THOMAS®

Pro Tough 2200

Owner's and Operator's Manual

PUBLICATION NO. 48241, MAY 2002

THOMAS EQUIPMENT LIABILITY WARRANTY

THE WARRANTY IS THE ONLY OBLIGATION OF THOMAS OR A THOMAS DEALER TO THE PURCHASER OR ANYONE ELSE CONCERNING A PRODUCT, IT'S SERVICE, IT'S USE OR PERFORMANCE OR IT'S LOSS OF USE OR FAILURE TO PERFORM. NEITHER THOMAS NOR A THOMAS DEALER HAVE MADE AND NEITHER WILL MAKE ANY OTHER EXPRESSED OR IMPLIED REPRESENTATION, WARRANTY OR AGREEMENT CONCERNING A PRODUCT, NEITHER THOMAS NOR A THOMAS DEALER HAVE MADE OR WILL MAKE ANY REPRESENTATION, WARRANTY OR AGREEMENT CONCERNING A PRODUCTS MERCHANTABILITY OR OTHER QUALITY, IT'S SUITABILITY FOR PURCHASER'S PURPOSE (EVEN IF A PURCHASER HAS INFORMED THOMAS OR A THOMAS DEALER OF THAT PURPOSE), IT'S DURABILITY, PERFORMANCE OR OTHER CONDITION.

EVEN IF THOMAS OR A THOMAS DEALER WAS ADVISED OF THE POSSIBILITY OF SUCH LOSS, NEITHER THOMAS NOR A THOMAS DEALER WILL BE LIABLE TO PURCHASER OR ANYONE ELSE FOR ANY INDIRECT, INCIDENTAL CONSEQUENTIAL, PUNITIVE, ECONOMIC, COMMERCIAL, OR SPECIAL LOSS WHICH IN ANY WAY ASSOCIATED WITH A PRODUCT. THIS INCLUDES ANY LOSS OF USE OR NON-PERFORMANCE OF A PRODUCT, ANY REPLACEMENT RENTAL OR ACQUISITION COST, ANY LOSS OF REVENUE OR PROFITS, ANY FAILURE TO REALIZE EXPECTED SAVINGS, ANY INTEREST COSTS, ANY IMPAIRMENT OF OTHER GOODS, ANY INCONVENIENCE OR ANY LIABILITY OF THE PURCHASER TO ANY OTHER PERSON.

PURCHASER MAY NOT ATTEMPT TO ENLARGE ITS RIGHTS UNDER THE WARRANTY BY MAKING CLAIM, FOR INDEMNITY, FOR BREACH OF CONTRACT, FOR BREACH OF COLLATERAL WARRANTY, FOR A TORT (INCLUDING NEGLIGENCE, MISREPRESENTATION OR STRICT LIABILITY) OR BY CLAIMING ANY OTHER CAUSE OF ACTION.

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

N.B. Read and practice your Thomas operating and servicing instructions. Failure to do this may void the warranty.

PUBLICATION NUMBER 48241

Printed in Canada

INDEX

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.

DANGER — **This warning indicates an immediate hazard which WILL result in severe personal injury or death.**

WARNING — **This warning indicates hazards or unsafe practices which COULD result in severe personal injury or death.**

CAUTION — **This warning indicates hazards or unsafe practices which COULD result in minor personal injury or product or property damage.**

IMPORTANT — **Instructions are necessary before operating or servicing this machine. Read the operators manual and service decals on the loader. Follow warnings and instructions in this manual when making repairs, adjustments or servicing. Check for correct operation after adjustments and repairs.**

IMPORTANT — **This notice shows 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.

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 specific service and backhoe operation procedures. 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 area 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, hydraulic controls, parking brake, operator guard, and lift arm supports 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 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 attachment.
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.
17. Keep both hands on the control levers while the loader is in motion.

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.
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. Keep the operator and foot pedal areas free from debris.
12. For lifting and towing instructions, refer to Sections 3. 7 and 3. 8 of this manual.

WARNING

To avoid personal injury, lower the lift 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

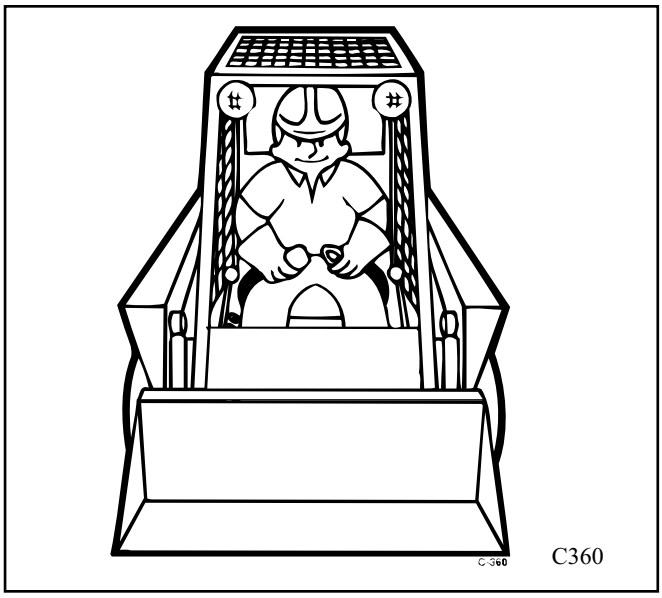
To prevent personal injury do not operate the loader without lowering the safety bar, fastening the seat belt and keeping feet on the control pedals or cab floor.

WARNING

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

IMPORTANT

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



C360

START SAFELY

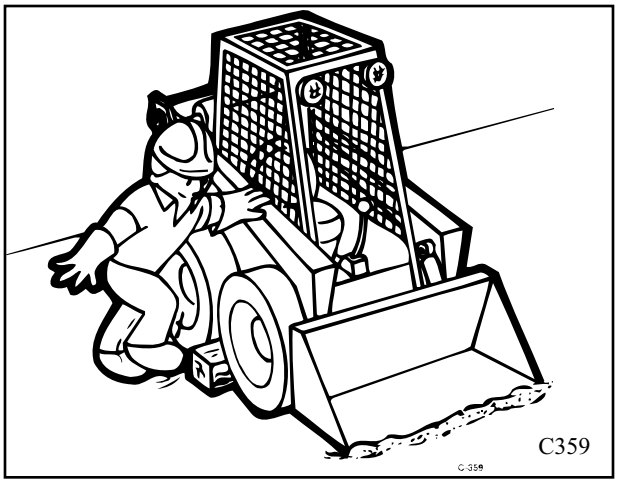
1. Sit in the operator's seat and adjust it so you can operate all of the controls properly.

2. Adjust the seat and fasten the seat belt. Cycle the controls to make sure they are in the locked or neutral position. Lower the seat bar.

3. Know the exact starting procedure for your machine. See Section 3 for the manufacturer's instructions for 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. Lower the attachment to the ground, engage the parking brake and block the wheels (C359).

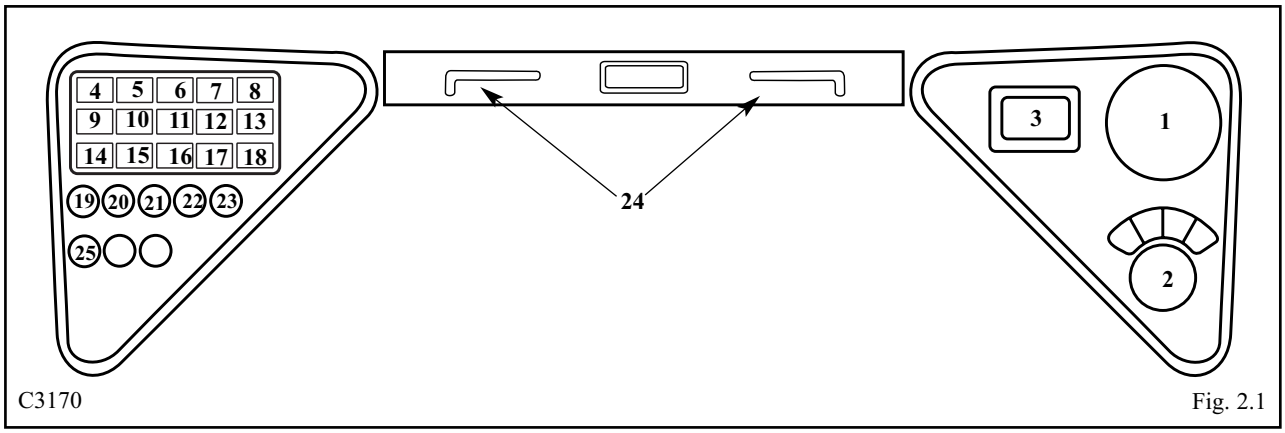


C359

2. CONTROLS

2. CONTROLS

2. 1 INSTRUMENT PANEL



C3170 Fig. 2.1

1. Fuel Gauge: The fuel gauge indicates the quantity of fuel remaining in the fuel tank.

2. Ignition Switch: The ignition switch is a four (4) position switch: 'OFF', 'PRE-HEAT', 'RUN' and 'START'. Turn the key counter clockwise to engage engine 'PRE-HEAT'. Turn the key clockwise to the 'START' position, this engages the starter. The key will be in the 'RUN' position when released. Turn the key to 'OFF' to shut off the engine and remove the key.

3. Hour Meter: The hour meter records the number of engine operating hours and has a total of 9999.9 hours.

4. Left Signal Indicator Light: This light will illuminate when the operator uses the optional left signal **(if equipped)**.

5. Auxiliary Front Indicator Light: This light will illuminate when the loader auxiliary hydraulic front switch **(if equipped)** is turned on.

6. Hi-Flow Hydraulics Indicator: This light will illuminate when the loader hi-flow hydraulics **(if equipped)** are in use.

7. Work Light Indicator: This light will illuminated when the loader headlights are turned on. This will serve as a reminder to turn them OFF when the loader is not in use.

8. Right Signal Indicator Light: This light will illuminate when the operator uses the optional right signal **(if equipped)**.

9. Hydraulic Oil Temperature Indicator: This light will illuminate when the oil temperature has exceeded recommended levels. Shut off the engine immediately and determine the cause.

WARNING

To prevent personal injury never add fuel to the loader when the engine is running or is hot. NO SMOKING!

10. Brake Indicator Light: The brake light will illuminate when the parking brake is engaged.

11. Seat Belt Indicator Light: This light will illuminate when the seat belt is unfastened.

12. Hydraulic Oil Pressure Indicator Light: This light will illuminate when there is low hydraulic oil pressure. If this light illuminates, shut off the engine and determine the cause.

13. Rotary Beacon Indicator: This light will illuminate when the optional rotary beacon **(if equipped)** is turned on.

14. Engine Oil Pressure Indicator: This light will illuminate when the engine loses lubrication pressure. Shut off the engine immediately and determine the cause.

15. Coolant Temperature Indicator Light: This light will illuminate if there is a rise in engine temperature. If this occurs, shut off the engine immediately and determine the cause.

16. Alternator Indicator Light: This light will illuminate when the alternator is not producing sufficient current.

IMPORTANT

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

WARNING

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

IMPORTANT

Fully retract lift arm supports before raising or lowering lift arms.

17. Air Cleaner Indicator Light: This light will illuminate when there is an obstruction in the intake or when the air filter needs servicing. If this light illuminates, stop the engine and service the cleaner (see section 4.8).

18. Pre-heat Indicator Light: This light will illuminate when the ignition key is turned counter clockwise to activate the engine glow plugs.

19. Dipped Beam Light Switch: This switch is a toggle switch. Push up to turn the work lights on. The light is located on the front of the loader.

20. Rotary Beacon Light Switch: This switch is a toggle switch. Push up to turn the optional rotary beacon light **(if equipped)** on.

21. Hazard Light Switch: This switch is a toggle switch. Push up to turn the optional hazard light **(if equipped)** on.

22. Work Light Switch: This switch is a toggle switch. Push up to turn the optional work light **(if equipped)** on. The light is located on the back of the loader.

23. Auxiliary Hydraulics Front Switch: This switch is a toggle switch. Push up to provide a continuous flow of hydraulic oil to the quick couplers when using an attachment.

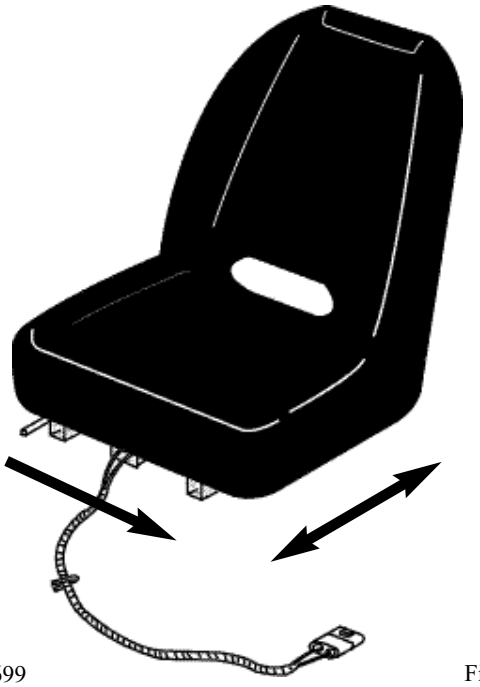
24. Lift Arm Supports: For safety while performing service or maintenance, the loader is equipped with a lift arm support device. Refer to section 2.6 for details.

25. Hi-Flow Hydraulic Switch: This switch is a toggle switch. Push up to turn the hi-flow hydraulics **(if equipped)** on.

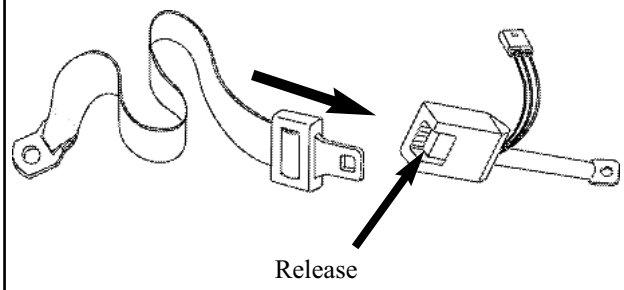
2. 2 SEAT AND SEAT BELT

The loader is equipped with a deluxe seat. The seat can be adjusted 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 beat belt (Fig. 2.2B) around you. The seat and seat belt also have integrated safety lock switches whereby the operator must be seated in the seat with the belt securely fastened and seat bar lowered before the loader hydraulics can be operated.



C2699 Fig. 2. 2A



C3352 Fig. 2.2B

WARNING

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

2. 3 SEAT BAR

For operator protection the loader is equipped with a seat bar.

To raise the seat bar, lift up on the bar until it locks in the up position (Fig. 2.3A). In the up position, the seat bar automatically locks the steering controls in neutral position and engages the park brake.

Before exiting the loader always check hand control levers by cycling them to be sure they are locked. The loader must be started with the operator seated in the loader and the seat bar in the up position.

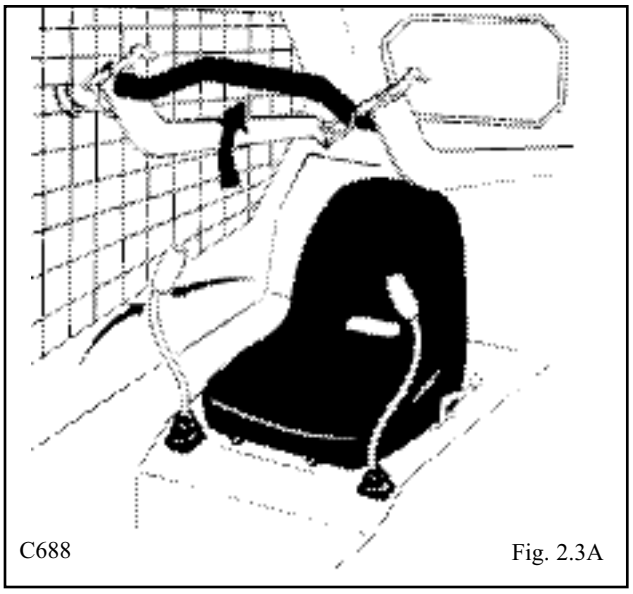
To lower the seat bar place both hands over the latch, release handles and lift the seat bar slightly (Fig. 2.3B).

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.

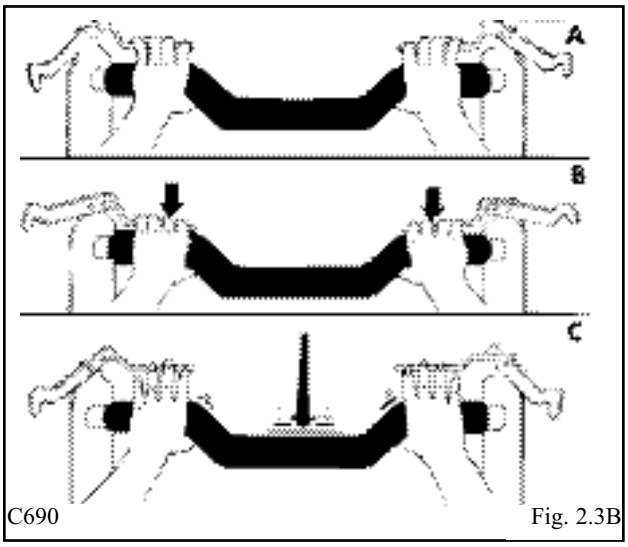
When down, the seat bar releases the park brake and the steering control levers (Fig. 2.3C).

⚠ WARNING

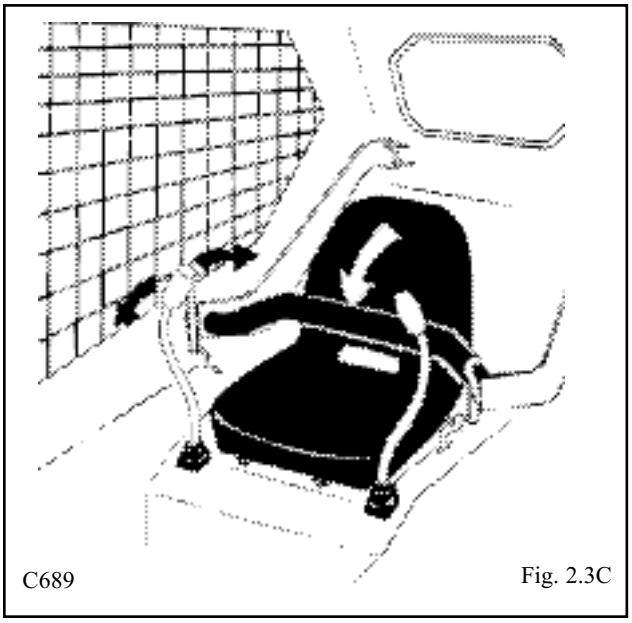
To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls to ensure they are locked. Then, Unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific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



C688 Fig. 2.3A



C690 Fig. 2.3B

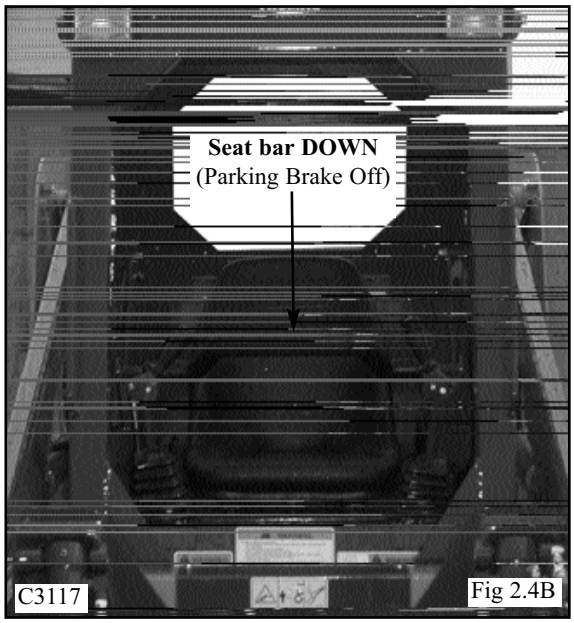


C689 Fig. 2.3C

2. 4 PARKING BRAKE

The loader is equipped with two mechanical, caliper type disc brakes located inside the final drive housing. Both brakes are activated by the seat bar. When the seat bar is in the up position, the brake is activated. (Fig. 2.4A) When the bar is lowered, the brake is released. (Fig. 2.4B)

The loader has a parking brake indication light to warn if the brake is engaged.

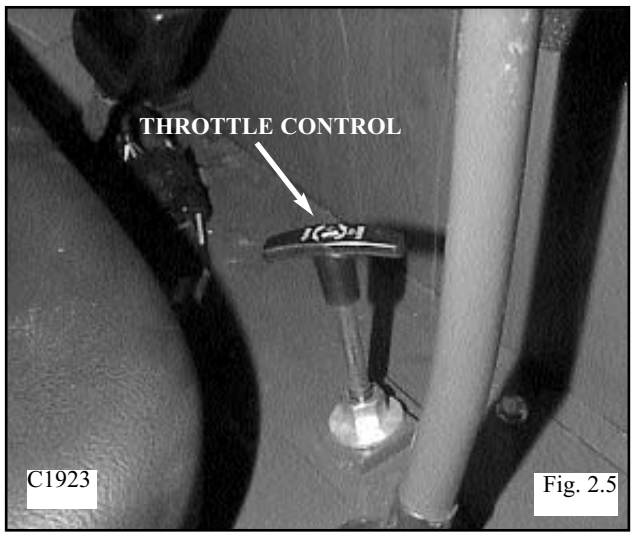


WARNING

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.

2. 5 THROTTLE CONTROL

The diesel engine throttle control, is a push / pull / turn to lock, located on the left hand side of the loader next to the steering control lever (Fig. 2.5) Engine start and stop are controlled electrically by the ignition key.



WARNING

To avoid personal injury do not enter or exit the loader with the engine running unless as specified in this manual or under service procedures and backhoe operation.

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

Pulling upward, out, will increase engine speed. Turn the handle to lock. Turn the handle to release from position, push down to lower engine speed.

The engine should always be operated at full speed and the loader travel speed controlled with the steering control levers. (See Section 2.7).

WARNING

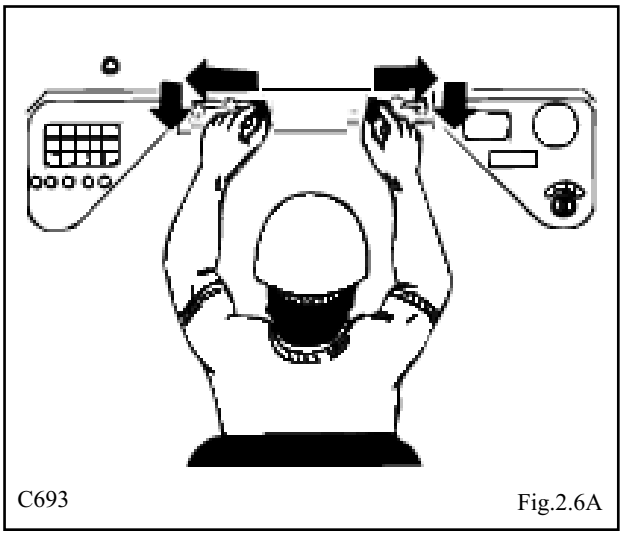
To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls to ensure they are locked. Then, unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific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

2. 6 LIFT ARM SUPPORTS

For safety while performing regular service or maintenance work the loader is equipped with lift arm supports.

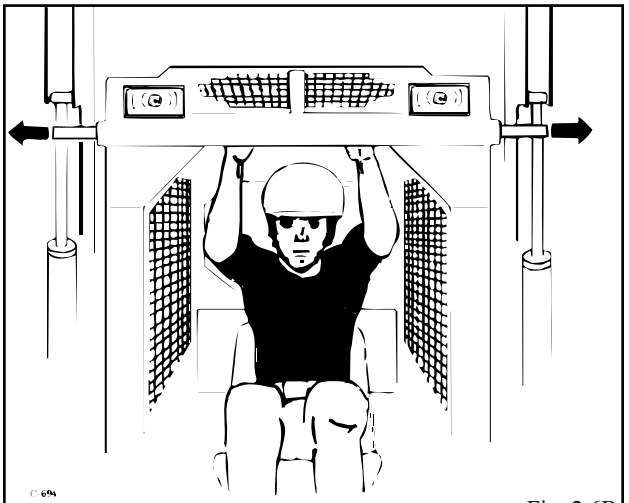
The lift arm supports, when extended, prevent the lift arms from dropping if hydraulic pressure is relieved or the foot control pedals are accidentally cycled.

To operate the lift arm supports, first remove any bucket or attachment from the quick-tach; raise the lift arms to full height and shut OFF the engine. Raise the lift arm handles (Fig. 2.6A) up and push out toward lift arms to extend the lift arm supports. (Fig. 2.6B). Then, lower the lift arms down to rest on the lift arm support pins. To retract the lift arm support pins first lift the lift arms up off of the pins and then retract lift arm handles fully.



C693 Fig.2.6A

IMPORTANT **Fully retract the lift arm supports before raising or lowering lift arms.**



C694 Fig. 2.6B

2. 7 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 controls the wheels on the L.H side of the loader. The loader speed is controlled by the amount each lever is moved from centre or neutral position. (Fig. 2.7A) The further away from neutral the faster the travel speed. For maximum power and slow travel speed move the control levers only a small amount.

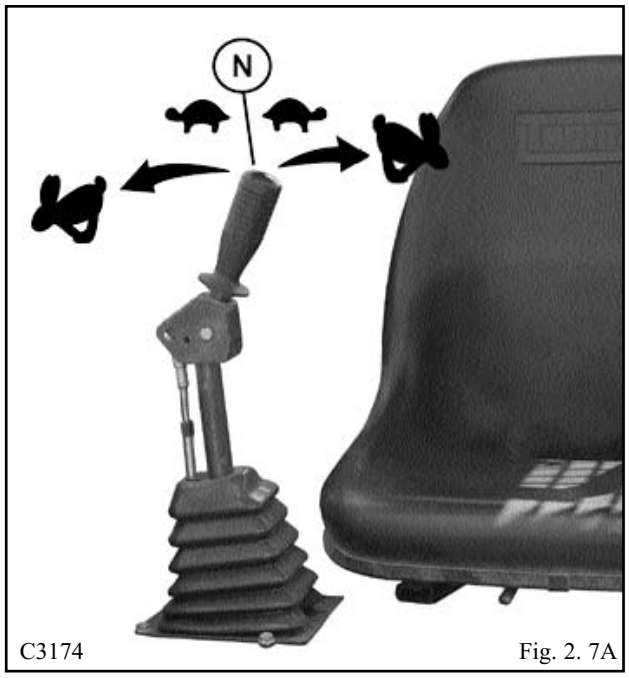
To drive the loader forward in a straight line, move both control levers forward the same amount. (Fig. 2.7B)

To drive the loader in reverse in a straight line, move both control levers back the same amount. (Fig. 2.7B)

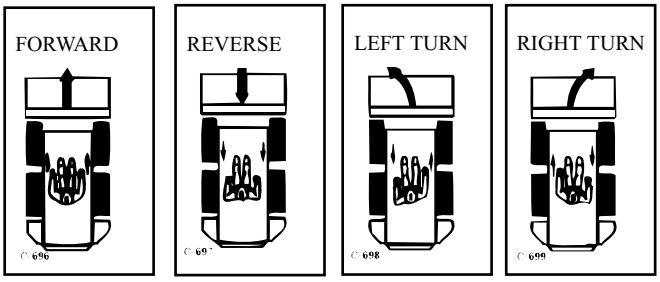
The loader is turned by moving one lever further forward than the other. To turn right move the left lever further than the right lever, to turn left move the right lever further than the left lever. (Fig.2.7B).

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. (Fig. 2.7B).

NOTE: The steering control levers automatically lock in the neutral position when the safety bar is in the up position.



C3174 Fig. 2. 7A



C696-9 Fig. 2.7B

WARNING

To avoid personal injury do not start the engine unless you are in the seat with the seat belt fastened around you, unless as specified in this manual or under service procedures and backhoe operation.

WARNING

To avoid personal injury always carry the load low.

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.

WARNING

To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls 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.

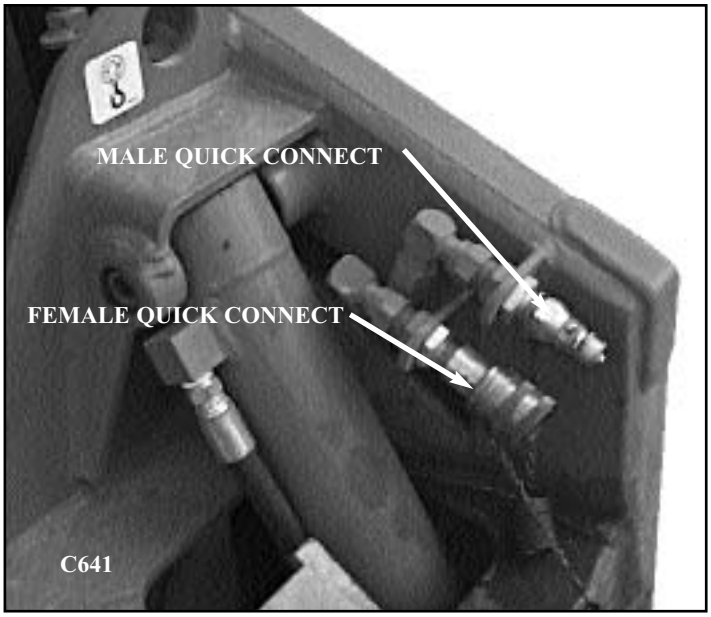
2.8 HAND AUXILIARY

The Auxiliary Hand Control. Is located on the R.H. steering control lever (Fig. C2899) it is used to engage the loaders auxiliary hydraulic circuit to power attachments such as post hole augers, sweepers etc.

By pressing and holding the hand auxiliary control handle towards the left this provides hydraulic flow to the female quick connect coupling located at the front of the lift arms (Fig. C641). Releasing the hand auxiliary control handle returns the auxiliary hydraulic circuit to neutral, stopping hydraulic flow.

By pressing and holding the hand auxiliary control handle towards the right this provides hydraulic flow to the male quick connect coupling located at the front of the lift arms (Fig. C641). Releasing the hand auxiliary control handle returns the auxiliary hydraulic circuit to neutral, stopping hydraulic flow.

For continuous flow to the auxiliary hydraulic circuit, position the hand auxiliary control handle towards the extreme left. This provides continuous hydraulic flow to the female quick connect coupling located at the front of the lift arms (Fig. C641). To stop hydraulic flow to the auxiliary hydraulic circuit, return the hand auxiliary control handle to the neutral position.



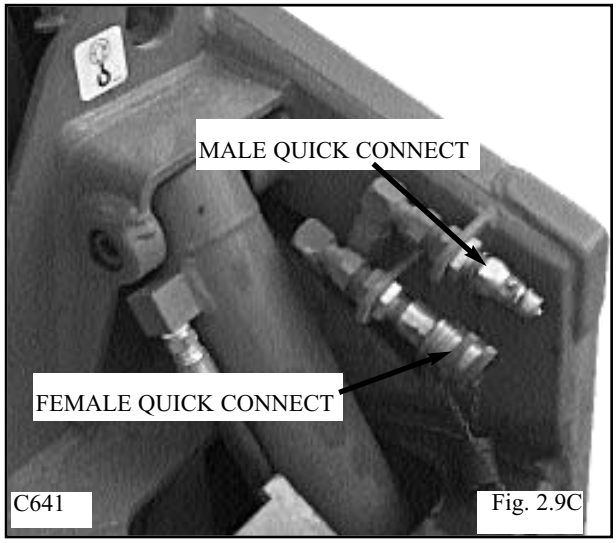


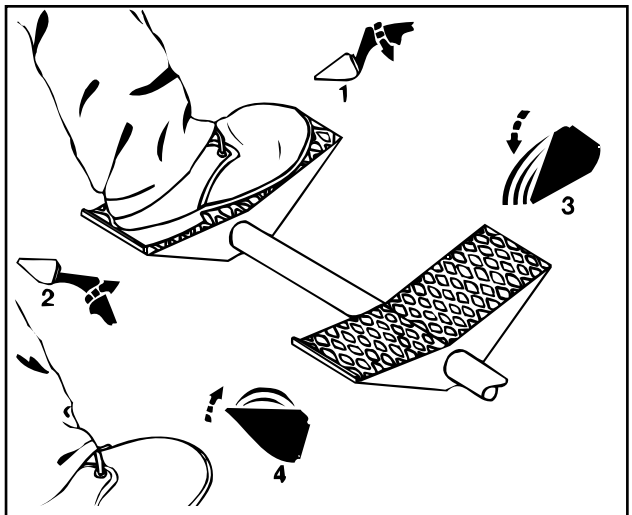
Fig. 2.9C

2. 9 FOOT PEDALS

Operation of the lift cylinders and the bucket tilt cylinders are controlled by foot pedals (Fig. 2.10) connected to a hydraulic control valve. The hydraulic control valve is a series type valve which allows simultaneous use of both the lift and bucket tilt circuits.

Lift – The L.H. pedal is the lift control (Fig. 2.10). To raise the lift arms press on the heel (2) of the pedal. To lower the lift arms press on the toe (1) of the pedal. Firm pressure on the toe (1) of the pedal will lock the lift arms in float position. This allows the bucket to follow the ground as the loader moves backward.

Bucket Tilt – The R.H. pedal is the bucket tilt (dump) control (Fig. 2.10). Pressing on the toe (3) of the pedal will dump the bucket. Pressing on the heel (4) of the pedal will roll the bucket back.



C669 Fig. 2.10A

IMPORTANT

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

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

Return the auxiliary hydraulic control to the neutral position when not in use.

WARNING

To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls 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.

2.10 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 (2) (Fig. 2.11D). Tilt the quick - tach frame forward (Fig. 2.11B) 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 (1) fully down (Fig. 2.11C) extending the lock pins (Fig. 2.11E item 2) through the attachment and securing the attachment.

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

WARNING

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

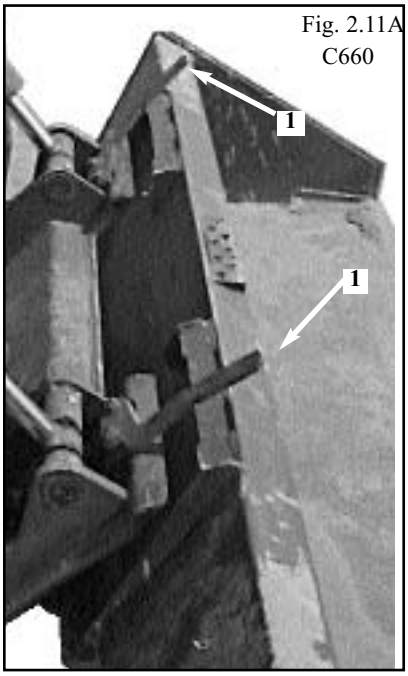


Fig. 2.11A
C660

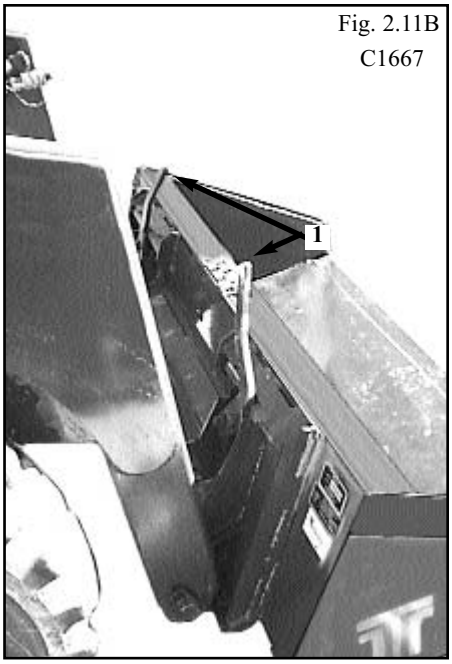


Fig. 2.11B
C1667

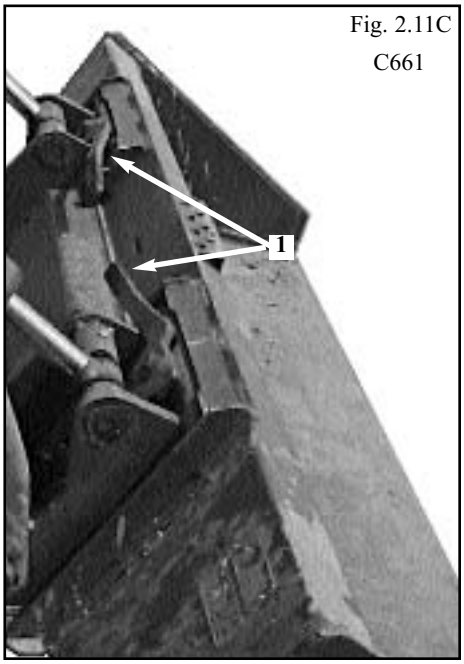
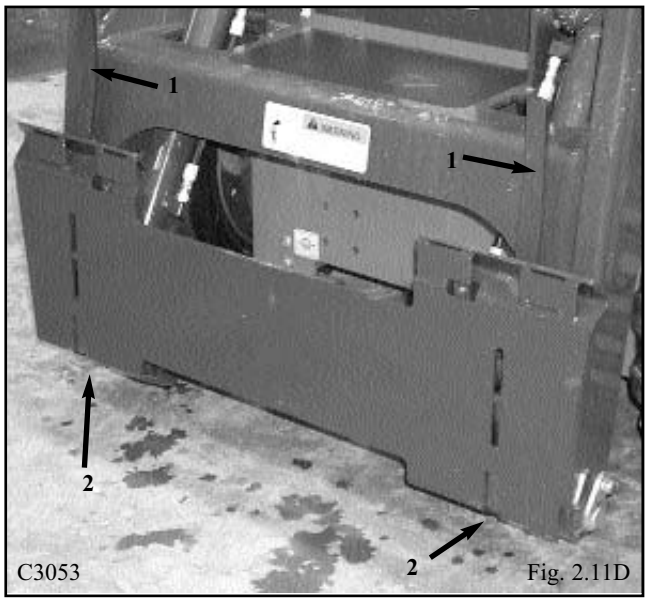
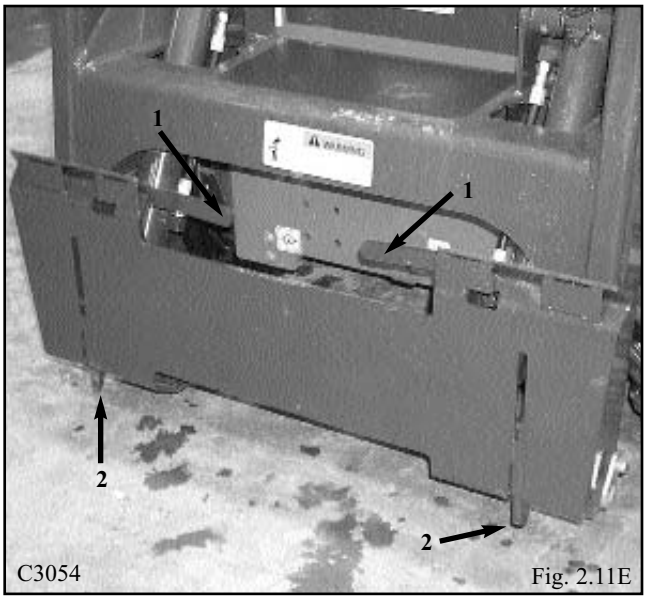


Fig. 2.11C
C661



C3053 Fig. 2.11D



C3054 Fig. 2.11E

2.11 ELECTRICAL PANEL

The loader is equipped with a 12 volt, negative ground electrical system. The fuse and relay panel are located in the engine compartment on the engine cover. The panel consist of the following:

1. Engine Pre - Heater Relay.

2. Starter Relay

3. Fuse Panel.

FUSE PANEL (3)

5. Electric Fuel Solenoid Shutoff (15 A)

6. Alternator Light (10A)

7. Electric Auxiliary (10A)

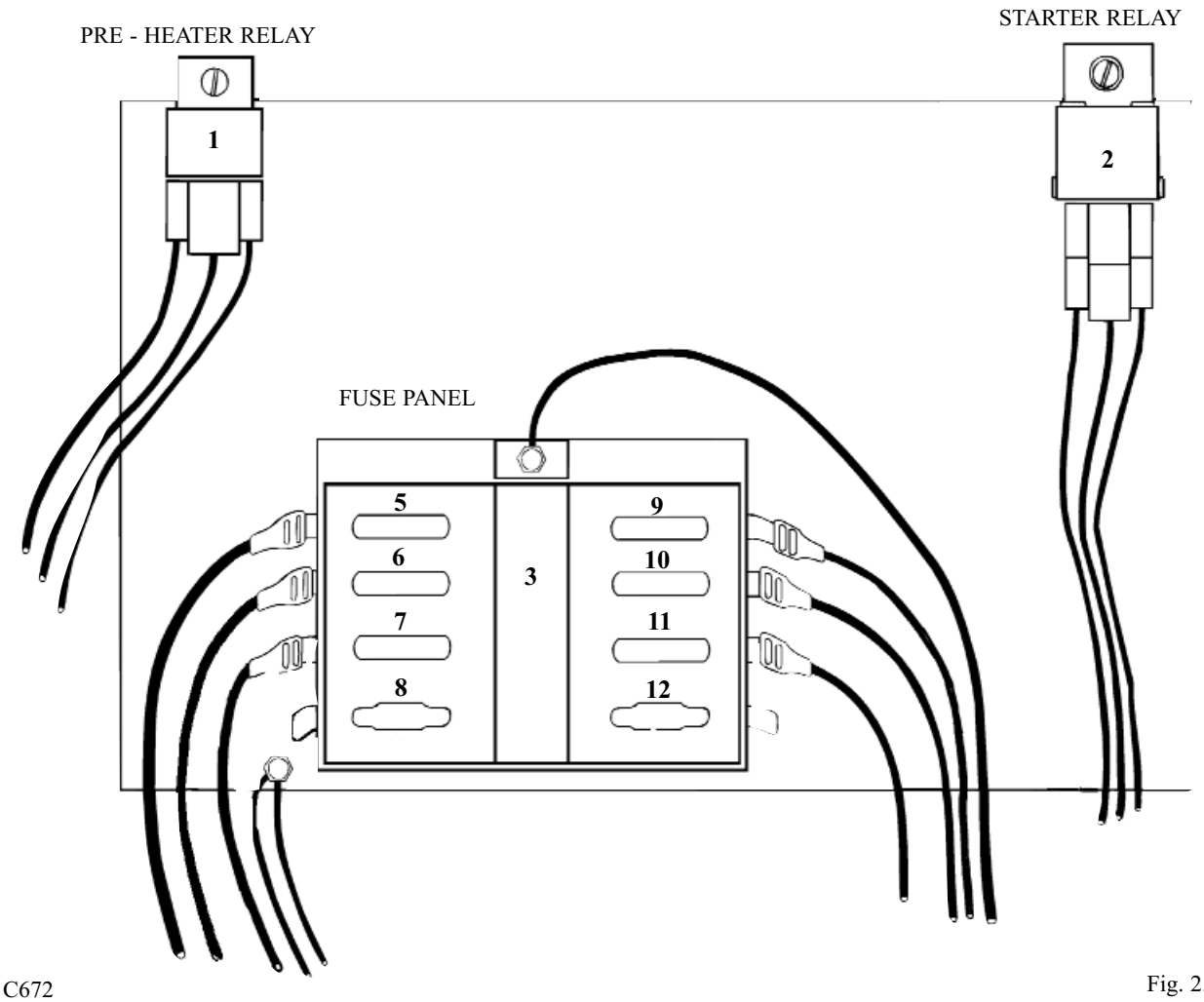
8. Spare

9. Spare

10. Valve Locks (10A)

11. Horn (Optional) (10 A)

12. Spare



C672

Fig. 2.14

3. OPERATION

3. OPERATION

3. 1 STARTING INSTRUCTIONS

1. Pre-Starting Inspection

Before starting the loader complete the following inspection:

1. Check the hydraulic oil level, engine oil level and fuel supply.
2. Check for fuel, oil and hydraulic leaks.
3. Check lights, battery level and cables.
4. Check tire pressure:

   12.00 x 16.5 . . . . 40-45 PSI (276-310 kPa)

5. Check wheel nut torque 100-110 ft. lbs. (136-149 N m)
6. Lubricate all grease fittings.
7. 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 4.2

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.

2. Starting Procedure – Diesel

1. Ensure the seat bar is in the UP position and the steering controls are centered.
2. Adjust and fasten the seat belt securely around you.
3. Place the throttle control in idle position.
4. Turn the ignition key counter clockwise to activate the glow plug heaters. Hold for 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.

   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 any high energy fuels to assist starting.

WARNING

To avoid personal injury do not start the engine unless you are in the seat with the seat belt fastened around you, unless as specified in this manual or under specific service and backhoe operating procedures.

3. Shut-Off Procedure

1. Park the loader on level ground. If it's 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 normal. At least 2 minutes.
4. When the engine is cool, turn the ignition key to the OFF position and remove the key.
5. Never enter or exit the loader when the engine is running unless as specified in this manual or under service procedures and backhoe operation.
6. Make sure the electric solenoid switch is in the OFF position.
7. 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.

WARNING

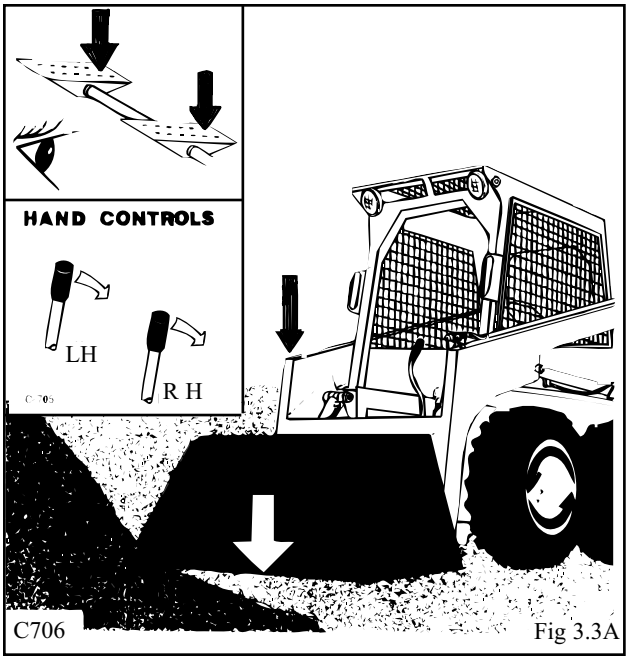
To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls to ensure they are locked. Then, Unlatch the seat belt and exit the loader. Do not enter or exit with the engine running unless as specified in this manual or under specific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

3. 2 OPERATING PROCEDURES

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 2.7) 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 lift 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.

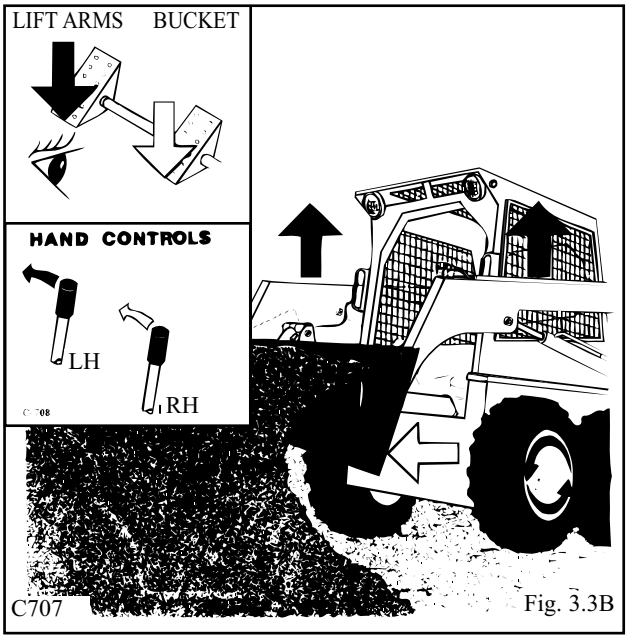


C706 Fig 3.3A

3. 3 FILLING FROM A PILE

Push down on the toe of the lift arm pedal and lower the lift arms completely down (Fig. 3.3A). Push the toe of the bucket pedal and place the cutting edge of the bucket on the ground. For hand control units, move the L.H. control lever towards you and lower the lift arms 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.

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 lift arm 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.



C707 Fig. 3.3B

To dump the bucket (Fig. 3.3C) push down on the heel of the lift arm pedal to raise the lift arms. Push down on the toe of the bucket pedal small amounts as the lift 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 lift arms. Move the R.H. control lever away from you in small amounts as the lift 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.

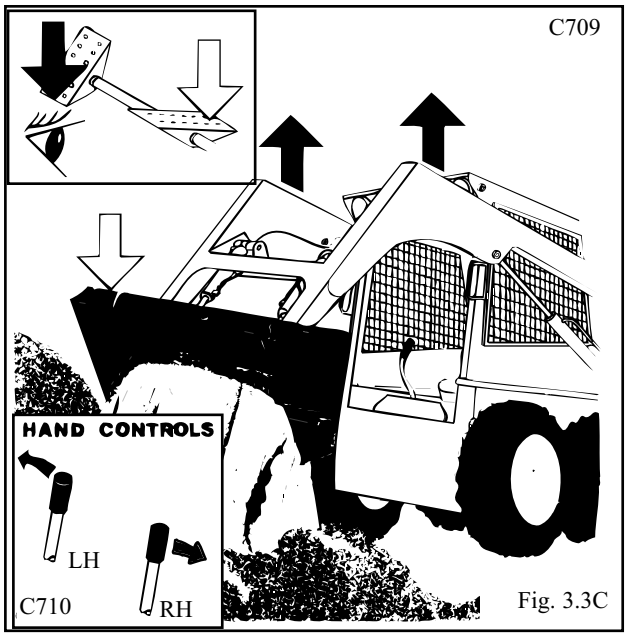


Fig. 3.3C

WARNING **To avoid personal injury always carry the load low.**

3. 4 DIGGING WITH A BUCKET

Push on the toe of the lift arm pedal and lower the lift arms completely down. Push on the toe of the bucket pedal and place the cutting edge of the bucket on the ground (Fig. 3.4D). Drive the loader forward at a slow rate and continue to tilt the bucket down until it enters the ground.

Push down on the heel of the bucket pedal (Fig. 3.4E) 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. 3.4F) to raise the tip of the bucket.

For hand control units, move the L.H. control lever towards you to lower the lift arms completely down. Move the R.H. control lever away from you and place the cutting edge of the bucket on the ground (Fig. 3.4D). 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. 3.4E) 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. 3.4F) to raise the tip of the bucket.

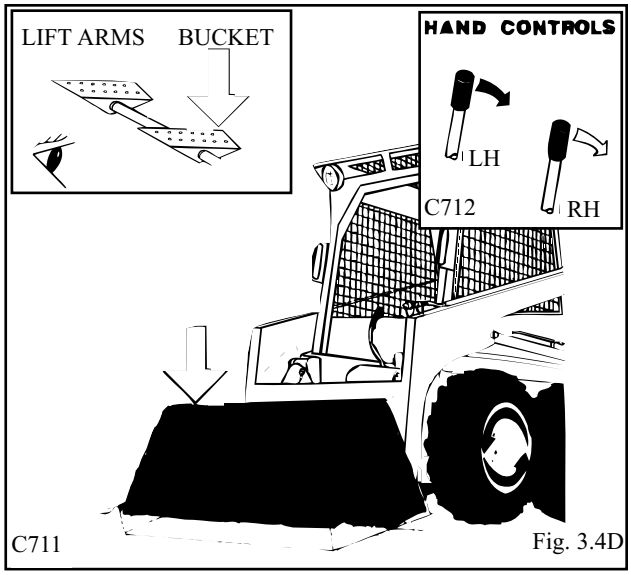


Fig. 3.4D

WARNING **To avoid personal injury: When starting or operating loader in an enclosed area make sure there is enough ventilation. Exhaust fumes can kill.**

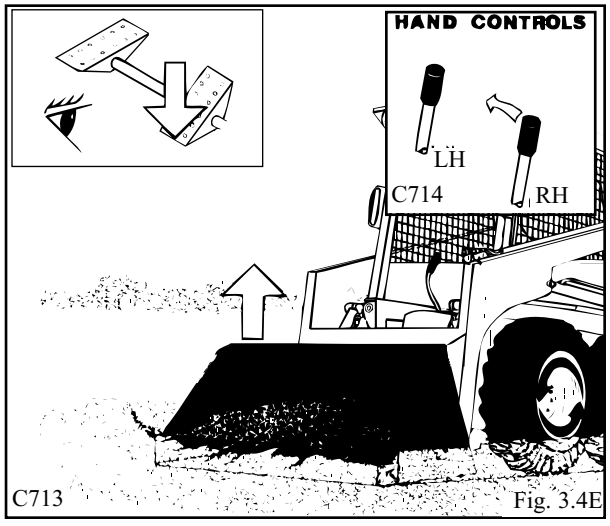


Fig. 3.4E

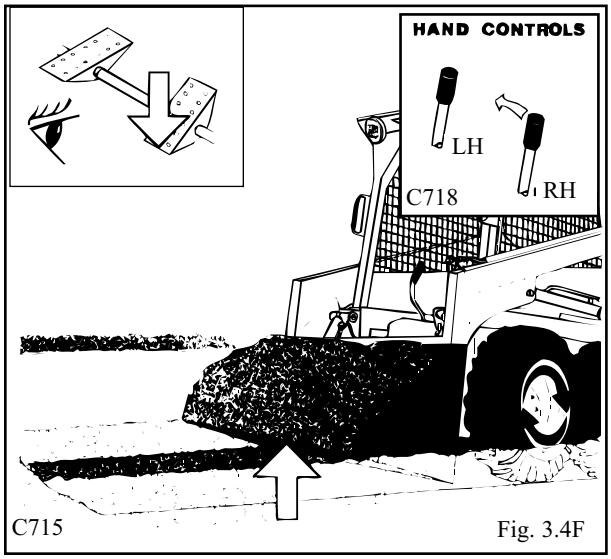


Fig. 3.4F

3. 5 LEVELING AND BACKFILLING

Spread dirt on uneven ground by pushing on the heel of the lift arm pedal (Fig. 3.5G) to raise the lift arms 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. 3.5G). To raise the lift arms and move the right hand control lever away from you to tilt the bucket down as you drive forward.

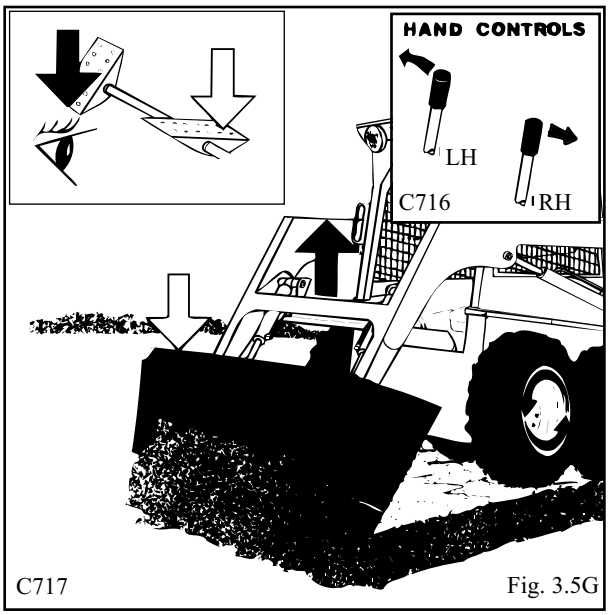


Fig. 3.5G

To level the ground; raise the lift arms and tilt the bucket down by pressing on the toe of the bucket pedal. (See Fig. 3.5H) Push firmly on the toe of the lift arm pedal to lock the lift arms in the 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 lift arms and tilt the bucket down by moving the R.H. lever away from you.

Move the L.H. control lever all of the way towards you (Fig. 3.5H) to place the lift arms 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.

To fill a hole (Fig. 3.5I) drive the loader slowly with the bucket low, up to the hole. As the bucket passes the edge of the hole,

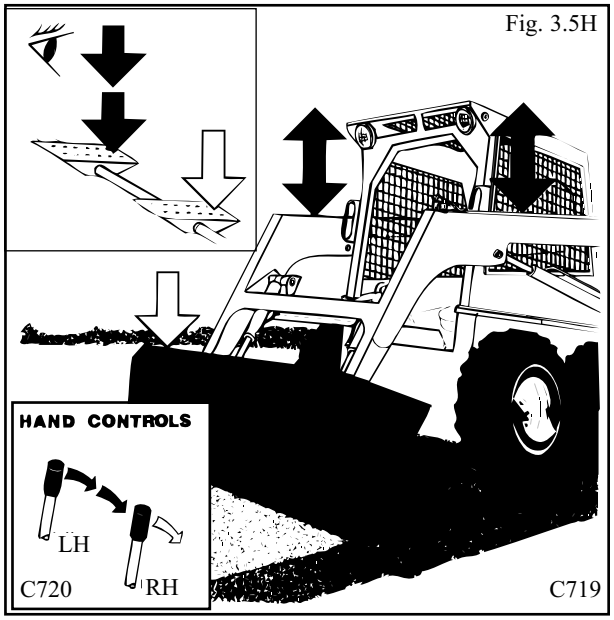


Fig. 3.5H

push on the toe of the bucket pedal to dump the bucket. When necessary raise the lift 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 lift arms to empty the bucket.

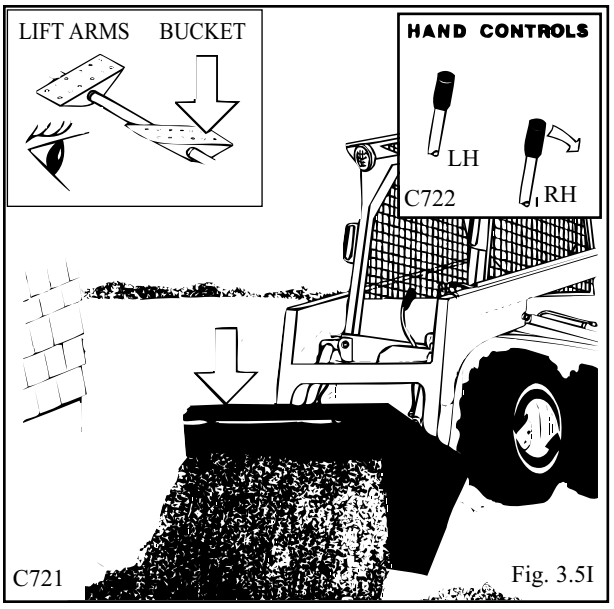


Fig. 3.5I

3.6 HAND AUXILIARY

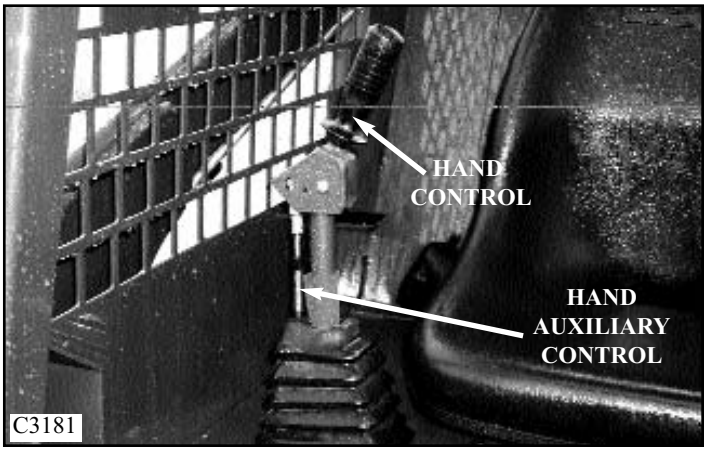
The Auxiliary Hand Control. Is located on the R.H. steering control lever (Fig. C2899) it is used to engage the loaders auxiliary hydraulic circuit to power attachments such as post hole augers, sweepers etc.

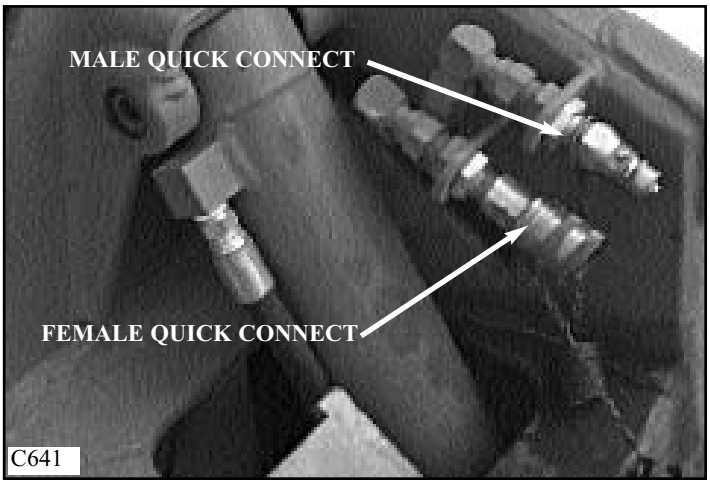
By pressing and holding the hand auxiliary control handle towards the left this provides hydraulic flow to the female quick connect coupling located at the front of the lift arms (Fig. C641). Releasing the hand auxiliary control handle returns the auxiliary hydraulic circuit to neutral, stopping hydraulic flow.

By pressing and holding the hand auxiliary control handle towards the right this provides hydraulic flow to the male quick connect coupling located at the front of the lift arms (Fig. C641). Releasing the hand auxiliary control handle returns the auxiliary hydraulic circuit to neutral, stopping hydraulic flow.

For continuous flow to the auxiliary hydraulic circuit, position the hand auxiliary control handle towards the extreme left. This provides continuous hydraulic flow to the female quick connect coupling located at the front of the lift arms (Fig. C641). To stop hydraulic flow to the auxiliary hydraulic circuit, return the hand auxiliary control handle to the neutral position.

NOTE: The optional right hand control lever Auxiliary Control Switch, if equipped, operates a Horn, or Hi-Flow hydraulics.





3.7 LIFTING

NOTE: THE PROTOUGH 2200 IS NOT EQUIPPED WITH A MEANS TO BE LIFTED BY A CRANE.

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 3.1-3).
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 3.1-3).
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.
4. Lower the restraint bar to deactivate 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.

IMPORTANT

Never install tie down chains across the bucket cylinders. Damage to the cylinders may occur.

⚠ WARNING

To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls 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.

IMPORTANT

Return the auxiliary control switch to OFF when not in use, or return the control pedal to the neutral position, otherwise starting may be impossible and damage to the starter may occur. Return toggle switch to neutral.

3. 9 SECURING AND TRANSPORTING

There are three tie down points provided for securing the skid steer while transporting. One at the lower front and two at the rear (Fig. 3.9).

Be sure the trailer and/or truck is of adequate size and capacity to safely transport your skid steer.

Measure the clearance height of the machine and trailer or truck, and post it in the cab of the truck.

Before loading the skid steer make sure the ramps and parking surface are free of all oil, grease, ice, etc. and of sufficient strength to support the load.

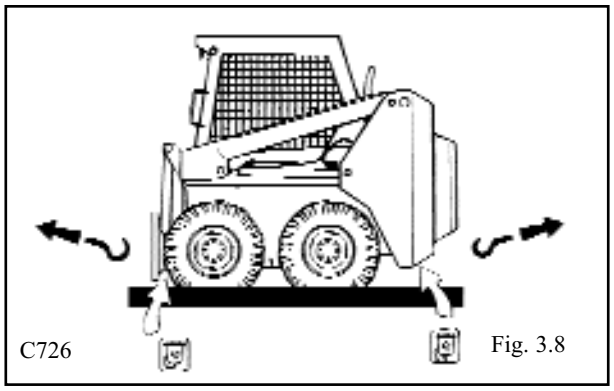
Know the local rules and regulations, and make sure your truck and trailer is equipped with the correct safety equipment.

When loading a skid steer with an attachment, always load the heavy end first.

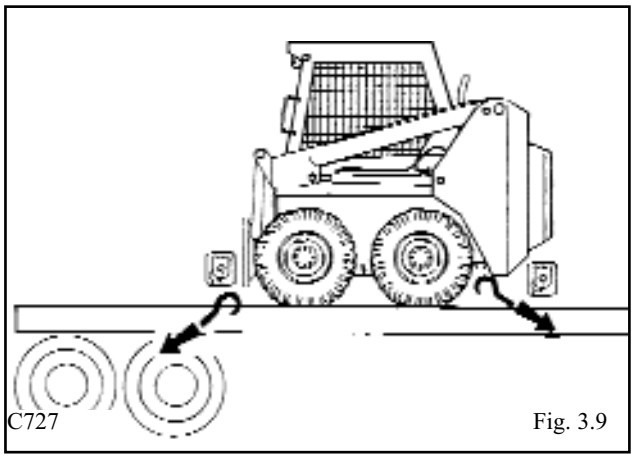
Once the skid steer has been loaded, lower the attachment to the floor, stop the engine and engage the park brake.

Install chains at the front and rear tie down locations, and securely attach to the transport vehicle.

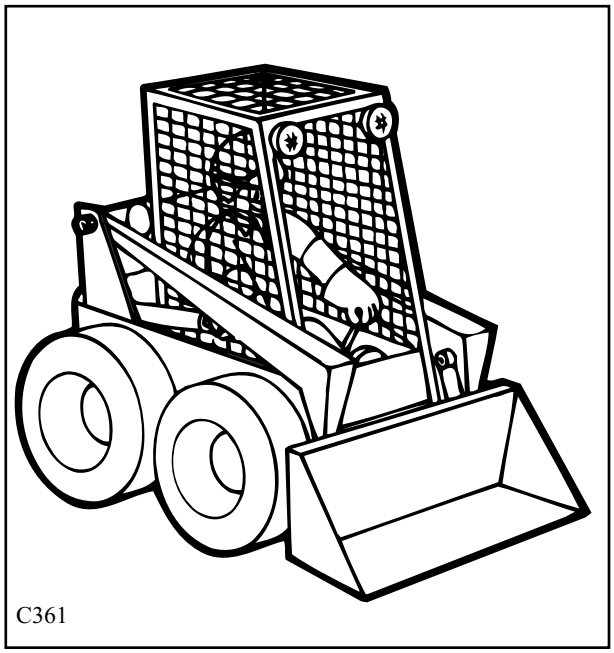
NOTE: Minimum 3/8 in. grade 40 chain is required

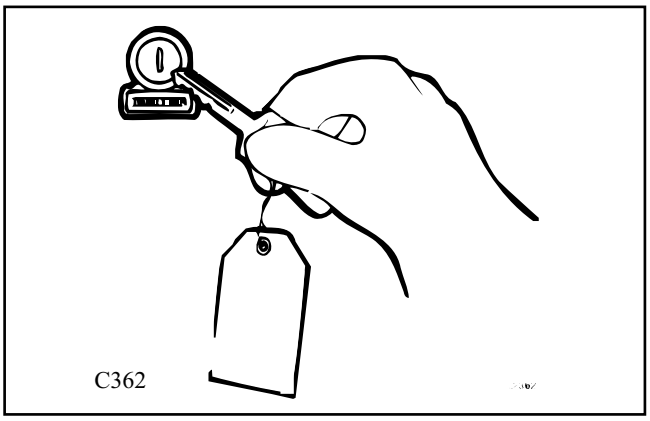


C726 Fig. 3.8



C727 Fig. 3.9


C361


C362

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 lift arm/bucket controls are locked in neutral
- Unbuckle seat belt
- Remove ignition key and lock covers and closures

⚠ WARNING

To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls 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.

IMPORTANT

When moving your skid steer on or off a transport vehicle, drive slowly and keep the machine centered.

⚠ WARNING

Ramps must be of sufficient strength to support the weight of your skid steer. Wooden ramps can break and cause personal injury.

3. 10 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.

WARNING

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

1. Lift Arm Height Is Sufficient To Engage Lift Arm Support Pins

Engage lift arm 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. Remove the solenoid, then remove the lock pin and spring assembly. (Fig. 3.11B) Once the lock pin and spring are removed, the lift arm 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 dis-engage lift arm support pins. Move the lift arm pedal or control lever to lower the lift arms to the ground.

2. Lift Arm Height Is Not Sufficient To Engage Lift Arm 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 some one place a suitable support under the lift arms (e.g. 4" x 4" Lumber) or a piece of angle iron between lift cylinder end cap and lift cylinder rod mount.

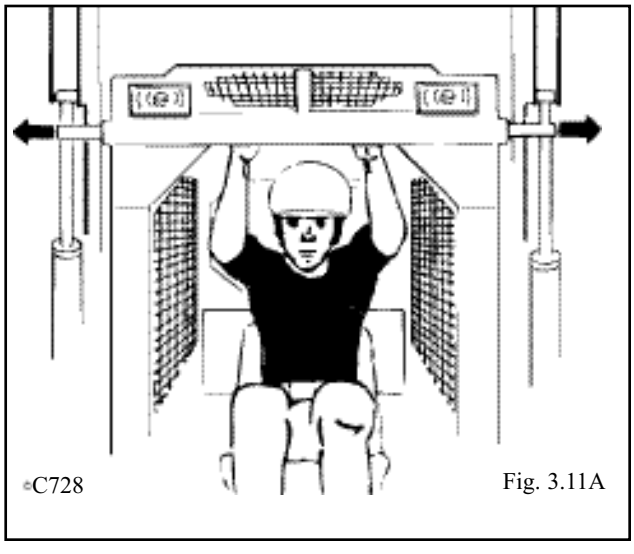


Fig. 3.11A

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 (Fig. 3.11B1). Unplug the electrical wire and remove the knurled nut holding the solenoid on the spool lock. Remove the solenoid, then remove the lock pin and spring assembly. (Fig. 3.11B2). Once the lock pin and spring are removed, the lift arm 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 lift arm pedal or control lever to lower the lift arms to the ground.

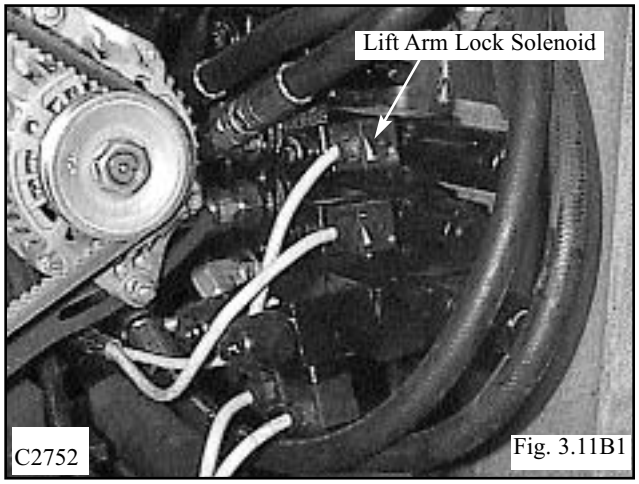


Fig. 3.11B1

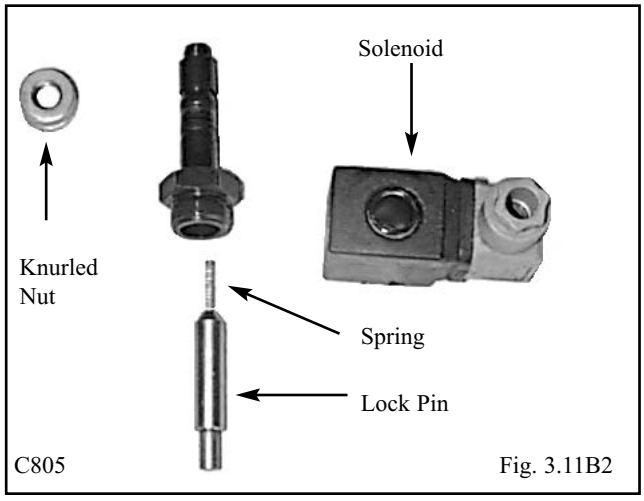


Fig. 3.11B2

4. MAINTENANCE

4. 1 PREVENTIVE MAINTENANCE SERVICE SCHEDULE

ITEM	SERVICE REQUIRED	8 HOURS	50 HOURS	150 HOURS	300 HOURS	1000 HOURS
Engine Oil	Check level and add if necessary. Use API Classification CF oil.	■				
Hydraulic Oil	Check level and add if necessary. Use10W30 API Classification SE/CD or 20W50 API Classification SE/CD oil.	■				
Radiator & Oil Cooler	Check cooling fins for dirt. If necessary blow out with compressed air.	■				
Air Cleaner	Empty dust cap. Check condition indicator and service or replace element as required.	■				
Tires and Wheel Nuts	Check for low pressure or tire damage. inflate 6.00 x 15 tires 50 PSI (345 kPa),12.00 x 16.5 tires 40 -45 PSI (276-310 kPa). Check wheel nut torque 100-110 ft. lbs. (136-149 N m)	■				
Safety Equipment	Check all safety equipment for proper operation and condition. Seat belt, lift arm supports, quick-tach locks, parking brake, steering locks, safety treads, front shield and cab side screens. If necessary lubricate foot pedal and steering control linkages, springs and shafts with a silicone based lubricant. If necessary repair or replace.	■				
Decals	Check for damaged safety or instruction decals (See Section 5.4). If necessary replace.	■				
Lubrication	Grease all hinge pin fittings and pivot bearings until excess shows.	■				
Hydraulic Oil Filter(s)	Replace hydraulic oil filter element. Initial change only.		■			
Safety System Linkages and Springs	Check and if necessary adjust. Lubricate foot pedal lock springs, shaft and linkage with a silicone based lubricant.		■			
50 Hour Service	Perform complete 50 hour service (See Section 4.3).		■			
Engine Oil	Replace engine oil. Use API Classification CF oil. (See Section 4.8-3). Initial change only.		■			
Engine Oil Filter	Replace engine oil filter. See 4.7C. Initial change only.		■			
Final Drive	Check chain and sprocket condition. Check every 150 hours.			■		
Hydraulic Oil Filter(s)	Replace hydraulic oil filter element(s).			■		
Preventative Maintenance Service Check	It is recommended as a preventative maintenance procedure that the 50 hour service be repeated every 150 hours. (See Section 4.3)			■		
Engine Oil	Replace engine oil. Use API Classification CF oil. See 4.8-3. Replace every 150 hours.			■		
Engine Oil Filter	Replace engine oil filter. See 4.8-3. Replace every 300 hours.				■	

ITEM	SERVICE REQUIRED	50 HOURS	150 HOURS	300 HOURS	800 HOURS	1000 HOURS
Engine Fuel Filter	Replace engine fuel filter. (See Section 4. 8-5).			■		
Engine Valve Clearance	Adjust				■	
Final Drive	Change final drive lubricating oil. Use 10W30 API Classification SE/CD oil.					■
Hydraulic reservoir	Remove and replace the 100 micron suction element in the oil reservoir. (See Section 4.7-3). Change hydraulic oil. Replace with 10W30 API Classification SE/CD oil or 20W50 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

⚠ WARNING

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

4. 2 DAILY SERVICE CHECK

1. Hydraulic Oil Level

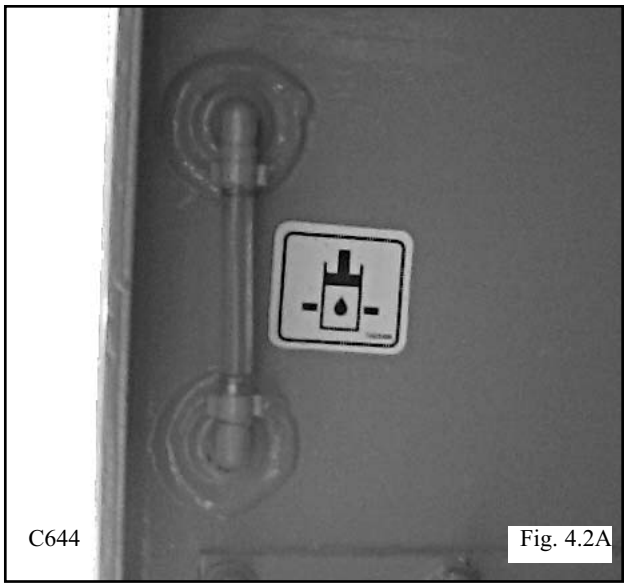
Check the oil level with the machine on a level surface with the lift arms down and the attachment grounded. Open the rear door and check the oil level sight glass (Fig. 4.2A). If oil is apparent the oil level is satisfactory.

If necessary to add oil, remove the reservoir cap located at the top of the oil reservoir and add oil until oil appears in the oil level sight glass.

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

WARNING

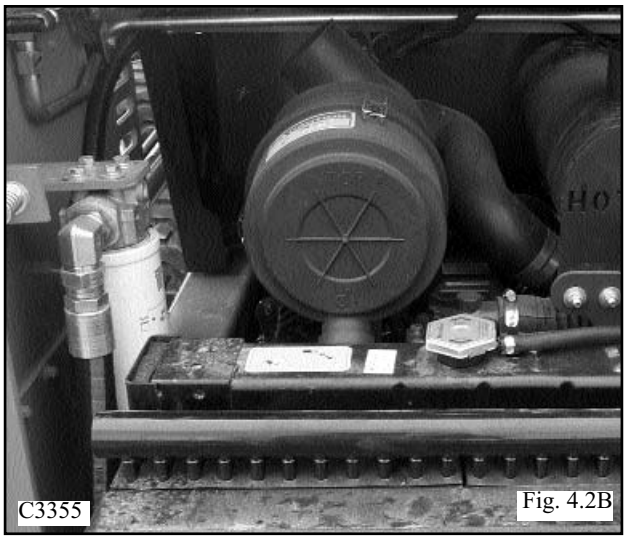
To avoid personal injury: Stop, Cool and Clean the engine of flammable materials before servicing. Never service or adjust machine with engine running.



C644 Fig. 4.2A

2. Air Cleaner

The loader is equipped with an air cleaner restriction warning lamp, should this lamp illuminate, shut off the engine and determine cause. Possibly a plugged air filter. Fig. 4.2B shows the air cleaner.



C3355 Fig. 4.2B

3. Tires and Wheel Nuts

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

12.00 x 16.5 . . . . 40-45 PSI (276-310 kPa)

Tires can be inflated to 50 PSI (345 kPa) when operating on hard, flat surfaces.

To prevent shearing of the wheel studs and rim damage check wheel nuts for proper torque 100-110 lbs. ft.(136-149 N m) daily (Fig. 4.2C). After changing a rim, Check wheel nuts hourly, until the reading stabilizes.

C1658 Fig. 4.2C

TORQUE WHEEL NUTS 100-110 LBS. FT. (136-149 N m)

4. Safety Equipment

Check all safety equipment for proper operation and condition - seat belt, lift arm supports, seat bar, steering neutral lock, parking brake, quick tach lock, shields, safety treads and lift arm lock down. Lubricate all linkages, springs and pivot points with a silicone based lubricant. Repair or replace if necessary.

5. 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.

6. Lubrication

There are sixteen (16) grease fittings located in the loader that require lubrication every eight hours. Lubricate with a good quality multi-purpose lithium based grease. Apply grease until excess shows. Refer to the service schedule for complete service details.(See Fig. 4.2F). The sixteen (16) lubrication points are:

Rear Lift Arm Pivots (2)
Lift Cylinder Bushings (4)
Bucket Cylinder Bushings (4)
Lift Arm Supports (2)
Quick Tach Pivot and Lock Pins (4)

7. Engine Oil Level

Check the oil before engine start up. If the engine has been running let it cool for at least 5 minutes to allow the oil to drain back to the oil pan.

To check the oil level, check with the loader on level ground, open the rear door and remove the dipstick (Fig. 4.2H1).

Keep the oil level between the full and low mark on the dipstick (Fig. 4.2H2). Do not fill above the full mark. Use API Classification CF oil.

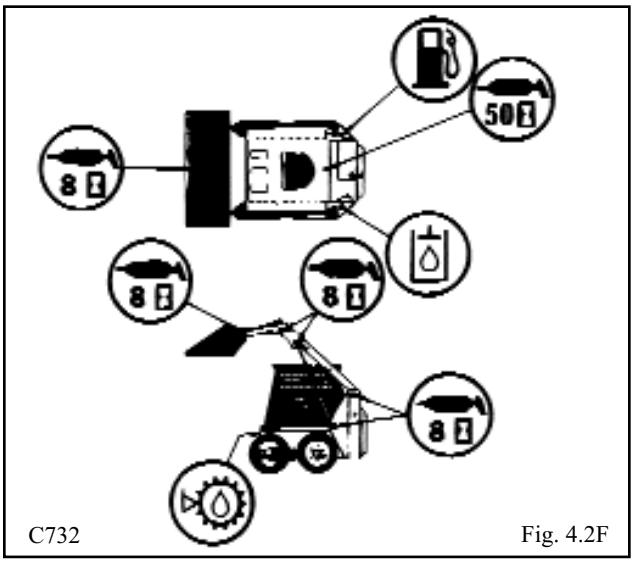
8. Radiator / Oil Cooler Service

The radiator oil cooler fins must be kept free of debris otherwise overheating of the hydraulic oil or engine will occur. Check the cooler and if necessary remove debris by flushing with compressed air (Fig. 4.2G).

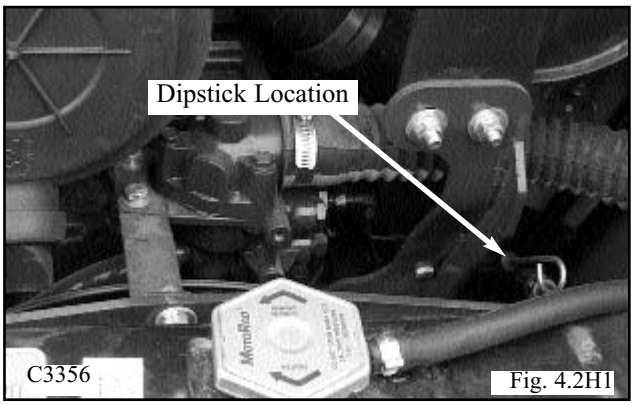
9. Engine Cooling System

The engine cooling system fluid is a 50/50 mixture of ethylene glycol and water. To maintain the fluid level, add coolant to the top of the radiator (Fig. 4.2G) so that it is level with the bottom of the filler neck. The coolant level should be checked daily when the engine is cold.

⚠ WARNING — **To avoid personal injury never add coolant when the engine is running or is hot.**

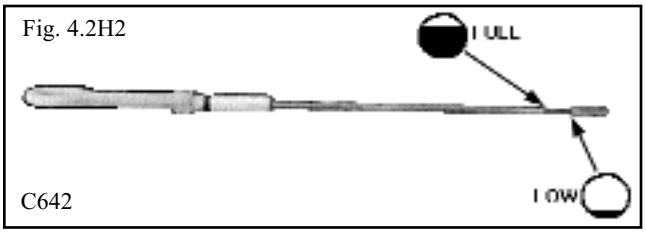


C732 Fig. 4.2F

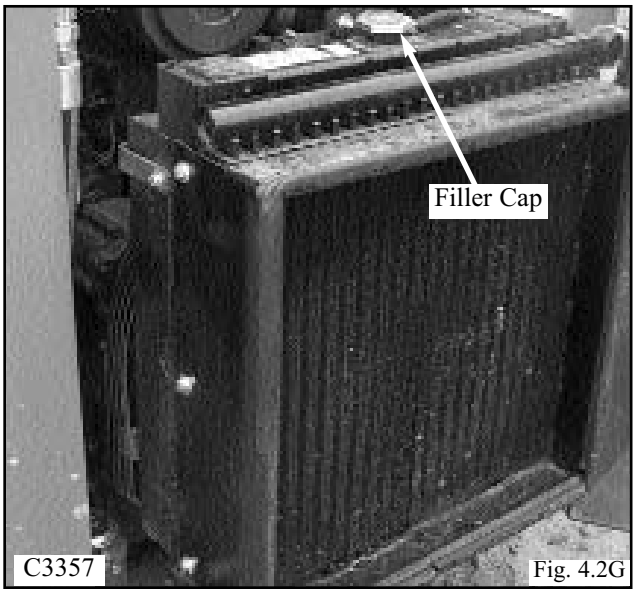


C3356 Fig. 4.2H1

Fig. 4.2H2



C642



C3357 Fig. 4.2G

4. 3 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 and Filter:

Change the engine oil and filter. Use only original replacement parts. Change the oil every 150 hours thereafter. Change the filter every 300 hours thereafter.

1.2 Radiator:

Check the coolant level. If necessary flush the radiator with compressed air. A dirt buildup on the radiator cooling fins can cause both engine and hydraulic system overheating. Check the foam sealing ring on the fan drive.

1.3 V-Belt Tension and Condition:

Check v-belt for cuts or wear, if necessary replace. Check tension and adjust as shown in Section 4.8-4, page 42.

1.4 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. Replace fuel filter every 300 hours.

1.5 Air Intake and Cleaner System:

Visually inspect the air cleaner system and be sure all hose clamps are secure and no hoses are damaged.

1.6 Exhaust System:

Visually inspect the exhaust system and ensure all clamps are secure and the manifold bolts/nuts are tight.

1.7 Engine Speed:

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

IMPORTANT

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

2 Hydraulic / Hydrostatic

2.1 Hydraulic Oil Filter:

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

2.2 Hydrostatic Charge Filter:

Change this hydraulic filter now. Change this filter every 150 hours thereafter.

2.3 Hydraulic Oil Level:

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

2.4 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, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls 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.

2.5 Cylinders:

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

2.6 Hydraulic Functions:

Check that the following operate properly: control valve float position, auxiliary hydraulics, pedal and electrically controlled, hydraulic cylinders and fan drive.

2.7 Pumps & Motors, Leakage:

Inspect pumps and motors for leaks.

2.8 Oil Cooler:

Inspect the oil cooler for leaks, fin damage or clogged with dirt. If necessary flush fins with compressed air.

2.9 Fan Drive:

Inspect fan, bolts, fan belt and guard to ensure there is no buildup of dirt, trash, or wear. Use compressed air to clean the area. Inspect all hydraulic hoses for leaks, loose or damaged connections.

3 Final Drive

3.1 Oil Level:

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

3.2 Drive Chain Condition:

Check drive chains for any sign of wear or damage.
Check lubrication oil in housing for signs of contamination.

3.3 Hydrostatic Motor Mounting Bolts:

Check torque 80 ft. lbs. (108.8 N.m.)

3.4 Axle Bearing End Play:

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

3.5 Idler Sprocket Bearing End Play:

Check both the idler sprocket and axle bearings for loss of bearing pre-load. If necessary, adjust the bearings for zero end play.

3.6 Axle Seal:

Inspect axle seal area. Clean area of debris build up and visually check for seal damage, replace as required.

4. MAINTENANCE

4 Controls and Safety Equipment

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 control levers lock in neutral with seat bar up. Lubricate linkage with a silicone based lubricant.

4.2 Hydraulic Controls, Operation and Linkage:

Check that the hydraulic controls, foot pedals or hand controls, operate freely without binding. Before leaving the operator seat, ensure the controls are locked. Raise the safety bar and unbuckle the seat belt, to test the seat switch, grasp the seat bar and raise your weight off the seat and check pedals at the same time to ensure they are locked. If the safety controls are malfunctioning or require adjustment, consult your Thomas Equipment Dealer for service. Lubricate linkage with a silicone based lubricant.

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.

4.5 Lift Arm Support Operation:

Check that the lift arm supports operate without binding.

4.6 Quick-Tach, Operation & Linkage:

Ensure the quick-tach linkage operates smoothly without binding and engage completely.

4.7 Seat Belt:

Check seat belt condition. If necessary replace.

5 Electrical

5.1 Battery (s):

Maintenance Free.

5.2 Battery Terminals:

Check battery terminals for corrosion. If necessary, clean.

5.3 Starter Operation:

Engage and disengage the starter a few 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- heater indicator, work lights, seat and seat belt switch, seat bar switch and all optional equipment to ensure they are operating correctly.

6 Grease/Lubrication

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

Rear Lift Arm Pivots (2)
Lift Cylinder Bushings (4)
Bucket Cylinder Bushings (4)
Lift Arm Support (2)
Quick-Tach Pivot and lock pins (4)
*Brake Shaft Pivot Bearings (2)
*Control Shaft Pivot Bearings (2)

* Items accessible by removing the seat and hydrostatic shield.

7 General

7.1 Tire Pressure:

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

12.00 x 16.5 . . . . . 40 - 45 PSI (276-310 kPa)
Flotation tires may be inflated to 50 PSI (345 kPa) on hard flat surfaces.

7.2 Wheel Nut Torque:

Check and torque wheel nuts to 100-110 ft. lbs. (136-149 N.M.).

7.3 Condition of Cab:

Inspect both the seat and seat belt. Ensure all safety and instruction decals are in place. Inspect sound insulation, side windows and door operation for machines equipped with cab enclosure kits. Inspect for structural damage and alterations to R.O.P.S.

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. Ensure owners and operators manual, safety manual and 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.

WARNING

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

4. 4 150 HOUR SERVICE CHECK

The following service check is to be performed by your dealer after the first 150 hours of operation.

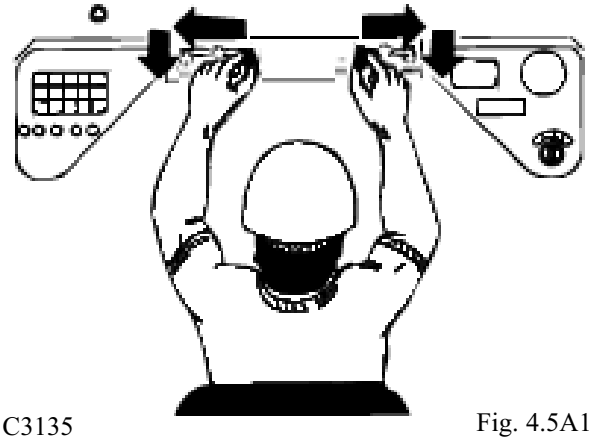
1. It is recommended that the 50 hour check be repeated at 150 hours (See Section 4.3).

4. 5 SERVICE ACCESS

1. Lift Arm Support

For safety while performing regular service or maintenance work, the loader is equipped with lift arm support pins. The lift arm support pins when extended prevent the lift arms from dropping if hydraulic pressure is relieved or the hydraulic controls are accidentally cycled.

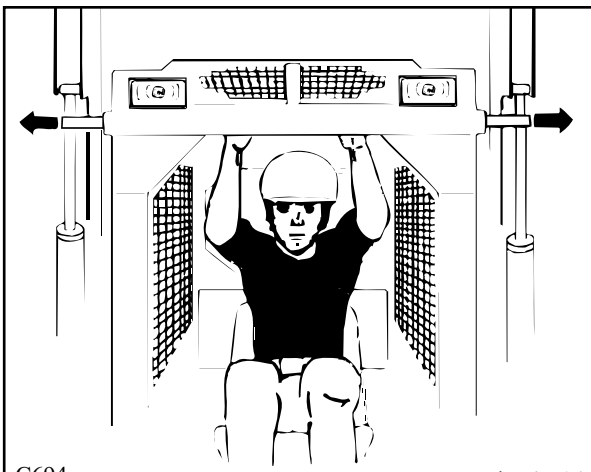
To operate the lift arm support, first remove any bucket or attachment from the quick-tach; raise the lift arms to full height. Raise the lift arm support handle (fig. 4.5A1) up and push out toward lift arms to extend the lift arm supports. (fig. 4.5A2) Slowly lower the lift arms down on to the pins.To retract the lift arm supports, lift the lift arms off of the pins before retracting pins.



C3135 Fig. 4.5A1

⚠ WARNING

To avoid personal injury: Do not leave lift arms up unless the lift arm support locks are engaged.



C694 Fig. 4.5A2

IMPORTANT

Fully retract lift arm support pins before raising or lowering lift arms.

2. Seat Removal

The seat assembly 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. (Fig. 4.5B) Lift the seat assembly out of the machine. When installing the seat, be sure the seat plate is in place at the rear.

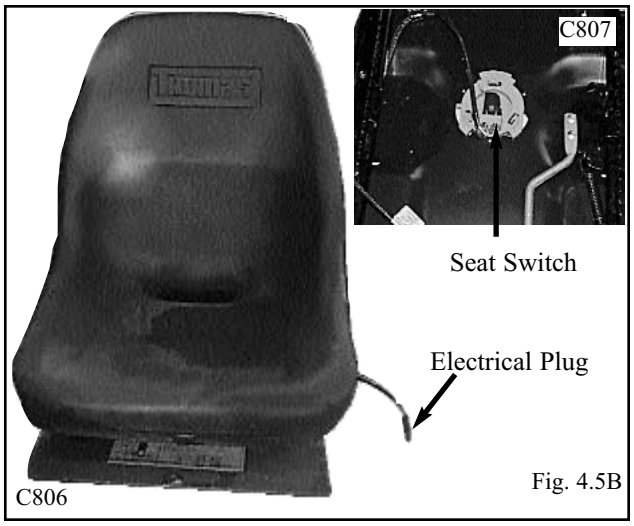


Fig. 4.5B

WARNING

To avoid personal injury: DO NOT charge a frozen battery because it can explode and cause personal injury. Let the battery warm to 60°F.(15.5°C.) before putting on a charger.

3. Battery Access

The batteries are located in a compartment found behind the operators seat (Fig. 4.5C). Remove the seat and remove the bolt holding the battery cover in place (Fig. 4.5D). The battery compartment is hinged with a prop rod to hold open.

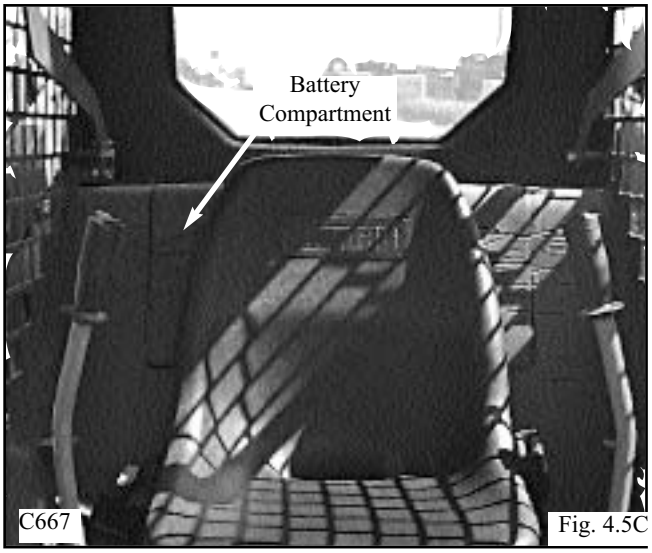


Fig. 4.5C

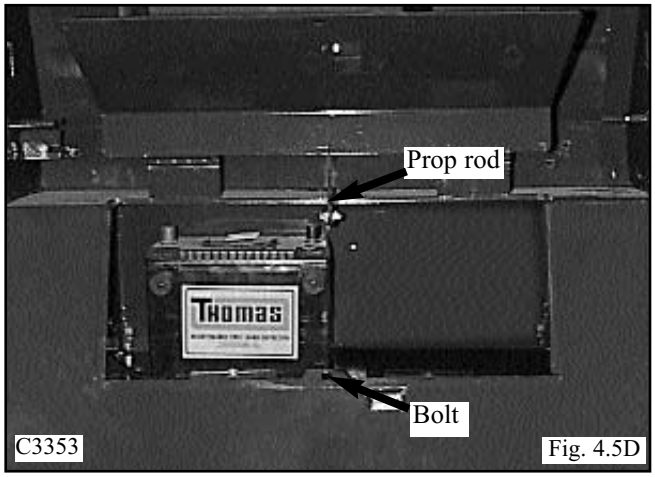


Fig. 4.5D

4. 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; pull outward releasing the door catch and swing the door open. (Fig. 4.5E1). Lower the engine cover before closing the rear door (See Fig. 4.5E2).

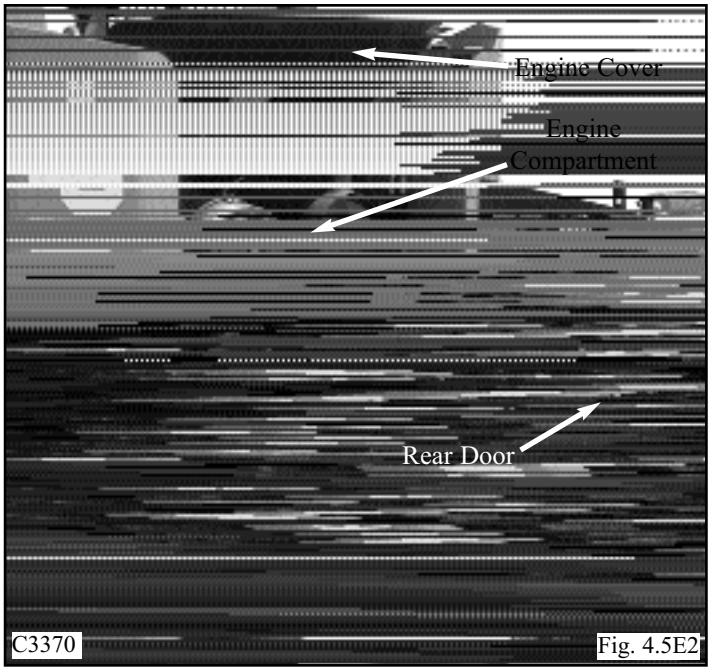


Fig. 4.5E2

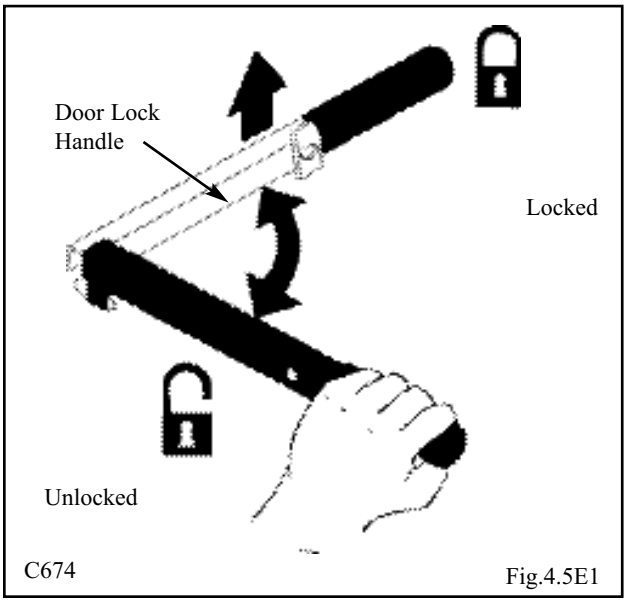


Fig.4.5E1

IMPORTANT

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

4. 6 FINAL DRIVE MAINTENANCE

1. Oil Level Check

The loader has two independent final drive housings. Check the lubricating oil level with the loader on a level surface. Remove the oil level check plug (Fig. 4.6A) located between the two tires to determine the oil level. The oil level should be checked after 50 operating hours and every 150 hours thereafter. It is recommended the oil be changed after 1000 operating hours or if it shows signs of contamination.

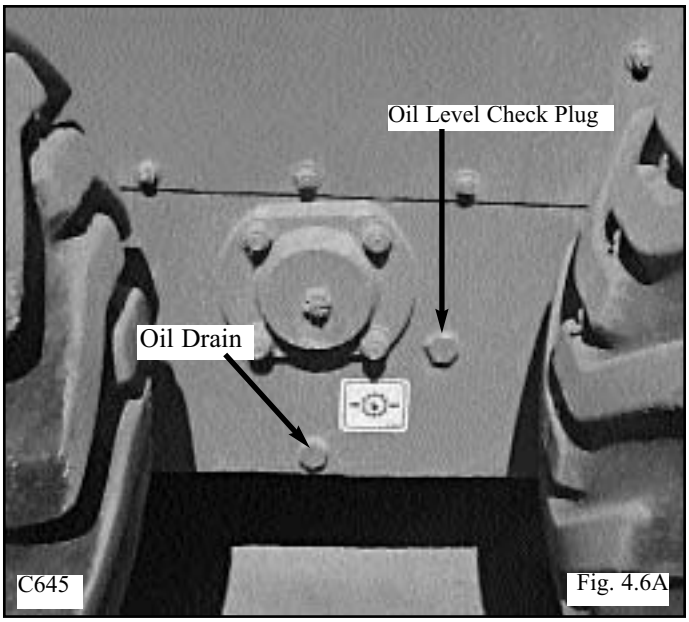


Fig. 4.6A

2. Adding Oil

Add oil with the loader on level ground. Remove the oil level check plug (Fig. 4.6.A) on the final drive housing. Remove the seat and hydrostatic shield. Remove the filler cap. (Fig. 4.6B) Fill with 10W30 API Classification SE/CD to the level of the check plug.

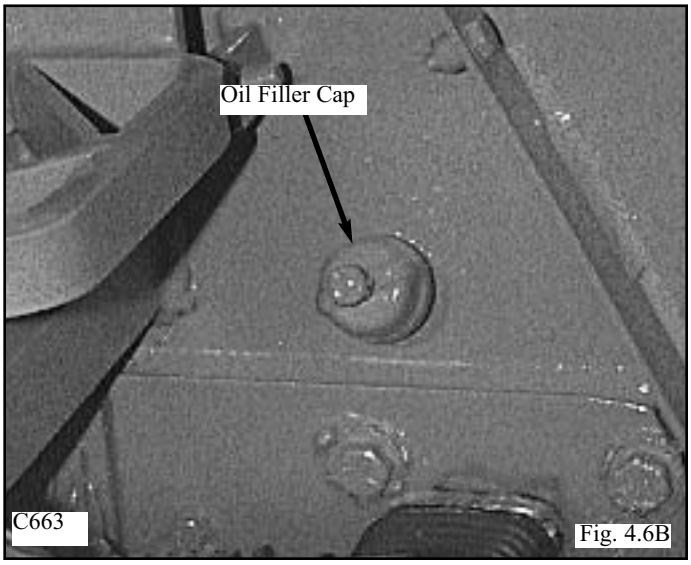


Fig. 4.6B

3. Drive Chain, Axle and Sprocket Inspection

The condition of the drive chains should be checked after the first 50 hours of operation and every 150 hours thereafter.

To inspect, block the loader securely with all four wheels clear off the ground. Remove both the front and rear wheels. On reassembly torque the wheel nuts to 100-110 ft. lbs. (136-149 N m). Remove the inspection cover on the side of the chain drive housing.

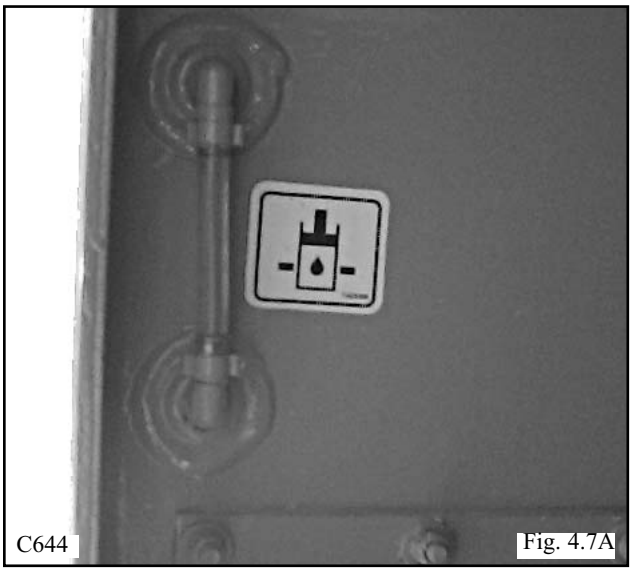
Inspect the chain for any sign of wear, damage or excessive looseness. Inspect the sprockets for any sign of damage or excessive wear. Inspect the lubricating oil for signs of contamination. Check both the idler sprocket and axle bearings for loss of bearing preload. If necessary adjust the bearings for zero end play.

Check the axle seals for leaking oil or damage. Replace seals at first sign of problem.

4. 7 HYDRAULIC/ HYDROSTATIC SYSTEM MAINTENANCE

1. Oil Level Check

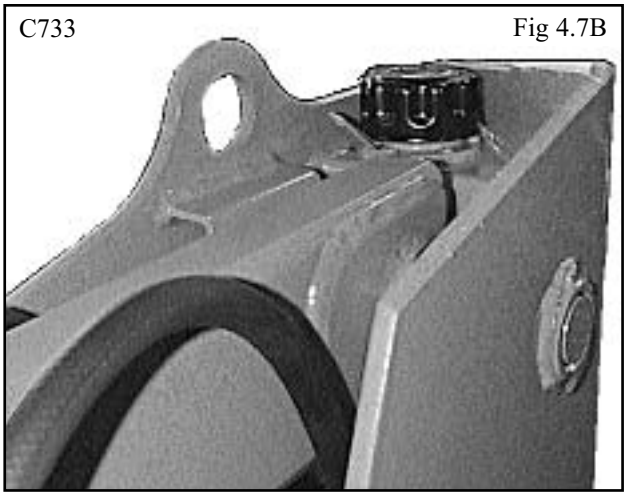
Check the oil level of the hydraulic reservoir with the machine on a level surface with the lift arms down and the attachment grounded. Shut off the engine. Open the rear door and check the oil level sight glass (Fig. 4.7A). If oil is apparent the level is satisfactory.



C644 Fig. 4.7A

2. Adding Oil

To add oil, remove the oil filler cap located at the top of the oil reservoir (Fig. 4.7B). Check and ensure the filter screen in the filler neck is undamaged. Add 10W30 or 20W50API Classification SE/ CD oil until oil is visible in the oil level sight glass (Fig. 4.7A).



C733 Fig 4.7B

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

WARNING

To avoid personal injury, lower the lift arms, shut off the engine, raise the seat bar and cycle the hydraulic and steering controls 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. Hydraulic Filter Replacement

The hydraulic oil filter (4.7 C) must be changed after the first 50 hours of operation and every 150 hours thereafter.

To change the filter; shut off the engine, lower the lift arms, ground any attachment and set the parking brake. Open the rear door and using an oil filter wrench remove the filter element. Lubricate the new filter seal with system fluid and reinstall hand tight.

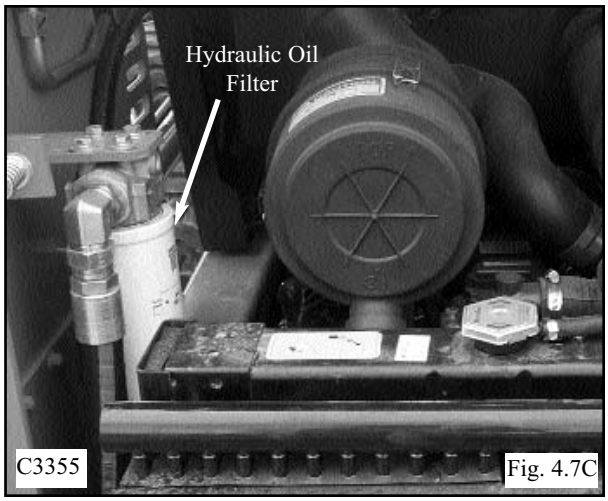


Fig. 4.7C

4. Draining System Fluid

Change the hydraulic oil:

1. After 1000 operating hours.
2. If the oil has become contaminated.
3. After any major hydrostatic repair.

To drain the oil: remove the drain plug located at the bottom of the reservoir (Fig. 4.7D). Have a container(s) ready to hold approximately 15 gallons (58 liters) of fluid. Remove any metal particles stuck to the magnet. Seal the plug with teflon tape when replacing.

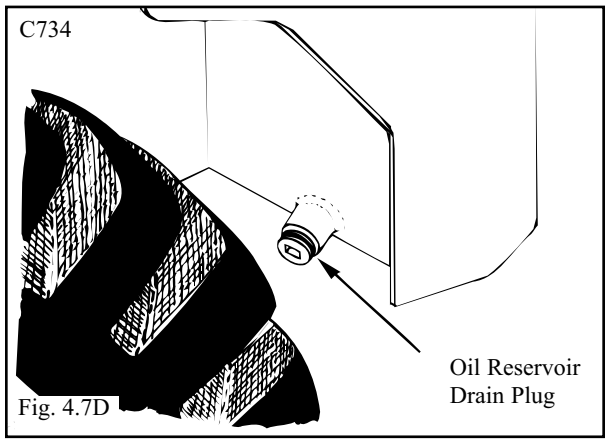


Fig. 4.7D

WARNING

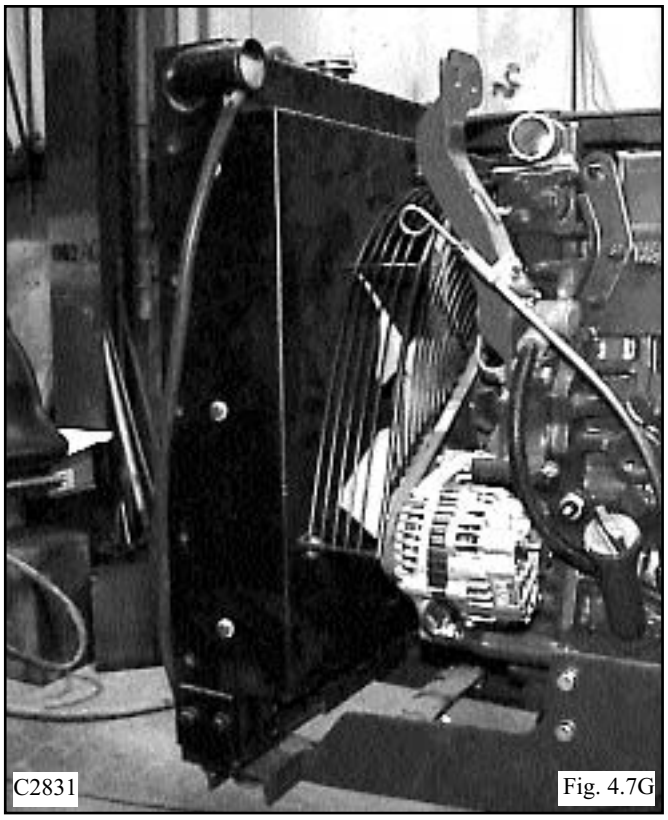
To avoid personal injury: Stop, Cool and Clean the engine of flammable materials before servicing. Never service or adjust machine with engine running.

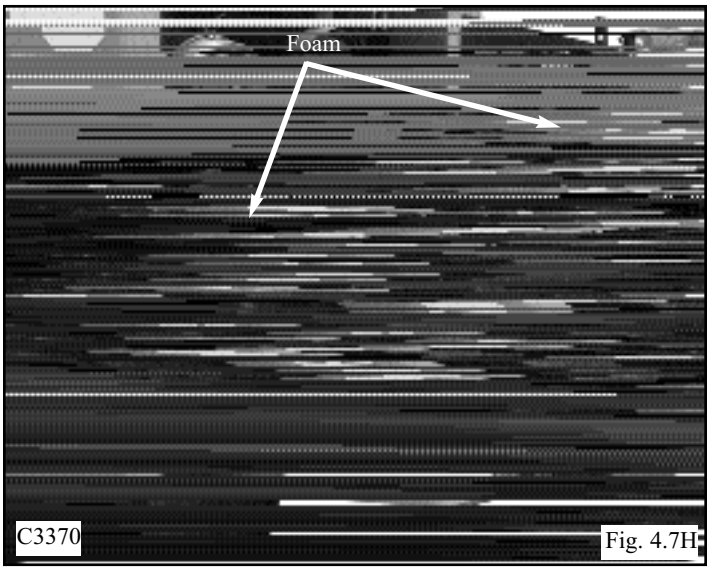
5. Oil Cooler and Cooling Fan

Oil returning from the control valve is circulated through the oil cooler before being sent to other parts of the hydraulic system.

An engine cooling fan drives air through the oil cooler when the rear door is closed. Refer to Figure 4.7G.

The oil cooler is rated at 1000BTU/minute. The oil cooler should be checked daily for dirt buildup on the cooling fins. If the air flow is restricted through the cooling fins, overheating of the hydraulic system may occur. Clean any dirt buildup with compressed air. Flush with water if necessary. (Fig. 4.7H shows the radiator setup for the ProTough 2200).


C2831 Fig. 4.7G



C3370 Fig. 4.7H

⚠ WARNING

To avoid eye injury always use safety goggles when cleaning with compressed air.

4. 8 ENGINE MAINTENANCE

1. Engine Specifications

Make ..... Kubota
Model.....V3300 T - TMS
No. of Cyls 4
Horsepower ..... 87 (64.7 kW) @ 2600 RPM
Max. High Idle..... 2700 RPM
Max. Torque.....206 ft./lbs (280 N m) @ 1400 RPM
Displacement ..... 202.53 in.^{3} (3318 c.c.)
Engine Oil ..... 14 qt. (13.2 L)
Firing Order ..... 1 - 3 - 4 - 2
Alternator..... 60 Amp (Internal Regulator)
Oil Check..... Daily
Oil Change..... 150 hrs.
Filter Change ..... 300 hrs.

2. Oil Level Check

Check the oil before engine start up. If the engine has been running let it cool for at least 5 minutes.

To check the oil level, stop the engine with the loader on level ground, open the rear door and remove the dipstick (Fig. 4.8B).

Keep the oil level between the full and low mark on the dipstick. Do no fill above the full mark.

3. Engine Oil and Filter Replacement

Operate the engine until warm, approximately 5 minutes. Stop the engine.

Remove the cap on the engine oil drain hose located at the bottom of the engine.(See fig. 4.8C1) Remove the oil filter (Fig. 4.8C2). Clean the filter housing surface. Put clean oil on the seal of the new filter and install the filter hand tight.

Replace the cap on the engine oil drain. Remove the filler cap and add 13 liters (14qts) of API classification CF engine oil. Start the engine and run for 5 minutes. Stop the engine and check for leaks. Recheck the oil level and add oil until the level is at the top mark on the dipstick.

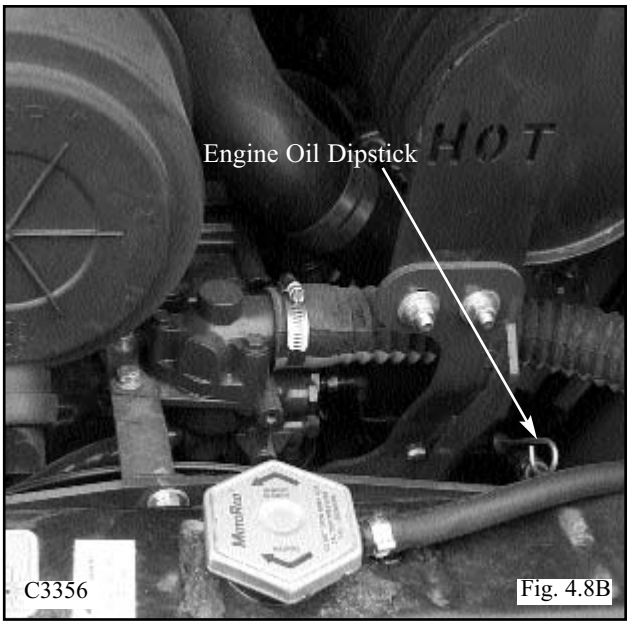


Fig. 4.8B

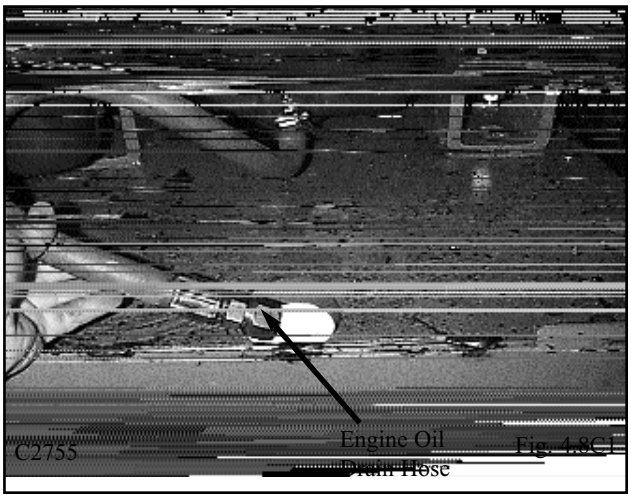


Fig. 4.8C1

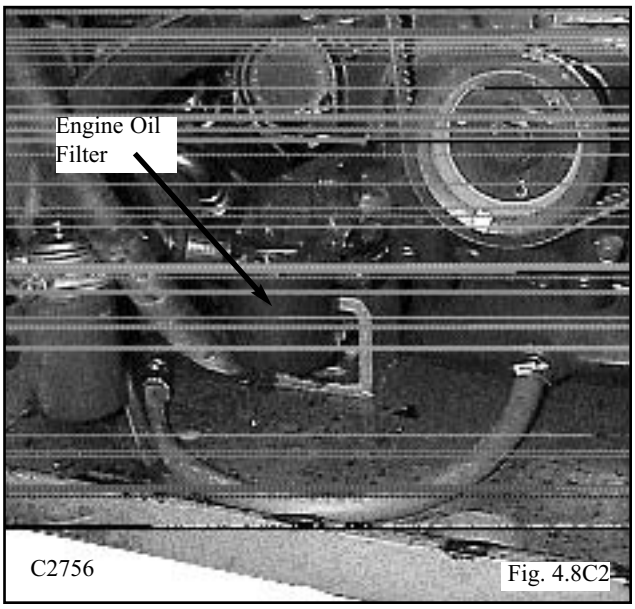


Fig. 4.8C2

4. V-Belt Tension

Check the V-belt tension midway between the crankshaft pulley and alternator pulley (Fig. 4.8D2). Deflection should be between 1/4 to 3/8 in. (7-9 mm).

Note:This figure shows the ProTough 2200 rear engine assembly. The fan has been removed for clarity refer to Fig. 4.8D2.

WARNING

To avoid personal injury do not check belt tension while the engine is operating.

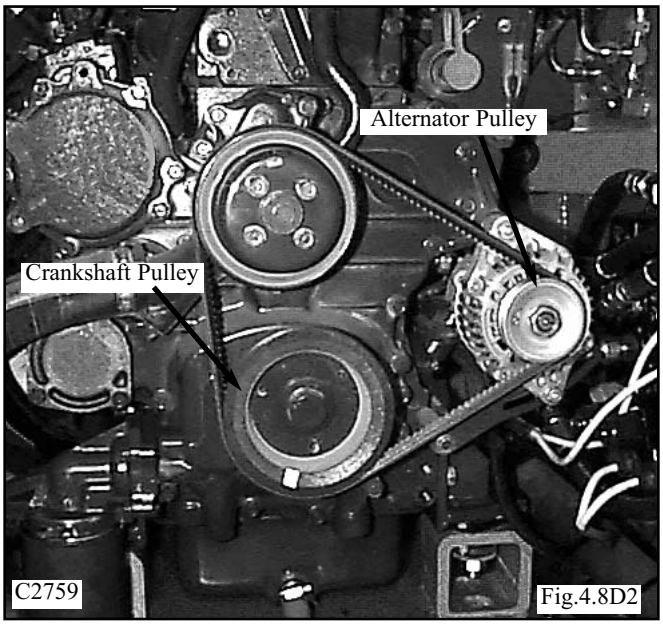
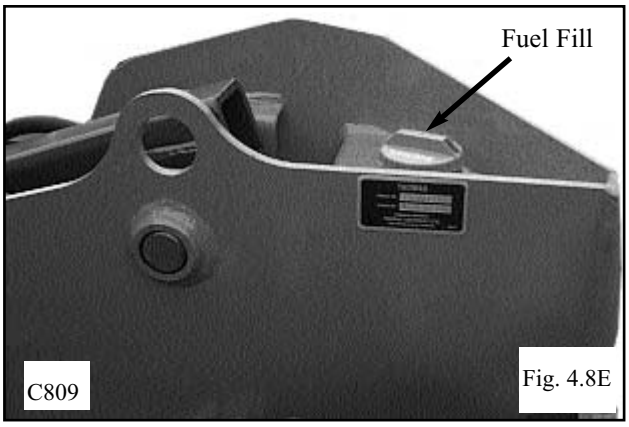


Fig.4.8D2

5. Adding Fuel

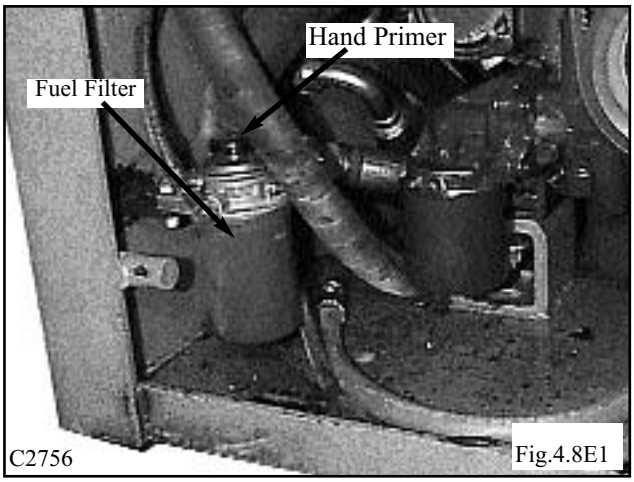
Use No. 2 diesel fuel only. Total tank capacity 18 gal.(68 l). Before adding fuel to the loader the key switch must be off and the engine must be cool. Remove the fuel cap (Fig. 4.8E). Use a clean approved safety container to add fuel. Add fuel only in an area that is well ventilated and away from open flames or sparks - NO SMOKING!



6. Fuel Filter Replacement

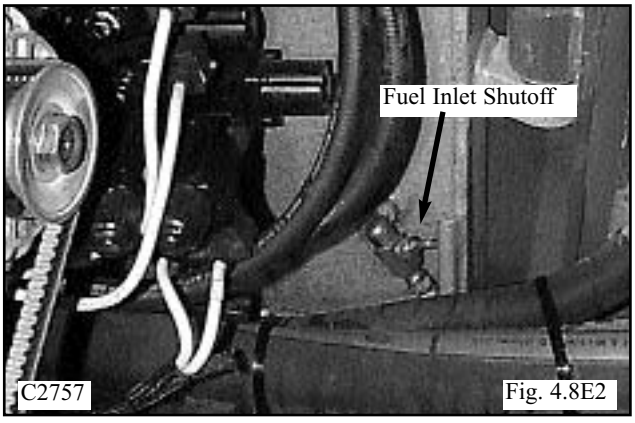
The fuel filter is located in the engine compartment on the left hand side. (Fig. 4.8E1) The fuel filter should be removed every 100 hours and any water or dirt found in the element drained off. Change the filter every 300 hours.

To replace the filter; close the fuel inlet line shut-off located on the side of the fuel tank (Fig. 4.8E2). Remove the filter element. Lubricate the seal on the new filter and install the filter hand tight. Open the fuel inlet shut-off. Open the bleed screw on the injection pump (Fig. 4.8E3) and start the engine. If the engine fails to continue to run, bleed the system using the hand primer pump located on top of the fuel filter assembly (Fig. 4.8E1).



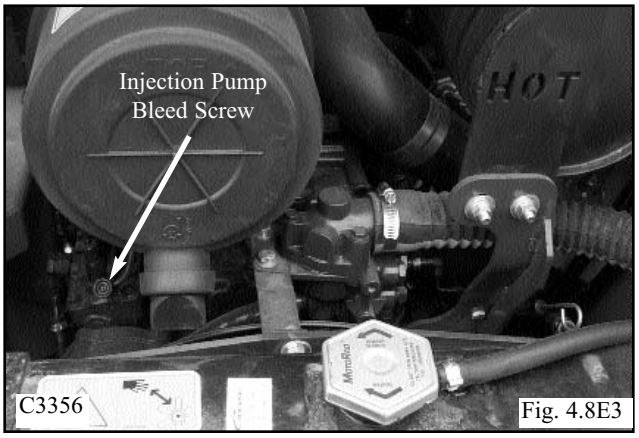
7. Bleeding the Fuel System

Assure adequate fuel supply is in fuel tank. Ensure the fuel inlet shut off is open (Fig. 4.8E2). Open the injection pump bleed screw (Fig. 4.E3). Bleed the system using the hand primer pump located on top of the fuel filter assembly (Fig. 4.8E1).



WARNING

To avoid personal injury never add fuel to the loader when the engine is running or is hot. NO SMOKING.



4. 9 AIR CLEANER MAINTENANCE

1. Daily Maintenance

Inspect the air cleaner canister for holes, dents, missing or mis-aligned gaskets. Check all hose clamps for tightness and inspect the hoses for damage (Fig. 4.9A).

2. Servicing Cleaner Element (Fig. 4.9B)

DO NOT open unless the indicator indicates a blocked filter or under normal scheduled servicing. To check the indicator, with the engine running, block half of the intake inlet and check the indicator on the dash panel. It should illuminate to simulate a blocked filter.

2.1. Release The Seal Gently - The filter should be removed gently to reduce the amount of dust dislodged. Move the end of the filter up and down and side to side or twist to break the seal.

2.2. Avoid Dislodging Dust from the Filter - Gently pull the filter off the outlet tube. Avoid knocking the filter against the housing.

2.3. Always clean the sealing surface of the outlet tube - Dust on the outside diameter of the housing could hinder an effective seal.

2.4. Always clean the inside of the outlet tube. Dirt inside of the outlet tube will reach the engine : it only takes 9 grams of dirt to dust an engine.

2.5. Check your old filter. Inspecting your old filter will detect foreign material on the sealing surface that may causing leakage.

2.6. Inspect the new filter for seal or pleat damage.

2.7. Insert the new filter properly - The seal area is on the inside of the open end of the primary filter. A new filter has a dry lubricant to aid installation. The critical sealing area will stretch slightly, adjust itself and distribute the sealing pressure evenly. To complete a tight seal, apply pressure at the outer rim of the filter, not the flexible centre. No cover pressure is required to hold the seal.

2.8. Check connections and ducts for air tight fit - Make sure all clamps, bolts and connections are tight. Check for holes in piping. Leaks here send dust directly to the engine.

2.9 DO NOT reuse filters by cleaning and reinserting.

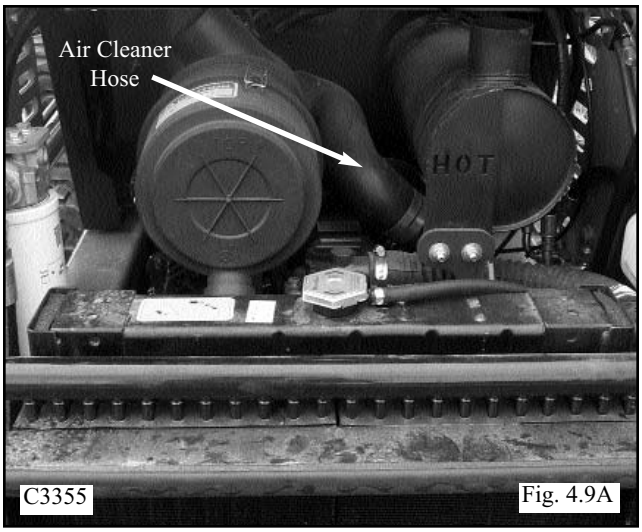


Fig. 4.9A

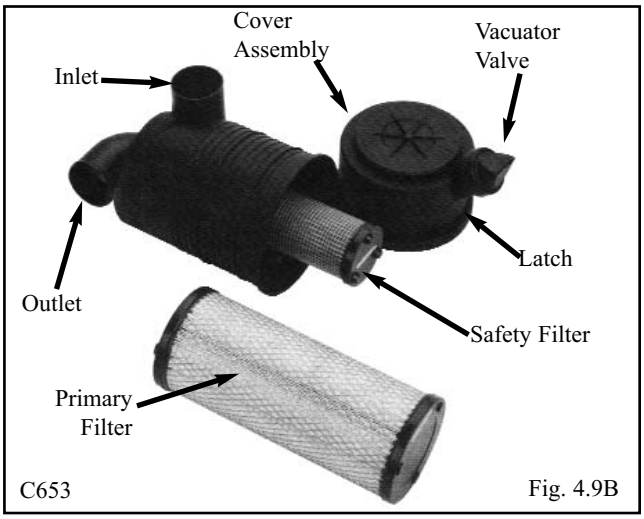


Fig. 4.9B

4. 10 ENGINE COOLING SYSTEM

The engine cooling system fluid is a 50 / 50 mixture of ethylene glycol and water.

To drain the cooling system, turn the radiator petcocks (Fig. 4.10B) in to open. Release the radiator cap. Remove the lower coolant hose from the engine to drain the coolant from the engine block. Drain, flush and replenish the cooling system flush every two (2) years or every 1000 operating hours, which ever comes first.

⚠ WARNING

To avoid personal injury never add coolant when the engine is running or is hot.

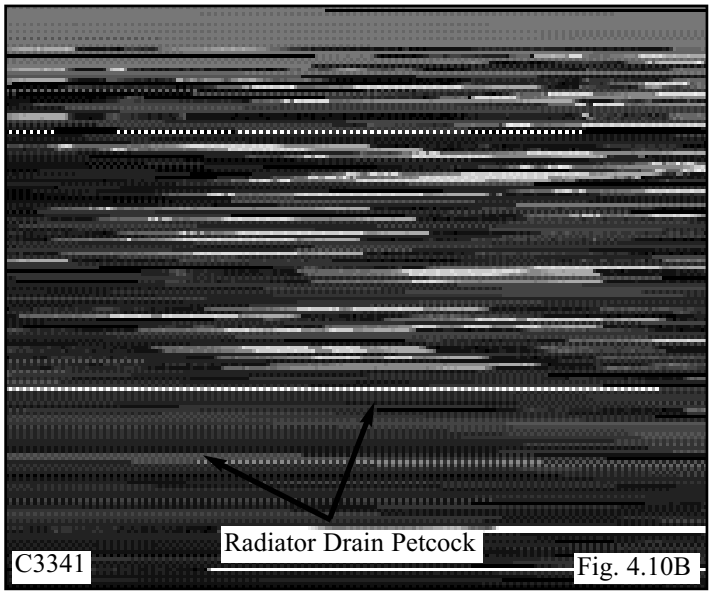


Fig. 4.10B

4. 11 ELECTRICAL SYSTEM

1. Battery Maintenance and Boosting

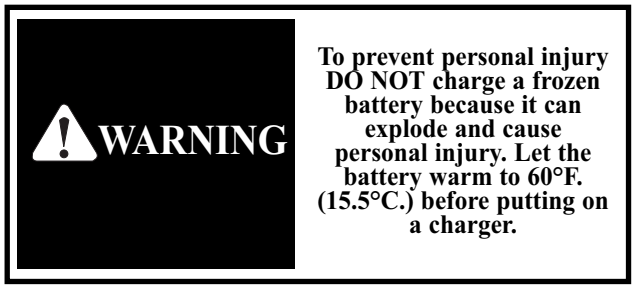
Inspect the batteries on a regular basis for damage such as a cracked or broken case or cover which would allow electrolyte loss.

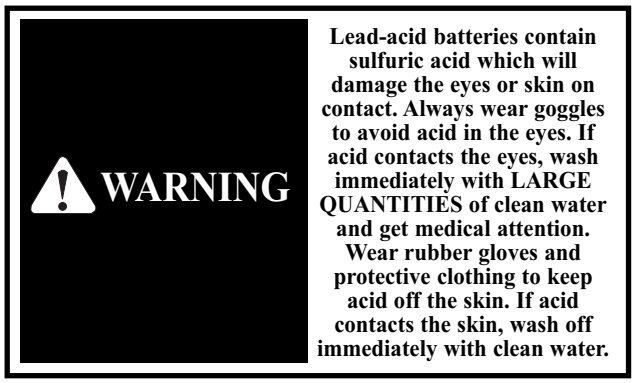
Check the battery cables for tightness and corrosion. Remove any acid corrosion from the battery and cables with a baking soda and water solution. Coat the terminal connections with di-electric grease.

If it is necessary to use a booster battery to start the engine, BE CAREFUL! There must be one person in the operators seat and one person to connect and disconnect the battery cables.

BOOSTING PROCEDURES

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 loader battery positive (+) terminal. Connect the end of the second cable to the negative (–) terminal of the booster battery. Connect the other end of the same cable to a ground. Keep cables away from moving parts. Start the engine. After the engine has started, disconnect the end of the second cable from the negative (–) terminal of the booster battery. Disconnect the other end of the same cable from the ground. Disconnect the end of the first cable from the positive (+) terminal of the booster battery. Disconnect the other end of the same cable from the loader battery positive (+) terminal.

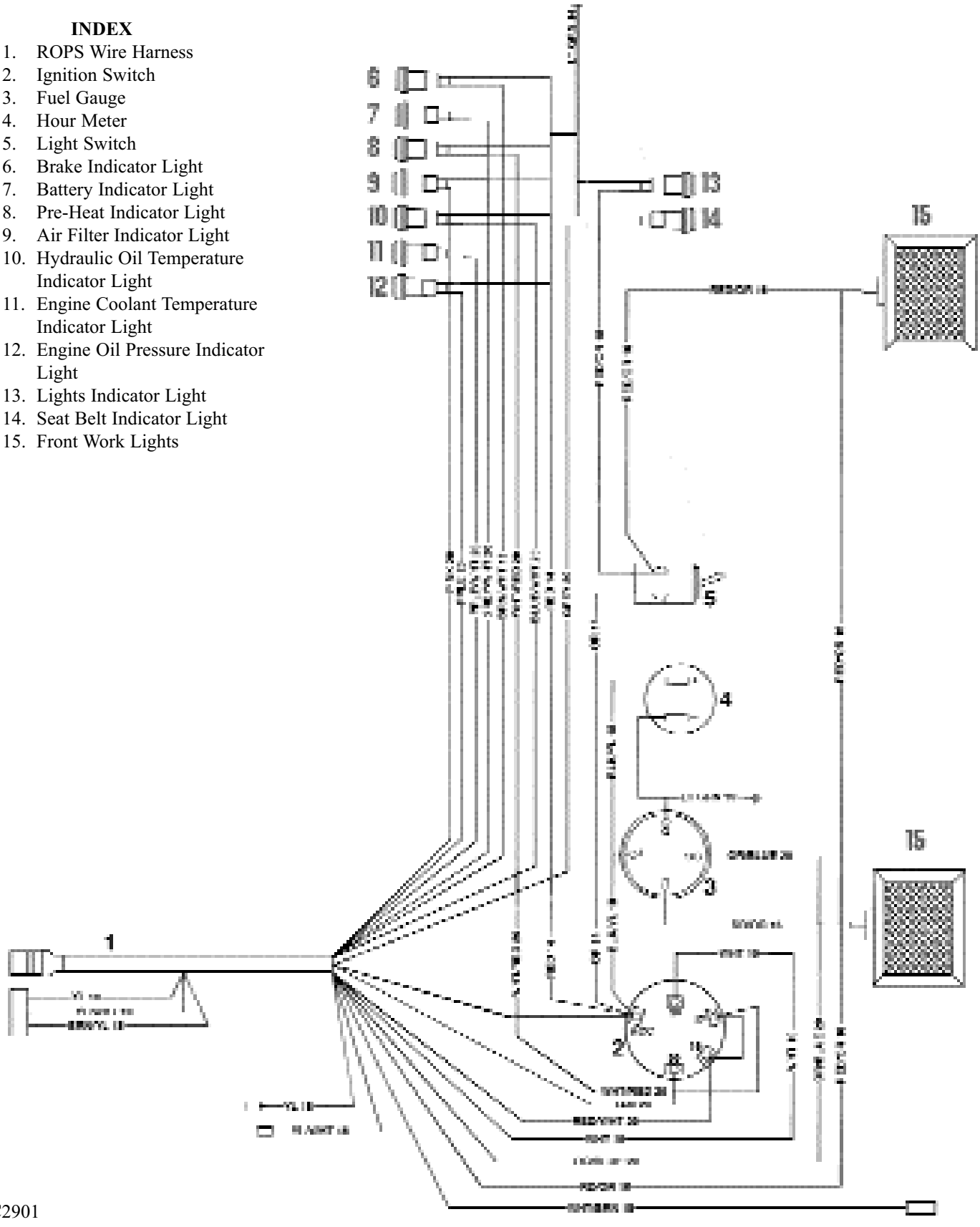




2. ELECTRICAL SYSTEM R.O.P.S.

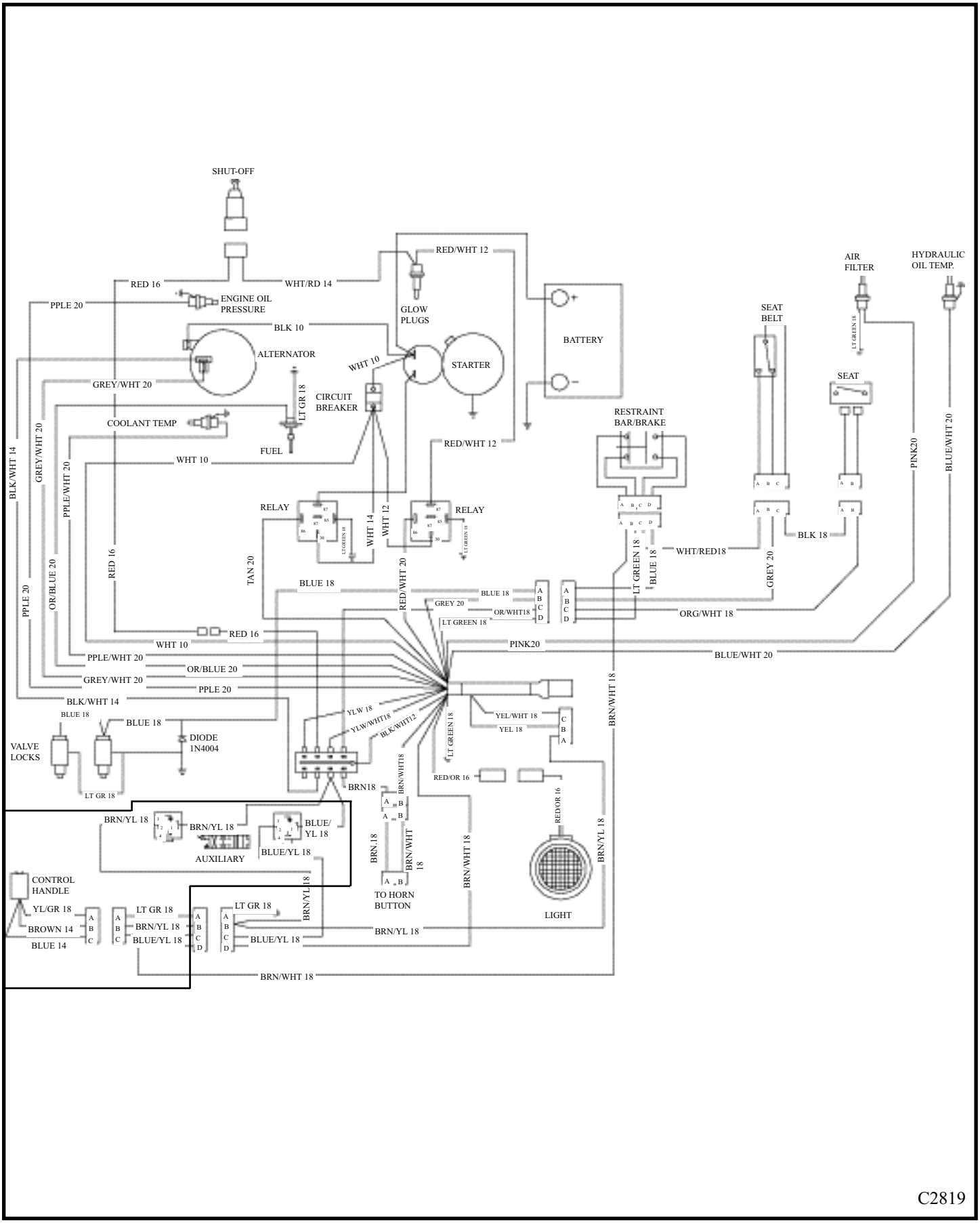
INDEX

1. ROPS Wire Harness
2. Ignition Switch
3. Fuel Gauge
4. Hour Meter
5. Light Switch
6. Brake Indicator Light
7. Battery Indicator Light
8. Pre-Heat Indicator Light
9. Air Filter Indicator Light
10. Hydraulic Oil Temperature Indicator Light
11. Engine Coolant Temperature Indicator Light
12. Engine Oil Pressure Indicator Light
13. Lights Indicator Light
14. Seat Belt Indicator Light
15. Front Work Lights



C2901

2. ELECTRICAL SYSTEM



C2819

4. 12 TIRE MAINTENANCE

1. Tire Inflation and Service

1.1 Upon receiving your loader, check the air pressure in the tires as indicated in the tables.

1.2 Check tire pressure every 8 hours.

1.3 Tire inflation pressure affects the amount of weight which a tire may carry. Do not over-or-under inflate the tires.

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

1.5 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.

1.6 When checking tire pressure, inspect the tire for damaged side walls and tread cuts. Neglected damage will lead to early tire failure.

⚠ WARNING

To avoid personal injury: Inflating or servicing tires can be dangerous. Trained personnel should be called to service and/or mount tires when possible. In any event to avoid possible serious or fatal injury, follow the safety precautions below.

1.7 Be sure the rim is clean and free of rust.

1.8 Lubricate both tire beads and rim flanges with soap solution. Do not use oil or grease.

1.9 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.

NOTE: Never inflate to over 35 PSI, 240 kPa (12.00 x 16.5) or 50 PSI, 345 kPa (6.00 x 15) depending on which tire you are operating with, to seat beads. If beads have not seated by time pressure reaches 35 psi (240 kPa) or 50 PSI (345 kPa), deflate the assembly, reposition tire on rim, lubricate tire beads and rim flanges and re-inflate. INFLATION beyond 35 psi (240 kPa) or 50 PSI (345 kPa) with unseated beads may break the bead or rim with explosive force sufficient to cause serious injury.

1.10 After seating the beads, adjust inflation pressure to recommended operating pressure.

1.11 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.

1.12 Do not weld, braze, or otherwise repair a rim, Do not use a damaged rim.

1.13 Never attempt tire repairs on a public road or highway.

1.14 Use jack stands or other suitable blocking to support the loader while repairing tires

1.15 Insure jack has adequate capacity to lift your loader.

1.16 Insure jack is placed on a firm level surface.

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

1.18 Torque lug nuts to specification after reinstalling wheel. Check lug not torque hourly until torque stabilizes.

Tire Inflation Table	
Tire	*Inflation Pressure*
12.00 x 16.5	40-45 PSI (276-310 kPa)

2. 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. 13 TROUBLE SHOOTING

1. Hydraulic System

Problem	Cause	Remedy
Loss of Hydraulic power (no flow from gear pump)	Reservoir low on fluid	Replenish with 10W30 or 20W50 API SE/CD oil. Check for hose or fitting leaking
	Flexible coupling 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 fluid	Replenish with 10W30 or 20W50 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 or 20W50 API SE/CD oil.
	Air in hydraulic system	Check for leaks between the reservoir and pump. Bleed system by extending and retracting lift cylinders several times.
	Anticavitation check valve not functioning.	Check and repair or replace.
Hydraulic overheat	Engine fan blocked or fan not turning	Clean fan area or repair or replace faulty drive system components
	Broke hydraulic fluid line	Repair or replace defective line. Replenish with 10W30or 20W50 API SE/CD oil

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

Problem	Cause	Remedy
Lift arms raise slowly at full engine RPM	Anti-cavitation check valve not functioning	Inspect and repair or replace
	Reservoir low on oil	Replenish with 10W30 or 20W50 API SE/CD oil
	Foot pedal linkage binding	Inspect and adjust
	Auxiliary engaged	Disengage
	Engine RPM too slow	Check RPM and reset
	Anticavitation check valve spring broken	Replace
	Main relief or port relief valve in control valve faulty	Check pressure if necessary - adjust
	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 leaks and correct.
	Control valve spool not centering	Check for sticking foot pedal linkages.
		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 fluid overheating	Reservoir low on fluid	Replenish with 10W30 or 20W50 API SE/CD oil.
	Oil cooler plugged or dirty (also check engine radiator)	Clean cooling fins.
	Auxiliary engaged	Disengage
	Engine RPM too slow	Check RPM and adjust.
	Incorrect temperature sensor	Replace.
Foot pedals do not operate smoothly	Foot pedal linkages out of adjustment	Adjust foot pedal linkages.
	Foot pedal linkages need lubrication	Lubricate with a silicone based lubricant.
	Cable binding	Check routing for kinks etc.

2. Hydrostatic Drive

Problem	Cause	Remedy
No power on one side, both directions	Reservoir low on oil	Replenish with 10W30 or 20W50 API SE/CD oil. Check for hose or fitting leak.
	Disconnected control linkage	Reconnect and adjust linkage.
	Bolt 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. Adjust tightener tension.
	Motor shaft or key failure	Inspect and repair defective parts. Check motor mounting bolts.
No power on one side, one direction only	Defective relief valve	Replace defective valve.
No power on both sides, also loss of hydraulic power	Reservoir low on oil	Replace with 10W30 or 20W50 API SE/CD oil. Check for hose or fitting leak.
	Flexible coupling failure between engine and pump	Inspect and replace damaged parts. Check for misalignment between engine and pumps.
	Drive coupling between front and rear pump failure	Inspect couplings for sheared splines, replace. Also check support bearings in pumps.
	Check system pressure	If low, consult dealer or **Thomas** Service Dept.
Gradual loss of power as machine warms up	Excessive internal leakage in pump and/or motor	Consult dealer or **Thomas** Service Dept.
System erratic and/or noisy	Air in system due to low oil level in reservoir	Replenish with 10W30 or 20W50 API SE/CD oil.
	Air in system due to leak at suction fitting	Check fittings and tighten.
	Internal pump or motor wear caused by overspeeding	Consult dealer or **Thomas** Service Dept.
	Excessive play in linkage or pintle lever	Adjust linkage and tighten or replace pintle lever.
Machine will not travel in a straight line	Control levers binding	Check that shields are not stopping lever from full travel.
		Adjust Tracking

3. Final Drive Transmission

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

4. 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
	Centering Spring 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.
	Bolt in pintle lever worn or broke	Replace bolt. Inspect pintle lever for wear at bolt hole. Ensure bolt clamping lever to pump shaft is tight
		See also troubleshooting guide for hydrostatic system
Machine will not travel in a straight line	Linkage binding	Adjust
	Control lever travel out of adjustment	Adjust
Control levers do not operate smoothly	Internal pump and/or motor leakage	See troubleshooting hydrostatic system
	Control lever linkages out of adjustment	Adjust control lever linkages.
	Control lever linkages need lubrication	Lubricate with a silicone based lubricant.

5. Electrical		
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 di-electric grease to prevent corrosion. Check continuity of cables and replace
	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, but will not start	Auxiliary hydraulics engaged	Engine will smoke, but not run unassisted by starter. Disengage auxiliary hydraulics .
	Defective manifold heater relay	Check continuity and if defective replace
	Defective manifold heater	Check continuity and if defective replace
	Broken connection or defective wire	Disconnect the ROPS harness from the engine harness. Open the dash panel and check continuity of the circuit not functioning properly in both engine and ROPS harness.
	No fuel	Check fuel levels and system.
Loader starts,but foot controls will not release	Electric solenoids not releasing valve spools	Defective solenoid or binding solenoid locks. Loosen screws and re-adjust. Check continuity of connectors and wire

6. Diesel Engine

FAULT											REMEDY	
Engine fails or is difficult to start											Check	**P**
	Engine starts but runs unevenly or stalls										Adjust	**E**
		Engine overheats. Temperature monitor gives warning									Replace	**W**
			Engine gives poor performance								Clean	**R**
				Engine not firing on all cylinders							Top Up	**A**
					Engine has little or no oil pressure						Drop Level	**S**
						Engine oil consumption excessive						
							Engine smokes - blue					
								white				
									black			
										CAUSE		
•								•		Below starting limit temperature	P	
		•			•					Oil level too low	A	
		•	•			•	•			Oil level too high	P / S	
					•	•	•			Excessive inclination of engine	S	
•					•					Incorrect lube oil SAE class or quality	W	
•	•		•					•		Fuel quality not as per operating manual	W	
		•	•						•	Air cleaner clogged / turbocharger defective	P / W	
		•	•						•	Air cleaner service switch / indicator defective	P / W	
			•						•	Charge air line leaking	P	
		•								Radiator & Oil cooler clogged	P / R	
		•								Cooling fan defective	P / W	
		•								Cooling air temp. rise / heating short circuit	P	
		•								Resistance in cooling system too great / quantity too small	P	
•										Battery defective or discharged	P / W	
•										Electrical cable to starter system loose, oxidized	P	
•										Starter defective or pinion does not engage	P	
•										Solenoid defective (release switch)	P	
•	•		•					•	•	Incorrect valve clearance	E	
	•		•	•						Leaking injection line	P	
•	•	•	•	•				•	•	Injection valve defective	P / W	

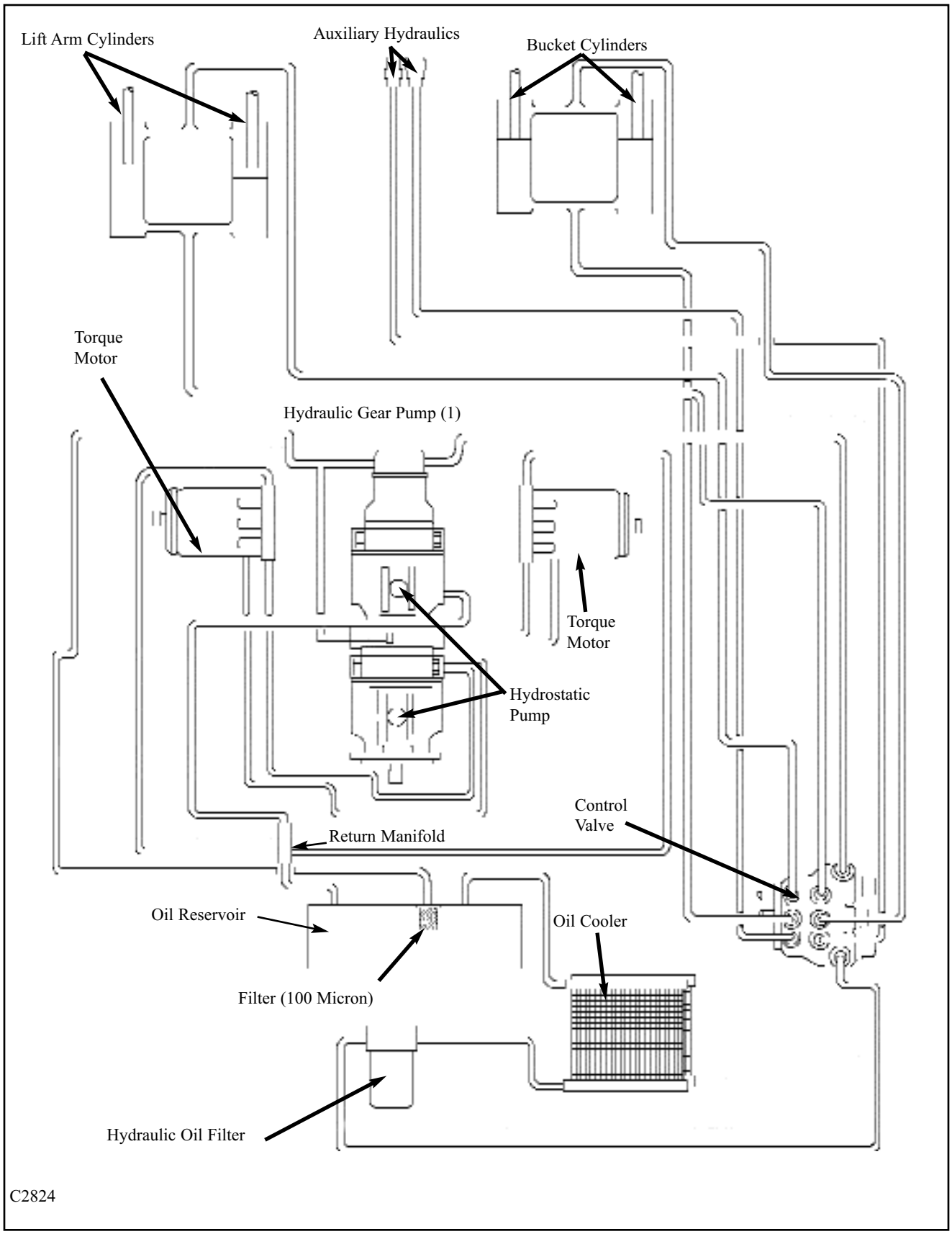
6. Engine Cont'd

PROBLEM	CAUSE	REMEDY
Engine will not turn over	Engine jammed, battery discharged, starter malfunctioning, wires disconnected.	Check engine to find the problem and repair it. Recharge battery, repair or replace starter, reconnect wires.
Engine turns over slowly but does not start	Increased resistance of moving parts. Excessively high viscosity of fuel or engine oil at low temperature	Repair or replace. Use specified fuel or engine oil.
Engine turns over at normal speed but does not start	No fuel, compression pressure too low, piston ring and cylinder worn, improper valve clearance, defective fuel system, restricted air cleaner	Replenish fuel, replace head gasket and tighten cylinder head screws, check cylinder and piston ring, replace if necessary, adjust valve clearance, check fuel line, clean or replace.
Rough low speed running and idling	Idle adjustment, incorrect governor adjustment, improper valve clearance	Governor, adjust valve clearance.
Rough high speed running	Incorrect governor adjustment	Adjust governor.
Engine speed does not increase	Incorrect governor adjustment. Clogged air cleaner	Adjust governor. Clean or replace air cleaner.
Deficient output	Improper intake or exhaust valve sealing, incorrect governor adjustment, excessive carbon in engine, improper valve clearance, piston ring and cylinder worn, clogged air cleaner	Replace defective valve, adjust governor, remove carbon, adjust valve clearance, replace worn piston rings, clean or replace clogged air cleaner.
	Improper valve clearance, rattles from loosely mounted external components	Adjust valve clearance, retighten external components.
Engine is noisy	Stale or diluted fuel will contaminate injectors, causing a severe knock or rattle.	Have injectors cleaned. Always keep clean, fresh fuel in your machine.

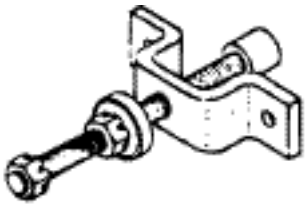
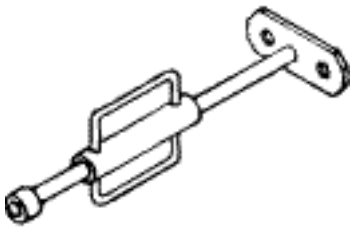
7. Park Brake

PROBLEM	CAUSE	REMEDY
Brake will not hold machine	Slack in 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 worn or damaged parts.
Brake will not release	Cables kinked or binding	Inspect, replace, clean or adjust as required.

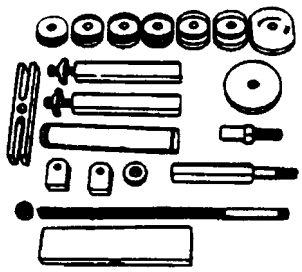
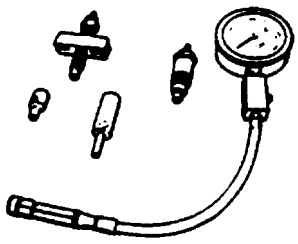
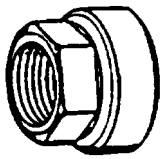
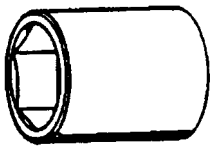
4. 14 HYDRAULIC / HYDROSTATIC CIRCUIT



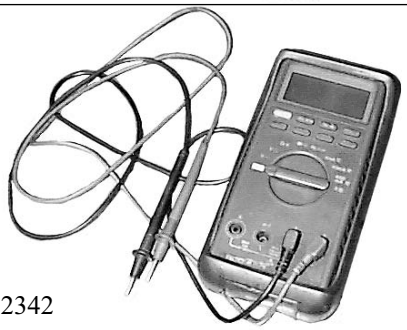
4. 15 SPECIAL TOOLS

Part No.	Illustration	Description	2200 USE
955280		AXLE INSTALLATION TOOL-To install axle in final drive housing. Quantity-1	
962201* 955281		SEAL INSTALLATION TOOL-To install axle seal in final drive housing. Quantity-3 required	
955283* (6 Bolt) 960475 (8 Bolt)		AXLE EXTRACTOR TOOL- To remove axle from final drive housing. Quantity-1	YES
960986		SEAL INSTALLATION TOOL-To install axle seal in final drive housing. Quantity-1	
958674		SEAL INSTALLATION TOOL-To install axle seal in final drive housing. Quantity-2 Required	YES
960997	 C501	CHAIN TENSION TOOL-To test chain tension.	
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”	YES

4. 15 SPECIAL TOOLS (Cont'd)

Part No.	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 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	 C500	Hydraulic Flow and Pressure Gauge Assembly.	All Models

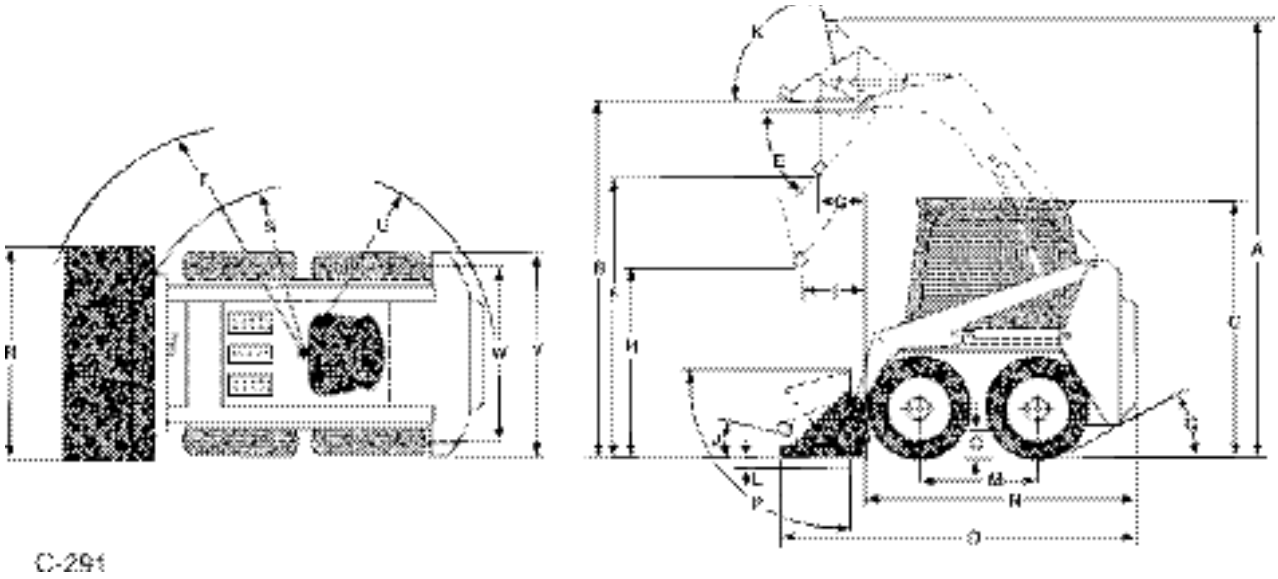
4.15 SPECIAL TOOLS (Cont'd)

P/N	Illustration	Description	2200 USE
43979	 C1840	CHAIN PULLER	ALL MODELS
43980	 C1841	SPANNER WRENCH 2" - 4 3/4" To repair hydraulic cylinders	ALL MODELS
43981	 C1837	PHOTO SENSOR / WHEEL SPEED TACHOMETER (Dual Function)	ALL MODELS
	 C1839	FORCE GAUGE, PUSH PULL For measuring restraint bar brake cable adjustment. Special order only	YES
	 C2342	MULTI METER For measuring continuity, voltage, etc.	ALL MODELS
	 C2343	ANGLE FINDER For measuring control angles, U-joint and chassis angles etc.	ALL MODELS

5. SPECIFICATIONS

5. SPECIFICATIONS

5. 1 LOADER SPECIFICATIONS ProTough2200



Dimensions: (With Std. Tires & Dirt Bucket)

A. Overall Operating Height.....157” (3988 mm)
B. Height to hinge pin .....123.75” (3143 mm)
C. Overall vehicle height .....84” (2134 mm)
D. Overall length with bucket .....144.25” (3664 mm)
E. Dump angle .....36°
F. Dump height .....96.75” (2458 mm)
G. Reach — fully raised .....21.5” (546 mm)
H. Height at 45° dump angle .....80.25” (2038 mm)
I. Reach at 45° dump angle .....25.25” (641 mm)
J. Maximum roll back at ground .....20°
K. Maximum roll back fully raised .....87°
M. Wheel base .....44.75” (1137 mm)
N. Overall length less bucket .....117.25” (2978 mm)
O. Ground clearance .....9” (229 mm)
P. Maximum grading angle – bucket .....88°
Q. Angle of departure .....27°
R. Bucket width .....73” (1854 mm)
S. Clearance circle – front – less bucket .....47.63” (1511 mm)
T. Clearance circle – front – with bucket .....76.25’’ (1210 mm)
U. Clearance circle – rear .....70.5” (1791 mm)
V. Overall width – less bucket .....70.75” (1797 mm)
W. Tread.....58.5”(1486 mm)

Operational: (With Std. Tires & Dirt Bucket)

Tipping Load SAE .....4700 lbs. (2136 kg)
Rated Operating Capacity.....2200 lbs. (999 kg)
Operating Weight .....8000 lbs. (3636 kg)
Shipping weight .....7300 lbs. (3318 kg)
Travel speed .....6.2 mph (10.0 kph)

5. SPECIFICATIONS

Controls

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

HYDRAULICS: Lift and bucket tilt are controlled by separate foot pedals. Aux hydraulics are controlled by hand lever.

ENGINE: Hand throttle, key type ignition switch.and shutoff.

Engine

Make and model .....Kubota V3300 - T
Cylinders .....4 Inline
Cooling system .....Liquid
Displacement .....202.5 cu. in.(3318 cc)
Horsepower .....83 @ 2600 RPM
Net kW (ISO 9249).....61.8 kW @ 2600 RPM
Max Torque .....206 ft. lbs. 280 N m @ 1400 RPM
Fuel type .....Diesel No. 2
Air cleaner .....Replaceable Dry Cartridge
.....w/indicator
Maximum governed
RPM (no load) .....2700 RPM

Hydraulic System

Pump type .....Gear
Pump capacity (theoretical)..... (16 GPM) 60.6 LPM
Control valve .....Series type with float
.....on lift and auxiliary
Filtration (Main) .....5 micron
Hydraulic fluid.....10W30/20W50API Class, SE/CD

Cylinders (double acting)	Lift	Tilt
Bore dia.	2.5 in	2.5 in
Rod Dia.	1.5 in	1.5 in

Tires

Standard .....12.00 x 16.5, 6 ply
.....40 - 45 PSI (276-310 kPa)

Fluid Capacities

Fuel tank .....23 gal. (87.1 L)
Final drive transmission .....3.5 gal. (13.2 L)
Hyd. Reservoir .....21 gal (79.5 L)
Engine oil.....14 qt (13.2 L)

Hydrostatic Transmission & Final Drive

Pump type ..... Two in line, axial piston
Pump displacement ..... 2.65 cu. in. (43.43 cm^3)
Motor type ..... Geroler, torque motor
Pump capacity .....2800 RPM/ 32.1 GPM 120 LPM
System relief setting ..... 4712 PSI (345 Bar)
Final drive ..... No. 100 roller chain running in an oil bath

Electrical

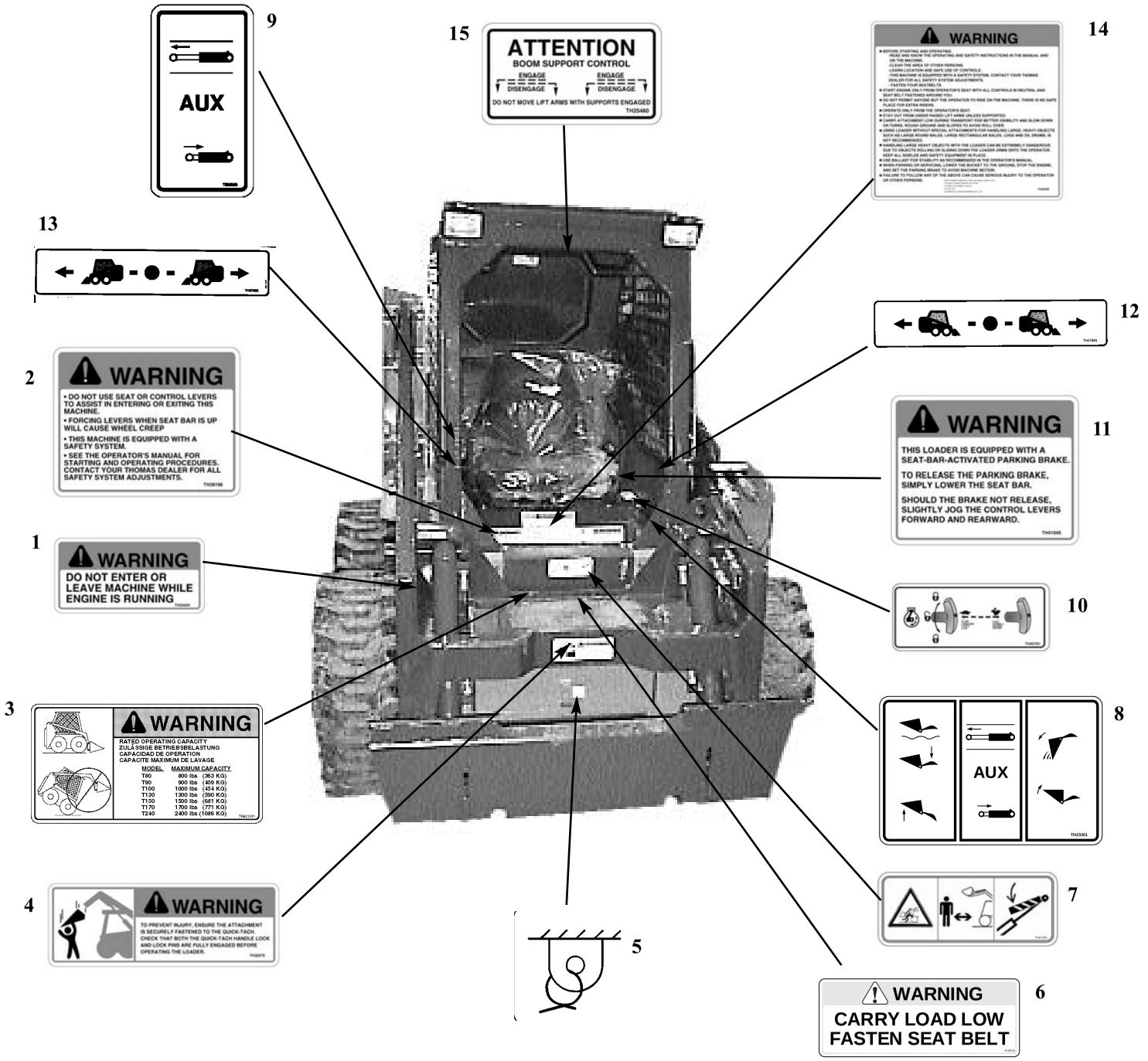
Alternator .....60 A
Battery .....1 x12 V
Type (BCI GROUP).....34/78
Cranking amps 730
Reserve capacity.....125
Starter.....12 V (2.5 kW)

5. 2 TORQUE SPECIFICATIONS

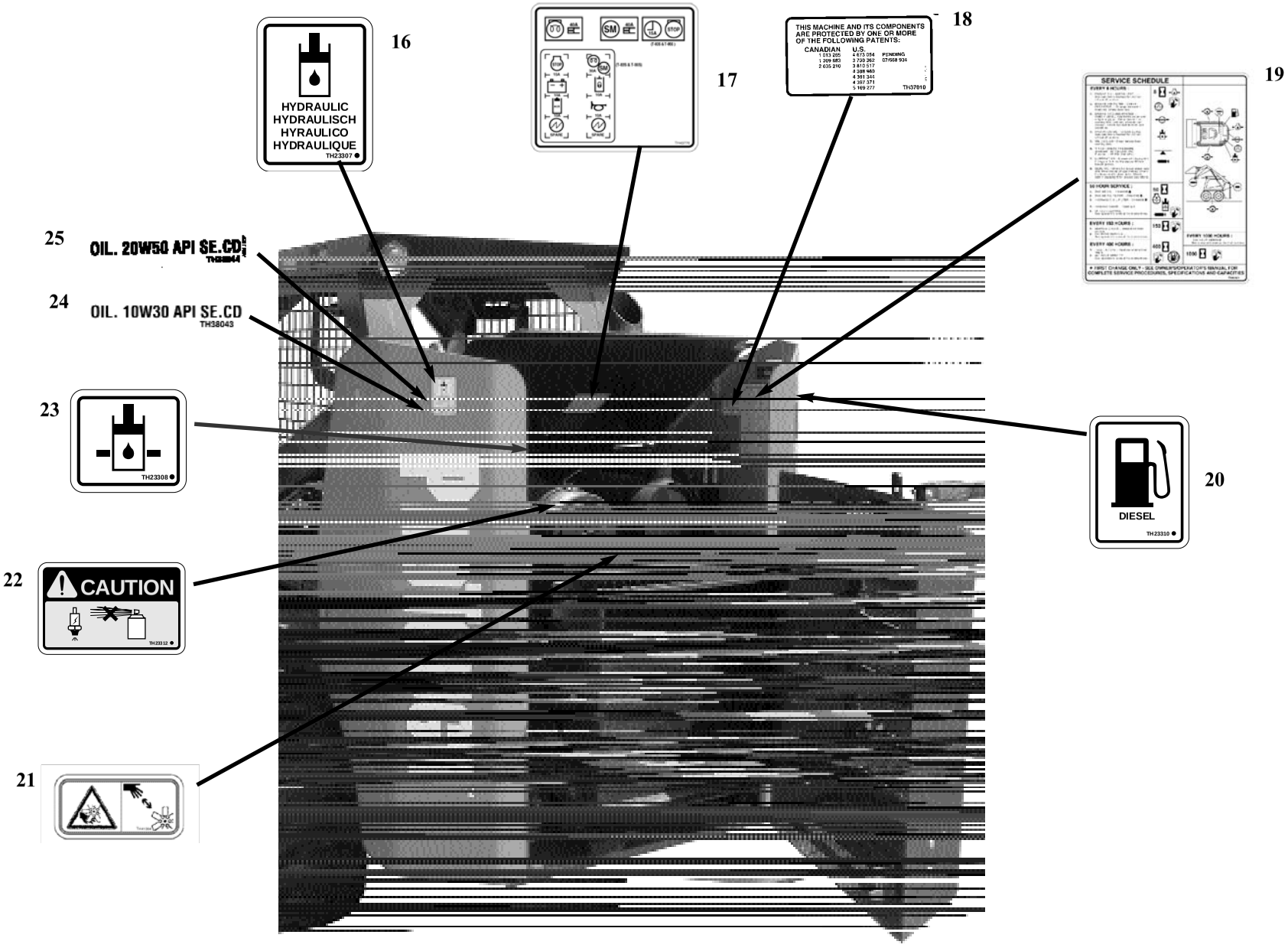
Wheel nuts (32) . . . . . 100-110 lbs. ft. (136-149 N m)

Bolts & Nuts	*Torque Lbs. ft. (N m)*
1/4-20	5-7 (6.7-9.5)
5/16-18	1215 (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)
5/8-18	100-110 (136-139)

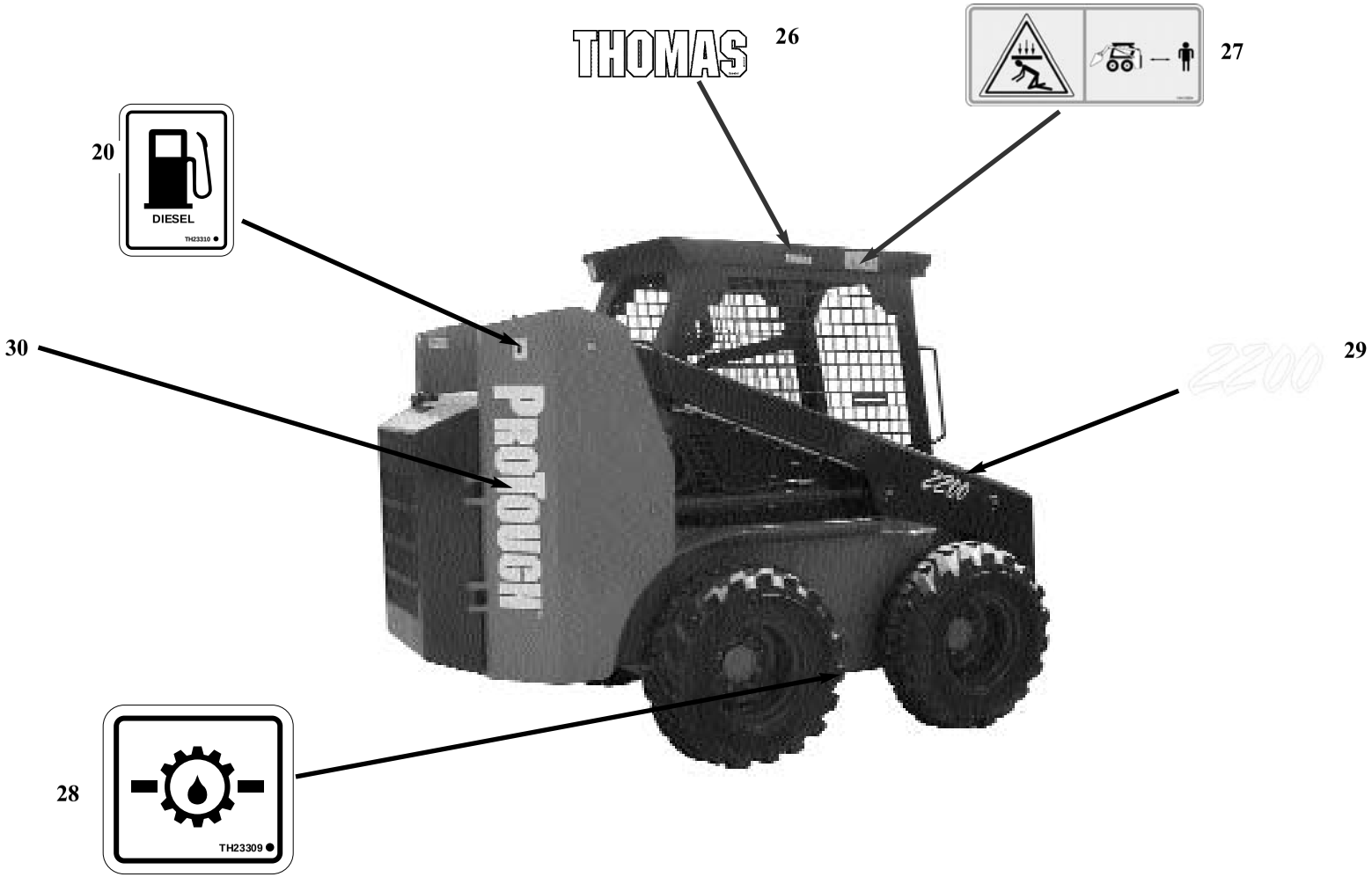
5.3 Decals


9
AUX
15
ATTENTION
BOOM SUPPORT CONTROL
ENGAGE
DISENGAGE
ENGAGE
DISENGAGE
DO NOT MOVE LIFT ARMS WITH SUPPORTS ENGAGED
TH25460
14
WARNING
13
12
2
WARNING
• DO NOT USE SEAT OR CONTROL LEVERS TO ASSIST IN ENTERING OR EXITING THIS MACHINE.
• FORCING LEVERS WHEN SEAT BAR IS UP WILL CAUSE WHEEL CREEP
• THIS MACHINE IS EQUIPPED WITH A SAFETY SYSTEM.
• SEE THE OPERATOR'S MANUAL FOR STARTING AND OPERATING PROCEDURES. CONTACT YOUR THOMAS DEALER FOR ALL SAFETY SYSTEM ADJUSTMENTS.
11
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.
1
WARNING
DO NOT ENTER OR LEAVE MACHINE WHILE ENGINE IS RUNNING
10
3
WARNING
RATED OPERATING CAPACITY
ZULÄSSIGE BETRIEBSBELASTUNG
CAPACIDAD DE OPERATION
CAPACITE MAXIMUM DE LAVAGE
MODEL MAXIMUM CAPACITY
T80 800 lbs (363 KG)
T90 900 lbs (409 KG)
T100 1000 lbs (454 KG)
T130 1300 lbs (590 KG)
T150 1500 lbs (681 KG)
T170 1700 lbs (771 KG)
T240 2400 lbs (1089 KG)
8
AUX
4
WARNING
TO PREVENT INJURY, ENSURE THE ATTACHMENT IS SECURELY FASTENED TO THE QUICK-TACH. CHECK THAT BOTH THE QUICK-TACH HANDLE LOCK AND LOCK PINS ARE FULLY ENGAGED BEFORE OPERATING THE LOADER.
7
5
WARNING
CARRY LOAD LOW
FASTEN SEAT BELT
6

5.3 Decals


16
HYDRAULIC
HYDRAULISCH
HYRAULICO
HYDRAULIQUE
TH23307
17
18
THIS MACHINE AND ITS COMPONENTS ARE PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS:
CANADIAN
U.S.
TH37010
19
SERVICE SCHEDULE
25
OIL. 20W50 API SE.CD
TH38044
24
OIL. 10W30 API SE.CD
TH38043
23
TH23308
20
DIESEL
TH23310
22
CAUTION
TH23312
21

5.3 Decals



1.	23324	7.	41066	13.	37060	19.	23321	25.	38044
2.	39196	8.	23301	14.	36598	20.	23310	26.	44615
3.	42107	9.	35935	15.	25460	21.	41064	27.	41065
4.	32275	10.	43791	16.	23307	22.	23312	28.	23309
5.	39192	11.	41045	17.	43776	23.	23308	29.	46377
6.	23326	12.	37059	18.	37010	24.	38043	30.	46375

6. ATTACHMENTS AND BUCKETS

6.1 Thomas Approved Buckets and Attachments

6. ATTACHMENTS AND BUCKETS

6. 1 THOMAS APPROVED BUCKETS AND ATTACHMENTS

BUCKETS

Cat. #	Description	SAE Heaped Capacity (ft^3)	Approx. Weight
1890	68" Dirt Bucket	13.3	434 lb
1889	73" Dirt Bucket	14.3	456 lb
2454	78" Dirt Bucket	15.8	488 lb
2002	68" Fertilizer Bucket	20.6	396 lb
2003	72" High Capacity Fertilizer Bucket	26.0	565 lb
1936	73" Utility Bucket	16.8	480 lb
1956	78" Snow and Light Material Bucket	28.3	518 lb
2008	72" Produce Bucket	31.5	562 lb
2009	78" Produce Bucket	34.3	604 lb

BUCKET OPTIONS

Cat. #	Description	Approx. Weight
2443	Toothbar Complete for 73" Dirt Bucket	101 lb
2444	Toothbar Complete for 78" Dirt Bucket	109 lb
2452	9 Tooth Kit, Painted for 68" & 73" Bucket	20 lb
2453	10 Tooth Kit, Painted for 78" Bucket	22 lb
2457	Kit, Bolt-on Edge for 73" Bucket	101 lb
2458	Kit, Bolt-on Edge for 78" Bucket	109 lb

QUICK-TACHS

Cat. #	Description	Approx. Weight
2326	Quick-Tachs Complete	
2031	Quick-Tachs Adapter Plate	69 lb

PALLET FORKS

Cat. #	Description	Approx. Weight
2330	Pallet Fork Frame (Requires Tines)	226 lb
99	30" Tines (Set of 2)	110 lb
98	36" Tines (Set of 2)	138 lb
437	42" Tines (Set of 2)	149 lb
2564	48" Tines (Set of 2)	160 lb

INDUSTRIAL GRAPPLE

Cat. #	Description	Approx. Weight
1931	72" Industrial Grapple	824 lb

DOZER BLADE

Cat. #	Description	Approx. Weight
2039	78" Dozer Blade, Hydraulic Swing	728 lb

POST HOLE AUGER

Cat. #	Description	Approx. Weight
2569	Model PA 40 Auger Drive (Requires Mount & Bit)	160 lb
1891	Auger Mount	126 lb
941	9" x 48" Auger Bit w/Serrated Edges	75 lb
943	12" x 48" Auger Bit w/Serrated Edges	100 lb
119	14" x 52" Auger Bit w/Serrated Edges	105 lb
120	16" x 52" Auger Bit w/Serrated Edges	118 lb

ANGLE BROOM

Cat. #	Description	Approx. Weight
2189	72" Angle Broom (Requires Quick Coupler Kit)	500 lb
1423	Quick Coupler Kit	5 lb

6. ATTACHMENTS AND BUCKETS

BUCKET SWEEPER

Cat. #	Description	Approx. Weight
1428	72" Bucket Sweeper Drive (Requires Quick Coupler; Plate; Bucket)	660 lb
1423	Quick Coupler Kit	5 lb
1427	Backing Plate	5 lb
1935	60" Flat Bottom Utility Bucket	386 lb
1936	73" Utility Bucket	480 lb

BUCKET SWEEPER OPTIONS

Cat. #	Description	Approx. Weight
1834	Gutter Brush	80 lb
1298	Water Sprinkler System	50 lb

HYDRAULIC BREAKER

Cat. #	Description	Approx. Weight
1541	HH 300-300 ft. lb. Class Hydraulic Breaker	300 lb
1585	HH 500-500 ft. lb. Class Hydraulic Breaker	400 lb

BREAKER SIDE PLATES & MOUNTS

Cat. #	Description	Approx. Weight
1694	HH300/500 Side Plates	200 lb
1929	HH300/500 Breaker Mount	192 lb

BREAKER TOOLS

Cat. #	Description	Approx. Weight
1545	Moil Point - HH300	25 lb
1546	Chisel Point - HH300	35 lb
1547	Blunt Point - HH300	35 lb
1576	Asphalt Cutter - HH300	41 lb
1577	Tamping Pad 12 x 12 - HH300	105 lb
1586	Moil Point - HH500	40 lb
1587	Chisel Point - HH500	32 lb
1589	Asphalt Cutter - HH500	41 lb
1590	Tamping Pad 12 x 12 - HH500	105 lb
1549	Gas Charger	2 lb

HYDRAULIC SPREADER

Cat. #	Description	Approx. Weight
1943	Hydraulic Salt/Sand Spreader	394 lb

TRACKS

Cat. #	Description	Approx. Weight
2576	Tracks, Metal, for 12.00 x 16.5 Tire	1034 lb
2577	Tracks, Soft w/Replaceable Pads, for 12.00 x 16.5 Tire	1074 lb
2578	Tracks, Hard w/Replaceable Pads, for 12.00 x 16.5 Tire	1206 lb
NOTE: All tracks include spacers.		

XR 911 XTREME REACH BACKHOE

Cat. #	Description	Approx. Weight
2195	XR 911 Xtreme Reach Backhoe	1860 lb
2204	14" Bucket w/Teeth	106 lb
2202	18" Bucket w/Teeth	126 lb
2198	24" Bucket w/Teeth	146 lb
2200	36" Bucket w/Teeth	195 lb