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Skid Steer Loader



Owner's and Operator's Manual

PUBLICATION NO. 47994
December, 2001

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THE WARRANTY IS A CONDITION OF SALE OF THE PRODUCT TO PURCHASER AND WILL THEREFORE APPLY EVEN IF PURCHASER ALLEGES THAT THERE IS A TOTAL FAILURE OF THE PRODUCT.

*N.B. Read and practice your **Thomas** S/S Loader operating and servicing instructions. Failure to do this may void your warranty.*

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FOREWORD

This book has been written to give the Owner / Operator necessary operating servicing and preventative maintenance instructions on the loader.
Read this manual completely and know the loader before operating or servicing it.
Do not do any service procedures that are not in the Operator's manual.
Only service personnel that have had training in the service of this loader can do these service procedures.

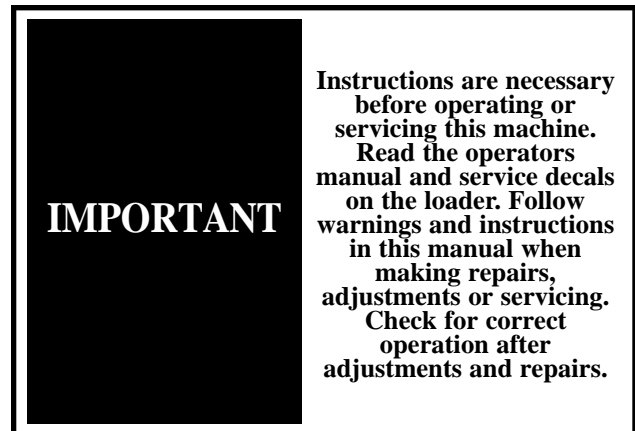
Reference Information

Write the correct information for your loaders in the spaces below. Always use these numbers when referring to your loader.

Model No. _____
Serial No. _____
Dealer Name _____
Address _____
Phone _____

Throughout this manual the terms DANGER, WARNING and CAUTION are used to indicate the degree of hazard in terms of personal safety. These words will be used in conjunction with the Safety - Alert symbol, a triangle with an exclamation mark. Throughout this manual, the term IMPORTANT is used

- * To indicate that instructions are necessary before operating or servicing the loader.
- * To show important procedures which must be followed to prevent damage to the loader or attachment.



1 SAFETY PRECAUTIONS

The following precautions are suggested to help prevent accidents.

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. Read and take the following precautions before operating this loader to help prevent accidents. Equipment should be operated only by those who are responsible and instructed to do so.

THE LOADER

1. Read this manual carefully before using the loader. Working with unfamiliar equipment can lead to accidents.
2. Do not allow anyone to ride on the loader with the operator.
3. Make sure the seat bar is installed and functioning at all times.
4. Never run the engine in a closed building without adequate ventilation, as the exhaust fumes can cause death.
5. Always fasten the seat belt around your waist before starting the engine. Never fasten the seat belt behind you.
6. Never attempt to start the engine while standing beside the unit unless as specified in this manual or under service procedures and backhoe operations. Start the engine only while sitting in the operator's seat with the seat belt fastened around you. Always check to make certain that the seat cushion is secured to the frame.
7. Keep the operator's platform free of debris.
8. Never enter or leave the loader while the engine is running. Always lower the lift arms down against the frame, drop the attachment down to contact the ground, set the parking brake and shut off the engine prior to leaving the loader.
9. If the unit is equipped with a cab enclosure kit always close the door prior to operating the loader lift arms.
10. Do not operate the loader unless all safety equipment, shields, seat belt, seat bar, foot pedal and steering lever locks, parking brake, operator guard, and boom support are working properly, as well as all safety and instruction decals are in place.

OPERATING THE LOADER

1. Always drive the loader at speeds compatible with safety, especially when operating over rough ground, crossing ditches or when turning.
2. Avoid jerky turns, starts, stops, or reverses.
3. Use care when operating on steep grades to maintain proper stability.
4. Do not turn the loader while the lift arms are in the raised position.
5. Be careful when driving through door openings or under overhead objects. Always make sure there is sufficient clearance for the operator's guard.
6. When travelling on public roads, know the local rules and regulations and make sure your loader is equipped with the proper safety equipment.
7. Always be sure of water, gas, sewage and electrical line locations before you start to dig.
8. Watch out for overhead and underground high-voltage electrical lines when operating the loader.
9. Always park the loader on level ground where possible. If the loader is to be parked on an incline, always lower the attachment so that it contacts the ground, set the parking brake and block the wheels.

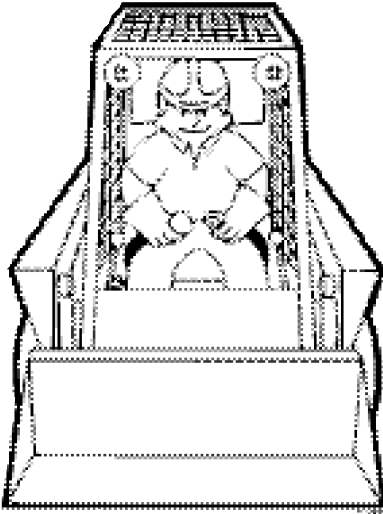
10. Do not leave the loader when it is in motion.
11. Do not dismount from the loader and leave the loader lift arms raised unless following specific service procedures. Always lower the lift arms down against the frame and drop the attachment down to contact the ground.
12. Always be watchful of bystanders when operating the loader.
13. Always carry the attachment low for maximum stability and visibility.
14. Exercise extreme caution when operating the loader with a raised, loaded attachment or fork.
15. Never attempt to lift loads in excess of loader capacity.
16. Check that the foot pedals are locked before getting out of the operator's seat.

MAINTENANCE

1. Stop the engine before performing any service on the loader.
2. Never refuel the loader while smoking or with the engine hot or running.
3. Replace all missing, illegible or damaged safety and warning decals. (See Section 5. 4 for list).
4. Do not modify or alter, or permit anyone to modify or alter this loader or any of its components or any loader function.
5. Do not bypass the safety system. Consult your **Thomas** Equipment Dealer if your safety controls are malfunctioning. Use booster cables only in recommended manner. (See Section 3. 10).
6. Do not make mechanical adjustments while the loader is in motion or when the engine is running. However, if minor engine adjustments must be made, securely block the loader with the wheels clear of the ground and use extreme caution.
7. Do not attempt to repair or tighten hydraulic hoses when the system is under pressure, when the engine is running or when the lift arms are raised.
8. Do not get under the attachment or lift arms or reach through the lift arms when they are raised.
9. Never attach the chains or ropes to the operator's guard for pulling purposes, as the loader can tip over.
10. Whenever servicing or replacing pins in cylinder ends, buckets, etc., always use a brass drift and a hammer. Failure to do so could result in injury from flying metal fragments.
11. Cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while system is hot. Always turn cap slowly to the first stop and allow the pressure to escape before removing the cap entirely.

1 SAFETY PRECAUTIONS

12. Keep the operator platform and foot pedal area free from debris.
13. For lifting and towing instructions, refer to Sections 3.7 and 3.8 of this manual.



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Start Safely

WARNING: START THE ENGINE FROM THE OPERATOR'S SEAT ONLY. NEVER ATTEMPT TO START THE ENGINE BY SHORTING ACROSS STARTER TERMINALS. Machine may move uncontrollably and cause serious injury or death to anyone in its path.

Know the exact starting procedure for your machine. See the manufacturers manual for starting.

1. Sit in the operator's seat and adjust the seat so you can operate all the controls properly.
2. Fasten the seat belt/operator restraint.

IMPORTANT

Do not raise the seat bar engaging the park brake while the machine is in motion. This can potentially cause damage to the braking system.

WARNING

To prevent personal injury do not start the engine unless you are in the seat with the seat belt fastened around you.

WARNING

To prevent personal injury do not operate the loader without lowering the safety bar, fastening the seat belt and keeping feet on the control pedals or cab floor.

IMPORTANT

This engine is equipped with glow plugs. Do not use ether or any high energy fuels to assist starting.

Park Safely

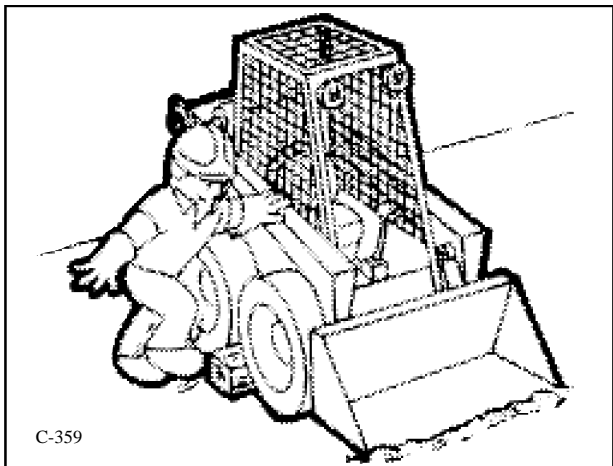
Select level ground, whenever possible. If you must park on a slope or incline, position the machine at right angles to the slope, engage the parking brake, lower the bucket and other attachments and block the wheels.

WARNING

To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.

WARNING

To prevent personal injury always keep feet on the foot pedal or cab floor while operating the loader.



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2 CONTROLS

2...CONTROLS

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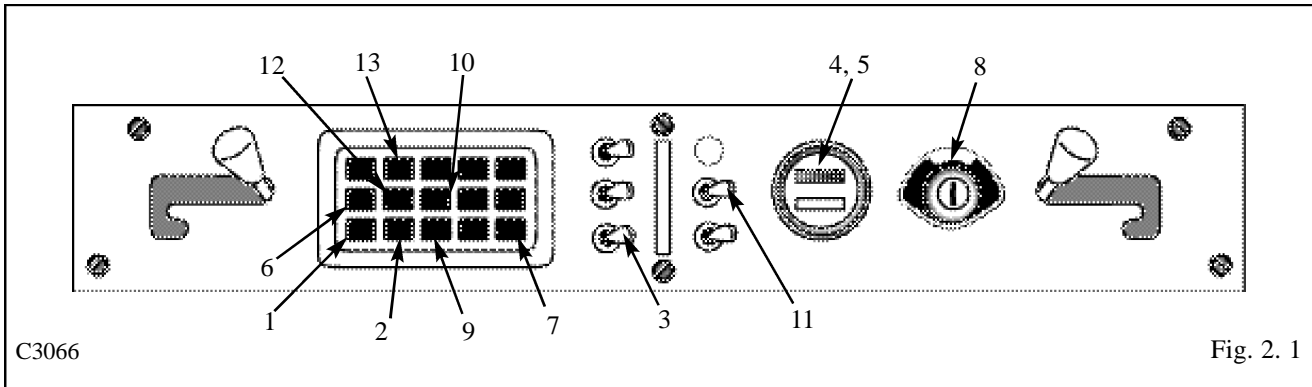


Fig. 2. 1

2. 1 INSTRUMENT PANEL

1. Engine Oil Pressure

If the light comes on during operation or fails to go out after starting, shut off the engine immediately and determine cause.

2. Engine Coolant Temperature

Light comes on when coolant is too hot.

3. Light Switch (Optional)

The light switch is an on-off toggle switch.

4. Hour Meter

The hour meter records the number of engine operating hours and has a total read out of 9999.9 hours.

5. Fuel Gauge

This gauge indicates the quantity of fuel in the tank.

6. Hydraulic Oil Temperature Light

The hydraulic oil temperature light comes on when the hydraulic oil becomes too hot.

7. Engine Pre-Heat Indicator (Diesel only)

The diesel engine is equipped with glow plugs to assist in starting. The glow plug indicator light will turn red when glow plugs are activated.

8. Ignition Switch

The ignition switch is a four position switch, off, pre-heat, run and start. Turning the key counter clockwise will engage the engine pre-heat. To engage the starter, turn the key clockwise. When the key is released it will return to run position.

IMPORTANT

The diesel engine is equipped with glow plugs. Do not use ether or any high energy fuels to assist starting.

9. Alternator Light

The alternator light will come on if the alternator is not producing sufficient current. Refer to the engine manual for test procedures.

10. Seat Belt Light

Refer to Section 2. 2.

11. Auxiliary Hydraulics Switch (Optional)

The panel mounted on/off switch will provide continuous hydraulic flow of the auxiliary circuit.

WARNING

To prevent personal injury do not start the engine unless you are in the seat with the seat belt fastened around you.

12. Park Brake Light

Park brake light is illuminated when the park brake is engaged.

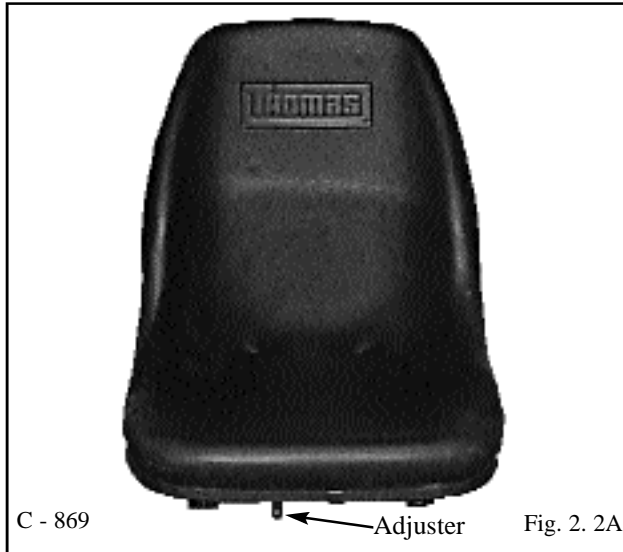
13. Auxiliary Hydraulic Light

Auxiliary hydraulic light is illuminated when the auxiliary hydraulics are engaged.

2 CONTROLS

2.2 SEAT AND SEAT BELT

The loader is equipped with an adjustable seat which can be moved forward or back for operator comfort. (Fig. 2. 2A)



For your safety, the loader is equipped with a seat belt. Before starting the loader, adjust and fasten the seat belt around you. (Fig. 2. 2B). The **Thomas** seat and seat belt also have integrated safety lock switches whereby the operator must be seated in the seat with the belt securely fastened, before the loader can be operated.



2.3 SEAT BAR

For operator protection, the loader is equipped with a seat bar. The seat bar is also an integrated part of the braking system. When the seat bar is raised, the park brake is automatically applied. Make sure the machine has come to a full stop before raising the seat bar.(Fig. 2. 3A).

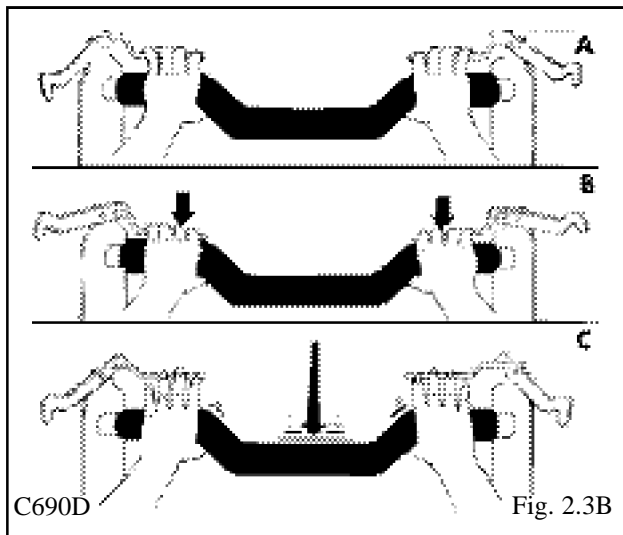


To raise the seat bar, lift up on the seat bar until it locks in the UP position (Fig. 2. 3A).

2 CONTROLS

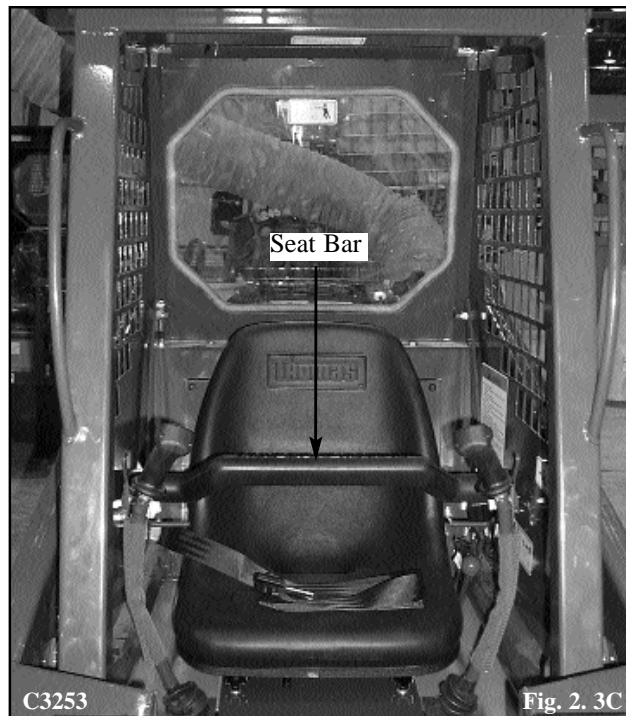
In the up position, the seat bar automatically centers the steering controls in neutral.

To lower the seat bar, place both hands over the latch, release handles and lift the seat bar slightly (Fig. 2. 3B).



Squeeze the latch handles and pull down on the seat bar. Pull the seat bar down beyond the locking point and release the latch handles. Completely lower the seat bar to operating position.


When down, the seat bar releases the park brake. (Fig. 2. 3C).



2.4 PARKING BRAKE

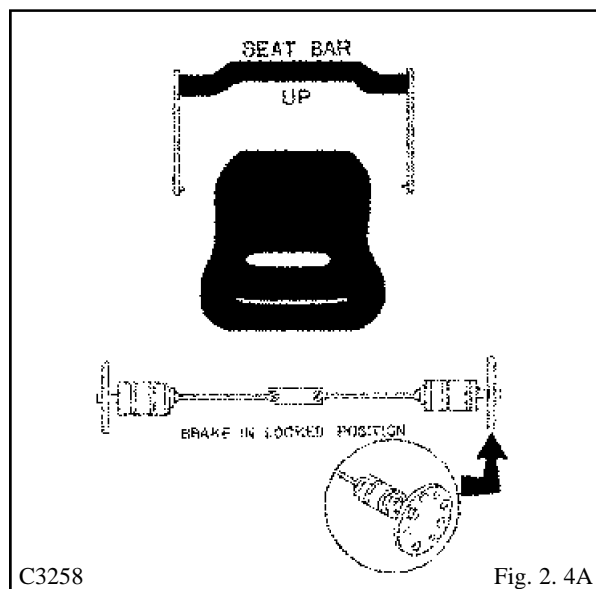
The loader is equipped as standard equipment with a parking brake. The brakes are built into the loader chain drive, and are activated and released when the seat bar is raised or lowered.

To engage the parking brake, raise the seat bar (Fig 2. 4B). The brakes should not be engaged while the loader is in motion or damage occurs to the brake mechanism. To release the parking brake, simply lower the seat bar (Fig 2. 4A). Should the brake not release, simply move the control lever slightly forward or rearward to free the lock mechanism.

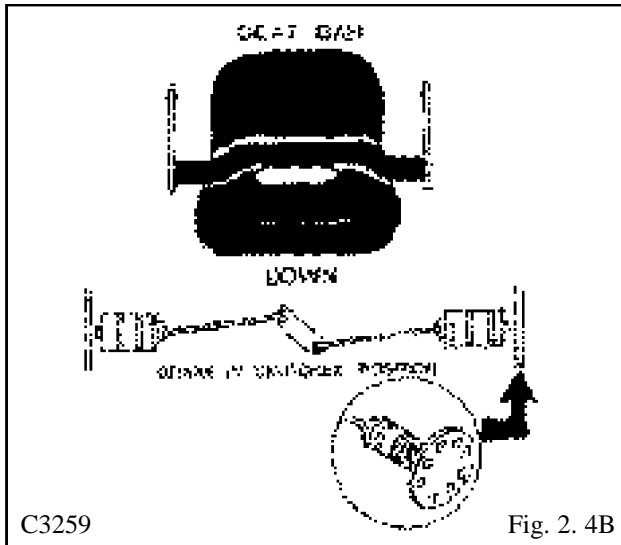


WARNING

To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.



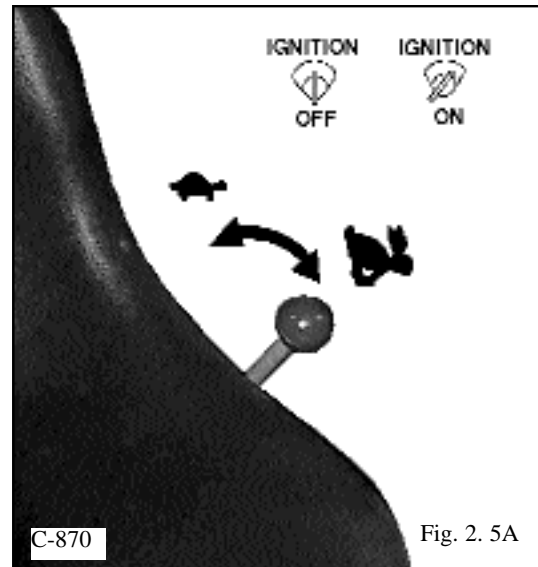
2 CONTROLS



Do not park on a slope. If necessary to park on a slope, park across the grade, engage the parking brake, ground the attachment and block the wheels.

IMPORTANT

To prevent possible damage to the drive chain, do not engage the parking brake while the machine is in motion.



WARNING

To avoid personal injury do not start the engine unless you are in the seat with the seat belt fastened around you.

2.5 THROTTLE CONTROL

The throttle control is mounted next to the operators seat. When the throttle control is set fully back the engine is at idle speed. Moving the control forward increases the engine speed. The machine should always be operated with the throttle fully open.

WARNING

To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.

Before shutting off the engine, return the throttle control to idle position and allow the engine to cool at least 2 minutes. (See Fig. 2. 5).

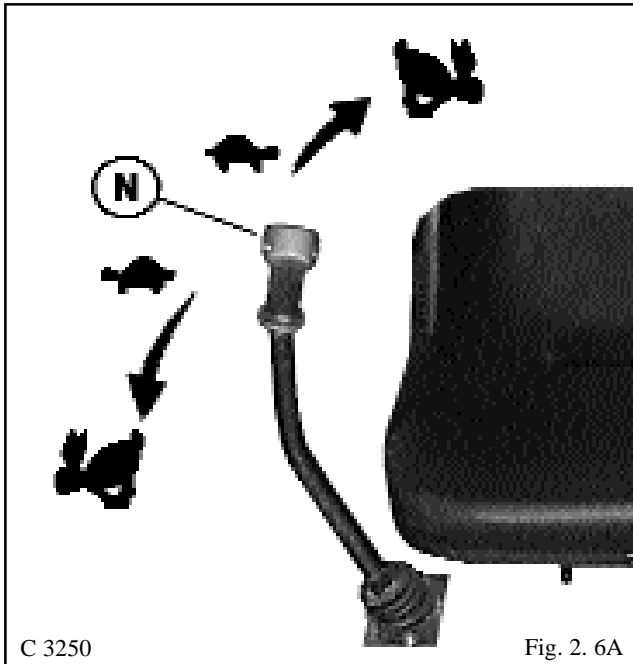
2.6 STEERING CONTROLS

The two steering levers control speed, direction, and turning the loader. The R.H. lever controls the wheels on the R.H. side of the loader and the L.H. lever the L.H. wheels. Loader speed is controlled by the amount each lever is moved from centre or neutral position. (Fig. 2 6A)

The further away from neutral the faster the travel speed. For maximum travel speed, move the control levers full forward or rearward for reverse. For maximum power, move the control levers only a small amount.

To drive the loader forward in a straight line, move both control levers forward the same amount (Fig. 2. 6B).

2 CONTROLS



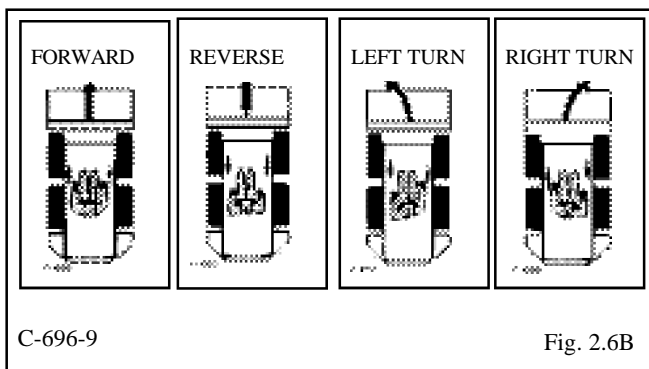
To drive the loader in reverse in a straight line, move both control levers back the same amount.

The loader is turned by moving one lever further forward than the other. To turn right move the left lever further than the right lever, to turn left move the right lever further than the left lever.

For the loader to turn or “skid-steer” within its own length, one lever is moved forward and the other back. This causes the wheels on one side to turn forward and the wheels on the other side to reverse, turning the loader.

2.7 HAND CONTROLS

Hand controls to operate the loaders boom and bucket hydraulic system as well as control the loader travel speed and direction are available as a factory installed option.

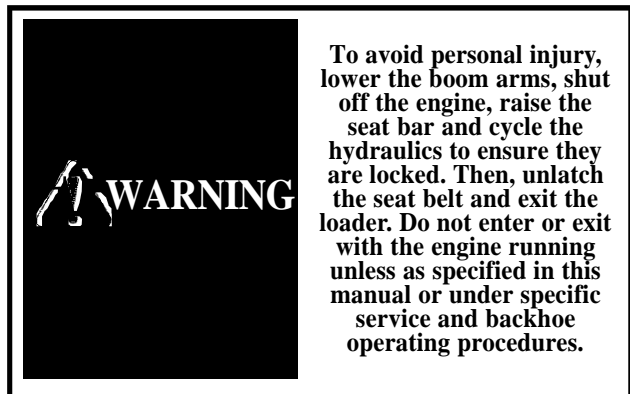


BUCKET CONTROL

The right hand lever controls the bucket tilt cylinders. (Fig. 2. 7A) Moving the control lever to the right will cause the bucket cylinders to extend, dumping the bucket. Moving the control lever to the left will cause the bucket cylinders to retract, rolling the bucket back.

BOOM CONTROL

The left hand lever controls the boom lift cylinders. (Fig. 2. 7A) Moving the control lever to the left will cause the boom cylinders to extend, raising the loaders boom arms. Moving the control lever to the right causes the boom cylinders to retract, lowering the boom. Moving the control lever to extreme right will place the boom in float position. This allows the bucket to follow the contour of the ground as the loader moves backward.



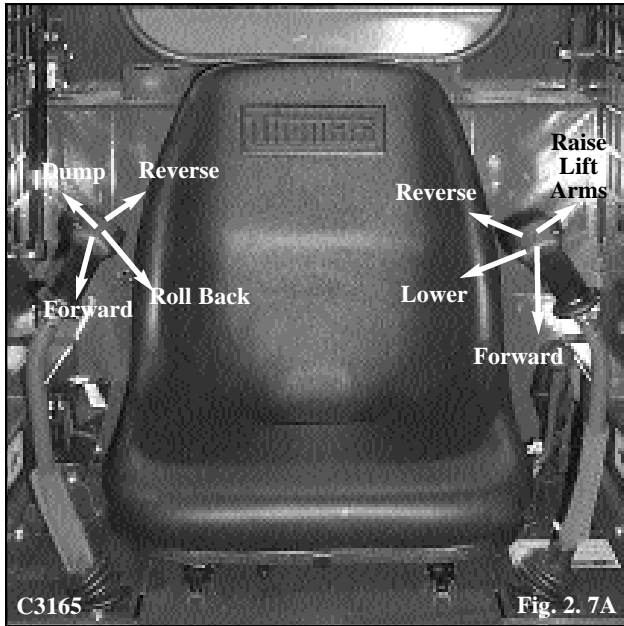
When the control levers are released, they will automatically return to the neutral position stopping all hydraulic movement and travel speed. Before exiting the loader, shut off the engine and ground the attachment by lowering the boom completely down to the frame. Raise the seat bar to the locked position. Move both control levers forward and backward to ensure the steering controls are locked and move both levers to the left and right to ensure the hydraulic controls are locked before you get out of the loader.

AUXILIARY HYDRAULICS:

The foot pedal is used to engage the loaders auxiliary hydraulic circuit to power an attachment such as a post hole auger. (Fig. 2. 8A) Pressing on the toe of the pedal provides hydraulic flow to the female quick-connect coupling located at the front of the boom arms. Firm pressure on the toe of the pedal will lock it into detent position providing a continuous flow of hydraulic oil to the attachment. Pressing on the heel of the pedal provides hydraulic flow to the quick-connect coupling reversing the flow of hydraulic oil. If not locked in detent position, releasing the pedal will cause it to return to the neutral position stopping all hydraulic flow. Once the pedal is locked in detent, it can be returned to neutral by tapping the heel of the pedal.

2 CONTROLS

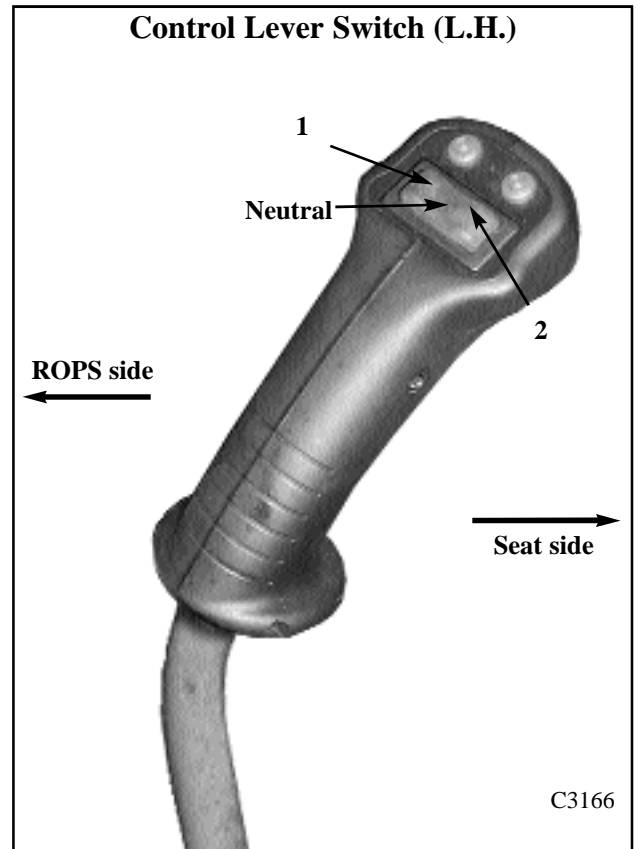
When the auxiliary hydraulic system is not in use return the pedal to the neutral position, otherwise starting the loader may be difficult or impossible and damage to the starter motor may occur.



IMPORTANT	Return the auxiliary hydraulic foot pedal to neutral position when not in use.
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2.8 ELECTRICAL AUXILIARY CONTROL

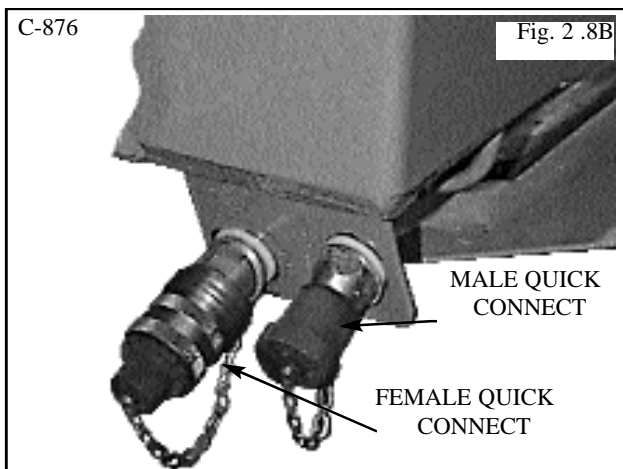
Auxiliary Hydraulic (solenoid operated – optional). A switch located in the L.H. steering control lever (Fig. 2.8A) is used to engage the loader's auxiliary hydraulic circuit to power attachments such as post hole augers, sweepers, etc. By pressing and holding the switch in position 1 (Fig. 2.8A) provides hydraulic flow to the female quick connect coupling located at the front of the boom arms (Fig. 2.8B). Releasing the switch returns the auxiliary hydraulic circuit to neutral, stopping hydraulic flow.



By pressing and holding the switch in position 2 (Fig. 2.8A) provides hydraulic flow to the male quick connect coupling located at the front of the boom arms (Fig. 2.8A). Releasing the switch returns the auxiliary hydraulic circuit to neutral, stopping hydraulic flow.

For continuous flow to the auxiliary hydraulic circuit, a push-pull switch is located on the R.H. side of the instrument panel. Placing the push-pull switch in the ON position provides continuous hydraulic flow to the female quick connect coupling located at the front of the boom arms (Fig. 2.8A). To stop hydraulic flow to the auxiliary hydraulic circuit, return the push-pull switch to the OFF position. When the push-pull switch on the instrument panel is in the ON position, the switch located in the L.H. control lever is not operable.

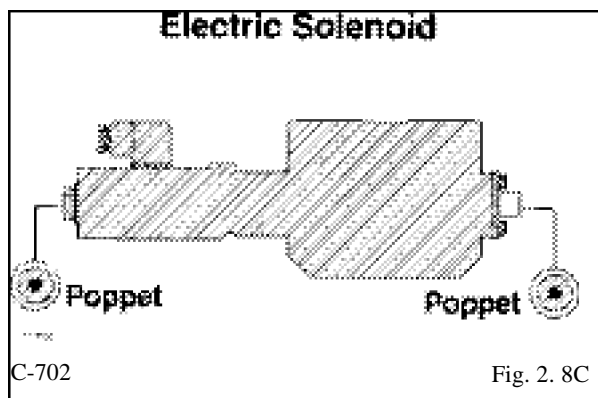
2 CONTROLS



When the auxiliary circuit is not in use, and before starting the loader, ensure the push-pull switch located on the R.H. side of the instrument panel is in the off position, otherwise starting the loader may be difficult or impossible and damage to the starter may occur.

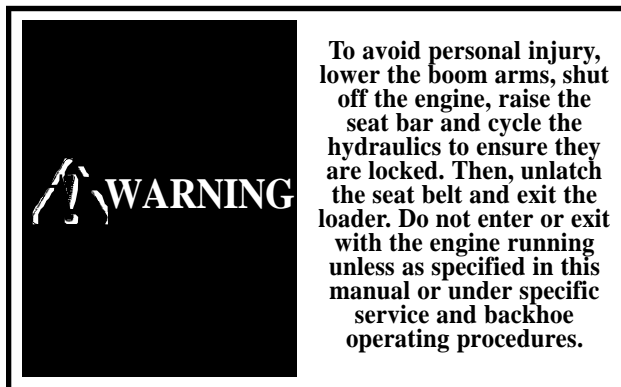


This machine is equipped with electric solenoid controlled auxiliary hydraulics, if for any reason the loader stops or loses current when the electric solenoid is engaged, it can be disengaged by simply turning off the switch located in the upper panel, or by depressing the poppet located at either end of the control valve. (See Fig. 2. 8C).

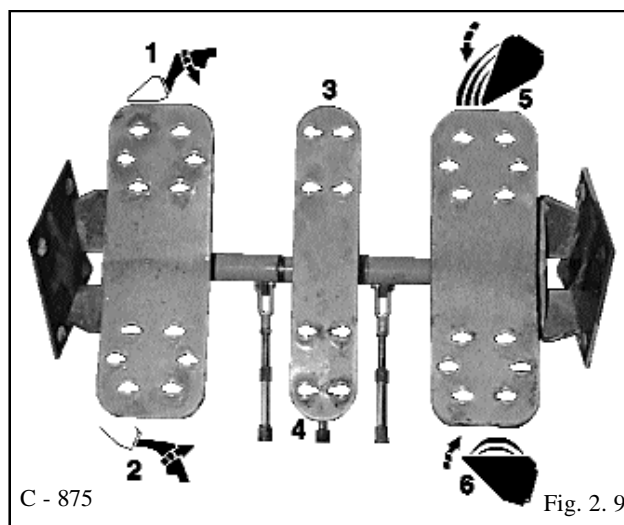


2.9 FOOT PEDALS

Operation of the boom lift cylinders, bucket tilt cylinders and auxiliary hydraulic circuit are controlled by foot pedals (Fig. 2. 9) connected to a hydraulic control valve. The hydraulic control valve is a series type valve which allows simultaneous use of both the boom lift and bucket tilt circuits. The control valve is equipped with a relief valve for circuit protection.



Boom Lift – The L.H. pedal is the boom lift control (Fig. 2. 9). To raise the boom press on the heel (2) of the pedal. To lower the boom press on the toe (1) of the pedal. Firm pressure on the toe (2) of the pedal will lock the boom in float position. This allows the bucket to follow the ground as the loader moves backward.



Auxiliary Hydraulics – The center pedal is used to engage the auxiliary hydraulic circuit to power an attachment such as an auger. Pressing on the toe (3) of the pedal provides hydraulic pressure to the female quick - connect coupling located at the front of the boom arms.

Firm pressure on the toe (3) of the pedal places the valve in detent position providing a continuous flow of hydraulic oil to the attachment. Pressing on the heel of the pedal (4) provides hydraulic pressure to the male quick-connect coupling reversing the flow of hydraulic oil. When the auxiliary circuit is not in use return the foot pedal to neutral position, otherwise starting the loader may be difficult or impossible and damage to the starter may occur.

Bucket Tilt – The R.H. pedal is the bucket tilt (dump) control. Pressing on the toe (5) of the pedal will dump the bucket. Pressing on the heel (6) of the pedal will roll the bucket back.

2.10 QUICK - TACH

The quick - tach, which is standard equipment, allows changing from one attachment to another quickly without having to remove bolt or pins.

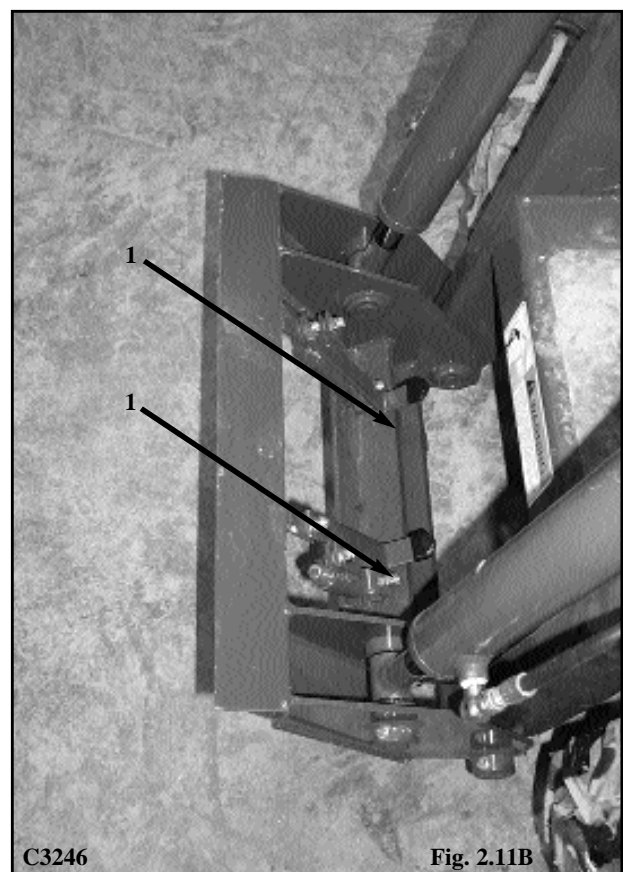
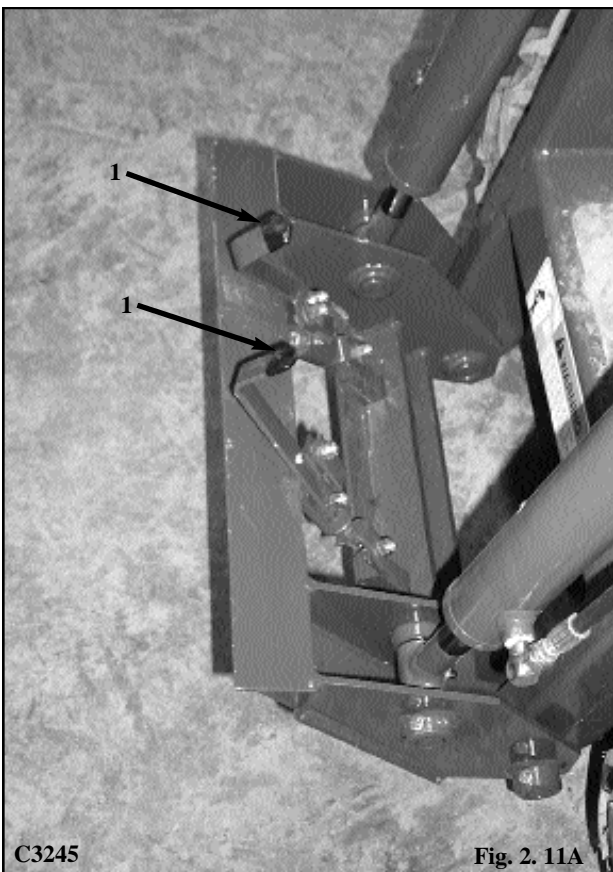
To operate, (Fig. 2.11A), lift the locking lever (1) up to completely retract the locking pins. Tilt the quick - tach frame forward with the bucket tilt cylinders and drive into the attachment. Retract the bucket tilt cylinders which will line up the bottom of the attachment with the quick - tach lock pins. Shut off the engine.

Push the locking lever fully down (Fig. 2.11B item 1) extending the lock pins through the attachment and securing the attachment.

Before operating the attachment check that the locking pins are correctly engaged.

IMPORTANT

After hook up to the attachment check to be sure the pins and locking levers are fully engaged.



2 CONTROLS

2.11 BOOM SUPPORT

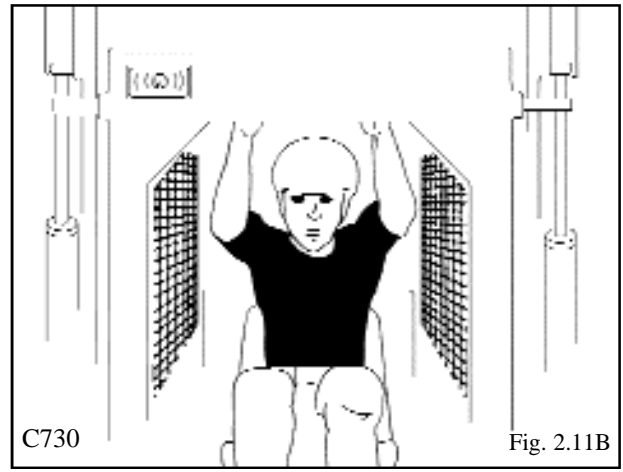
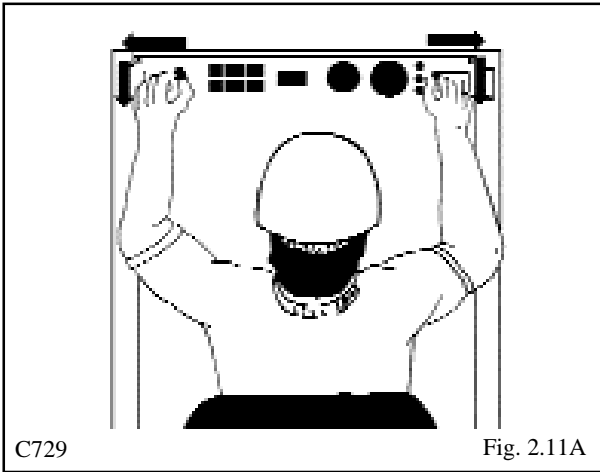
For safety while performing regular service or maintenance work, the loader is equipped with boom support pins. The boom support pins, when extended, prevent the boom arms from dropping if hydraulic pressure is relieved or the foot control pedals accidentally cycled.

To operate the boom support, first remove any bucket or attachment from the quick-tach; raise the boom arms to full height; push the two boom lock pin handles (Fig. 2.

11A), located directly in front of the operator at the top of the operator compartment, outward, extending the boom support pins (See Fig. 2. 11B). Slowly lower the boom arms down onto the pins. To retract the support pins, first lift the boom arms off of the pins before retracting.

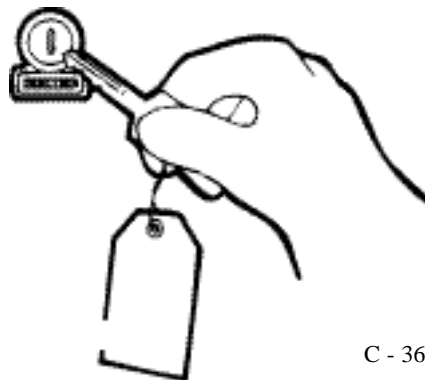
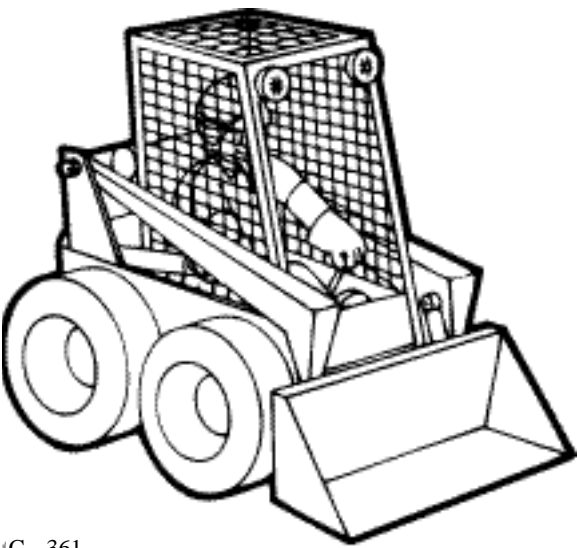
IMPORTANT

Fully retract the boom supports before raising or lowering boom arms.



Safe Shutdown Procedures

- Stop machine
- Lower the bucket and other attachments flat on the ground.
- Position controls in neutral.
- Engage parking brake.
- Idle engine for short cool-down period.
- Stop engine.
- Cycle hydraulic controls to eliminate pressure.
- Raise operator seat bar.
- Check that controls are locked in neutral.
- Unbuckle seat belt.
- Remove ignition key and lock covers and closures.



Don't give anyone the key to an accident.

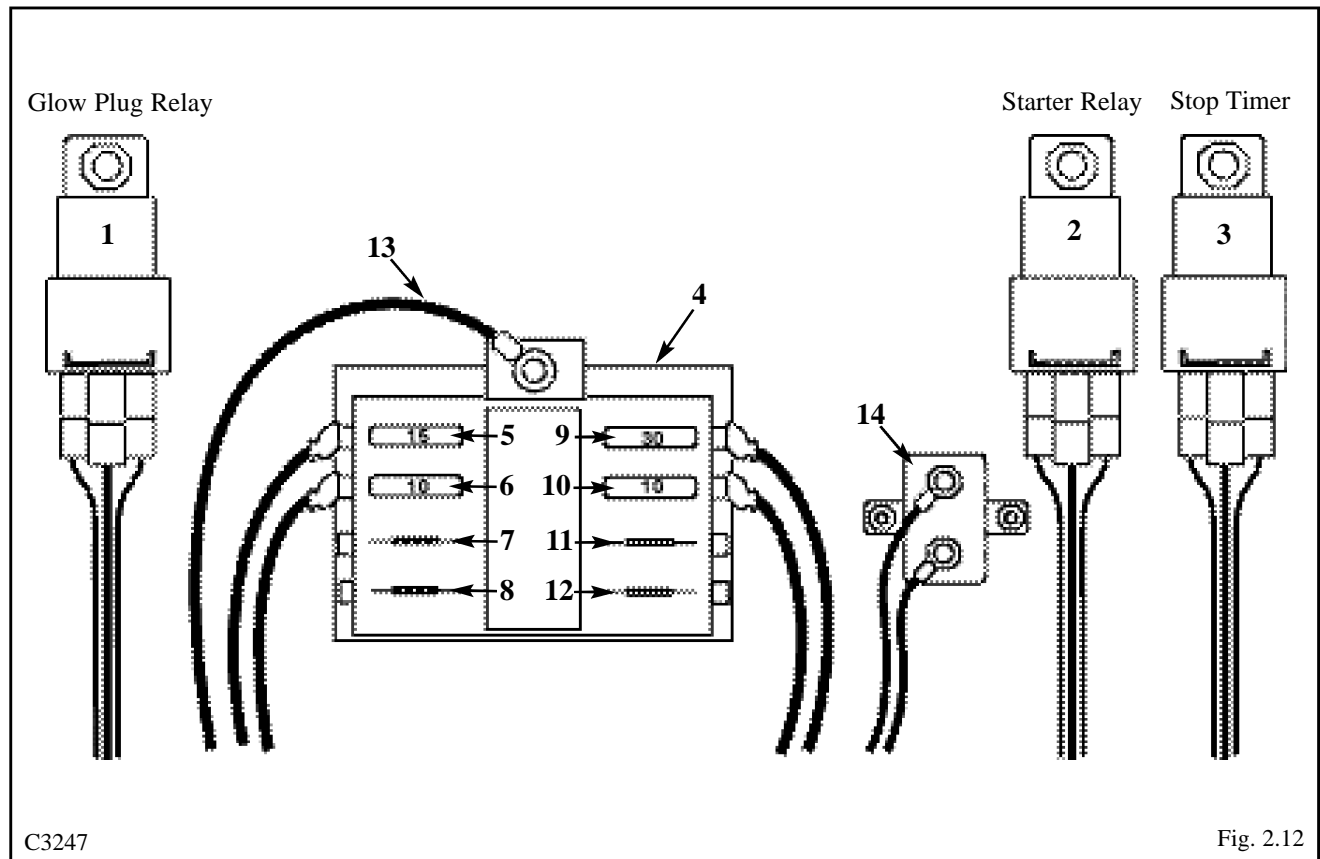
2 CONTROLS

2. 12 ELECTRICAL PANEL

The loader is equipped with a 12 volt, negative ground electrical system. The fuse and relay panel is located in the engine compartment just in front of the battery box. The panel consist of the following:

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Glow Plug Relay 2. Starter Relay 3. Engine Fuel Stop Timer 4. Fuse Panel | <ol style="list-style-type: none"> 5. Stop Timer (Y/B) 6. Alternator (B/W) 7. Electrical Auxiliary 8. Spare 9. Starter (W/B)
Glow Plug (R/W) 10. Valve Locks (Or/W) 11. Horn 12. Spare 13. From ACC Switch (B/W 12) 14. Circuit Breaker |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Optional equipment for the loader are back up alarm, horn and work lights (Fig. 2. 12)



C3247

Fig. 2.12

3 OPERATION

3...OPERATION

- 3. 1 Starting Instructions
 - 3.1 A Pre-Starting Inspection
 - 3.1 B Starting Procedure
 - 3.1 C Shut-Off Procedure
 - 3.1 D Shut-Off Procedure Manual
- 3. 2 Operating Procedure
- 3. 3 Filling From a Pile
- 3. 4 Digging With a Bucket
- 3. 5 Leveling and Backfilling
- 3. 6 Auxiliary Hydraulics
- 3. 7 Lifting
- 3. 8 Towing
- 3. 9 Securing
- 3. 10 Battery Maintenance and Boosting
- 3. 11 Lowering Lift Arms

3 OPERATION

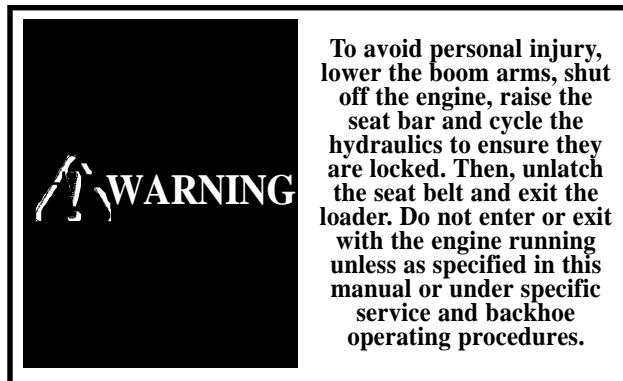
3.1 STARTING INSTRUCTIONS

3.1A Pre - Starting Inspection:

Before starting the loader complete the following inspection:

1. Check the hydraulic oil level, engine oil level, engine coolant level and fuel supply.
2. Check the air filter indicator.
3. Check for fuel, oil and hydraulic leaks.
4. Check lights, battery level and cables.
5. Check tire pressure:
Standard 50 PSI (345 kPa)
Flotation 40 - 45 PSI (276 - 310 kPa)
6. Check wheel nut torque 80-90 ft. lbs. (109 - 122 Nm)
7. Lubricate all grease fittings.
8. Check the condition and operation of all safety decals and equipment – Ensure all shields and safety screens are in place. If necessary, repair or replace before starting.

(For complete daily servicing Refer to Section 4. 3).



3.1B Starting Procedure :

1. Ensure the seat bar is in the UP position and the steering controls are centered and the foot pedals locked.
2. Adjust and fasten the seat belt securely around you.
3. Place the throttle control in idle position.

4. Turn the ignition key counterclockwise to activate the glow plugs. Hold approximately 15 seconds. Both the alternator and engine oil pressure warning lights should be on.
5. Turn the key clockwise to start position to engage the starter. Do not crank the starter for more than 15 seconds. If the engine fails to start, turn the key counter clockwise and pre-heat again.
6. When the engine has started the engine oil pressure and alternator warning lights should go out. If they don't, shut-off the engine immediately and determine cause.
7. Allow the engine to warm up for five minutes before operating. When ready to operate, lower the seat bar and advance the throttle to full on position.

IMPORTANT

This engine is equipped with glow plugs. Do not use ether or any high energy fuels to assist starting.

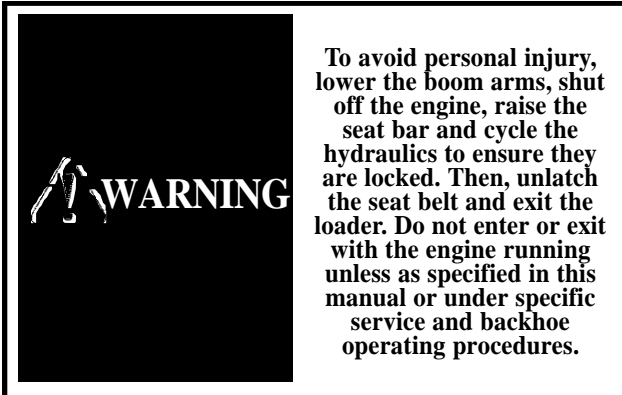
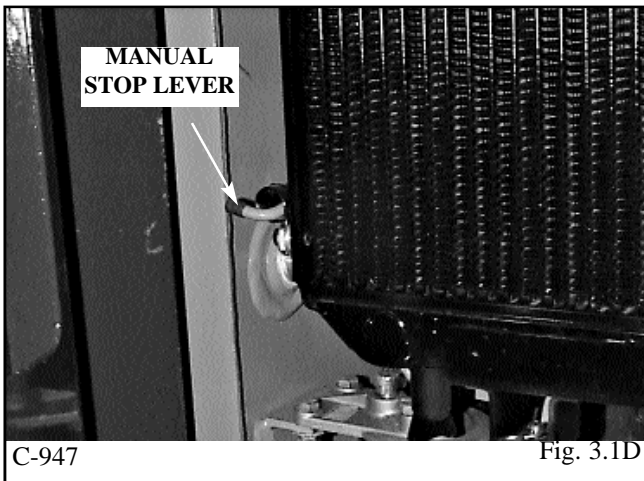
3.1C Shut-Off Procedure:

1. Park the loader on level ground. If it is necessary to park on a slope, position the machine at right angles to the slope.
2. Lower the lift arms and ground the attachment.
3. Return the throttle control to idle position. If the engine is hot, allow it to idle until cool, at least 2 minutes. (See Section 2. 5).
4. When the engine is cool, turn the ignition key to the OFF position and remove the key.
5. Place the auxiliary foot pedal in neutral position. If the auxiliary foot pedal is left in detent, restarting the machine may be impossible. If equipped with electro solenoid, make sure the switch is in the OFF position.
6. Raise the seat bar to apply the park brake. Turn the ignition switch to the OFF position, unfasten the seat belt, and ensure the pedals are locked by rocking them and ensure the steering levers are locked in neutral.

3 OPERATION

3.1D Manual Shutoff Procedure

1. Should the engine fail to stop after following the procedure described in Section 3.1 - C, ensure that the lift arms are lowered and grounded and the foot pedals and steering levers are locked.
2. Exit the machine and open the rear engine compartment access door. Pull the manual stop lever (Fig 3. 1D) and hold until the engine has stopped. (See Section 4. 11A, Electrical System Troubleshooting Guide).



3.2 OPERATING PROCEDURE

1. When learning to use the loader operate at a slow rate.
2. Take advantage of the efficient operation of the loader. Keep the travel distance as short as possible. Keep the work area small so the cycle time is short.
3. Keep the work area as level as possible.
4. Decrease cycle time by “skid” turning (See Section 2.6) rather than a go backward-go forward turn.
5. Fill the bucket to rated capacity. Turning is easier with a full load than with a partial load. Keep the loaded bucket close to the ground when transporting.

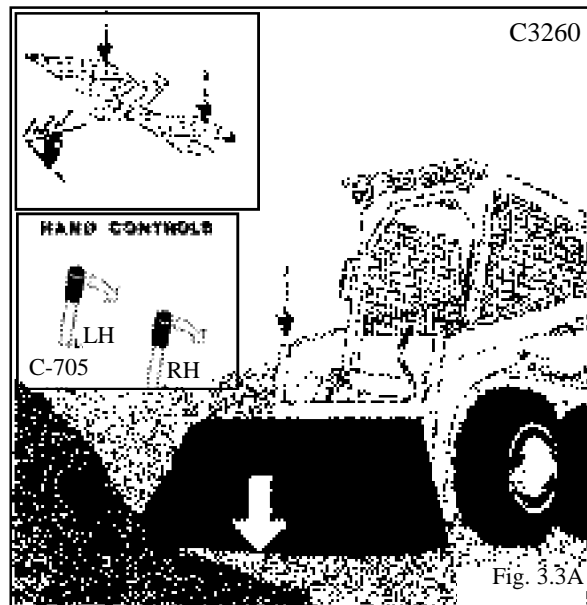
6. Tilt the bucket as you raise the boom arms or drive up a slope. This will prevent material from falling off the back of the bucket.
7. Do not drive across a slope. Always go up or down a slope with the heavy end of the loader pointing up towards the top of the slope.

IMPORTANT

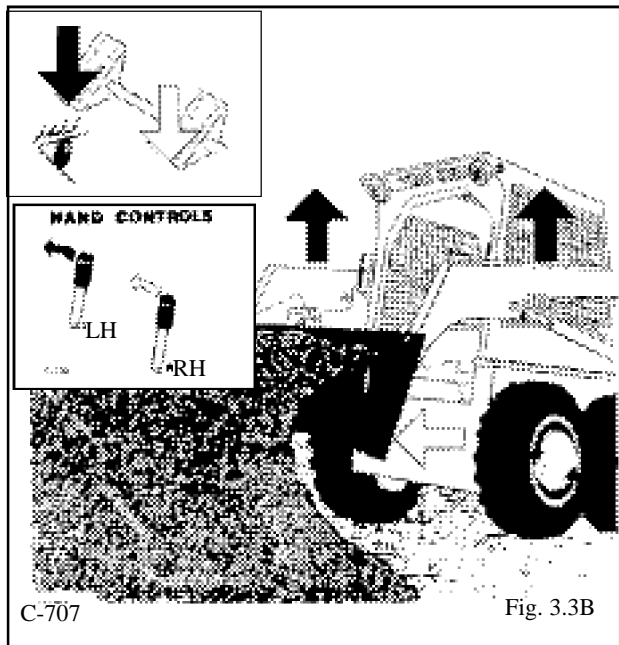
Always let the engine warm completely before you begin operation each day.

3.3 FILLING FROM A PILE

Push down on the toe of the boom arm pedal and lower the boom completely down. Push the toe of the bucket pedal and place the cutting edge of the bucket on the ground (Fig. 3. 3A). For hand control units, move the L.H. control lever towards you and lower the boom completely down. Move the R.H. control lever away from you (Fig. 3. 3A) and place the cutting edge of the bucket on the ground.

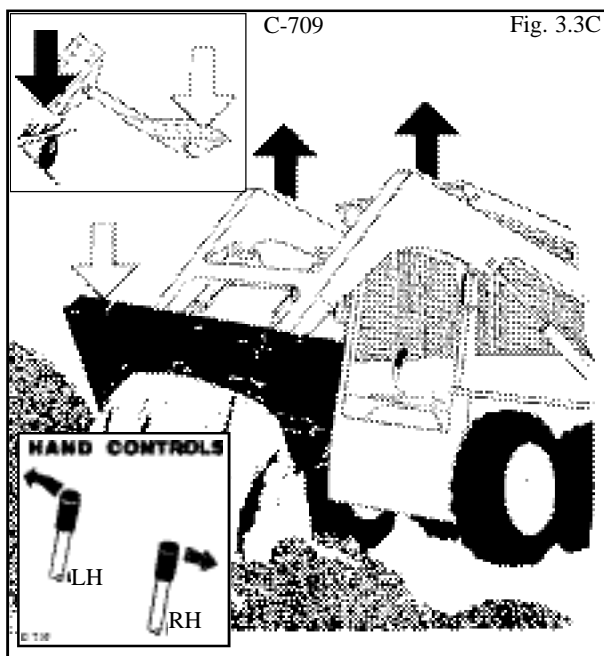


3 OPERATION



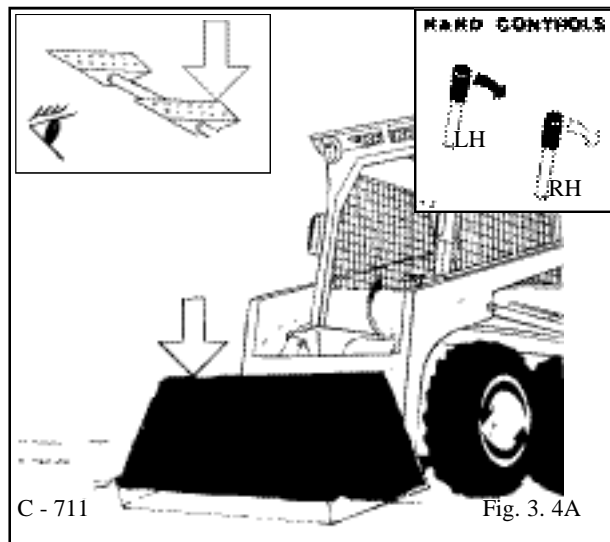
Drive the loader forward slowly. As the bucket begins to fill, push on the heel of the bucket pedal to raise the front of the bucket (Fig. 3. 3B) and push on the heel of the boom pedal to raise the lift arms. When the bucket is full, back away from the pile. For hand control units, move the R.H. control lever towards you to raise the front of the bucket and move the L.H. control lever away from you to raise the lift arms (Fig. 3. 3B). When the bucket is full back away from the pile.

Drive the loader forward slowly. As the bucket begins to fill, push on the heel of the bucket pedal to raise the front of the bucket (Fig. 3. 3B) and push on the heel of the boom pedal to raise the lift arms.



To dump the bucket (Fig. 3. 3C) push down on the heel of the boom pedal to raise the bucket. Push down on the toe of the bucket pedal small amounts as the boom arms are raising to stop material from falling off the back of the bucket. When the bucket is at the correct height for dumping, push on the toe of the bucket pedal to empty the bucket.

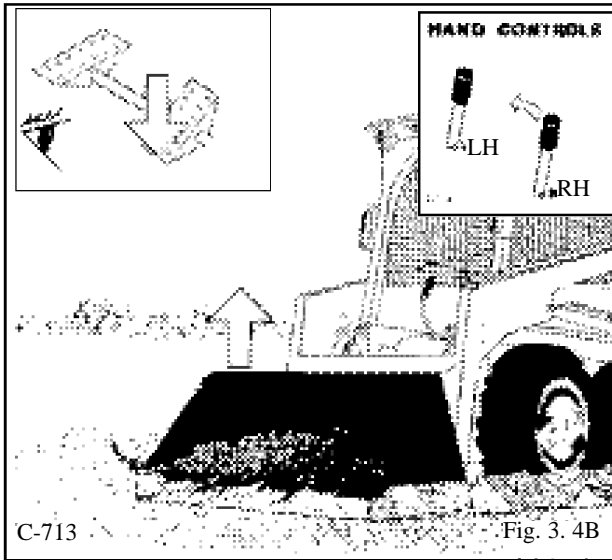
For hand control units, move the L.H. control lever away from you (Fig. 3. 3C) to raise the boom. Move the R.H. control lever away from you in small amounts as the boom arms are raising to stop material from falling from the back of the bucket. When the bucket is at the correct height for dumping, move the R.H. lever away from you to empty the bucket.



3. 4 DIGGING WITH A BUCKET

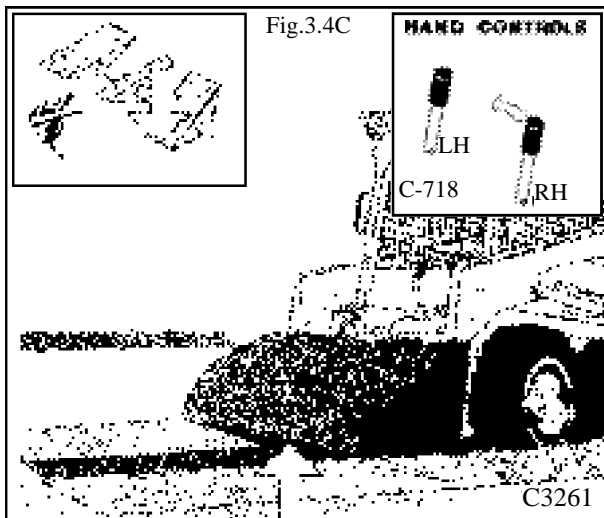
Push on the toe of the boom pedal and lower the boom completely down. Push on the toe of the bucket pedal and place the cutting edge of the bucket on the ground (Fig. 3. 4A). Drive the loader forward at a slow rate and continue to tilt the bucket down until it enters the ground. For hand control units, move the L.H. control lever towards you to lower the boom completely down. Move the R.H. control lever away from you and place the cutting edge of the bucket on the ground (Fig. 3. 4A).

3 OPERATION



Push down on the heel of the bucket pedal (Fig. 3. 4B) to increase traction and keep an even digging depth.

Continue to drive forward until the bucket is full. When digging in hard ground, it is easier to raise and lower the bucket cutting edge with the tilt pedal while slowly driving forward.



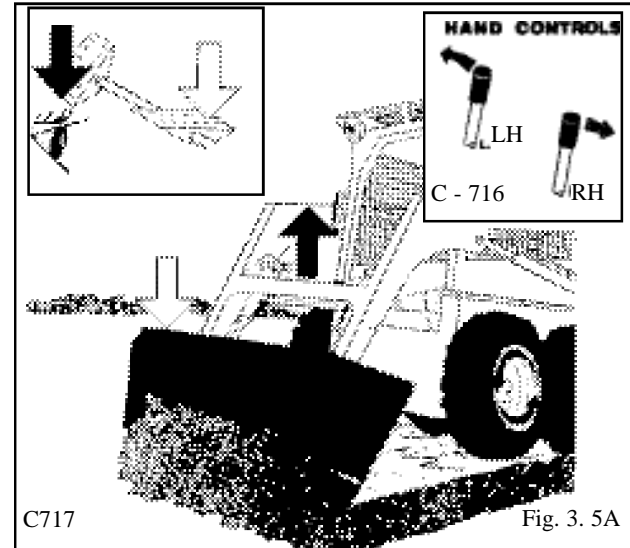
When the bucket is full push down on the heel of the bucket pedal (Fig. 3. 4C) to raise the tip of the bucket.

Drive the loader forward at a slow rate and continue to tilt the bucket down until it enters the ground. Move the R.H. control lever towards you (Fig. 3.4B) to increase traction and keep an even digging depth. Continue to drive forward until the bucket is full. When the bucket is full, move the R.H. control lever towards you (Fig. 3. 4C) to raise the tip of the bucket.

3. 5 LEVELING AND BACKFILLING

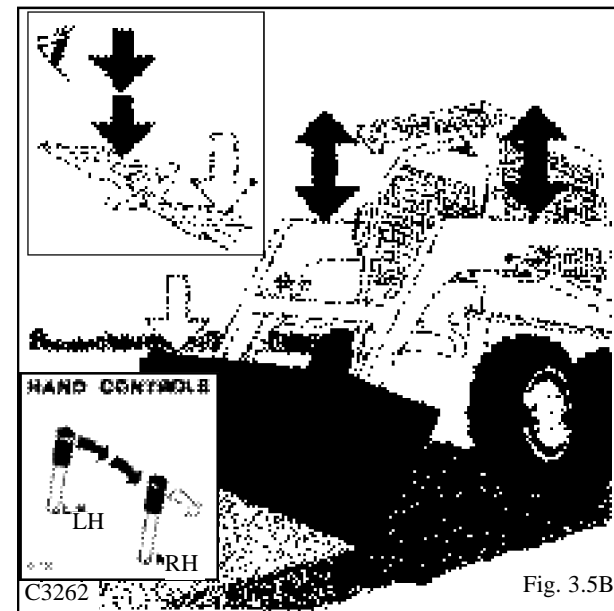
Spread dirt on uneven ground by pushing on the heel of the boom pedal (Fig. 3. 5A) to raise the boom and push on the toe of the bucket pedal to tilt the bucket down as you drive

forward. For hand control units, spread dirt on uneven ground by moving the L.H. control lever away from you (Fig. 3. 5A). To raise the boom and move the right hand control lever away from you to tilt the bucket down as you drive forward.

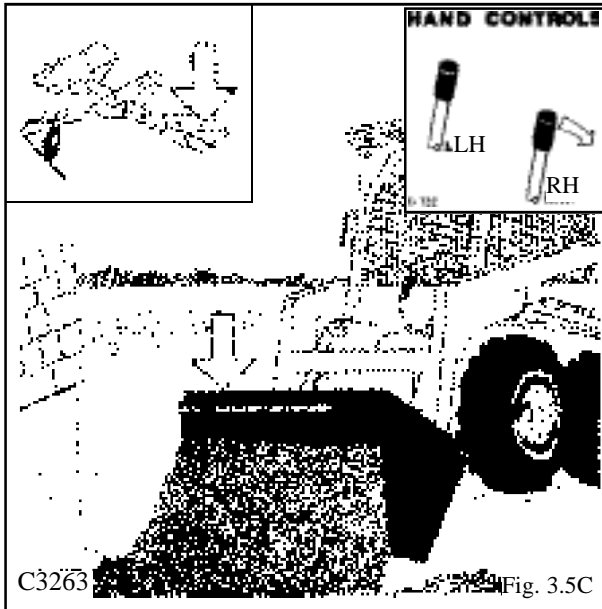


To level the ground; raise the boom arms and tilt the bucket down by pressing on the toe of the bucket pedal (Fig. 3. 5B). Push firmly on the toe of the boom pedal to lock the boom in float position. The weight of the lift arms and bucket will hold the bucket on the ground. Drive backward to level material.

To level the ground with a hand control unit, raise the boom arms and tilt the bucket down by moving the R.H. control lever away from you. Move the L.H. control lever all of the way towards you (Fig. 3. 5B) to place the boom in the float position. The weight of the lift arms and the bucket will hold the bucket on the ground. Drive backwards to level material.



3 OPERATION



To fill a hole (Fig. 3. 5C) drive the loader slowly with the bucket low up to the hole. As the bucket passes the edge of the hole, push on the toe of the bucket pedal to dump the bucket. When necessary, raise the boom arms to empty the bucket.

On hand control units, as the bucket passes the edge of the hole, move the R.H. control lever away from you to dump the bucket. When necessary, raise the boom arms to empty the bucket (Fig. 3.5C).

WARNING To prevent personal injury, always carry the load low.

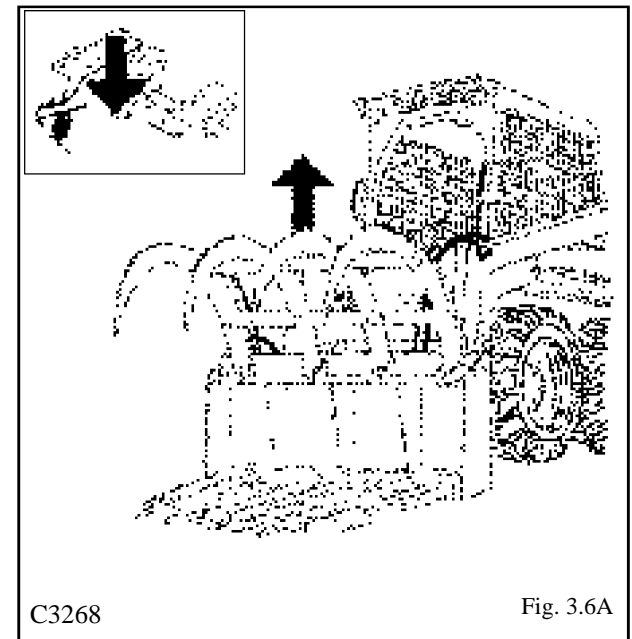
WARNING To prevent personal injury, do not exceed the rated lift capacity of the loader.

WARNING To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.

3.6 AUXILIARY HYDRAULICS

To operate an attachment such as a grapple fork (Fig. 3. 6A) using the auxiliary hydraulic circuit, push on the heel of the centre or auxiliary pedal to open the grapple. (See Section 2. 8 for electric solenoid controlled auxiliary).

IMPORTANT Return the auxiliary control to neutral when not in use otherwise starting may be impossible and damage to the starter may occur.

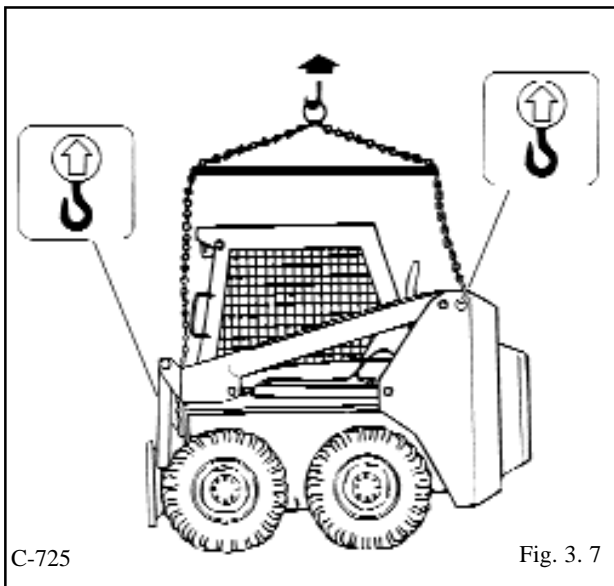
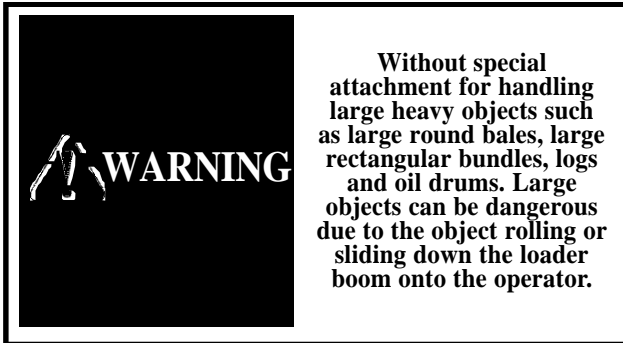
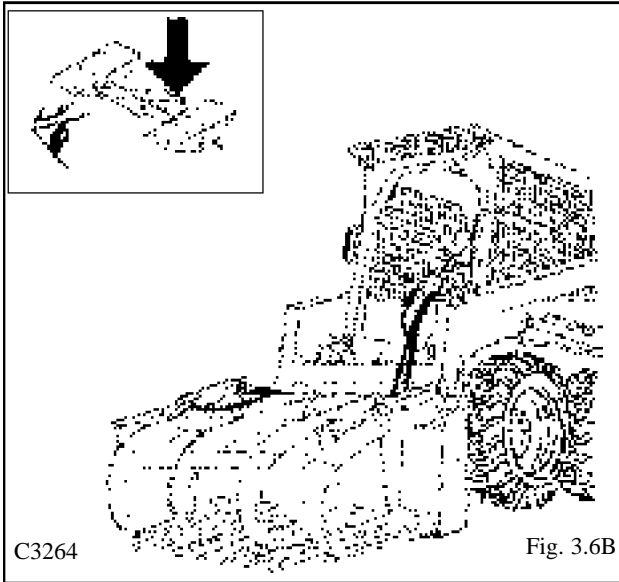


IMPORTANT Units equipped with electric controls, the switch must be returned to the OFF position prior to shutting the engine off.

WARNING To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.

3 OPERATION

To close the grapple (Fig. 3.6B), push down on the toe of the auxiliary pedal. The boom and the bucket pedals can be used to raise and tilt the grapple as with a bucket. To operate an attachment which requires a constant flow of oil such as a sweeper, push down firmly on the toe of the



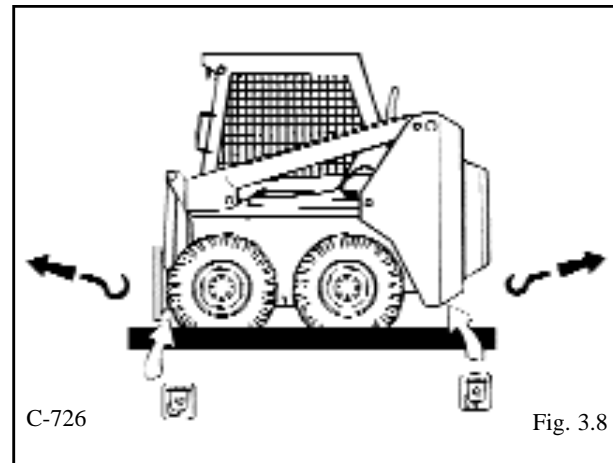
auxiliary pedal until the pedal locks in detent position. When the auxiliary circuit is not in use return the auxiliary pedal to neutral position, otherwise starting the loader may be difficult or impossible.

3.7 LIFTING

The loader is equipped with features to use in lifting (for example by crane onto a flatbed trailer or a flat car), for securing, and for extraction (from mud or snow).

To lift using a crane, first follow the shut-off procedure. (See Section 3.1C).

Once this is done, attach properly rated cables, chains or straps to lift points provided (See Fig. 3.7). To prevent marking the operator guard or chafing of the lifting cable, a lifting frame should be used.



3.8 TOWING

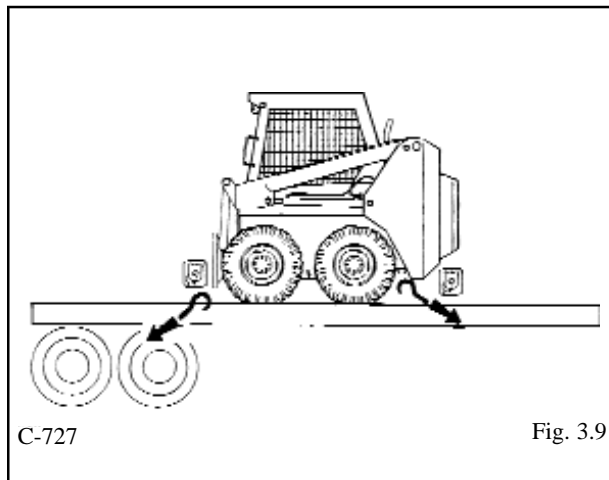
1. When winching or towing a stuck loader from the rear, always lower the lift arms until the attachment is resting on the ground and then follow the shut-off procedure (See Section 3.1C).
2. When winching or towing a stuck loader from the front, lower the attachment so that the front attachment points are accessible and have an assistant block the attachment, then follow the shut - off procedure (See Section 3.1C).
3. Attach a properly rated chain, cable or towing strap to the towing point provided (Fig. 3.8). The point was designed to accommodate a chain, but a cable or strap with a sufficiently large hook to prevent jamming in the chain slot may be used.


3 OPERATION

4. Lower the restraint bar to activate the brake system. Towing with the restraint bar up could result in damage to the braking system. If towing from the front, remove the blocks supporting the attachment prior to engaging tow equipment.
5. The attachment point on the towing or winching equipment should be kept as low as possible and in as direct a line as possible with the stuck loader. A steep tow line angle or side pull could result in upsetting the stuck loader.

3.9 SECURING

There are 4 points provided for securing the loader while trailering (Fig. 3.9). These attachment points will accommodate a 5/16" through 5/8" diameter chain for use with accompanying load binders.






WARNING

To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.

3.10 BATTERY MAINTENANCE AND BOOSTING:

Inspect the battery on a regular basis for damage such as a cracked or broken case or cover which would allow electrolyte loss.




WARNING

To prevent personal injury **DO NOT** charge a frozen battery because it can explode and cause personal injury. Let the battery warm to 60PF. (15.5PC.) before putting on a charger.

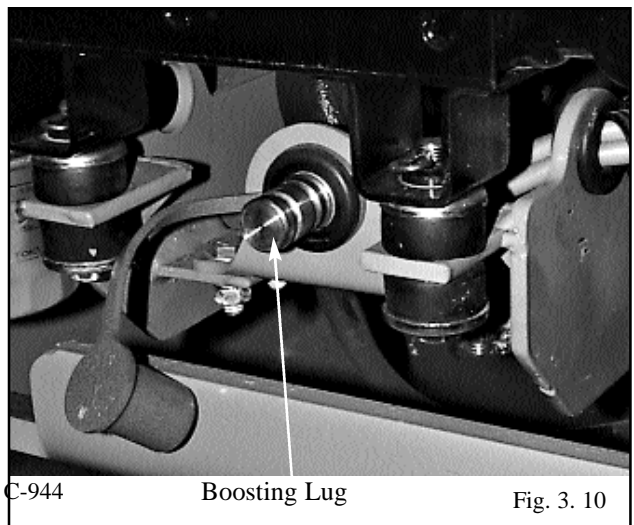
Check the battery cables for tightness and that they are corrosion free. Remove any acid corrosion from the battery and cables with a baking soda and water solution. Coat the terminal connections with di - electric grease.

If it is necessary to use a booster battery to start the engine, **BE CAREFUL!** There must be one person in the operator's seat and one person to connect and disconnect the battery cables. The ignition must be in the "OFF" position. The booster battery to be used must be 12 volt. Connect the end of the first cable to the positive (+) terminal of the booster battery. Connect the other end of the same cable to the optional boosting lug. (See Fig. 3.10).



WARNING

Lead-acid batteries contain sulfuric acid which will damage the eyes or skin on contact. Always wear goggles to avoid acid in the eyes. If acid contacts the eyes, wash immediately with large quantities of clean water and get medical attention. Wear rubber gloves and protective clothing to keep acid off the skin. If acid contacts the skin, wash off immediately with clean water.



3 OPERATION

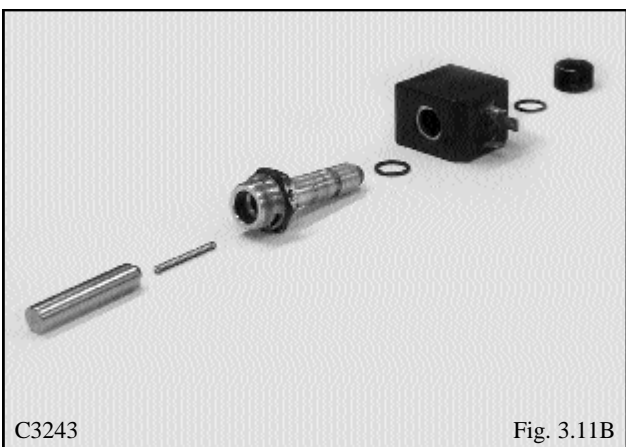
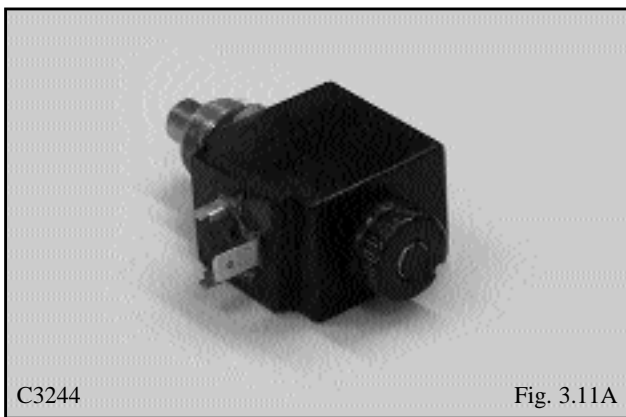
Connect the end of the second cable to the negative (-) terminal of the booster battery. Connect the other end of the same cable to the engine. Keep cables away from moving parts. Start the engine. After the engine has started, remove the ground cable (-) first, then remove the cable from the boosting lug

3.11 LOWERING LIFT ARMS (ENGINE OFF)

In the event that you should have an electrical failure which renders your skid steer inoperable with the lift arms up, the following procedures would apply.

3.11A Lift Arm Height Is Sufficient To Engage Boom Support Pins

Engage Boom support pins. (Fig. 3.11A) Raise seat bar and cycle all controls to ensure they are locked. Exit loader and open rear door. Locate the control valve on the right side of the machine. Unplug the electrical wire and remove the knurled nut holding the solenoid on the spool lock (Fig.3.11A). Remove the solenoid, then remove the lock pin and spring assy (Fig. 3.11B). Once the lock pin and spring are removed, the boom spool is free to travel. Enter the machine, being careful not to cycle the foot pedals or the control levers as the locking system has been disabled. Once in the operator seat, lower the safety bar, and disengage boom support pins (Fig.3.11C). Move the boom pedal or control lever to lower the lift arms to the ground.

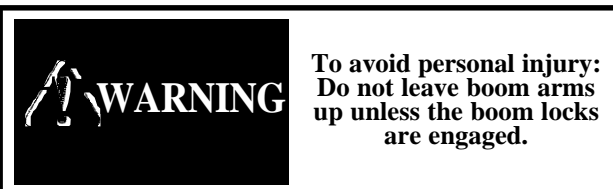
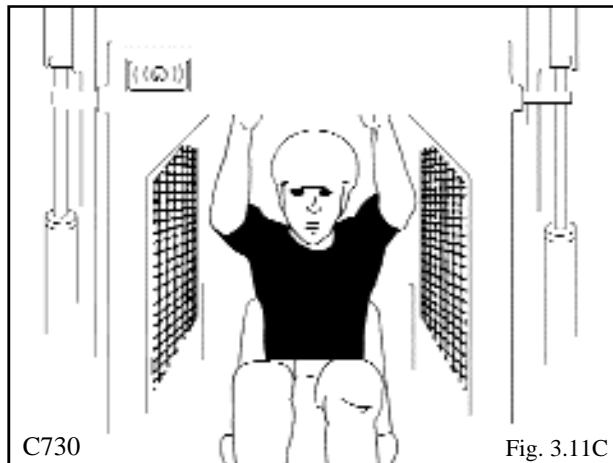


3.11B Lift Arm Height Is Not Sufficient To Engage Boom Support Pins

DO NOT EXIT FROM FRONT OF LOADER WITHOUT LIFT-ARMS ON GROUND OR SUPPORTED BY ACCEPTABLE MEANS!

Raise seat bar and cycle all controls to ensure they are locked. If help is readily available, have someone place a suitable support under the boom (i.e. 4" x 4" Lumber) or a piece of angle iron between lift cylinder end cap and lift cylinder rod mount. Then exit loader using extreme caution. If help is not available, the operator must exit the loader from the rear window and perform the proper lift arm supporting (As described previously) Once this is completed, open rear door. Locate the control valve on the right side of the machine. Unplug the electrical wire and remove the knurled nut holding the solenoid on the spool lock (Fig.3.11A). Remove the solenoid, then remove the lock pin and spring assy (Fig. 3.11B). Once the lock pin and spring are removed, the boom spool is free to travel.

Ensure assistance is available, then the operator can enter the machine, being careful not to cycle the foot pedals or the control levers as the locking system has been disabled. Once in the operator seat, lower the safety bar. Have the assistant remove the lift arm support devices. The operator can then move the boom pedal or control lever to lower the lift arms to the ground.



4 MAINTENANCE

4 MAINTENANCE

- 4. 1 Preventative Maintenance Service Schedule
- 4. 2 Service Access
 - 4. 2A Boom Support
 - 4. 2B Seat Removal
 - 4. 2C Engine Compartment
- 4.3 Daily Service Checks
 - 4. 3A Radiator Service
 - 4. 3B Hydraulic Oil Level
 - 4. 3C Air Cleaner Service
 - 4. 3D Tires and Wheel Bolts
 - 4. 3E Safety Equipment
 - 4. 3F Decals
 - 4. 3G Lubrication
- 4. 4 50 Hour Service Check
- 4. 5 Final Drive Maintenance
 - 4. 5A Oil Level Check
- 4. 6 Hydraulic/Hydrostatic System Maintenance
 - 4. 6A Hydraulic Oil Level
 - 4. 6B Filter Replacement
 - 4. 6C Draining System Fluid
- 4. 7 Engine Maintenance
 - 4. 7A Oil Level Check
 - 4. 7B Engine Oil Filter Replacement
 - 4. 7C Cooling System Fluid
 - 4. 7D Fan Belt Tension
 - 4. 7E Fuel Filter Replacement
 - 4. 7F Adding Fuel
 - 4. 7G Bleeding the Fuel System - Diesel
- 4. 8 Air Cleaner Maintenance
 - 4. 8A Daily Maintenance
 - 4. 8B Servicing Cleaner Element
- 4. 9 Electrical System
 - 4. 9A Electrical Schematic
 - 4. 9B Battery Access
 - 4. 9C Battery Maintenance
- 4.10 Tire Maintenance
 - 4. 10A Tire Inflation and Service
 - 4. 10B Tire Rotation
- 4.11 Troubleshooting
 - 4. 11A Troubleshooting Electrical
 - 4. 11B Hydrostatic Drive System
 - 4. 11C Hydraulic System
 - 4. 11D Final Drive System
 - 4. 11E Control System
 - 4. 11F Park Brake
 - 4. 11G Engine
- 4.12 Hydraulic/Hydrostatic Circuit
- 4.13 Special Tools

4 MAINTENANCE


4.1 PREVENTATIVE MAINTENANCE SERVICE SCHEDULE

ITEM	SERVICE REQUIRED	8 HOURS	50 HOURS	75 HOURS	150 HOURS	400 HOURS
Engine Oil	Check level and add if necessary. Use 10W30 API Classification SE/CD oil.					
Radiator	Check level and add if necessary. Fill with 50% mixture of ethylene glycol and water. Check cooling fins for dirt. If necessary blow out with compressed air.					
Hydraulic Oil	Check level and add if necessary. Use 10W30 API Classification SE/CD oil.					
Air Cleaner	Empty dust cap. Check condition indicator and service or replace element as required.					
Tires and Wheel Bolts	Check for low pressure or tire damage. Inflate standard tires 50 PSI (345 kPa), flotation tires 40 - 45 PSI (276 - 310 kPa). Check wheel bolt torque 80 - 90 ft. lbs. (109 - 122 Nm)					
Safety Equipment	Check all safety equipment for proper operation and condition. Seat belt, boom locks, quick-tach locks, parking brake, steering and foot pedal locks, safety treads. Repair or replace as necessary.					
Decals or Instruction	Check for damaged or missing safety or instruction decals (see section 5. 4). If necessary replace.					
Lubrication	Grease all hinge pin fittings until excess shows.					
Engine Oil	Replace engine oil. Use 10W30 API Classification SE/CD oil. Initial change only.					
Engine Oil Filter	Change engine oil filter. Initial change only. (See 4. 7B)					
Hydraulic Oil Filter	Change hydraulic oil filter. Initial change only. (See 4. 6.B)					
50 Hour Service	Perform complete 50 hour service (See 4. 4).					
Engine Oil	Change engine oil. Use 10W30 API Classification SE/CD oil. (See 4. 7B)					
Engine Oil Filter	Change engine oil filter.					

4 MAINTENANCE

ITEM	SERVICE REQUIRED	8 HOURS	50 HOURS	150 HOURS	400 HOURS	1000 HOURS
Hydraulic Oil Filter	Change hydraulic oil filter.					
Preventative Maintenance Service Check	It is recommended as a preventative maintenance procedure that the 50 hour service be repeated every 150 hours. (See Section 4.4). Grease U - Joint 3 shots					
Engine Fuel Filter	Change fuel filter element. Change every 400 hours.					
Hydraulic Oil	Change hydraulic oil. Replace with 10W30 API Classification SE/CD oil only.					
Final Drive	Change final drive lubricating oil. Use 10W30 API Classification SE/CD oil only.					
Engine Cooling System	Drain, flush and refill. Use 50% mixture of ethylene glycol and water.					

NOTE: For complete engine service details refer to the engine manufacturers service manual. Specify Kubota Part # for this manual.



WARNING

WARNING: Escaping hydraulic fluid under pressure can penetrate the skin causing serious injury.

- **DO NOT** use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
- Stop engine and relieve pressure before connecting or disconnecting lines.
- Tighten all connections before starting engine or pressurizing lines.

If any fluid is injected into the skin obtain medical attention immediately of gangrene may result.



WARNING

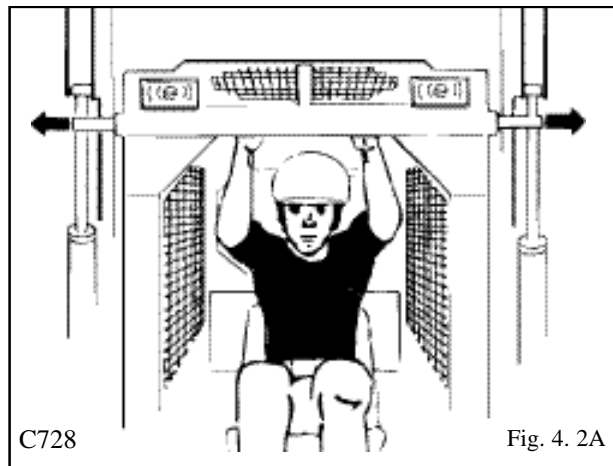
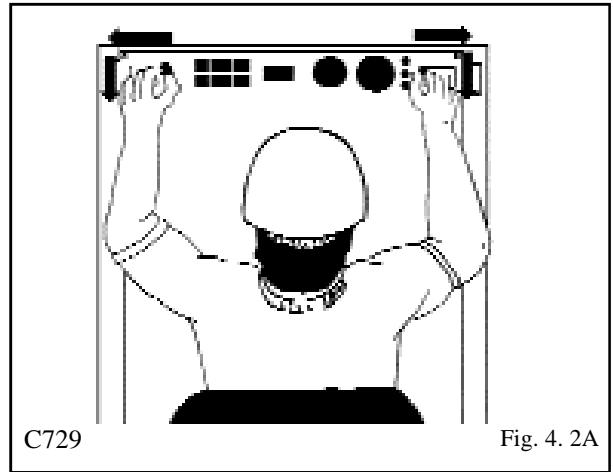
To avoid personal injury service repairs must be performed by an authorized Thomas dealer.

4 MAINTENANCE

4.2 SERVICE ACCESS

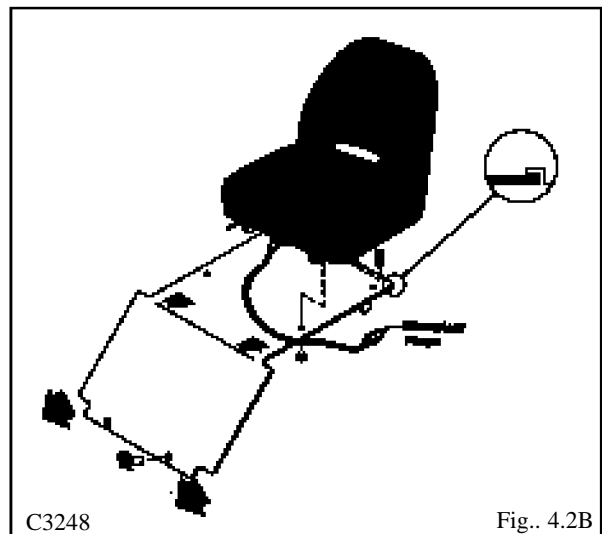
4.2A Boom Support:

For safety while performing regular service or maintenance work, the loader is equipped with boom support pins. The boom support pins, when extended, prevent the boom arms from dropping if hydraulic pressure is relieved or the foot control pedals accidentally cycled. To operate the boom support, first remove any bucket or attachment from the quick - tach; raise the boom arms to full height; push the two boom support handles, located directly in front of the operator at the top of the operator compartment, outward, extending the boom locking pins (see Fig. 4. 2A). Slowly lower the boom arms down onto the pins.

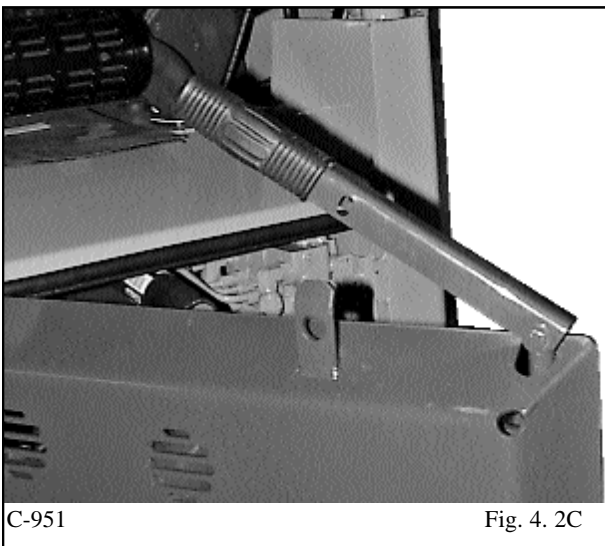


4.2B Seat Removal:

The seat and seat plate can be removed to provide access to the controls, hydraulic and hydrostatic components. To remove the seat assembly, remove the fasteners located at the front of the seat. **DISCONNECT ELECTRICAL PLUG!** Lift the seat assembly out of the machine. When installing the seat, be sure the seat plate locks are in place at the rear (Fig. 4. 2B).

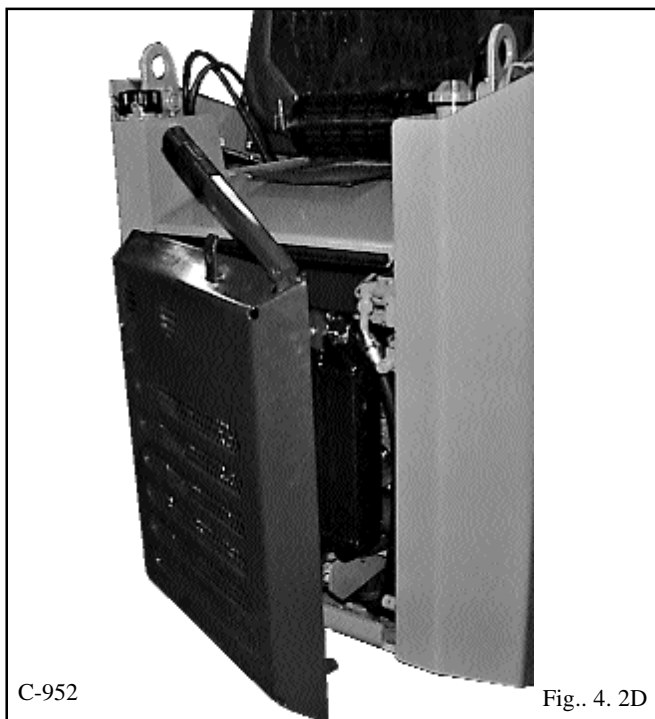


4 MAINTENANCE



IMPORTANT

Keep the rear door closed except for servicing. Make sure the door is closed and latched before operating the loader.



4. 2C Engine Compartment

The engine compartment is completely enclosed for component protection and lockable to discourage vandalism. For servicing, the rear door swings open and the engine cover hinges up. To open; raise the door lock handle up clear of the lock plate (See Fig. 4.2C); pull outward releasing the door catch and swing the door open (See Fig. 4. 2D). Lower the engine cover before closing the rear door.

4. 3 DAILY SERVICE CHECKS

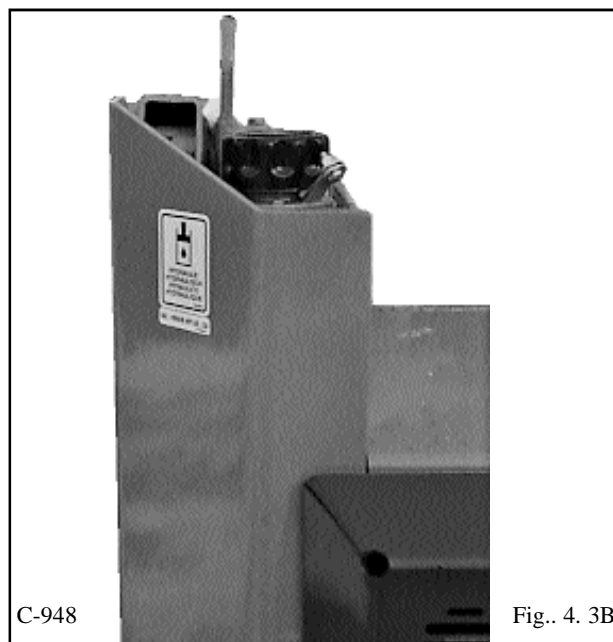
4. 3A Radiator Service

With the engine cool, remove the radiator cap and check the coolant level. If adding coolant is required, fill with a 50% mixture of ethylene glycol and water for cold weather protection.

The radiator cooling fins must be kept free of debris, otherwise overheating of the engine will occur. Inspect the radiator cooling fins for damage or buildup of debris. Repair any damage and, if necessary, flush the radiator with compressed air to remove debris.

4. 3B Hydraulic Oil Level

Check the oil level with the machine on level ground, the boom arms down and the bucket flat on the ground. Oil level should be visible through the sight gauge located on the left hand inner tank wall.



If necessary to add oil, remove the reservoir cap (Fig. 4. 3B) and add oil until it appears in the sight gauge. Located inside engine compartment at the left.

Use a good quality 10W30 oil which meets the API classification SE/CD. Total capacity 11.3 gal. (43 L).

4 MAINTENANCE

4. 3C Air Cleaner Service

Inspect the air cleaner service indicator (Fig. 4. 3C). If the indicator element shows red, the filter element must be replaced. (See Section 4.9B). Check that all hose clamps are tight and the hose is undamaged. Check the vacuator valve for damage.



4. 3D Tires and Wheel Bolts

Inspect tires for wear or damage. Check and inflate tires to correct pressure:

Standard Tires (5.90 x 15) 50 P.S.I. (345 kPa)

Flotation Tires (8.5 x 15) 40 - 45 P.S.I. (276 - 310 kPa)

To prevent shearing of the wheel bolts and rim damage, check wheel bolts for proper torque 80 - 90 lbs. ft. (109 - 122 Nm) (Fig. 4. 3D).



4. 3E Safety Equipment

Check all safety equipment for proper operation and condition - seat belt, boom support, seat bar, foot pedal lock, parking brake, quick tach lock, shields and safety treads. Lubricate all linkages, springs and pivot points with a silicone based lubricant. Repair or replace if necessary.

4. 3F Decals

Check the condition of all safety and instruction decals. Replace any damaged or missing decals. (Refer to Section 5. 4 for decal description and locations).

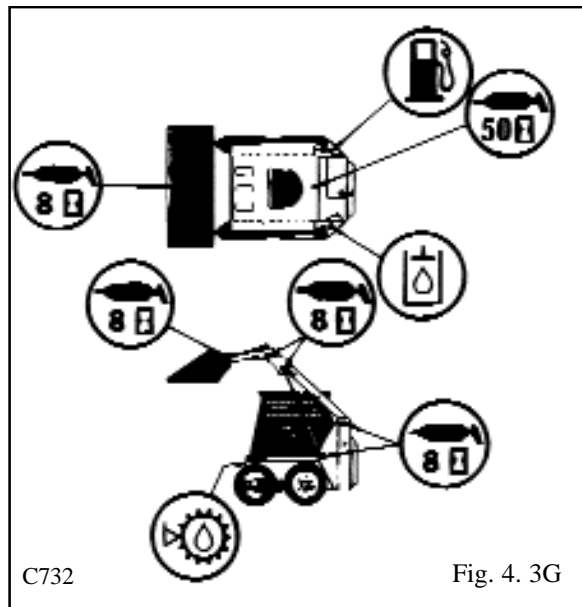
IMPORTANT

To avoid personal injury, check all safety equipment, warning, and instruction decals before operating. Replace as required.

4. 3G Lubrication

There are fourteen grease fittings located in the loader which require lubrication. Lubricate with a good quality multi-purpose lithium based grease. Apply grease until excess shows. The fourteen lubrication points are:

- Rear Boom Pivots (2)
- Boom Cylinder Bushings (4)
- Bucket Cylinder Bushings (4)
- Engine Universal Joint (2)
- Quick - Tach Pivot (2)



4 MAINTENANCE

4.4 50 HOUR SERVICE CHECK

The following service check is to be performed by your dealer after the first 50 hours of operation.

1. Engine

1.1 Oil Filter:

Change the engine oil filter. Use only original replacement parts. (Refer to Section 4. 7B for installation details). Change the oil filter every 150 hours.

1.2 Engine Oil:

Change the engine oil. Use 10W30 API classification SE/CD oil. (Refer to Section 4. 7B).

1.3 Coolant Level:

Check that the coolant is to the proper level. The cooling system is filled with a 50% mixture of ethylene glycol and water.

1.4 Radiator for Leakage and Dirt:

If necessary flush the radiator with compressed air. A dirt buildup on the radiator cooling fins can cause both engine and hydraulic system overheating.

1.5 Fan Belt Tension and Condition:

Check fan belt for cuts or wear, if necessary replace. Check tension and adjust. (See Section 4. 8 - 5).

1.6 Fuel System for Leaks:

Make a visual inspection of fuel system for leaks and potential hazards such as fuel line(s) touching exhaust manifold, flywheel, etc.

1.7 Air Intake and Cleaner System:

Visually inspect the air cleaner system and be sure all hose clamps are secure. Check that the filter indicator is not indicating that filter service is required. (See Section 4. 3C)

1.8 Exhaust System:

Visually inspect the exhaust system and ensure all clamps are secure and the manifold bolts/nuts are tight. Check muffler for carbon and soot buildup or plugging.

1.9 Engine Speed:

Check and if necessary adjust engine R.P.M.

1.10 Muffler:

Check muffler for carbon and soot buildup and plugging. If necessary clean.

IMPORTANT

Keep the rear door closed except for servicing. Make sure the door is closed and latched before operating the loader.

WARNING

To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.

2. Hydraulic/Hydrostatic

2.1 Hydraulic Oil Filter:

Change the hydraulic oil filter. Change the hydraulic filter every 150 hours after the initial change. Lubricate the filter cartridge seal with system fluid.

2.2 Hydraulic Oil Level:

If oil is visible in the oil level sight glass the level satisfactory.

If additional oil is required use only 10W30 API classification SE/CD oil. Fill to the top or maximum check point.

2.3 Hoses and Pipes:

Make a visual inspection of all hydraulic lines and fittings for leaks. Check that steel lines do not touch one another.

WARNING

To avoid personal injury; never repair or tighten hydraulic hoses or fittings with the engine running or the system under pressure.

2.4 Cylinders:

Inspect cylinders for leaks. Extend cylinders and check for rod damage.

2.5 Hydraulic Functions:

Check that the following operate properly: control valve float position, auxiliary hydraulic detent, hydraulic cylinders.

2.6 Pumps & Motors, Leakage:

Inspect pumps and motors for leakage.

4 MAINTENANCE

3. Final Drive

3.1 Oil Level:

Check lubricating oil level. If necessary add 10W30 API classification SE/CD oil.

3.2 Torque Motor Mounting Bolts:

Mounting nuts 85 - 90 ft. lbs (115 - 122 Nm)

Jam nuts 40 - 60 ft. lbs. (54 - 81 Nm)

3.3 Axle Bearing End Play:

Axle bearings are preloaded and must have no end play. Inspect and adjust if necessary

4. Controls

4.1 Control Levers, Operation and Linkage:

Check that the steering levers operate freely without binding, they return to neutral when released and the machine travels in a straight line with both levers in forward position. Ensure levers lock with seat bar up. Lubricate linkage with silicone based lubricant.

4.2 Foot Pedals, Operation and Linkage:

Check that the foot pedals operate freely without binding.

4.3 Engine Throttle Control:

Check that the throttle control operates freely without binding or slackening off due to vibration.

4.4 Parking Brake:

Check that the parking brake engages and completely disengages. Park brake automatically engages with seat bar up.

4.5 Boom Supports:

Check that the boom locks operate without binding.

NOTE: Ensure the boom supports are fully retracted before raising or lowering the boom.

4.6 Quick - Tach, Operation & Linkage:

Ensure the quick - tach linkage operates smoothly without binding.

4.7 Seat Bar:

Check that the seat bar operates freely, without binding. Lubricate linkage with silicone based lubricant.

4.8 Seat Belt:

Check seat belt condition. If necessary replace.

For your safety, this machine is equipped with electrically activated safety devices through the seat and seat belt. Consult your repair manual for repairs.

5. Electrical

5.1 Battery Electrolyte Level:

Check electrolyte level. If necessary add distilled water.

5.2 Battery Terminals:


Check battery terminals for corrosion. If necessary, clean.

5.3 Operation of Starter:

Engage and disengage the starter several times to ensure it's working properly. To prevent starter damage do not engage for more than 15 seconds. Allow 1 minute between starting attempts for cooling the starter.

5.4 Operation of Electrical Equipment:

Make a complete check of all electrical equipment, gauges, warning devices, pre - heat indicator, seat switch and belt to ensure they are operating correctly.



To avoid personal injury, lower the boom arms, shut off the engine, raise the seat bar and cycle the hydraulics to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific service and backhoe operating procedures.

6. Grease/Lubrication

Lubricate the following points with a good quality grease. Numbers marked () indicate the number fittings at each location.

Rear Boom Pivots (2)

Boom Cylinder Bushings (4)

Bucket Cylinder Bushings (2)

Engine Universal Joint (2)

Quick-Tach Pivot (2)

7. General

7.1 Tire Pressure:

Check tire pressure and if necessary inflate to the following pressures:

Standard Tires 5.90 x 15 . . . 50 PSI (345 kPa)

Flotation Tires 8.5 x 15 . . . 40 - 45 PSI (276- 310 kPa)

7.2 Wheel Bolt Torque:

Check and torque wheel bolts to 80 - 90 ft. lbs. (108 - 122 Nm).

IMPORTANT

Keep the rear door closed except for servicing. Make sure the door is closed and latched before operating the loader.

4 MAINTENANCE

7.3 Condition of Cab:

Inspect both the seat and seat belt. Ensure all safety and instruction decals are in place. Check the condition and operation of all safety equipment.

7.4 Condition of Shields and Safety Equipment:

Inspect and ensure all shields are in place and securely fastened. Inspect and ensure all safety equipment is working properly, all safety and instruction decals are in place. If necessary replace. If the safety controls are malfunctioning or require adjustment consult your **Thomas** Equipment Dealer for service.

7.5 General Condition:

Make a general inspection of the machine looking for loose or missing parts, oil leaks, etc.

IMPORTANT

Fully retract pins before raising or lowering boom arms.

WARNING

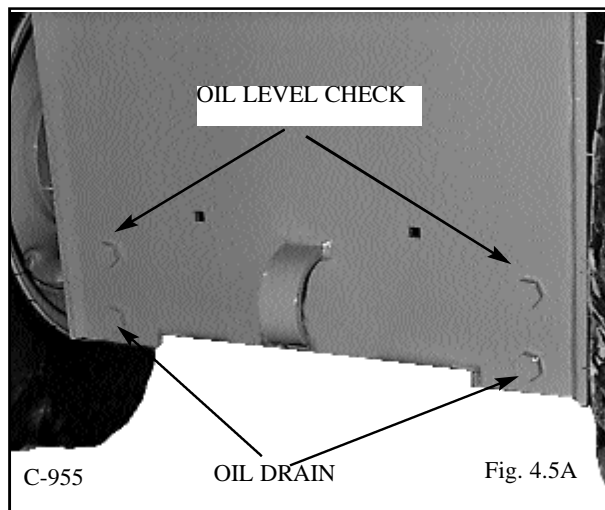
To avoid personal injury: Do not leave boom arms up unless the boom supports are engaged.

4.5 FINAL DRIVE MAINTENANCE

4.5A Oil Level Check

The loader has two independent final drive housings. Check the lubricating oil level with the machine on level ground. Remove the check plug located on the front section of the side transmission (Fig. 4.5A) located between the front tires.

Use 10W30 API Classification SE/CD oil.



4.6 HYDRAULIC/ HYDROSTATIC SYSTEM MAINTENANCE

4.6A Hydraulic Oil Level

Check the oil level with the machine on level ground, with the boom arms down and the bucket flat on the ground. Open the rear door and check the hydraulic oil sight gauge located on the left rear reservoir. If it's necessary to add oil, remove the reservoir cap and add oil until it appears approximately three - quarters full in the sight gauge.

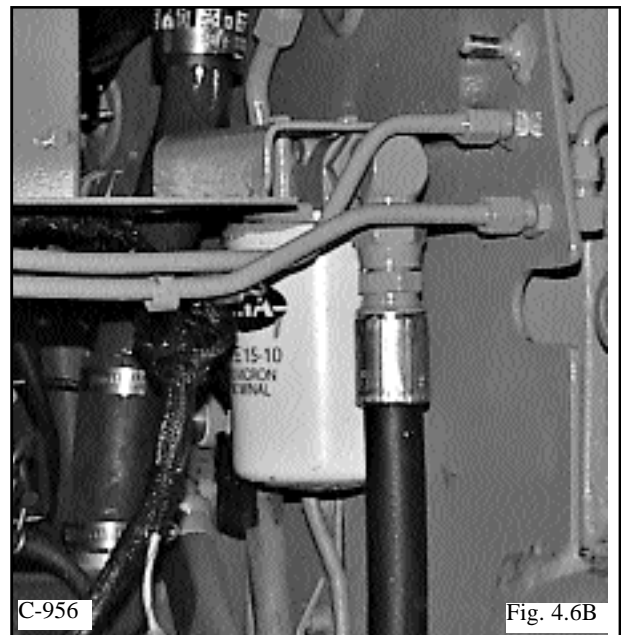
Use a good quality 10W30 oil which meets the API classification SE/CD.

WARNING

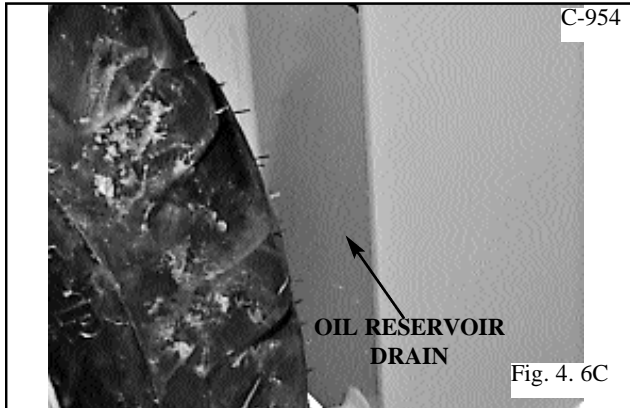
WARNING: Escaping hydraulic fluid under pressure can penetrate the skin causing serious injury.

- **DO NOT** use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
- Stop engine and relieve pressure before connecting or disconnecting lines.
- Tighten all connections before starting engine or pressurizing lines.

If any fluid is injected into the skin obtain medical attention immediately of gangrene may result.



4 MAINTENANCE



4. 6B Filter Replacement

The hydraulic filter must be changed after the first 50 hours of operation and every 150 hours thereafter.

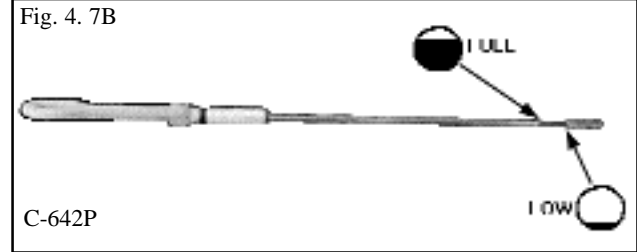
To change the filter; set the parking brake, lower the boom arms, ground any attachment and shut off the engine. Remove the oil filter. Lubricate the seal of the new filter and install hand tight.

4. 6C Draining System Fluid

Change the hydraulic oil after 1000 operating hours or if the oil has become contaminated or after any major hydrostatic repair.

To drain the oil; remove the drain plug located at the bottom of the oil reservoir (Fig. 4. 6C) on the L.H. side.

Refill the hydraulic oil reservoir with 10W30 API Classification SE/CD engine oil only.



4. 7 ENGINE MAINTENANCE

4. 7A Oil Level Check

To check the oil level, stop the engine with the loader on level ground, set parking brake and open the rear door and remove the dipstick (Fig. 4. 7A).

Keep the oil level between the full and low mark on the dipstick (Fig. 4.7B). Do not fill above the full mark – use 10W30 API classification SE/CD oil.

4. 7B Engine Oil and Filter Replacement

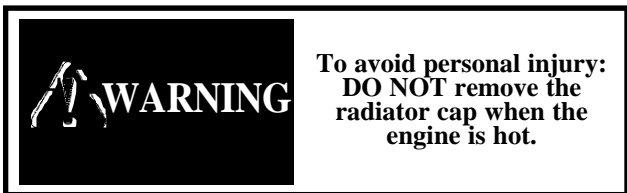
Operate the engine until warm. Stop the engine.

Remove the oil drain plug located at the bottom of the oil pan.

Remove the oil filter. Clean the filter housing surface. Put clean oil on the seal of the new filter. Install the new filter and tighten hand tight.

Replace the oil drain plug. Remove the filler cap and add oil. See specifications for quantity. Start the engine and run for 5 minutes. Stop the engine and check for leaks at the filter. Recheck the oil level and add oil until the level is at the top mark on the dipstick. Change the engine oil every 75 hrs. and the oil filter every 150 hrs. as indicated in the service schedule.

4. 7C Cooling System Fluid



The engine cooling system fluid is a 50 - 50 mixture of ethylene glycol and water for cold-weather protection. See specifications for quantity.

To drain the cooling system; remove the radiator cap, open the drain valve located on the base of the radiator.

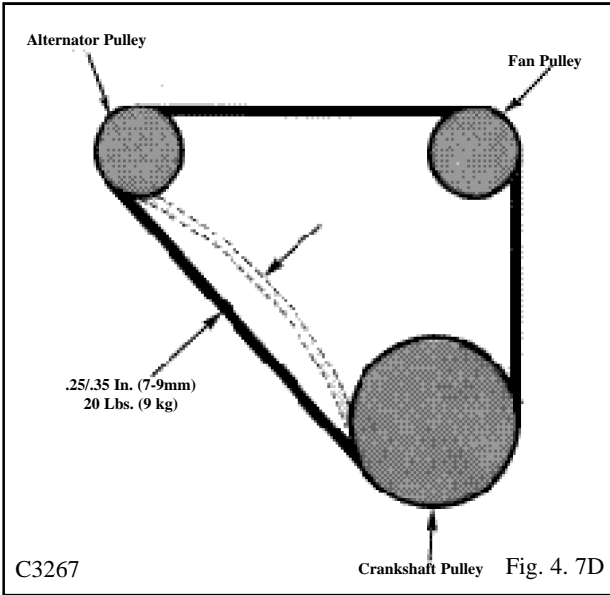
4 MAINTENANCE

To fill the cooling system; close the drain valve. Fill the radiator with a 50-50 mixture of ethylene glycol and water.

Fill to within .375 inches (10 mm) from the bottom of the filler tube. Refit the radiator cap.

4. 7D Fan Belt Tension

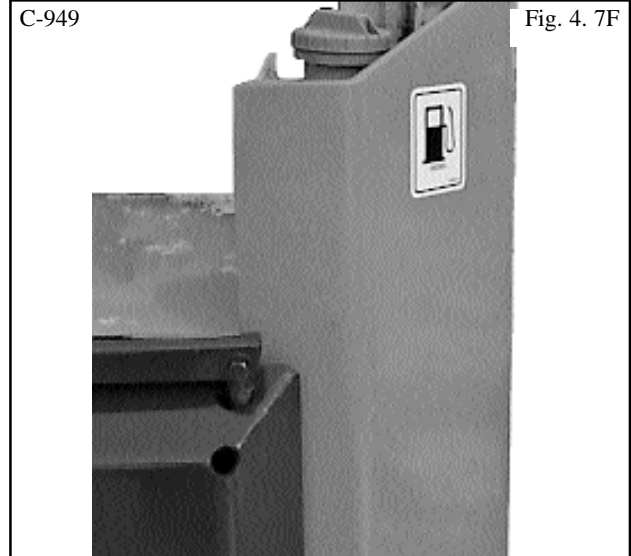
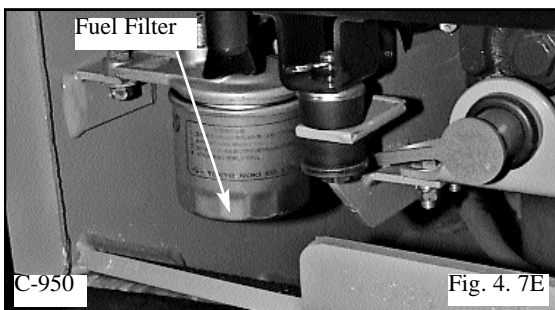
Check and adjust the fan belt tension after the first 50 hours of operation. Adjust the tension as shown in Fig. 4.7D.



4. 7E Fuel Filter Replacement

The fuel filter is located in the engine compartment on the left hand side (Fig. 4. 7E). The fuel filter should be removed every 150 hours and any water or dirt found in the element drained off. Change the filter every 400 hours. To replace the filter, first close the fuel shut-off cock located on the fuel tank. Remove the old filter element. Lubricate the seal on the new filter element and install the filter hand tight. Open the fuel shut - off cock on the fuel tank.

It may be necessary to remove air from the fuel system after changing the filter element. (Refer to Section 4. 7G).

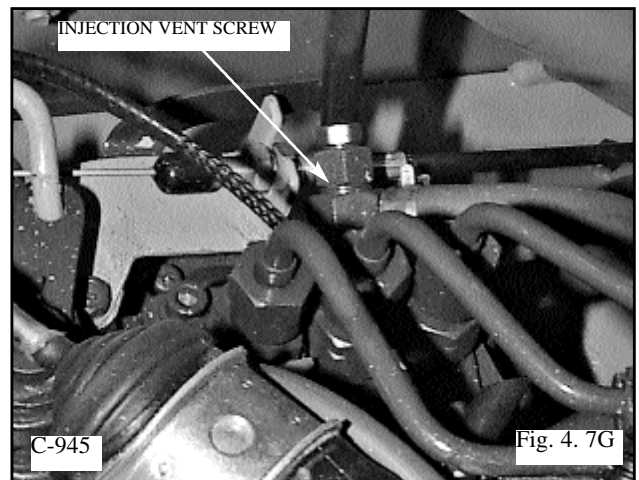


4. 7F Adding Fuel

The loader is equipped with one fuel tank on the right hand side of the loader at the rear (Fig. 4. 7F).

Before adding fuel to the loader, the key must be OFF and the engine must be cool. Remove the fuel cap (Fig. 4. 7F). Use a clean approved safety container to add fuel. Add fuel only in an area that is well ventilated and away from open flames or sparks – NO SMOKING.

Fill with No. 2 Diesel Fuel.



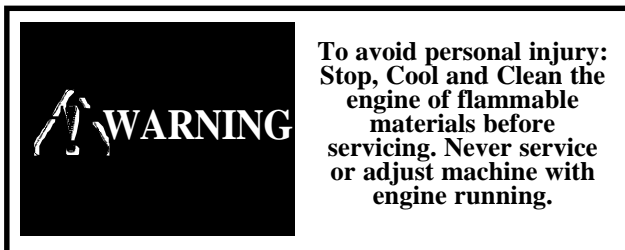
4 MAINTENANCE

4.7G Bleeding the Fuel System - Diesel:

Be sure that the fuel tank is full and the fuel shut-off cock is open. Remove air as follows:

- (1) Open the vent screw on top of the fuel filter until air-free fuel runs from the vent plug.
- (2) Loosen the injection pump vent screw (Fig. 4.7G). Turn the engine over with the starter motor until air-free fuel runs from the vent screw. Tighten the vent screw.
- (3) Place the throttle control in maximum forward position and turn the engine over with the starter motor for a few seconds to remove air from the high pressure fuel lines.

If there is still air in the fuel system, start again at step 1 and repeat the above procedure.



4.8 AIR CLEANER MAINTENANCE

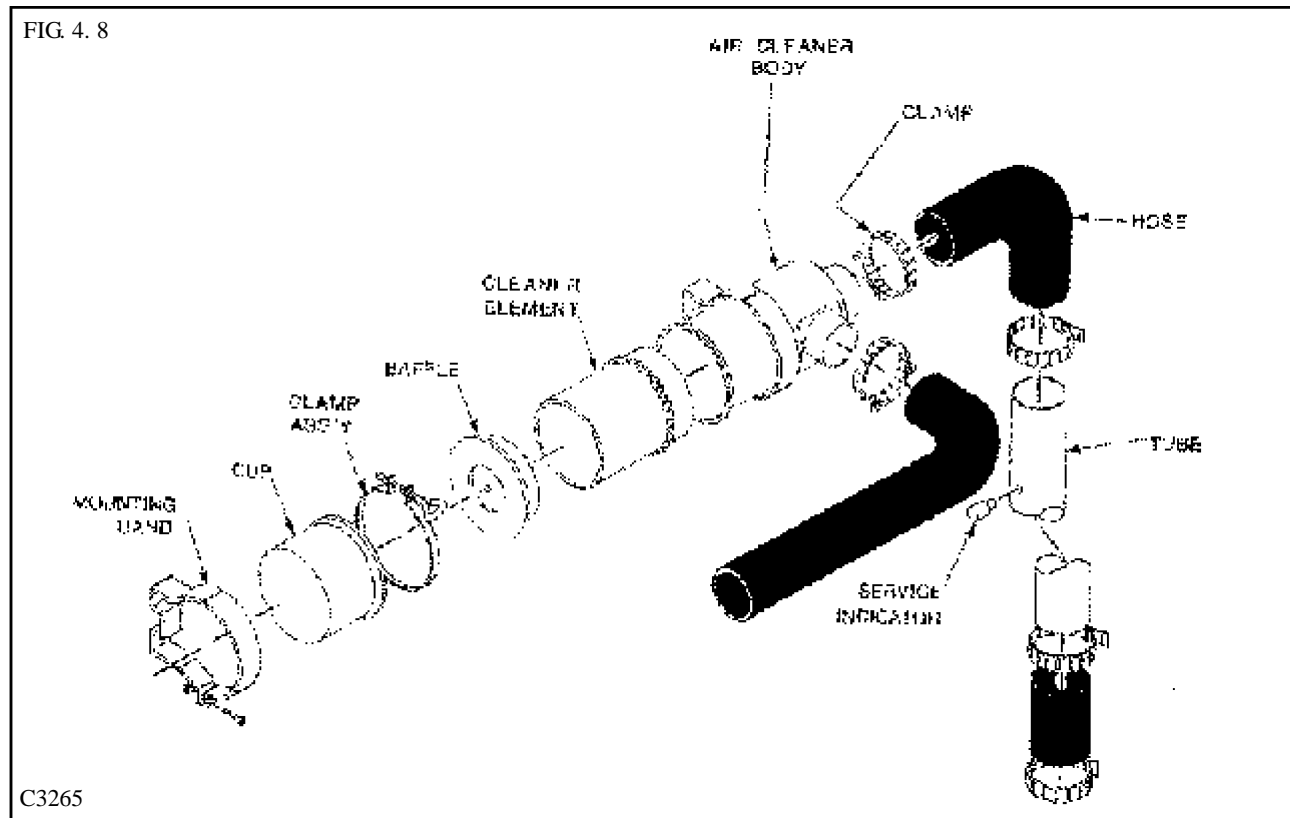
4.8A Daily Maintenance

Inspect the air cleaner service indicator (Fig. 4.8) daily. If the indicator element shows red, the filter element must be replaced.

4.8B Servicing Cleaner Element

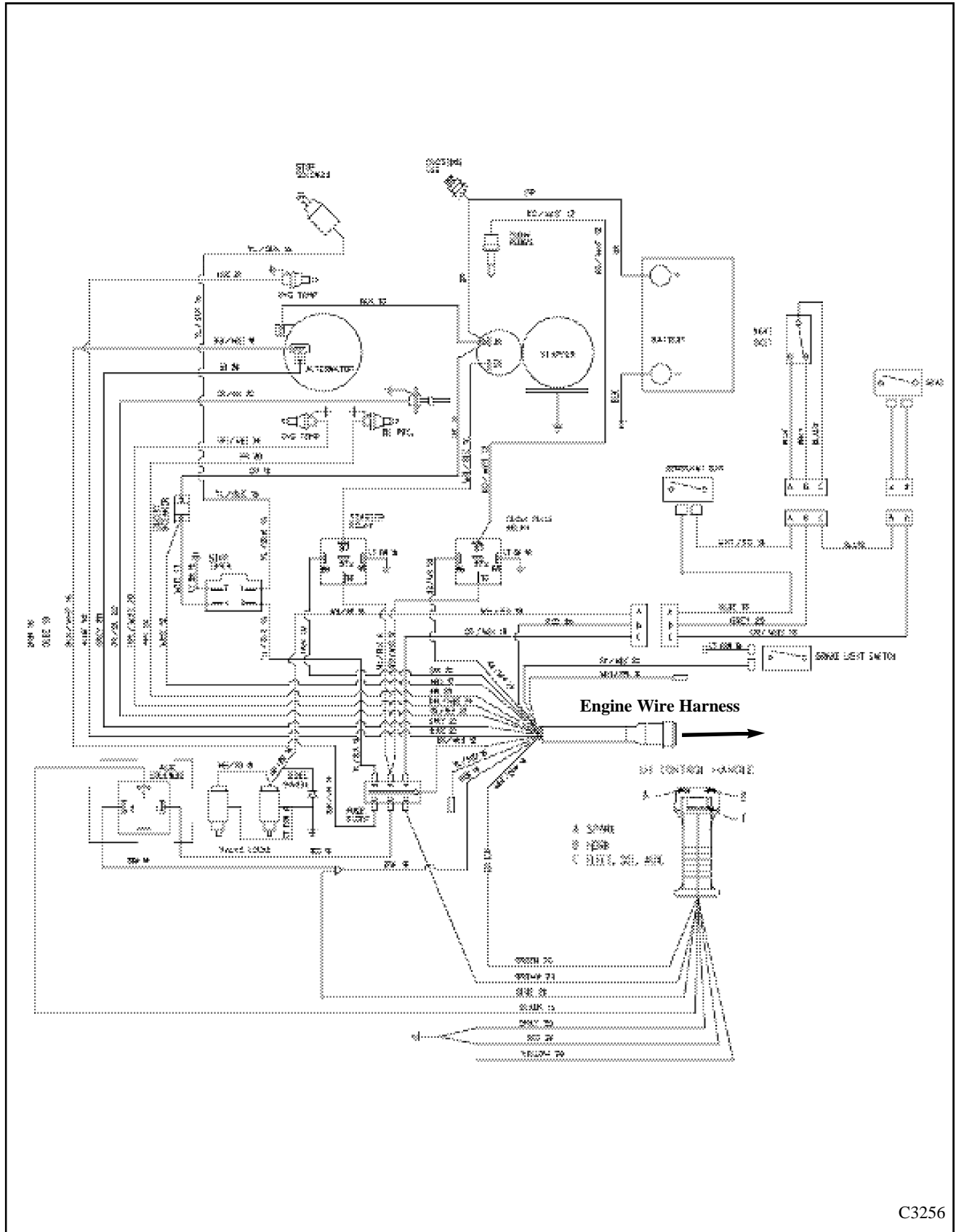
To replace the air filter element; loosen the clamp assembly (Fig. 4.8). Remove the dust cup assembly. Remove the baffle from the cup and empty. Remove the wing nut and filter.

With a damp cloth clean out the inside of the body. Inspect the seal on the new element for damage and install the element in the filter body. Be sure the wing nut securing the element is tight. Reinstall the baffle in the dust cup and install. Be sure the dust cup is sealed 360° around the air cleaner body. Reset the restriction indicator.



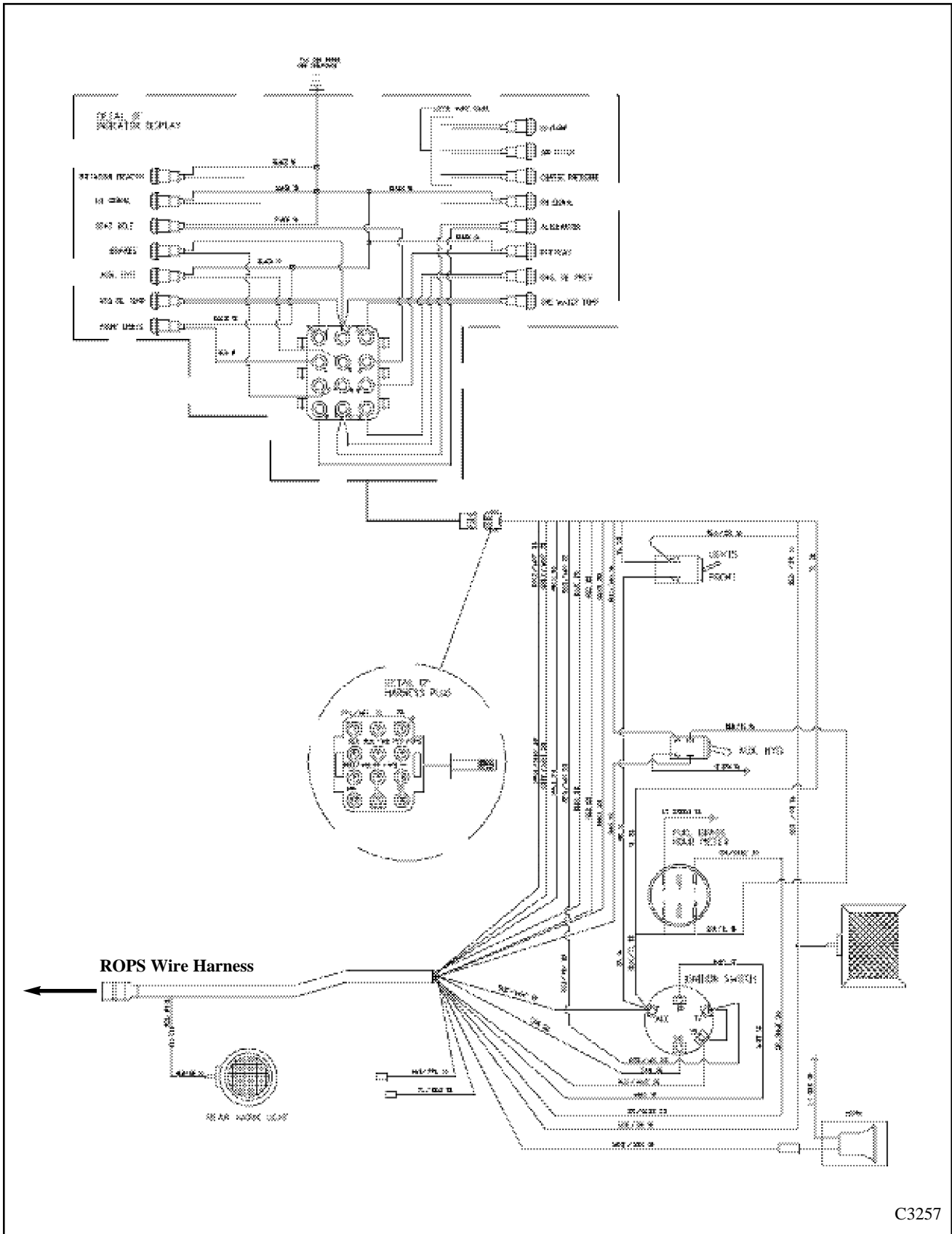
4 MAINTENANCE

4.9A ELECTRICAL SCHEMATIC (Engine Side)



4 MAINTENANCE

4.9A ELECTRICAL SCHEMATIC (ROPS Side)

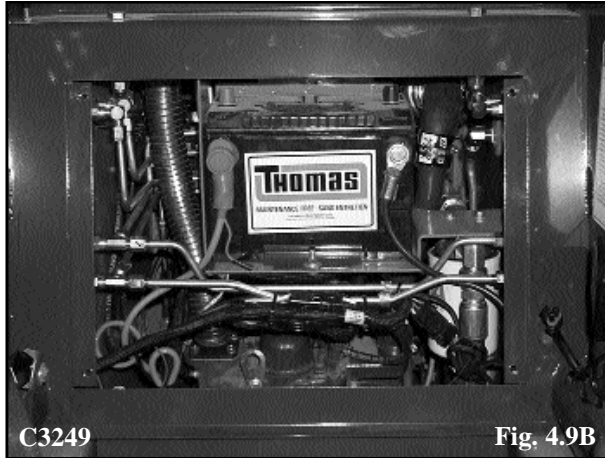


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4 MAINTENANCE

4. 9B Battery Access

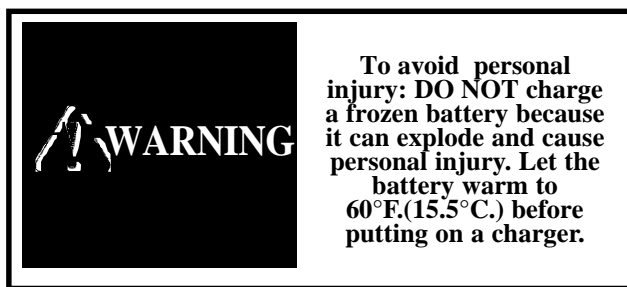
The battery is located in the engine compartment behind the electrical panel. Simply remove the two (2) retaining bolts and pull the battery out for service (Fig. 4.9B)



4. 9C Battery Maintenance

Inspect the battery on a regular basis for damage such as a cracked or broken case or cover which would allow electrolyte loss. Check the battery "Hold Down Strap" for tightness.

Check the battery cables for tightness and that they are corrosion free. remove any acid corrosion from the battery and cables with a baking soda and water solution. Coat the terminal connections with a high temperature grease. A boosting lug is located on the right hand engine mount, just beneath the radiator.

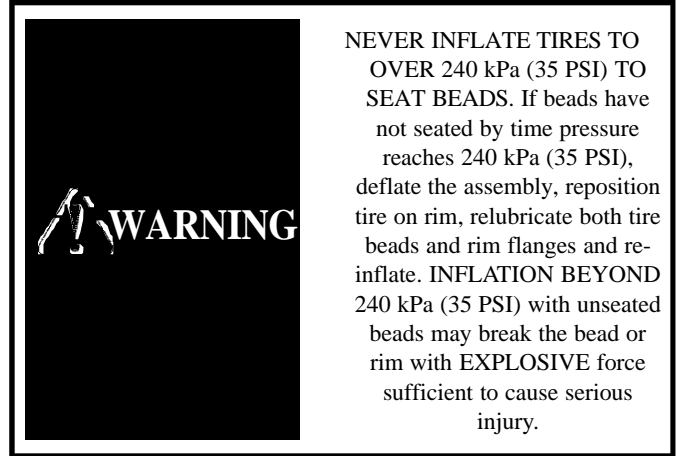


4. 10 TIRE MAINTENANCE

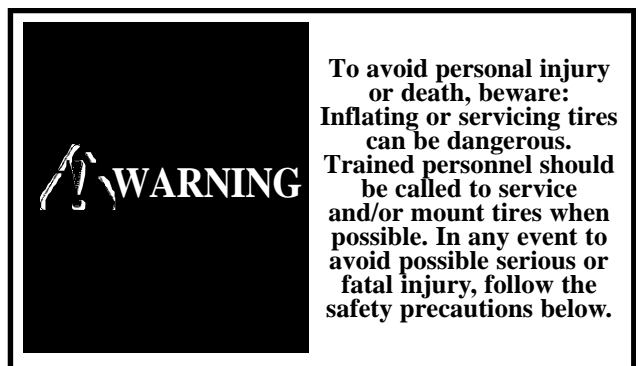
4. 10A Inflation and Service

- Upon receiving your loader, check the air pressure in the tires as indicated in the tables.
- Check tire pressure every 50 hours, or weekly.
- Tire inflation pressure affects the amount of weight which a tire may carry. Do not over -or -under inflate the tires.

- Do not inflate a tire above the manufacturer's maximum pressure shown on the tire or the maximum pressure shown in the table.



- Do not re - inflate a tire that has been run flat or seriously under-inflated until the tire has been inspected for damage by a qualified person.
- When checking tire pressure, inspect the tire for damaged side walls and tread cuts. Neglected damage will lead to early tire failure.
- Be sure the rim is clean and free of rust.
- Lubricate both tire beads and rim flanges with soap solution. Do not use oil or grease.
- Use a clip-on tire chuck with a remote hose and gauge which allows the operator to stand clear of the tire while inflating it.



- After seating the beads, adjust inflation pressure to recommended operating pressure.
- Do not inflate a tire unless the rim is mounted on the loader or is secured so that it will not move if the tire or rim should suddenly fail.

4 MAINTENANCE

- Do not weld, braze, otherwise repair, or use a damaged rim.
- Never attempt tire repairs on a public road or highway.
- Use jack stands or other suitable blocking to support the loader while repairing tires.
- Insure jack has adequate capacity to lift your loader.
- Insure jack is placed on a firm level surface.

Do not put any part of your body under the loader or start the engine while the loader is on the jack.

- Torque lug nuts to specification after reinstalling wheel. Check lug nut torque daily until torque stabilizes.

Tire Inflation Table:	
<i>Tire</i>	<i>Inflation Pressure</i>
7.00 x 15	50 PSI (345 kPa)
10.00 x 16.5	40 - 45 PSI (276 - 310 kPa)

4. 10B Tire Rotation

The front and rear tires will wear at different rates. For even wear move the front tires to the rear and the rear tires to the front when wear is first noticed.

If two tires become worn more than the other two put the two worn tires on the same side.

When new tires are installed, always keep tires the same size on the same side of the loader. Two different size tires on the same side of the loader will cause drive chain wear, tire wear and a loss of power.

4.11 TROUBLE SHOOTING

4. 11A Electrical System

This machine is equipped with a 12 Volt negative ground electrical system. The charging system is equipped with an alternator and built in regulator. The starting circuit is equipped with a starter motor, glow plugs, and solenoid for starting the engine.

The seat belt and seat switch are wired in series. In order to operate the loader, the operator must be sitting in the seat with the seat belt securely fastened around the waist.

Contact Thomas Equipment for all major fixes under the remedy column except for regular service (i.e. Replenish fluids, tightening etc.).

Problem	Cause	Remedy
Engine will not crank over	Battery failure	Check battery, charge or replace
	Battery cable failure	Check for loose or corroded connectors. Tighten and clean as required. Use dielectric grease to prevent corrosion.
		Check continuity of cables and replace if defective
	Starter failure	Repair or replace
	Fuse burnt	Check and replace
	Defective relay	Check relay continuity if defective, replace
	Ignition switch failure	Check continuity, repair or replace
Engine cranks over, will not start	Auxiliary hydraulics engaged	Engine will smoke, but not run unassisted by starter Disengage auxiliary hydraulics See Sect. 2.8 - 2.10.
	Defective glow plug relay	Check continuity and if defective replace
	Broken connection or defective wire	Disconnect the ROPS harness from the engine harness Fig. 4.10A. Open the dash panel and check continuity of the circuit not functioning properly in both engine and ROPS harness
	No fuel	Check fuel level
Loader starts, but foot controls will not release	Electro solenoids not releasing valve spools	Defective solenoid or binding solenoid lock. Loosen screws and readjust
		Check continuity of connectors and wire
Engine will not stop when the key is turned OFF	Broken or poor contact from relay to solenoid on valve	Defective solenoid or binding solenoid lock. Loosen screws and readjust
		Check continuity of connectors and wire
	Poor connection in harness	Check and replace if necessary

4 MAINTENANCE

4. 11A Electrical (Cont'd)

Problem	Cause	Remedy
Engine will not stop when the key is turned OFF	Defective fuel solenoid switch	Check and correct
	Burnt fuse 15A	Check and correct
	Loose or faulty connection	Check and correct

4. 11B Hydrostatic Drive

Problem	Cause	Remedy
No power on one side (Both directions)	Reservoir low on oil	Replenish with 10W30 API SE/CD oil Check for hose or fitting leak
	Disconnected control linkage	Reconnect and adjust linkage
	Groove pin sheared on pump pintle lever	Replace. Check pintle lever for loose bolt or excessive play
	High pressure line failure	Replace line. Ensure new line fits without being forced. If necessary stress relieve
	Drive chain failure	Replace chain or connection link
	Motor shaft or key failure	Inspect and repair defective parts. Check motor mounting bolts
	Charge pressure failure	Replace parts as necessary
Power may appear to be lost on one side only initially, but after a few minutes running, will be lost on both sides	Excessive internal leakage in pump and/or motor	Inspect and repair defective unit. Flush all lines and tank. Replace filter. Check on type of filter used and engine RPM
	Defective relief valve	Replace defective valve
No power on one side (one direction only)	Damaged ball check	Disassemble and repair
No power on both sides (also loss of hydraulic power)	Reservoir low on fluid	Replenish with 10W30 API SE/CD oil Check for hose or fitting leak

Problem	Cause	Remedy
No power on both sides (also loss of hydraulic power)	Universal joint failure between engine and pump	Inspect and repair damaged parts. Check for misalignment between engine and pumps
	Drive coupling between front and rear pump failure	Inspect coupling for sheared spines - replace. Also check support bearings in pump.
No power on both sides (full hydraulic power)	Reservoir low on oil	Replenish with 10W30 SE/CD oil. Check for hose or fitting leak.
	Charge pump failure	Check hydraulic oil level, check charge pressure relief valve Pressure must be minimum 110 PSI
	Excessive internal leakage in pump and/or motor	Inspect and repair defective unit. Flush all lines and tank, change filter. Check on type of fluid used and engine RPM
	Damaged ball check	Disassemble and repair
Gradual loss of power as machine warms up	Excessive internal leakage in pump and/or motor	Inspect and repair defective unit. Flush all lines and tank, change filter. Check on type of fluid used and engine RPM Replenish with 10W30 SE/CD oil.
System erratic and/or noisy	Air in system due to low oil level in reservoir	Replenish with 10W30 SE/CD oil.
	Air in system due to leak at suction fitting	Check fittings and tighten
	Internal pump or motor wear caused by overspeeding	Inspect and repair defective unit. Flush all lines, tanks and change filter. Check type of fluid used and engine RPM
	Excessive play in linkage or pintle lever	Adjust linkage and tighten or replace pintle lever.
Machine will not travel in a straight line in high range	Control levers binding improper adjustment	Check that shields are not stopping lever from full travel. Check for linkage binding at spring mount.

4 MAINTENANCE

4. 11C Hydraulic System

Problem	Cause	Remedy
Loss of hydraulic power (no flow from gear pump)	Reservoir low on oil.	Replenish with 10W30 API SE/CD oil. Check for hose or fitting leak.
	Universal joint between engine and pump failure	Inspect and replace damaged parts. Check for misalignment between engine and pumps.
	Spline coupling failure between front and rear hydrostatic pump.	Inspect coupling for sheared splines. Also check pump shaft bearings.
	Hydraulic gear pump not functioning	Inspect and repair
Loss of hydraulic power (flow from gear pump)	Reservoir low on oil.	Replenish with 10W30 API SE/CD oil.
	Foot pedal linkage disconnected or binding	Inspect and adjust
	Auxiliary hydraulics engaged	Disengage
	Relief valve failure in control valve	Check pressure and adjust
Hydraulic action jerky	Reservoir low on oil.	Replenish with 10W30 API SE/CD oil.
	Air in hydraulic system	Check for leak between reservoir and pump. Bleed system by extending and retracting lift cylinders several times.
	Anti-cavitation check valve not functioning	Inspect and repair or replace
	Reservoir low on oil	Replenish with 10W30 API SE/CD oil.
Boom raises slowly at full engine RPM	Control linkage binding	Inspect and adjust
	Auxiliary foot pedal engaged	Disengage
	Engine RPM too slow	Check RPM and reset
	Pilot check valve spring broken	Replace

Problem	Cause	Remedy
Boom raises slowly at full engine RPM	Pressure relief valve in control valve faulty	Check pressure flow and repair or replace pump as necessary
	Internal leakage in pump due to wear	Check pump flow and repair or replace pump as necessary
	Oil bypassing one or both lift cylinder piston seals	Install new piston seal kits
Lift or tilt cylinders will not support a load	External leak between or at control valve and cylinders	Check for leak and correct
	Control valve spool not centering	Check for sticking foot pedal linkage Check for broken or stuck return spring on valve spool.
	Oil leaking by one or both cylinder piston seals	Install new piston seal kits
Hydraulic oil overheating	Reservoir low on oil.	Replenish with 10W30 API SE/CD oil
	Auxiliary hydraulics engaged	Disengage
	Engine RPM too slow	Check RPM and adjust
	Inoperable temperature sensor	Replace

4. 11D Final Drive Transmission

Problem	Cause	Remedy
Final drive transmission noisy	No lubricating oil	Check and bring oil to the proper level. Use 10W30 SE/CC engine oil
	Axles have too much end play	Pre-load axle bearings removing all end play
	Parking brake damaged or out of adjustment	Inspect and adjust or replace damaged parts.
	Chain loose	Replace parts

4 MAINTENANCE

4. 11E Control Levers

Problem	Cause	Remedy
Control levers will not centre	Linkage out of adjustment	Adjust, check for wear at rod ends, loose counter nuts
	Linkage disconnected	Reconnect, check for wear at rod ends loose counter nuts
	Hydroback broken	Replace
	Linkage binding	Binding of spring bushing in spring box. Align spring box with linkage.
		Control levers binding with safety shields or sound insulation. Adjust.
		Control lever bearings binding in lever assembly. Inspect, replace or clean as required.
Machine operates erratically	Control lever linkage loose	Inspect linkage for wear at rod ends, loose counter nuts
	Spiral pin in pintle lever worn or broken	Replace pin. Inspect pintle lever for wear at pin hole. Ensure bolt clamping lever to pump shaft is tight. See also Hydrostatic system Troubleshooting guide
Machine loses power while turning		Inspect for worn or broken groove pin securing limiter to control lever shaft - replace See also Hydrostatic system Troubleshooting guide
	Linkage binding	Adjust
	Control lever travel out of adjustment	Adjust
	Internal pump and/or motor leakage	See troubleshooting Hydrostatic System

4. 11F Park Brake

Problem	Cause	Remedy
Brake will not hold machine	Slack in cables, cables out of adjustment	Adjust tightening nuts on cables
	Cable mounts or end loose or disconnected	Inspect, tighten or reconnect as required
	Cable kinked or broken	Replace
	Brake damaged or worn	Inspect and replace, clean or adjust as required
Brake will not release	Cables kinked or binding	Inspect, replace worn or damaged parts
	Spring broken, worn or disconnected	Inspect, reconnect or replace as required
	Pin stuck	Move machine slightly forward or reverse (slowly)

4 MAINTENANCE

4. 11G Engine

SYMPTOM	PROBABLE CAUSE	SOLUTION
Engine does not start	No fuel	Replenish fuel
	Air in the fuel	Vent air
	Water in the fuel	Change fuel and repair or replace fuel system
	Fuel pipe clogged	Clean
	Fuel filter clogged	Clean or change
	Excessively high viscosity of fuel or engine oil at low temperature	Use the specified fuel or engine oil
	Fuel with low cetane number	Use the specified fuel
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Incorrect injection timing	Adjust
	Fuel cam shaft worn	Replace
	Injection nozzle clogged	Clean
	Injection pump malfunctioning	Repair or replace
	Seizure of crankshaft, camshaft, piston, cylinder liner or bearing	Repair or replace
	Compression leak from cylinder	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder
	Improper valve timing	Correct or replace timing gear
Piston ring and liner worn	Replace	
Excessive valve clearance	Adjust	
Starter does not run	Battery discharged	Charge
	Starter malfunctioning	Repair or replace
	Key switch malfunctioning	Repair or replace
	Wiring disconnected	Connect
Engine revolution is not smooth	Fuel filter clogged or dirty	Clean or change
	Air cleaner clogged	Clean or change
	Fuel leak due to loose injection pipe retaining nut	Tighten nut
	Injection pump malfunctioning	Repair or replace
	Incorrect nozzle opening pressure	Adjust
	Injection nozzle stuck or clogged	Repair or replace
	Fuel overflow pipe clogged	Clean
Governor malfunctioning	Repair	
Either white or blue exhaust gas is observed	Excessive engine oil	Reduce to the specified level
	Low grade fuel used	Repair or replace
	Fuel filter clogged	Adjust
	Air cleaner clogged	Adjust top clearance
Either black or dark gray exhaust gas is observed	Overload	Lessen the load
	Low grade fuel used	Use the specified fuel
	fuel filter clogged	Clean or change
	air cleaner clogged	Clean or change

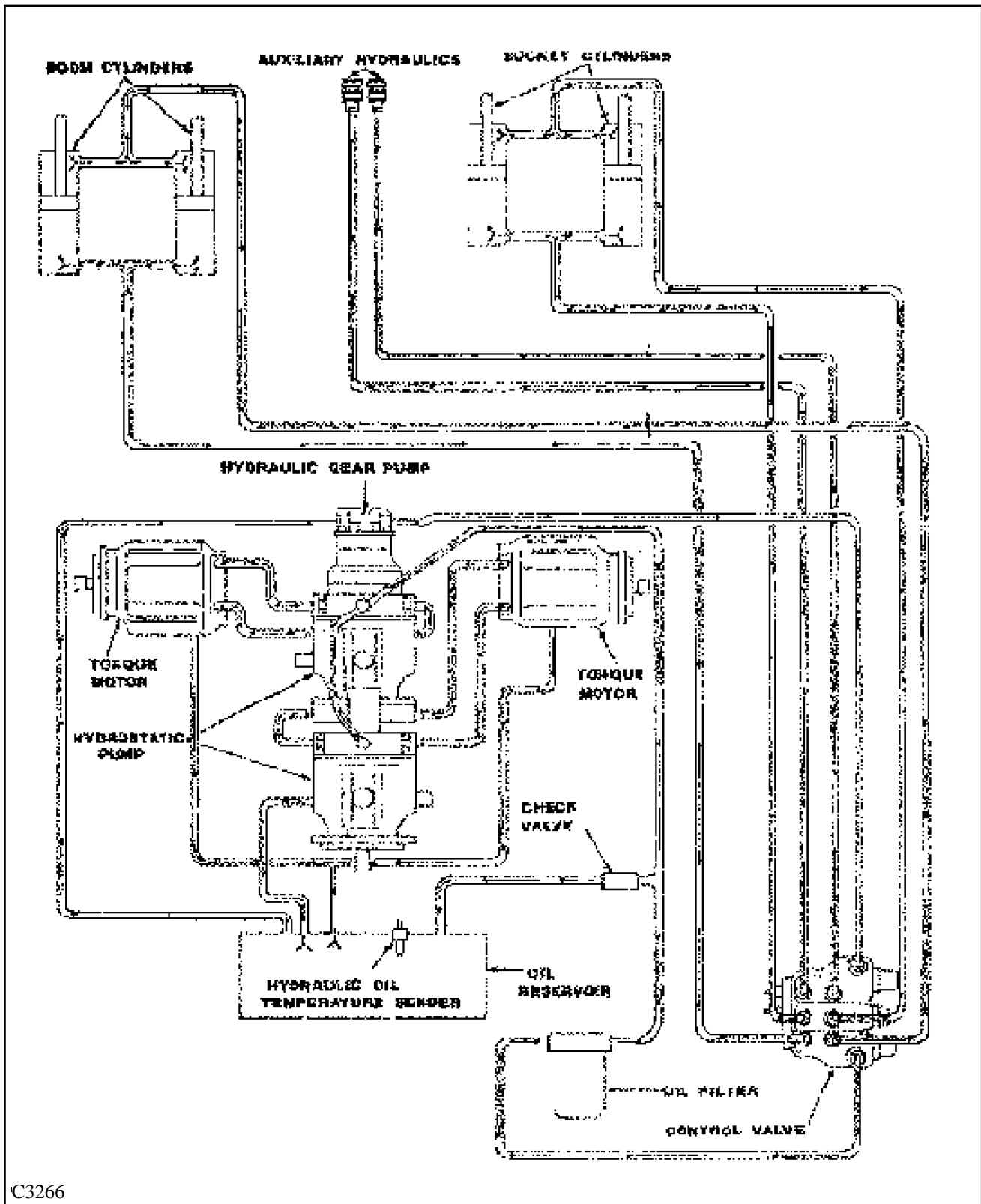
4 MAINTENANCE

4. 11G Engine

SYMPTOM	PROBABLE CAUSE	SOLUTION
Excessive lubricant oil consumption	Piston rings gap facing the same direction	Shift gap direction
	Oil ring worn or stuck	Replace
	Piston ring groove worn	Replace
	Valve stem and guide worn	Replace
	Crankshaft bearing and crank pin bearing worn	Replace
Fuel mixed into lubricant oil	Injection pump's plunger worn	Replace pump element or pump
	Injection pump broken	Replace
Water mixed into lubricant oil	Head gasket defective	Replace
	Cylinder block or cylinder head flawed	Replace
Low oil pressure	Engine oil insufficient	Replenish
	Oil strainer clogged	Clean
	Relief valve stuck with dirt	Clean
	Relief valve spring weakened or broken	Replace
	Excessive oil clearance of crankshaft bearing	Replace
	Excessive oil clearance of crank pin bearing	Replace
	Excessive oil clearance of rocker arm bearing	Replace
	Oil passage clogged	Clean
Oil pump defective	Use the specified oil type	
High oil pressure	Different type of oil	Use the specified oil type
	Relief valve defective	Replace
Engine overheated	Engine oil insufficient	Replenish
	Fan belt broken or elongated	Change or adjust
	Cooling water insufficient	Replenish
	Radiator net and radiator fin clogged with dust	Clean
	Inside of radiator corroded	Clean or replace
	Cooling water flow route corroded	Clean or replace
	Radiator cap defective	Replace
	Overload running	Loosen the load
	Head gasket defective	Replace
	Incorrect injection timing	Adjust
	Unsuitable fuel used	Use the specified fuel
Deficient output	Incorrect injection timing	Adjust
	Engine's moving parts seem to be seizing	Repair or replace
	Uneven fuel injection	Repair or replace injection pump
	Deficient nozzle injection	Repair or replace nozzle
	Compression leak	Replace head gasket, tighten cylinder head bolt, glow plug and nozzle holder
Battery quickly discharges	Battery electrolyte insufficient	Replenish distilled water recharge Adjust belt tension or change
	Fan belt slips	Connect
	Wiring disconnected	Replace
	Rectifier defective	Replace
	Alternator defective	Change
	Battery defective	

4 MAINTENANCE

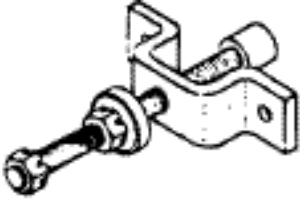

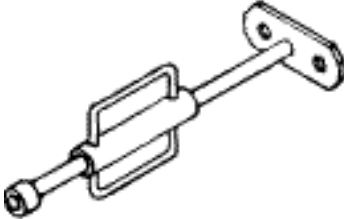



4.12 HYDRAULIC/HYDROSTATIC CIRCUIT



C3266

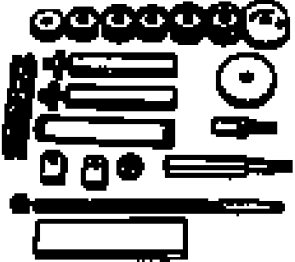
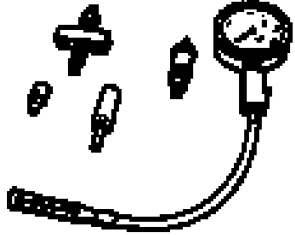




4 MAINTENANCE

4.13 SPECIAL TOOLS

P/N	ILLUSTRATION	DESCRIPTION	MODEL
955280		AXLE INSTALLATION TOOL-To install axle in final drive housing. Quantity-1	T103 T133 T133'S'
960849 955281		SEAL INSTALLATION TOOL-To install axle seal in final drive housing. Quantity-3 required	T103 T133 T133'S'
955283		AXLE EXTRACTOR TOOLS- To remove axle from final drive housing. Quantity-2	T103 T133 T173HL T173HLS' T173HL'S'II T203HD T233HD T243HDS
955287		SEAL INSTALLATION TOOL-To install axle seal in final drive housing. Quantity-1	T173 T233
957189		SEAL INSTALLATION TOOL-To install axle seal in final drive housing. Quantity-1	T173HL T173HLS' T173HL'S'II T203HD T233HD T243HD'S
959849		CHAIN TENSION TOOL-To test chain tension.	T103 T133 T133'S'
U-1288	Universal Tool Kit	1 each. Combination wrench 7/16", 1/2", 9/16", 11/16" 3/4", 1 1/16", 1 1/4". Sockets, 1", 1/2" drive, 7/8", 1/2" drive, tool pouch, allen wrench 5/32" and 1/8"	ALL MODELS

4 MAINTENANCE

4.13 SPECIAL TOOLS

Order #	Illustration	Description	Models
916-30042-01 25197		DRY LINER PULLER - Used for removing and installing the dry liner of the engine. Consists of: 304742 (64mm); 304743 (68mm); 30744 (75mm) 304745 (76mm); 304746 (82mm); 304747 (105mm); Removing Plates; 304748 Installing Plate	KUBOTA
07909-30202-01 25198		DIESEL ENGINE COMPRESSION TESTER - Used to measure diesel engine compression and diagnosis of need for major overhaul.	KUBOTA
07916-30820-01 25199		CRANKSHAFT NUT SOCKET - Used to take off and fix the crankshaft nut. (46 mm).	KUBOTA
07916-30840-01 25200		NOZZLE REMOVER SOCKET - Used to unfasten the screw type nozzle holders.	KUBOTA
70090-01125-01 25201		NOZZLE DISASSEMBLY SOCKET - Used in place of a vice for disassembly and repair of nozzles.	KUBOTA
960456		HYDRAULIC FLOW AND PRESSURE GAUGE ASSEMBLY.	All Models

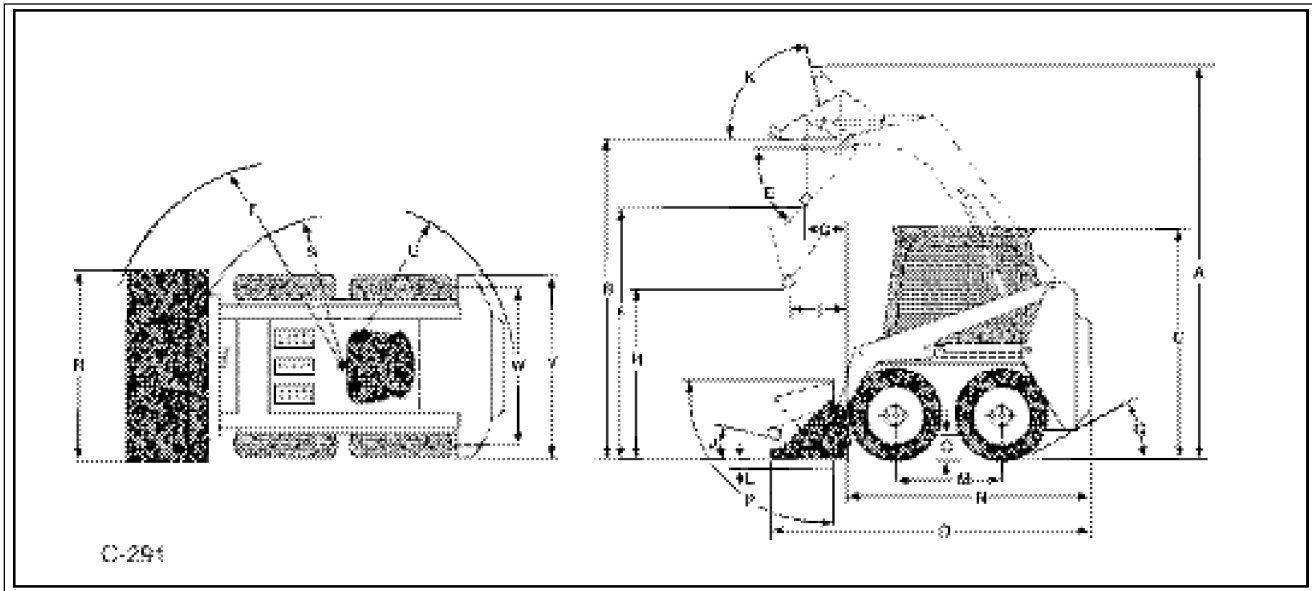
5 SPECIFICATIONS

5...SPECIFICATIONS

- 5. 1 Loader Specifications
- 5. 2 Torque Specifications
- 5. 3 Sound Power Level Specifications
- 5. 4 Decals

5 SPECIFICATIONS

5.1 LOADER SPECIFICATIONS



Dimensions:

	85
A. Overall operating height	121.5" (3086 mm)
B. Height to hinge pin	93.5" (2375 mm)
C. Overall height of vehicle	71.5" (1816 mm)
D. Overall length with bucket	105" (2667 mm)
E. Dump angle	45°
F. Dump height	69" (1753 mm)
G. Reach — fully raised	14.5" (368 mm)
H. Height at 45° dump angle	69" (1753 mm)
I. Reach at 45° dump angle	14.5" (368 mm)
J. Maximum roll back at ground	30°
K. Maximum roll back fully raised	94°
M. Wheel base	33.18" (843 mm)
N. Overall length less bucket	83.5" (2121 mm)
O. Ground clearance	7" (178 mm)
P. Maximum grading angle — bucket	91°
Q. Angle of departure	30°
R. Bucket width	36" (914 mm)
S. Clearance circle — front — less bucket	38.0" (967 mm)
T. Clearance circle — front — with bucket	60.25" (1530 mm)
U. Clearance circle — rear	48" (1219 mm)
V. Overall width — less bucket	35.75" (908 mm)
W. Tread	29.25" (743mm)

Operational:

*Rated operating capacity	900 lbs. (408 kg)
Travel speed	0 - 5.0 mph (0 - 8 km/hr)
Pump capacity	8.0 GPM (30.3 l/min) @ 2150 PSI (148.2 Bar)
Shipping weight	2670 lbs. (1211 kg)
Operating weight	3000 lbs. (1361 kg)

Controls:

VEHICLE: Steering direction and speed controlled by two hand-operated control levers.

HYDRAULICS: Boom lift, bucket tilt and auxiliary hydraulic functions controlled by separate foot pedals.

ENGINE: Hand lever throttle and key type ignition starter and stop switch.

Engine:

Loader model	85
Make and model	Kubota (D722B)
Cylinders	3
Cooling system	Liquid

*Equipped with flotation tires 19TE0190 and dirt bucket 19TE0186

5 SPECIFICATIONS

Displacement	43.8 cu. in. (719 c.c.)
Horsepower (SAE)	19.5 (14.5 kW)
ISO 3046.2534	10.5 kW
Torque	34 ft. lbs. @ 1800 RPM
Fuel Type	Diesel No. 2
Air Cleaner	Replaceable, Cartridge w/Indicator
Maximum Governed RPM (no load)	3140 RPM

Hydraulic System:

Pump type	Gear
Pump capacity	8.0 GPM@ 2150 PSI (148.2 Bar)
Control valve	Series type with float on lift and detent on auxiliary
System relief pressure	2150 PSI (148.2 Bar)
Filtration	10 micron
Hydraulic fluid	10W30 API Class, SE/CD

Cylinders (double acting)	Lift (2)	Tilt (2)
Bore dia.	.2in.	2 in.
Rod dia.	1.125 in.	1.125 in.
Stroke	.26"	14"

Hydrostatic Transmission & Final Drive:

Pump type	Two Inline, Axial Piston
Pump displacement	1.24 cu. in. (20.3 cm ³)
Motor type	Geroler
Motor Displacement	20.6 cu. in. (337.6 cm ³)
System relief setting	2750 PSI (189.6 Bar)
Final drive	Number ASA 60H Roller Chain, running in oil bath to each axle

Electrical:

Alternator	40 A
Battery	12 V Maintenance Free 600 cranking amps
Starter	12 V

Tires:

Standard	.5.90 x 15, 6 ply rating, 50 PSI (345 kPa)
Flotation	.8.5 x 15, 6 ply rating, 30-35 PSI (207-241 kPa)

Fluid Capacities:

	85
	<i>Kubota</i>
	<i>(Diesel)</i>
Fuel tank	14.6 gal. (55 l)
Engine Lub. (w/filter)	3.3 qt (3.8 l)
Final drive transmission (2)	2.0 gal. (7.5 l)
Hyd. Reservoir	11.3 gal (43 l)
Engine cooling system	3.3 qt. (3.1 l)

5.2 TORQUE SPECIFICATIONS

Loader:

Wheel bolts (20)	85 lbs. ft. (115 Nm)
Torque motor drive spkt. nut (2)	275 lbs. ft. (372 Nm)
Torque motor mounting nut (8)	80 - 85 lbs. ft. (108 - 115 Nm)

Hydraulic / Hydrostatic

Gear pump section bolts (8)	25-28 lbs. ft. (34 - 38 Nm)
Piston pump section bolts (8)	17 - 20 lbs. ft. (23 - 27 Nm)

FOR NON-CRITICAL AND NOT OTHERWISE MENTIONED APPLICATIONS, THE FOLLOWING GENERAL ASSEMBLY TORQUES WILL APPLY.

<i>Bolts & Nuts</i>	<i>Torque</i> <i>Lbs. ft. (Nm)</i>
1/4-20	5-7 (6.7-9.5)
5/16-18	12-15 (16-20)
5/16-24	12-15 (16-20)
3/8-16	17-22 (23-30)
3/8-24	22-27 (30-37)
7/16-14	30-35 (41-47)
7/16-20	40-45 (54-61)
1/2-13	45-50 (61-68)
1/2-20	50-60 (68-81)
9/16-12	60-70 (81-95)
9/16-18	65-75 (88-102)
5/8-11	75- 85 (102-115)
5/8-18	100-110 (136-139)

5.3 SOUND POWER

LEVEL SPECIFICATION (86/662 EEC)

LpA Sound level at operators ear	.81 DbA
LwA Adjusted sound level at 10m (32.8ft)	.100 DbA

WARNING

- BEFORE OPERATING THE MACHINE, READ AND UNDERSTAND THE OPERATING AND SAFETY INSTRUCTIONS IN THE MANUAL, AND CLEAN LOCATION AND SAFE USE OF CONTROLS.
- CONTACT YOUR THOMAS DEALER FOR ALL SAFETY SYSTEM ADJUSTMENTS.
- STARTING ONLY WITH OPERATOR'S SEAT WITH ALL CONTROLS IN NEUTRAL AND SEAT BELT FASTENED AROUND YOU.
- OPERATOR MUST BE SEATED ON THE MACHINE. THERE IS NO SAFE PLACE FOR EXTRA RIDERS.
- OPERATE ONLY FROM THE OPERATOR'S SEAT. ALL CONTROLS ARE SUPPORTED.
- SLOW DOWN DURING TRANSPORT FOR BETTER VISIBILITY AND SLOW DOWN LOW ATTACHMENT LOW DURING TRANSPORT FOR LANDING. LARGE, HEAVY OBJECTS SUCH AS LARGE ROUND BALES, LARGE RECTANGULAR BALES, LOGS AND OIL DRUMS, IS DANGEROUS. ALWAYS USE PROPER TIE DOWN TECHNIQUES TO SECURE LOADS INTO THE OPERATOR'S CAB.
- HANDLING LARGE HEAVY OBJECTS WITH THE LOADER CAN BE EXTREMELY DANGEROUS. ALWAYS USE PROPER TIE DOWN TECHNIQUES TO SECURE LOADS INTO THE OPERATOR'S CAB.
- KEEP ALL SHIELDS AND SAFETY EQUIPMENT IN PLACE.
- ALWAYS WEAR YOUR SEAT BELT AND SAFETY EQUIPMENT IN PLACE.
- USE BALLAST FOR STABILITY AS RECOMMENDED IN THE OPERATOR'S MANUAL.
- ALWAYS USE THE PARKING BRAKE TO STOP THE ENGINE, STOP THE MACHINE, AND SET THE PARKING BRAKE TO AVOID MACHINE MOTION, INCLUDING SLOTTED ENGINE, AND TO AVOID MACHINE MOTION.
- ALWAYS USE THE PARKING BRAKE TO AVOID MACHINE MOTION TO THE OPERATOR OR OTHER PERSONS.

ATTENTION

BOOM SUPPORT CONTROL

DO NOT MOVE LEFT ARMS WITH SUPPORTS ENGAGED

AUX

AUX

WARNING

WARNING

DO NOT ENTER OR LEAVE MACHINE WHILE ENGINE IS RUNNING

WARNING

DO NOT ENTER OR LEAVE MACHINE WHILE ENGINE IS RUNNING

WARNING

RATED OPERATING CAPACITY
ZULASSIGE BETRIEBSBELASTUNG
CAPACITE MAXIMUM DE LA VASE

MODEL	MAXIMUM CAPACITY
T90	900 lbs (408 KG)
T100	1000 lbs (454 KG)
T110	1100 lbs (499 KG)
T120	1200 lbs (544 KG)
T130	1300 lbs (591 KG)
T140	1400 lbs (635 KG)
T150	1500 lbs (681 KG)
T160	1600 lbs (727 KG)
T170	1700 lbs (771 KG)
T180	1800 lbs (817 KG)
T190	1900 lbs (863 KG)
T200	2000 lbs (909 KG)
T210	2100 lbs (955 KG)
T220	2200 lbs (1001 KG)
T230	2300 lbs (1047 KG)
T240	2400 lbs (1093 KG)

WARNING

- DO NOT USE SEAT OR CONTROL LEVERS WHEN ENTERING OR EXITING THIS MACHINE.
- DO NOT FORCE LEVERS WHEN SEAT BAR IS UP.
- ALWAYS WEAR YOUR SEAT BELT AND SAFETY EQUIPMENT IN PLACE.
- THIS MACHINE IS EQUIPPED WITH A SAFETY SYSTEM.
- ALWAYS REFER TO THE OPERATOR'S MANUAL FOR STARTING AND OPERATING PROCEDURES.
- CONTACT YOUR THOMAS DEALER FOR ALL SAFETY SYSTEM ADJUSTMENTS.

WARNING

TO PREVENT INJURY, ALWAYS USE THE ATTACHMENT SAFETY SYSTEM WHEN OPERATING THE MACHINE. ALWAYS WEAR YOUR SEAT BELT AND SAFETY EQUIPMENT IN PLACE.

WARNING

CARRY LOAD LOW
FASTEN SEAT BELT

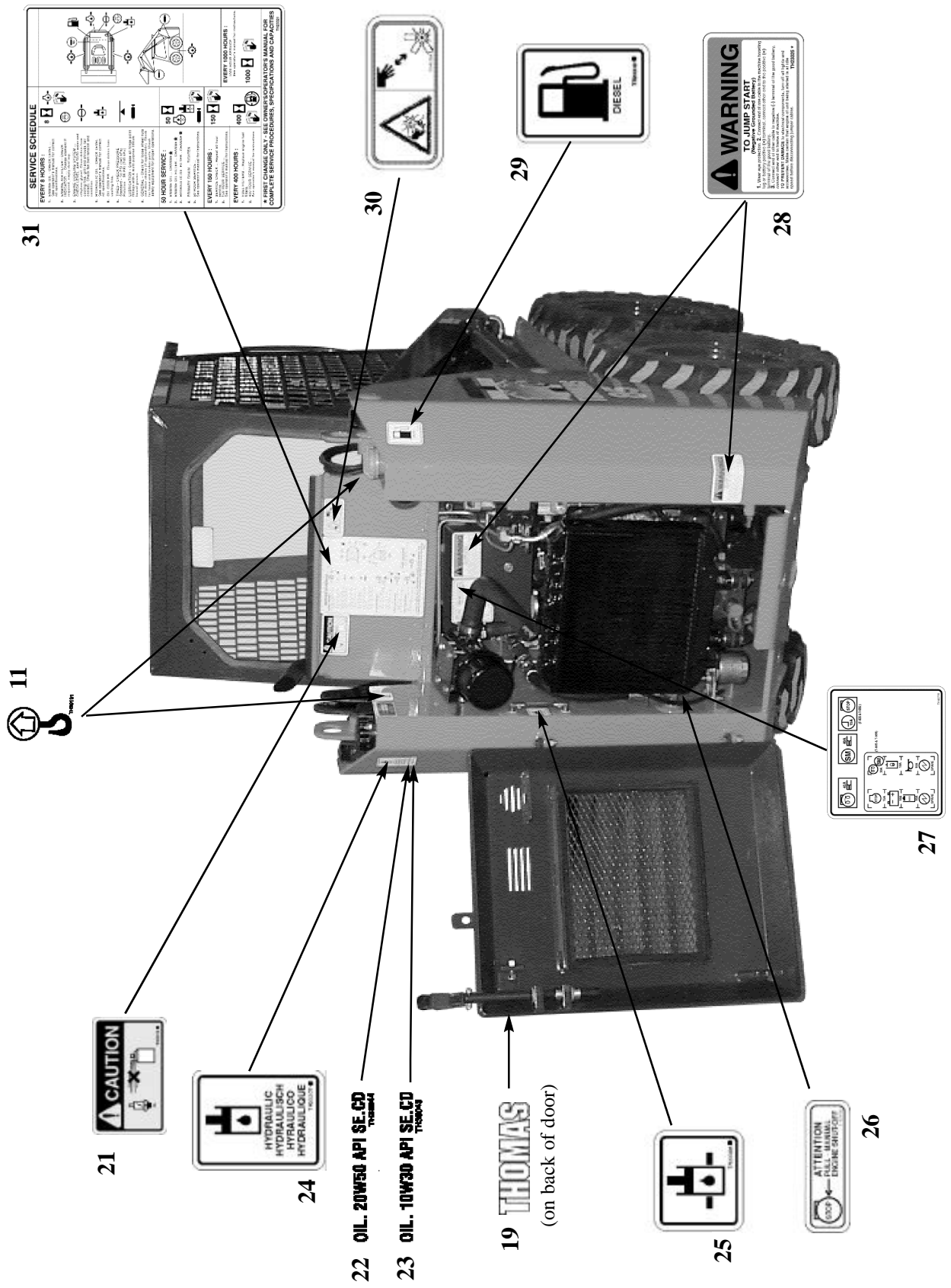
WARNING

CARRY LOAD LOW
FASTEN SEAT BELT

WARNING

THIS LOADER IS EQUIPPED WITH A SEAT-BAR-ACTIVATED PARKING BRAKE. TO RELEASE THE PARKING BRAKE, SIMPLY LOWER THE SEAT BAR. SHOULD THE BRAKE NOT RELEASE, SLIGHTLY JOG THE CONTROL LEVERS FORWARD AND REARWARD.

5.4 DECALS



11

21

24

22 OIL. 20W50 API SE-CD
THOMAS

23 OIL. 10W30 API SE-CD
THOMAS

19 THOMAS
(on back of door)

25

26

27

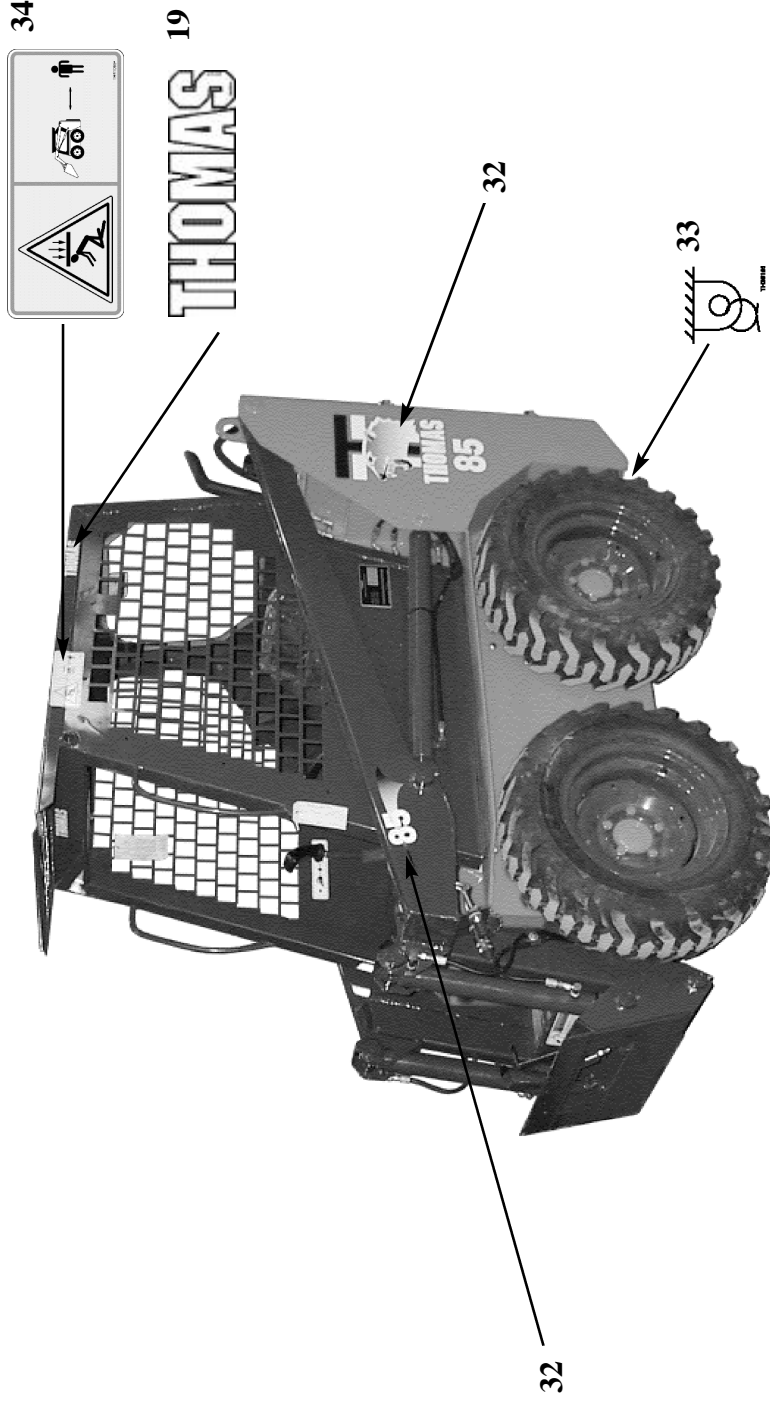
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5.4 DECALS



T85 DECAL PARTS LIST

1.	25460	10.	23309	19.	44615	28.	23325
2.	35935	11.	39191	20.	36841	29.	23310
3.	23301	12.	41066	21.	23312	30.	41064
4.	35886	13.	23326	22.	38044	31.	23321
5.	37060	14.	31291	23.	38043	32.	47986 (Kit)
6.	23324	15.	41045	24.	23307	33.	39192
7.	42107	16.	35885	25.	23308	34.	41065
8.	39196	17.	37059	26.	39189		
9.	32275	18.	36598	27.	43776		

6 ATTACHMENTS AND BUCKETS

6 ATTACHMENTS AND BUCKETS

- 6. 1 Thomas Approved Buckets
- 6. 2 Thomas Approved Forks and Grapples
- 6. 3 Thomas Approved Attachments

6 ATTACHMENTS AND BUCKETS

6.1 THOMAS APPROVED BUCKETS

BUCKETS

Cat. #	Description	Struck Capacity	Approx. Weight
185	35.5" Dirt Bucket	5.75ft	160lb
186	42" Dirt Bucket	6.85ft	190lb
197	42" Flat Bottom Dirt Bucket	6ft	190lb
187	48" Fertilizer, Grain Or Snow Bucket	8.9ft	200lb
326	54" Produce Bucket	15ft	275lb

BUCKET - TEETH KITS

Cat. #	Description	Approx. Weight
1001	Tooth Kit For 36" Bucket (Factory)	13lb
792	Tooth Kit For 36" Bucket (Field)	13lb
1002	Tooth Kit For 42" Bucket (Factory)	15lb
793	Tooth Kit For 42" Bucket (Field)	15lb

6.2 THOMAS APPROVED FORKS AND GRAPPLES

FARM GRAPPLES AND FORKS

Cat. #	Description	Approx. Weight
188	36" Utility Fork	210lb
192	42" Utility Fork	240lb
306	36" Utility Fork And Grapple (Requires Aux. Hyd. Circuit)	270lb
307	42" Utility Fork And Grapple (Requires Aux. Hyd. Circuit)	350lb

PALLET FORKS

Cat. #	Description	Approx. Weight
189	Pallet Fork Mounting Frame (Requires Tines)	120lb
99	30" Tines (Set Of 2)	110lb
98	36" Tines (Set Of 2)	131lb

6.3 THOMAS APPROVED ATTACHMENTS

DOZER BLADE

Cat. #	Description	Approx. Weight
349	48" Dozer Blade, Manual Swing	165lb

SWEEPER

Cat. #	Description	Approx. Weight
700	60" Angle Broom (Requires Aux. Hyd. & Quick Coupler Kit)	360lb
1423	Quick Coupler	5lb

6 ATTACHMENTS AND BUCKETS

6.3 THOMAS APPROVED ATTACHMENTS

HYDRAULIC BREAKER (Requires Side Plates, Mount & Tool)

Cat. #	Description	Approx. Weight
1536	HH150 - 150 Ft.Lbs. Class, Hydraulic Breaker	200lb

BREAKER SIDE PLATES & MOUNT

Cat. #	Description	Approx. Weight
1693	Model HH150 Side Plates	120lb
1524	Breaker Mount	100lb

BREAKER TOOLS

Cat. #	Description	Approx. Weight
1530	Moil Point - HH150	25lb
1531	Chisel Point - HH150	25lb
1532	Blunt Point - HH150	25lb
1567	Asphalt Cutter Point - HH150	
1569	Frost Point - HH150	25lb
1568	Tamping Pad 12" x 12" - HH150	
1548	Gas Charger	15lb