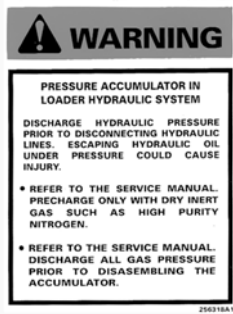


Language	Part Number
English	6108495M1
French	6108496M1
German	6108497M1
Italian	6108498M1
Spanish	6108501M1
Dutch	6108502M1
Danish	6108502M1
Croatian	6111015M1
Czech	6111016M1
Estonian	6111017M1
Greek	6111018M1
Hungarian	6111019M1
Latvian	6111020M1
Lithuania	6111021M1
Polish	6111022M1
Slovakian	6111023M1
Slovenian	6111024M1

Pressure accumulator



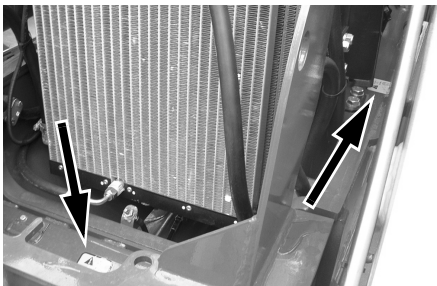
DCP_0023



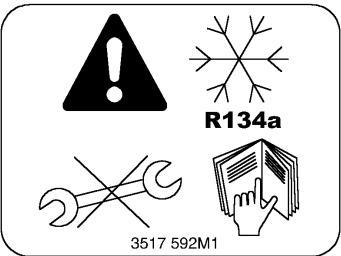
250318A1

Language	Part Number
English	256318A1
French	256453A1
German	256454A1
Italian	256457A1
Spanish	256456A1
Dutch	256463A1
Danish	256455A1
Croatian	6111025M1
Czech	6111026M1
Estonian	6111027M1
Greek	6111028M1
Hungarian	6111029M1
Latvian	6111030M1
Lithuania	6111031M1
Polish	6111032M1
Slovakian	6111033M1
Slovenian	6111034M1

Air Conditioning (Optional)



TV051161



3517 592M1

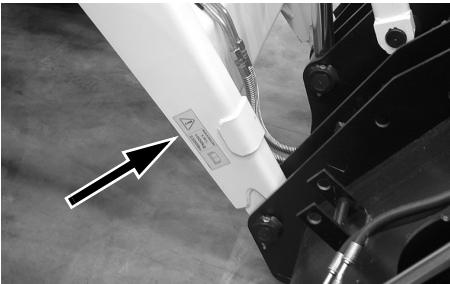
TV051164

Part number: 3517592M1

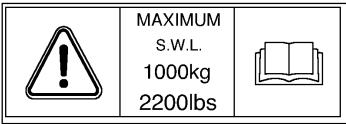
This decal shows that it is mandatory to read the Operator's Manual before performing maintenance on the air conditioning system.

CS98J533

Safe Working Load (S.W.L.)



TV051162



Seat Belt



TV051166



6101 952M2

TV051163

TV051165

Language	Part Number
English	6102194M1
Italian	6110494M1
Croatian	6111045M1
Czech	6111046M1
Estonian	6111047M1
Greek	6111048M1
Hungarian	6111049M1
Latvian	6111050M1
Lithuania	6111051M1
Polish	6111052M1
Slovakian	6111053M1
Slovenian	6111054M1

Part number: 6101952M1

This decal shows that the seat belt must be worn at all times.

Hand Signals

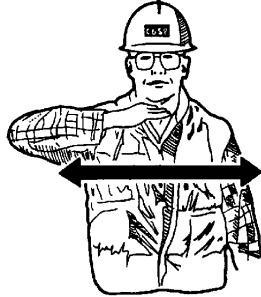
When operating the machine, never attempt to carry out tasks calling for fine control or to work in areas where visibility is poor or impaired without seeking the assistance of a signalman. Make perfectly sure that you and the signalman understand the signals to be used.

Start the engine



PDE0002A

Stop the engine



PDE0002

Come to me



PDE0003A

Move away from me



PDE0003

Move hands forward and rearward (palms in).

Move hands forward and rearward (palms out).

Go this far



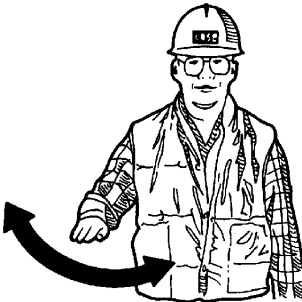
PDE0004A

All stop and hold



PDE0004

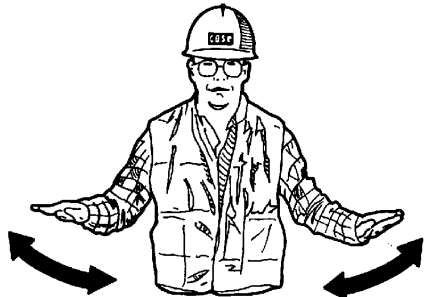
Stop



PDE0005A

Move one hand palm down back and forth.

Emergency stop



PDE0005

Move both hand palms down rapidly back and forth.

Raise load or bucket



PDE0006A

Lower load or bucket



PDE0006

Raise load or bucket slowly



PDE0007A

Lower load or bucket slowly



PDE0007

Turn machine left



PDE0008A

Turn machine right

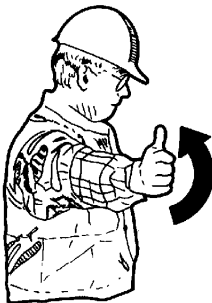


PDE0008

To stop movement, stop moving hand and make a fist.

To stop movement, stop moving hand and make a fist.

Roll back loader bucket



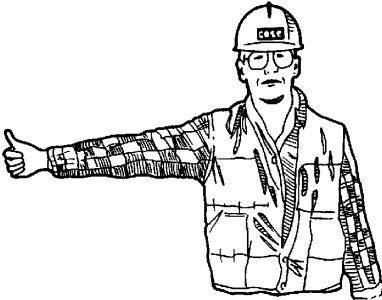
PDE0009A

Dump loader bucket



PDE0009

Raise backhoe boom



PDE0010A

Lower backhoe boom



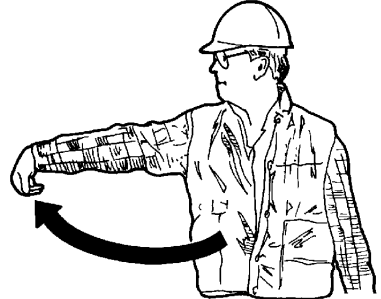
PDE0010

Backhoe dipper in



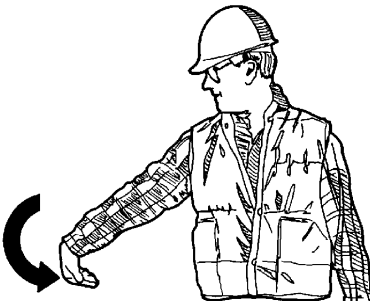
PDE0011A

Backhoe dipper out



PDE0011

Backhoe bucket dig



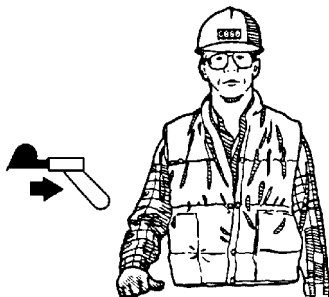
PDE0012A

Backhoe bucket dump



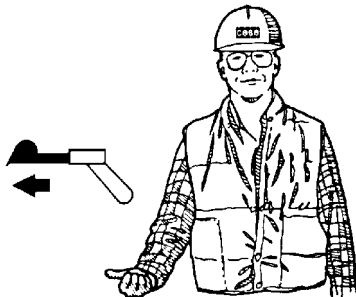
PDE0012

**Retract extendable dipper
(if equipped)**



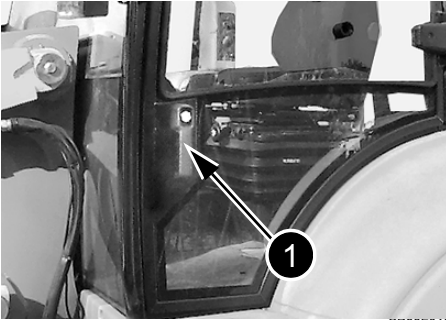
CS95M208

**Extend extendable dipper
(if equipped)**

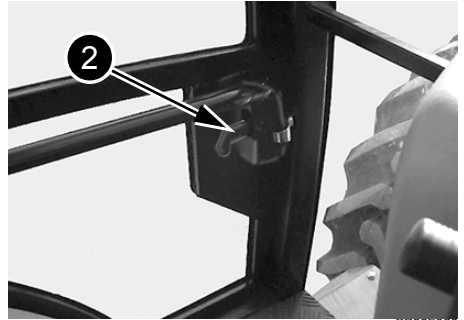


CS95M209

Cab Doors (cab version)



CP98F019



CP98F020

The doors are opened with the handle (1) from the outside and with the handle (2) from the inside.



WARNING: Make sure that the doors are correctly closed before any travel.

NOTE: To lock the doors, use the key.

Steps and Access Handles



PN00001

Use the steps and access handles when entering or leaving the operator's compartment.

IMPORTANT: Use the left-hand side for entering or leaving the operator's compartment. The right-hand side is only for use in emergency.



WARNING: Never use the steering wheel or the control levers to help yourself entering or leaving the operator's compartment



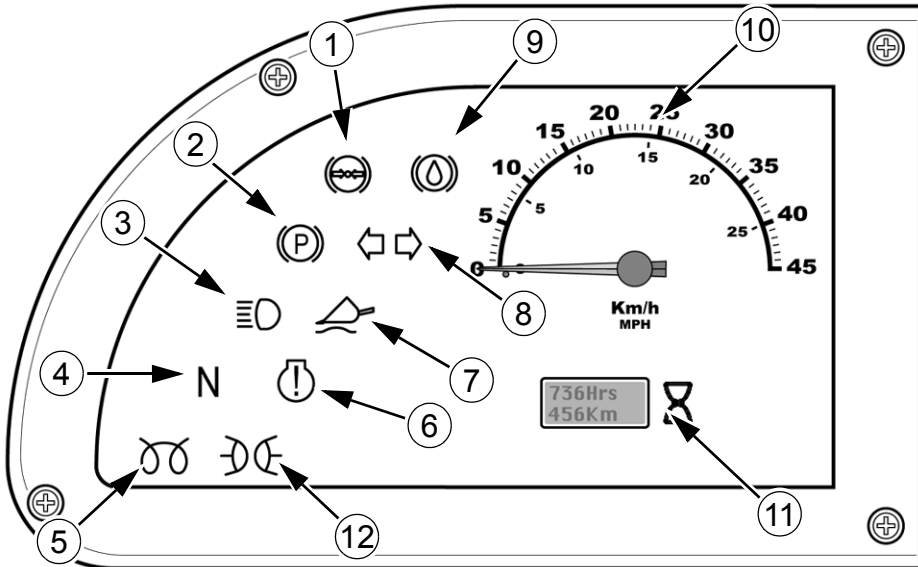
WARNING: Clean the steps and access handles and remove all traces of grease, oil, mud and ice (winter).



WARNING: Never jump down from the machine. When dismounting from the operator's compartment always face the machine and use the steps and access handles.

Instrument Panel

Front control panel



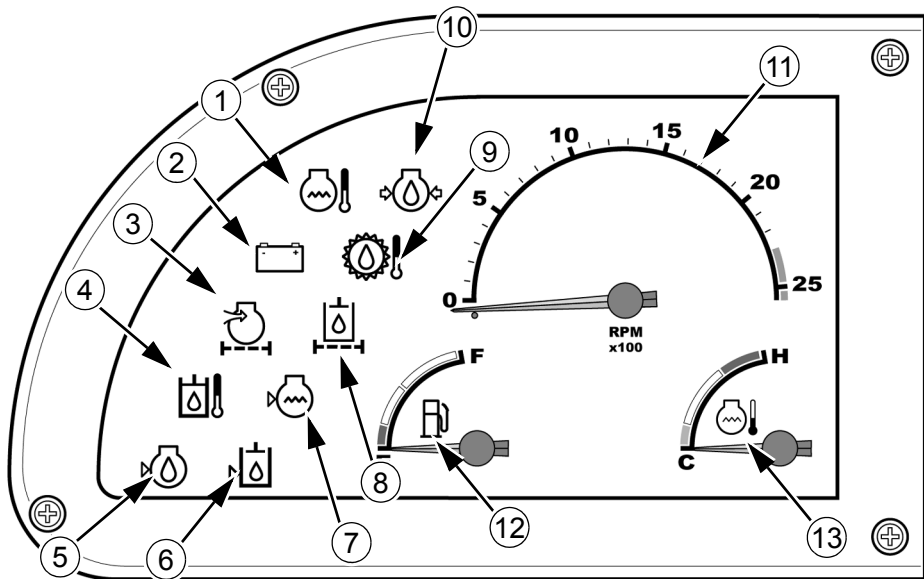
CS98G564

1. Not used.
2. PARKING BRAKE INDICATOR LAMP - This indicator lamp comes on when the parking brake lever is engaged (wheels braked). See *"Parking brake lever"*, page 62.
3. MAIN BEAM INDICATOR LAMP - This indicator lamp comes on when head lights are on main beam.
4. INDICATOR LAMP FOR, DIRECTION OF TRAVEL LEVER (SYNCHROSHUTTLE MACHINES) OR TRANSMISSION CONTROL LEVER (POWERSHIFT) - This indicator lamp comes on when the lever is in neutral position.
5. PRE-HEAT INDICATOR LAMP - This indicator lamp comes on when the starter switch key is in the Pre-heat position.
6. ENGINE FAULT WARNING LAMP - This warning lamp comes on when an engine fault occurs. If the lamp comes on when the machine is working, move the machine to a place of safety, stop the engine, engage parking brake, remove the starter switch key and find the cause of the problem.
7. Not used.
8. DIRECTION INDICATOR LAMP - This indicator lamp flashes when the direction indicator lever is moved.

NOTE: The lamp flashes at the same speed as the indicators. If the lamp flashes at a different speed from that of the direction indicators the bulb of one of the direction indicators is defective and must be replaced. See *"Replacing a Bulb"*, page 233.

9. Not used.
10. SPEEDOMETER (optional) - The speedometer shows the forward machine speed. The big numbers at the top are the Km/h and the ones at the bottom are in m.p.h.
11. HOURMETER - The hourmeter shows the hours for which the engine has been operated. It also enables servicing operations to be scheduled. See "*Hourmeter*", page 146
12. SIDE-LIGHT INDICATOR LAMP - This indicator lamp comes on when the side position light comes on.

Side control panel



CS98G565

1. **ENGINE COOLANT TEMPERATURE WARNING LAMP** - This warning lamp comes on when the engine cooling system reaches an abnormally high temperature. If the lamp comes on when the machine is working, move the machine to a place of safety, stop the engine, engage parking brake, remove the starter switch key and find the cause of the problem.
2. **ALTERNATOR CHARGE WARNING LAMP** - This warning lamp comes on when the alternator/fan belt is broken or when the alternator is not charging the battery. If the lamp comes on when the machine is working, move the machine to a place of safety, stop the engine, engage parking brake, remove the starter switch key and find the cause of the problem.
3. **AIR FILTER RESTRICTION WARNING LAMP** - This warning lamp comes on when the air filter primary element needs to be cleaned or replaced. See *"Air Filter"*, page 183.
4. **HYDRAULIC OIL TEMPERATURE WARNING LAMP** - This warning lamp comes on when the hydraulic oil temperature is too high. If the lamp comes on when the machine is working, move the machine to a place of safety, stop the engine, engage parking brake, remove the starter switch key and find the cause of the problem.
5. Not used.
6. Not used.
7. Not used.
8. **HYDRAULIC FILTER RESTRICTION WARNING LAMP** - This warning lamp comes on when the hydraulic filter needs to be replaced. See *"Hydraulic System"*, page 178.
9. **TRANSMISSION OIL TEMPERATURE WARNING LAMP** - This warning lamp comes on when the transmission oil temperature is too high. If the warning lamp comes on when the machine is working, move the machine to a place of safety, stop the engine, engage parking brake, remove the starter key and find the cause of the problem.

10. ENGINE OIL PRESSURE WARNING LAMP - This warning lamp comes on when the engine oil pressure is too low. If the lamp comes on when the machine is working, move the machine to a place of safety, stop the engine, engage parking brake, remove the starter switch key and find the cause of the problem.
11. ENGINE TACHOMETER - The tachometer shows the engine speed in revolutions per minute. The figures indicated must be multiplied by 100.
12. FUEL LEVEL GAUGE - This gauge shows the quantity of fuel in the fuel tank.
13. ENGINE COOLANT TEMPERATURE GAUGE - This gauge shows the temperature of the engine coolant. When the temperature is normal the needle is in the white area. If the needle is in the red area, move the machine to a place of safety, leave engine running at idle for 2 to 3 minutes, then stop the engine, engage parking brake, remove the starter switch key and check the engine coolant level. Make sure that the radiator and oil cooler are perfectly clean. See *"Cooling System"*, page 169 and *"Radiator and Oil Cooler"*, page 202.

NOTE: *When the starter switch key is in the "On" position the warning lights (2) and (10) come on. If one or more do not come on, the bulbs must be replaced. See "Replacing a Bulb", page 233.*

Operator's Compartment Controls



WARNING: Before starting the engine, make sure you are fully aware of the location and the function of each control. Operating the controls wrongly can cause serious physical injury.

Starter switch



CP99D001



USC05602

Located on the right of the operator's seat (with seat in loader attachment position), this switch has four positions :

Key position:

Position (0): Off.

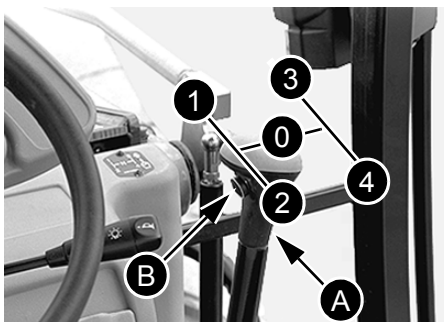
Position (1): On.

Position (2): Pre-heat.

Position (3): Start.

NOTE: See "Starting the Engine", page 107.

Gear change lever and transmission dump button (synchroshuttle only)



CK98F025

Located to the right of the steering wheel, the lever (A) enables four forward and four reverse gears to be selected. See "Transmission", page 243:

Position (0): Neutral.

Position (1): First gear.

Position (2): Second gear.

Position (3): Third gear.

Position (4): Fourth gear.

NOTE: (Specific to certain countries), position (4), 4th gear, does not exist since speed is limited to 20 Kph on public highways.

NOTE: (Specific to certain countries), 4th gear in reverse does not exist.

NOTE: Forward and reverse travel depends on the position of the direction of travel control lever. See "Direction of travel control", page 57.

All four gears are synchronized. All the ratios can be selected without stopping the machine.

Before changing gear, press and hold the transmission dump button (B) located on the left-hand side of the lever. After changing the gear, release the button (B) to engage the clutch.

NOTE: Reduce engine speed before changing to a lower gear.

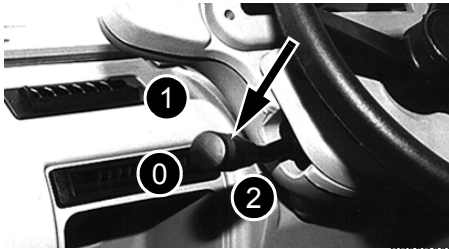
IMPORTANT: Before stopping or starting the engine, make sure that the lever is in the neutral position (0).

IMPORTANT: Before using the backhoe attachment controls, make sure that the lever is in neutral position (0).



WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe attachment working position, it is essential for the direction of travel lever and the gear change lever to be placed in the neutral position and the parking brake engaged.

Direction of travel control lever (synchroshuttle only)



CP99D002

Located to the left of the steering wheel, this lever has three positions to select the direction of travel of the machine.

Neutral (0): In this position the machine cannot travel.

Forward (1): Raise and push the lever completely forward. In this position, the machine can travel forwards.

Reverse (2): Raise and pull the lever completely backwards. In this position the machine can travel in reverse and the audible warning device sounds.

NOTE: If the gear change lever is in the neutral position, the machine cannot move forward or in reverse. See "Gear change lever and

transmission dump button (synchroshuttle only)", page 55.

IMPORTANT: Before stopping or starting the engine make sure that the lever is in the neutral position (0).

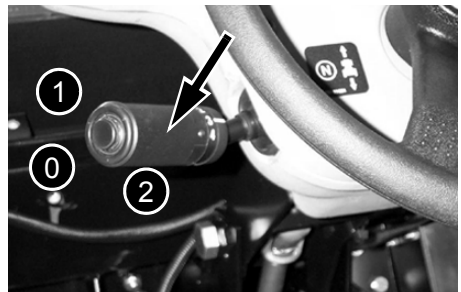
IMPORTANT: Before using the backhoe attachment controls, make sure that the lever is in neutral position (0).

NOTE: If the lever is operated in forward or reverse travel while the parking brake is engaged (wheels braked), the audible warning device will sound. The parking brake lever must be released. See "Parking brake lever", page 62.



WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe equipment working position, it is essential for the direction of travel lever and the gear change lever to be placed in the neutral position and the parking brake engaged.

Transmission control lever (powershift only)



PSFNR

Located to the left of the steering wheel, this lever is used to control:

- The direction of travel.
- Four speed powershift selection.
- Powershift 2nd gear kickdown function.

Direction of travel control

Neutral (0): In this position the machine cannot travel.

Forward (1): Raise and push the lever completely forward. In this position, the machine can travel forwards.

Reverse (2): Raise and pull the lever completely backwards. In this position the machine can travel in reverse and the audible warning device sounds.

IMPORTANT: *Before stopping or starting the engine make sure that the lever is in the neutral position (0).*

IMPORTANT: *Before using the backhoe attachment controls, make sure that the lever is in neutral position (0).*

NOTE: *If the lever is operated in forward or reverse travel while the parking brake is engaged (wheels braked), the audible warning device will sound. The parking brake lever must be released. See "Parking brake lever", page 62.*



WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe equipment working position, it is essential for the transmission control lever to be placed in the neutral position and the parking brake engaged.



WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe attachment working position, it is essential for the transmission control lever to be placed in the neutral position and the parking brake engaged.

Four speed powershift control



PS4S

The transmission control lever is used to select the desired powershift gear. Turn the lever

away from you to select a higher gear or turn the lever toward you to select a lower gear.

Any powershift gear can be selected without stopping the machine.

NOTE: *There are four (4) forward gears (1st, 2nd, 3rd and 4th), and two (2) reverse gears (1st and 2nd).*

Semi-Automatic feature

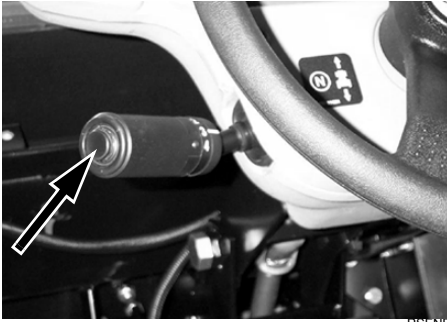
The machine can begin travel with any powershift gear selected. However if 4th gear is selected, the transmission will begin travel in 2nd gear and automatically shift to 4th as the travel speed increases. Also with 4th gear selected, if travel speed decreases the transmission will automatically shift to 3rd gear.

NOTE: *(Specific to certain countries), position (4), 4th gear, does not exist since speed is limited to 20 Kph on public highways.*

NOTE: *4th gear reverse does not exist on all powershift versions.*

NOTE: *Reduce engine speed before changing to a lower gear.*

Powershift kickdown button



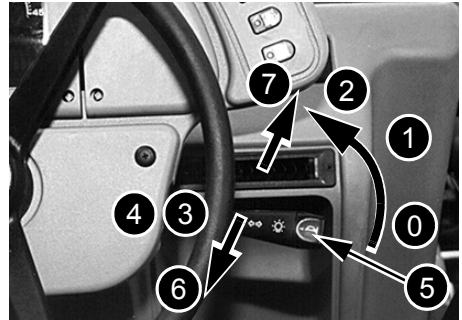
PSFNR

Located on the end of the transmission control lever, press and release this button to instantly shift from 2nd to 1st gear.

When the transmission control lever is moved to select neutral or reverse the transmission will automatically shift back to 2nd gear.

NOTE: *This function can only be used with 2nd gear selected.*

Direction indicator lever, horn and lighting switch



CD98F032

Located to the right of the steering wheel, this lever has eight positions.

Position (0): The lever is in a neutral position.

Position (1): Rotate switch 90° towards operator, the side lights come on and the indicator lamp on the front control panel comes on.

Position (2): Rotate a further 90°, the dipped headlights come on, with the side lights.

Position (3): With the switch in position (2), pull towards operator, the main beam comes on and the indicator lamp on the front control panel comes on. Pull again to turn main beam off.

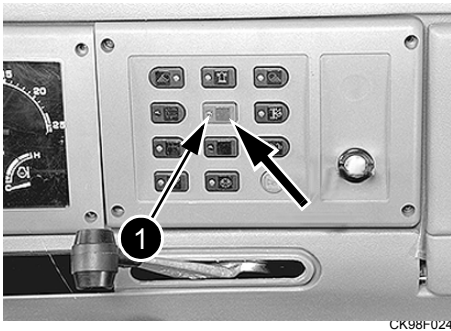
Position (4): With the switch in positions (0) and (1), pull towards operator to flash main beam.

Position (5): Push the end of the lever to operate the horn.

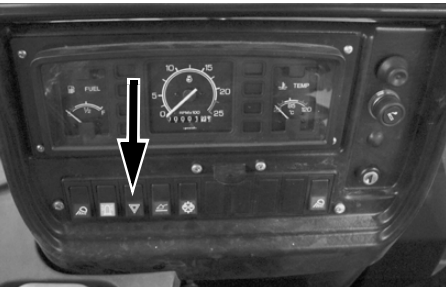
Position (6): Pull the lever down to operate the right direction indicators and the indicator lamp on the front control panel.

Position (7): Push the lever up to operate the left direction indicators and the indicator lamp on the front control panel.

Hazard warning switch



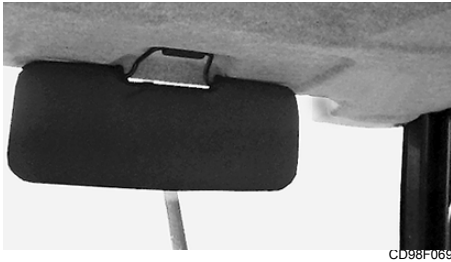
CK98F024



DSC05602

Located on the side control panel, press the switch, all the direction indicators flash simultaneously and the indicator lamp (1) comes on. Press again the switch, all the direction indicators go out.

Sunvisor (if equipped)



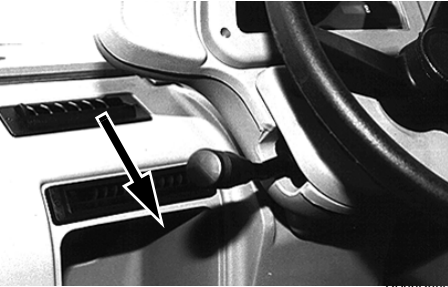
CD98F069

Attached to the cab roof, the sun visor can easily be positioned as required.

Storage areas and compartments

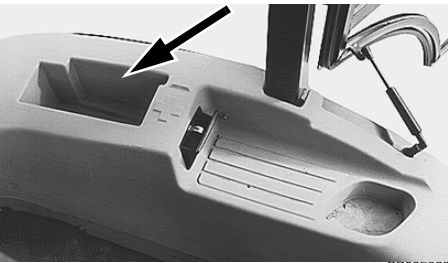


CK98F026



CP99D002

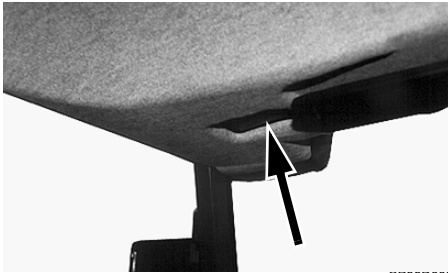
First aid kit and documentation pack storage compartment (cab version only)



CP98F023

Located on the left-hand side of the cab, this storage compartment is intended to contain a first aid kit and the documentation pack.

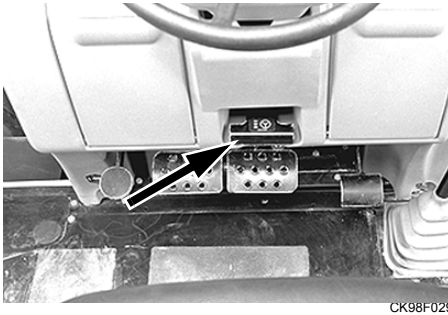
Cab interior light (cab version only)



Located on the roof lining, this light is controlled by a switch incorporated in the lamp base.

NOTE: To replace a cab interior light bulb, see "Replacing a Bulb", page 233.

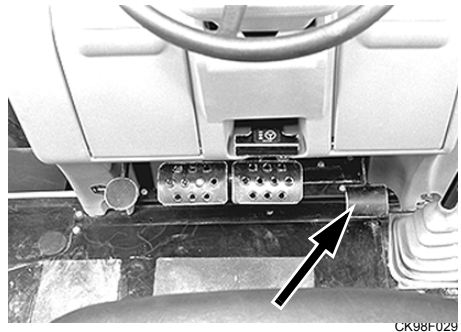
Steering column tilting lever



Located under the steering column, this lever enables the steering column to be tilted forwards and backwards as required by the operator. Raise the lever, place the steering column in the desired position and release the lever.

IMPORTANT: It is essential that the machine to be brought to a complete halt before attempting to adjust the steering column tilt position. If this instruction is not observed an accident may occur.

Engine accelerator pedal



Located under the steering wheel, this pedal enables the engine speed to be increased or decreased.

Maximum speed: press the pedal fully down.

Idle speed: release the pedal.

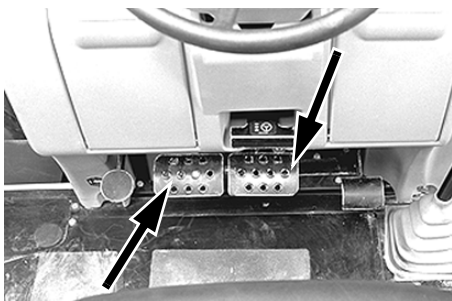
This pedal is used for travel and for operating the loader attachment.

NOTE: This pedal is coupled with the engine throttle lever. Before using the pedal, make sure that the throttle lever is in the minimum speed position. See "Engine throttle lever", page 62.

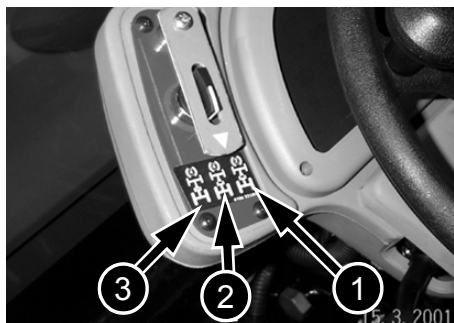


WARNING: Never use this pedal when working with the backhoe attachment.

Brake pedals



Located under the steering wheel, these two pedals are equipped with a system which enables them to be locked together or unlocked. This enables the machine either to be braked (pedals locked) by pressing either of the pedals or to be turned (pedals unlocked) to the right by pressing on the right-hand pedal or to the left by pressing on the left-hand pedal. See “*Locking and unlocking the brake pedals*”, page 61.



NOTE: (4 wheel drive only), when braking: braking will depend upon the position of the “3 Position” brake selector switch (if equipped). There are three positions as follows:

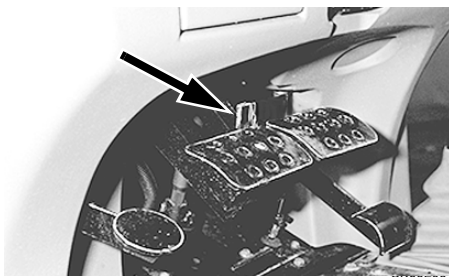
- (1) 2 wheel drive/2 wheel braking.
- (2) 2 wheel drive/4 wheel braking.
- (3) 4 wheel drive/4 wheel braking.



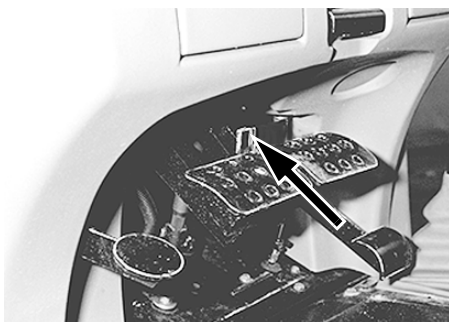
WARNING: It is mandatory to make sure that the brake pedals are locked together before any road travel or travel in 3rd or 4th gear. If this instruction is not observed an accident may occur.

NOTE: Check the correct braking of the machine regularly. See “*ROPS/FOPS Cab (or Protective Frame)*”, page 209.

Locking and unlocking the brake pedals



Locking and unlocking of the pedals is done by means of a hinged pin which locks the pedals together or unlocks them.



Brake pedals locked.

Raise the pin, slide it to the right and then turn it downwards to lock it. It is mandatory to use this position for road travel or when travelling in 3rd or 4th gear.



CK98F027

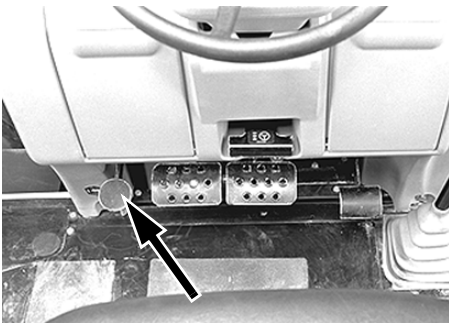
Brake pedals unlocked.

Raise the pin, slide it to the left and then turn it downwards to lock it. The two pedals are now independent. This position must be used only on the job site.



WARNING: It is mandatory to make sure that the brake pedals are locked together before any road travel or travel in 3rd or 4th gear. If this instruction is not observed an accident may occur.

Differential locking pedal



CK98F029

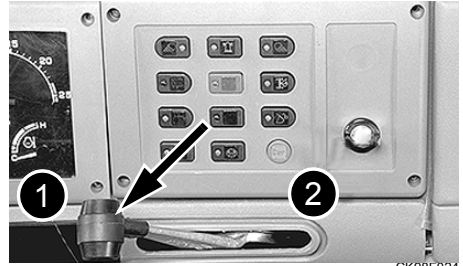
Located under the steering wheel, this pedal enables equal power to be transmitted to both rear wheels. See "Differential Lock", page 122.

IMPORTANT: This pedal should never be used during travel on a public highway.

IMPORTANT: Do not engage differential lock with wheels spinning.

IMPORTANT: (970/980 only) Do not engage the differential when 4 wheel steering or crab steering have been selected

Engine throttle lever



CK98F024

Located under the side control panel. This lever enables the engine speed to be increased or decreased.

Position (1): Idle speed.

Position (2): Maximum speed.

Parking brake lever



CK98F033

Located on the right of the operator's seat (with the seat in the loader attachment position), this lever enables the machine to be parked securely.

Raise the lever to engage the parking brake. In this position, the indicator lamp lights up on the front control panel. Lower the lever to free the machine (wheel brakes released). In this position, the indicator lamp on the front control panel goes out.

IMPORTANT: When the parking brake is engaged, the audible warning device sounds if the direction of travel control lever (synchro-

shuttle only) or the transmission control lever (powershift only) is not in the neutral position.

IMPORTANT: *Never try to move the machine when the parking brake is engaged.*

IMPORTANT: *Before stopping the engine make sure the parking brake is engaged.*

IMPORTANT: *Before using the backhoe attachment controls, make sure that the parking brake is engaged.*

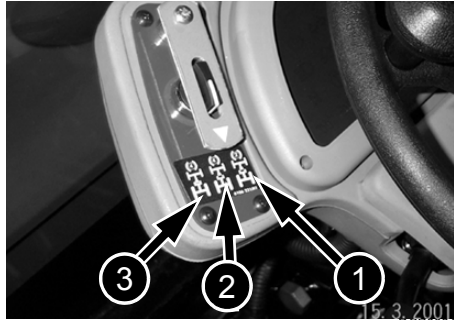


WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe equipment working position, it is essential for the direction of travel lever and the gear change lever (synchroshuttle only) or the transmission control lever (powershift only) to be placed in the neutral position and the parking brake engaged.

IMPORTANT: *The parking brake can also be used as an emergency brake in the event of a main brake system failure.*

Three position, 4 wheel drive switch

(4WD models only)



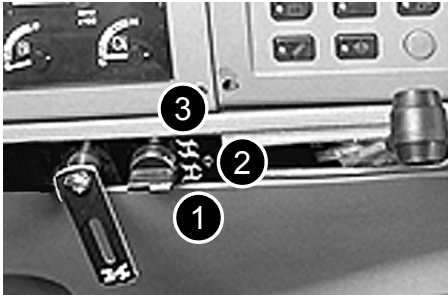
Position (1): The switch will select 2 wheel drive, 2 wheel braking.

Position (2): The switch will select 2 wheel drive, 4 wheel braking.

NOTE: *The switch can be locked in this position. This position will produce the most efficient braking and should be utilised for roading the machine.*

Position (3): The switch will select 4 wheel drive, 4 wheel braking.

Steering mode switch (970/980 only)



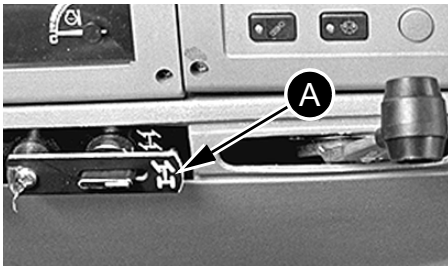
CK99E003

Located under the side control panel, this switch makes it possible to select 4 wheel steering, two wheel steering or crab steering. The switch has three positions:

Position (1): 4 wheel steering.

Position (2): 2 wheel steering.

Position (3): crab steering.



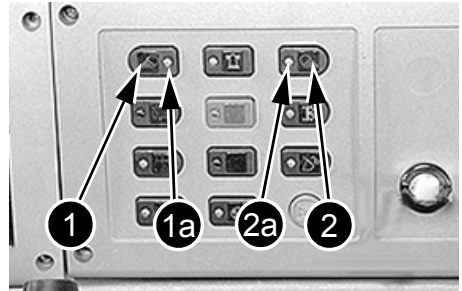
CK99E004

The tab (A) is used to lock the switch in 2 wheel steer position.

IMPORTANT: Before undertaking any road travel, select two wheel steer position and place the tab over the switch to lock it in this position.

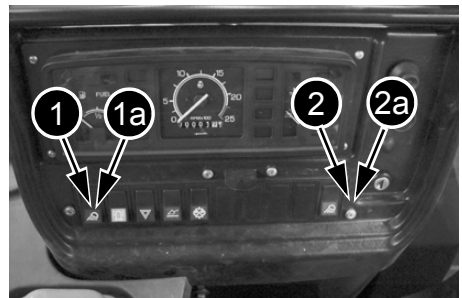
Front and Rear working light switches

With Cab



CK98F024

Without Cab



DSC05602

1. Front Working Light Switch.

1a Front Working Light indicator lamp.

2. Rear Working Light Switch.

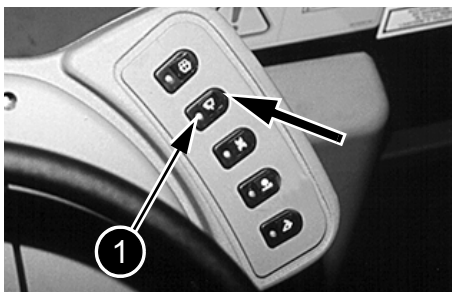
2a Rear Working Light indicator lamp.

Located on the side control panel: press the desired switch, the two outer worklights (and inner worklights if equipped) and the indicator lamp come on.

Press the switch once more, the worklights and the indicator lamp go out.

NOTE: To replace the front and rear working light bulbs, see "Replacing a Bulb", page 233.

Front windshield wiper control (cab version)



CP98F014

Located on the right of the steering wheel. Press the switch to operate the front windshield wiper and the indicator lamp (1) comes on. Press the switch again and the front windshield wiper will stop.

Front windshield washer control (cab version)

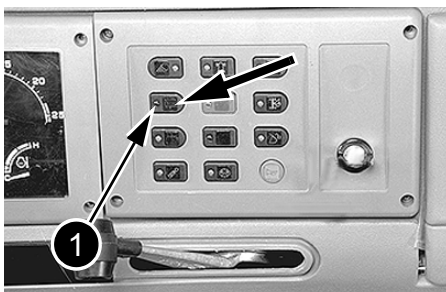


CP98F014

Located on the right of the steering wheel. This momentary action switch operates the front windshield washer.

IMPORTANT: *Never operate the windshield washer switch when the windshield washer reservoir is empty, since this may cause damage to the electric pump. See "Front and Rear Windshield Washer Reservoir", page 94.*

Rear windshield wiper control (cab version)



CK98F024

Located on the side control panel. Press the switch to operate the rear windshield wiper and the indicator lamp (1) comes on. Press the switch again and the rear windshield wiper will stop.

Rear windshield washer control (cab version)



CK98F024

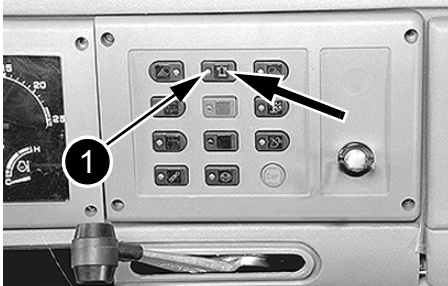
Located on the side control panel. This momentary action switch operates the rear windshield washer.

IMPORTANT: *Never operate the windshield washer switch when the windshield washer reservoir is empty, since this may cause damage to the electric pump. See "Front and Rear Windshield Washer Reservoir", page 94.*

Rotating beacons switch

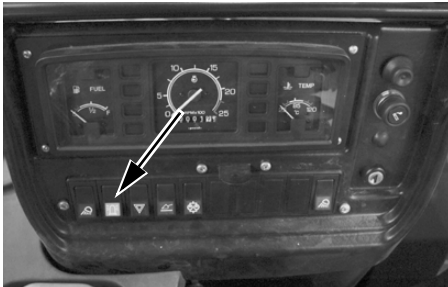
Located on the side control panel:

With Cab



Press the switch, the two rotating beacons and the indicator lamp (1) come on. Press the switch again and the two rotating beacons go out.

Without Cab



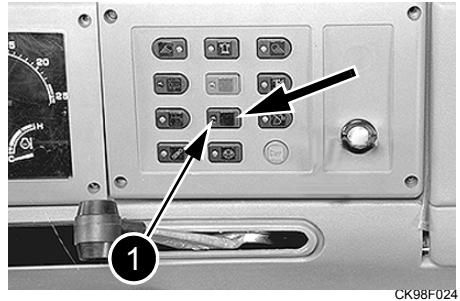
Press the bottom of switch, the two rotating beacons and the indicator lamp (1) come on. Press the top of switch, the two rotating beacons go out.

NOTE: To install the rotating beacons, see "Rotating Beacons", page 89.

NOTE: To replace a rotating beacon bulb, see "Replacing a Bulb", page 233.

Return-to-dig switch

Located on the side control panel.

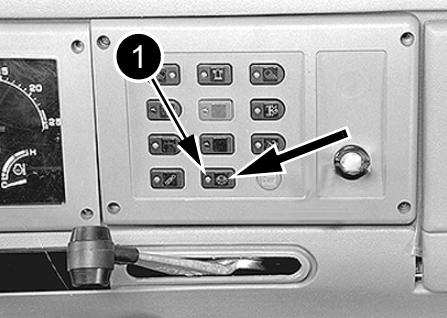


Press the switch to enable the return to dig function and the indicator lamp (1) comes on. Press the switch again to disable the return to dig function.

Hydraulic pumps flow control

Located on the side control panel.

With Cab



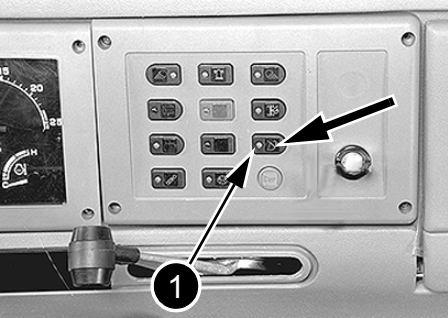
Press the switch and the indicator lamp (1) comes on. In this position the flow is from the larger pump only. Use this position for more precise control of the loader attachment and backhoe attachment, also used for roading. Press the switch again to provide full flow from both pumps.

Without Cab



Press the bottom of switch and the indicator lamp (1) comes on. In this position the flow is from the larger pump only. Use this position for more precise control of the loader attachment and backhoe attachment, also used for roading. Press the top of switch to provide full flow from both pumps.

Backhoe quick attach locking/unlocking switch (optional)



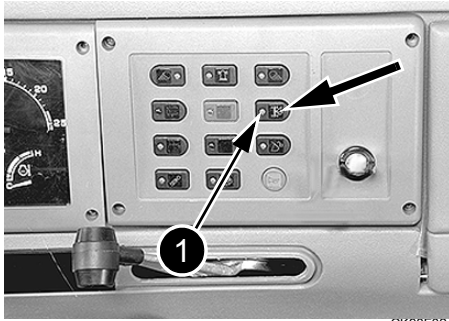
Located on side control panel. Press and hold the switch, the backhoe quick attach is unlocked and the indicator lamp (1) comes on. Release the switch, the backhoe quick attach is locked. See *“Removal and Installation of Quick Attach Backhoe Bucket (optional)”*, page 118.

NOTE: It may be necessary to increase engine rpm to give suitable pump flow for quick attach to function.

Backhoe attachment boom lock switch (craning valve) (centremount (axial) backhoe version)

Located on the side control panel.

With Cab



CK98F024

Without Cab



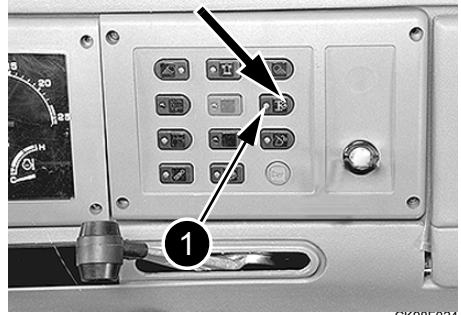
DSC05602

Located on the side panel, the boom lock switch operates a craning valve which hydraulically locks the boom cylinder enabling the load to be moved with the dipperstick.

- Raise the boom to the required position.
- Press the switch to illuminate the lamp and apply the lock.
- Press the switch again to extinguish the lamp and release the lock.

NOTE: Ensure the load being craned by the backhoe has been safely lowered to the ground before the boom lock is released.

Backhoe attachment sideshift carriage locking and unlocking switch (sideshift (offset) backhoe version)

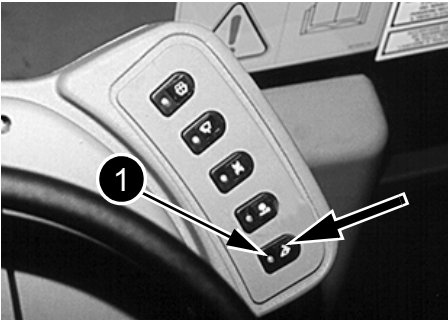


CK98F024

Located on the side control panel. Press the switch to unlock the sideshift carriage and the indicator lamp (1) comes on. To lock the sideshift carriage press the switch again and at the same time dead head any hydraulic service (e.g. end stroke a hydraulic cylinder).

NOTE: For sideshift operation see "Backhoe Attachment Sideshift (Sideshift (offset) Backhoe version)", page 115.

Loader quick attach locking/unlocking switch (optional)



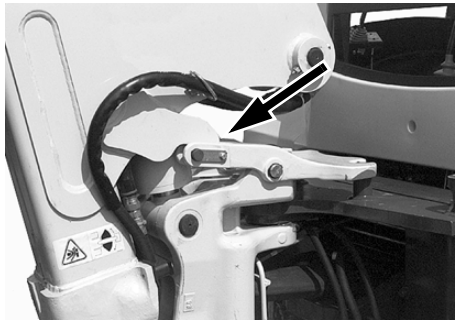
CP98F014

Located on the right of the steering wheel. Press and hold the switch, the loader quick attach is unlocked and the indicator lamp (1) comes on. Release the switch, the loader quick attach is locked. See *"Removal and Installation of Quick Attach Backhoe Bucket (optional)"*, page 118.

Backhoe attachment boom unlocking lever



CK98F035



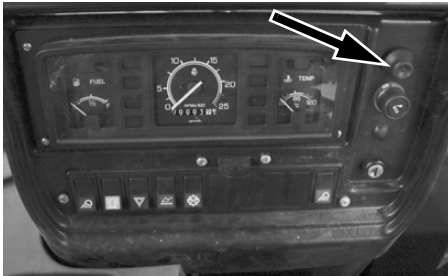
CD98F036

Located to the left of the floor (with the operator's seat in the backhoe attachment position). This lever enables the backhoe boom locking stop to be unlocked after road travel. See *"Setting the Machine in the Backhoe Attachment Working Position"*, page 112.

Horn switch (backhoe attachment)



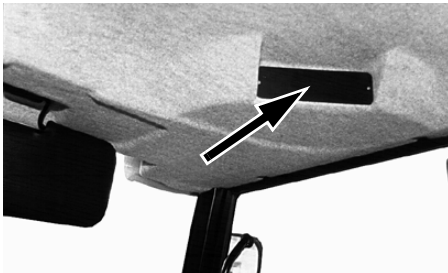
CK98F024



DSC05602

Located on the side control panel. This momentary action switch operates the horn. The switch is to be used when working with the backhoe attachment.

Radio compartment (cab version)



CP98F022

Located on the roof lining, this pre-equipped compartment is intended for installing a 12 volt radio.

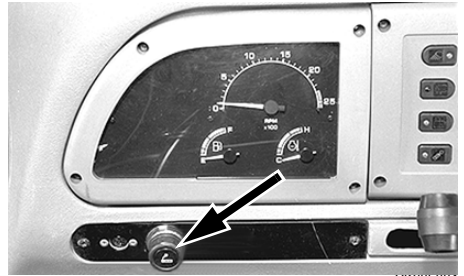
Fuses and relays location



CK98F033

Located behind side console front panel. See "Fuses and Relays", page 224.

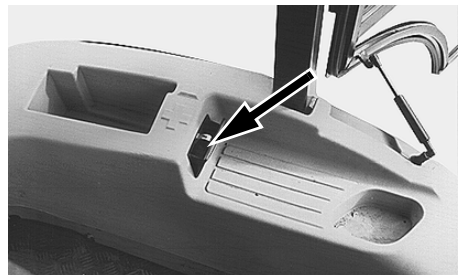
Cigar lighter



CK98F034

Located under the side control panel.

Ashtray (cab version)



CP98F023

Located on the left-hand side of the cab (with the operator's seat in the loader attachment position).

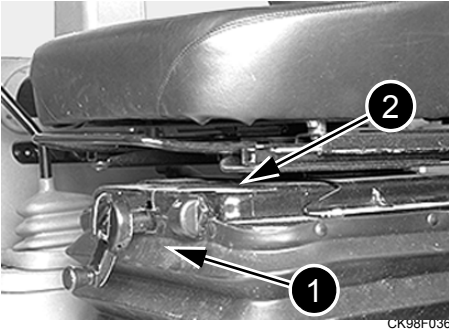
Operator's Seat

To operate the machine correctly with maximum efficiency and comfort, the seat should be correctly adjusted to suit the height and weight of the operator.



WARNING: Before using the controls, make sure that the seat is adjusted and positioned correctly.

Suspension adjustment



Sit on the seat. Turn handle (1) to adjust seat height. Clockwise to raise seat. Anti-Clockwise to lower seat. Check ride indicator (2) shows green. If red, readjust seat height. Within the green band of the ride indicator there is 75 mm of height adjustment for any driver.

Swivel adjustment



To turn the seat, hold the lever to the top, slide the seat to the rear and turn it. Release the lever and make sure that the seat is correctly locked in position.

Air suspension

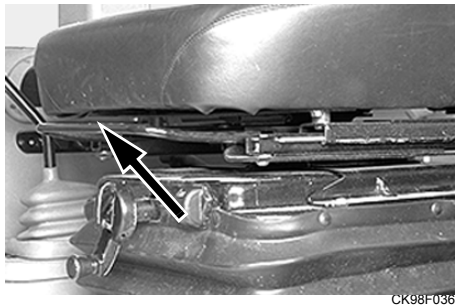


Lever up raises the seat, lever down lowers the seat.

For optimum comfort ensure there is sufficient upwards and downwards movement after the seat is adjusted.

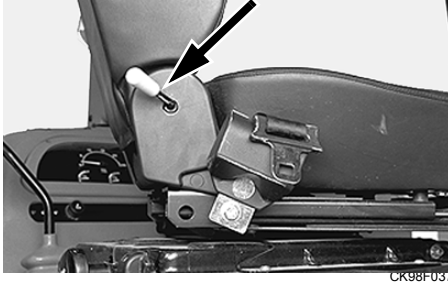
This is achieved when the ride indicator is showing green.

Forward and rear



Hold the lever to the top, slide the seat until the desired position is reached and then release the lever.

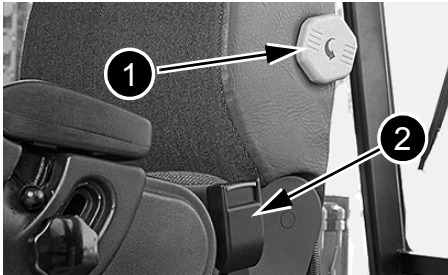
Seat back angle adjustment



CK98F037

To adjust the seat back angle, hold the lever downwards, move the seat back to obtain the desired position and then release the lever.

Lumbar support adjustment



CK99E007

Turn the knob (1) to obtain good back support from the seat back.

Seat belt

Sit comfortably on the seat. Pull a generous amount of belt out of the reel, and buckle it at (2). Allow the excess belt to retract back into the reel.



WARNING: Always fasten your seat belt before starting the engine. The machine is equipped with a roll over protection structure (ROPS) which ensures your safety. The seat belt will protect you efficiently if you attach it correctly and if you always wear it. The seat belt must not be too loose. It must not be twisted or caught in the seat.

Loader Attachment Controls

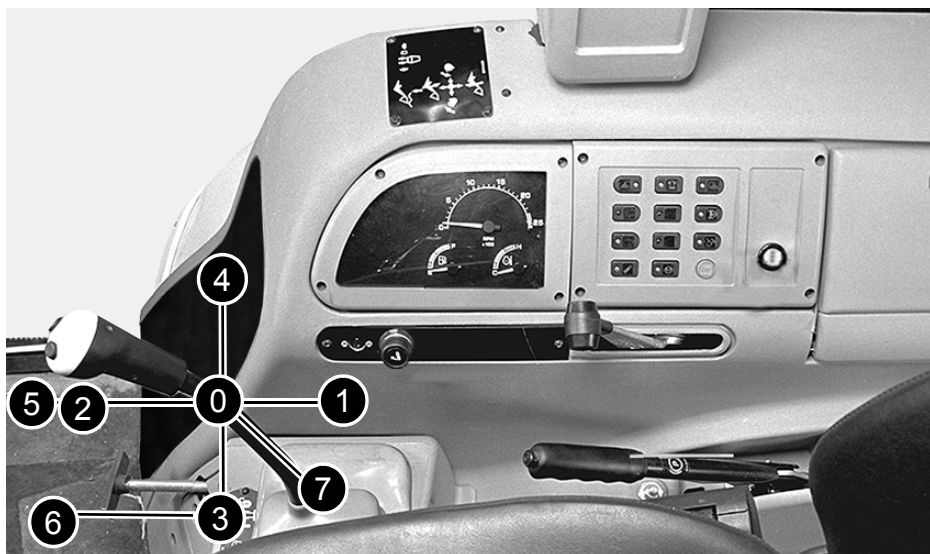


WARNING: Before starting the engine, make sure you are fully aware of the location and the function of each control. Operating the controls wrongly can cause serious physical injury.



WARNING: Before using the controls make sure that the operator's seat is correctly adjusted in the loader attachment position.

With standard loader bucket



CK98F032

Located on the right-hand side of the cab (with the operator's seat in the loader attachment position), this eight position lever operates the loader attachment controls. The speed of movement of each control depends on the tilting angle of the lever.

NOTE: A decal located to the right of the lever explains the function of each control.

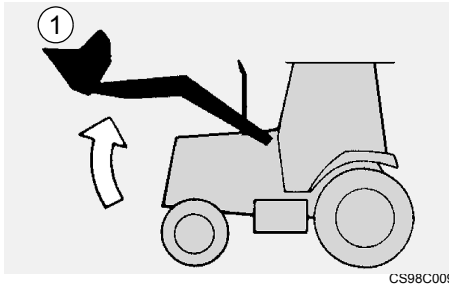
NOTE: See "Operation of the Loader Controls", page 74.

Operation of the Loader Controls

Neutral

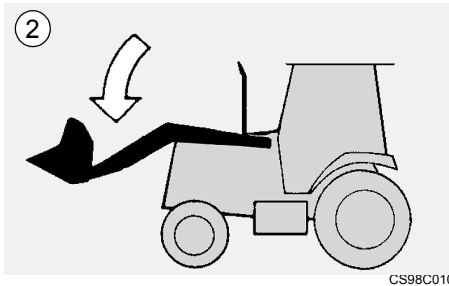
When the lever is in neutral position (0) the loader beam and bucket will not move. The lever is spring loaded to neutral position (0) and will automatically return to this position when released, movement of the loader beam and/or bucket will stop.

Raising the loader beam



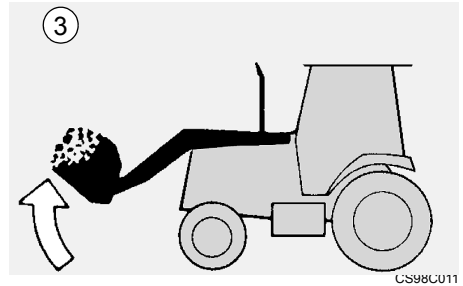
With the lever in position (1), the loader beam rises and the bucket automatically self levels.

Lowering the loader beam



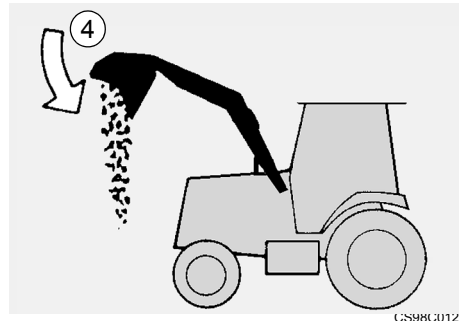
With the lever in position (2), the loader beam lowers.

Filling the loader bucket



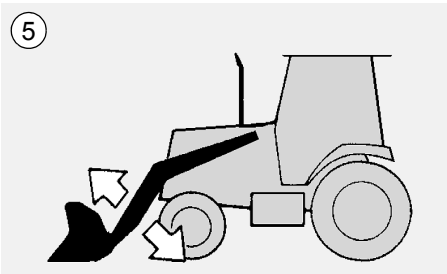
With the lever in position (3), the bucket rolls back (crowds).

Dumping the loader bucket



With the lever in position (4), the bucket dumps.

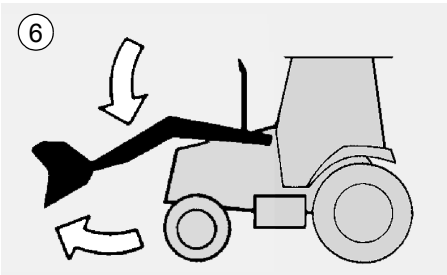
Loader bucket float control



With the lever in position (5), the bucket follows the contours of the ground without it being necessary to operate the lever.

NOTE: In this position the lever does not automatically return to neutral when it is released. It is necessary to move it manually.

Loader beam automatic return to dig (RTD)



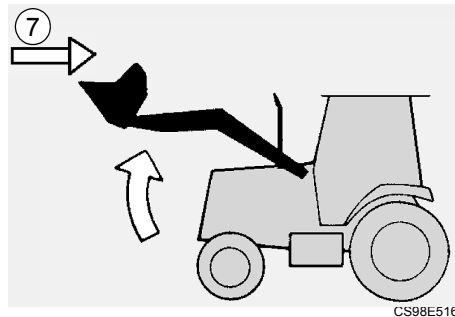
Press the return to dig switch on the side console and pull the lever towards the operator through detent to enable RTD. The loader bucket places itself in the digging position.

To simultaneously lower the loader beam, either manually lower loader beam or select float (position (6)).

To disable RTD either press the RTD enable switch again or push the lever away from the operator.

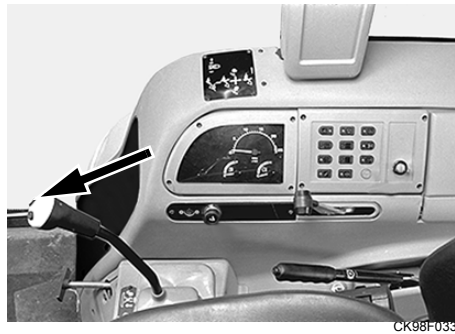
NOTE: It is possible to adjust the tilt angle for bucket dig. See "Loader Bucket Return-To-Dig Adjustment", page 201.

Automatic loader bucket levelling



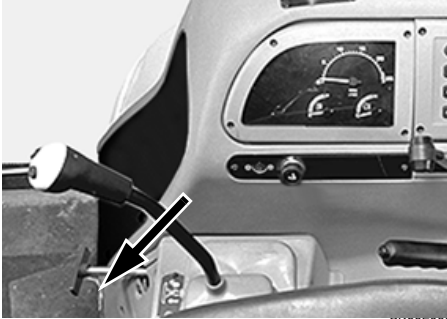
With the lever in position (7), the loader beam raises and simultaneously the loader bucket remains in the level position.

Hydraulic unload button



Located on the right end of the lever, press and hold the button to disengage the secondary hydraulic pump for added traction effort. Release the button to re-engage the pump.

Locking the loader attachment controls (if equipped)



CK98F033

Located at the right-hand side of the cab (with the operator's seat in the loader attachment position), this lever enables the attachment controls to be locked.

To lock the controls, push the handle and turn it anti-clockwise. To unlock the controls, push the handle in then turn it clockwise.



WARNING: Before dismounting from the operator's compartment, when travelling on the road or when using the backhoe attachment, place the lever in the locked position.

Transmission dump button



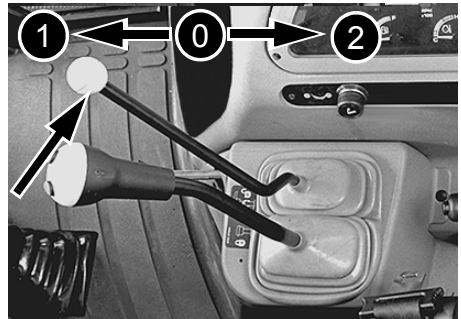
CK98F033

All models

Located on the left-end of the lever.

Press and hold the button to disengage the transmission drive and speed up loader performance. Release the button to re-engage the drive.

7 in 1 loader bucket clamshell control (if equipped)



CK98G002

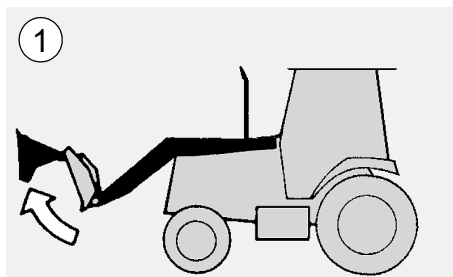
All models

Located at the right-hand side of the cab (with the operator's seat in the loader attachment position), this three position lever operates the opening and closing of the 7 in 1 loader bucket clam.

Neutral and hold

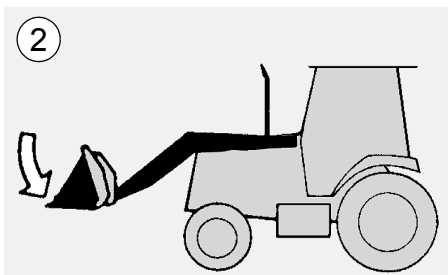
Position (0): Neutral/hold. As soon as the lever/switch is released, it automatically returns to the neutral position (0) and the clam remains in the position where it was when movement stopped.

Open clamshell



With the lever/switch in position (1), clamshell opens.

Close clamshell



With the lever in position (2), clamshell closes.

Backhoe Attachment Controls



WARNING: Before starting the engine, make sure you are fully aware of the location and the function of each control. Operating the controls wrongly can cause serious physical injury.



WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe attachment working position, it is essential to place the direction of travel control lever and the gear change lever in the neutral position (synchroshuttle only) or the transmission control lever in the neutral position (powershift only), the parking brake engaged and lock the loader attachment controls (if equipped).



WARNING: Before using the backhoe controls, make sure that the operator's seat is correctly adjusted in the backhoe attachment position.

Servo controls

The servo controls will function only when locked in the working or transport position with the override button depressed.

When locked in the working position, either of the override buttons must be depressed to initially activate the servo control levers.

All models

Control levers are used to operate the backhoe attachment. The speed of movement of each control depends on the angle to which the lever is tilted.

NOTE: A decal located in front of levers explains the function of the controls.

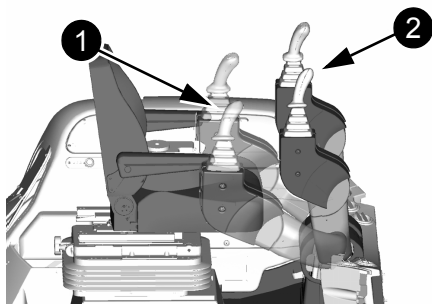
IMPORTANT : Whenever the backhoe attachment is used, it is mandatory for the machine to be resting on the stabilizers. See "Stabilizer Controls", page 87 and "Setting the Machine in the Backhoe Attachment Working Position", page 112.

IMPORTANT : Three backhoe attachment control configurations exist, depending on market requirement:

- (1) SAE (Society of Automotive Engineers). Non-European Community.
- (2) ISO (International Organisation for Standardisation). European Community only.
- (3) 'X' Pattern.

The operating pattern of the control levers is different. Check which configuration you have on your machine.

Servo control position



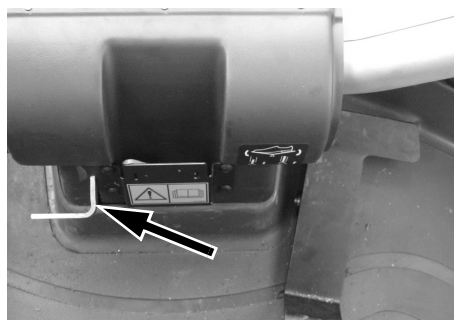
TV051143

The servo controls have two operating positions:

The backhoe can only be controlled with the controls in either of the following positions.

Position (1): Working position.

Position (2): Transport position (with override button depressed)



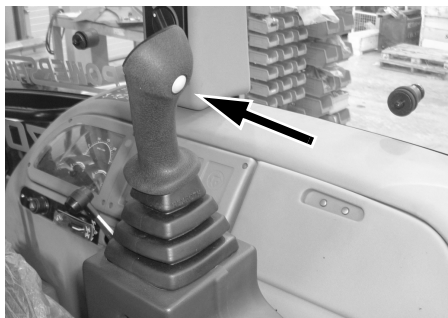
TV051159

IMPORTANT: Do not reposition the backhoe servo controls using the joysticks. Use the handles provided.

To adjust the operating position, depress the pedal and move the servo controls into the desired position using the handles provided, release the pedal to lock in place.

IMPORTANT: Once locked in the working position, the joysticks will remain inactive until either of the override buttons is depressed to re-activate the system.

Override buttons

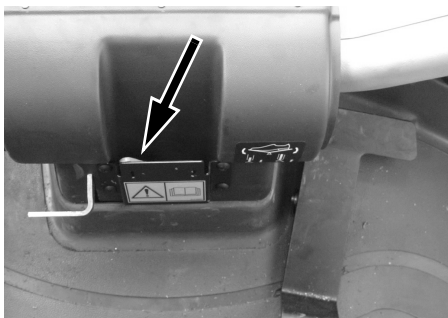


TV051139

Located on the reverse of the servo control joysticks are override buttons. When the servo controls are in the transport position press and hold the override button to activate the joysticks.

The override buttons are also used to re-activate the joysticks after re-positioning.

Configuration changeover valve



TV051159

To switch between control configurations use the lever located in the centre of the servo controls.

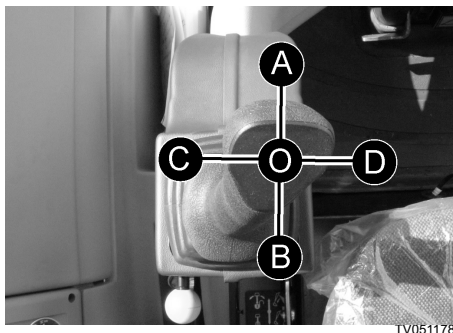
The lever has two positions:

Position (1): ISO (European community only).

Position (2): SAE (Non - European community).

ISO Configuration - Servo controls

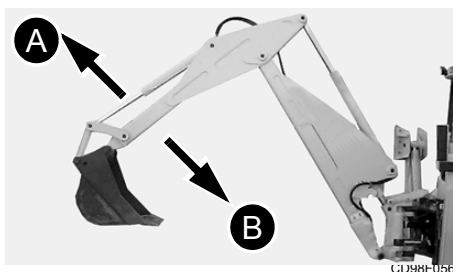
Backhoe dipper and backhoe attachment swing left-hand control lever



TV051178

This lever has five positions:

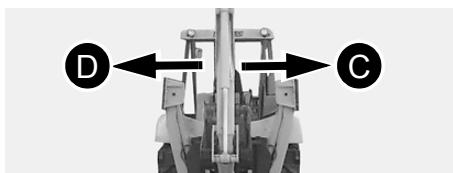
Position (O): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (O) and the attachment remains in the position where it was when movement stopped.



CD98F056

Position (A): The backhoe dipper extends.

Position (B): The backhoe dipper retracts.

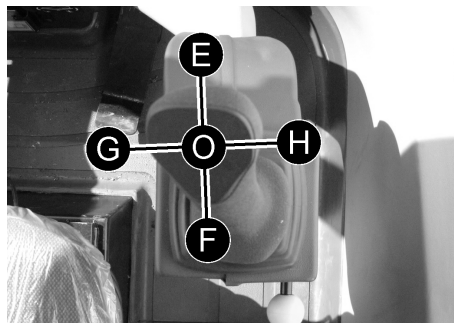


CD98F052

Position (C): The backhoe attachment swings to the left.

Position (D): The backhoe attachment swings to the right.

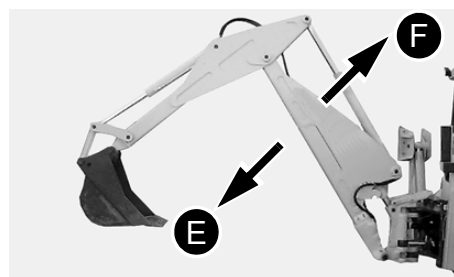
Backhoe boom and backhoe bucket right-hand control lever



TV051179

This lever has five positions:

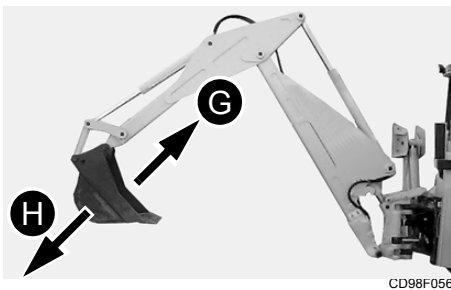
Position (O): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (O) and the attachment remains in the position where it was when movement stopped.



CD98F056

Position (E): The backhoe boom lowers.

Position (F): The backhoe boom rises.



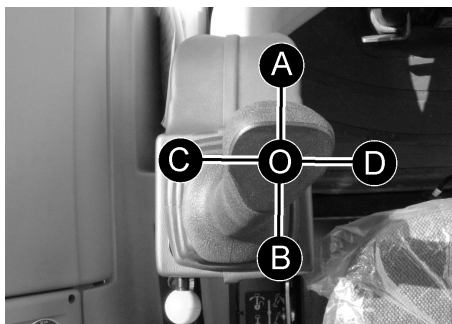
CD98F056

Position (G): The backhoe bucket digs (crowds).

Position (H): The backhoe bucket dumps.

SAE Configuration - Servo controls

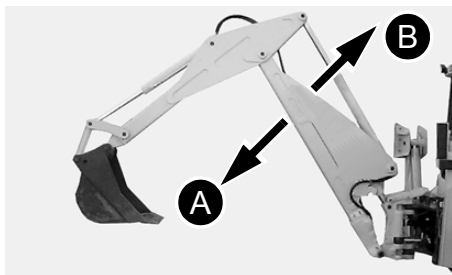
Backhoe dipper and backhoe attachment swing left-hand control lever



TV051178

This lever has five positions:

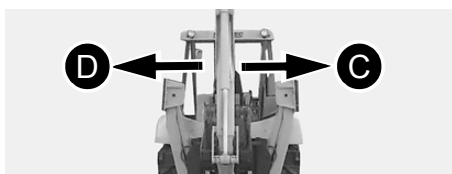
Position (0): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (0) and the attachment remains in the position where it was when movement stopped.



CD98F056

Position (A): The backhoe boom lowers.

Position (B): The backhoe boom rises.

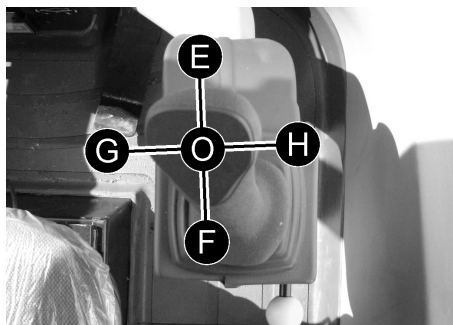


CD98F052

Position (C): The backhoe attachment swings to the left.

Position (D): The backhoe attachment swings to the right.

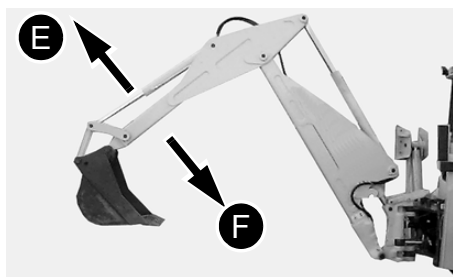
Backhoe boom and backhoe bucket right-hand control lever



TV051179

This lever has five positions:

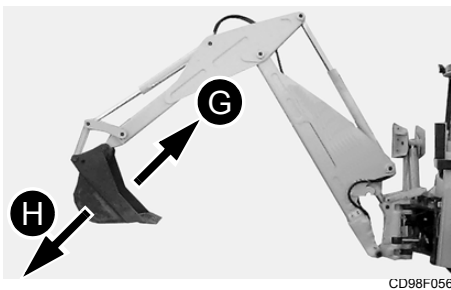
Position (0): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (0) and the attachment remains in the position where it was when movement stopped.



CD98F056

Position (E): The backhoe dipper extends.

Position (F): The backhoe dipper retracts.

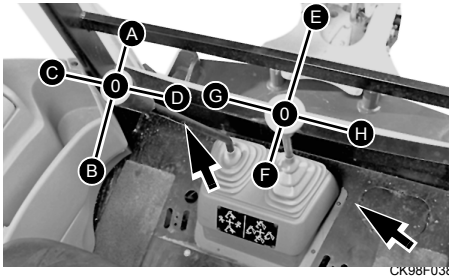


CD98F056

Position (G): The backhoe bucket digs (crowds).

Position (H): The backhoe bucket dumps.

ISO Configuration - Mechanical controls

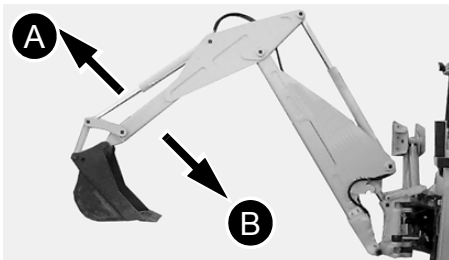


CK98F038

Backhoe dipper and backhoe attachment swing left-hand control lever

This lever has five positions:

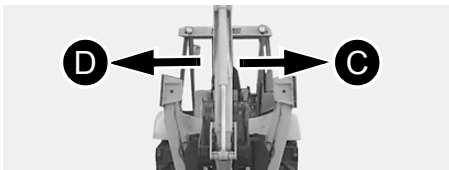
Position (0): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (0) and the attachment remains in the position where it was when movement stopped.



CU98F056

Position (A): The backhoe dipper extends.

Position (B): The backhoe dipper retracts.



CD98F052

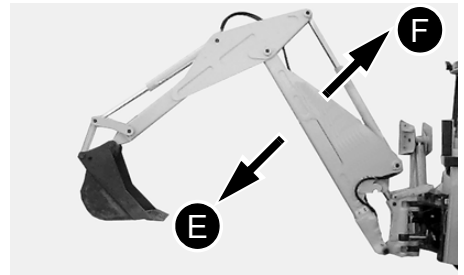
Position (C): The backhoe attachment swings to the left.

Position (D): The backhoe attachment swings to the right.

Backhoe boom and backhoe bucket right-hand control lever

This lever has five positions:

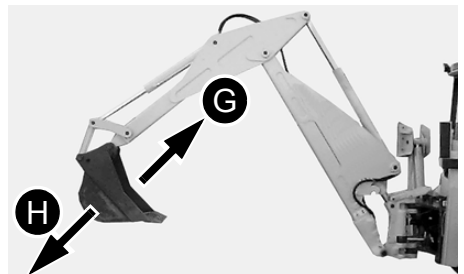
Position (0): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (0) and the attachment remains in the position where it was when movement stopped.



CD98F056

Position (E): The backhoe boom lowers.

Position (F): The backhoe boom rises.

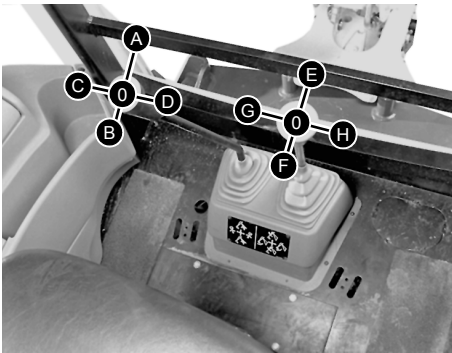


CU98F056

Position (G): The backhoe bucket digs (crowds).

Position (H): The backhoe bucket dumps.

SAE Configuration - Mechanical controls

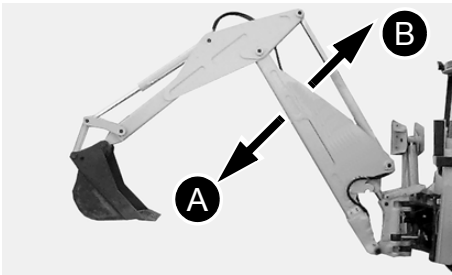


CK98F038

Backhoe boom and backhoe attachment swing left-hand control lever

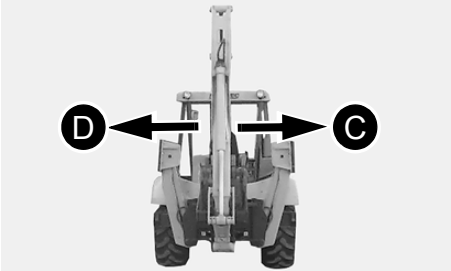
This lever has five positions:

Position (0): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (0) and the attachment remains in the position where it was when movement stopped.



CD98F056

- Position (A):** The backhoe boom lowers.
- Position (B):** The backhoe boom rises.



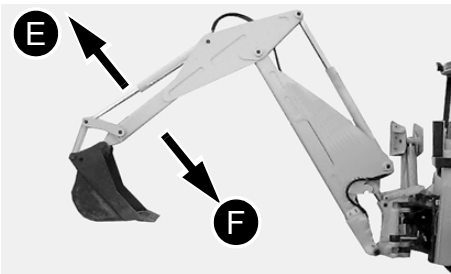
CD98F052

- Position (C):** The backhoe attachment swings to the left.
- Position (D):** The backhoe attachment swings to the right.

Backhoe dipper and backhoe bucket right-hand control lever

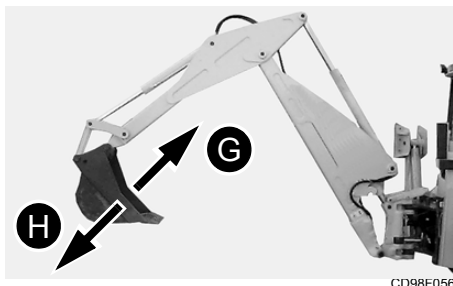
This lever has five positions:

Position (0): Neutral/hold. This position enables the attachment movement to be stopped. As soon as the lever is released, it automatically returns to the neutral position (0) and the attachment remains in the position where it was when movement stopped.



CD98F056

- Position (E):** The backhoe dipper extends.
- Position (F):** The backhoe dipper retracts.

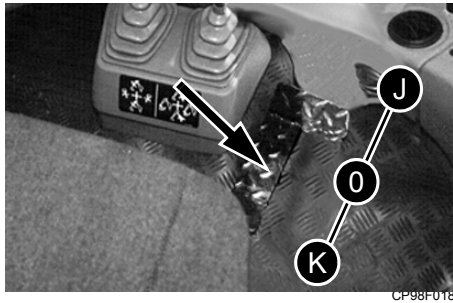


Position (G): The backhoe bucket digs (crowds).

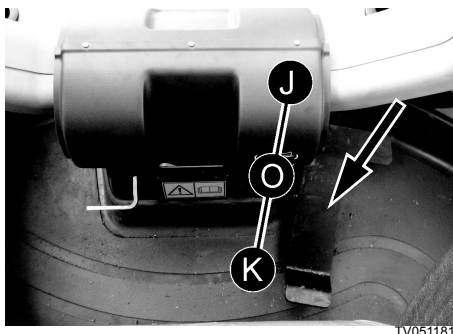
Position (H): The backhoe bucket dumps.

Extendable dipper/ auxiliary hydraulic control pedal (if equipped)

Mechanical control



Servo control



All models



To operate the extendable dipper use the rotary switch on the side console, select the "X" symbol.

To operate the auxiliary hydraulics, select the hydraulic hammer attachment.

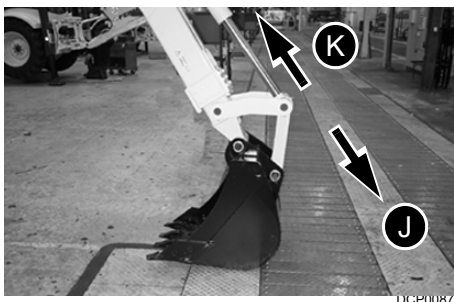
This pedal has three positions:

Position (O): Neutral. This position enables the movement of the extendable dipper/auxiliary hydraulic control to be stopped.

Position (J): The extendable dipper extends or auxiliary hydraulics operate.

Position (K): The extendable dipper retracts.

Before using this pedal make sure that the extendable dipper is mechanically unlocked. See "Setting the Machine in the Backhoe Attachment Working Position", page 112.



Stabilizer Controls



WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe attachment working position, it is essential to place the direction of travel control lever and the gear change lever in the neutral position (synchroshuttle only), or the transmission control lever in neutral position (powershift only), the parking brake engaged and lock the loader attachment controls (if equipped).



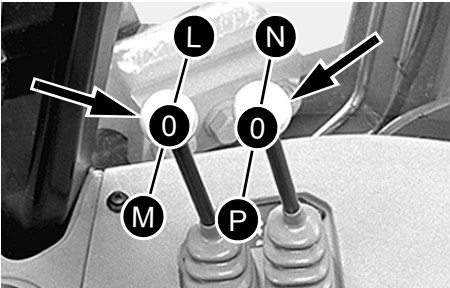
WARNING: Before using the stabilizer controls, make sure that the operator's seat is correctly adjusted in the backhoe attachment position.

IMPORTANT : Whenever the backhoe attachment is used the machine must be resting on the stabilizers.

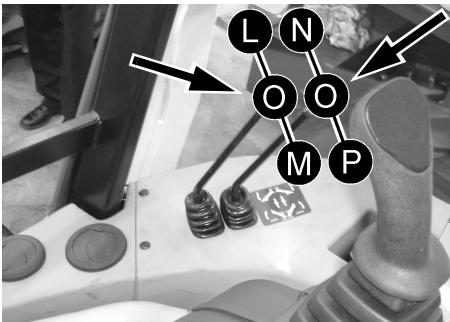


WARNING: Before moving the stabilizers make sure that no person is within the working range of the stabilizers.

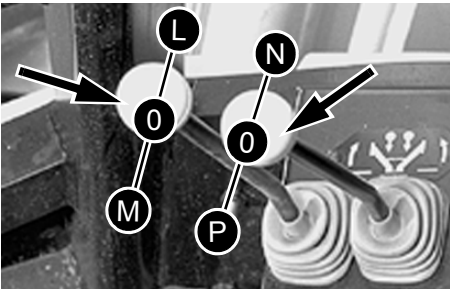
NOTE: Two decals explain the function of the controls.



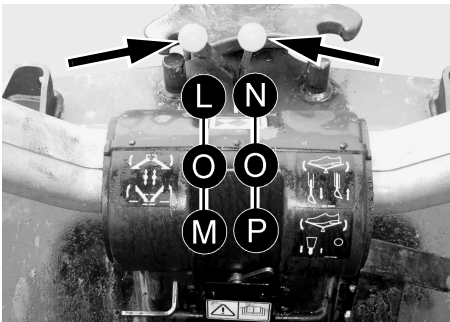
Stabilizer controls (sideshift (offset) backhoe version)



Stabilizer controls (servo control backhoe version) with cab



Stabilizer controls (centremount (axial) backhoe version)



Stabilizer controls (servo control backhoe version) without cab

Left-hand stabilizer left-hand control lever

This lever has three positions:

Position (0): Neutral. This position stops the movement of the left-hand stabilizer. As soon as the lever is released, it automatically returns to the neutral position (0) and the left-hand stabilizer stops raising or lowering.

Position (L): The left-hand stabilizer lowers.

Position (M): The left-hand stabilizer rises.

Right-hand stabilizer right-hand control lever

This lever has three positions :

Position (0): Neutral. This position stops the movement of the right-hand stabilizer. As soon as the lever is released, it automatically returns to the neutral position (0) and the right-hand stabilizer stops raising or lowering.

Position (N): The right-hand stabilizer lowers.

Position (P): The right-hand stabilizer rises.

NOTE: *To raise or lower the stabilizers at the same time, operate the two levers simultaneously.*

IMPORTANT: *Before machine travel or before using the loader attachment, make sure that the stabilizers are completely raised.*

IMPORTANT: *During road travel, the stabilizers must be completely raised. See "Road Travel", page 133.*

Rotating Beacons



IMPORTANT: *The rotating beacons must be installed and functioning when undertaking road travel. See “Road Travel”, page 133.*

NOTE: *To replace the bulb, See “Replacing a Bulb”, page 233.*

Place the rotating beacons on the roof of the cab and connect the cable to the sockets located under the roof of the cab.

Tool Box

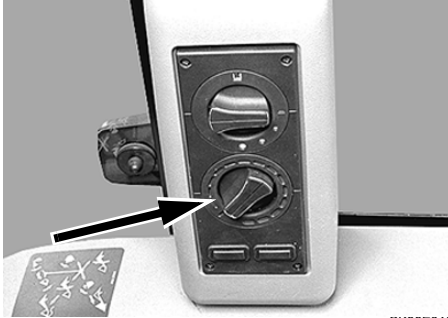


Located under the engine hood, the tool box is used for storing essential parts and tools required for servicing operations.

Heating, Ventilation (cab version) and Air Conditioning (optional) Controls

The heating, ventilation and air conditioning (optional) controls are located on the right-hand cab upright (with the operator's seat in the loader attachment position).

Heater control (cab version)



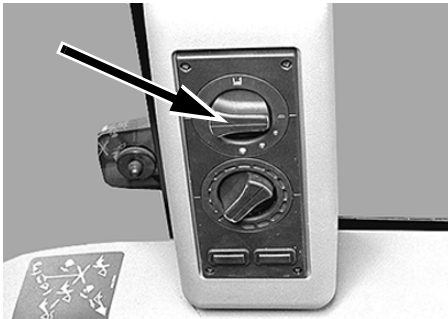
CK99E015

This knob enables the air temperature to be adjusted in the operator's compartment.

To increase the temperature, turn the knob clockwise.

To reduce temperature, turn the knob anti-clockwise.

Fan control (cab version)



CK99E015

This knob enables air flow to be adjusted in the operator's compartment.

To increase the air flow, turn the knob clockwise.

To reduce the air flow, turn the knob anti-clockwise.

NOTE: The air will be hot or cold depending on the position of the heater control.

Air conditioning control (optional)



CK99E015

This control is used to turn on or stop the air conditioning system.

NOTE: The air conditioning can only be switched on if the blower control is not on the stop position.

Use the heater control and the fan control to adjust the air temperature.

IMPORTANT: When using the air conditioning, it is essential that all the windows of the operator's compartment are completely closed.

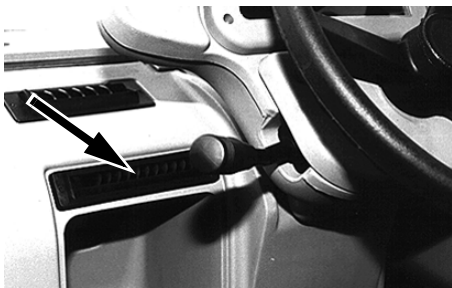
NOTE: To ensure correct operation and full efficiency of the air conditioning system, it must be used at least once a week, even for a short time.

Air vents (cab version)

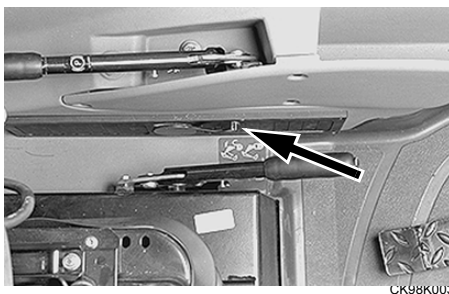
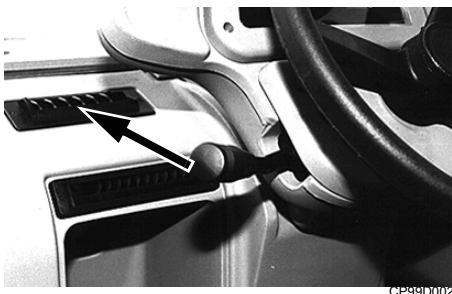
The flow of air can be directed by means of the knurled knob and the louvres. To close the air vents, push the louvres completely inwards.

When using air conditioning (optional) the louvres must be in the open position.

Main air vents



Defrosting vents

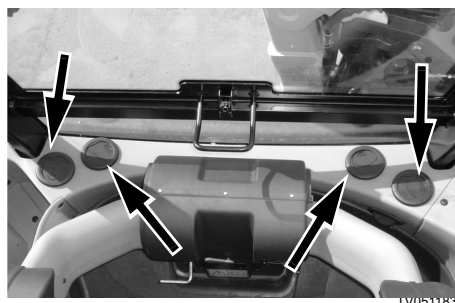


Two re-cycling vents located in the right-hand side of the cab (with the operator's seat in the loader attachment position) are controlled by the central lever.

To obtain maximum heat or cooling, open these vents.

NOTE: When using the machine with the windows open, close the recycling vents to avoid sucking in dust which may damage the system.

NOTE: The cab is equipped with filter which must be cleaned regularly. See "Air Intake Filter Cab Heater", page 206.



NOTE: To obtain maximum air flow, close the main vents.

Operator's Compartment Windows (cab version)

Cab door windows

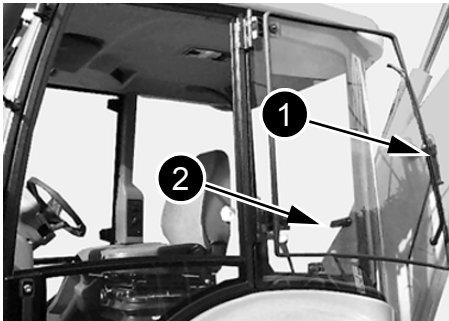
Partial opening



CD98F072

Lift the handle and push out and down to lock the window partially open.

Full opening



CD98F073

From the closed position, lift the handle (1) horizontally, then swing it backwards to disengage it from the striker pin, open the window and secure it in the rubber (2).

Closing



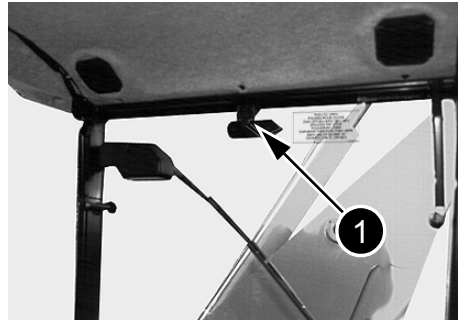
CD98F074

Ensure the handle fully engages the striker pin, pull the window closed, then push the handle down.

Rear window

Opening

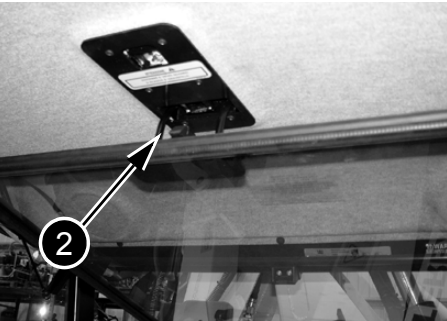
STEP 1



CP98F026

Turn the handle (1) and push the window outwards, retain hold of the lower handle.

STEP 2



Pull the bottom handle (2) inwards and upwards and secure the handle into the roof latch.

Closing

STEP 1

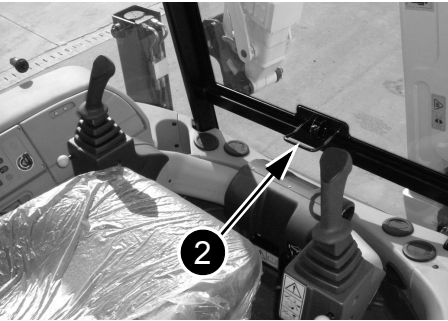


Hold the window and release the roof lock by pulling it back.

STEP 2

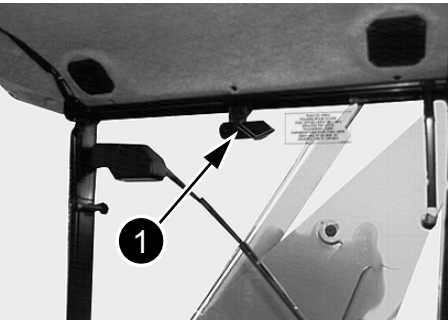
Lower the window until it is hanging freely, supported by the gas struts.

STEP 3



Pull the handle (2) down to engage in the lower latch. This action will bring the top of the window hard against the seal.

STEP 4



Turn the handle (1) to lock the window closed.

IMPORTANT: *It is only possible to open/close the rear window when the servo controls are in the working position.*

Rear View Mirrors



Make sure the rear view mirrors are correctly adjusted before driving the machine.

Front and Rear Windshield Washer Reservoir



Located on the left of the engine, this reservoir is equipped with an electric pump which is con-

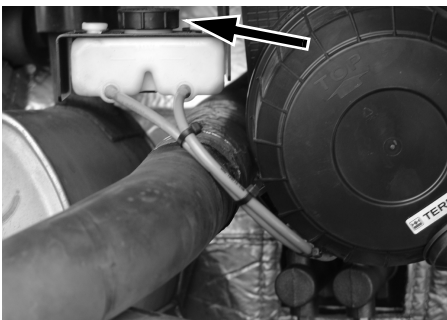
trolled by two switches located in the operator's compartment. See "Front windshield wiper control (cab version)", page 65 and "Front windshield washer control (cab version)", page 65.

NOTE: In cold weather, add anti-freeze to the windshield washer water.

IMPORTANT: Never operate the windshield washer switch when the reservoir is empty, since this may damage the electric pump.

IMPORTANT: Before checking the reservoir, raise the loader attachment fully and install the support strut, see "Loader Attachment Support Strut", page 97.

Brake Fluid Reservoir - 'Safim' Brakes



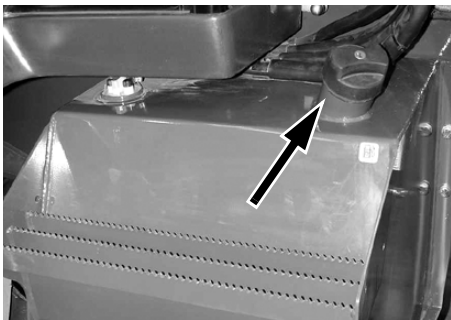
NOTE: Clean around the filler cap before refilling.

NOTE: Use a suitable brake fluid. See "Fluids and Lubricants", page 150.

Level marks on the reservoir show the level of fluid in the reservoir. See "Brake System - 'Safim'", page 172.

To fill the reservoir, see "Brake System - 'Safim'", page 172.

Fuel Tank



DSC05496

Located on the right-hand side of the machine, the tank capacity is 130 litres (34.2 US gals).

NOTE: Clean around the filler cap before re-fuelling.

NOTE: In cold weather, use fuel corresponding to the ambient temperature, see “Fluids and Lubricants”, page 150.

IMPORTANT: In cold weather, fill the tank after each working day, to prevent the formation of condensation.

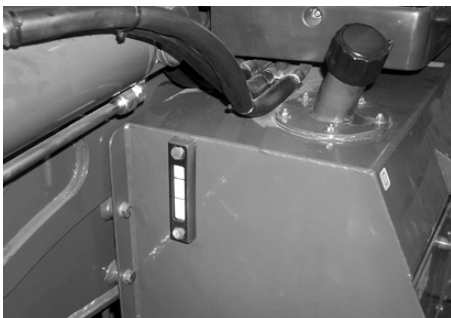
When installing the cap, make sure that it is correctly placed in the notches and then lock it by tightening up to the stop.

NOTE: The fuel cap can be locked by a key.



WARNING: Never refill the tank when the engine is running. Do not smoke during re-fuelling.

Hydraulic Reservoir



PN00005

To refill the reservoir, see “Hydraulic System”, page 178.

NOTE: Clean around the filler cap before refilling.

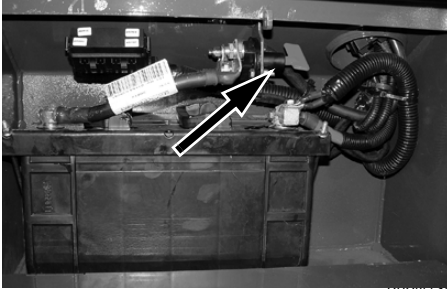
IMPORTANT: Use a suitable hydraulic fluid. See “Fluids and Lubricants”, page 150.

When installing the cap, make sure that it is correctly placed in the notches and lock it by turning clock-wise until it stops.

The sight glass shows the level of fluid in the reservoir. See “Hydraulic System”, page 178.

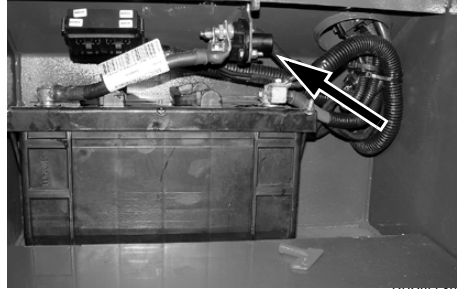
Battery Master Switch

Located on the left-hand side of the machine, the battery master switch is used to disconnect the battery completely from the electrical system.



DSC05518

When the battery master switch key is in position, the circuit is connected.



DSC05519

When the battery master switch key is removed, the circuit is disconnected.



WARNING: The battery master switch key must be removed after each working day, during maintenance operations, for any service work on the electrical system and when leaving the machine unattended.

Battery Box



DSC04792

IMPORTANT: Before carrying out any service work on the battery, see "Battery", page 227.

IMPORTANT: Remove the battery master switch key (optional) before carrying out any service work on the battery.

Loader Attachment Support Strut



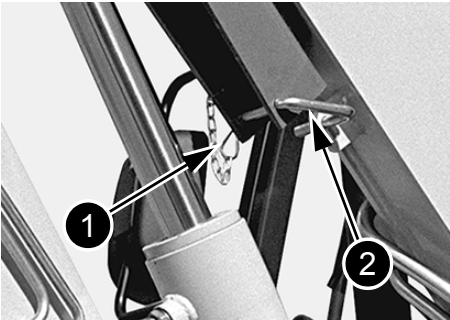
Located on the left-hand side of the loader attachment, this safety strut enables the loader attachment to be secured in the raised position during inspection, service or repair.

Locked position

STEP 1

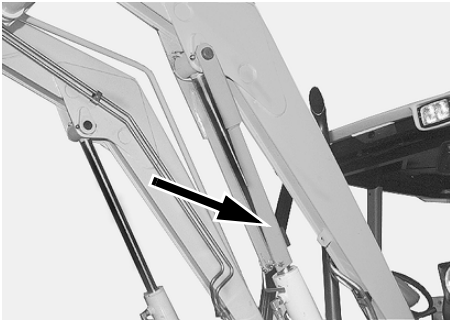
Raise the loader attachment completely, stop the engine, engage parking brake and remove the starter switch key.

STEP 2



WARNING: *It is essential to support the safety strut before removing the "U" bar.*

Remove the retaining pin (1) and "U" bar (2).

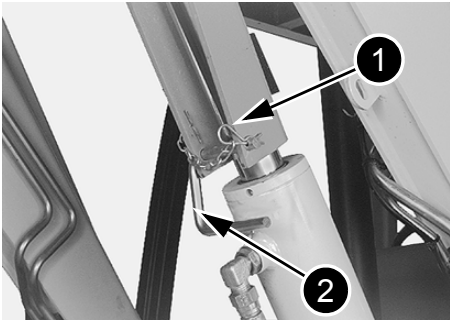


Place the strut on the cylinder rod and install the pin and "U" bar in the holes in the strut.

WARNING: *It is essential to install the safety strut when carrying out any operation requiring the loader attachment to be in the raised position.*

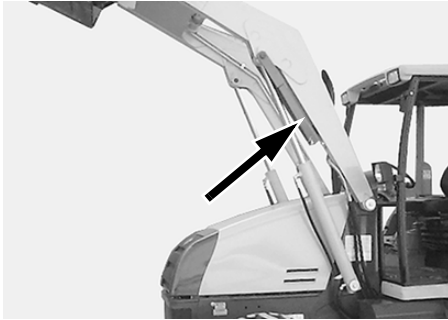
Unlocked position

STEP 1



Remove the retaining pin (1) and "U" bar (2).

STEP 2



CD98F057

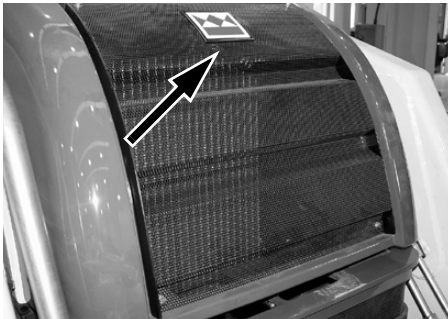
Swing the strut against the lift arm and install the pin and “U” bar in the holes in the strut and the retaining lug.

STEP 3

Start the engine and lower the loader attachment.

NOTE: Before lowering the loader attachment, make sure that the engine bonnet is closed.

Engine Bonnet



DSCU5520

Release the catch by means of the key.



CK98F043

Move the safety catch sideways to open the engine bonnet.

To close the bonnet, lower it and then lock it.

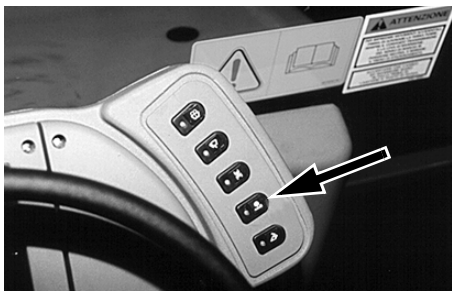


WARNING: It is essential to install the loader attachment support strut before any servicing work is done on the engine.

Ride Control System (optional)

The ride control system improves the machine behaviour during travel, regardless of the type of terrain and with the loader bucket full or empty. It reduces forward and rearward pitching when moving rearwards or forwards and when carrying loads, at the same time increasing productivity and operator comfort. It also minimises impact forces to which the machine may be subjected.

With cab



CP98F014

When the system is no longer required, press the switch again. The indicator lamp goes out.

When the ride control system is operating, the loader beam is subject to hydraulic shock absorption while the machine is travelling.

The ride control system should not be used during precise levelling operations or when an exact loader bucket position has to be maintained.



WARNING: *Never use the ride control system when using the backhoe attachment.*



WARNING: *Never operate the ride control system when the front wheels are raised off the ground. The machine could fall and cause serious injury.*

IMPORTANT: *Consult your dealer for any checking required on the ride control system.*

Without cab

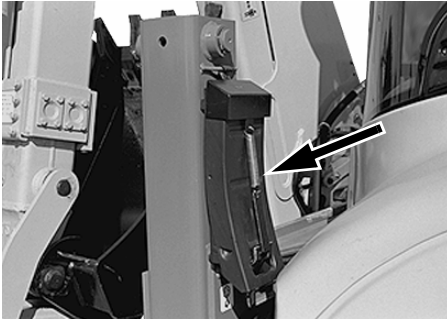


DSC05602

Press the switch. The indicator lamp comes on.

NOTE: *The loader beams may rise or lower slightly when the control is operated.*

Wheel Chock (specific to certain countries)



The wheel chock is located on the right-hand stabilizer (with the operator's seat in the loader attachment position).



Unfold the wheel chock and place the chock under a wheel.

After use, fold up the chock again and replace it in this housing.



WARNING: *Whenever parking the machine on sloping ground, use the wheel chocks to immobilize the machine (specific to certain countries).*

Tooling

The machine is supplied with these tools which are located in the tool box:

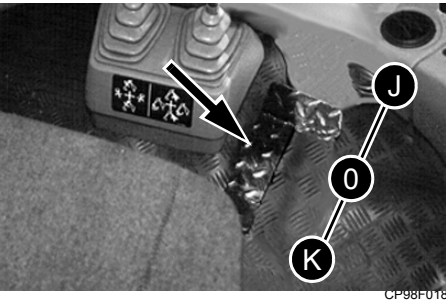
- 1 Grease gun
- 1 Wheel brace

Backhoe Attachment Auxiliary Hydraulic Tool Controls (optional)

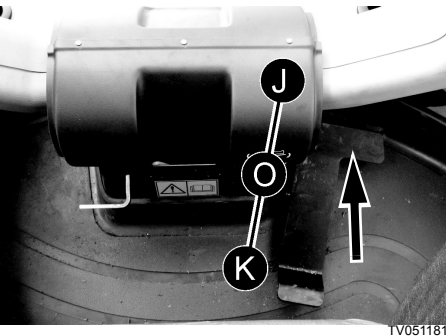
For instructions on how to use these controls, see “Backhoe Attachment Auxiliary Hydraulic Tools (optional)”, page 123.

Operating control pedal

Mechanical control



Servo control



All models



To operate the auxiliary hydraulics, use the rotary control on the side console, select the hydraulic hammer symbol.

This pedal has three positions:

Position (O): Neutral. This position enables the movement of the auxiliary hydraulic tool to be stopped.

Position (J): The auxiliary hydraulic tool operates.

Position (K): The auxiliary hydraulic tool operates. This position also operates hydraulic hammer.

Auxiliary Hydraulic Circuit

Hydraulic oil flow from the tandem hydraulic pumps.

MODEL	760/820	860/880	870	970/980
HYDRAULIC FLOW Litres/min. at 2200 rpm.	142	160	160	160

It is essential that operators match both the flow and the pressure characteristics of the attachments (such as a hammer) fitted by a dealer. This will prevent damage due to either excessive flow or excessive pressure.

Regulating oil flow to an attachment

Before operating an attachment fitted to any machine referenced above, the oil flow to the attachment must be regulated to it by setting the engine rpm, using the hand throttle. Please refer to the following table and match the correct engine rpm, with the corresponding oil flow requirement of the attachments, for the appropriate model.

For example, a 860 machine with a hammer attachment, must not be operated at above 1200 engine rpm, if the hammer attachment has a maximum flow requirement 90 litres/min.

Maximum Operating Speed Setting of Engine (RPM)	FLOW REQUIREMENT OF ATTACHMENT (Litres/min.)			
	760/820	860/880	870	970/980
800	50	57	57	57
900	57	65	65	65
1000	63	72	72	72
1100	70	80	80	80
1200	78	89	89	89
1300	83	95	95	95
1400	88	101	101	101
1500	96	110	110	110

Backpressure

When selecting an attachment to connect to the machines hydraulic circuit, check the maximum hydraulic return line back pressures, to ensure it is compatible with the attachment. This check is to be carried out by an authorised dealer

Engine at 1000rpm - 5 bar

Engine at 2200 rpm - 13 bar



Exceeding the correct engine rpm will result in:-

- Overheating of the hydraulic oil.
- Excessive fuel consumption.
- Excessive noise levels.
- Damage to the attachment.

Before any person connects any attachment, they must also refer to the attachments Operator's Manual.

Before Operating the Machine



WARNING: Read and ensure that you understand the instructions and warnings shown in this manual before operating the machine.

Before operating the machine, observe the following instructions :

- Check the levels (engine oil, transmission oil, hydraulic fluid, brake fluid and engine coolant) and make sure that the various fluids correspond to the conditions of use. See *“Operating the Machine in Cold Weather”*, page 111 and *“Fluids and Lubricants”*, page 150.
- Carry out the daily maintenance operations see *“Servicing Instructions”*, page 145.
- Walk round the machine, look for any leaks and inspect the hoses. Tighten or replace any items as required, See *“Maintenance/Adjustments”*, page 199.
- Before undertaking any road travel, lock the attachments, raise the stabilizers completely and install the safety systems required by regulations see *“Road operation”*, page 132.
- Before any road travel or job site work at night, check that the lighting and signalling systems are operating correctly.
- Check the condition and pressure of the tyres. See *“Wheels and Tyres”*, page 199.
- Clean the steps and access handles. The presence of oil, mud or ice (winter) can cause accidents. Make sure they are always clean.
- Clean or replace safety decals which are no longer legible. See *“Decals”*, page 20.
- Make sure that the engine bonnet is closed and latched correctly.
- Make sure that the cab doors (cab version) are closed correctly.
- Remove anything which might hinder visibility. Clean the windshield windows (cab version) and rear view mirrors.
- Make sure that no objects or tools are left on the machine or in the operator's compartment.
- Make sure you know how to evacuate the machine (emergency exit via the right-hand side) in case access by the left-hand side is impossible.
- Make sure that the right-hand door (cab version) is not locked.
- Make sure that nobody is under or on the machine. The operator should be the only person on the machine.
- Make sure that nobody is within the working range of the machine.

Operating the Machine



WARNING: Check that all the controls and all the safety devices operate correctly in a safe, clear area before beginning work.

When operating the machine the following instructions must be observed :

- Start the engine taking into account weather conditions. See *“Starting the Engine”*, page 107.
- Regularly consult the hourmeter to ensure Servicing intervals are observed. See *“Intervals”*, page 147.

Operating Instructions

- If you use the machine under particularly severe conditions (dusty or corrosive atmosphere, etc.), the Servicing Intervals should be reduced.
- If this machine is new or if the engine has been re-conditioned. See *"Running-In Period"*, page 106.
- Make sure that you know the location of underground services such as gas, electricity, telephone or mains water before starting work.
- Do not work near overhead high-voltage electrical cables without checking beforehand that all necessary measures have been taken to respect the minimum distances:
Under 57,000 volts: 3 metres (118 inch).
Over 57,000 volts: 5 metres (197 inch).
- On job sites on the public highway, use regulation signals, taking into account the working range of the machine. Local regulations define the number, type and location of reflective strips.
- Make sure that the operator's seat is correctly adjusted and positioned.
- Never operate any control or driving component unless you are seated correctly in the operator's seat with the seat belt adjusted and attached correctly.
- Adapt your operating style to the type and conditions of work. See *"Loader Attachment Operating Instructions"*, page 139.
- Do not allow anyone to stand in the machine working area. Stop all movement until the person has moved away.
- Use all the controls gradually so that the machine works smoothly.
- If the machine has to work in water, see *"Operating the Machine in Water"*, page 131.
- When loading the machine onto the trailer of an articulated vehicle, see *"Transporting the Machine"*, page 128.
- When towing the machine, see *"Towing the Machine"*, page 130.
- Load lifting should be carried out in accordance with the instructions given in this manual and in accordance with prevailing regulations. See *"Load Lifting"*, page 125.
- Avoid running the engine in an enclosed space. Ensure good ventilation under all circumstances.
- Dust, smoke or fog can reduce visibility and cause an accident. Stop or slow down the machine until normal visibility is restored.
- If there is any operating problem or damage move the machine to a place of safety, stop the engine, engage parking brake, remove the starter switch key. Find the cause or contact your local dealer and take the necessary measures to prevent the use of the machine. Place a "Do not start up" label on the instrument panel.
- When stopping the engine take account of weather conditions. See *"Stopping the Engine"*, page 110.
- When parking the machine, see *"Parking the Machine"*, page 131.

Running-In Period

Your machine will last longer and give better and more economical performance if you pay particular attention to the engine during the first twenty hours of operation.

During this period:

Keep a close watch on the instrument panel.

Check the oil and engine coolant levels frequently.

Operate the machine at normal speeds during the first eight hours. Do not run the engine too much at stalling speeds (with the wheels turning slowly or stopped and the engine at full speed).

Maintain the engine at the normal operating temperature.

Do not run the engine at idle speed for long periods.

During the running-in period, the following inspections and maintenance operations must be carried out in addition to the operations shown in the Maintenance Programme:

After the First 50 Operating Hours

1. Check engine oil and filter. See *"Engine"*, page 167.
2. Check hydraulic oil filter. See *"Hydraulic System"*, page 178.
3. Check air filter. See *"Air Filter"*, page 183.
4. Change transmission oil and filter. See *"Transmission"*, page 186.
5. Clean transmission strainer. See *"Transmission"*, page 186.
6. Change front (4 wheel drive) and rear axle oils. See *"Front and Rear Drive Axles and Reduction Gears"*, page 191.
7. Check front reduction gear oil level (2 wheel drive). See *"Front and Rear Drive Axles and Reduction Gears"*, page 191.
8. Check road wheel nuts for tightness daily until stabilised. See *"Wheels and Tyres"*, page 199.

This wheel nut checking procedure must be applied also for any wheel which is removed and replaced, for any reason.

9. Check fan belt tension. See *"Engine Alternator and Fan Belt"*, page 203.

10. Check the brake fluid level. See *"Brake System - 'Safim'"*, page 172.
11. Check brake adjustment. See *"Parking Brake Check (all models)"*, page 207.
12. Check bolt torques on cardan shafts to front and rear axles. See *"Steering and Axles"*, page 211.
13. Check bolt torques on transmission mounting bolts. See *"Transmission"*, page 211.
14. Check loader control lever lock (if equipped). Engage the loader control lever lock and attempt to move the loader control levers.
15. Check the automatic loader bucket leveling for correct adjustment and operation.

Running-in



CAUTION: Do not operate the engine at high speeds without a load.



CAUTION: Do not overload the engine.

A gradual running-in of a new engine or an exchange engine is not necessary. Prolonged operation at light loads during the early life of the engine can cause lubricating oil to enter the exhaust system. Maximum load can be applied to a new engine as soon as the engine is put into service and when the coolant temperature has reached a minimum of 60°C (140°F).

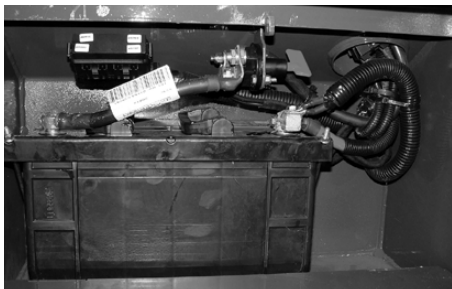
The engine will benefit if the load is applied as soon as possible after the engine is put into service.

Starting the Engine

NOTE: After the machine has not been operated for an extended period, see "Starting up after storage", page 241.

NOTE: If you have to start the engine by means of a booster battery, see "Connecting a Booster Battery", page 232.

STEP 1



Connect the electrical system by means of the battery master switch key (optional).

STEP 2



Check that the parking brake is engaged.

STEP 3



Check the engine throttle lever is in low idle position.

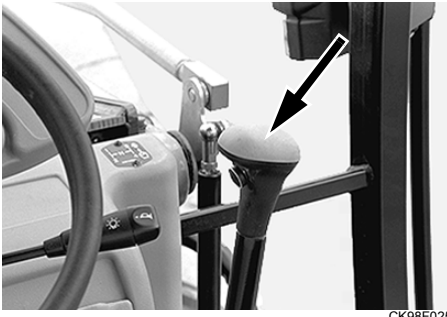
STEP 4



Check that the direction of travel lever (synchro-shuttle only) or transmission control lever (powershift only) is in the neutral position.

NOTE: If this is not done the audible warning device will sound and it will be impossible to start the engine.

STEP 5



CK98F025

Check that the gear change lever is in the neutral position (synchroshuttle only).



WARNING: Do not use aerosol-type starting aids such as ether. Such use could result in an explosion and personal injury.

STEP 6

How to start a cold engine with the glow plug starting aid

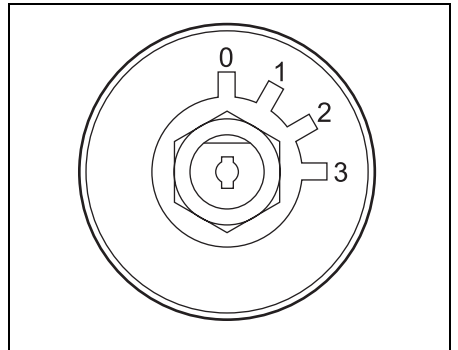


WARNING: Engine exhaust contains products of combustion which may be harmful to your health. Always start and operate the engine in a well ventilated area and, if in an enclosed area, vent the exhaust to the outside.

1. Turn the start key to the "2" position (B) and keep it there for 20 seconds.
2. Adjust the engine speed control to the maximum speed position.
3. Turn the start key to the "3" position (B) to engage the starter motor. Allow the start key to return to the "1" position (B) when the engine starts. Then adjust the engine speed control to give an even idle speed.
4. If the engine does not start in 30 seconds, turn the start key to the "0" position (B) and wait 90 seconds. Turn the start key to the "2" position (B) and hold it there for 20 seconds. Then engage the starter motor again, for a maximum period of 30 seconds.

How to start a warm engine

1. Adjust the engine speed control to one quarter of maximum speed.
2. Turn the start key to the "3" position (B) to engage the starter motor.
3. If the engine does not start in 30 seconds, turn the start key to the "0" position (B) and wait 90 seconds. Then engage the starter motor again for a maximum period of 30 seconds.



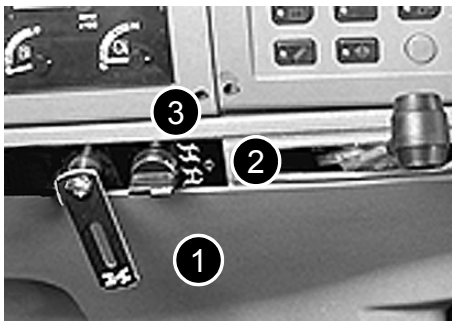
ORHHS

Turbo charged engines

Because of the power characteristics of the turbo charged engines, when fitted in vehicles, it is necessary to maintain a high engine speed when you need full load. To ensure that the engine is not overloaded at low engine speeds engage a lower gear.

970/980 Steering Selection

Steering mode switch



CK99E003

Located under the side control panel, this switch makes it possible to select 4 wheel steering, two wheel steering or crab steering. The switch has three positions:

Position (1): 4 wheel steering (4WS)

Position (2): 2 wheel steering (2WS)

Position (3): crab steering

To select 4WS

Turn the steering mode switch to the 4WS position (1), bring front wheels to centre position. Both LEDS will illuminate when the wheels are in the straight ahead position and then they extinguish when the steering wheel is turned.

To select 2WS

Turn steering mode switch to the 2WS position (2), bring front wheels to centre position. Front and rear LEDS will illuminate and stay on, and 4WS will disengage.

To select crab

Turn selector switch to the crab position (3) and bring front wheels to centre position.

NOTE: Crab position cannot be selected from 4WS and vice versa, 2WS must be selected first.

In the event of major misalignment or steering locking up in 4WS or crab position:

- Select 2WS.
- Press and hold reset button.
- Turn front wheels onto same lock as rear wheels (as in 4WS).
- Select 4WS.
- Press and hold reset button.
- Turn front wheels until they pass through the centre position.
- Re-select 2WS and turn the front wheels until 2WS is engaged.



WARNING: Any malfunction must be reported to your local dealer immediately.



WARNING: Travel at on-road speeds in 4WS mode can result in loss of control or unexpected swing-out of the rear end. Travel in crab mode will prevent the normal negotiation of bends, corners and intersections.

Stopping the Engine

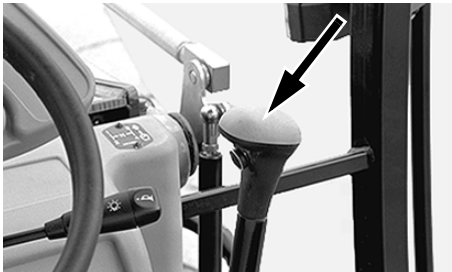
STEP 1



CP99D002

Place the direction of travel control lever (synchroshuttle only) or transmission control lever (powershift only) in the neutral position.

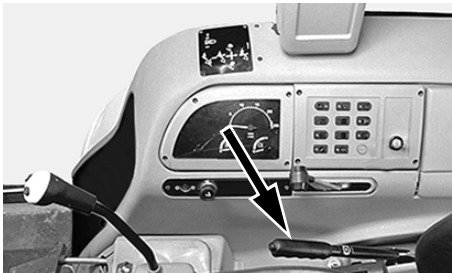
STEP 2



CK98F025

Place the gear change lever in the neutral position (synchroshuttle only).

STEP 3.



CK98F033

Apply parking brake securely.

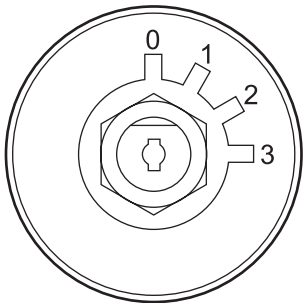
STEP 4

How to stop the engine



CAUTION: *It is recommended that a turbo charged engine is run at approximately 1000 rev/min. at reduced load for 2 to 3 minutes before it is shut down. This allows the turbocharger to cool.*

Turn the engine start key to the "0" position.



ORHHIS

Operating the Machine in Cold Weather

Observe the following recommendations:

Battery

It must be fully charged.

Fuel

- a Refill the fuel tank after each working day to prevent the formation of condensation and the entry of water into the fuel system.
- b To prevent the formation of crystals use a low temperature fuel or mix a protective fluid with your fuel. See *"Fluids and Lubricants"*, page 150.

Engine oil

The engine oil must have a viscosity corresponding to the ambient temperature. See *"Fluids and Lubricants"*, page 150.

Engine coolant

It must have a specification corresponding to the ambient temperature. It must contain a minimum of 50% of ethylene glycol solution. See *"Fluids and Lubricants"*, page 150.

Operating the Machine in Hot Weather

Observe the following recommendations:

- 1. Maintain the correct level of engine coolant in the engine coolant reservoir.
- 2. Check the condition of the radiator cap before starting. Replace the cap if necessary.
- 3. Clean the radiator, the oil cooler and the engine carefully.
- 4. Check the condition of the alternator and fan belt.
- 5. Use lubricants with the recommended degree of viscosity. See *"Fluids and Lubricants"*, page 150.
- 6. Use an appropriate engine coolant (a mixture of ethylene glycol and water at the required concentration). See *"Fluids and Lubricants"*, page 150.

Setting the Machine in the Backhoe Attachment Working Position



WARNING: Any uncontrolled movement of the machine can cause an accident. Before turning the operator's seat to the backhoe attachment working position, it is essential to place the direction of travel control lever and the gear change lever (synchroshuttle only) or the transmission control lever (powershift only) in the neutral position, the parking brake engaged and lock the loader attachment controls (If equipped).



WARNING: Before using the backhoe attachment, place the seat in the backhoe attachment position. Always sit in the seat and attach the seat belt. Serious injury can result if these instructions are not observed.

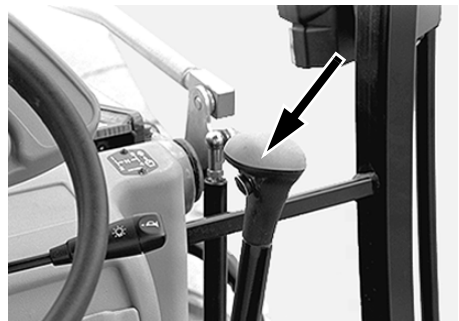
STEP 1



CP99D002

Check that the direction of travel control lever (synchroshuttle only) or the transmission control lever (powershift only) is in the neutral position.

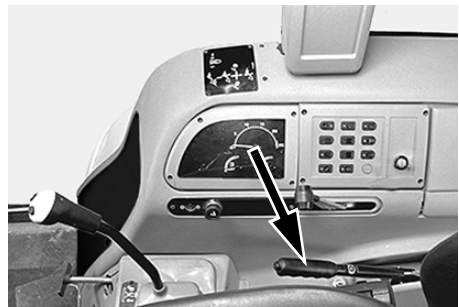
STEP 2



CK98F025

Make sure that the gear change lever is in the neutral position (synchroshuttle only).

STEP 3



CK98F033

Make sure that the parking brake is engaged.

Operating Instructions

STEP 4

(Machine with standard loader bucket)



Start the engine. Place the loader bucket in the dumping position. Lower the bucket to the ground until the front wheels are about 10 cm (4 inch) above the ground.

(Machine with 7 in 1 loader bucket)



Start the engine. Place the loader bucket in the level position. Lower the bucket to the ground until the front wheels are about 10 cm (4 inch) above the ground.

STEP 5



Turn the seat round to the backhoe attachment position and adjust if necessary.

NOTE: *Adjust the servo controls (if equipped) to the working position.*

STEP 6

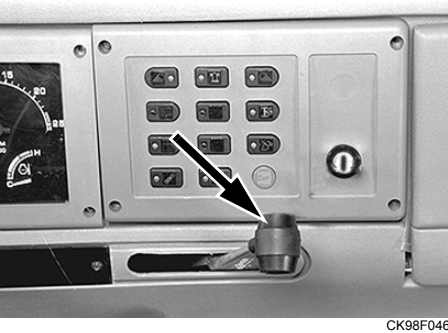
Lower the stabilizers. The rear wheels must be about 10 cm (4 inch). off the ground and the machine must be in a horizontal position.

IMPORTANT: *Whenever the backhoe attachment is used the machine must be resting on the stabilizers*



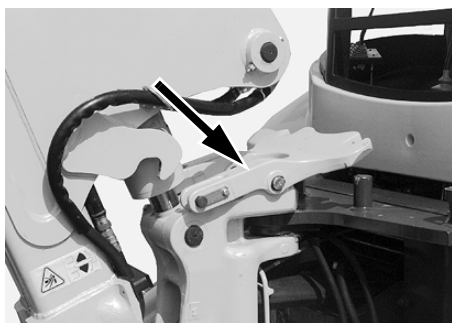
WARNING: *Before operating the backhoe, ensure that no person is within its working range.*

STEP 7



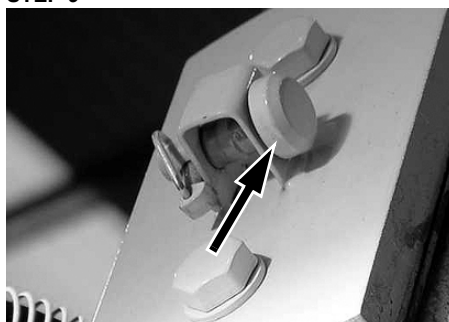
Run the engine at about 1800 rpm.

STEP 8



Raise the backhoe boom. Pull the backhoe attachment boom lever up to release the lock.

STEP 9



When using the extendable dipper (if equipped) make sure that the pin is placed in the external stowage bracket.



WARNING: Before starting work, make sure that no person is within the working range of the machine.



WARNING: Before starting work, check that all the backhoe controls operate correctly.

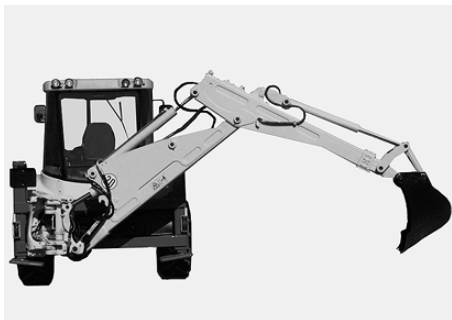
Backhoe Attachment Sideshift (Sideshift (offset) Backhoe version)

To dig alongside a building or fence, etc., it is possible to shift the backhoe equipment sideways to the right or the left.

STEP 1

The machine must be in the backhoe attachment position, see “*Setting the Machine in the Backhoe Attachment Working Position*”, page 112.

STEP 2



CD98K013

Place the backhoe attachment on the left if you want to shift the attachment to the right or place it on the right if you want to shift it to the left, then place the attachment on the ground in the position shown.

STEP 3



CK98F024

Press the sideshift unlocking switch. The indicator comes on.

STEP 4

Operate the backhoe attachment controls alternately so as to slide the sideshift carriage sideways.

STEP 5

Once the attachment is in the side position required, swing it round into alignment with the machine.

STEP 6



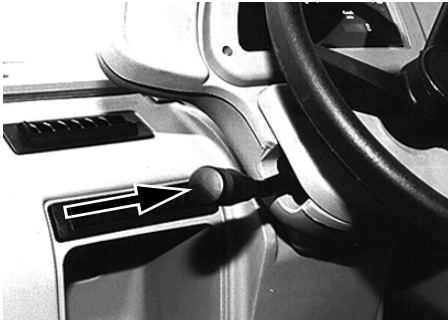
CK98F024

Press the sideshift locking switch again to lock the sideshift. The indicator lamp will go out.

Setting the Backhoe Attachment in the Road Travel Position

IMPORTANT: *This procedure must be used for road travel, securing the loader attachment and when parking the machine.*

STEP 1



CP99D002

Check that the direction of travel control lever (synchroshuttle only) or transmission control lever (powershift only) is in the neutral position.

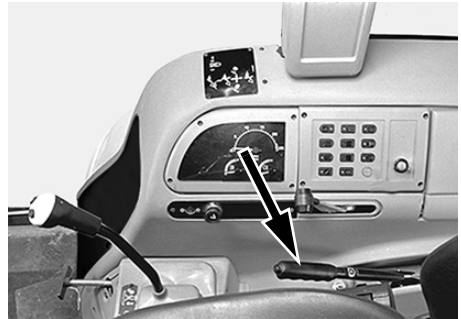
STEP 2



CK98F025

Make sure that the gear change lever is in the neutral position (synchroshuttle only).

STEP 3



CK98F033

Make sure that the parking brake is engaged.

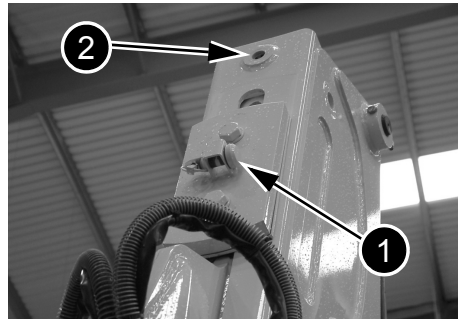
STEP 4

Make sure that the operator's seat is correctly positioned.

STEP 5

Make sure that the machine is resting on the stabilizers and the loader bucket.

STEP 6



TV051167

Retract the extendable dipper (if equipped) completely and place the pin (1) in the extendable dipper locking hole (2).

STEP 7

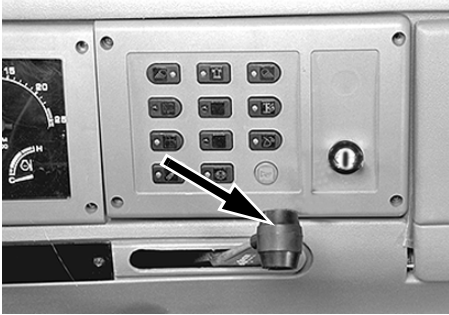
(Sideshift (offset) backhoe version), position the backhoe attachment sideshift carriage completely to the right. See "*Backhoe Attachment Sideshift (Sideshift (offset) Backhoe version)*", page 115.

Operating Instructions

STEP 8

Place the backhoe attachment in line with the machine.

STEP 9



CK98F046

Run the engine at about 900 rpm.

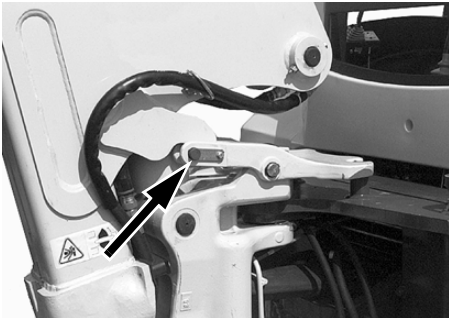
STEP 10

Completely retract the backhoe bucket, dipper and boom.

STEP 11

(Sideshift (offset) backhoe version), swing the backhoe attachment completely to the left.

STEP 12



CD98F036

Release the boom lock lever by depressing the button and lowering the lever. It may be necessary to make small adjustments to the boom position before the lock will fully engage.

STEP 13

Raise the stabilizers completely.

STEP 14

Run the engine at low idle speed.

NOTE: *Adjust the servo controls (if equipped) to the transport position.*

STEP 15

Turn the seat round to the loader attachment position. Raise the loader bucket.

Removal and Installation of Quick Attach Backhoe Bucket (optional)



WARNING: *Never place your hands inside the quick coupler if the engine is running.*

NOTE: *It may be necessary to increase engine rpm to give suitable pump flow for quick attach to function.*

Quick Attach

Safety

- Never place your hands inside the quick coupler if the engine is running.
- The quick hitch coupler is able to work with all Ferrec/Terex recommended buckets and attachments.
- The coupler should not be used over long periods without a periodical inspection of all working parts.
- When operating a hammer, always crowd the hammer towards the machine.
- Never use a hammer as a lever, this puts excessive load on the coupler cylinder and hydraulics.
- Do not use the coupler where excessive vibration is endured, remove coupler to reduce premature wear.

Operation - To release bucket or attachment

STEP 1



FIGURE 1

Crowd the bucket or attachment close to the ground.

STEP 2

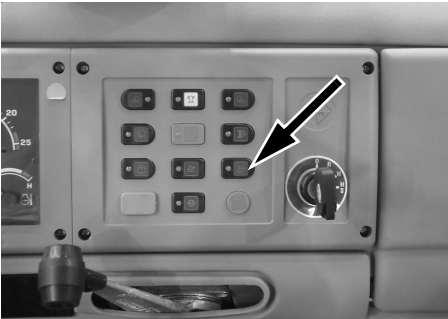


FIGURE 2

Remove the safety pin from the coupler.

Operating Instructions

STEP 3



TV051168

- Press and hold the quick hitch switch in the cab to release the coupler hook. The hook will retract after 5 - 10 seconds and will remain retracted until the switch is released.

STEP 4



FIGURE 4

Slowly dump to release the bucket or attachment.

STEP 5

Release the switch in the cab.

Operation - To pick up bucket or attachment

STEP 1

Remove the safety pin from the coupler.

STEP 2

Make sure the pins are correctly installed in the bucket or attachment.

STEP 3

Press and hold the quick attach switch in the cab to release the coupler hook.

STEP 4



FIGURE 5

Position the coupler with the fixed open jaw over the bucket's front pin. Crowd the coupler down until the bucket pin is fully engaged in the coupler jaw. Crowd the bucket until the bucket teeth are in an approximate vertical position.

STEP 5

Release the quick attach switch to engage the coupler. The hook powers forward and will secure the bucket or attachment pin in the coupler.

Recommended weekly checks

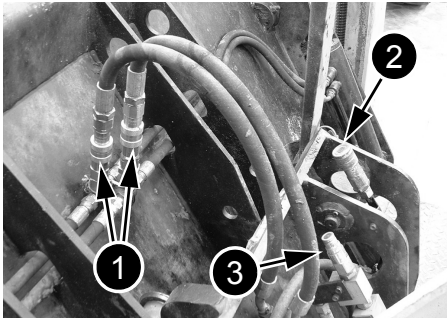
- Check the coupler for damage or missing parts, loose or missing pins and chaffed or frayed hydraulic hoses. Repair or replace as necessary.
- Check the hook jaw for wear on the connecting pin face, which would increase pin opening dimension (gap maximum 2 mm). Repair or replace as necessary.
- Grease all grease points with general purpose grease. See *"Fluids and Lubricants"*, page 150

Removal and Installation of Quick Attach Loader Bucket (optional)

Removal

STEP 1

Place the loader bucket on firm, level ground, stop the engine, engage parking brake, release pressure in the hydraulic system. See *"Releasing the Pressure in the Hydraulic System"*, page 176

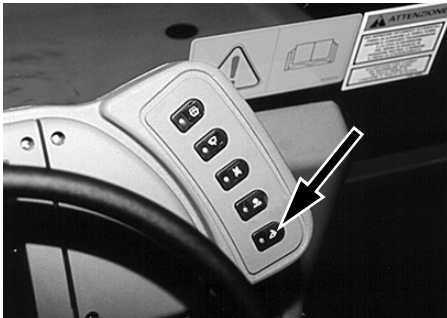


TV051148

Clean quick couplers.

Disconnect the hoses from the bucket couplers (1) and connect to the tube (2) and solenoid valve (3).

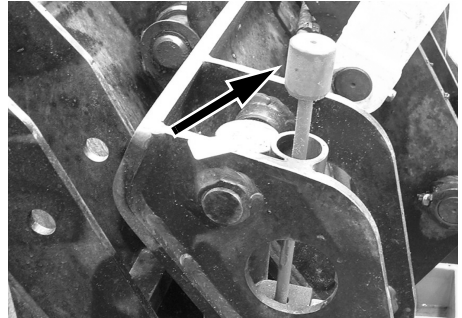
STEP 2



CP98F014

Start the engine, press and hold the switch down to unlock the loader quick attach. See *"Loader quick attach locking/unlocking switch (optional)"*, page 69.

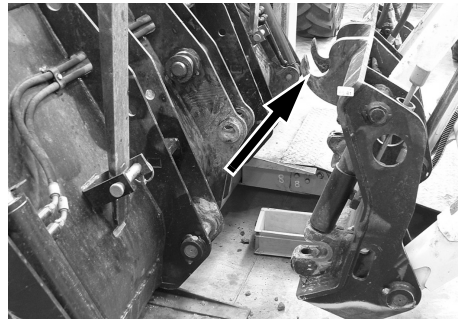
STEP 3



TV051149

Push the clamshell operating lever forward until the clamp pins on the quick-attach are fully retracted (indicator (4) raised clear of the tube).

STEP 4

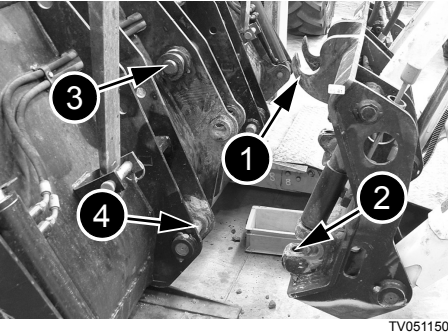


TV051150

With the bucket on the ground, slowly drive the machine in reverse whilst dumping the bucket to disengage the quick-attach hooks from the bucket pins.

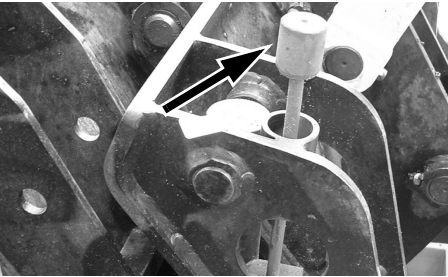
Installation

STEP 1



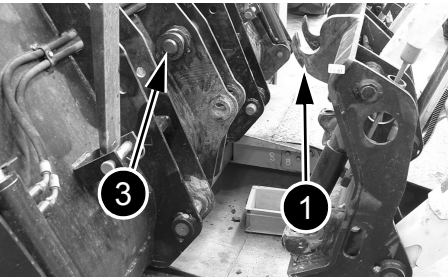
Position the hooks (1) and (2) in alignment with the bucket pins (3) and (4). The quick-attach must be slightly damped.

STEP 2



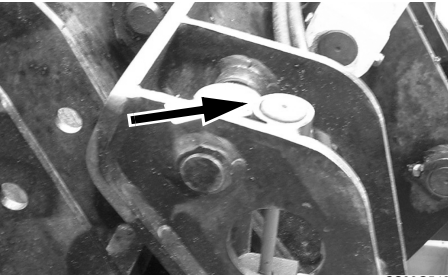
Press and hold the switch, then push the clamshell operating lever forward until the clamp pins on the quick-attach are fully retracted (indicator (5) raised clear of the tube). Move the clamshell lever to the neutral position and release the switch.

STEP 3



Slowly drive the machine forward to engage the top hooks (1) with the top pins (3) then fully crowd the bucket.

STEP 4

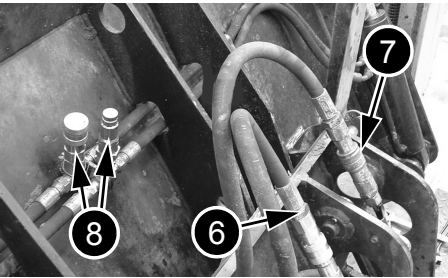


Press and hold the switch, then pull back the clamshell operating lever to lock the bucket onto the quick-attach (indicator (5) retracted into the tube). Allow sufficient time for both pins to lock.

STEP 5

Place the bucket onto the ground, stop the engine, engage parking brake, release pressure in the hydraulic system. See *"Releasing the Pressure in the Hydraulic System"*, page 176

STEP 6



Disconnect the hoses from the solenoid valve (6) and tube (7) and connect them to the bucket couplers (8).

Differential Lock

The differential lock gives equal power to both rear wheels. It is particularly useful when the wheels have insufficient adhesion, as in the following situations:

IMPORTANT: *Never use the differential lock during travel on a public highway.*

When the machine is stuck

STEP 1

Make sure that the rear wheels are not turning.

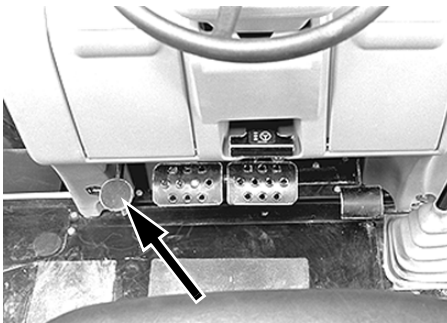
STEP 2



TV051169

Press the transmission dump button.

STEP 3



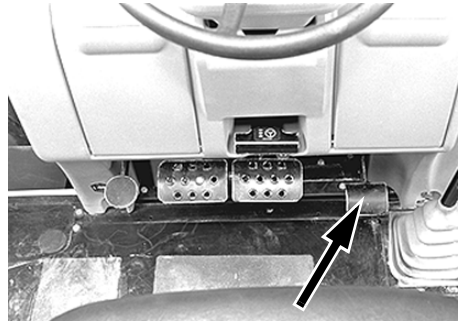
CK98F029

Push down the differential lock pedal and hold it down.

STEP 4

Engage a gear and release the transmission dump button.

STEP 5



CK98F029

Use the accelerator pedal to increase the engine speed and free the machine.

STEP 6

Stop the machine. Once free, push down the transmission dump button and then release the differential lock pedal.

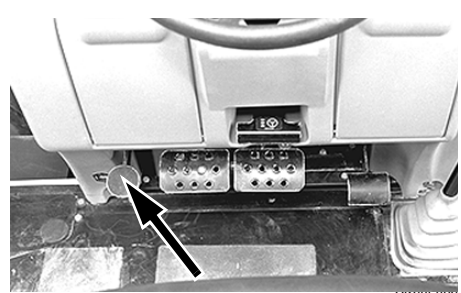
Before crossing a soft or muddy area

NOTE: *You can engage the differential lock when the machine is moving in a straight line.*

STEP 1

Make sure that the machine is moving in a straight line and that both rear wheels are turning at the same speed.

STEP 2



CK98F029

Push down the differential lock pedal and hold it down while you move the machine through the soft or muddy area.

Operating Instructions

STEP 3

After you have moved through the area, stop the machine push down the transmission dump button and then release the differential lock pedal.

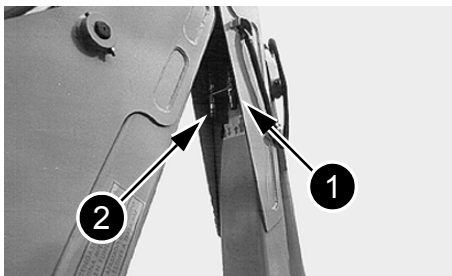
IMPORTANT: *You can cause damage to the transmission if you try to engage the differential lock when the machine is turning or if one rear wheel is rotating faster than the other rear wheel.*

Backhoe Attachment Auxiliary Hydraulic Tools (optional)

Before using auxiliary tools, it is necessary to proceed as follows:

- Place the direction of travel control lever (synchroshuttle only) or the transmission control lever (powershift only) in neutral position.
- Place the gear change lever in neutral (synchroshuttle only).
- Lower the loader bucket until it is pressing on the ground.
- Stop the engine, engage parking brake, release hydraulic pressure and remove the starter switch key. See "Releasing the Pressure in the Hydraulic System", page 176

STEP 1



Connect the tool hoses to (1) and (2) couplers located on the backhoe dipper.

NOTE: *The coupler is used to supply percussion tools, such as hydraulic hammers, compaction tools, tampers, etc.*

NOTE: *Oil delivery to the attachment must be through the male coupler.*

STEP 2



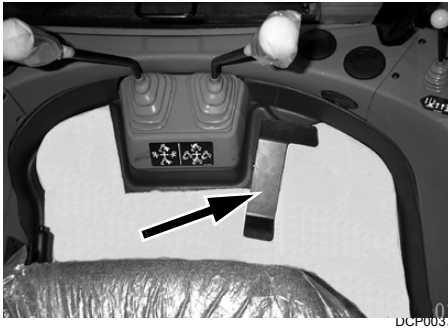
To operate the auxiliary hydraulics, use the rotary control on the side console, select the hydraulic hammer symbol.

WARNING:

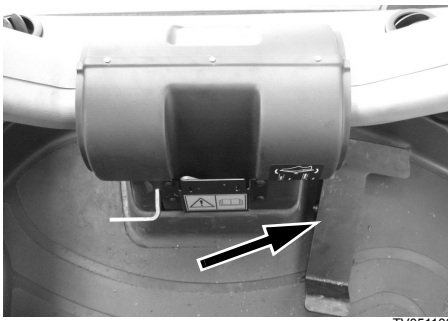


- Only single acting hydraulic tools can be fitted. If in doubt consult your local dealer.
- Move the switch to the "X" position when the auxiliary hydraulic circuit is not used.

STEP 3 Mechanical controls



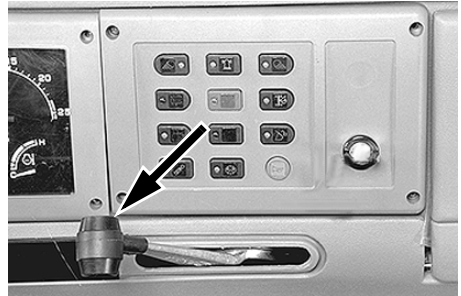
Servo controls



Press the toe of the pedal to supply oil through coupler (1).

Flow mode selection

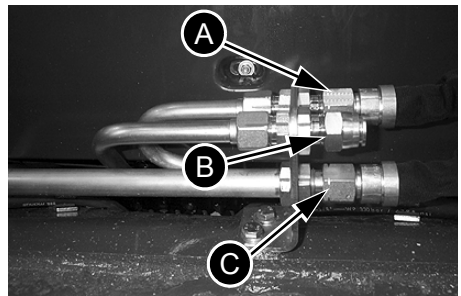
The operator must decide how much flow should be used by consulting the manufacturer's operating instructions. Be sure to select the flow recommended. Excess flow can damage some equipment.



Flow rate setting depends on the engine speed.

Single and double acting hydraulics

Hoses located as shown in the picture below. If in doubt, consult your dealer.



Located at the top of the back frame:

- For single acting hydraulics (e.g. hammer), connect pipes using (A) and (C).
- For double acting hydraulics (e.g. auger), connect pipes using (A) and (B) only.

No adjustment is necessary at the valve.

Load Lifting



WARNING: *Load lifting must be carried out in accordance with the instructions shown in this manual and in accordance with current regulations.*

For load lifting, it is essential that the machine is equipped with a load fixing point.

For lifting operations above 1000 kg, it is a legal requirement for the fitment of hose burst lockout valves on specific services.

To lift a load, the following instructions must be followed:

- Place the machine on flat, hard, level ground.
- Lower the loader attachment until the front wheels just touch the ground without supporting the weight of the machine.
- Lower the stabilizers until the rear wheels just touch the ground without supporting the weight of the machine.
- It is mandatory for the backhoe attachment to be in line with the machine and the sideshift carriage to be locked hydraulically (sideshift (offset) backhoe version).
- If the machine is equipped with an extendable dipper, it is mandatory for it to be completely retracted and mechanically locked.
- It is essential for the backhoe bucket cylinder rod to be completely extended.
- Use the load fixing point (never use other load fixing points). See "*Maximum Working Loads*", page 125. It is forbidden to weld hooks or lugs to the bottom of buckets.
- Use slings and chains in perfect condition, able to support the load to be lifted and with an effective device preventing the slings or chains becoming un-cooked.
- Check that the safety valves operate correctly. A pressure setting check must be carried out every six months in accordance with the manufacturer's instructions. Consult your local dealer.
- Do not allow any person within the machine's working range.
- Use the controls gradually so as to move the attachment accurately.

Maximum Working Loads

IMPORTANT: *Before lifting a load refer to the "Load Lifting" instructions*

Backhoe attachment

IMPORTANT: *The Safe Working Load of the backhoe is calculated using a standard bucket, therefore, when using any other bucket or attachment for "lifting" or "craning" the weight of the bucket or attachment must be taken into account when calculating the rated load of the backhoe.*

Safe Working Load

All models = 1000 kg (2204 lbs)

Loader attachment

IMPORTANT: *The Safe Working Load of the loader is calculated using a standard bucket, therefore, when using any other bucket or attachment for "lifting" or "craning" the weight of the bucket or attachment must be taken into account when calculating the rated load of the loader.*

Safe Working Load

All models = 1000 kg (2204 lbs)

Loader Bucket Mounted Forks (optional)



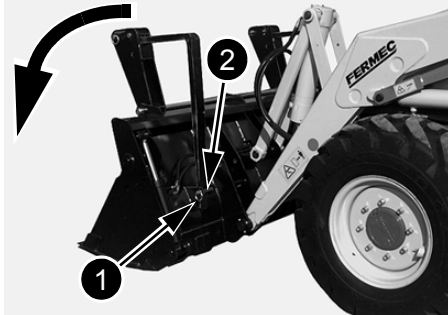
WARNING: The forks are heavy, so use extreme caution when swinging them into their working and stowage position.

Install forks in working position

STEP 1

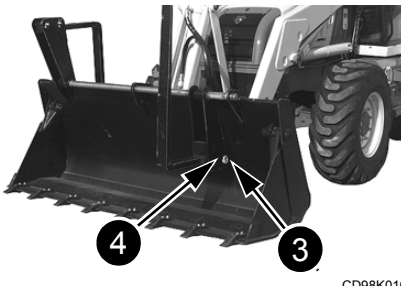
Place the loader bucket onto the flat level ground stop the engine, engage parking brake and remove the starter switch key.

STEP 2



Remove the retained pin (1) and the pin (2), then lower the bracket.

STEP 3



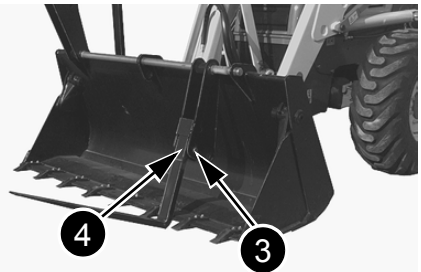
Hold the fork and remove the retained pin (3) and the pin (4).

STEP 4



Lower the fork into position against the bucket cutting edge.

STEP 5



Install the pin (4) and the retained pin (3).

STEP 6

Repeat steps 2 to 6 for the other fork.

STEP 7

Slide the forks until they are suitably spaced for the intended job.

IMPORTANT: That both forks must be spaced equally each side of the centre of the bucket.

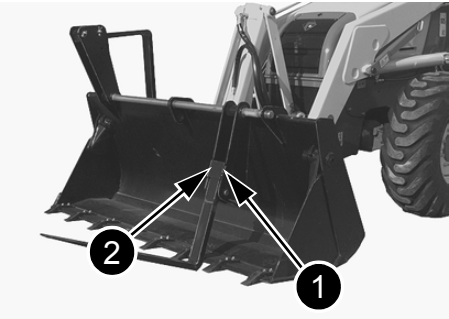
IMPORTANT: The forks must be lying against the cutting edge, not against the bucket teeth.

Install the forks in the rest position

STEP 1

Place the bucket onto firm level ground, stop the engine, engage parking brake and remove the starter switch key.

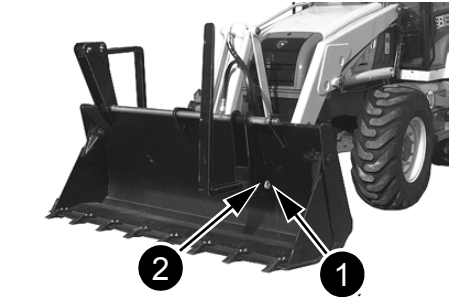
STEP 2



CD98K017

Support the fork. Remove the retained pin (1) and the pin (2).

STEP 3



CD98K016

Raise the fork and install the pin (2) and the retained pin (1).

STEP 4



CD98K004

Raise the fork and the bracket.

NOTE: If necessary slide the fork to bring it into its housing.

STEP 5



CD98K004

Install the pin (3) and the retained pin (4).

STEP 6

Repeat steps 2 to 5 for the other fork.

IMPORTANT: The forks must be securely retained in their proper transport positions using the correct pins and linch pins. Improperly stowed forks may cause serious injury.

Transporting the Machine

On a railway wagon

Since railway transport is subject to special regulations, please consult an approved organization.

On the trailer of an articulated vehicle

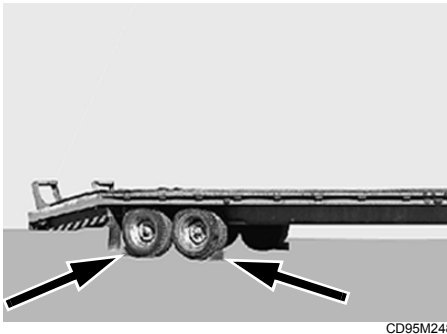


WARNING: This machine can slip and fall from a trailer or ramp and cause serious physical injury. Make sure that the trailer and the ramp are both clean. The machine must be in line with the trailer before being loaded.

Make sure you know the safety rules and regulations before transporting this machine. Make sure that the articulated vehicle and the machine are fitted with the correct safety equipment.

Loading

STEP 1



Place a chock behind the wheels of the trailer. Install the trailer side extensions (if equipped).

STEP 2

Place the backhoe attachment in the road travel position. See “Setting the Backhoe Attachment in the Road Travel Position”, page 116.

STEP 3

Raise the loader bucket approximately 20 cm (8 inch) above the ramps.

STEP 4

Select 1st gear and load the machine carefully onto the trailer.

STEP 5

Lower the loader attachment so that the bucket is resting on the bed of the trailer.

STEP 6



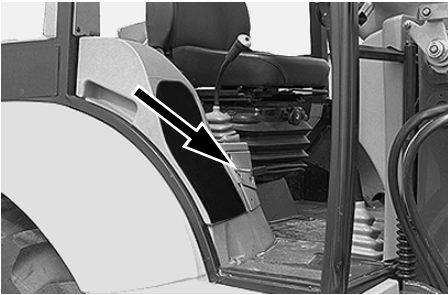
Engage the parking brake and place the direction of travel control lever and gear change lever in the neutral position (synchroshuttle only) or the transmission control lever in the neutral position (powershift only).

STEP 7



Stop the engine and remove the starter switch key.

STEP 8



CK98F030

Lock the loader attachment controls by means of the control locking lever (if equipped).

STEP 9

Make sure the windows, doors (cab version) and engine bonnet are closed and correctly fastened.

STEP 10



CD98F075

Turn the rear view mirrors inwards.

STEP 11

Use chocks and chains to secure the machine and the loader attachment on the trailer.

STEP 12

Measure the distance between the ground and the highest point. You must know the total height.

IMPORTANT: *After a short distance, check that the machine has not moved and that the chains are still under tension.*

Unloading

STEP 1

Remove the chocks and the retaining chains.

STEP 2

Return the rear view mirrors to their correct position.

STEP 3

Unlock the loader attachment controls by means of the control locking lever (if equipped).

STEP 4

Raise the loader attachment to bring the bucket clear of the bed of the trailer.

STEP 5

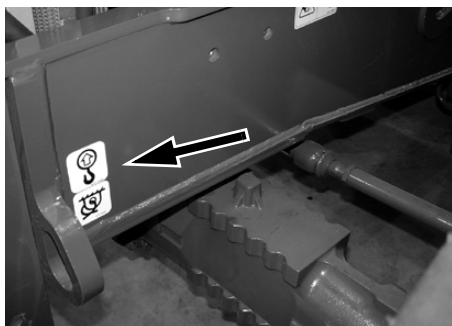
Release the parking brake and select 1st gear.

STEP 6

Slowly reverse the machine, so as to keep the loader attachment permanently a few centimetres above the bed of the trailer and the ramps.

Lifting the Machine

IMPORTANT: Before lifting the machine, it is essential to place the backhoe attachment in the road travel position. See "Setting the Backhoe Attachment in the Road Travel Position", page 116.



The lifting points for the machine are shown by decals. See "Decals", page 20.

IMPORTANT: Never use any other lifting points than those shown by the decals.

Use suitable slings to lift the machine.

Make sure that the slings are in perfect condition and that they can take the weight of the machine. See "General Dimensions and Weights", page 251.



WARNING: Do not allow anybody within the machine's working range. Never swing the machine over people who are in close proximity.

NOTE: See "Machine weight" in the "Specifications" section.

Towing the Machine

The machine should only be towed when it is undriveable.

First of all make sure that it can be towed without causing further damage.

Whenever possible carry out the repair at the site or consult your local dealer.

If the machine is on the public highway, make sure that no component of the machine projects onto the highway. If this cannot be avoided, install signs in accordance with regulations.



WARNING: Towing is a delicate operation which is always performed at the risk of the user. The manufacturer's guarantee does not apply to incidents or accidents occurring during towing. Whenever possible, carry out the repair at the location, without towing the machine.



WARNING: It is essential for a tow bar to be used for towing the machine.



WARNING: The machine must be towed very slowly (15 kph (9 m.p.h.) maximum), over a short distance and only if it is really necessary. Allow plenty of time to turn with the engine stopped, as with no power assistance much more effort is required.



WARNING: With engine stopped, the braking operation requires much more effort.



WARNING: When towing, the operator must be alone on the machine. Make sure that no other person is on the machine or within the machine's working range.

Operating the Machine in Water

IMPORTANT: *Never work in water if the water level is higher than the centre of the front wheels.*

IMPORTANT: *Never work in fast-flowing water.*

1. Make sure that the bed of the stream or stretch of water can support the weight of the machine.
2. Before taking the machine into the water, pump plenty of new grease into the machine's attachment linkages.

Parking the Machine

STEP 1

Park the machine on firm, level ground away from any soft ground or excavations.

STEP 2

Lower the loader bucket to the ground.

STEP 3

All models

Lock the loader attachment by means of the control locking lever (if equipped).

STEP 4

Engage the parking brake and place the direction of travel control lever and gear change lever in neutral position (synchroshuttle only), or the transmission control lever in neutral (power-shift only).

STEP 5

Place the backhoe attachment in the road travel position. See *"Setting the Backhoe Attachment in the Road Travel Position"*, page 116.

STEP 6

Release the hydraulic pressure. See *"Releasing the Pressure in the Hydraulic System"*, page 176

STEP 7

Lock the operator's compartment doors (cab version).

STEP 8

Disconnect the electrical system by means of the battery master switch key (optional).

STEP 9

If the machine is parked outdoors, cover the exhaust pipe so as to protect the engine against damp.



WARNING: *Check that no part of the machine is protruding onto the public highway. If this cannot be avoided, install signs in accordance with regulations.*

Instructions for Use



WARNING: *Observe the instructions for use shown in this chapter. Any other practice without the prior approval of the manufacturer is considered as being forbidden.*

Road operation

IMPORTANT: *Road speed is subject to restrictions in certain countries. It is the operator's responsibility to limit the machine speed accordingly.*

- Before carrying out any road travel, lock the attachments and install the safety systems required by regulations. The machine must be within the maximum dimensions permitted on the road in accordance with local road traffic regulations.
- Raise the stabilizers completely.
- Check that the lighting and signalling systems operate correctly.
- Check that the brakes and steering operate correctly.
- Check the condition and pressure of the tyres.
- Never leave the operator's compartment with the engine running.
- Never use the differential lock.
- All road travel should be undertaken with the front drive axle (4 wheel drive) disengaged.

Job site operation

- Be vigilant, be aware of places where other persons are working close to your working area. Keep other persons away from the machine. Serious physical injury can result if these instructions are not observed.
- Make sure you know the location of underground pipes or cables before beginning work. Electrical cables, gas pipes, water pipes or other underground installations can cause serious physical injury.
- Adapt your driving style to suit the conditions of work (sloping ground or rough ground), the state of the road and weather conditions.
- When travelling at right angles to the slope keep the loader bucket at ground level.
- When travelling in the same direction as the slope, move onto the slope in 1st gear. Never travel down slopes with the gear change lever (synchroshuttle only) in the neutral position.
- When working on a slope, engage the front drive axle (4 wheel drive).
- Holes, obstacles, debris and other hazards in the working area can cause serious physical injury. Always walk around and identify all possible hazards before operating the machine in a new working area.
- Do not work close to live overhead electric lines without first making sure that the minimum distances are observed:
 - Under 57,000 volts: 3 metres (9.8ft).
 - Over 57,000 volts: 5 metres (16.4 ft).

Road Travel



WARNING: Always fasten your seat belt before travelling on the road.



WARNING: It is essential to lock the attachments and install the safety systems required by regulations before travelling on the road.



WARNING: Check that the lighting and signalling systems are operating correctly before travelling on the road.



WARNING: Before undertaking any road travel, make sure that the backhoe attachment is in the road travel position and mechanically immobilized.

STEP 1

Place the backhoe attachment in the road travel position. See “Setting the Backhoe Attachment in the Road Travel Position”, page 116.

STEP 2



CK98F024

Make sure that the engine throttle lever is in the low idle position.

STEP 3

Make sure the stabilizers are completely raised.

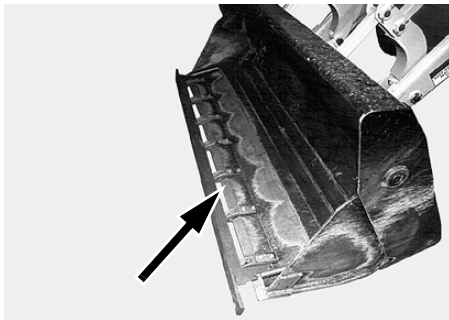
STEP 4

Place the seat in the loader attachment position.

STEP 5

Raise the loader attachment about 20 cm (8 inch). above the ground and roll back the loader bucket completely. Stop the engine, engage parking brake and remove the starter switch key.

STEP 6



CP98D028

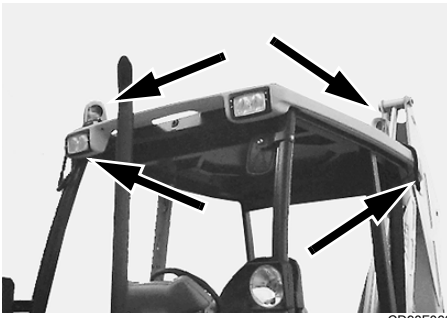
Install the tooth-cover and the warning panels on the loader bucket (optional or specific to certain countries).

STEP 7



Adjust the rear view mirrors correctly.

STEP 8

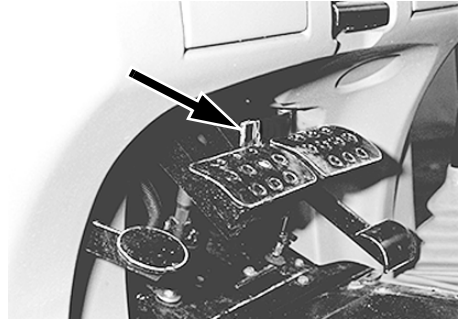


Place the rotating beacons on the cab roof and connect the cables.

STEP 9

Make sure that the doors (if equipped) are closed correctly and that the engine bonnet is fastened.

STEP 10



Make sure that the two brake pedals are locked together.

STEP 11



Adjust the operator's seat correctly and fasten the seat belt.

STEP 12



Make sure the direction of travel control lever (synchroshuttle only) or the transmission control lever (powershift only) is in the neutral position and start the engine.

STEP 13



CK98F030

Lock the loader attachment controls by means of the control locking lever (if equipped).

STEP 14



CK99E004

Make sure the steering mode switch is in two wheel steering position and it is locked with the tab (970/980 only).

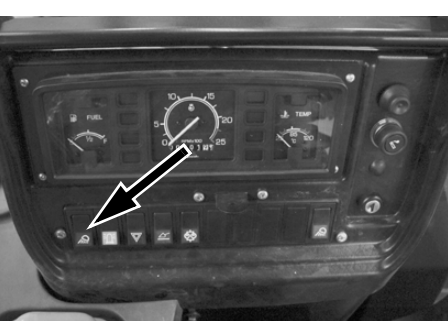
STEP 15



CK98F024

Make sure that 4 wheel drive is disengaged.

STEP 16

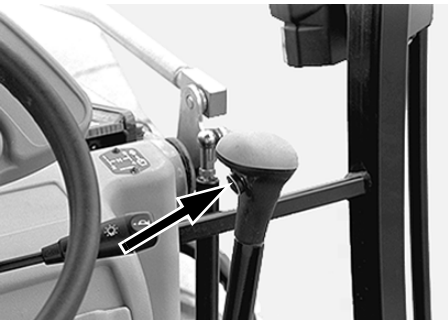


DSC05602

Turn on the rotating beacons.

STEP 17

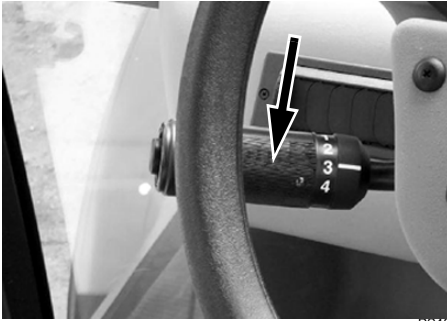
Synchroshuttle only



CK98F025

Press the clutch transmission dump button and then place the gear change lever in 3rd or 4th gear. Release the button.

Powershift only



PS4S

Select 3rd or 4th gear.

NOTE: (Specific to certain countries), there is no 4th gear.

STEP 18



CK98F033

Press the brake pedals down and release the parking brake.

IMPORTANT: In the event of a brake system failure, immediately engage the parking brake.



WARNING: Check all gauges and indicator/warning lamps frequently.

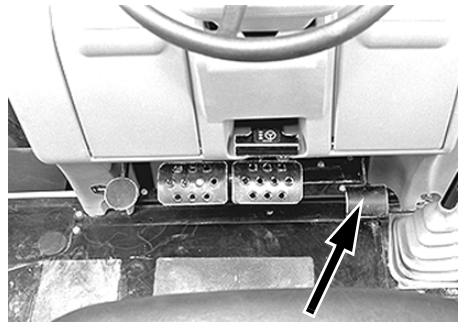
STEP 19



CP99D002

Move into forward position, the direction of travel control lever (synchroshuttle only) or transmission control lever (powershift only).

STEP 20



CK98F029

Release the brake pedals and control the travel speed by means of the accelerator pedal.



WARNING: Never use the differential lock pedal.

Job Site Travel

NOTE: After road travel, remove all the road safety devices before carrying out any job site travel.

STEP 1



Make sure the engine throttle lever is in the low idle position.

STEP 2

Make sure the stabilizers are completely raised.

STEP 3

Make sure the doors (cab version) are closed correctly and the engine bonnet is fastened.

STEP 4



Adjust the operator's seat correctly and fasten the seat belt.

STEP 5



Make sure the direction of travel control lever (synchroshuttle only) or the transmission control lever (powershift only) is in the neutral position.

STEP 6

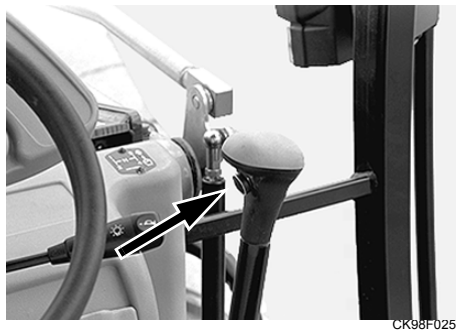
Start the engine.

STEP 7

Raise the loader attachment about 20 cm (8 inch) off the ground.

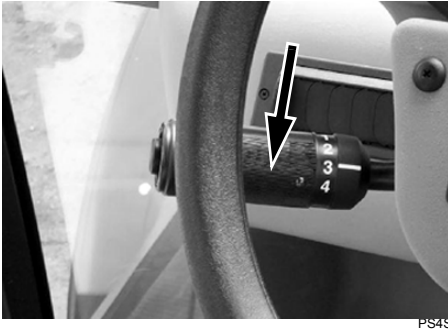
STEP 8

Synchroshuttle only



Press the clutch transmission dump button and then place the gear change lever in 1st or 2nd gear. Release the button.

Powershift only



Select 1st or 2nd gear.

STEP 9



Press the brake pedals down and release the parking brake.

STEP 10



Move into forward position, the direction of travel control lever (synchroshuttle only) or transmission control lever (powershift only).

NOTE: Wait for the machine to stop completely before changing the direction of travel. The life of the transmission clutch will be shortened if changes of direction are made while the machine is moving.

STEP 11



Release the brake pedals and control the travel speed by means of the accelerator pedal.



WARNING: While travelling, check all gauges and indicator/warning lamps frequently.

Loader Attachment Operating Instructions

The instructions contained in this chapter do not cover all possible conditions of use of the loader attachment. They only constitute basic information to enable the machine to be operated correctly.

NOTE: *The first time it is operated, manoeuvre the machine in a clear area, at low speed.*

NOTE: *To operate the controls, see "Loader Attachment Controls", page 73.*

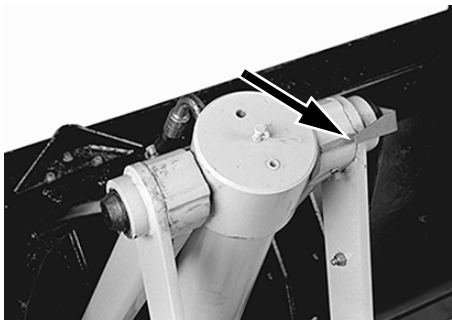


WARNING: Automatic loader bucket levelling only operates when raising the attachment; it does not operate when lowering the attachment. You must take care to keep the bucket level during attachment lowering to avoid the load being dumped.

Safety instructions

- Be careful.

Standard bucket level indicator



CK98G003

- Make sure that the operator's seat is correctly adjusted in the loader attachment position.
- Use the seat belt.
- Make sure that no other person is in the working range of the machine.

Transmission dump button



CK98F033

Release the transmission dump button to engage the transmission once more.

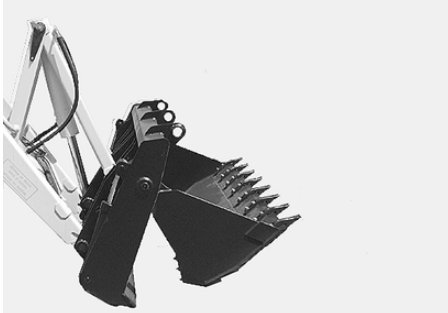
Located on the bucket cylinder, this indicator enables the loader bucket to be positioned flat when the pointer is opposite the red pointer.

7 in 1 loader bucket (if equipped)

NOTE: Raise the attachment so that the bucket is about 20 cm (8 inch) above the ground.

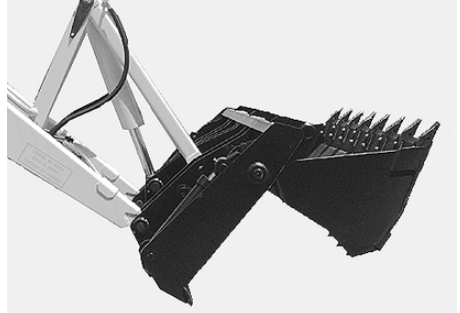
NOTE: Ensure lifting or handling weight does not exceed 1000 kg (2204 lbs)

Scraper position



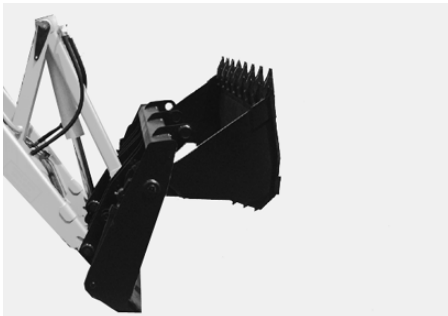
CD98F040

Clamshell configuration



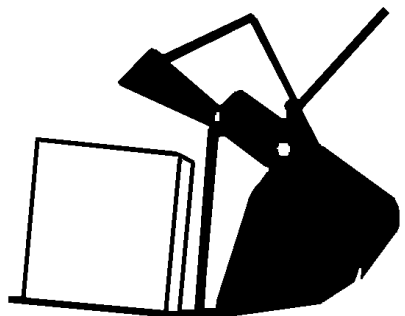
CD98F043

Dozer blade configuration



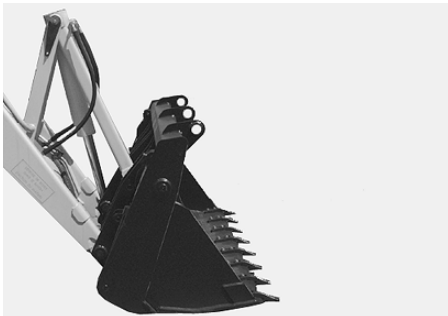
CD98F041

Load handling configuration



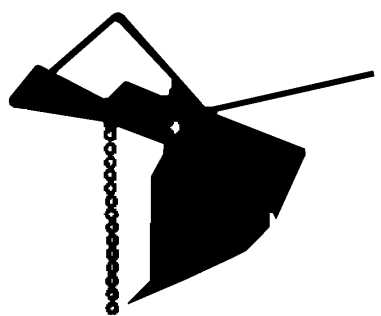
CS98N502

Loader bucket configuration



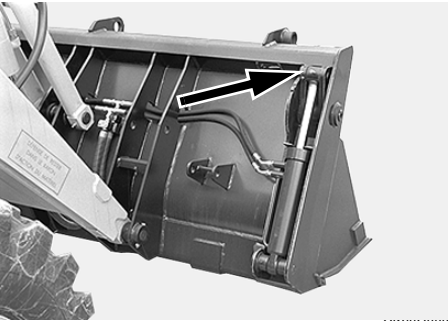
CD98F042

Load lifting configuration



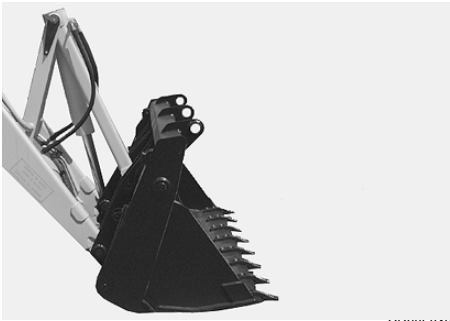
CS98N503

7 in 1 loader bucket clam opening indicator (if equipped)



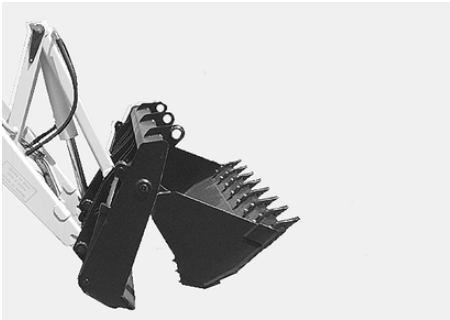
CK98G008

Located on the cylinders of the clam, this indicator enables the clam opening and depth of penetration of the bucket to be selected when the bucket is in the scraper configuration.



CD98F042

Clam closed.



CD98F040

Clam opening.

Return-to-dig

After dumping the load, use this function to bring the bucket back into digging position and to renew the digging cycle automatically.



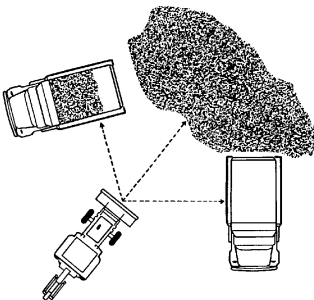
DSC05524



DSC05525

Move the control lever in position (1) and release. The bucket will tilt backwards until the bottom of the bucket is level, then it will stop.

Organising the job site



CS95M227

Use the shortest possible work cycle. The location provided for the trucks is an all important element. Spend a little time levelling the work area.

A smooth working surface facilitates the work of the machine and moving and parking the trucks. It gives a shorter work cycle.



WARNING: Operating the loader attachment with a full bucket on sloping ground can cause the machine to turn over. If possible avoid turning the steering wheel and always travel forwards when climbing a slope and in reverse when travelling down a slope. Keep the bucket as close as possible to the ground. There is a risk of accident if these instructions are not observed.



WARNING: On the job site, always keep the bucket as close as possible to the ground so as to increase the machine's stability to the maximum and to ensure perfect visibility.



WARNING: On rough or slippery ground, when the bucket is full, drive the machine as slowly as possible. If these instructions are not observed there is a risk of accident.

Heaped material

Using the indicator, check that the bottom of the bucket is in the horizontal position.

Drive the machine into the heap of material. When the speed of the machine starts to decrease, raise the attachment and crowd the bucket backwards.

Backhoe Attachment Operating Instructions

The instructions contained in this chapter do not cover all possible conditions of operation for the backhoe attachment. They only constitute basic

information to enable the machine to be operated correctly.

NOTE: *The first time it is operated, manoeuvre the machine in a clear area, at low speed.*

NOTE: *For the operation of the controls, see “Backhoe Attachment Controls”, page 78.*

Safety instructions

- Be careful.
- Make sure that the operator's seat is correctly adjusted in the backhoe attachment position.
- Use the seat belt.
- Make sure that no other person is in the working range of the machine and be aware of people entering the working range of the machine during operation.
- Place the attachment in the working position. See “*Setting the Machine in the Backhoe Attachment Working Position*”, page 112.
- Never dig near or under the stabilizers, since the machine could fall into the excavation.
- When working in an area of reduced visibility, for example next to a building, place a safety barrier and sign panels to prevent anyone coming near the machine.

General

The backhoe attachment will dig more quickly if the work cycle is short and uninterrupted. Organize your work site so as to obtain a smooth work cycle.

If you try to take a very big cut with the backhoe bucket, you may cause a hydraulic stall situation (where the dipper control lever is pulled towards the operator but nothing happens). The hydraulic system main relief valve makes a noise when a hydraulic stall occurs. This overload causes the work cycle to be prolonged and it increases the hydraulic temperature.

Moving the machine forwards when working on flat ground

It is possible to use the backhoe attachment to push the machine forward whilst excavating.

1. Make sure that no other person or obstacles are in the working range of the machine.
2. Make sure that the front wheels are straight.
3. Set the engine speed to 1000 rpm.
4. Release the machine's brakes by means of the parking brake.
5. Make sure that the direction of travel and gear change levers are both in the neutral position (synchroshuttle only), or the transmission control lever is in neutral position (powershift only).
6. Raise the boom and retract the dipper, then move the boom so as to place the backhoe bucket teeth on stable ground.
7. Raise the stabilizers and the loader bucket about 20 cm (8 inch) from the ground.
8. Use the boom and dipper to move the machine.
9. After moving the machine, lower the stabilizers and place the loader bucket on the ground, then level the machine.
10. Use the parking brake to brake the machine.

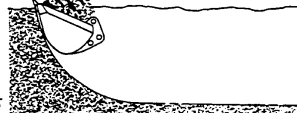
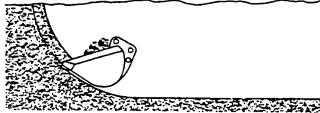
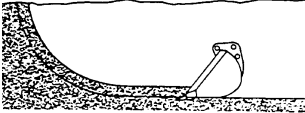
NOTE: *This procedure can only be used on flat ground. Never use it on sloping ground. On sloping ground it is essential to turn the operator's seat to the loader attachment position to move the machine by the normal procedure.*

Filling the backhoe bucket

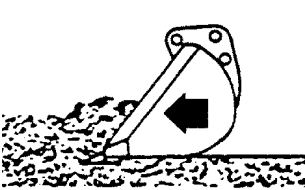
Fill the backhoe bucket by manoeuvring the boom and dipper. Keep the bottom of the backhoe bucket parallel to the cut. The backhoe

bucket teeth and blade must cut the ground like the blade of a knife. The depth of dig varies depending on the type of material.

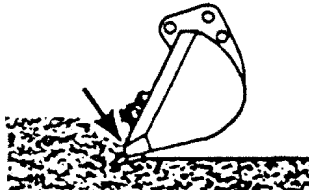
Excavating method



PDH0493M

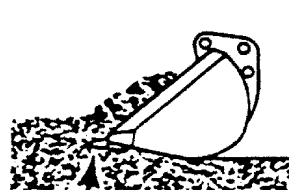


CORRECT



WRONG

The backhoe bucket will dig in and cause a stall.



WRONG

The bucket is pushed upwards. This will also increase the cycle time.

PDH0494M

Servicing Instructions

Observe the servicing intervals by checking the hourmeter every day. Before starting maintenance, park the machine on flat, firm ground, away from any obstacles, with the loader bucket and the backhoe bucket on the ground. All maintenance operations must be carried out with the engine stopped and the key removed from the starter switch. It is preferable to wait for all circuits to cool down before starting work.

Clean the grease fittings before lubrication. Clean around plugs and filler holes before adding oil. No dust or dirt must enter the components or the circuits.



WARNING: *There is a risk of serious injury if maintenance or repairs are not performed correctly. If you do not understand the maintenance procedures, consult your local dealer.*



WARNING: *If the attachment is raised or the machine moves when there is no operator, serious injury can result. Before carrying out any servicing operator on this machine, proceed as follows :*

1. *Park the machine on a flat, level ground.*
 2. *Lower the loader and backhoe attachments until they are resting on the ground.*
 3. *Stop the engine and remove the starter switch key.*
 4. *Engage the parking brake.*
 5. *Lock the loader attachment controls (all models, if equipped).*
 6. *Block the wheels to prevent any machine movement.*
- For all service work on the engine, install the loader attachment support strut.*



WARNING: *Never leave the operator's compartment when the engine is running.*

When performing maintenance work on the machine, place a "Do not start up" label on the instrument panel.

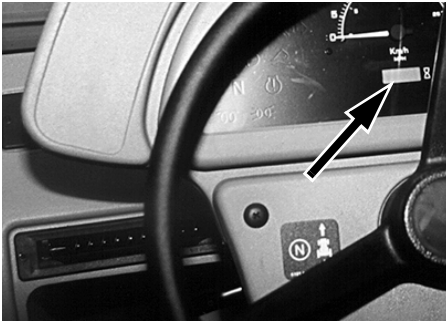
Any modification to this machine without prior authorization could cause serious injury. Do not make any modifications without authorization. Consult your local dealer.

IMPORTANT: *If you use your machine under particularly severe conditions (dusty or corrosive atmosphere, etc.) reduce the interval between servicing operations.*

IMPORTANT: *Observe the Servicing Intervals for all the machine's filters. The life of the engine depends on clean filters.*

IMPORTANT: *Do not drain used oil into the ground or down a drain. Stock the oil in sealed containers for collection by a company which recycles or disposes of it.*

Hourmeter



CD98F031

The hourmeter enables servicing operations to be scheduled. It works in the same way as a clock when the engine is running.

Servicing Intervals are properly calculated to guarantee safe and efficient machine operation.

Be sure to carry out all the servicing operations properly, as defined in this manual.

Intervals

PAGE	SERVICE POINTS	NO. OF POINTS	INTERVALS IN HOURS				
			CLEAN	REPLACE	CHECK	GREASE	DRAIN
154	Front axle pivots	1				10	
156	Loader attachment pivots	14				10	
157	7 in 1 loader bucket (NOTE 2)	4				10	
159	Backhoe attachment pivots (Sideshift offset) backhoe)	23				10	
162	Backhoe attachment pivots (Centremount (axial) backhoe)	24				10	
165	Engine oil level	1			10		
165	Engine coolant level	1			10		
172	Brake fluid level	1			10		
154	Front axle kingpins & rear on 970/980	4				50	
154	Rear cardan shaft joints	3				50	
154	Front cardan shaft joints (NOTE 1)	3				50	
165	Radiator level	1			50		
165	Hydraulic fluid level	1			50		
165	Transmission oil level (NOTE 3)	1			50		
199	Tyres pressure	4			50		
207	Parking brake	1			50		
154	Front & rear drive axle universal joints (NOTE 1)	4				250	
155	Pedal pivots	4				250	
158	Feedback linkage loader attachment	4				250	
169	Cooling system hoses and hose clamp tightness	-			250		
166	Front drive axle oil level (NOTE 1)	1			250		
166	Front reduction gear oil level (NOTE 3)	2			250		
166	Rear axle oil level	1			250		
192	Front axle breather (NOTE 2)	1			250		
194	Rear axle breather	1			250		
199	Wheel nut torque setting (NOTE 3)	-			250		

PAGE	SERVICE POINTS	NO. OF POINTS	INTERVALS IN HOURS				
			CLEAN	REPLACE	CHECK	GREASE	DRAIN
203	Engine alternator and fan belt (NOTE 3)	1			250		
205	Compressor lubrication (NOTE 2)	1			250		
205	Compressor drive belt (NOTE 2)	1			250		
209	ROPS/FOPS cab	-			250		
211	Steering system fasteners, ball joints and pivots	-			250		
211	Power steering system pipes, hose and unions	-			250		
211	Transmission mounting bolt torque (NOTE 3)	8			250		
188	Transmission oil filter (synchroshuttle and powershift) (NOTE 3))	1		500			
206	Air intake filter cab heater	1	500				
168	Engine oil (NOTE4)	1		500			
168	Engine oil filter	1		500			
173	Fuel filter	1		500			
209	Bleed brakes	2		500			
179	Hydraulic fluid return filter (NOTE 3)	1		1000			
180	Intake strainer of hydraulic fluid (NOTE 3)	1	1000				
181	Hydraulic fluid	1					1000
183	Air filter primary element	1		1000			
189	Transmission screen filter (synchroshuttle only) (NOTE 3)	1	1000				
194	Front drive axle oil (NOTE 1) (NOTE 3)	1					1000
195	Front reduction gear oil (NOTE 3)	2					1000
197	Rear drive axle oil (NOTE 3)	1					1000
197	Rear reduction gear oil (NOTE 3)	2					1000
170	Engine coolant	1					1yr
207	Parking brake	1			2000		
204	Machine inspection and cleaning	-			(1)		
175	Bleeding the fuel system	1			(1)		

Servicing Intervals

PAGE	SERVICE POINTS	NO. OF POINTS	INTERVALS IN HOURS				
			CLEAN	REPLACE	CHECK	GREASE	DRAIN
196	Bleeding the primary water separator	1					(1)
176	Fuel tank	1					1000
183	Air intake system (NOTE 3)	-			(1)		
184	Air filter primary element (NOTE 3)	1	(1)				
183	Air filter secondary element	1		(1)			
202	Radiator and oil cooler	-	(1)				
212	External bearing pads on extendable dipper (NOTE 2)	-		(1)			
221	Bucket tooth tightening torque	-			(1)		

NOTE 1: 4 wheel drive machine.

NOTE 2: If equipped.

NOTE 3: After the first 50 hours during the running-in period.

NOTE 4: Reduce the service interval to 250 hours if the percentage of sulphur in the fuel is above 0.2%.

(1) As required

Fluids and Lubricants

Fluids and lubricants must have the correct properties for each application.



WARNING: *It is mandatory to observe the instructions for use of the various fluids and lubricants.*

Hydraulic fluid

Hydraulic fluid is specially designed for high pressure applications and for hydraulic system. The type of fluid to be used depends upon the ambient temperature.

Temperate climates

Up to +30°C (86°F)

Fluid type: ISO VG 46

Hot climates

Up to +50°C (122°F)

Fluid type: ISO VG 68

Brake fluid 'Safim' Brake System Only

Type of oil to be used: Mobiloil LHM (Mineral brake fluid)

Transmission component oil

Synchroshuttle

- Texamatic 7045E
- ATF TypeA SuffixA
- Dextron II D
- Dextron III G
- Allison C4

Powershift

- Texamatic 7045E
- ATF TypeA SuffixA
- Dextron II D
- Dextron III G
- Allison C4

Grease

General:

Extreme pressure grease EP NLGI grade 2.

Components:

- Back hoe swing
- Prop. shafts
- Drive shafts U.J.
- Axle(s) king pins

Extreme pressure grease EP NLGI grade 2 with molybdenum disulphide.

Rear axle oil

Type of oil to be used: API GL4 grade 80W

Front axle oil (4 Wheel drive)

Type of oil to be used: API GL5 grade 80W-90

Engine oil

The engine oil to be used depends on the ambient temperature.

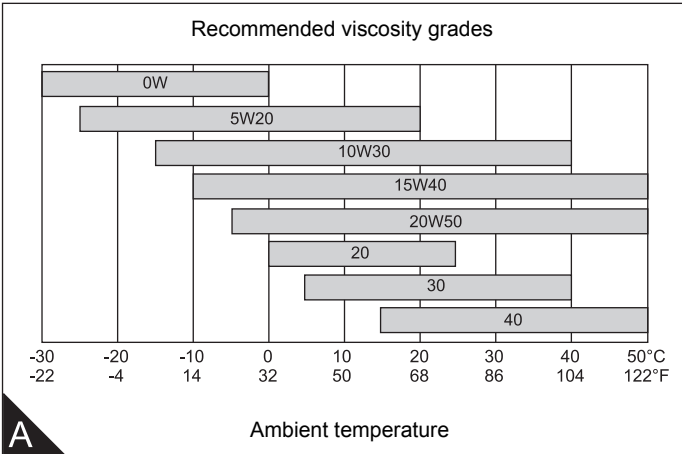
NOTE: *Do not put any performance additive or other additive in the sump. Oil change intervals shown in this manual are based on tests carried out on lubricants.*

Lubrication oil specification

Always make sure that the correct viscosity grade of lubricating oil is used for the ambient temperature range in which the engine will run as shown in the chart (A).

Use only a good quality lubricating oil to the minimum specification of:

- EMA DHD-1 Multigrade (preferred oil)
- API CH-4 Multigrade (preferred oil)
- ACEA E3
- API CG-4
- ACEA E5



CHN00001

Coolant specification

The quality of the coolant that is used can have a great effect on the efficiency and life of the cooling system. The recommendations indicated below can help to maintain a good cooling system and to protect it against frost and/or corrosion.



CAUTION: *An anti-freeze which contains the correct inhibitor must be used at all times to prevent damage to the engine by corrosion, because of the use of aluminium in the coolant circuit.*



CAUTION: *If frost protection is not necessary, it is still extremely important to use an approved anti-freeze mixture because this gives a protection against corrosion and also raises the boiling point of the coolant.*

NOTE: *If combustion gases are released into the coolant circuit, the coolant must be renewed after repair of the fault.*

If it is possible, use clean soft water in the coolant.

The quality of the anti-freeze coolant must be checked at least once a year, for example, at the beginning of the cold period. The coolant must be renewed every two years.

Anti-freeze/anti-corrosion

Use anti-freeze in all seasons to protect the cooling system from corrosion and all risk of freezing.

For areas where ambient temperatures are over -36°C (-33°F), use a blend of 50% ethylene-glycol based anti-freeze.

For areas where temperatures are below -36°C (-33°F), it is advisable to use a blend of 40% water and 60% anti-freeze.

Fuel

The fuel to be used must be in conformity with the D975-91 Class 2-2DA, US DF1, US DF2, US DFA standard of the American Society for Testing and Materials (ASTM).

The use of other fuels may cause loss of engine power, excessive fuel consumption and may reduce the life of the fuel injection equipment.

In cold weather, a mixture of fuel no. 1 and no. 2 is temporarily permitted. Consult your fuel supplier.

If the temperature falls below the fuel cloud point (point at which wax appears), wax crystals in the fuel will cause a loss of engine power or make it impossible to start the engine.

IMPORTANT: *In cold weather, fill the fuel tank after each day's work, to prevent the formation of condensation.*

Fuel Storage

Prolonged fuel storage causes foreign bodies or condensation water to accumulate in the storage tank. Many engine failures are caused by the presence of water in fuel.

Condensation water should be drained off at regular intervals.

Low sulphur fuel

% of sulphur in fuel	Oil change interval
< 0.2%	Normal
> 0.2%	0.50 of normal

Environment

Before carrying out any maintenance operation on the machine and before disposing of used fluids or lubricants, always think of the environment. Never throw oil or fluid on the ground and never put them in leaky receptacles.

Consult a local recycling or environmental centre, or a local dealer to obtain information on the correct method of disposing of these materials.

Plastic and Resin Parts

When cleaning plastic windows, the console, the instrument panel, the gauges, etc., avoid the use of petrol, paraffin, paint solvents, etc. Use only water, soap and a soft cloth.

The use of petrol, paraffin, paint solvents, etc. will cause discoloration, cracks or deformation of these parts.

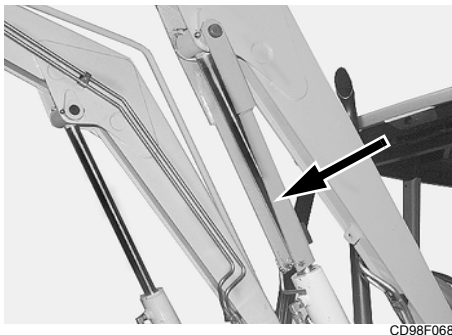
Engine Access

NOTE: *Many of the checks and operations referred too in this section require access to the engine. Take the following steps to safely gain access to the engine.*

STEP 1

Park the machine on flat, level ground.

STEP 2



Raise the loader attachment, stop the engine, engage parking brake, remove the starter switch key and install the support strut. see *"Loader Attachment Support Strut", page 97*

STEP 3



Unlock the engine bonnet and swing it open.

Grease Points

Machine

Tool required

- Grease gun (delivered with machine)

Grease specification	See "Fluids and Lubricants", page 150 or 254.
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NOTE: The figures shown in brackets indicate the number of grease points.

Every 10 hours



DSC05528

Front axle pivot(1)

Every 10 hours



DSC05528

Front axle swivel (both sides)(2)

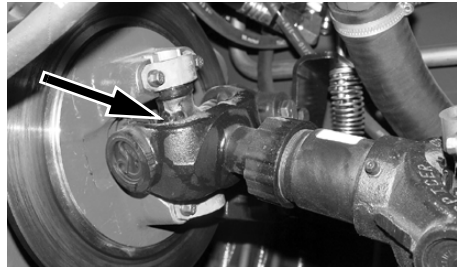
Every 10 hours



DSC05529

Front axle swivel (both sides)(2)

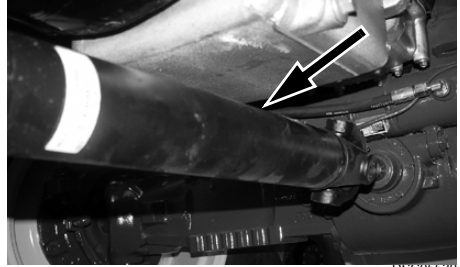
Every 50 hours



DSC05531

Rear cardan shaft joints(3)

Every 50 hours



DSC05530

Front cardan shaft joints (4WD).....(3)

Pedal pivot

Tool required

- One oil can

Every 250 hours



DSC05532

Pedal pivots..... (4)

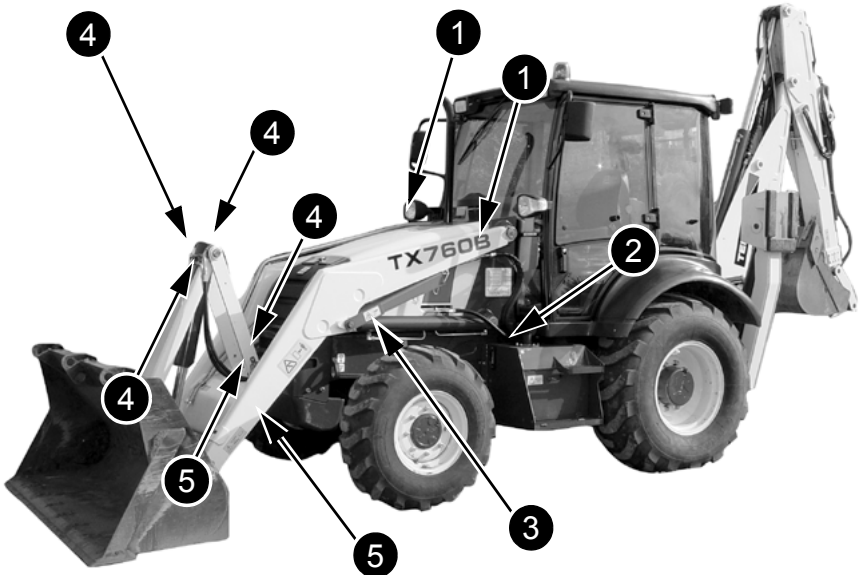
Loader attachment

Tool required

- Grease gun (delivered with machine)

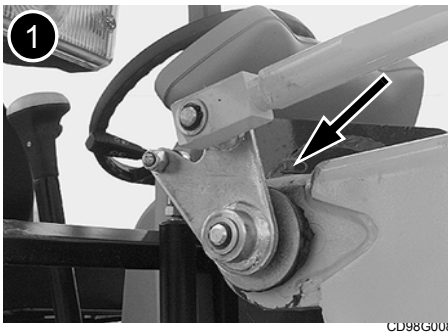
Grease specification	See "Fluids and Lubricants", page 150 or 254.
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NOTE: The figures shown in brackets indicate the number of grease points.



DSC04520

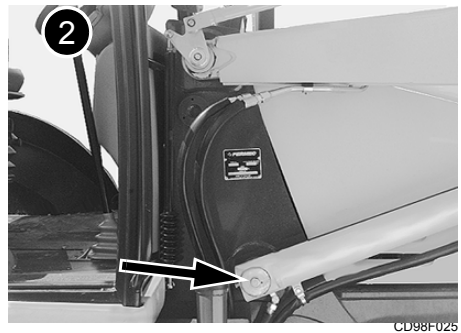
Every 10 hours



CD98G008

Beam linkage (all models)(2)

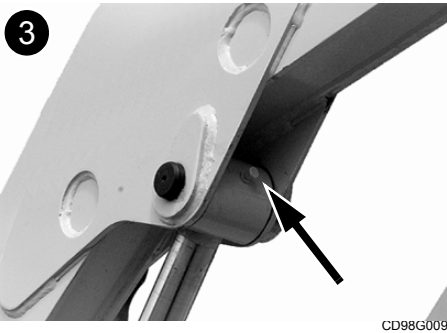
Every 10 hours



CD98F025

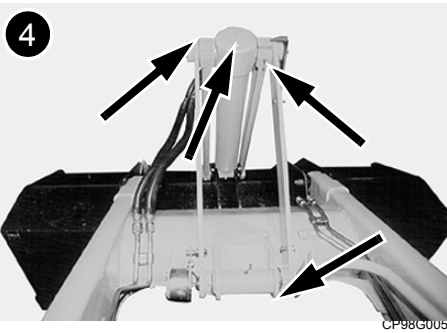
Beam cylinder bottom pins(2)

Every 10 hours



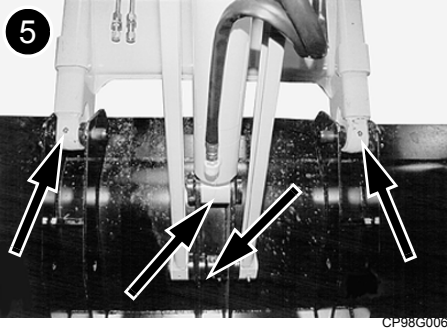
Beam cylinder top pins (2)

Every 10 hours



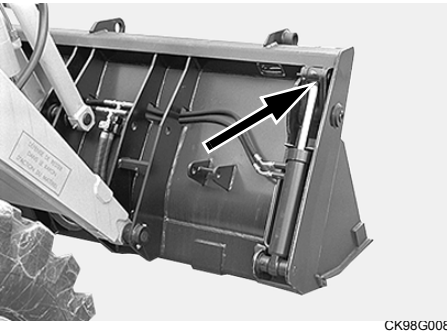
Bucket connecting rods (4)

Every 10 hours



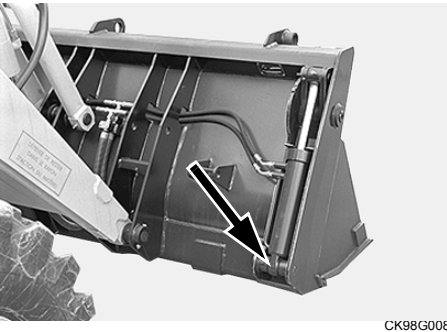
Bucket linkage (4)

Every 10 hours



Clam cylinder to 7 in 1 bucket
(if equipped) (2)

Every 10 hours



7 in 1 bucket clam cylinder bottom pins
(if equipped) (2)

Feedback linkage of the loader attachment

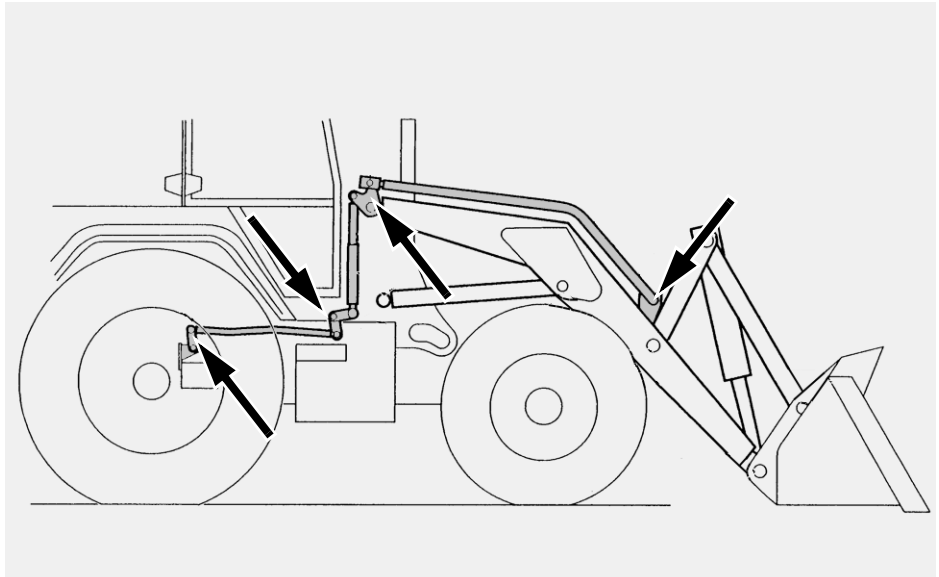
All models

Tool required

- One oil can

NOTE: *The figures shown in brackets indicate the number of grease points.*

Every 250 hours



CS98GB4/

Pivots(4)

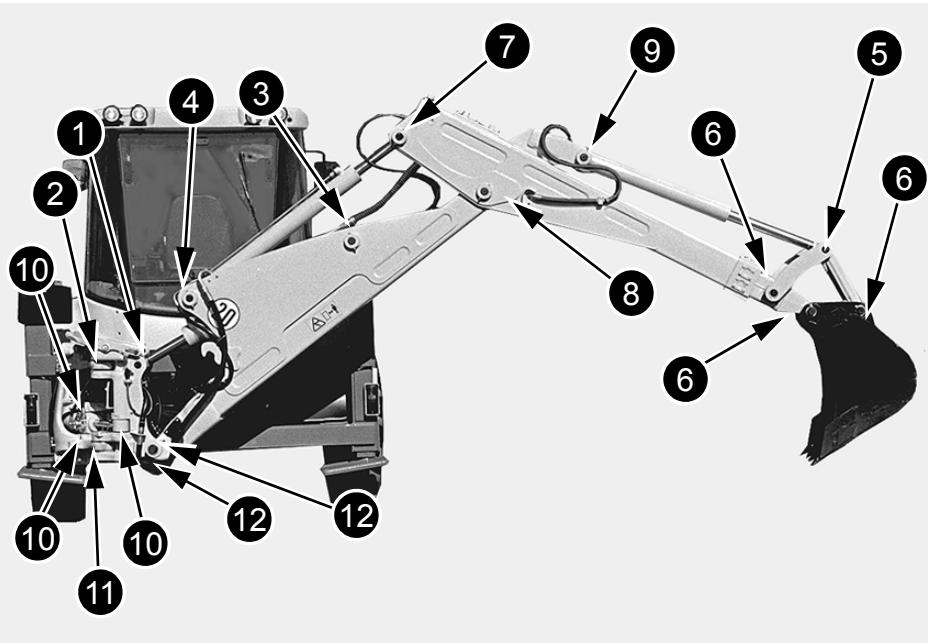
Backhoe attachment (sideshift (offset) backhoe version)

Tool required

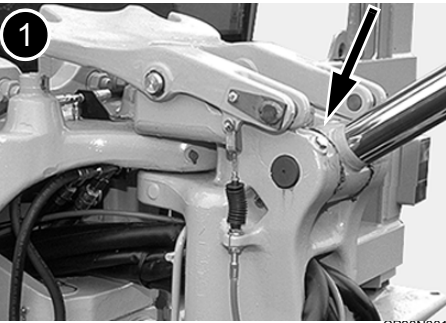
- Grease gun (delivered with machine)

Grease specification	See “Fluids and Lubricants”, page 150
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NOTE: The figures shown in brackets indicate the number of grease points.

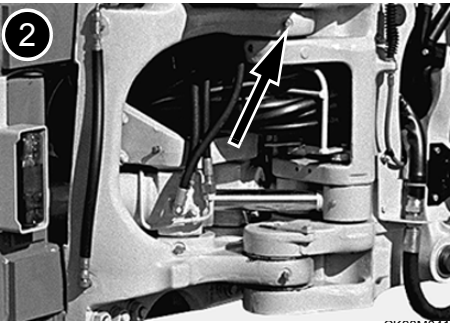


Every 10 hours



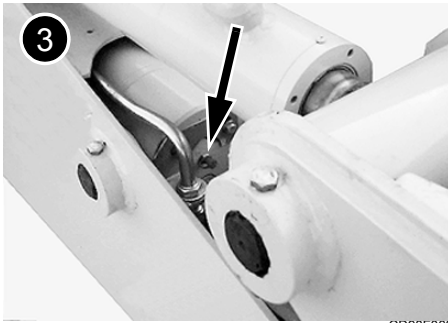
Boom cylinder top pin..... (1)

Every 10 hours



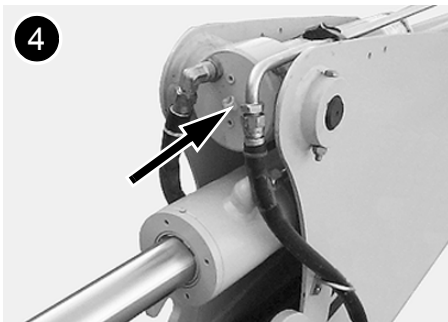
Upper swing pin..... (1)

Every 10 hours



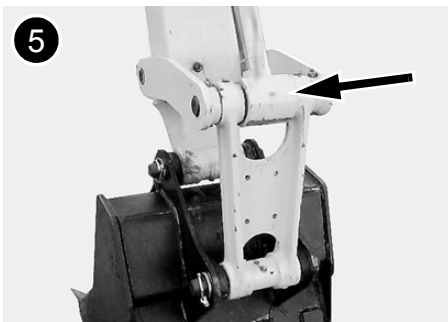
Boom cylinder bottom pin(1)

Every 10 hours



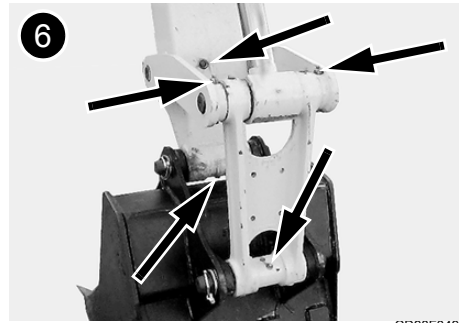
Dipper cylinder bottom pin(1)

Every 10 hours



Bucket cylinder top pin.....(1)

Every 10 hours



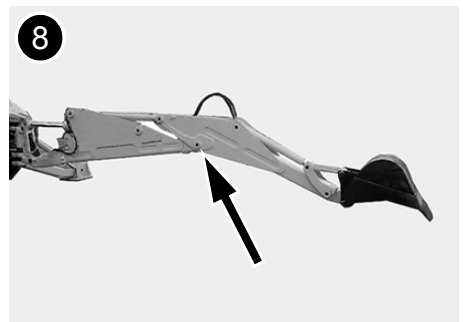
Bucket linkage(5)

Every 10 hours



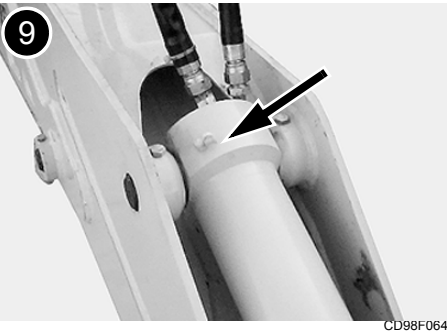
Dipper cylinder top pin(1)

Every 10 hours



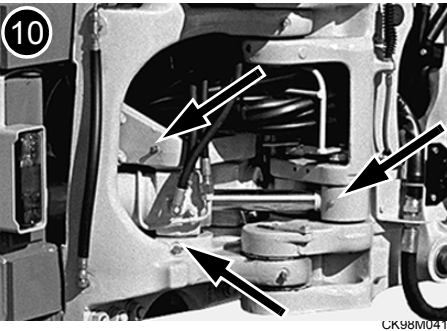
Boom/dipper linkage(1)

Every 10 hours



Bucket cylinder bottom pin (1)

Every 10 hours



Swing cylinders (6)

Sideshift version

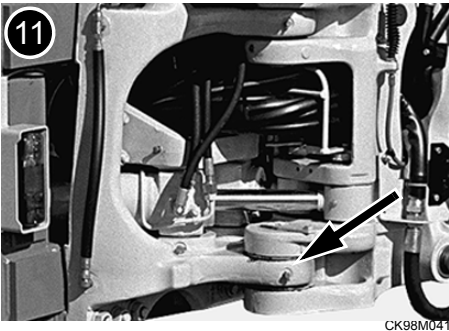
WARNING: *Do not grease the chassis rail faces.*

WARNING: *Do not grease the stabiliser legs.*

Sideshift and centremount versions

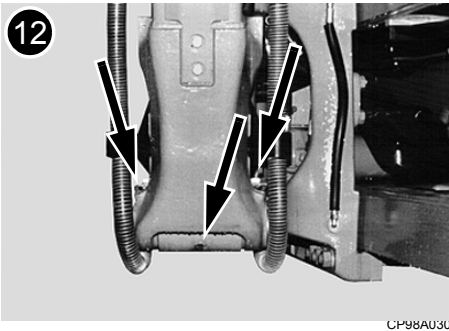
WARNING: *Do not grease the external faces of the extendable dipper (if fitted).*

Every 10 hours



Lower swing pin..... (1)

Every 10 hours



Boom bottom pin (3)

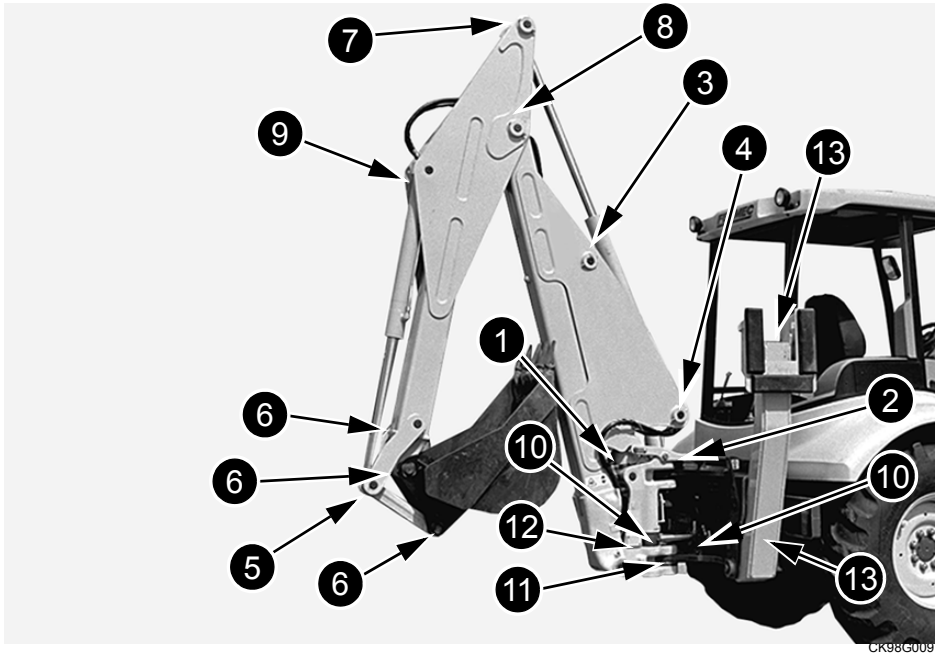
Backhoe attachment (centremount (axial) backhoe version)

Tool required

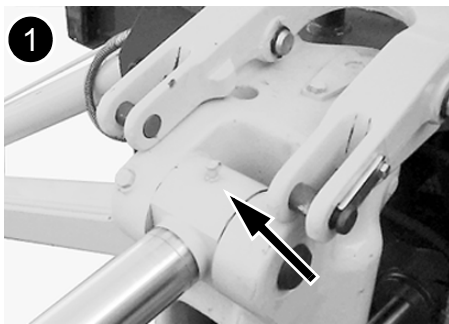
- Grease gun (delivered with machine)

Grease specification	See "Fluids and Lubricants", page 150 or 254.
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NOTE: The figures shown in brackets indicate the number of grease points.

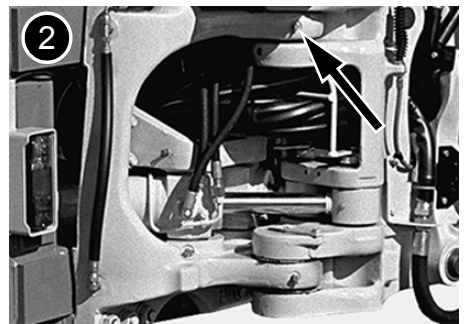


Every 10 hours



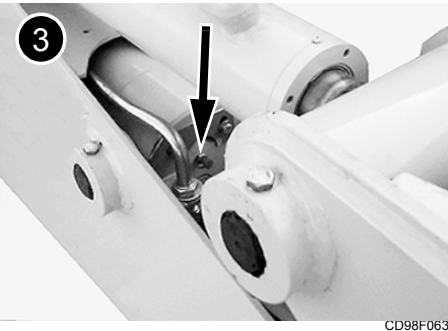
Boom cylinder top pin(1)

Every 10 hours



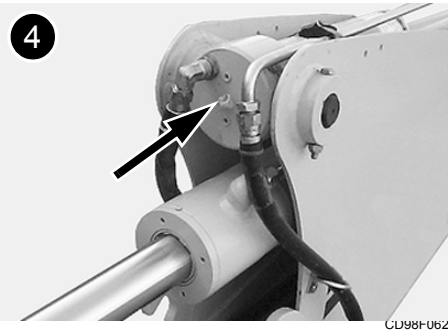
Upper swing pin(1)

Every 10 hours



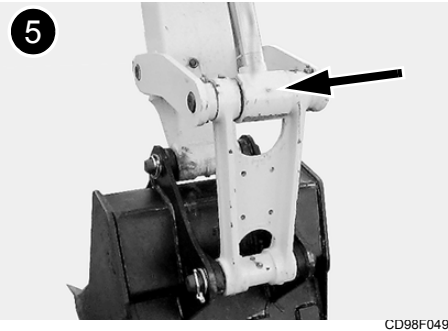
Boom cylinder bottom pin..... (1)

Every 10 hours



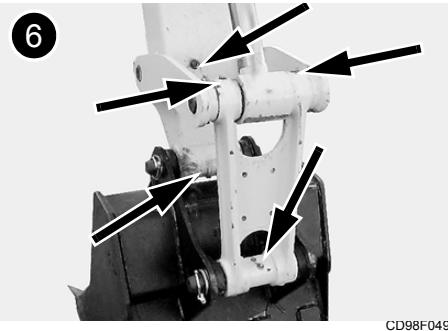
Dipper cylinder bottom pin..... (1)

Every 10 hours



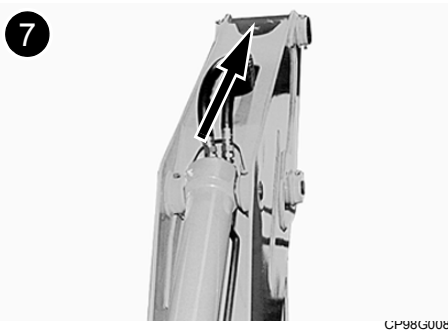
Bucket cylinder top pin (1)

Every 10 hours



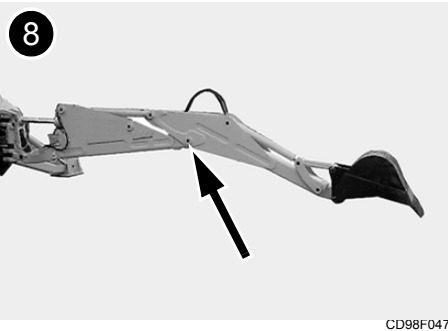
Bucket linkage..... (5)

Every 10 hours



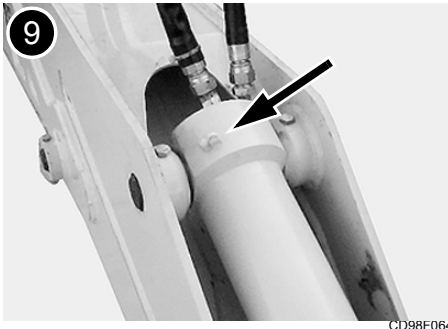
Dipper cylinder top pin..... (1)

Every 10 hours



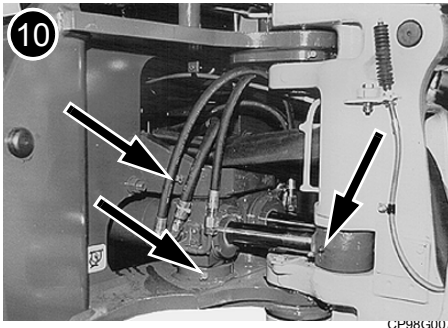
Boom/dipper linkage..... (1)

Every 10 hours



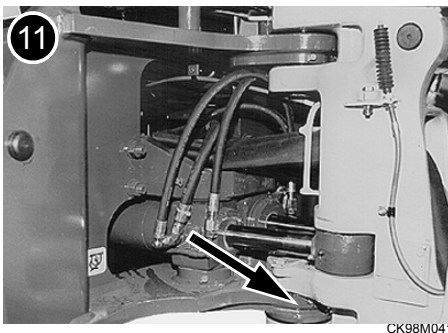
Bucket cylinder bottom pin.....(1)

Every 10 hours



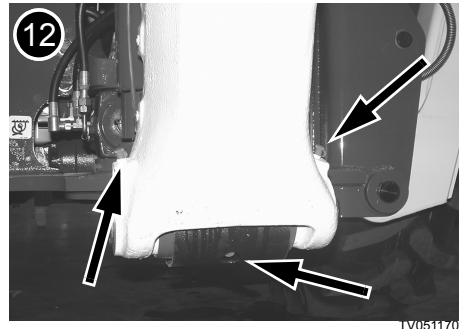
Swing cylinders (Both sides).....(6)

Every 10 hours



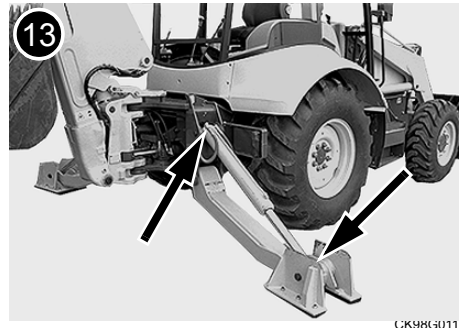
Lower swing pin.....(1)

Every 10 hours



Boom bottom pin.....(3)

Every 10 hours

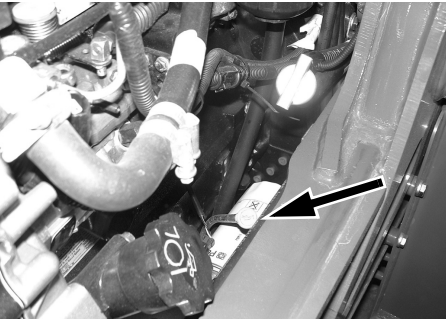


Stabilizer cylinders(4)

Levels

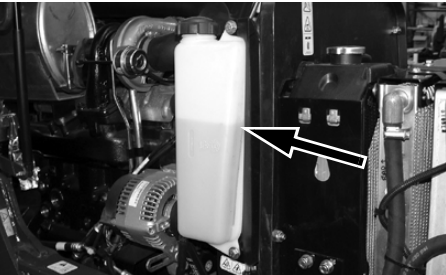
NOTE: *The figures shown in brackets indicate the number of level points.*

Every 10 hours



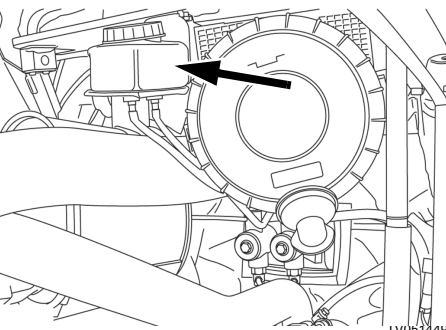
Engine oil..... (1)

Every 10 hours



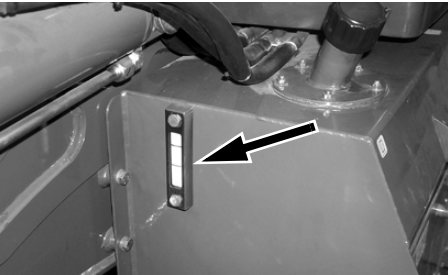
Engine coolant reservoir..... (1)
ETHYLENE GLYCOL AND WATER

Every 10 hours



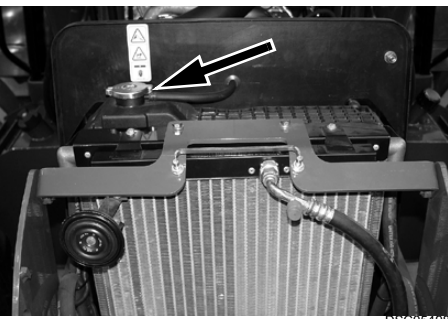
Brake fluid level (1)

Every 50 hours



Hydraulic reservoir (1)

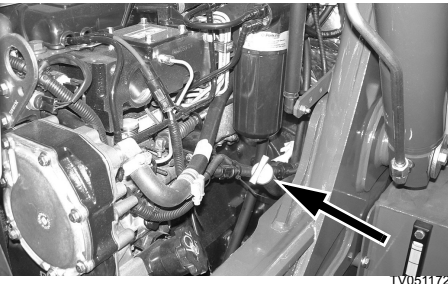
Every 50 hours



Radiator (1)
ETHYLENE GLYCOL AND WATER

Every 50 hours

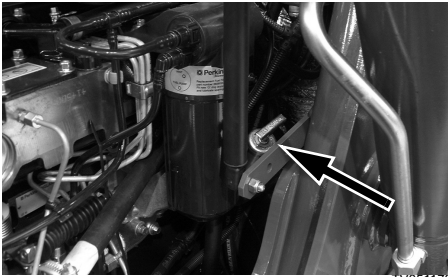
Synchroshuttle machines



Transmission oil (**engine running**) (1)

Every 50 hours

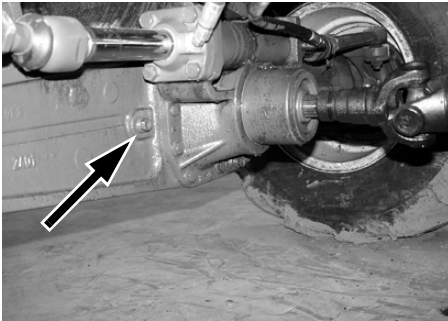
Powershift machines



TV051173

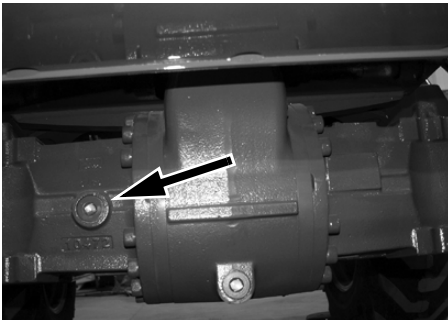
Transmission oil (engine running).....(1)

Every 250 hours



DSC05537

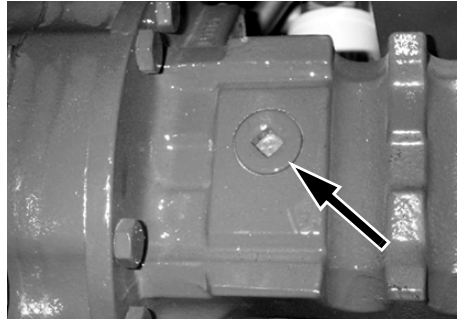
Front drive axle (4 Wheel drive)
760/820/860/870/880.....(1)



DSC05538

Front drive axle (970/980).....(1)

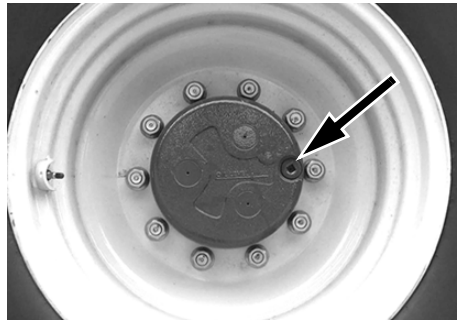
Every 250 hours



AXFP

Rear axle(1)

Every 250 hours



AXWN

Reduction gears.....(4)

Engine

Service specifications

Oil level check	Every 10 hours or every day
Oil change	Every 500 hours (Every 250 hours if sulphur content in fuel exceeds 0.2% of mass)
Oil filter replacement	Every 500 hours (Every 250 hours if sulphur content in fuel exceeds 0.2% of mass)
Type of oil	See “Fluids and Lubricants”, page 150 or 254.
Oil capacity	See “Capacities”, page 250.

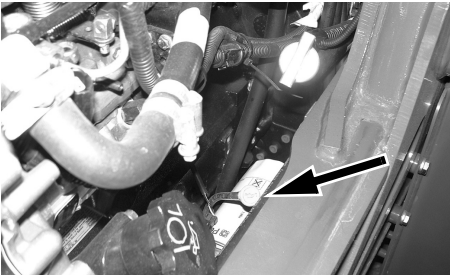
Oil Level

NOTE: The machine must be parked on flat, level ground.

STEP 1

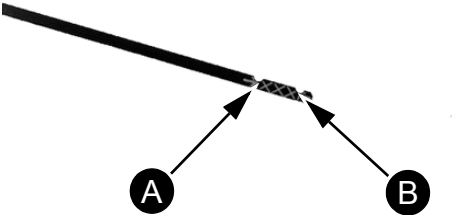
To access the engine see “Engine Access”, page 153.

STEP 2



DSC04798B

After the engine has been stopped for 15 minutes, remove the dipstick, clean it with a clean cloth, replace it in the guide tube as far as it will go and then remove it again.



If the oil level is below the (B) mark, remove the filler cap and add oil up to the (A) mark on the dipstick. Then replace the filler cap.

The level should not be higher than the (A) mark on the dipstick.

STEP 3

Close and lock the engine bonnet.

STEP 4

Remove the support strut and lower the loader attachment. see “Loader Attachment Support Strut”, page 97

Oil change and oil filter replacement

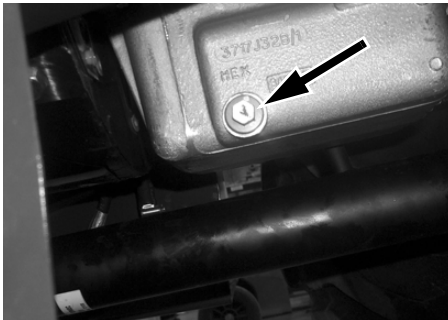
NOTE: Drain the engine when it is still hot. The oil will flow more easily.

NOTE: The machine must be parked on flat level ground.

STEP 1

To access the engine see "Engine Access", page 153.

STEP 2



PN00007

Place a receptacle of a suitable capacity under the drain plug from the sump, remove the drain plug and allow the oil to flow out. Discard the "O" ring.

STEP 3



PN00008

Clean around the filter and remove it, using the filter wrench.

NOTE: The filter contains a valve and a special tube to ensure that lubricating oil does not drain from the filter when the lubricating oil is changed.

STEP 4

Apply clean oil to the new filter seal.

STEP 5

Install the new filter. Turn the filter until the seal is in contact with the filter head and then tighten it half a turn more by hand.

IMPORTANT: Do not use the filter wrench to install the filter. Excess tightening can damage the seal and the filter.

STEP 6



PN00007

Install a new "O" ring and the drain plug, tighten the plug to 34 Nm (25 lbf ft).

STEP 7



TV051171

Fill the engine with new oil to the 'A' mark on the dipstick.

STEP 8

Run the engine for a few minutes and check for leaks. Then check the level again.

NOTE: Always wait 15 minutes to allow the oil to return to the engine sump before checking the oil level.

STEP 9

Close and lock the engine bonnet.

STEP 10

Remove the support strut and lower the loader attachment. see “Loader Attachment Support Strut”, page 97

Cooling System

Service specifications

Coolant reservoir level check	Every 10 hours or every day
Radiator level check	Every 50 hours
Cooling system hose and clamp tightness check	Every 250 hours
Draining	Every year
Cooling system capacity	See “Capacities”, page 250
Radiator cap pressure	0.7 bar (10 lbf/in ²)
Coolant specification	See “Fluids and Lubricants”, page 150 or 254.



WARNING: Boiling engine coolant can spray out if the radiator cap is removed while the system is still hot. To remove the cap: allow the system to cool down, turn the cap to the first notch and wait until there is no more pressure. Then remove the cap.



WARNING: Check and service the cooling system according to the instructions given in this manual.

Engine coolant

Only put ethylene-glycol engine coolant in the cooling system. Use good quality ethylene-glycol that has a high boiling point, with no additives to prevent leakage. Do not use non-approved anti-rust additives. Anti-rust additives and ethylene-glycol can mix and work against each other, thereby reducing anti-corrosion protection, forming deposits in the cooling system and causing damage to the cooling system and radiator.

Consult your local dealer for suitable engine coolant.

Engine coolant level in coolant reservoir

The level of engine coolant should be checked when the engine is cold.

NOTE: The machine must be parked on firm level ground.

STEP 1

To access the engine see “Engine Access”, page 153.

STEP 2



DSC05504

IMPORTANT: Do not remove the radiator cap.

The level in the coolant reservoir should be between the "FULL" and "ADD" marks. If necessary, remove the reservoir cap and add coolant to the reservoir until the level reaches the "FULL" mark on the coolant reservoir.

IMPORTANT: On no account must the coolant reservoir level be higher than it was the day previously. If it is, check the level in the radiator. See "Radiator level", page 170.

STEP 3

Close and lock the engine bonnet.

STEP 4

Remove the support strut and lower the loader attachment. see "Loader Attachment Support Strut", page 97

Radiator level

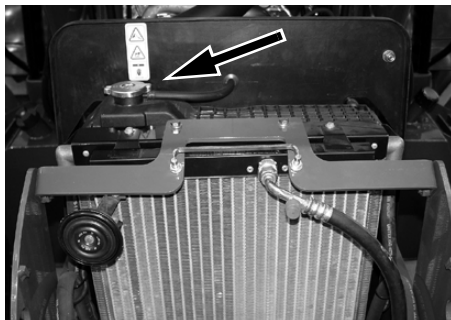
The level of engine coolant should be checked when the engine is cold.

NOTE: The machine must be parked on firm level ground.

STEP 1

To access the engine see "Engine Access", page 153.

STEP 2



Remove the radiator cap. The engine coolant should be level with the filler orifice. If not, see "Filling", page 171.



WARNING: Do not remove the cap when the engine is hot. The circuit is still under pressure and you could be scalded.

IMPORTANT: If the level in the radiator is low, but full in the coolant reservoir, check for an air leak in the hose connecting the radiator to the coolant reservoir. If the problem persists, consult your local dealer.

STEP 3

Close and lock the engine bonnet.

STEP 4

Remove the support strut and lower the loader attachment. see "Loader Attachment Support Strut", page 97

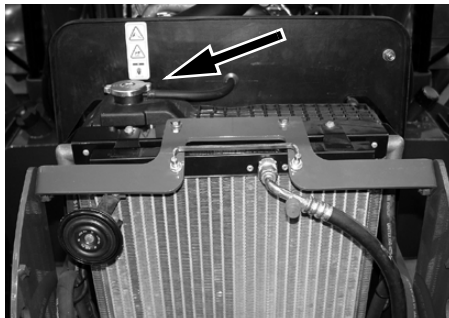
Draining the cooling system

NOTE: The machine must be parked on firm level ground.

STEP 1

To access the engine see "Engine Access", page 153.

STEP 2



Remove the radiator cap.



WARNING: Do not remove the cap when the engine is hot. The circuit is still under pressure and you could be scalded.

NOTE: Prepare a receptacle of suitable capacity.

STEP 3



Release the connection on the radiator bottom hose and allow the engine coolant to flow out.

STEP 4

After the system is completely drained, install the bottom hose.

STEP 5

Rinse the system through with fresh water, drain again and fill the system as shown below.

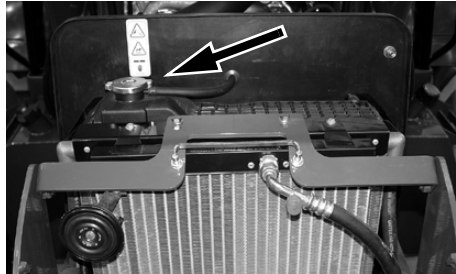
NOTE: If you use a detergent solution for rinsing, follow the instructions for preparing the solution. After draining the detergent solution, rinse again with fresh water.

STEP 6

Check the condition of the hoses, connections and the water pump. Make sure that the external surfaces of the engine and the radiator are clean.

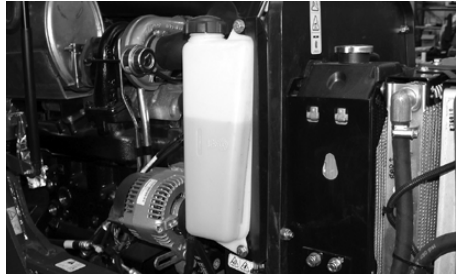
Filling

STEP 1



Fill the radiator with engine coolant until it is level with the filler orifice. Then install the cap.

STEP 2



Completely fill the coolant reservoir with engine coolant.

IMPORTANT: Use the correct engine coolant.

STEP 3

Run the engine for a few minutes then check the level in the coolant reservoir again. Top up if necessary until the "FULL" mark is reached. Then install the cap.

IMPORTANT: Do not remove the radiator cap to check the level.

STEP 4

Close and lock the engine bonnet.

STEP 5

Remove the support strut and lower the loader attachment. see "Loader Attachment Support Strut", page 97

Brake System - 'Safim'

Service specifications

Fluid level check	Every 10 hours or every day
Fluid change	Every 500 hours
Type of oil	See " <i>Fluids and Lubricants</i> ", page 150 or 254.
Oil capacity	See " <i>Capacities</i> ", page 250.

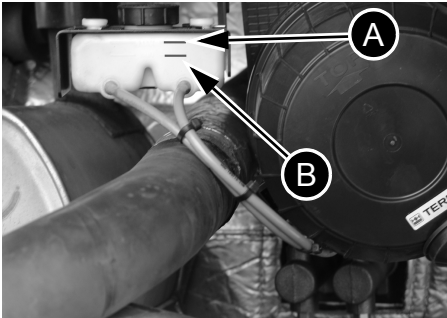
Fluid Level

NOTE: The machine must be parked on firm, level ground.

STEP 1

To access the engine see "*Engine Access*", page 153.

STEP 2.



TV051577

The level in the brake reservoir should be between the minimum (B) and maximum (A) marks. If necessary, remove the reservoir cap and add brake fluid to the reservoir until the level reaches the maximum (A) mark on the brake reservoir.

STEP 3

Replace the brake reservoir cap.

NOTE: The level should not be higher than the maximum mark (A) on the reservoir.

STEP 4

Close and lock the engine bonnet.

STEP 5

Remove the support strut and lower the loader attachment. see "*Loader Attachment Support Strut*", page 97

Fuel System

Service specifications

Fuel filter replacement	Every 250 hours (After the first 50 hours during the running-in period)
Clean the gauze strainer in the fuel lift pump	Every 500 hours
Drain primary water separator	As required
Fuel filter sediment removal	As required
Fuel tank sediment removal	As required
Fuel tank capacity	See "Capacities", page 250
Type of fuel	See "Fluids and Lubricants", page 150 or 254

Replacing the filter



WARNING: *The combustible material of some components of the engine (for example certain seals) can become extremely dangerous if it is burned. Never allow this burnt material to come into contact with the skin or with the eyes.*



WARNING: *Discard the used element and fuel oil in a safe place and in accordance with local regulations.*



WARNING: *Ensure that the starter switch is in the off position before servicing or repairs are made to the fuel system, because fuel will be released if the lift pump has power.*



CAUTION: *It is important that only genuine Perkins parts are used. The use of an element that is not a genuine Perkins part may damage the fuel injection pump and the warranty.*

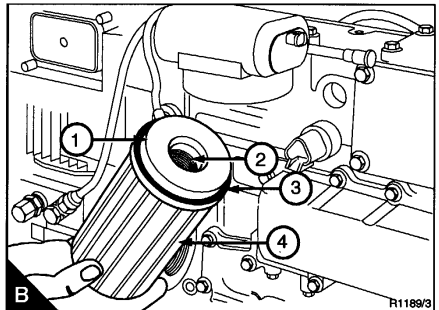
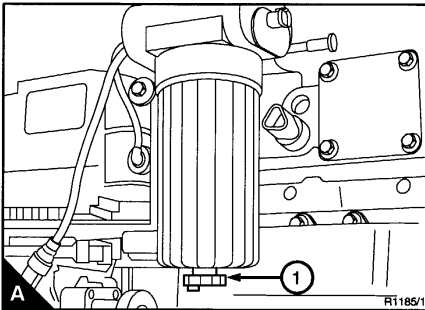


CAUTION: *The pre-filter canister and main filter elements must be renewed at the same time.*



CAUTION: *Do not allow dirt to enter the fuel system. Before a connection is disconnected, clean thoroughly the area around the connection. After a component has been disconnected fit a suitable cover to all open connections. To access the engine see "Engine Access", page 153.*

- 1 Place a suitable container below the fuel filter assembly to retain spilt fuel oil.
- 2 Thoroughly clean the outside surfaces of the fuel filter assembly. Open the drain tap (A) at the bottom of the filter casing to drain the fuel from the filter.
- 3 Loosen the filter casing. Remove the casing and element from the fuel filter head.
- 4 Remove the filter element from the casing. Press down on the filter element (B1), against the spring pressure, and rotate it to the left to release it from the filter casing (B4).
- 5 Put the new filter element inside the casing and press it down against the spring pressure, rotate it to the right to lock it into the casing.
- 6 Fit a new seal (B3) to the casing and lightly lubricate the seal face with clean fuel oil.
- 7 Check that the thread (B2) on the inside of the element is not damaged.
- 8 Fit the filter assembly to the fuel filter head and tighten by hand until it contacts the filter head. Tighten the assembly a further 1/4 of a turn by hand. Do not use a strap wrench.
- 9 Close the drain tap (A) and remove the container.
- 10 Before the starter motor is engaged, operate the lift pump for one minute to eliminate air from the filter.
- 11 Start the engine and check for leaks.



PN00027

Bleeding the system

It is necessary to bleed the fuel system when:

- The tank has been completely emptied.
- Parts of the fuel system have been removed for servicing or repair work.
- The machine has been in storage for a fairly long period.



CAUTION: Do not operate the engine until the air is eliminated from the fuel injection pump.



CAUTION: After the air is eliminated, operate the engine at low idle for two minutes.

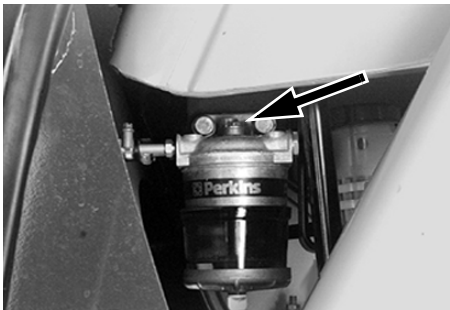
The Delphi DP210 fuel injection pump will vent automatically when the start key is turned from the off position to the first (ignition position) for three minutes.

Bleeding the pre-filter

STEP 1

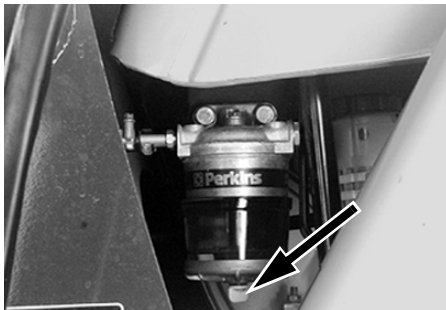
To access the engine see "Engine Access", page 153.

STEP 2



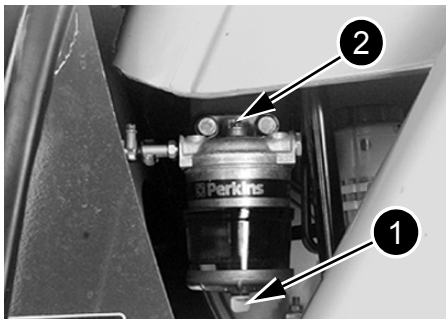
Remove the bleed screw. Discard the washer.

STEP 3



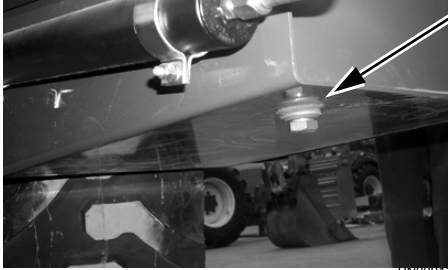
Place a receptacle of a suitable capacity under the tap of the primary water separator, open the tap and allow the soiled fuel to flow out.

STEP 4



Re tighten the tap (1) and install a new washer and the bleed screw (2).

Fuel tank sediment removal



PN00013

Place a receptacle of a suitable capacity under the fuel tank, unscrew the drain plug located behind the fuel tank one or two turns and allow the soiled fuel to flow out. Then re tighten the plug.

Releasing the Pressure in the Hydraulic System

Before carrying out any service operation on the hydraulic system, it is first necessary to release the pressure in all the circuits.

Before doing this, make sure that the ride control function (optional) is not operating.

Mechanical controls

STEP 1

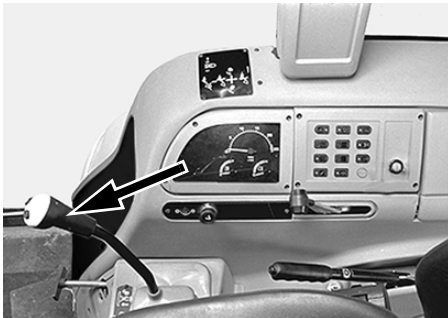
Lower the loader attachment and the backhoe attachment until they are resting on the ground.

STEP 2

Stop the engine, engage parking brake.

Remove the starter switch key.

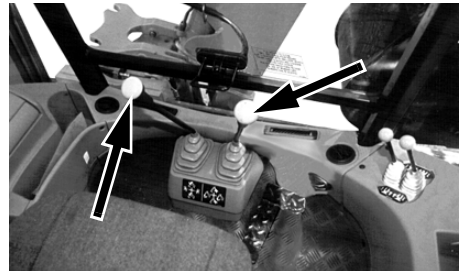
STEP 3



CK98F033

Operate the loader attachment controls and 7 in 1 loader bucket (if equipped) in all directions.

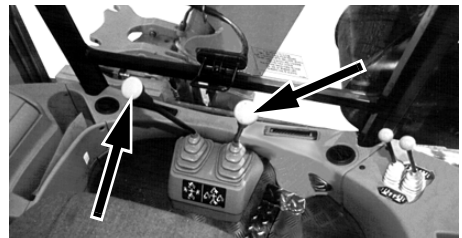
STEP 4



CP98F024

Operate the backhoe attachment controls in all directions to release the pressure.

STEP 5



CP98F024

Operate the backhoe attachment controls in all directions to release the pressure.

Servo controls

STEP 1

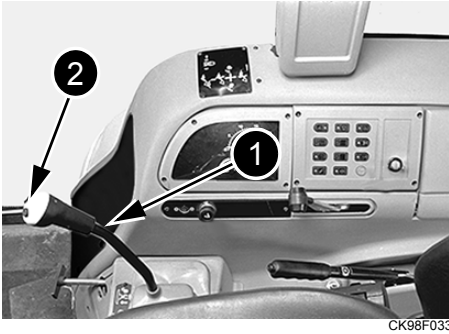
Lower the loader attachment and the backhoe attachment until they are resting on the ground.

STEP 2

Stop the engine, engage parking brake.

Turn the ignition to the 'ON' position.

STEP 3



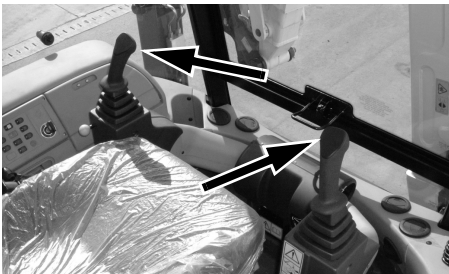
CK98F033

Operate the loader attachment controls (1) and 7 in 1 loader bucket (if equipped) in all directions.

STEP 4

Depress the hydraulic unload button (2).

STEP 5



TV051176

Operate the backhoe attachment controls in all directions to release the pressure.

NOTE: Repeat this operation several times to ensure pressure is fully released.

IMPORTANT: This procedure is also used in the emergency lower procedure in the event of an inoperative engine.

Hydraulic System

Service specifications

Hydraulic reservoir level check	Every 50 hours or every week
Hydraulic fluid return filter replacement	Every 1000 hours or when the warning light on the instrument panel comes on (after the first 50 hours during the running-in period)
Draining the circuit	Every 1000 hours
Cleaning the intake strainer	Every 1000 hours
Reservoir capacity	See <i>"Capacities"</i> , page 250
Type of fluid	See <i>"Fluids and Lubricants"</i> , page 150 or 254

Reservoir level

STEP 1

Park the machine on flat, level ground.

STEP 2

Lower the loader bucket flat on the ground.

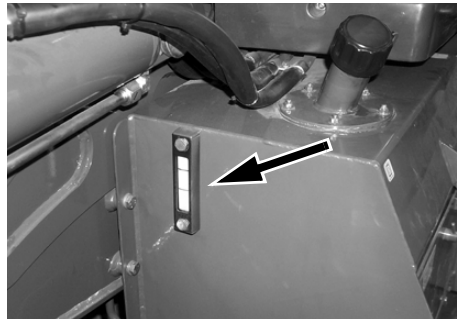
STEP 3

Make sure that the backhoe attachment is in the road travel position. See *"Setting the Backhoe Attachment in the Road Travel Position"*, page 116.

STEP 4

Stop the engine, engage parking brake, remove the starter switch key and wait until the fluid reaches ambient temperature.

STEP 5



PN00005

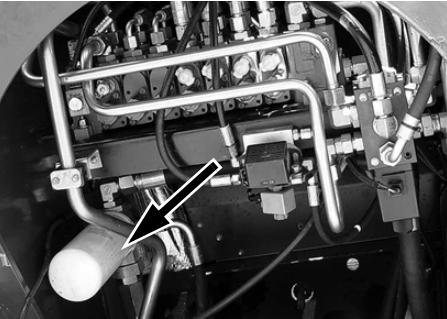
The fluid level should be in the middle of the sight gauge. Top up if necessary. See *"Filling"*, page 181.

Replacing the hydraulic fluid return filter

STEP 1

Lower the loader bucket flat on the ground, engage parking brake, stop the engine and remove the starter switch key.

STEP 2



NOTE: Viewed from underside of machine.

Clean around the filter head.

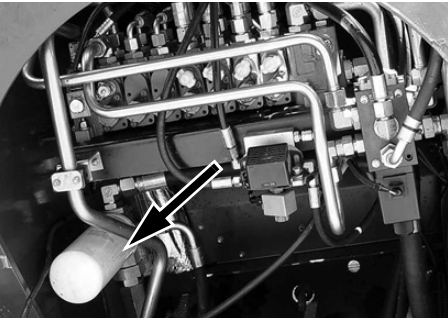
STEP 3

Place a receptacle of a suitable capacity under the filter, loosen the filter by means of the filter wrench and then unscrew it by hand.

STEP 4

Apply a thin layer of oil on the new filter seal.

STEP 5

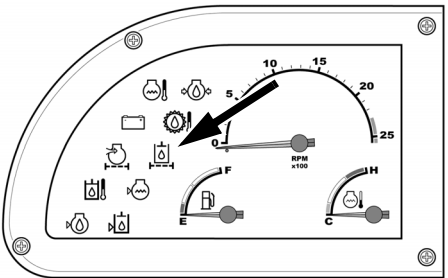


NOTE: Viewed from underside of machine.

Install the new filter. Turn the filter until the seal is in contact with the filter head and tighten the filter a further half turn by hand.

IMPORTANT: Do not use the filter wrench to tighten. Over tightening can damage the seal and the filter.

STEP 6



CS98G565

Start the engine, run it at low idle speed and make sure that the filter restriction warning light on the instrument panel is not on.

NOTE: After using the machine, check that there are no leaks.

Cleaning the intake strainer

STEP 1

Lower the loader bucket flat on the ground, engage parking brake, stop the engine and remove the starter switch key.

STEP 2



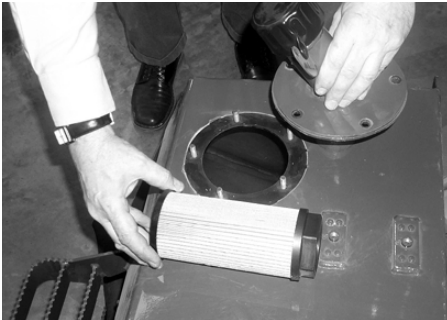
PN00015

Clean around the filler tube.

STEP 3

Remove the bolts (1) securing the filler tube (2) and remove it.

STEP 4



PN00016

Remove by hand the intake strainer from intake pipe clean and dry it.

STEP 5

Refit and tighten by hand, careful to avoid straining the pleats.

STEP 6

Renew the gasket. Apply Loctite 'Form-a-gasket' No. 2 or equivalent to both sides of gasket before fitting. Fit filler tube and torque bolts to 6 Nm (4.42 ft/lbs).

Replacing the hydraulic fluid

Replacing the hydraulic fluid requires the fluid to be systematically drained from the main components (reservoir, pumps, cylinders, control valves, hydraulic motors and oil cooler).

We recommend you to consult your local dealer.

Draining

NOTE: When carrying out draining, the hydraulic fluid must be at operating temperature.

STEP 1

Park the machine on firm, level ground.

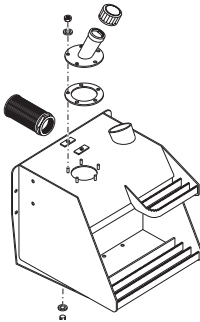
STEP 2

Lower the loader bucket flat on the ground.

STEP 3

Make sure that the backhoe attachment is in the road travel position. See “*Setting the Backhoe Attachment in the Road Travel Position*”, page 116. Engage parking brake, stop the engine and remove the starter switch key.

STEP 4



C-40001-05.1-A

Place a receptacle of suitable capacity under the reservoir and remove the filler cap and the drain plug. Discard the washer. Allow the fluid to flow out.

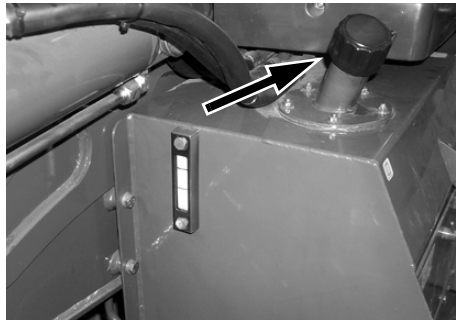
STEP 5

Install a new washer and the reservoir drain plug.

NOTE: See “*Replacing the hydraulic fluid return filter*”, page 179 if the filter has to be replaced.

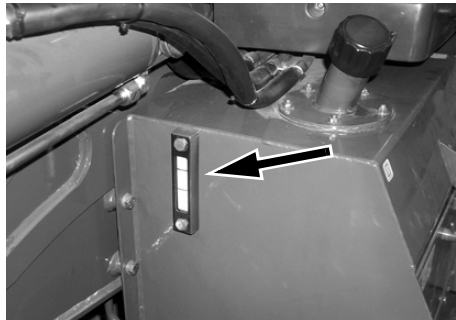
Filling

STEP 6



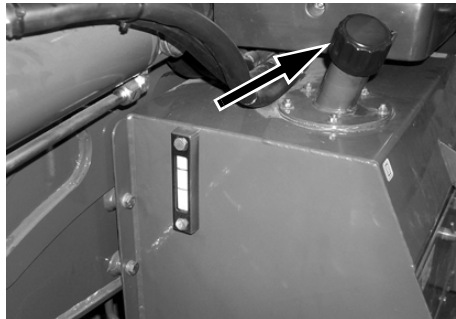
Clean around the filler cap and fill the reservoir with the correct hydraulic fluid.

STEP 7



The fluid level should be in the middle of the sight gauge.

STEP 8



Install the filler cap.

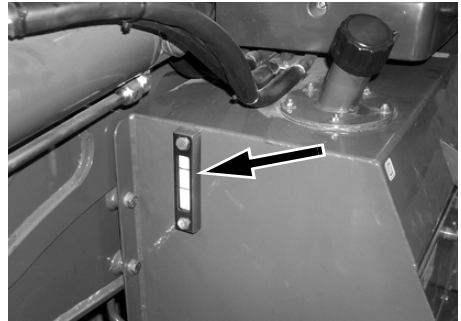
STEP 9

Start the engine. Do not touch the controls for 1 or 2 minutes, then operate the loader attachment and backhoe attachment functions for 3 to 4 minutes.

STEP 10

Once again place the loader bucket flat on the ground and the backhoe attachment in the road travel position. Stop the engine, engage parking brake and remove the starter switch key.

STEP 11



PN00005

Check the level. The fluid level should come up to the middle of the sight gauge. Top up if necessary.

Air Filter

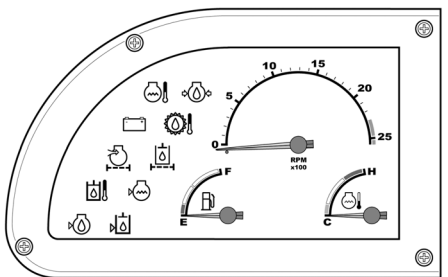
Inspection

Be sure to carry out regular checks on the air filter, intake manifold, gaskets and seals. At the same time, check the intake manifold screws and hose clamps for tightness.

The hoses should be replaced before they are worn.

Check frequently that the air filter restriction warning lamp on the instrument panel is in good working order.

Air filter restriction warning lamp



CS98G565

If the air filter restriction warning lamp comes on when the engine is running, the air filter elements must be checked.

Air filter elements



PN00018

Your machine is fitted with a two-stage air filtering system, consisting of a high capacity primary element, designed to provide optimal protection of the engine, plus a secondary element which provides extra engine protection.

The large outer primary element can be cleaned. The smaller inner secondary element can not be cleaned and should be replaced when dirty.

Service specifications

Primary element maintenance	Clean or replace when the warning lamp on the instrument panel comes on (After the first 50 hours during the running-in period)
Primary element replacement	Every 1000 hours or after six cleanings
Secondary element replacement	Once a year or after cleaning the primary element three times

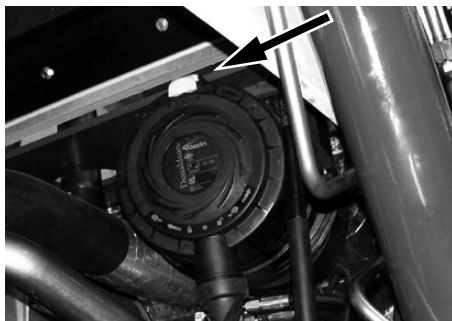
IMPORTANT: Carefully observe the air filter service intervals. The life of the engine depends on the cleanliness of the air filter.

Removing the elements

STEP 1

To access the engine see “Engine Access”, page 153.

STEP 2



DSC05158B

Pull the yellow tang, rotate the cover anticlockwise and remove it.

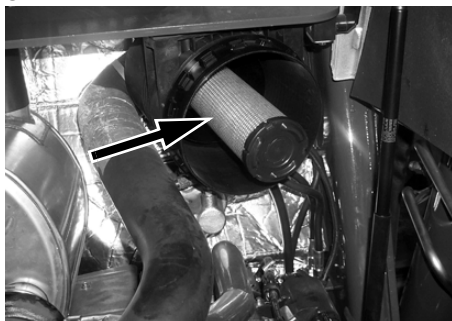
STEP 3



PN00017

Carefully remove the primary element.

STEP 4



PN00021

If the secondary element has to be replaced, take care whilst removing.

IMPORTANT: The secondary element must not be cleaned. It must be replaced every year or after three cleanings of the primary element.

IMPORTANT: Make sure you protect your face before using compressed air.

Cleaning the primary element

Tool required

- A compressed air line



PN00019

If the primary element is dry:

Blow compressed air from the inside towards the outside at very low pressure. The compressed air nozzle should be held at least three centimetres from the inside wall of the primary element. Cleaning is completed once no more dust comes out of the primary element.

IMPORTANT: When using compressed air, take the necessary precautions to protect your face.

IMPORTANT: Compressed air pressure should not exceed 7 bar (101lbf/in²).

NOTE: Do not use compressed air if there is oil or soot in the element.

If the primary element is oily :

Clean it in water with a suitable detergent (e.g. a typical household detergent). Instructions for using the detergent are printed on the packaging.

Lubrication/Filters/Fluids

The primary element must be completely dry before installing. We advise you to keep a spare, clean primary element for installation while the other primary element is drying.

Inspecting the primary element

Check the primary element for damage by placing an inspection lamp inside.

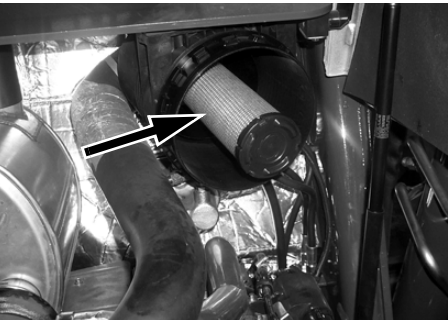
IMPORTANT: *Replace the element if light can be seen through a hole, however small. Replace inner element as well.*

Installing the elements

STEP 1

Clean the inside of the filter body by means of a clean damp cloth.

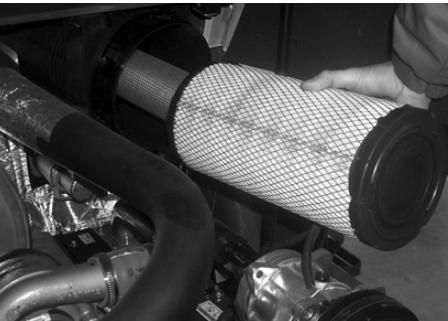
STEP 2



PN00021

Apply a thin layer of oil on the rubber lip and carefully install a secondary element if the old element had to be replaced.

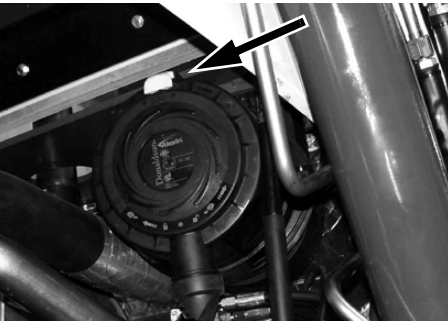
STEP 3



PN00017

Apply a thin layer of oil on the rubber lip and carefully install the primary element.

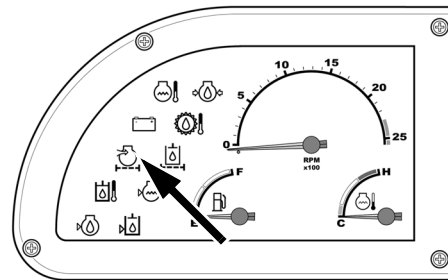
STEP 4



DSC05158B

Install the cover, rotate it clockwise and push the locking tang.

STEP 5



CS98G565

Start the engine, run it at low idle speed and make sure that the filter restriction warning light on the instrument panel is not on.

STEP 6

Close and lock the engine bonnet.

STEP 7

Remove the support strut and lower the loader attachment. see “Loader Attachment Support Strut”, page 97

Transmission

Service specifications

Oil level check	Every 50 hours (After the first 50 hours during the running-in period)
-----------------	---

NOTE: On synchroshuttle machines the transmission oil level must be checked with the engine switched off.

NOTE: On powershift machines the transmission oil level must be checked with the engine running and set to low idle.

Filter replacement (synchroshuttle and powershift)	Every 500 hours (After the first 50 hours during the running-in period)
Cleaning the screen filter (synchroshuttle only)	Every 1000 hours (After the first 50 hours during the running-in period)
Oil change	Every 1000 hours (After the first 50 hours during the running-in period)
Type of oil	See "Fluids and Lubricants", page 150 or 254.
Capacities	See "Capacities", page 250

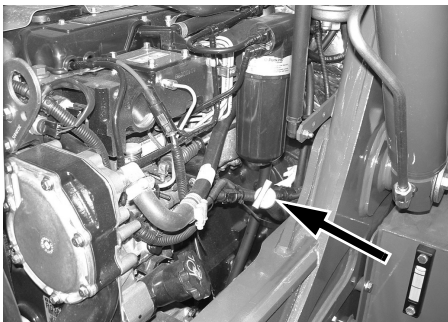
Oil Level

STEP 1

To access the engine see "Engine Access", page 153.

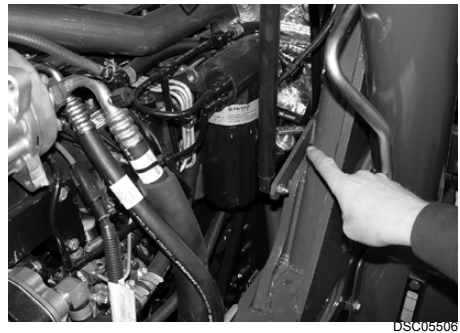
STEP 2

Synchroshuttle only



With the engine running at idle and the transmission oil at working temperature, remove the dipstick, clean it with a clean cloth and replace it in the guide tube up to the stop. Then remove it again.

Powershift only



WARNING: Keep clear of engine moving parts when checking oil level. Contact with moving parts could cause serious injury.

With the engine running at idle and the transmission oil at working temperature, remove the dipstick, clean it with a clean cloth and replace it in the guide tube up to the stop. Then remove it again.

STEP 3



CD98F044

If the oil level is below the mark, top up. See “Filling”, page 189.

STEP 4

Close and lock the engine bonnet.

STEP 5

Remove the support strut and lower the loader attachment. see “Loader Attachment Support Strut”, page 97

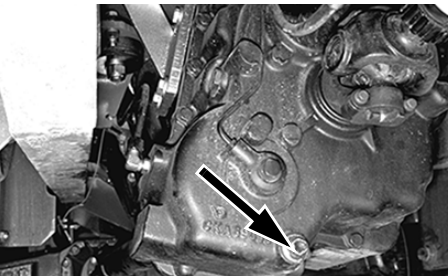
Draining

STEP 1

To access the engine see “Engine Access”, page 153.

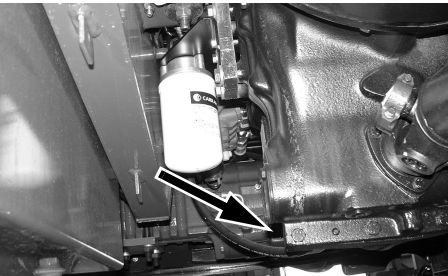
STEP 2

Synchroshuttle (Turner)



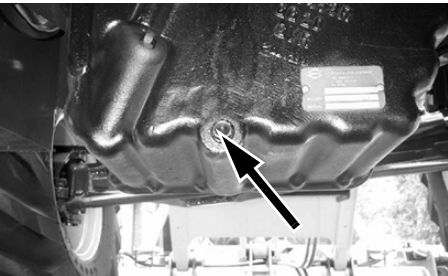
CK98G001

Synchroshuttle (Carraro)



TV051177

Powershift only

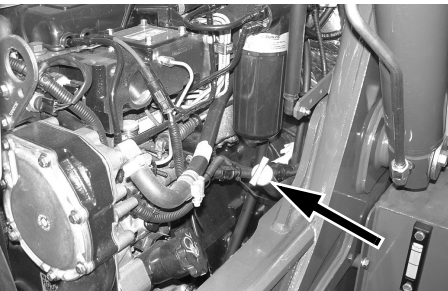


PSSP

Place a receptacle of a suitable capacity under the drain plug and remove the drain plug.

STEP 3

Synchroshuttle only



TV051172

Powershift only



DSC05506

Remove the filler cap and allow the oil to flow out.

STEP 4

Install the drain plug and the filler cap.

Replacing the filter

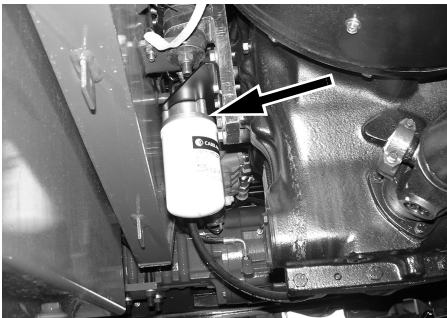
STEP 1

Synchroshuttle (Turner)



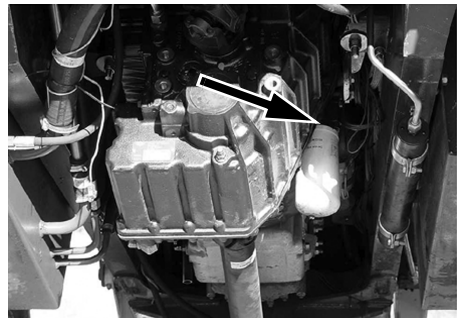
PN00023

Synchroshuttle (Carraro)



TV051177

Powershift



DSC04811B

Clean around the filter head.

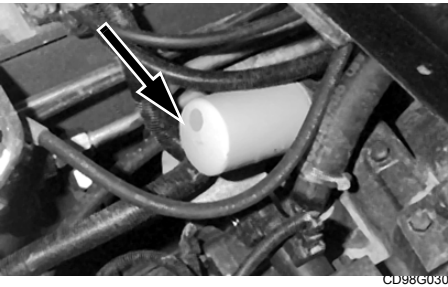
STEP 2

Place a receptacle of a suitable capacity under the filter, loosen the filter by means of the filter wrench and then unscrew it by hand.

STEP 3

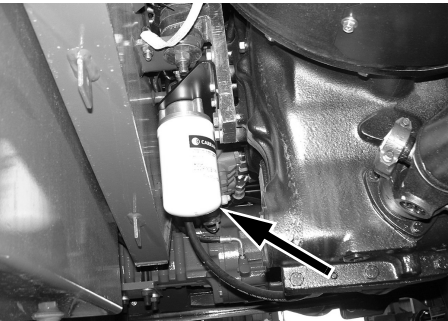
Apply a thin layer of oil on the new filter seal.

STEP 4
Synchroshuttle (Turner)



CD98G030

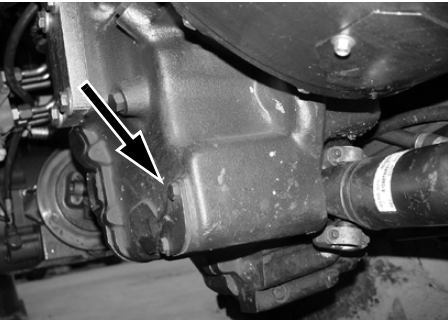
Synchroshuttle (Carraro)



TV051177

Cleaning the screen filter (synchroshuttle only)

STEP 1

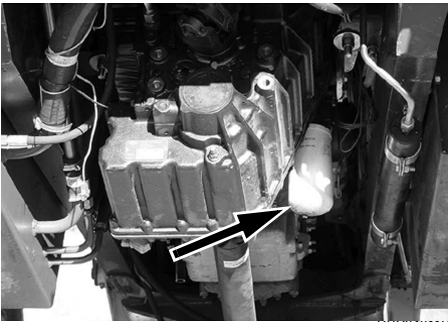


DSC05536

Clean around the cover plate and remove it. Check the condition of the O-ring and replace it if necessary. Remove the screen filter and clean it in a detergent solution.

Filling

Powershift



DSC04811B

Install the new filter. Turn the filter until the seal is in contact with the filter head and tighten the filter a further half turn by hand.

IMPORTANT: Do not use the filter wrench to tighten. Over tightening can damage the seal and the filter.

IMPORTANT: Follow the instructions for the detergent solution.

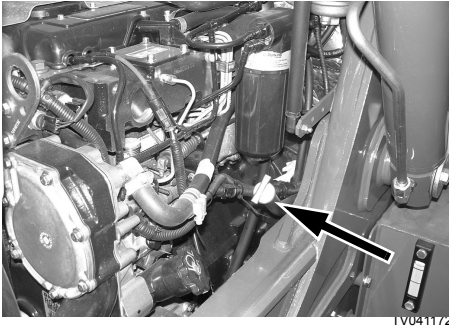
Dry the screen filter carefully with compressed air and install it.

IMPORTANT: Make sure you protect your face before using compressed air.

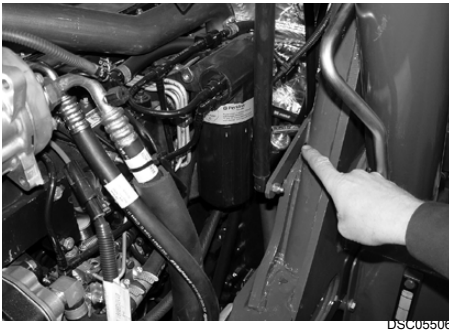
Install the cover plate.

STEP 1

Synchroshuttle



Powershift



Remove the combined filler/dipstick and fill with the correct oil to the oil level mark on the dipstick. Then replace the filler/dipstick.

STEP 2

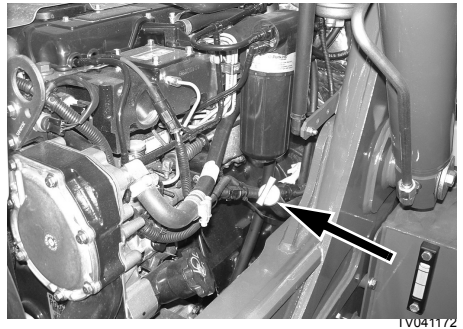
Start the engine and check for leaks.

STEP 3

Drive the machine for a few minutes in 1st and 2nd gear then stop the engine.

STEP 4

Synchroshuttle



Powershift



Check the oil level by means of the dipstick. Top up if necessary. See *"Oil Level"*, page 186

STEP 5

Close and lock the engine bonnet.

STEP 6

Remove the support strut and lower the loader attachment. see *"Loader Attachment Support Strut"*, page 97

Front and Rear Drive Axles and Reduction Gears

Service specifications

Oil level check	Every 250 hours (After the first 50 hours during the running-in period)
Oil change	Every 1000 hours (After the first 50 hours during the running-in period)
Cleaning the breathers	Every 250 hours
Type of oil	See “Fluids and Lubricants”, page 150 or 254.
Capacities	See “Capacities”, page 250

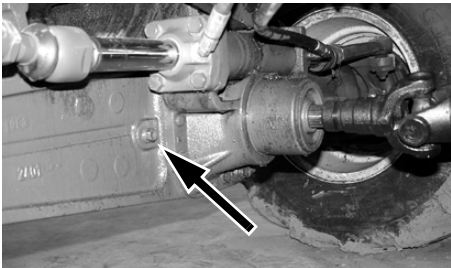
Front drive axle oil level

STEP 1

Park the machine on firm, level ground, stop the engine, engage parking brake and remove the starter switch key.

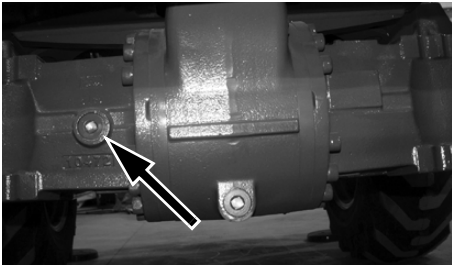
STEP 2

Front axle
(760/820/860/870/880 only)



DSC05537

(970/980 only)



DSC05538

Remove the plug and check that the oil is level with the orifice. If necessary, top up via this orifice.

STEP 3

Install the plug. Tighten to 60 Nm.

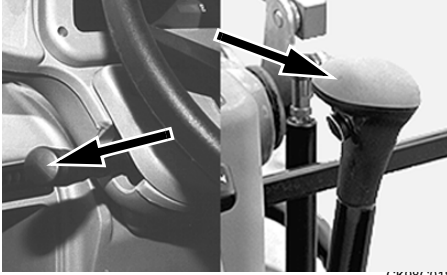
Front axle reduction gear oil level

STEP 1

Park the machine on firm, level ground.

STEP 2

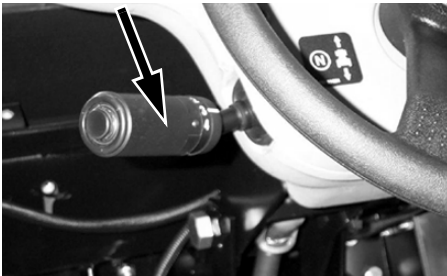
Synchroshuttle only



CK98G018

Make sure that the direction of travel control lever and gear change lever are in neutral position.

Powershift only



PSFNR

Make sure the transmission control lever is in neutral position.

STEP 3

Use the loader attachment to raise the front of the machine slightly so that the front wheels are no longer in contact with the ground and place chock blocks under the front drive axle. Chock rear wheels.

STEP 4

Stop the engine, engage parking brake and remove the starter switch key.

STEP 5



CD98G012

Manually turn the wheel until the orifice is in the horizontal position and remove the plug.

STEP 6

The oil should be level with the orifice. If necessary, top up via this orifice.

STEP 7

Install the plug. Tighten to 60 Nm.

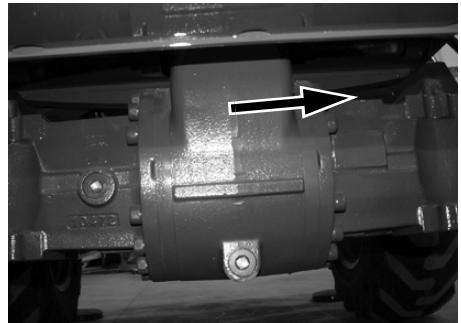
STEP 8

Repeat Steps 5 to 7 for the other reduction gear.

STEP 9

Lower the machine to the ground.

Cleaning the breather



DSC05538

Check that the front axle breather is not blocked or damaged (970/980 only).

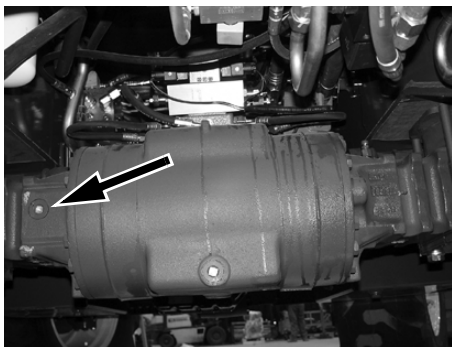
Rear drive axle oil level

STEP 1

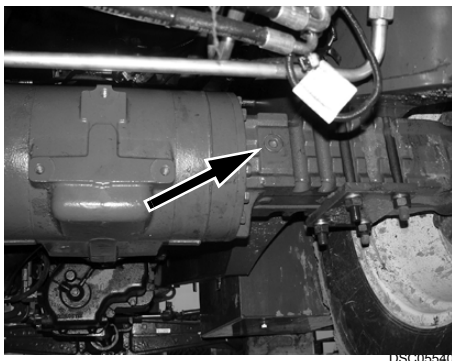
Park the machine on firm, level ground, stop the engine, engage parking brake and remove the starter switch key.

STEP 2

(970/980 only)



(760/820/860/870/880 only)



Remove the plug and check that the oil is level with the orifice. If necessary, top up via this orifice. 760/820 and 970/980 plugs are located at the rear of the axle housing. The 860/880 filler plug is located on the front side.

STEP 3

Install the plug. Tighten to 60 Nm.

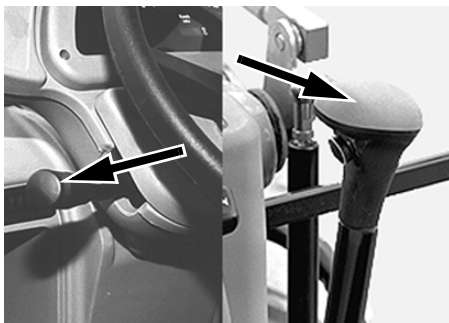
Rear axle reduction gear oil level

STEP 1

Park the machine on flat, level ground.

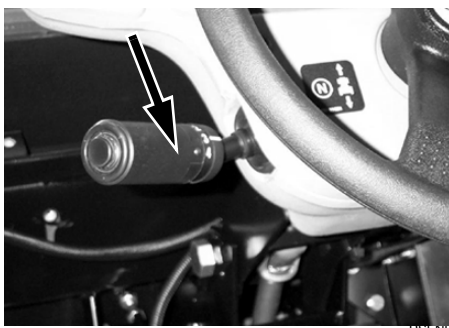
STEP 2

Synchroshuttle only



Make sure that the direction of travel control lever and gear change lever are in neutral position.

Powershift only



Make sure the transmission control lever is in neutral position.

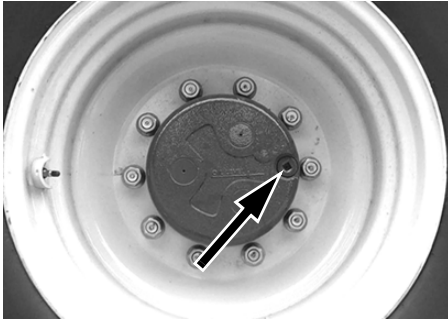
STEP 3

Use the stabilizers to raise the rear of the machine slightly so that the rear wheels are no longer in contact with the ground and place blocks under the rear axle. Chock front wheels.

STEP 4

Stop the engine, engage parking brake and remove the starter switch key.

STEP 5



AXWN

Manually turn the wheel until the orifice is in the horizontal position and remove the plug.

STEP 6

The oil should be level with the orifice. If necessary, top up via this orifice.

STEP 7

Install the plug. Tighten to 60 Nm.

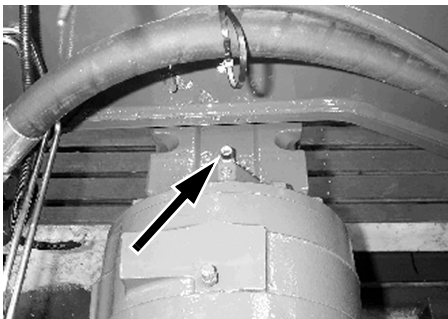
STEP 8

Repeat Steps 5 to 7 for the other reduction gear.

STEP 9

Lower the machine to the ground.

Cleaning the breather



AXBR

Check that the rear axle breather is not blocked or damaged.

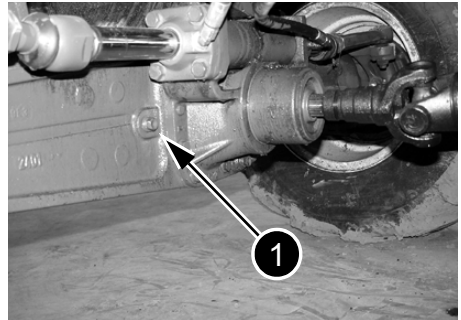
Draining and filling the front drive axle

STEP 1

Park the machine on firm, level ground, stop the engine, engage the parking brake and remove the starter switch key.

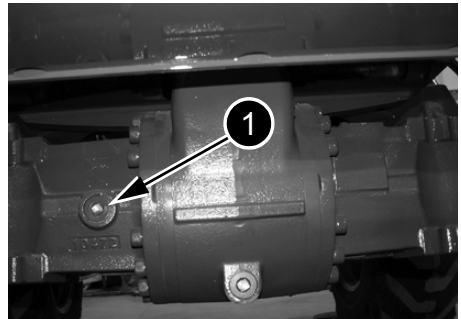
STEP 2

(760/820/860/870/880)



DSC05537

(970/980 only)

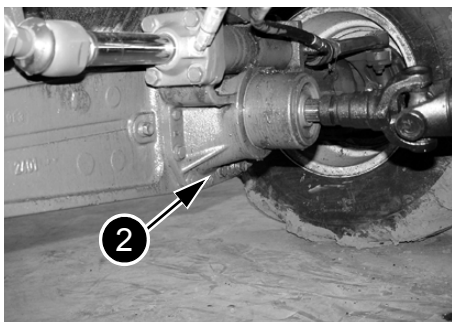


DSC05538

Remove the plug (1).

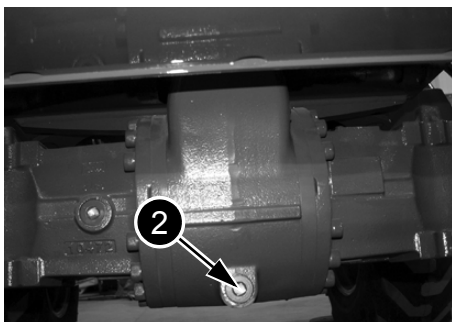
STEP 3

(760/760/860/880 only)



DSC05537

(970/980 only)



DSC05538

Place a receptacle of a suitable capacity under the drain plug (2) and remove the plug (2). Allow the oil to flow out.

STEP 4

Install the drain plug (2). Tighten to 60 Nm.

STEP 5

Fill with oil via the filler orifice (1) until the oil is level with the orifice. Then install the plug. Tighten to 60 Nm.

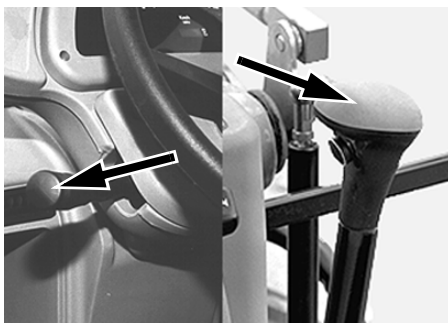
Draining and refilling the front axle reduction gears

STEP 1

Park the machine on flat, level ground.

STEP 2

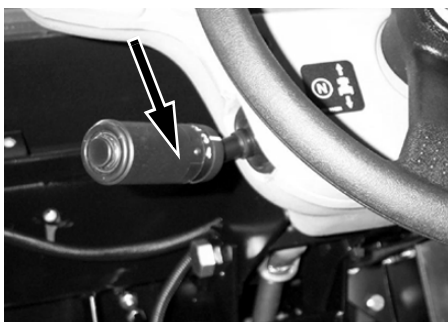
Synchroshuttle only



CK98G018

Make sure that the direction of travel control lever and gear change lever are in neutral position.

Powershift only



PSFNR

Make sure the transmission control lever is in neutral position.

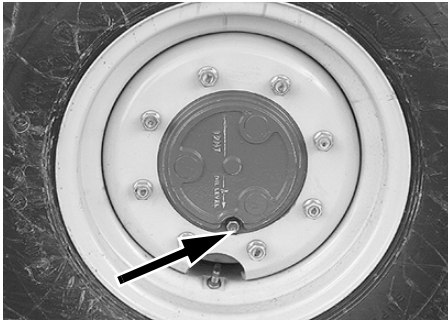
STEP 3

Use the loader attachment to raise the front of the machine slightly so that the front wheels are no longer in contact with the ground and place blocks under the front drive axle. Chock rear wheels.

STEP 4

Stop the engine, engage parking brake and remove the starter switch key.

STEP 5



Turn the wheel by hand until the orifice is in the lowest position.

STEP 6

Place a receptacle of a suitable capacity under the reduction gear, remove the plug and allow the oil to flow out.

STEP 7



Turn the wheel by hand until the orifice is in the horizontal position and then fill via that orifice until the oil is level with the orifice.

STEP 8

Install the plug.

STEP 9

Repeat Steps 5 to 8 for the other reduction gear.

STEP 10

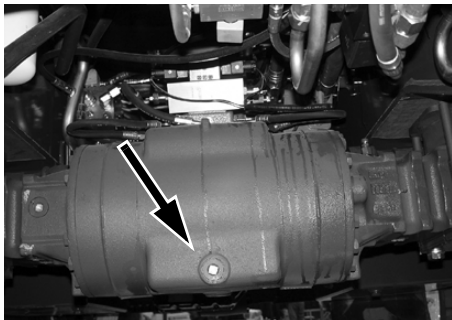
Start engine and lower the machine to the ground.

Draining and filling the rear axle

STEP 1

Park the machine on firm, level ground, stop the engine, engage the parking brake and remove the starter switch key.

STEP 2

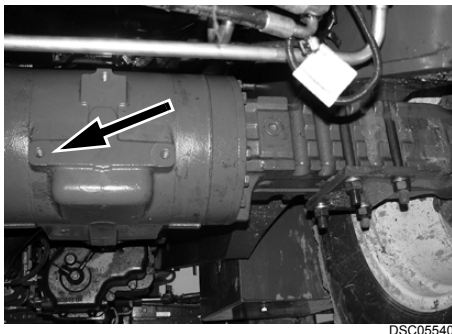


Place a receptacle of a suitable capacity under the drain plug, remove the drain plug and allow the oil to flow out.

STEP 3

Install the drain plug. Tighten to 60 Nm.

STEP 4



Fill with oil via the filler orifice until the oil is level with the orifice. Then install the plug. Tighten to 60 Nm.

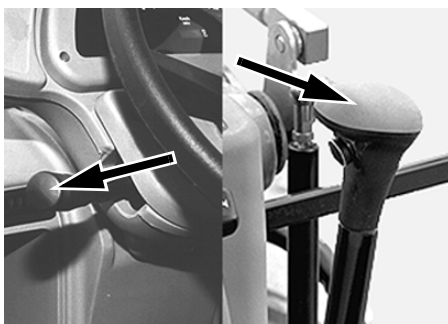
Draining and refilling the rear reduction gears

STEP 1

Park the machine on firm, level ground.

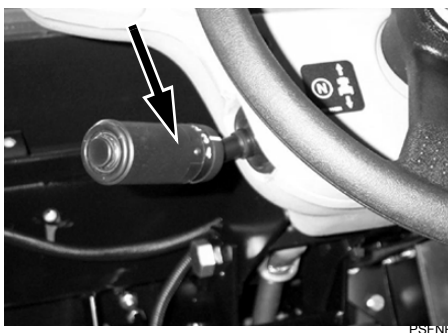
STEP 2

Synchroshuttle only



Make sure that the direction of travel control lever and gear change lever are in neutral position.

Powershift only



Make sure the transmission control lever is in neutral position.

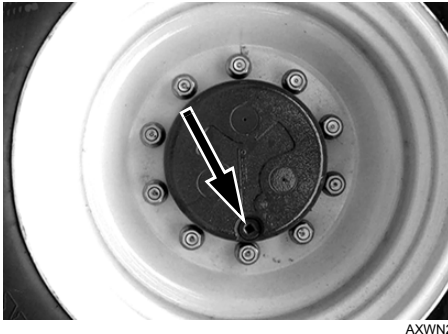
STEP 3

Use the stabilizers to raise the rear of the machine slightly so that the rear wheels are no longer in contact with the ground and place blocks under the rear axle. Chock front wheels.

STEP 4

Stop the engine, engage the parking brake and remove the starter switch key.

STEP 5



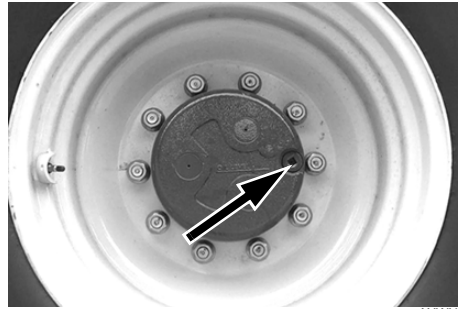
AXWN2

Turn the wheel by hand until the orifice is in the lowest position.

STEP 6

Place a receptacle of a suitable capacity under the reduction gear, remove the drain plug and allow the oil to flow out.

STEP 7



AXWN

Turn the wheel by hand until the orifice is in the horizontal position and then fill via that orifice until the oil is level with the orifice.

STEP 8

Install the plug. Tighten to 60 Nm.

STEP 9

Repeat Steps 5 to 8 for the other reduction gear.

STEP 10

Start engine and lower the machine to the ground.

Engine Access



WARNING: Many of the checks and operations referred too in this section require access to the engine. To safely gain access to the engine, see “Engine Access”, page 153

Wheels and Tyres



WARNING: A burst tyre can cause serious injury. Regularly check the condition of tyres and always observe the inflation pressures defined in accordance with the type of tyre and ground concerned.



WARNING: When checking tyre pressures or during an inflation operation, never face the tyre. Always use an inflation cage when the wheel is removed from the machine. Keep all other persons away from the area.



WARNING: Never weld near a tyre. It is essential to remove the tyre before any welding operation.

Wheel or tyre service



WARNING: The servicing of wheels and tyres for this machine should only be entrusted to a qualified mechanic, who will know how to inflate the tyres while observing safety instructions. To avoid any accident, use a protective device (an inflation cage for tyres), suitable tools and respect the procedure. Serious or fatal injury can result from a tyre suddenly flying off a rim (one piece rim) or from the tyre and/or the wheel components (a wheel consisting of several parts).

NOTE: When renewing worn or damaged tyres, always install tyres of the same make, model and size as those removed to prevent transmission gearing problems in 4WD. Failure to fit the correct tyre combinations may result in excessive tyre wear and severe damage to drive line components etc. when the machine is used in 4 wheel drive mode. Damage caused due to the wrong tyre combinations will not be covered by machine warranty. If in doubt consult your Dealer or manufacturer.

Tyre pressures

IMPORTANT: Make sure you protect your face before using compressed air.

Service specification

Pressure check	Every 50 hours
Pressure values	See “Tyres”, page 246

Wheel Nut Torque Settings

Service specifications

Torque tightening check	Every 250 hours (Every day for five days, after removing a wheel)(After the first 50 hours during the running-in period)
Torque values	See “Wheel Tightening Torque”, page 246

Replacing a wheel

STEP 1

Park the machine on firm, level ground, with no obstacles in the area.

STEP 2

Loosen the retaining nuts from the wheel which is to be removed.

STEP 3

Start the engine and use the loader attachment and the stabilizers to lift the machine until the wheels are no longer in contact with the ground.

STEP 4

Stop the engine, engage the parking brake and remove the starter switch key.

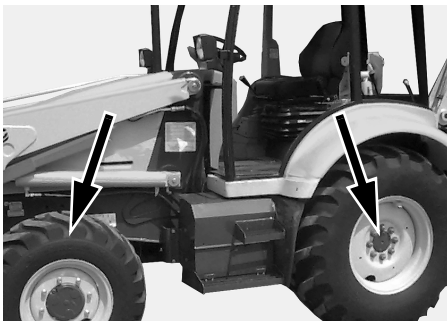
STEP 5

Place blocks under the axle for the wheel which is to be removed.

STEP 6

Remove the nuts and remove the wheel.

STEP 7



CD98G002

Install a new wheel, observing the orientation of the tread pattern.

STEP 8

Install the nuts and tighten them to correct torque, see “*Wheel Tightening Torque*”, page 246.

STEP 9

Remove the blocks from under the axle.

STEP 10

Lower the machine to the ground.

NOTE: *Make sure that the new wheel has a sufficient inflation pressure. Re-inflate it if necessary.*

IMPORTANT: *Make sure you protect your face before using compressed air.*

Loader Bucket Return-To-Dig Adjustment

STEP 1

Place the machine on firm, level ground and engage the parking brake.

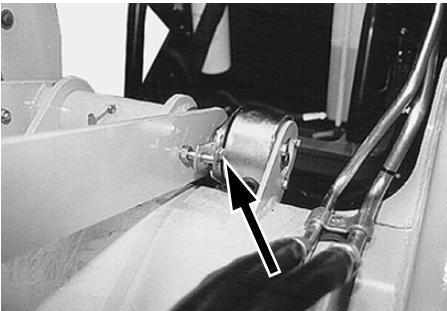
STEP 2

Lower the loader bucket to the ground and make sure that the bottom of the bucket is at the required digging angle.

STEP 3

Stop the engine and remove the starter switch key.

STEP 4



CP98G009

Unscrew the return-to-dig switch lock nut and slide the switch in the groove until the switch contact roller is resting on the loader beam cam, then tighten the nut.

STEP 5

Start the engine, raise the loader attachment completely and dump the bucket.

STEP 6

Press the return to dig override switch to illuminate the light.



DSC05525

STEP 7

Place the control lever in the return to dig position to enable the bucket to re-set.

Lower the arms to the ground and check digging angle. Adjust if necessary.

Radiator and Oil Cooler

Service specifications

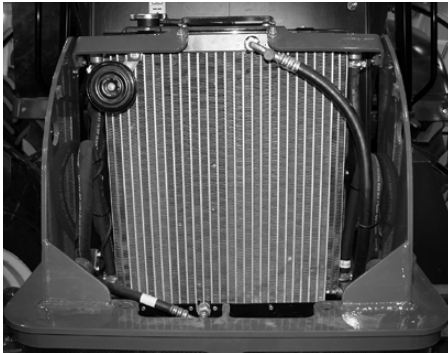
Checking for leaks	Every 10 hours or every day
Cleaning	As required

Cleaning

STEP 1

To access the engine see “*Engine Access*”, page 153.

STEP 2



DSC05543

Remove the two bolts securing the radiator and cooler assembly, and pivot the assembly forward.

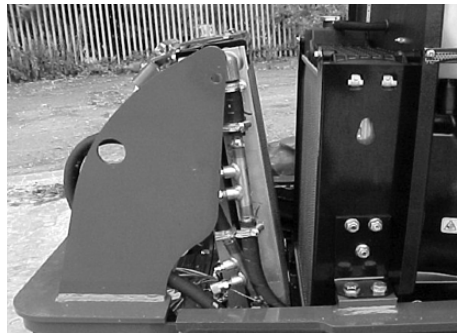
STEP 3

Clean:

Dry dust: use compressed air.

Mud: use a water jet.

Oily dust: use perchlorethylene.



PN00024

IMPORTANT: *The use of trichlorethylene is strictly forbidden.*

STEP 4

Re-position the cooler assembly and replace the two bolts.

STEP 5

Close and lock the engine bonnet.

STEP 6

Remove the support strut and lower the loader attachment. see “*Loader Attachment Support Strut*”, page 97

Engine Alternator and Fan Belt

Service specification

Check	Every 250 hours (After the first 50 hours during the running-in period)
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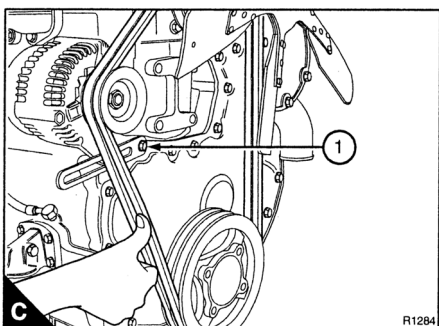
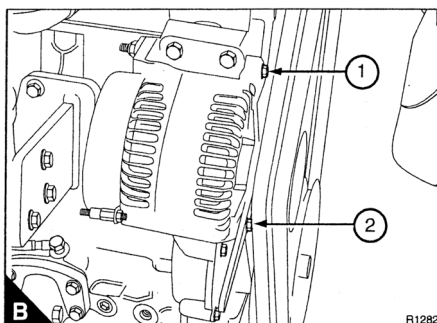
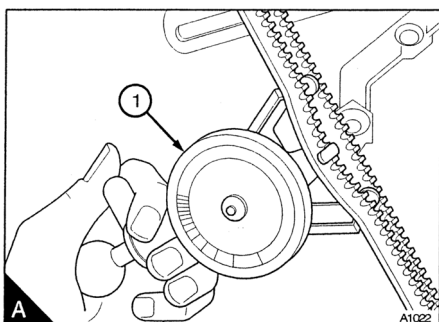
Checking the drive belt(s)

Renew a belt if it is worn or damaged. If twin belts are fitted, they must be renewed together.

To ensure maximum belt life, it is recommended that a belt tensioner gauge is used to check the belt tension. Fit the gauge (A) at the centre of the longest free length and check the tension. The correct tension is 535 N (120 lbf) 54 kgf. If the tension is 250 N (56 lbf) 25 kgf or below, adjust the belt to 535 N (120 lbf) 54 kgf as indicated below:

If twin belts are fitted, check and if necessary adjust the tension on both the belts.

Adjusting the belt tension



1. Loosen the pivot fastener (B1) of the alternator and the adjustment link fasteners (B2) and (C1).
2. Change the position of the alternator to give the correct tension. Tighten the pivot fastener of the alternator and the adjustment link fasteners to 22 Nm (16 lbf ft) 2,2 kgf m.
3. Check the belt tension again to ensure that it is still correct. If a new belt is fitted, the belt tension must be checked again after the first 20 hours of operation

Machine Inspection and Cleaning

Service specifications

Inspection and cleaning	As required.
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Whenever oil or grease has been spilt on the machine; clean such deposits off with steam or high pressure water.

Take advantage of this operation to make a visual check of all the welded components (possible appearance of cracks), and the attachment linkage. Mark any leaks, check the condition of pipes and hoses.

Cylinder Leak Inspection

A cylinder rod should be slightly oily. Check for leaks after a working period, when the entire hydraulic system is at normal operating temperature.

1. Clean the rod and the gland of the cylinder which is to be inspected.
2. Work normally for 5 to 10 minutes.
3. Extend the cylinder rod.
4. Check for leaks.

ROD APPEARANCE	TEST	CONCLUSION
Dry	Slight traces of oil when a sheet of paper is rubbed over 20 cm of the rod.	Normal
Slightly oily	The paper remains stuck when run over the rod.	Normal
Oily	A sheet of paper placed on the rod stays stuck to it.	Normal
Very oily or weeping	A ring of oil is visible on the rod after each rod extension.	Consult your local dealer
Leak	Oil drips from the gland every time the cylinder rod is retracted.	

Air Conditioning (optional)

The air conditioning system components require maintenance at regular intervals. Observe these intervals to ensure correct operation and full efficiency of the air conditioning. The air conditioning system contains a gas which is subject to strict regulations. Any problem with the system must be resolved quickly.



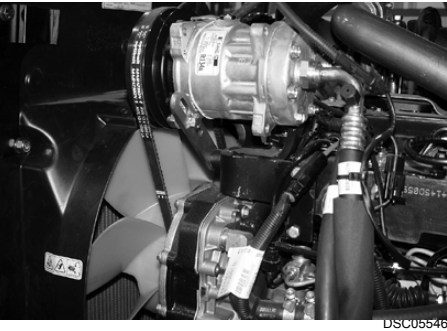
WARNING: *Never perform any service operation on the air conditioning circuit. For any operation, consult an approved specialist.*

NOTE: *Run the air conditioning at least once a week, even for a short time. See “Heating, Ventilation (cab version) and Air Conditioning (optional) Controls”, page 90.*

Service specifications

Compressor lubrication	Every 250 hours
Compressor drive belt inspection	Every 250 hours

Compressor lubrication



DSC05546

Using the air conditioning controls in the operator's compartment, run the compressor so as to lubricate the internal seal. See “Air conditioning control (optional)”, page 90.

NOTE: *In cold weather, run the engine for a few minutes and then start the compressor.*

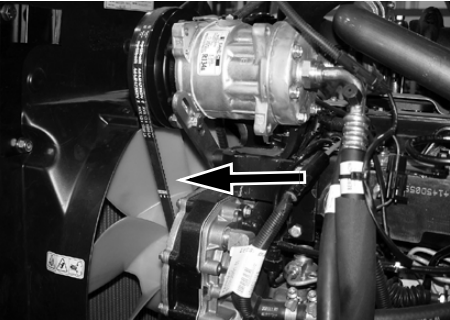
IMPORTANT: *Never unscrew the plug located on the top of the compressor since that would discharge the entire circuit.*

Compressor drive belt inspection

STEP 1

To access the engine see “Engine Access”, page 153.

STEP 2



DSC05546

Check the condition of the compressor drive belt. Replace it if it is worn or damaged and adjust the tension.

IMPORTANT: *After replacing the drive belt, make an adjustment after the first 20 operating hours.*

Check the drive belt tension. If necessary, adjust the tension. Unscrew the retaining hardware, tighten the drive belt and re-tighten the hardware. The deflection should be 13 - 19 mm (1/2 - 3/4 inch).

IMPORTANT: *The drive belt should not be over tightened (premature bearing wear) or too slack (premature belt wear).*

STEP 3

Close and lock the engine bonnet.

STEP 4

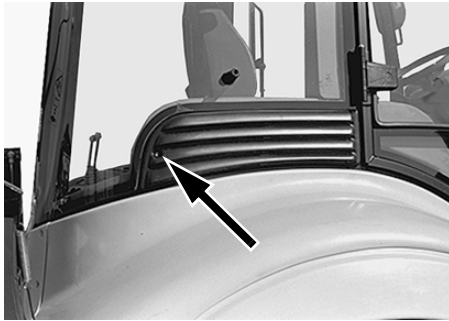
Remove the support strut and lower the loader attachment. see “Loader Attachment Support Strut”, page 97

Air Intake Filter Cab Heater

Service specifications

Filter cleaning	Every 500 hours, or in case of reduced air circulation.
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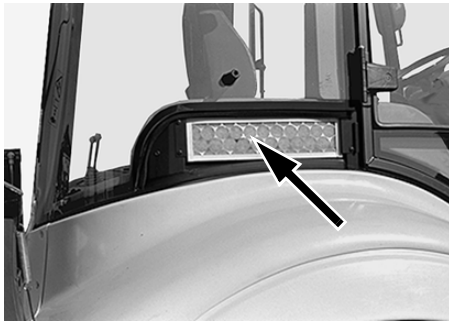
STEP 1



CK98K009

Remove the screw and the cab grille.

STEP 2



CK98K010

Remove the filter.

STEP 3

Check the condition of the filter. Replace it or clean it if necessary.

STEP 4

Blow the filter through with compressed air.

IMPORTANT: *Make sure you protect your face before using compressed air.*

IMPORTANT: *The air pressure used must be a maximum of 2 bar.*

STEP 5

Clean the filter in water using a suitable detergent (e.g. a typical household detergent). Instructions for using the detergent are printed on the packaging.

STEP 6

Allow the filter to dry completely.

STEP 7

Check the condition of the filter by placing an inspection lamp behind the filter.

IMPORTANT: *The filter must be replaced if light can be seen through a hole.*

STEP 8

Clean around the filter housing.

STEP 9

Install the new or cleaned filter.

STEP 10

Install the cab grille and the screw.

Parking Brake Inspection

Service specification

Check	Every 50 hours
Check and adjustment	Every 2000 hours

Parking Brake Check (all models)

STEP 1

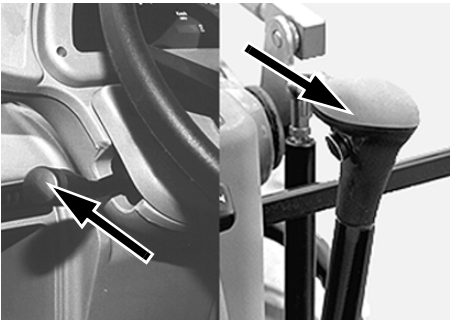


CK98F033

Engage the parking brake and start the engine.

STEP 2

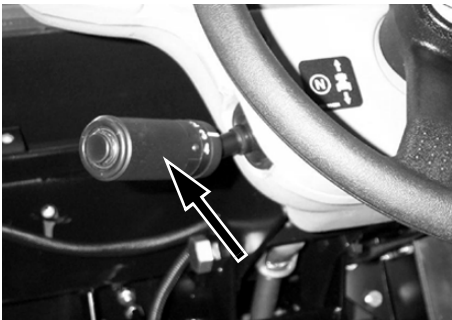
Synchroshuttle only



CK98G018

Place the gear change lever in 3rd gear, then place the direction of travel control lever in forward drive. The audible warning device will sound.

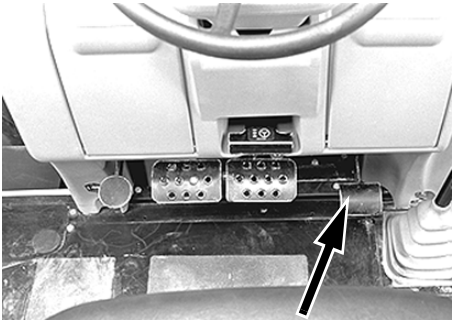
Powershift only



PSFNR

Select 3rd gear, then place the transmission control lever in forward drive.

STEP 3



CK98F029

Using the accelerator pedal, increase the engine speed to about 1800 rpm. The machine must not move. If the machine moves, adjust the brake.

See "Parking Brake Adjustment", page 208.

Parking Brake Adjustment

Park the machine on flat, level ground, with the loader beams 30 cm (12 inch) above the ground. Make sure that the backhoe boom locking device is engaged.

STEP 4

Use the stabilizers to raise the rear wheels.

STEP 5

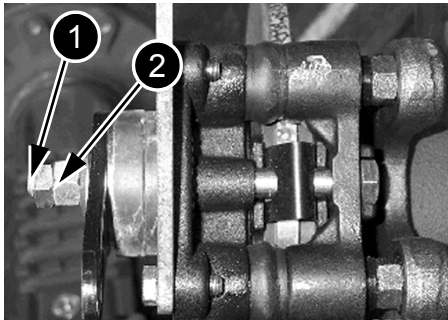
Use suitable axle stands to support the rear of the machine, making sure the wheels are not touching the ground.

IMPORTANT: *Make perfectly sure that the axle stands are capable of supporting the total weight of the machine.*

STEP 6

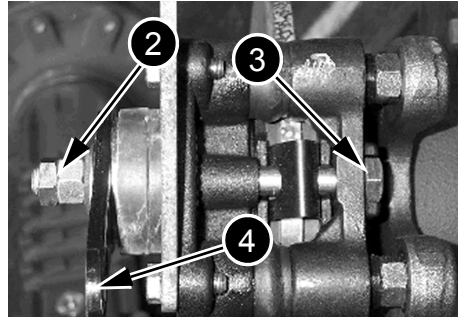
Lower the loader arms to the ground, stop the engine, remove the starter switch key and release the parking brake.

STEP 7



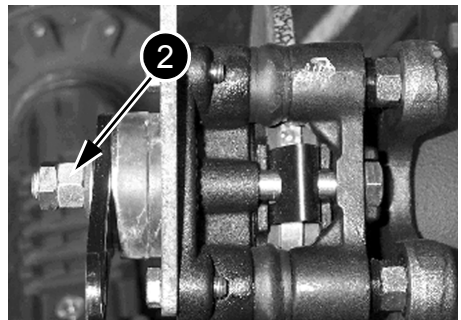
Loosen the locking nut (1) and adjuster nut (2).

STEP 8



Hold bolt (3) and tighten inner adjuster nut (2) until brake linings are in firm contact with brake disc. Torque to 10 Nm. Make sure operating lever (4) is in correct operating position.

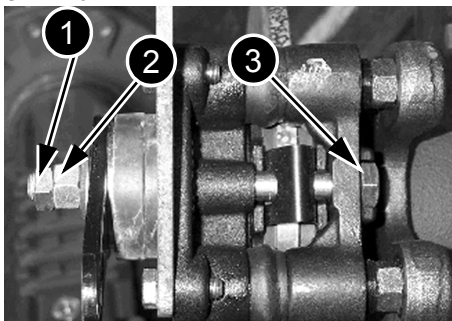
STEP 9



Loosen inner adjuster nut (2) 4 to 5 flats of the nut and check that brake disc is free to rotate.

Maintenance/Adjustments

STEP 10



NOTE: Make sure inner adjuster nut (2) does not turn relative to bolt (3).

Start the engine and raise the loader 30 cm above the ground. Use the stabilizers to raise the rear of the machine.

STEP 11

Remove the axle stands, lower the machine to the ground and stop the engine.

Tighten outer locking nut (1) to inner adjuster nut (2) and torque to 45 to 55 lbft in / 60 to 75 Nm.

Brake System

Service specifications

Checking for leaks	Every 10 hours or every day
Bleed brakes	Every 500 hours

When the machine requires the brake bleeding procedure to be carried out, please consult your local dealer.

ROPS/FOPS Cab (or Protective Frame)

Your machine has a ROPS/FOPS cab (or frame).

- ROPS: Roll over protective structure.
- FOPS: Falling object protective structure.

An identification plate is attached to the ROPS/FOPS cab (or frame). See “*ROPS/FOPS Cab (or Frame)*”, page 8 for:

- The manufacturer's address.
- The ROPS/FOPS serial number.
- The reference to the performance requirements meet :
ISO 3471/1 1996

Service specifications

Inspection	Every 250 hours
------------	-----------------

Maintenance and inspection

Check the torque of the mounting bolts and, if necessary, tighten the bolts to the correct torque (395 Nm).

Check the operator's seat and the seat belt mounting hardware. Tighten the bolts to the correct torque. Replace parts showing signs of wear or damage.

Check that there are no cracks, rust or holes in the ROPS/FOPS cab (or frame) and components. Age, weather and accidents can cause damage. If you have any doubt about the state of the ROPS/FOPS cab (or frame), consult your local dealer.

Damage

If the machine has rolled over or if the ROPS/FOPS cab (or frame) has been in some other type of accident, you must replace the damaged ROPS/FOPS components in order to conserve the same degree of protection you had previously.

After an accident, check the following for damage:

- The ROPS/FOPS cab (or frame).
- The lower ROPS/FOPS cab (or frame) chassis.
- The operator's seat.
- The seat belt mounting hardware.

IMPORTANT: Before putting the machine back into service, make sure all the damaged components of the ROPS/FOPS cab (or frame) have been replaced. See the Parts Catalogue for your machine or consult your local dealer.



WARNING: Do not try to weld or straighten the ROPS/FOPS cab (or frame).



WARNING: Do not modify the ROPS/FOPS cab (or frame) in any manner. Unauthorized modification, such as welding, drilling, cutting and adding attachments, as well as any damage resulting from collisions or the machine rolling over could weaken the structure and reduce your protection. Replace the ROPS/FOPS cab (or frame) if subjected to roll over or damage. Do not attempt to repair it.



WARNING: If you operate this machine without a ROPS/FOPS cab (or frame) and the machine rolls over, you can be seriously injured or killed. Remove the ROPS/FOPS cab only for service or replacement. Do not operate the machine with the ROPS/FOPS cab (or frame) removed.



WARNING: Do not install accessories (fixed or otherwise) which may increase the weight of the machine. This may cause serious accidents. Do not exceed the maximum weight shown on the ROPS/FOPS cab (or frame) identification plate.



WARNING: Improper ROPS/FOPS cab (or frame) inspection or maintenance can cause serious injury. Carry out the recommended ROPS/FOPS cab (or frame) inspection procedure shown in this manual. If it is necessary to replace ROPS/FOPS parts or the ROPS/FOPS cab (or frame), use only the replacement parts shown in the Parts Catalogue for your machine.

Steering and Axles

Service specifications

Check power steering system pipes, hoses and unions for damage or leakage	Every 250 hours
---	-----------------

Check all steering system fasteners and all ball joints and pivots for wear

If wear or excessive play occurs in the steering mechanism contact your local dealer.

Check power steering system pipes, hoses and unions for damage or leakage

This machine is equipped with hydrostatic power steering and it is therefore important that hoses are maintained in perfect condition and that no leaks occur anywhere in the steering system. If accessories have been added after the machine was purchased, check to ensure that they do not interfere with steering system hoses or components.

Transmission

Service specification

Check transmission mounting bolt torques	Every 250 hours (After the first 50 hours during the running-in period)
--	---

Check the tightness of the eight transmission mounting bolts (four each side of machine): 70 lbft (105 Nm (M12)).

Transmission to chassis: 170 lbft (230 Nm (M16))

Fuel Injectors

Service specification

Service the fuel injectors	Every 2000 hours
----------------------------	------------------

Fuel injection atomizers require regular servicing to maintain efficient operation. This work must be done by a CAV, Perkins Dealer or your local dealer.

Early signs of atomizer malfunction are:

- Misfiring.
- Knocking in one or more cylinders.
- Engine overheating.
- Loss of power.
- Black smoky exhaust.
- Increased fuel consumption.

Other faults can cause apparently similar symptoms and should be checked before removing injectors.

- Water in the fuel.
- Wrong fuel.
- Dirty or damaged fuel filters.

If none of these faults are present then call your local dealer.

Extendable Dipper

Service specification

Replacement of the internal and external wear pads	As required
--	-------------

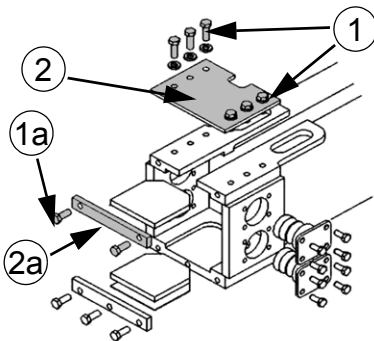
Top and bottom wear pads

STEP 1

Position the extendable dipper so that the inner member is extended approximately 30 cm (12 inch) and is resting on the bottom wear pad.

NOTE: The bucket must not be resting on the ground - dipper must be supported.

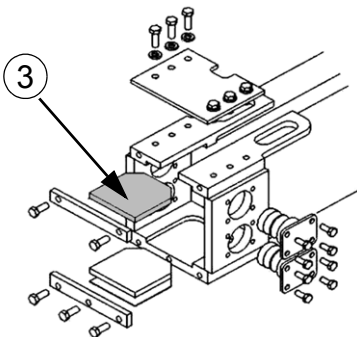
STEP 2



DIPNA

Remove all six bolts (1) and lift off top plate (2). Then remove both bolts (1a) and retainer plate (2a).

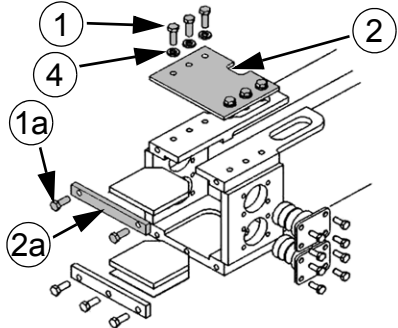
STEP 3



DIPNB

Slide out the old wear pad (3) and replace it with a new one.

STEP 4



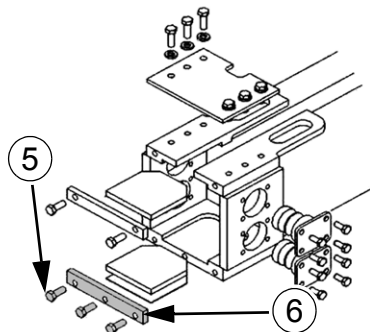
DIPNA

Refit the plate (2), washers (4) and bolts (1), which should be tightened to 140 Nm (104 lbft ft). Refit retainer plate (2a) and bolts (1a) and tighten to 140 Nm (105 lbft ft).

STEP 5

Lower the extendable dipper until the bucket contacts the ground so that the inner extendable member is pressed against the top wear pad.

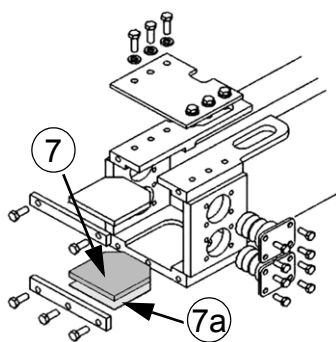
STEP 6



DIPNC

Remove three bolts (5) and the retainer plate (6).

STEP 7



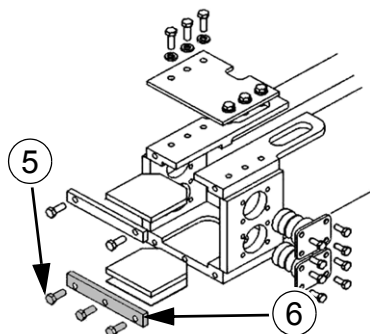
DIPND

Remove the bottom wear pad (7) and shims (7a).

STEP 8

Fit a new wear pad and adjust the shim thickness to give a maximum gap of less than 1 mm (0.04 inch).

STEP 9



DIPNC

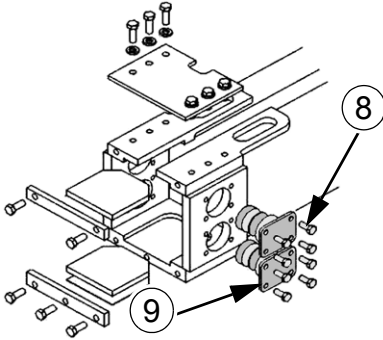
Refit the retainer plate (6) and tighten bolts (5) to 140 Nm (105 lbft ft).

Side wear pads

STEP 10

Raise dipper, bucket must be clear of the ground (dipper must be supported).

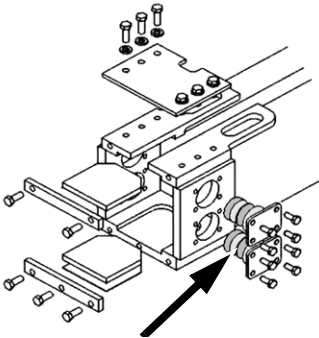
STEP 11



DIPNE

Remove sixteen bolts (8) and all four housings (9), shims and wear pads.

STEP 12



DIPNF

Place a 1 mm (0.04 inch) shim, a 2 mm (0.08 inch) shim and a new wear pad into two of the housings.

STEP 13

Fit both housings to one side of the extendable dipper outer member. Fit the bolts and tighten to 60 Nm (45 lbft ft).

STEP 14

Push the inner member hard against the wear pads just fitted.

STEP 15

Fit two new wear pads into the remaining housings and assemble the housings to the opposite side of the outer member. Fit and partially tighten all eight bolts.

STEP 16

Measure the clearance between the inner member and the wears pads just fitted.

STEP 17

Remove the housings fitted in step 15 and add shims behind the wear pads to achieve a total clearance between the wear pads and the inner member of less than 1 mm.

STEP 18

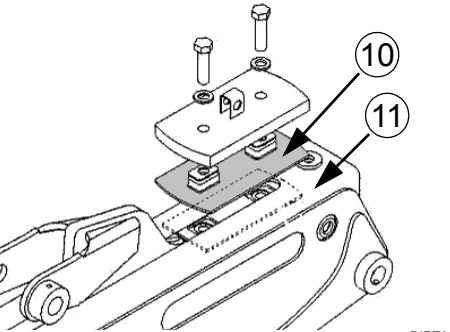
Fit and tighten the bolts to 60 Nm (45 lbft ft).

Checking and adjustment of Tail Upper wear pads

STEP 1

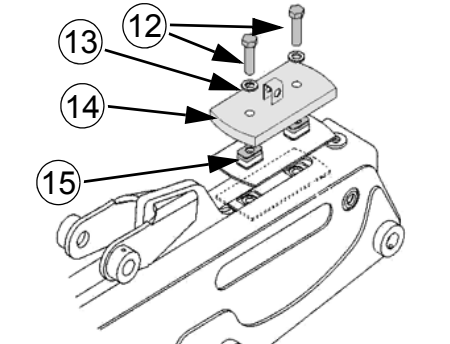
Position the backhoe to full reach, the dipper extended 3/4 travel and the bucket maintained 50 mm (2.0 ins) above the ground.

STEP 2



The wear clearance between the outer wear pad (10) and the dipper (11) should be maximum 1.0 mm (0.04 ins).

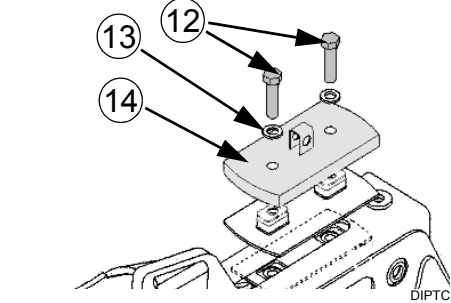
STEP 3



If adjustment is required, remove both bolts (12), washers (13), and retainer plate (14).

Remove sufficient shims (15) equally at both locations to compensate for the measured wear clearance at step 2.

STEP 4

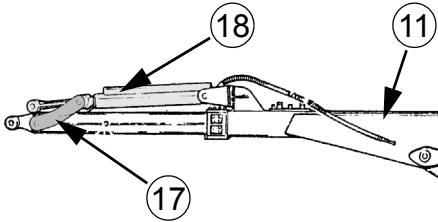


Refit the retainer plate (14), washers (13) and both bolts (12). Torque to 920 Nm (690 lbft ft).

Re-check wear clearance refer to step 2 and make further adjustments if required.

Replacement of Tail Upper wear pads and Internal wear pads

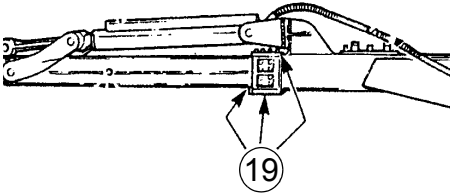
STEP 1



DIPFA

Remove the bucket, bucket link (17) and bucket cylinder (18) from the dipper (11).

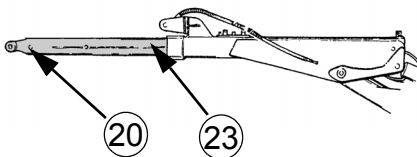
STEP 2



DIPF

Remove the top, bottom and side wear pads (19) from the end of the dipper.

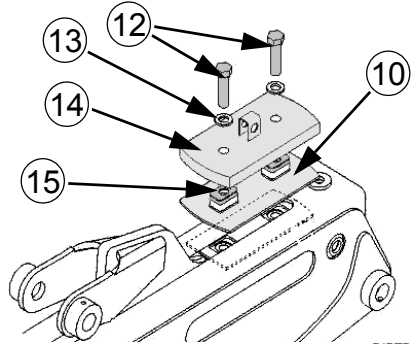
STEP 3



DIPFB

Extend inner section (23) fully, remove circlips from the extension cylinder mounting pin (20), then drive out the pin.

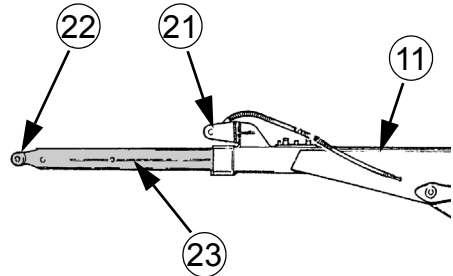
STEP 4



DIPTD

Remove both bolts (12) washers (13) and retainer plate (14). Remove shims (15) and outer top wear pad (10). Leave spacers in place.

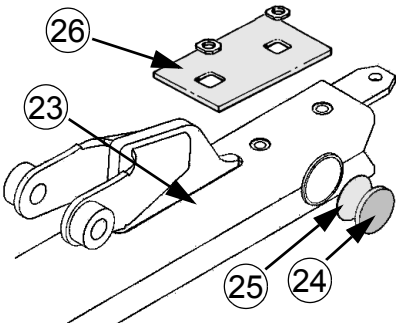
STEP 5



DIPFB

Support the inner section (23) by means of a suitable chain sling and bars inserted through the bucket cylinder mounting hole (21) and bucket pivot pin hole (22). Slide the inner section (23) out of the dipper (11).

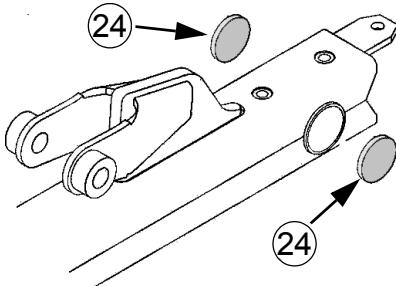
STEP 6



DIPB

Remove both side wear pads (24), shims (25) and top inner wear pad (26) from the inner section (23)

STEP 7



DIPIC

Fit new wear pads (24) (**without shims**) into each side of the inner section.

Measure the total width between the outer wear pads faces, this is: **Dimension A** (mm).

Measure the internal width of dipper outer section, this is: **Dimension B** (mm).

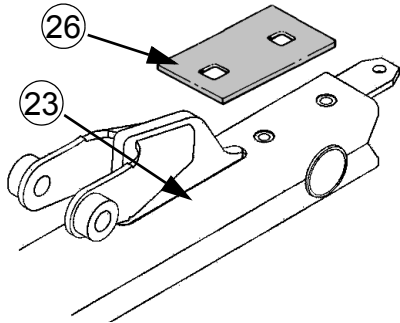
Thickness of shims required =

**Dim. B - Dim. A - 0.5 to 1.0mm
(0.02 to 0.04 inch)**

Divide shims equally (up to 1.0 mm, 0.04 inch difference allowed) and install under the side wear pads.

NOTE: A smear of heavy grease will help retain the shims and wear pads during assembly.

STEP 8

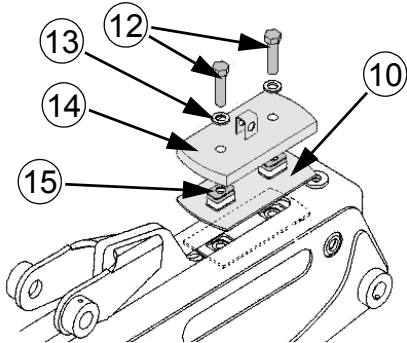


DIPJA

Fit a new inner top wear pad (26) to inner section (23).

Refit inner section to dipper.

STEP 9

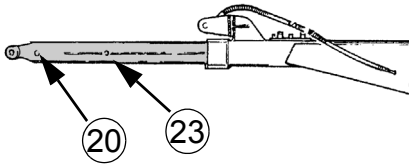


DIPTD

Fit a new outer top wear pad (10), spacers, shims (15) (3mm thickness shims fitted above spacers), retainer plate (14), washers (13) and bolts (12)

NOTE: Adjustment of these wear pads must be carried out when dipper is fully assembled. Continue to next step.

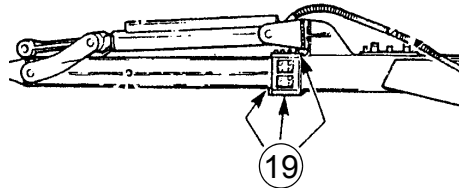
STEP 10



DIPFB

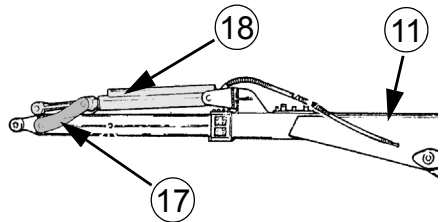
Align and fit mounting pin (20) through inner section (23) and extension cylinder then secure with circlips.

STEP 11



DIPF

Refit the top, bottom and side wear pads (19) to the end of the dipper.



DIPFA

Refit the bucket, bucket link (17) and bucket cylinder (18) to the dipper (11).

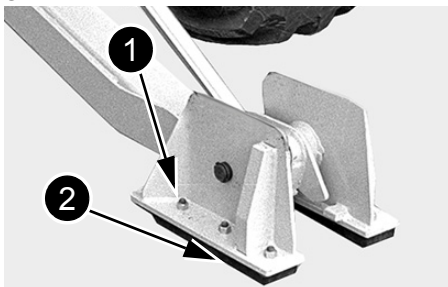
NOTE: Adjustment of the Tail Upper wear pads must now be checked, see "Checking and adjustment of Tail Upper wear pads", page 215.

Replacing a Stabilizer Pad (optional) (Centremount (Axial) Backhoe version only)

STEP 1

Park the machine on the firm, level ground, stop the engine, engage parking brake and remove the starter switch key.

STEP 2



CK98N003

Remove the 3 bolts (1) and the pad (2).

Replacing a Backhoe Bucket

Removal

STEP 1

Park the machine on firm, level ground.

STEP 2

Lower the stabilizers until the rear wheels are just clear of the ground.

STEP 3

Place the backhoe bucket flat on the ground.

STEP 4

Stop the engine, engage the parking brake and remove the starter switch key.

STEP 5



CD98F048

Remove the locking pin, washer and the connecting rod/bucket pivot pin.

STEP 6

Start the engine.

STEP 7

Retract the bucket cylinder rod.

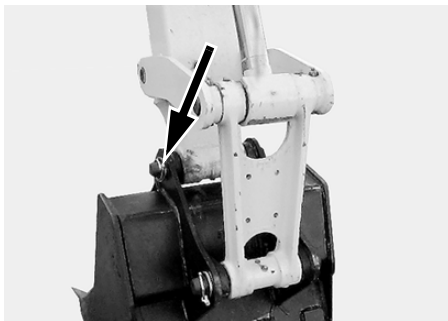
STEP 8

Operate the attachment controls so that the dipper/bucket pivot pin is not under load from the dipper.

STEP 9

Stop the engine, engage parking brake and remove the starter switch key.

STEP 10



CD98F049

Remove the locking pin, washer and the connecting dipper/bucket pivot pin.

STEP 11

Start the engine.

STEP 12

Operate the attachment controls so as to disconnect the dipper from the bucket.

Installation

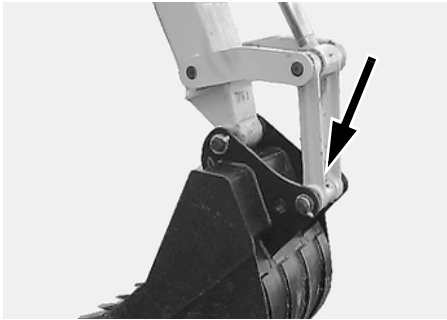
STEP 1

Start the engine.

STEP 2

Extend the bucket cylinder rod to bring the connecting rod into its housing.

STEP 3



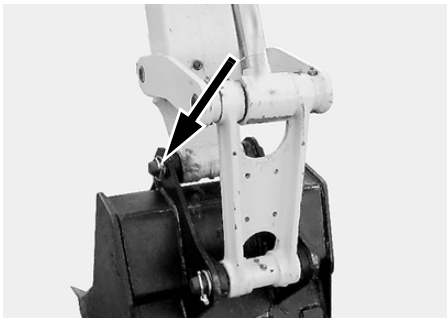
CD98F048

Install the connecting rod/bucket pivot pin the washer and the locking pin.

STEP 4

Slightly raise the attachment and then operate the bucket and dipper control to bring the dipper lugs in line with the bucket lugs.

STEP 5



CD98F049

Install the connecting dipper/bucket pivot pin the washer and the locking pin.

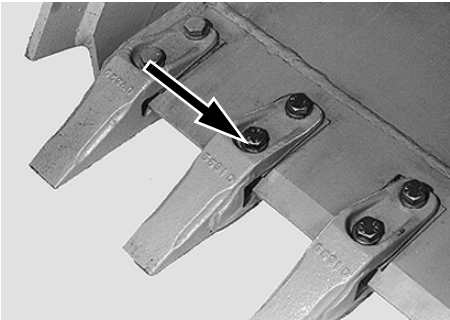
Replacing a Backhoe Bucket or Loader Bucket Tooth

Service specification

Torque tightening check	Every day for five days after replacing a bucket tooth
Fastening hardware	230 Nm (170 lbf ft)

Removal

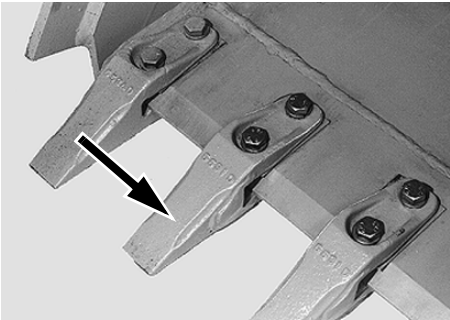
STEP 1



CD96B028

Remove the fastening hardware.

STEP 2

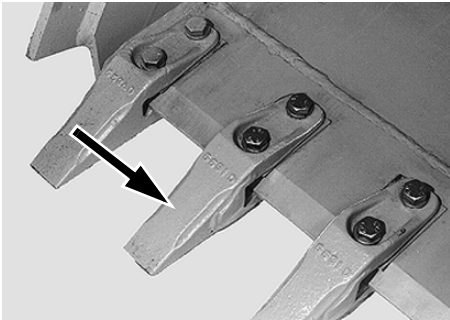


CD96B028

Remove the tooth.

Installation

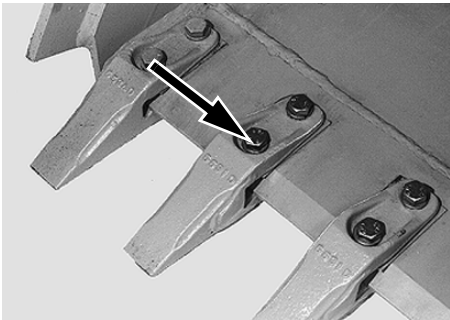
STEP 1



CD96B028

Install a new tooth and the appropriate adjustment shims .

STEP 2



CD96B028

Install the fastening hardware. Tighten to 230 Nm.

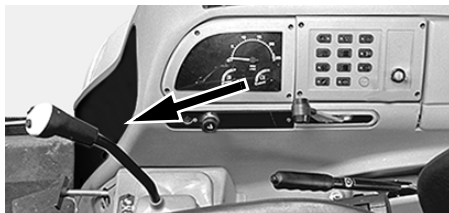
Engine Troubleshooting

Problem	Possible causes	
	Checks by the user	Checks by the workshop personnel
The starter motor turns the engine too slowly	1, 2, 3, 4	
The engine does not start	2, 5, 6, 8, 9, 10, 12, 13, 14, 15, 17	34, 35, 36, 37, 38, 42, 43, 63
The engine is difficult to start	5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19	34, 36, 37, 38, 40, 42, 43, 44, 63
Not enough power	8, 9, 10, 11, 12, 13, 16, 18, 19, 20, 21	34, 36, 37, 38, 39, 42, 43, 44, 62, 63, 64
Misfire	8, 9, 10, 12, 13, 15, 20, 22	34, 36, 37, 38, 39, 40, 41, 43, 63
High fuel consumption	11, 13, 15, 17, 18, 19, 22, 23	34, 36, 37, 38, 39, 40, 42, 43, 44, 62
Black exhaust smoke	11, 13, 17, 19, 21, 22	34, 36, 37, 38, 39, 40, 42, 43, 44, 62, 63
Blue or white exhaust smoke	4, 15, 21, 23	36, 37, 38, 39, 42, 44, 45, 52, 58, 61
The pressure of the lubricating oil system is too low	4, 24, 25, 26	46, 47, 48, 50, 51, 59
The engine knocks	9, 13, 15, 17, 20, 22, 23	36, 37, 40, 42, 44, 46, 52, 53, 60
The engine runs erratically	8, 9, 10, 11, 12, 13, 15, 16, 18, 20, 22, 23	34, 38, 40, 41, 44, 52, 60, 63
Vibration	13, 18, 20, 27, 28	34, 38, 39, 40, 41, 44, 52, 54, 63
The pressure of the lubricating oil system is too high	4, 25	49
The engine oil temperature is too high	11, 13, 15, 19, 27, 29, 30, 32, 64	34, 36, 37, 39, 52, 56, 57, 64
Crankcase pressure	31, 33	39, 42, 44, 45, 52
Bad compression	11, 22	37, 39, 40, 42, 43, 44, 45, 53, 60
The engine starts and stops	10, 11, 12	63

List of Possible Causes

1. Battery capacity low.
2. Bad electrical connections.
3. Fault in starter motor.
4. Wrong grade of lubricating oil.
5. Starter motor turns engine too slowly.
6. Fuel tank empty.
7. Fault in stop control.
8. Restriction in a fuel pipe.
9. Fault in fuel lift pump.
10. Dirty fuel filter element.
11. Restriction in air induction system.
12. Air in fuel system.
13. Fault in atomizers or atomizers of an incorrect type.
14. Cold start system used incorrectly.
15. Fault in cold start system.
16. Restriction in fuel tank vent.
17. Wrong type or grade of fuel used.
18. Restricted movement of engine speed control.
19. Restriction in exhaust pipe.
20. Engine temperature is too high.
21. Engine temperature is too low.
22. Incorrect valve tip clearances.
23. Too much oil or oil of the wrong type is used in wet type air cleaner, if one is fitted.
24. Not enough lubricating oil in sump.
25. Defective gauge.
26. Dirty lubricating oil filter element.
27. Fan damaged.
28. Fault in engine mounting or flywheel housing.
29. Too much lubricating oil in sump.
30. Restriction in air or water passages of radiator.
31. Restriction in breather pipe.
32. Insufficient coolant in system.
33. Vacuum pipe leak or fault in exhauster.
34. Fault in fuel injection pump.
35. Broken drive on fuel injection pump.
36. Timing of fuel injection pump incorrect.
37. Valve timing is incorrect.
38. Bad compression.
39. Cylinder head gasket leaks.
40. Valves are not free.
41. Wrong high-pressure pipes.
42. Worn cylinder bores.
43. Leakage between valves and seats.
44. Piston rings are not free or they are worn or broken.
45. Valve stems and/or guides are worn.
46. Crankshaft bearings are worn or damaged.
47. Lubricating oil pump is worn.
48. Relief valve does not close.
49. Relief valve does not open.
50. Relief valve spring is broken.
51. Fault in suction pipe of lubricating oil pump.
52. Piston is damaged.
53. Piston height is incorrect.
54. Flywheel housing or flywheel is not aligned correctly.
55. Fault in thermostat or thermostat is of an incorrect type.
56. Restriction in coolant passages.
57. Fault in coolant pump.
58. Valve stem seal is damaged.
59. Restriction in sump strainer.
60. Valve spring is broken.
61. Lubricating oil seal of turbocharged leaks.
62. Air leak in induction system (turbocharged engine).
63. Faulty engine management system.
64. Induction system leaks (turbocharged engines).

Fuses and Relays



The main fuse box is located next to the battery, and the secondary fuse/relay board is located at the front of the side console. Remove the cover plate to gain access to the fuses and relays.

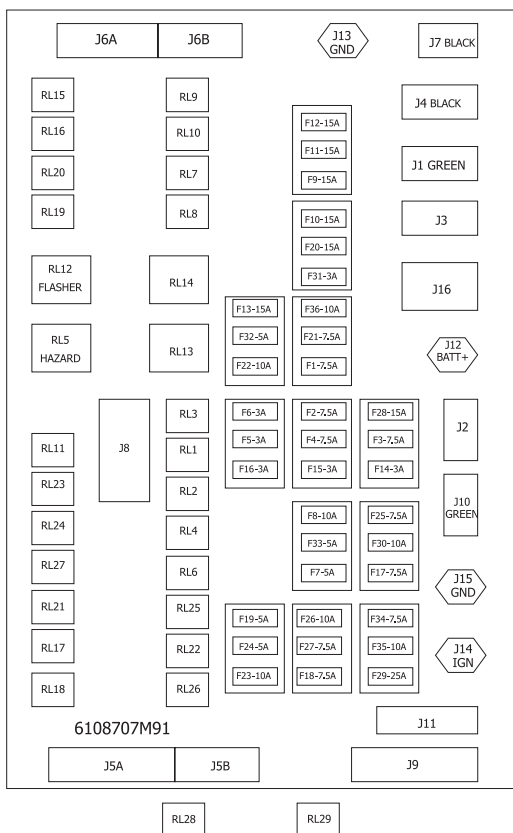


The servo control inline fuse (if equipped) is located under the secondary fuse/relay board cover.

IMPORTANT: *Before replacing fuses, remove the battery master switch key (optional).*

IMPORTANT: *Never replace a fuse with one of a different amperage.*

Powerboard fuses and relays



FRB SCHEMATIC

Relays

1. Headlight - Main.
2. Headlight - Dip.
3. Sidelights/Number Plate/Illum Inst. Pack.
4. Brake Lights.
5. Hazard enable.
6. Indicator/hazard enable.
7. Front Wiper.
8. Rear Wiper.
9. Front Washer.
10. Rear Washer.
11. Front Horn/Rear Horn.
12. Indicators flasher unit.
13. Front Worklights.
14. Rear Worklights.
15. Rotating Beacon.
16. Float enable relay.
17. Clamp (Ride control solenoids on TX760B axial ROPS).
18. Digger Quick Attach.
19. Return To Dig (RTD).
20. Unloader.
21. Loader Quick Attach.
22. Ride Control Solenoids (Excluding TX760B axial ROPS).
23. Gearbox - Forward.
24. Gearbox - Reverse.
25. 4WD Switch.
26. Hose Burst.
27. Gearbox - neutral.
28. Ignition relay (70A).
29. Starter motor relay.

Fuses

1. Headlight - Main - Left 75 A
2. Headlight - Main - Right 75 A
3. Headlight - Dip - Left 75 A
4. Headlight - Dip - Right 75 A
5. Sidelights - Left/Number Plate 3 A
6. Sidelights - Right 3 A
7. Indicators 5 A
8. Hazard 10 A
9. Worklights - Front 15 A
10. Worklights - Front 15 A
11. Worklights - Rear 15 A
12. Worklights - Rear 15 A
13. Rotating Beacon 15 A
14. Brake Light - Left 3 A
15. Brake Light - Right 3 A
16. Instrument Pack Illumination 3 A
17. Difflock/4WD 75 A
18. Clamp/Q/A Digger/Q/A Loader (Ride control on TX760B axial ROPS)..... 7.5 A
19. Return To Dig (RTD)/Unloader Valve 7.5 A
20. Wipers/Washers 15 A
21. Interior Light/Radio 7.5 A
22. Front Horn/Rear Horn 10 A
23. Ride Control Solenoids (Excluding TX760B axial ROPS)..... 10 A
24. Gearbox - Forward/Reverse 5 A
25. Fuel Solenoid/Fuel Enrich 7.5 A
26. Not used
27. Air Conditioning Switch 7.5 A
28. Cigar Lighter 15 A
29. Heater 25 A
30. Switch Pack & I Pack - Ignition 10 A
31. Switch Pack & I Pack - Battery..... 3 A
32. Battery Relay Coils 5 A
33. Ignition Relay Coils 5 A
34. Powershift 7.5 A
35. Battery Feed (spare) 10 A
36. Ignition Feed (spare) 10 A

Main fuse box

1. Alternator 125 A
2. Cab (Ignition) 80 A
3. Cab (Battery) 80 A
4. Ignition Feed (Thermostart) 20 A
5. Starter Relay and Solenoid 40 A

Inline fuses

1. Servo control 10 A

Battery

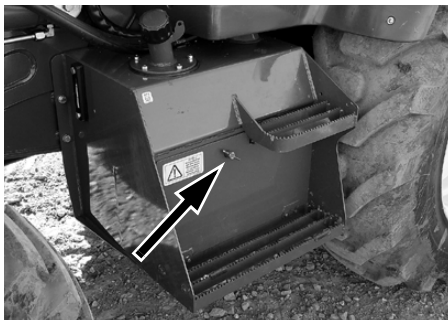


WARNING: Remove the battery master switch key (disconnected) before carrying out any servicing work on the Electrical System.

Access to the battery

Release the retaining catch and swing down cover plate.

NOTE: These batteries do not require the addition of distilled water.



DSC04792

WARNING: Battery electrolyte causes severe burns. The battery contains sulphuric acid. Avoid any contact with the skin, eyes or clothing.

Antidote:



EXTERNAL: Rinse with water.

INTERNAL: Drink large quantities of water or milk. Then drink milk of magnesia, a beaten egg or vegetable oil. Call a doctor immediately.

EYES: Rinse with water for 15 minutes and consult a doctor quickly.

WARNING: A spark or flame can cause the hydrogen in a battery to explode. To prevent any risk of explosion, observe the following instructions:



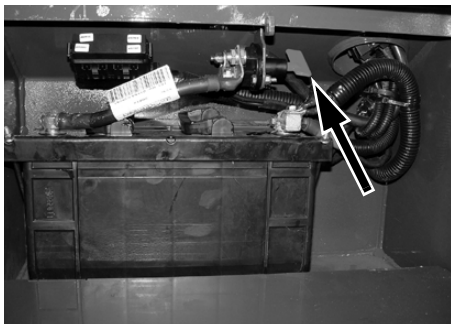
- Remove the battery master switch key (disconnected).
- When disconnecting the battery cables, always disconnect the negative cable (-) first.
- When reconnecting the battery cables, always connect the negative (-) cable last.
- Never short-circuit the battery terminals with metal objects.
- Do not weld, grind or smoke near a battery.



WARNING: Batteries produce explosive gases. Keep away any flame, spark or cigarettes. Always provide good ventilation when charging a battery or using a battery in an enclosed space. Always protect your eyes when working near a battery.

Replacing a single battery

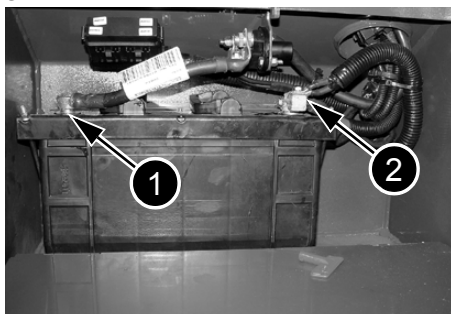
STEP 1



DSC05519

Remove the battery master switch key (optional).

STEP 2

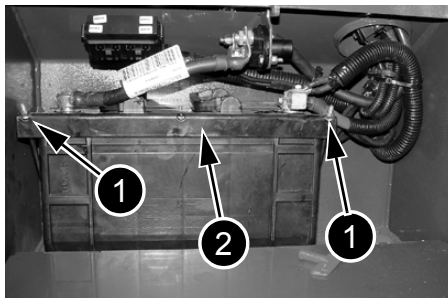


DSC05519

Disconnect the battery ground cable (1), then disconnect the battery positive cable (2).

IMPORTANT: Always disconnect the battery ground cable first.

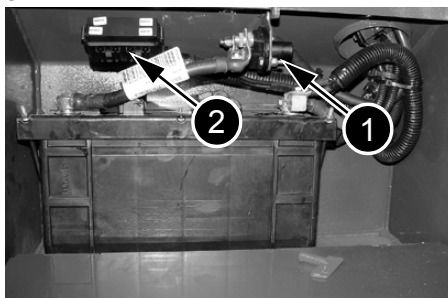
STEP 3



DSC05519

Remove the retaining nuts (1) and the clamping bar (2).

STEP 4



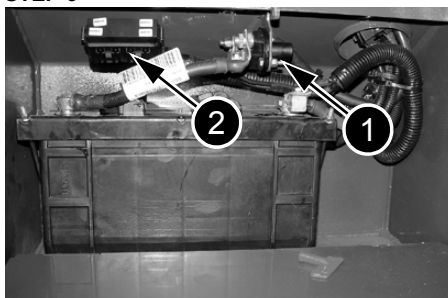
DSC05519

Detach the wiring harness (1) and position to one side. Detach the fuse box (2) and remove the battery.

STEP 5

Install the new battery.

STEP 6

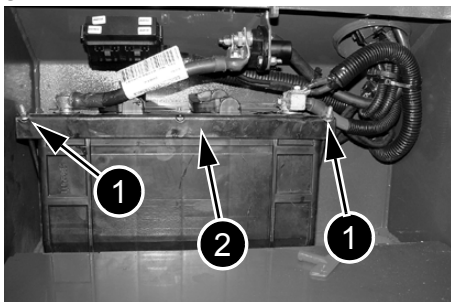


DSC05519

Install the fuse box (2). Install the wiring harness (1).

Electrical System

STEP 7

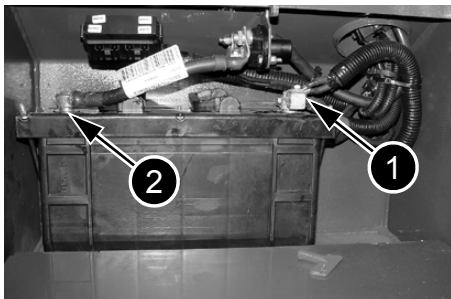


Install the clamping bar (2) and the retaining nuts (1).

STEP 8

Clean the cables and the connecting terminals and coat them with grease.

STEP 9



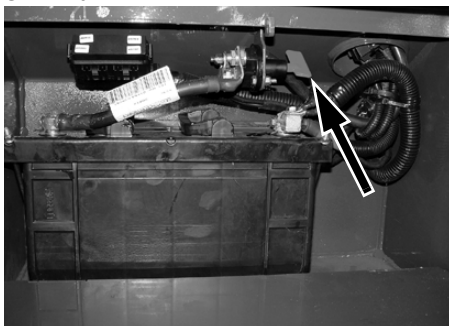
Connect the battery positive cable (1), then the battery ground cable (2).

IMPORTANT: *Always connect the battery ground cable last.*



WARNING: *Never reverse the battery terminals. Connect the positive cable to the positive terminal (+) and the negative cable to the negative terminal (-).*

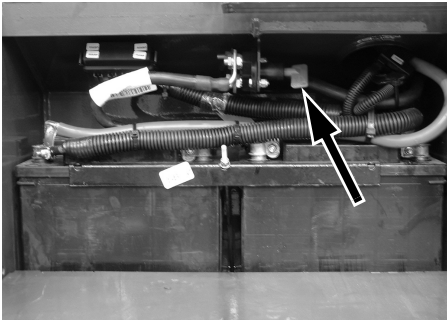
STEP 10



Install the battery master switch key (optional).

Replacing twin batteries

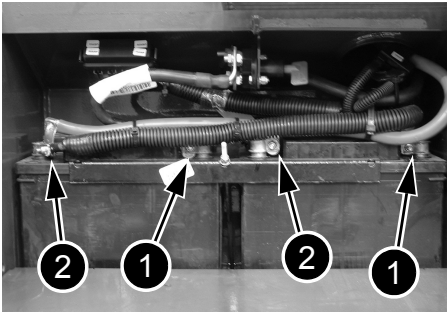
STEP 1



TV051182

Remove the battery master switch key (optional).

STEP 2

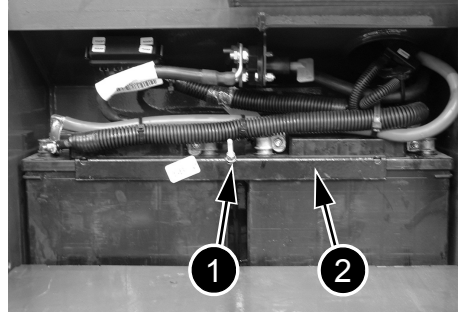


TV051182

Disconnect the battery ground cables (1), then disconnect the battery positive cables (2).

IMPORTANT: Always disconnect the battery ground cable first.

STEP 3



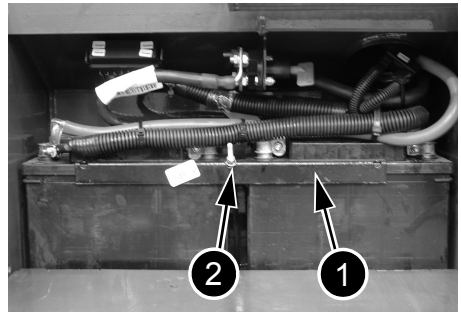
TV051182

Remove the retaining nut (1) and the clamping bar (2). Remove the batteries.

STEP 4

Install the new batteries.

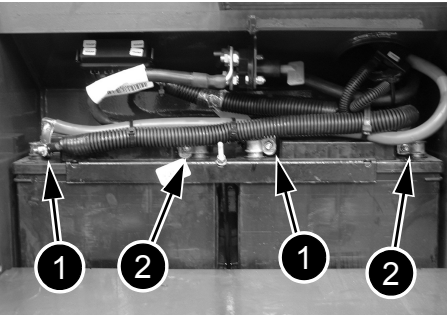
STEP 5



TV051182

Install the clamping bar (1) and the retaining nut (2).

STEP 6

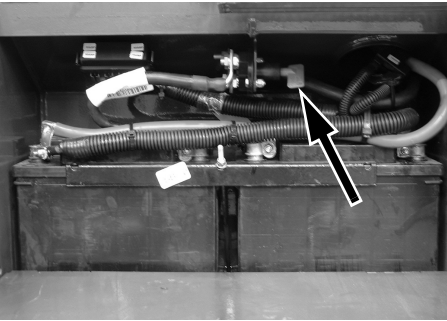


TV051182

Connect the battery positive cables (1), then connect the battery ground cables (2).

IMPORTANT: *Always connect the battery ground cable last.*

STEP 7



TV051182

Install the battery master switch key (optional).



WARNING: *Never reverse the battery terminals. Connect the positive cable to the positive terminal (+) and the negative cable to the negative terminal (-).*

Connecting a Booster Battery



WARNING: When the electrolyte of a battery is frozen, it can explode if you attempt to charge the battery or if you try to start the engine using a booster battery. Always keep the battery charged to prevent the electrolyte freezing.



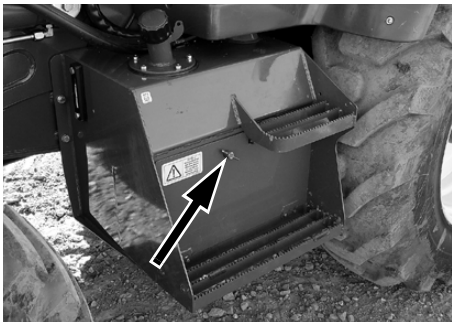
WARNING: Connecting jumper cables wrongly or short-circuiting battery terminals can cause an accident. Connect the jumper cables following the instructions in this manual.

IMPORTANT: Make sure that the voltage of the booster batteries is the same as that of the machine circuit (12 volts).

Tools required

- Jumper cables

STEP 1



DSC04792

Open the battery cover

STEP 2

Connect the positive (+) jumper cable to the positive (+) terminal of the machine's battery.

STEP 3

Connect the negative (-) jumper cable to the negative (-) terminal of the machine's battery.

STEP 4

Start the engine.

STEP 5

First disconnect the negative (-) jumper cable, then disconnect the positive (+) jumper cable from the booster battery.

STEP 6

Close the battery cover.

Bulbs

Operator's compartment light	5 W
Instrument panel indicator lamp	1.2 W
Instrument panel gauge	1.2 W
Headlights	55/60 W
Front side lights (on headlight)	4 W
Front direction indicators	21 W

Rear direction indicators	21 W
Brake lights/Rear side lights	21/5 W
Front working lights	48 W
Rear working lights	48 W
Rotating beacons	55 W
Licence plate light (specific to certain countries)	5 W

Replacing a Bulb

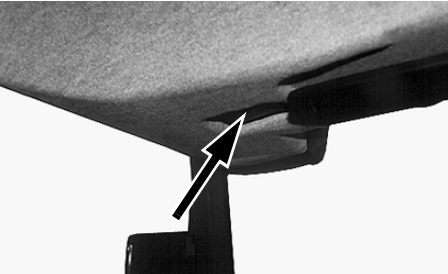
IMPORTANT: *Never touch a tungsten iodide bulb with your fingers.*

Cab interior light

Tool required

- One flat-headed screwdriver

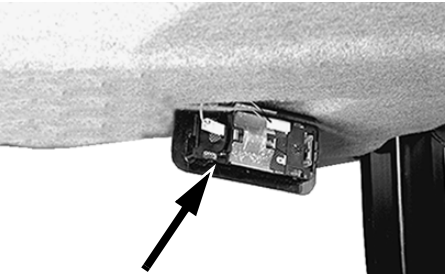
STEP 1



CP99D003

Remove the clip.

STEP 2



CK98N002

Remove the clip, the bulb and install a bulb of the same wattage (5 W).

STEP 3

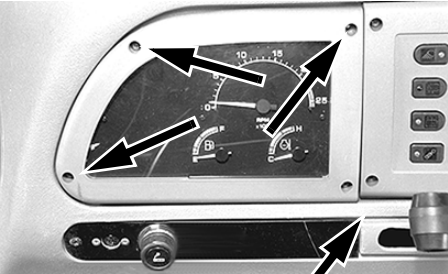
Install the lens.

Instrument panel light

Tool required

- One cross-headed screwdriver

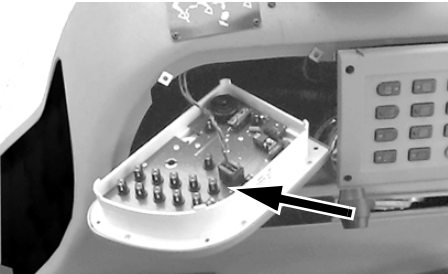
STEP 1



CK98F034

Remove the four screws.

STEP 2



CD98G020

Remove the instrument panel and turn it over. Turn the bulb holder to the left and remove it.

STEP 3

Install a bulb of the same wattage.

STEP 4

Install the instrument panel and the four screws.

Headlights / Sidelights

Tool required

- One cross-headed screwdriver

STEP 1



DCP_0753

Remove the six retaining screws then remove the light unit.

STEP 2



DCP_0754

Remove the bulb holders from the light unit.

STEP 3

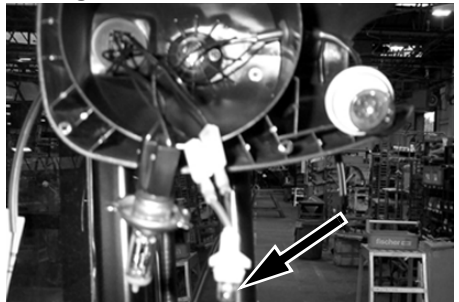
Headlights



DCP_0755

Remove the bulb and install a bulb of the same wattage (55/60 W).

Sidelights



DCP_0755A

Remove the bulb and install a bulb of the same wattage (4 W).

STEP 4

Install the bulb holder in the light unit.

STEP 5

Install the light unit and the six retaining screws.

Front direction indicator

Tool required

- One cross-headed screwdriver

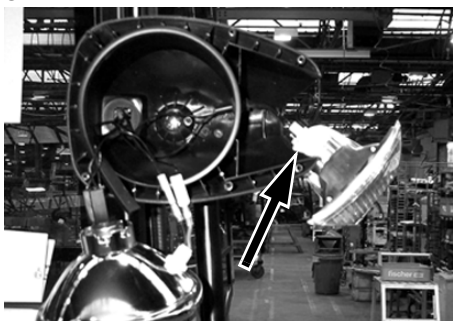
STEP 1



DCP_0753

Remove the six screws then remove the light unit.

STEP 2



DCP_0754

Remove the bulb and install a bulb of the same wattage (21 W).

STEP 3

Install the light unit and the six screws.

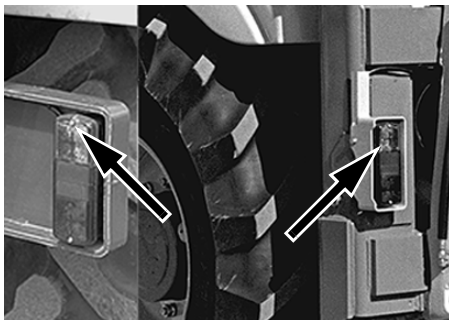
NOTE: Some North American models only have direction indicators.

Rear lights

Tool required

- One cross-headed screwdriver

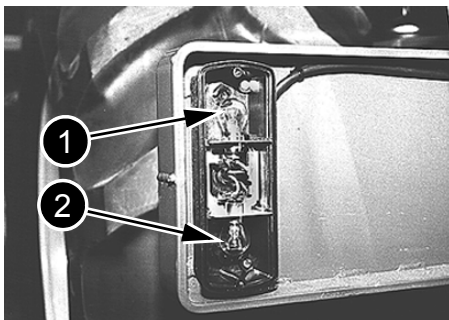
STEP 1



CK98G024

Remove the two screws then remove the lens.

STEP 2



CD98G023

Remove the bulbs and install bulbs of the same wattage.

1. Direction indicator (21 W).
2. Brake light/Side light (21/5 W).

STEP 3

Install the lens and the two screws.

NOTE: Some North American models have rear lights mounted at roof level.



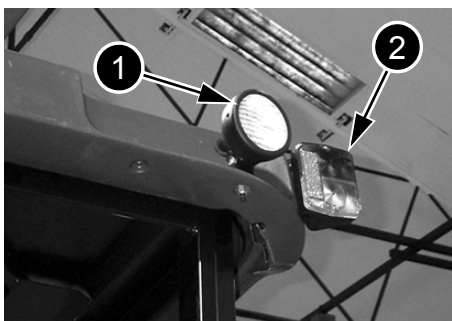
DCP_0078

Headlight (without cab)



DCP_0104

Headlight



DCP_0079

1. Rear additional spotlight
2. Rear light cluster



DCP_0105

Rear light cluster

Front working lights

Tool required

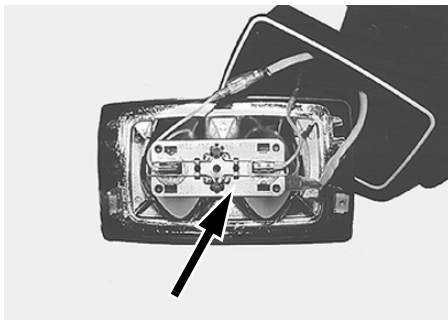
One cross-headed screwdriver

STEP 1



CD98F021

STEP 2



CD98G021

Remove the clip and the bulb holder. Remove the bulb and install a bulb of the same wattage (48 W).

STEP 3

Install the bulb holder and the clip.

STEP 4

Install the light unit. Install the retaining frame and the two screws.



CD98G022

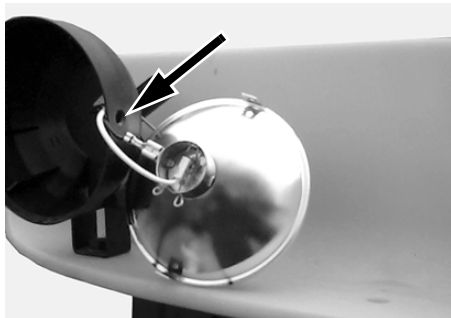
Remove the two screws, remove the retaining frame and remove the light unit.

Rear working lights

Tool required

- One cross-headed screwdriver

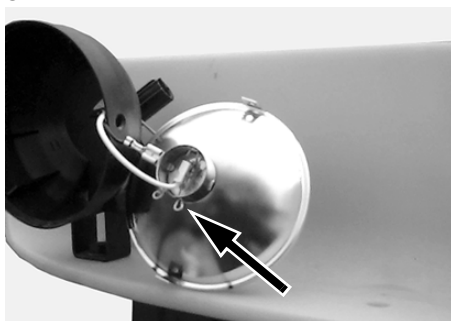
STEP 1



CD98G018

Remove the two screws and remove the light unit.

STEP 2



CD98G018

Remove the clip and the bulb holder. Remove the bulb and install a bulb of the same wattage (48 W).

STEP 3

Install the bulb holder and the clip.

STEP 4

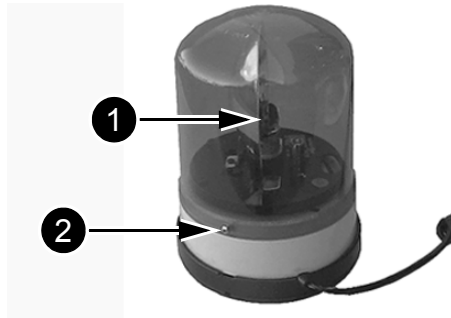
Install the light unit. Install the two screws.

Rotating beacon

Tool required

- One cross-headed screwdriver

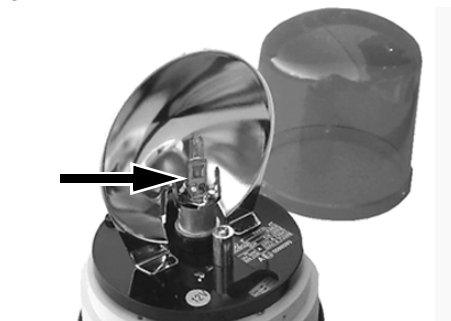
STEP 1



CD97E094

Remove the three screws (2) and remove the lens (1).

STEP 2



CD97E095

Raise the clip and remove the bulb.

STEP 3

Replace the bulb by a bulb of the same wattage (55 W).

IMPORTANT: *Never touch a tungsten iodide bulb with your fingers.*

STEP 4

Install the lens and its three retaining screws.

Licence plate light (specific to certain countries)

Tool required

One cross-headed screwdriver

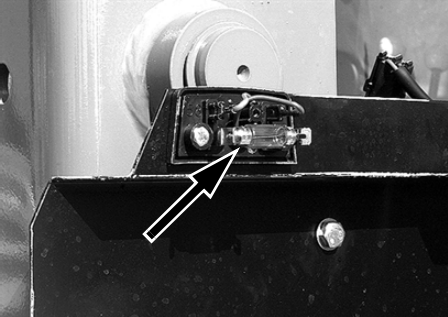
STEP 1



CD98K006

Remove the screw and the lens.

STEP 2



CD98K021

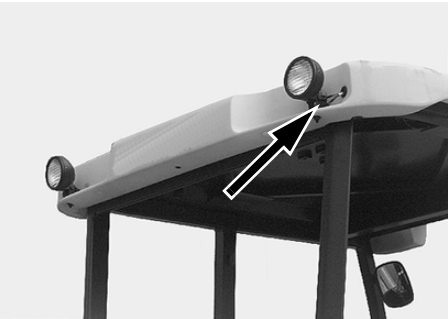
Remove the bulb and replace it by a bulb of the same wattage.

STEP 3

Install the lens.

Vertical Adjustment of the Cab-Mounted
Front and Rear Working Lights

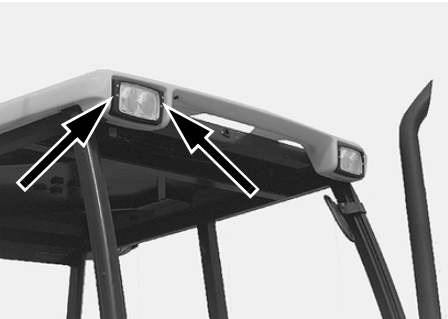
Rear working lights



CD98F020

Vertical adjustment is carried out manually.

Front working lights



CD98F021

Vertical adjustment is carried out with the two screws.

Storing the Machine

Preparation for storage

If the machine is to remain unused for a period exceeding 30 days, store it under cover or cover it with a waterproof tarpaulin.

1. Clean the machine.
2. Grease all the machine's grease fittings.
3. Raise the wheels off the ground and put suitable axle stands under the front and rear axles in order to keep the wheels clear off the ground.
4. Drain the fuel tank.
5. Pour about 8 litres of rinsing fuel in the fuel tank. Run the engine until the exhaust smoke is a bluish white colour.
6. Place a tablespoonful of Shell Oil Company VPI crystals (or equivalent) in the fuel tank.
7. Operate all the hydraulic controls to release pressure in the hydraulic circuits. See *"Releasing the Pressure in the Hydraulic System"*, page 176
8. Drain the engine oil and replace the oil filter. Fill the engine with the correct specification oil.
9. Drain the cooling system. Do not tighten the radiator cap. Place a "Do not start up" label on the instrument panel.
10. Clean or replace the air filter elements.
11. Coat the exposed portions of the cylinder rods and control valve spools with grease.
12. Paint all parts of the machine where the paint has been damaged.
13. Charge the battery. Remove it from the machine and place it on a wooden pallet in a cool, dry place. If possible, store it in a building where the temperature is above 0°C. Make sure the battery is clean.

NOTE: *This battery does not need the addition of distilled water.*

14. Store the machine under a water-proof cover.

Starting up after storage

Do not start the engine before carrying out the following operations :

1. Replace the fuel filter.
2. Fill the engine cooling system with engine coolant.
3. Check the condition of the alternator belt. Replace it if necessary.
4. Check the engine oil level.
5. Check the brake fluid level.
6. Check the hydraulic fluid level.
7. Check the transmission oil level.
8. Check the oil levels in the rear axle.
9. Check the oil levels in the front drive axle and reduction gears (4 Wheel drive).
10. Grease all the machine's linkages.
11. Remove the anti-corrosion product from the hydraulic cylinder rods.
12. Install the battery.
13. Fill the fuel tank.
14. Bleed air from the fuel supply system.
15. Check the condition and pressure of the tyres.
16. Check and if necessary bleed the braking system. (consult your local dealer)
17. Start the engine.
18. Raise the machine
19. Remove the axle stands from under the axles. Lower the machine.



WARNING: Check the machine for leaks and for broken, defective or missing parts.



WARNING: Before starting the engine, make sure all the controls are in the neutral position. This will prevent any unexpected movement of the machine and of any electrical equipment.



WARNING: Avoid running the engine in an enclosed space. Ensure adequate ventilation at all times.

Engine (Model 760/820)

Make and type	PERKINS 1104C-44T
Displacement	4.4 litres
Number of cylinders	4
Bore and stroke	105 x 127 mm
Aspiration	Turbo charged
Injection system	Direct
Air filter	Dry type – two stage – restriction indicator
Oil filter	Screw-on cartridge, total flow type
Compression ratio	18.23:1
ISO/TR14396 maximum horsepower	68.5 kW (92 hp*) @ 2200 rpm
ISO/TR14396 maximum torque	395 Nm @ 1400 rpm

* Nominal non-certified value.

Engine (Model 860/870/880/970/980)

Make and type	PERKINS 1104C-44T
Displacement	4.4 litres
Number of cylinders	4
Bore and stroke	105 x 127 mm
Aspiration	Turbo charged
Injection system	Direct
Air filter	Dry type – two stage – restriction indicator
Oil filter	Screw-on cartridge, total flow type
Compression ratio	18.23:1
ISO/TR14396 maximum horsepower	74.5 kW (100 hp*) @ 2200 rpm
ISO/TR14396 maximum torque	415 Nm @ 1400 rpm
*Nominal Non-Certified Values	

Electrical System

System voltage	12 volts (Negative ground)
Batter (single)	12 volts (105 amp/h)
Battery (double)	12 volts (70 amp/h)
Alternator	Standard - 75 amp Air conditioning - 100 amp

Specifications

Cab

- ROPS and FOPS type (with protection against rolling over and falling objects).
- Tinted safety glass – wide glazed surface giving total visibility.
- Operator's seat with adjustable suspension. Class III as per 1980 ISO/DIS 7096.
- Fresh air heater/blower unit, full heating control including demist on front and rear windows.
- Optional air conditioning.

Transmission

Torque converter

Two phase, single-stage.

Stall ratio - Synchroshuttle	3.01:1
Stall ratio - Powershift	2.60:1

Gearbox

Synchroshuttle only

- Type: Direction of travel control with 4 synchronised gears.
- 4 forward and 4 reverse gears (Specific to certain countries, the 4th gear is not fitted).
- Electrical transmission cut-out using push button on the gear change lever or on the loader attachment control lever.

Powershift only

- Type: Direction of travel control with 4 powershift gears.
- 4 forward and 2 reverse gears (Specific to certain countries, the 4th gear is not fitted).
- Semi-automatic feature on 3rd and 4th gears.
- Kickdown button provides instant kick down from 2nd to 1st gear to increase tractive push.

Travel speed

Speeds in forward and reverse with engine speed at 2200 rpm.

Synchroshuttle (Turner)

	Models: 760/820/860/870/880							
Tyre size	16.9 x 30		19.5L x 24		18.4 x 26		16.9 x 28	
Gear	kph	m.p.h.	kph	m.p.h.	Kph	m.p.h.	Kph	m.p.h.
1	5.8	3.6	5.1	3.2	5.6	3.5	5.5	3.4
2	9.3	5.8	8.2	5.1	9.0	5.6	8.8	5.5
3	20.1	12.5	17.8	11.1	19.4	12.1	19.2	11.9
4	37.4	23.2	33.0	20.5	36.0	22.4	35.6	22.1
R1	-5.8	-3.6	-5.1	-3.2	-5.6	-3.5	-5.5	-3.4
R2	-9.3	-5.8	-8.2	-5.1	-9.0	-5.6	-8.8	-5.5

Synchroshuttle (Carraro)

	Models: 760/820/860/870/880							
Tyre size	16.9 x 30		19.5L x 24		18.4 x 26		16.9 x 28	
Gear	kph	m.p.h.	kph	m.p.h.	Kph	m.p.h.	Kph	m.p.h.
1	6.1	3.8	5.4	3.4	5.9	3.7	5.8	3.6
2	9.9	6.2	8.7	5.4	9.5	5.9	9.4	5.8
3	20.6	12.8	18.1	11.2	19.8	12.3	19.6	12.2
4	38.9	24.2	34.3	21.3	37.5	23.3	37.0	23.0
R1	-6.1	-3.8	-5.4	-3.4	-5.9	-3.7	-5.8	-3.6
R2	-9.9	-6.2	-8.7	-5.4	-9.5	-5.9	-9.4	-9.4

Specifications

Powershift (Dana)

	Models: 860/870/880 (2WS)						Models: 970/980 (4WS)	
Tyre size	16.9 x 30		19.5L x 24		18.4 x 26		16.9 x 24	
Gear	kph	m.p.h.	kph	m.p.h.	Kph	m.p.h.	Kph	m.p.h.
1	6.0	3.7	5.3	3.3	5.8	3.6	6.2	8.7
2	11.3	7	10.0	6.2	10.9	6.8	11.6	7.2
3	21.5	13.4	19.0	11.8	20.8	12.9	21.0	13.0
4	40.7	25.3	34.0	21.1	37.2	23.1	39.7	24.7
R1	-7.1	-4.4	-6.3	-3.9	-6.9	-4.3	-7.3	-4.5
R2	-14.2	-8.8	-12.7	-7.9	-13.9	8.6	-14.8	-9.2

NOTE: Specific to certain countries, the 4th gear is inoperable in forward and reverse.

Axles

Fixed rear axle

760/820/860/870/880 only

Includes: differential with full differential lock, planetary reduction gears and oil-immersed disc brakes.

970/980 only

Spiral bevel crown wheel and pinion driving oil immersed disc brakes through axle-end epicyclic hubs.

Oscillating front axle (4WD)

All models

Spiral bevel crown wheel and pinion driving through axle-end epicyclic hubs.

Tyres

760/820/860/870/880 only

	Dimensions and type	Inflation pressure	
		bar	lbf/in ²
Front	Terex 12.5/80 x 18, 12P, TR-09, Ind.	3.7	54
Front	Terex 12.5/80 x 18, 10P, MPT-01, Ag.	3.7	54
Front	Firestone 12.5 x 18, 10P, R4, Ind.	3.0	44
Front	Terex 16/70 x 20, 14P, TR-09, Ind.	3.4	49
Front	Terex 405/70 x 20, 14P, MPT-01, Ag.	3.4	49
Rear	Terex 19.5L x 24, 12P, TI-05, Ind.	2.1	30
Rear	Barum 18.4 x 26, 12P, TZ-09, Ag.	1.8	26
Rear	Terex 16.9 x 28, 12P, TI-06, Ind.	2.5	36
Rear	Terex 16.9 x 30, 14P, TI-09, Ind.	2.8	41

970/980 only

Location	Dimensions and type	Inflation pressure	
		Bar	lbf/in ²
Front	Terex 16.9 x 24, 12P, TI-04, Ind	2.6	38
Rear	Terex 16.9 x 24, 12P, TI-04, Ind	2.6	38
Front	Nokian 16.9 x 24, Rad, TR1, Chev.	1.8	26
Rear	Nokian 16.9 x 24, Rad, TR1, Chev.	2.6	38
Front	Michelin 17.5 x 24, Rad, M27, Ag.	2.5	36
Rear	Michelin 17.5 x 24, Rad, M27, Ag.	2.5	36

Wheel Tightening Torque

Front wheel nuts (820/860/880 only)	300 Nm (220 lbf ft)
Front wheel nuts (970/980 only)	600 Nm (440 lbf ft)
Rear wheel nuts (all models)	600 Nm (440 lbf ft)

Brakes

Service brakes

The oil-immersed disc brakes are mounted inboard, on the rear drive shafts. Hydraulic operation by conventional brake pedal master cylinders, incorporating independent and compensating functions for site and highway use.

Parking or emergency brake

Hand-lever and cables operated through a totally separate mechanical system to directly operate a large calliper type disc brake.

Steering

Type	Hydrostatic
Pressure	175 bar (2540 lbf/in ²)

Turning circle

760/820 only (Tyres: 12.5/80x18 front, 18.4x26 rear)

	4WD Engaged		4WD Disengaged	
	RH Lock	LH Lock	RH Lock	LH Lock
Between kerbs, no brakes	9.3 m (30'5")	9.2 m (30'2")	8.2 m (26'9")	8.15 m (26'7")
Between kerbs, with brakes	8.3 m (27'2")	7.8 m (25'6")	7.1 m (23'3")	6.9 m (22'6")
Between walls, no brakes	11.95 m (39'2")	11.7 m (38'4")	10.95 m (35'9")	10.9 m (35'8")
Between walls, with brakes	10.4 m (34'1")	10.6 m (34'8")	10.3 m (33'8")	9.8 m (32'2")

860/870/880 only (Tyres: 16/70x20 front, 16.9x20 rear)

	4WD Engaged		4WD Disengaged	
	RH Lock	LH Lock	RH Lock	LH Lock
Between kerbs, no brakes	9.05 m (29'7")	9.0 m (29'5")	7.95 m (26'1")	8.0 m (26'2")
Between kerbs, with brakes	7.2 m (23'6")	7.25 m (23'8")	7.07 m (23'2")	7.07 m (23'2")
Between walls, no brakes	11.45 m (37'6")	11.42 (37'5")	10.55 m (34'6")	10.65 m (34'9")
Between walls, with brakes	9.74 m (32')	9.79 m (32'1")	9.87 m (32'4")	9.87 m (32'4")

970/980 only (Tyres: 16.9x24 front & rear)

Two wheel steer mode

	4WD Engaged		4WD Disengaged	
	RH Lock	LH Lock	RH Lock	LH Lock
Between kerbs, no brakes	11.63 m (38'2")	12.08 m (39'6")	11.07 m (36'3")	11.44 m (37'5")
Between kerbs, with brakes	8.67 m (28'4")	8.66 m (28'4")	9.21 m (30'2")	9.31 m (30'5")
Between walls, no brakes	13.55 m (44'5")	13.96 m (45'8")	13.07 m (42'9")	13.48 m (44'2")
Between walls, with brakes	10.79 m (35'4")	10.8 m (35'4")	11.53 m (37'8")	11.55 m (37'9")

Four wheel steer mode

	4WD Engaged		4WD Disengaged	
	RH Lock	LH Lock	RH Lock	LH Lock
Between kerbs, no brakes	7.33 m (24')	7.44 m (24'4")	7.24 m (23'8")	7.48 m (24'5")
Between kerbs, with brakes	6.72 m (22')	6.69 m (21'9")	6.67 m (21'9")	6.77 m (22'2")
Between walls, no brakes	9.53 m (31'3")	9.56 m (31'4")	9.26 m (30'4")	9.48 m (31'1")
Between walls, with brakes	8.84 m (29')	8.85 m (29')	8.93 m (29'3")	9.07 m (29'8")

Hydraulic System

Pump (760/820)

Two gear pumps in tandem

Combined flow	140 L/min. (37.2 US Gal) at 2200 rpm and MRV at 225 bar
First pump	80 L/min. (21.0 US Gal) at 2200 rpm and MRV at 225 bar
Second pump	60 L/min. (16.5 US Gal) at 2200 rpm and MRV at 225 bar

Pump (860/870/880/970/980)

Two gear pumps in tandem

Combined flow	160 L/min. (42.0 US Gal) at 2200 rpm and MRV at 225 bar
First pump	80 L/min. (21.0 US Gal) at 2200 rpm and MRV at 225 bar
Second pump	80 L/min. (21.0 US Gal) at 2200 rpm and MRV at 225 bar

Loader control valve

Three spool closed centre valve, incorporating circuit relief valves for bucket and lift services. Single lever operation of bucket and lift spools, plus a third spool for attachments, such as clamshell bucket.

Maximum working pressure	225 – 0/+7 bar
--------------------------	----------------

Specifications

Backhoe control valve

The backhoe control valve is a closed centre seven spool sectional valve. The seven spool controlling the digging functions through two control levers. Circuit relief valves protect the boom, dipperstick, bucket, swing, extendable dipperstick and auxiliary circuits.

There are two additional levers for operating the stabiliser spools.

Solenoid valves operate the sideshift clamp, (sideshift backhoe), optional craning valve (centremount backhoe) and optional digger bucket quick attach.

A separate foot pedal is used to operate a spool for the optional extendable dipperstick or auxiliary circuit.

A solenoid operated changeover valve is used to divert hydraulic flow to either the extendable dipperstick or the auxiliary circuit.

Maximum working pressure	225 – 0/+7bar
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Servo backhoe control valve

The servo backhoe control valve is a closed centre seven spool sectional valve. Four of the seven functions: Boom, dipper, slew and bucket are controlled by two servo joysticks. Stabiliser, dipperstick and auxiliary functions are controlled by additional levers and a foot pedal, connected by mechanical linkages.

Servo pressure to the joysticks is supplied by an additional pilot generating valve. This supplies a constant low pressure supply to the joysticks.

Maximum working pressure	225 – 0/+7bar
Pilot pressure	Max 35 bar

Filtration

On return circuit, by 10 micron interchangeable cartridge-type filter.

Vibration

The machinery safety directive 93/392/EEC requires that machinery be vibration tested.

These machines were all measured in hand vibration tests to be less than 2.5 m/s².

For body vibrations, these machines were all measured to be less than 0.5 m/s².

Capacities

Fuel tank	130 ltr (34.3 US Gal)
Hydraulic reservoir	85 ltr (22.4 US Gal)
Engine (with filter)	7.3 ltr (1.9 US Gal)
Front drive axle (820/860/880 only)	6.5 ltr (1.7 US Gal)
Front axle reduction gear (each) (820/860/880 only)	1.0 ltr (0.3 US Gal)
Front drive axle (970/980 only)	7.5 ltr (2.0 US Gal)
Front axle reduction gear (each) (970/980 only)	1.0 ltr (0.3 US Gal)
Rear axle (820/860/880 only)	14.5 ltr (3.8 US Gal)
Rear axle (970/980 only)	14.5 ltr (3.8 US Gal)
Rear axle reduction gear (each) (970/980 only)	1.5 ltr (0.4 US Gal)
Transmission (synchroshuttle only)	22 ltr (5.8 US Gal)
Transmission (powershift only)	23 ltr (6.1 US Gal)
Cooling system	16.0 ltr (4.2 US Gal)
Brake reservoir	225cc (13.7in ³)

Buckets

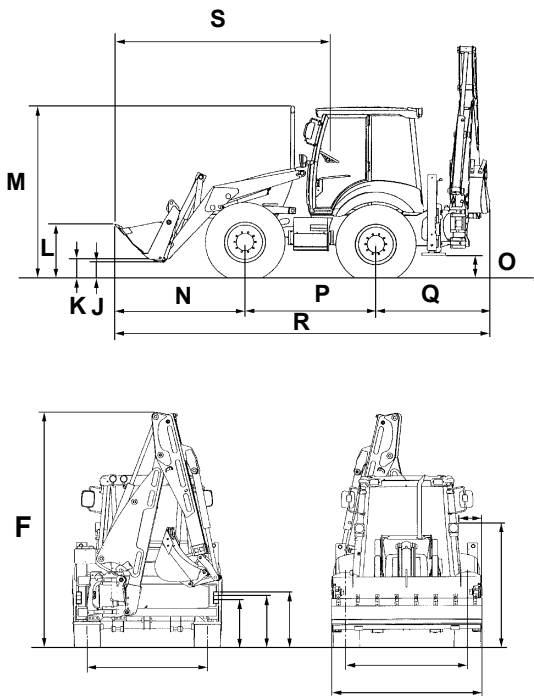
Loader

Type	Width	SAE Capacity
Standard	2386 mm (94 inch)	1.2 m ³ (1.6 yd ³)
	2310 mm (91 inch)	1.0 m ³ (1.3 yd ³)
Multi-purpose	2310 mm (91 inch)	1.0 m ³ (1.3 yd ³)
	2386 mm (94 inch)	1.2 m ³ (1.6 yd ³)

Backhoe

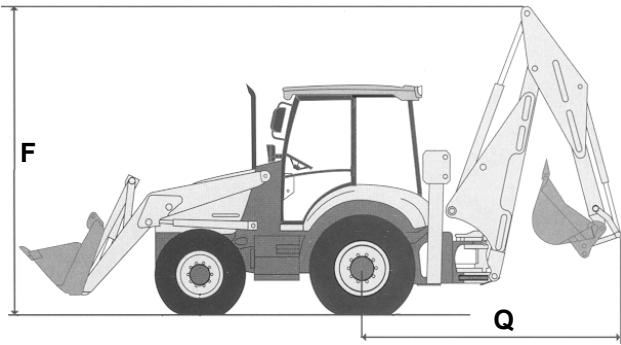
Type	Width	SAE Capacity
High capacity	600 mm (24 inch)	0.213 m ³ (0.233 yd ³)
Standard Capacity	305 mm (12 inch)	0.076 m ³ (0.083 yd ³)
	450 mm (18 inch)	0.113 m ³ (0.124 yd ³)
	600 mm (24 inch)	0.168 m ³ (0.184 yd ³)
	750 mm (30 inch)	0.227 m ³ (0.248 yd ³)
	900 mm (36 inch)	0.286 m ³ (0.312 yd ³)

General Dimensions and Weights



CS99D521

NOTE: Dimensions *F* and *Q* are different on models with Centremount backhoe



F = 3984 mm

Q = 3088 mm

DCM

Maximum authorised weight: 8,700 Kg (19,140 lb)

760/820/860/870/880 only

(See "General Dimensions and Weights", page 251)

NOTE: Some dimensions will differ according to different tyre sizes, tyre pressures and loader bucket specifications

Backhoe bucket	300 mm	600 mm	900 mm
Wheel combination	18.4x26 12P 16/70x20 14p	16.9x30 14P 16/70x20 14p	16.9x30 14P 16/70x20 14p
A (Front wheel track)	1788	1788	1788
B (Front light vertical location)	1997	1998	1998
C (Front light horizontal location)	372	372	372
D (Machine max. width)	2386	2386	2386
E (Rear wheel track)	1716	1770	1770
F (Machine max. height)	3778	3812	3812
G (Rear indicator vertical location)	893	928	928
H (Rear reflector vertical location)	829	864	864
I (Brake/rear light location)	772	807	807
J (Lowest implement height)	250	250	250
K (Transport position height)	300	300	300
L (Bucket tip height (MP))	869	869	869
M (Height to top of exhaust)	2799	2807	2807
N (Front overhang)	2116	2116	2116
O (Minimum machine height)	375	410	410
P (Wheelbase)	2130	2130	2130
Q (Rear overhang)	1751	1823	1971
R (Overall machine length)	5957	6029	6177
S (German bucket transport limit)	3459	3459	3459

Specifications

970/980 only

(See “General Dimensions and Weights”, page 251)

NOTE: Some dimensions will differ according to different tyre sizes, tyre pressures and loader bucket specifications

Backhoe bucket	300 mm	600 mm	900 mm
Wheel combination	16.9x24 12P 16.9x24 12P	16.9x24 12P 16.9x24 12P	16.9x24 12P 16.9x24 12P
A (Front wheel track)	1902	1902	1902
B (Front light vertical location)	1997	1997	1997
C (Front light horizontal location)	372	372	372
D (Machine max. width)	2386	2386	2386
E (Rear wheel track)	1902	1902	1902
F (Machine max. height)	3778	3778	3778
G (Rear indicator vertical location)	893	893	893
H (Rear reflector vertical location)	829	829	829
I (Brake/rear light location)	772	772	772
J (Lowest implement height)	250	250	250
K (Transport position height)	300	300	300
L (Bucket tip height (MP))	869	869	869
M (Height to top of exhaust)	2799	2799	2799
N (Front overhang)	2122	2122	2122
O (Minimum machine height)	375	375	375
P (Wheelbase)	2090	2090	2090
Q (Rear overhang)	1823	1751	1971
R (Overall machine length)	6035	5963	6183
S (German bucket transport limit)	3465	3465	3465

Fluids and Lubricants

Fluids and lubricants must have the correct properties for each application.



WARNING: *It is mandatory to observe the instructions for use of the various fluids and lubricants.*

Hydraulic fluid

Hydraulic fluid is specially designed for high pressure applications and for hydraulic system. The type of fluid to be used depends upon the ambient temperature.

Temperate climates

Up to +30°C (86°F)

Fluid type: ISO VG 46

Hot climates

Up to +50°C (122°F)

Fluid type: ISO VG 68

Brake fluid - 'Safim' Brake System Only

Type of oil to be used: Mobiloil LHM (Mineral brake fluid)

Transmission component oil

Synchroshuttle

- Texamatic 7045E
- ATF TypeA SuffixA
- Dextron II D
- Dextron III G
- Allison C4

Powershift

- Texamatic 7045E
- ATF TypeA SuffixA
- Dextron II D
- Dextron III G
- Allison C4

Grease

General:

Extreme pressure grease EP NLGI grade 2.

Components:

- Back hoe swing
- Prop. shafts
- Drive shafts U.J.
- Axle(s) king pins

Extreme pressure grease EP NLGI grade 2 with molybdenum disulphide.

Rear axle oil

Type of oil to be used: API GL4 grade 80W

Front axle oil (4 Wheel drive)

Type of oil to be used: API GL5 grade 80W-90

Engine oil

The engine oil to be used depends on the ambient temperature.

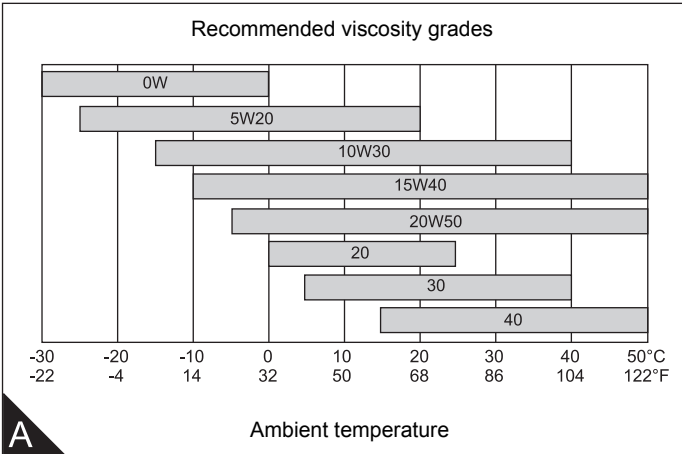
NOTE: *Do not put any performance additive or other additive in the sump. Oil change intervals shown in this manual are based on tests carried out on lubricants.*

Lubrication oil specification

Always make sure that the correct viscosity grade of lubricating oil is used for the ambient temperature range in which the engine will run as shown in the chart (A).

Use only a good quality lubricating oil to the minimum specification of:

- ENA DHD-1 Multigrade (preferred oil)
- API CH-4 Multigrade (preferred oil)
- ACEA E3
- API CG-4
- ACEA E5



CHN00001

Coolant specification

The quality of the coolant that is used can have a great effect on the efficiency and life of the cooling system. The recommendations indicated below can help to maintain a good cooling system and to protect it against frost and/or corrosion.



CAUTION: *An anti-freeze which contains the correct inhibitor must be used at all times to prevent damage to the engine by corrosion, because of the use of aluminium in the coolant circuit.*



CAUTION: *If frost protection is not necessary, it is still extremely important to use an approved anti-freeze mixture because this gives a protection against corrosion and also raises the boiling point of the coolant.*

NOTE: *If combustion gases are released into the coolant circuit, the coolant must be renewed after repair of the fault.*

If it is possible, use clean soft water in the coolant.

The quality of the anti-freeze coolant must be checked at least once a year, for example, at the beginning of the cold period. The coolant must be renewed every two years.

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