



648

WHEEL LOADER

Operator's Manual 9-8171

J I Case
A Tenneco Company





This Safety Alert Symbol Indicates Important Safety Messages In This Manual When You See This Symbol Carefully Read The Message That Follows and Be Alert To The Possibility Of Personal Injury Or Death

IF THIS MACHINE IS USED BY AN EMPLOYEE OR IS LOANED OR RENTED, MAKE ABSOLUTELY CERTAIN THAT THE OPERATOR(S), PRIOR TO OPERATING:

1. IS INSTRUCTED IN SAFE AND PROPER USE.
2. REVIEWS AND UNDERSTANDS THE MANUAL(S) PERTAINING TO THE MACHINE.

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WARNING

BEFORE STARTING ENGINE

STUDY OPERATOR'S MANUAL SAFETY MESSAGES
READ ALL SAFETY SIGNS ON MACHINE
CLEAR THE AREA OF OTHER PERSONS

LEARN & PRACTICE SAFE USE OF CONTROLS BEFORE OPERATING

IT IS YOUR RESPONSIBILITY TO UNDERSTAND AND FOLLOW MANUFACTURER'S INSTRUCTIONS ON MACHINE OPERATION, SERVICE, AND TO OBSERVE PERTINENT LAWS AND REGULATIONS. OPERATOR AND SERVICE MANUALS MAY BE OBTAINED FROM YOUR EQUIPMENT DEALER.

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SAFETY MESSAGES

The first twenty-three safety messages which follow are provided by the American National Standards Institute * (ANSI). Safety rules to supplement those provided by ANSI also appear on the following pages.

Study these rules carefully before starting and operating your Case Lawn and Garden Tractor.

* Rule Number 24, which does not apply to this product, has been omitted.



Separate Operator's Manuals are provided with the attachments purchased with your tractor. Refer to the appropriate attachment operators manual for specific operating instructions and safety messages that apply to the attachment.



CAUTION: Know the controls and how to stop quickly. **READ THE OWNER'S MANUAL.**



CAUTION: Do not allow children to operate the vehicle. Do not allow adults to operate it without proper instruction.



CAUTION: Do not carry passengers. Keep children and pets a safe distance away.



CAUTION: Clear the work area of objects which might be picked up and thrown.



CAUTION: Disengage all attachment clutches and shift into neutral before attempting to start the engine (motor).



CAUTION: Disengage power to attachment(s) and stop the engine (motor) before leaving the operator's position.



CAUTION: Disengage power to attachment(s) and stop the engine (motor) before making any repairs or adjustments.



CAUTION: Disengage power to attachment(s) when transporting or not in use.



CAUTION: Take all possible precautions when leaving the vehicle unattended, such as disengaging the power take-off, lowering the attachment(s), shifting into neutral, setting the parking brake, stopping the engine, and removing the key.



CAUTION: Do not stop or start suddenly when going uphill or downhill. Mow down the face of steep slopes; never across or up the face. (This ANSI rule modified)



CAUTION: Reduce speed on the slopes and in sharp turns to prevent tipping or loss of control. Exercise extreme caution when changing direction on slopes.



CAUTION: Stay alert for holes in the terrain and other hidden hazards.



CAUTION: Use care when pulling loads or using heavy equipment.

- a. Use only approved drawbar hitch point.
- b. Limit loads to those you can safely control.
- c. Do not turn sharply. Use care when backing.
- d. Use counterweight(s) or wheel weights when suggested in the owner's manual.



CAUTION: Watch out for traffic when crossing or near roadways.



CAUTION: When using any attachments, never direct discharge of material toward bystander nor allow anyone near the vehicle while in operation.



CAUTION: Handle gasoline with care — it is highly flammable.

- a. Use approved gasoline container.
- b. Never remove the cap of the fuel tank or add gasoline to a running or hot engine, or fill the fuel tank indoors. Wipe up spilled gasoline.
- c. Open doors if the engine is run in the garage — exhaust fumes are dangerous. Do not run the engine (motor) indoors.



CAUTION: Keep the vehicle and attachments in good operating condition, and keep safety devices in place.



CAUTION: Keep all nuts, bolts, and screws tight to be sure the equipment is in safe working condition.



CAUTION: Never store the equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark. Allow the engine to cool before storing in any enclosure.



CAUTION: To reduce fire hazard, keep the engine free of grass, leaves, or excessive grease.



CAUTION: The vehicle and attachments should be stopped and inspected for damage after striking a foreign object, and the damage should be repaired before restarting and operating the equipment.



CAUTION: Do not change the engine governor settings or overspeed the engine.



CAUTION: When using the vehicle with mower, proceed as follows:

- (1) Mow only in daylight or in good artificial light.
- (2) Never make a cutting height adjustment while the engine (motor) is running if the operator must dismount to do so.
- (3) Shut the engine (motor) off when removing the grass catcher or unclogging chute.
- (4) Check the blade mounting bolts for proper tightness at frequent intervals.



Remember, a careful operator is always the best insurance against an accident. Give complete and undivided attention to the job at hand.



CAUTION: Always shut off engine, remove key, set parking brake, and wait until all engine and attachment motion has stopped before dismounting from the operator's seat.



CAUTION: Only operate controls from the operator's seat to prevent injury.



WARNING: When mowing, keep the loader bucket empty and as close to ground level as possible and use extreme care when negotiating inclines and side slopes.



CAUTION: Do not wear loose clothing which may catch in moving parts.



CAUTION: Do not smoke when working near fuel.



CAUTION: Drive at a speed slow enough to insure safety and complete control at all times.



CAUTION: Highway travel should be avoided. If necessary, use SMV safety emblem and lights for adequate warning to the operators of other vehicles. Check local government regulations.



WARNING: Before starting engine - study safety messages in Operator's Manual. Read all safety signs on machine. Clear area of other persons. Learn and practice safe use of controls before operating.

To start engine - disengage attachment drive and release travel pedal.

To prevent load from spilling on machine and operator: Do not roll bucket back completely when lifting to the full height.

To prevent possible loss of control and injury: Do not transport with the bucket fully raised. Use low range when operating on inclines that can be safely negotiated - see Operator's Manual.

Keep all shields in place.

To park loader or dismount, or to service or adjust loader and/or attachments, lower or block all components or attachments, set parking brake, stop engine, and remove key.



CAUTION: If necessary to move tractor on a trailer, always back up onto the trailer and drive off of trailer.



Become thoroughly familiar with all tractor and attachment controls before operating.



WARNING: Improper operation of your tractor on hillsides and slopes can be dangerous. Avoid improper operation! Read and follow the instructions given in the section titled "Hillside Operation" in this manual before operating your tractor.



CAUTION: Hydraulic systems are highly pressurized. Escaping hydraulic oil, even an invisible pinhole leak, can penetrate body tissues causing serious injury. Use a piece of wood or cardboard when looking for leaks - never use the hands or other parts of the body.

Relieve hydraulic pressure before disconnecting circuits. When re-assembling, make absolutely certain that all connections are tight.

If injured by hydraulic oil escaping under pressure, see a doctor immediately. Serious complications may arise if medical attention is not given at once.



CAUTION: Place the transmission in neutral, set the parking brake and stop the engine before standing between the tractor and attachment when hitching.



WARNING: To jump start this machine, connect positive jumper cable to battery terminal on starter solenoid and connect negative jumper cable to good engine ground. Start engine only when seated in operator's seat. Stop engine before leaving machine. Disconnect jumper cables. Any other method could result in uncontrolled machine movement.



CAUTION: When removing a battery, always disconnect the (-) negative ground cable first. When installing the battery, always connect the (-) negative ground cable last.



DANGER: Batteries produce explosive charges. Keep sparks, flame and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.



CAUTION: Never wear rings or metal watch bands when working with the tractor electrical system or battery as you may ground a live circuit.



CAUTION: When working around storage batteries, remember that all of the exposed metal parts are "live". Never lay a metal object across the terminals as a spark or short circuit may result. Sparks, lighted matches and exposed flames must be kept away from the battery due to the presence of explosive gas in the battery. The liquid in the batteries is acid. Use care not to spill it on hands or clothing.



POISON: Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing. Antidote: **EXTERNAL**, flush with water; **INTERNAL**, drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately; **EYES**, flush with water for 15 minutes and get prompt medical attention. Keep out of reach of children.



CAUTION: Storage areas for batteries must be well ventilated to prevent accumulation of hydrogen gas from newly recharged batteries.



CAUTION: Oil, grease or adjust the loader tractor only when the engine is shut off and the loader is lowered to the ground or properly blocked.



CAUTION: Do not lower lift arms unless the engine is running. Failure to observe this precaution could result in the hydraulic reservoir overflowing or bursting.

Stop and inspect all attachments for damage after undue impact. Lower or block elevated components before servicing or when leaving the equipment.



CAUTION - The proper amount of rear counter weighting is required to achieve proper balance and stability when using the front loader. To use the loader to its full 600 pound lift capacity, put 500 pounds in the weight box. If wheel weights are used, the weight of these may be subtracted from the weight in the weight box. This applies to both the Models 644 and 646.

The weight may be removed for mowing or other jobs not utilizing the front loader.



CAUTION: Keep all shields in place.

Before leaving operator's position: Shift transmission to neutral, set parking brake, disengage attachment clutch, shut off engine and remove ignition key.

Wait for all movement to stop before servicing machine.

Keep people and pets a safe distance away from machine.

IMPORTANT: Always install new decals whenever the old decals are destroyed, lost, painted over or illegible. When individual parts are replaced that have decals attached, be sure to install a new decal with the new part. Replacement decals are available from your Case dealer.

HILLSIDE (SLOPE) OPERATION



WARNING: Improper operation of your tractor on hillsides and slopes can be dangerous. Avoid improper operation! Read and follow the instructions given in the section titled "Hillside Operation" in this manual before operating your tractor.

Avoid operating tractor on hillsides and slopes. To minimize the possibility of accidents while operating on hills and/or rough terrain, obey a combination of rules, practices and good common sense.

These include:

1. Reading, understanding, and obeying all written safety messages appearing on decals on the machine and in operator's manuals.
2. Learning from your operator's manual and carefully from EXPERIENCE how to operate your tractor correctly. Know your tractor's limitations.
3. Knowing the terrain on which you are operating your tractor. There are terrain conditions on which your tractor cannot be operated!
4. Learning to expect changes in operating conditions. Adding or removing attachments or weight to your tractor will make your tractor perform differently. Rain, snow, loose gravel, wet grass, etc., change the tractive conditions of the terrain requiring changes in your operating technique or not to operate on that terrain.

The following paragraphs will cover these practices one at a time. Read and study them. The examples provided are not all inclusive but will give you a firm understanding of the requirements for avoiding accidents while operating your tractor.

A tractor, the same as your model, passed a stability test at angles prescribed by ANSI B71.1 - 1972 and B71.1a - 1974 (American National Standards Institute). This test was made with a stationary tractor without mounted equipment and on a perfectly smooth and hard surface. This may not be representative of the conditions on which your tractor will operate.

THE OPERATOR IS THE SOLE JUDGE AS TO THE DEGREE OF SLOPE ON WHICH THIS TRACTOR CAN BE SAFELY OPERATED. IF IN DOUBT THAT THIS TRACTOR CAN BE SAFELY OPERATED ON A PARTICULAR SLOPE, DO NOT OPERATE ON THAT SLOPE! COMMON SENSE MUST PREVAIL.

Read, Understand, Obey:

Safety messages are found on the tractor and in the operator's manuals. These must be understood by the tractor operator to be of value. Be sure that these messages are studied before starting and/or operating the tractor by an operator not familiar with this particular tractor.

Learn to Operate:

Learn your tractors controls from decals on the tractor and from instructions in the operator's manual. Practice how to properly manipulate these controls. Practice must be done in a flat area, clear of obstacles and bystanders. Learn your tractors operating characteristics and limitations. These include:

- a. amount of engine power available
- b. engine governor response
- c. tractive ability
- d. steering characteristics
- e. braking characteristics
- f. movement of travel lever and pedal
- g. forward and reverse ground speeds
- h. speed of attachment lift
- i. and others

Attempting any operation which approaches or exceeds the tractor's limitation is risking an accident.

Know the Terrain:

Know the terrain on which you are working. Find hidden obstacles by walking through and inspecting the area prior to operating your tractor on it. Mark obstacles, such as, rocks, ruts or holes with a 6 ft long pole and red flag and stay well clear of these obstacles when operating.

Operate your tractor at a ground speed slow enough to insure complete control at all times.

Place the transmission in low range and regulate the travel control pedal slowly and smoothly to maintain this safe speed.

Always drive in a forward direction when proceeding downhill. Never drive up a hill. If necessary, back up a hill to the desired position. Always back up loading ramps and tilt bed trailers. If necessary to turn while on a hill, always turn downward.

Your judgement, based on operating experience is the final word in deciding if you should negotiate any given hill or slope. If you are in doubt about safety - STAY OFF THE SLOPE.

Under no circumstances should an inexperienced operator attempt to use your tractor on slopes or hillsides.

You may encounter some terrain on which your tractor cannot be operated even if a different piece of equipment has operated there in the past.

Learn to Compensate for Changes in Operating Conditions:

Adding or removing attachments or ballast (such as wheel weights or fluid) change the weight and weight distribution of your tractor and, therefore, change your tractors operating characteristics.

Be alert to these changes. Practice, operating the tractor after each change has been made.

Adding an attachment (weight) to the rear of the tractor reduces the weight on the front axle. Adding an attachment (weight) to the front of the tractor reduces weight on the rear of the tractor. You must add counterweight to the front if a rear mounted attachment is installed. You must add counterweight to the rear if a front mounted attachment is installed.

Tractive conditions will vary with weather and terrain and equipment.

Areas wet with dew, rain or snow will be more slippery than when dry. Areas covered with loose gravel are more slippery than firm dry ground. Greater stopping distances are required in these slippery areas.

Spinning rear wheels tend to move the tractor sideways. The addition of tire chains will provide more traction to the rear wheels in the forward-reverse direction but less stability in the sideways direction. Chains will cause more abrupt starting and stopping.

The final word in safe tractor operation rests on your judgement.

If in doubt of your safety - STAY OFF THE SLOPE.

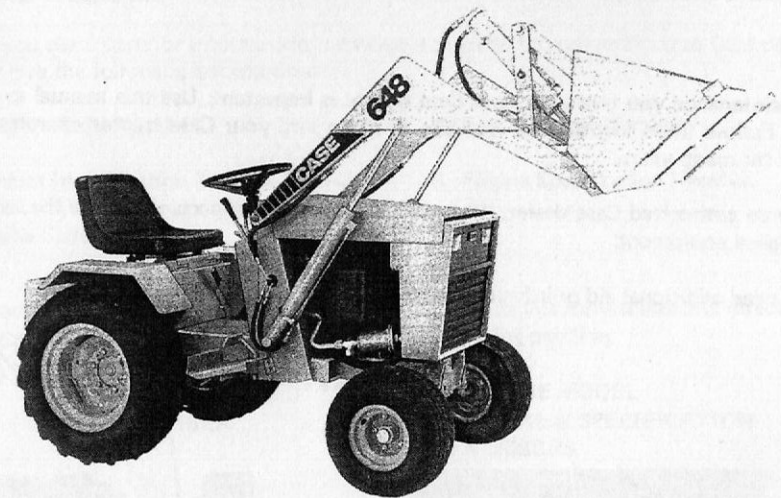


FIGURE 1

Right Hand View of Model 648 Compact Wheel Loader With Standard 44" Material Bucket and Counterweight Box.

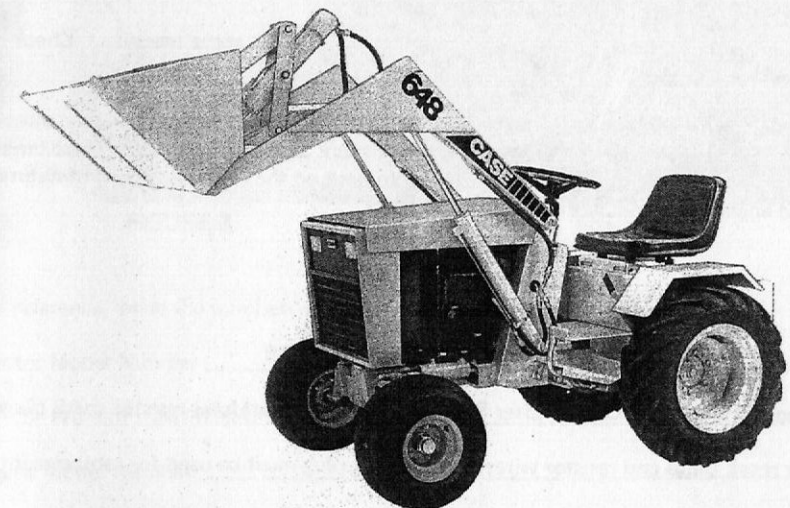


FIGURE 2

Left Hand View of Model 648 Compact Wheel Loader With Standard 44" Material Bucket and Counterweight Box.

TO THE OWNER OF A CASE TRACTOR

The Maintenance you give your new Case tractor is important. Use this manual as your guide. Follow these instructions and tips to make sure your Case tractor operates efficiently for many years.

We are an authorized Case dealer. We have Case replacement parts which are the same as the original equipment.

If you need additional aid or information, contact us.

Your Authorized Case Dealer

NOTICE

A spark arrester or spark arrester muffler must be used on some machines. Check the laws in your area.

Some states have regulations for the use of this machine in agriculture, forestry and construction. These laws control the maintenance of spark arrester equipment. These laws also control the installation of spark arrester equipment on the exhaust system of naturally aspirated engines (engines without a turbocharger).

RADIO INTERFERENCE REGULATIONS OF CANADA

Case tractors taken into Canada after September 1, 1976 must have resistor spark plugs.

Resistor spark plugs and resistor wires for the spark plug must be used for replacement.

The regulation label is applied to the engine. Do not remove or destroy this label.

SERIAL NUMBER

When you need parts or information, or when you write to your authorized Case dealer, always give the following information:

1. Tractor Model Number
2. Product Identification Number (P.I.N.)
3. Engine Serial Number
4. Engine Model Number
5. Engine Specification Number

The words "right", "left", "front" and "rear" as used in this manual indicate directions when you are in the operator's seat in the normal operating position.

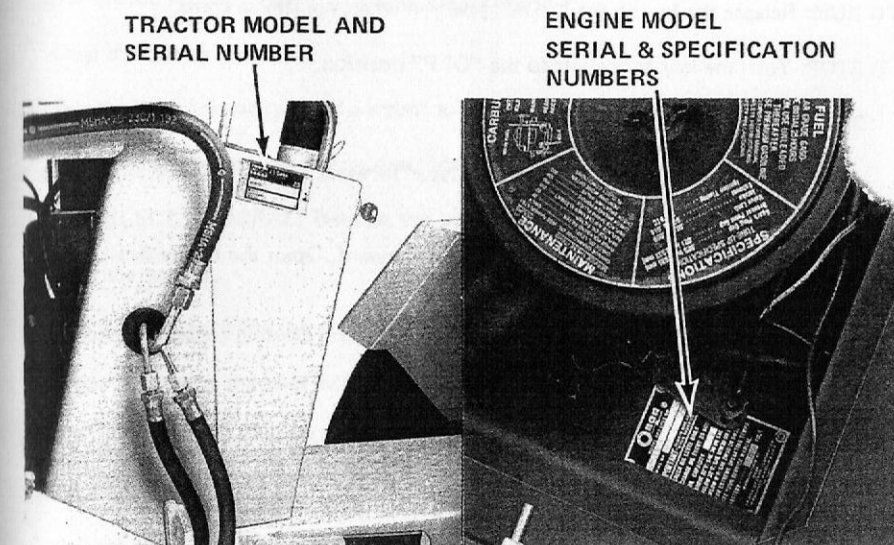


FIGURE 3

FIGURE 4

For reference, write the numbers on the lines below.

Tractor Model Number 648

Tractor Product Identification Number (P.I.N.) _____

Engine Model Number _____

Engine Serial Number _____

Engine Specification Number _____

OPERATING INSTRUCTIONS



Remember, a careful operator is always the best insurance against an accident. Give complete and undivided attention to the job at hand.

OPERATING CONTROLS AND INSTRUMENTS

1. IGNITION KEY AND STARTER SWITCH

TO START: Turn the key to the right and hold in the "START" position.

TO RUN: Release the key to the "RUN" position when the engine starts.

TO STOP: Turn the key to the left to the "OFF" position.

CHOKE

CLOSE THE CHOKE: Push the choke lever forward. Close the choke to start a cold engine.

TO OPEN THE CHOKE: Pull the choke lever rearward. Open the choke slowly after the engine starts.

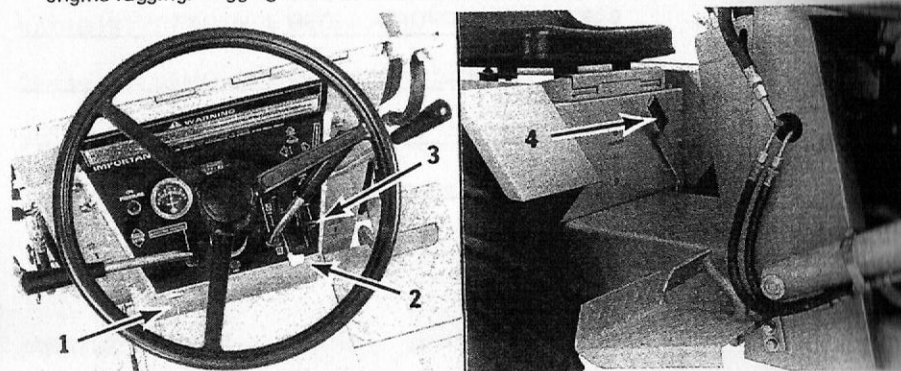
The choke must be open during normal operation or when starting a warm engine.

3. THROTTLE

ENGINE LOW IDLE: Pull the throttle lever rearward. Put the throttle in the "SLOW" position when starting and when stopping the engine. This gives a warm up and cool down period.

TO INCREASE ENGINE SPEED: Push the throttle lever forward until the needed engine speed is reached.

Decrease the engine speed during operation for maximum fuel efficiency. Do not cause engine lugging. Lugging will cause too much heat and damage to the engine.



CAUTION: Only operate controls from the operator's seat to prevent injury.



CAUTION: Always shut off engine, remove key, set parking brake, and wait until all engine and attachment motion has stopped before dismounting from the operator's seat.

4. DUAL RANGE TRANSAXLE

TO SELECT LOW RANGE: Release the travel pedal.

Stop the tractor.

Pull the lever forward a small amount to go over the locating pin.

Pull the lever up beyond the neutral locating pin and release.

TO SELECT NEUTRAL: Release the travel pedal.

Stop the tractor.

Pull the lever forward a small amount to go over the neutral locating pin.

Align the hole in the lever with the neutral locating pin and release.

TO SELECT HIGH RANGE: Release the travel pedal.

Stop the tractor.

Pull the lever forward a small amount to go over the neutral locating pin.

Push the lever down beyond the neutral locating pin and release.

If the range shift does not move easily, rotate the gears.

To rotate the gears:

1. move the direction control lever a small amount into the "FORWARD" position. Push the travel pedal down a small amount.

2. release the travel pedal.

IMPORTANT: The range shift lever must be beyond the neutral locating pin while in "LOW" or "HIGH" range. Gear damage will result if the lever is not in the correct position.

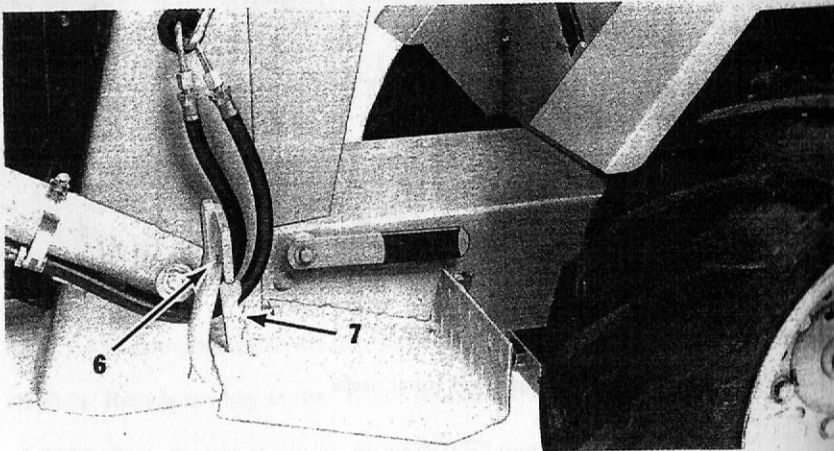


FIGURE 7

5. DIRECTION CONTROL LEVER AND TRAVEL PEDAL

TO STOP TRAVEL: Release the travel pedal.

FOR FORWARD TRAVEL: Put the direction control lever into the "FORWARD" position. Slowly push down on the travel pedal.

Speed and power will increase as you push the travel pedal down.

FOR REVERSE TRAVEL: Put the direction control lever into the "REVERSE" (rearward) position. Slowly push down on the travel pedal.

Speed and power will increase as you push the travel pedal down.

Do not operate at full speed in reverse travel.

FOR NEUTRAL: Release the travel pedal. Put the direction control lever into the "NEUTRAL" position.

A neutral start switch is actuated by the travel pedal. The pedal must be fully released before the engine will start.

6. BRAKE PEDAL

TO ACTUATE THE BRAKE: Push the brake pedal fully down. This will stop the loader very fast.

NOTE: Only use this method if the loader travel does not stop after you release the travel pedal.

See the Operating Procedure section of this manual for a more complete description of stopping travel.

7. PARKING BRAKE LOCK

TO SET: Push the brake pedal fully down. Pull the parking brake lock forward to engage one of the notches with the bottom of the slot.

TO RELEASE: Push the brake pedal down a small amount and release. A spring will disengage the parking brake lock.

8. HEADLIGHTS

TO ILLUMINATE: Turn the key to the "LIGHTS" position after the engine is started. Using the lights while the engine is off or at low idle will discharge the battery.

TO TURN OFF: Turn the key from the "LIGHTS" position.

9. AMMETER

The ammeter indicates the rate of current flowing to the battery. The ammeter reading will be high when the battery voltage is low. When the engine is started the reading will also be high.

The ammeter reading will gradually go back to zero as the battery voltage increases.

Stop the tractor and have the cause corrected if:

- The ammeter remains at "0" when the battery voltage is low.
- If the ammeter continues to give a high reading.

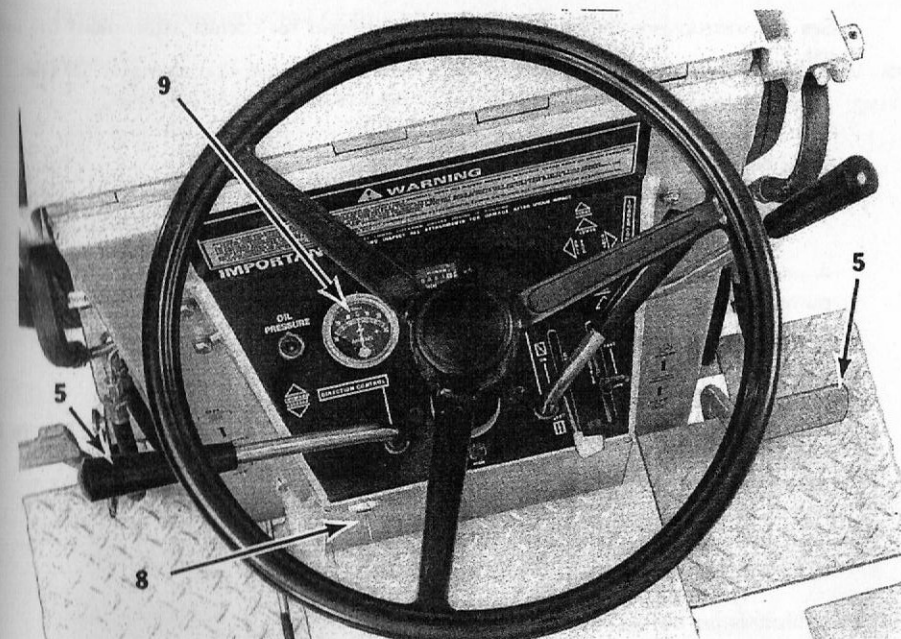


FIGURE 8

10. HOUR METER

An electric hour meter is provided to keep record of total hours. Utilize this hour meter in meeting required scheduled maintenance.

11. HYDRAULIC ATTACHMENT LIFT LEVER

TO LIFT: Run the engine.

Pull the lever rearward.

Release the lever when the needed height is reached.

TO LOWER: Run the engine.

Push the lever forward a small amount.

Release the lever when the needed height is reached. A spring will automatically return this lever to the "NEUTRAL" position.

THE "FLOAT" POSITION: Push the lever fully forward.

A detent holds the lever in the "FLOAT" position. The lever must be manually returned to the "NEUTRAL" position from the "FLOAT" position.

The "FLOAT" position prevents hydraulic down pressure on the attachment.

See the instructions included with each attachment for correct attachment lift lever use.

12. ATTACHMENT DRIVE LEVER

TO ENGAGE: Pull the lever fully up.

TO DISENGAGE: Push the lever fully down.

A neutral start switch is actuated by the attachment drive lever. The lever must be pushed fully down (disengaged) before the engine will start.

13. OIL PRESSURE LIGHT

The oil pressure light will indicate low oil pressure. The light will illuminate before the engine is started during normal conditions.

Stop the engine and correct the problem if the light:

- Does not go off after the engine is running.
- Illuminates during operation.

14. BUCKET CONTROL LEVER

TO RAISE: Pull the lever slowly rearward. The lever will automatically return to neutral.

TO LOWER: Push the lever slowly forward. The lever will automatically return to neutral.

TO ROLL BACK: Move the lever slowly to the left. The lever will automatically return to neutral.

TO DUMP: Move the lever slowly to the right. The lever will automatically return to neutral.

TO FLOAT: Push the lever fully forward. The lever will stay in this position until you pull it back.

You can use two operating positions of the bucket control lever at the same time. See the Loader Operating Procedure section in this manual for more information.

15. STEERING WHEEL

TO STEER: Turn the steering wheel at a normal rate of speed in the direction desired.

The power steering relief valve will open and make a noise when the front wheels are turned all the way.

Release the steering wheel slightly when this noise occurs.

NOTE: Damage will occur if the tractor is operated with the power steering relief valve open for long periods of time.

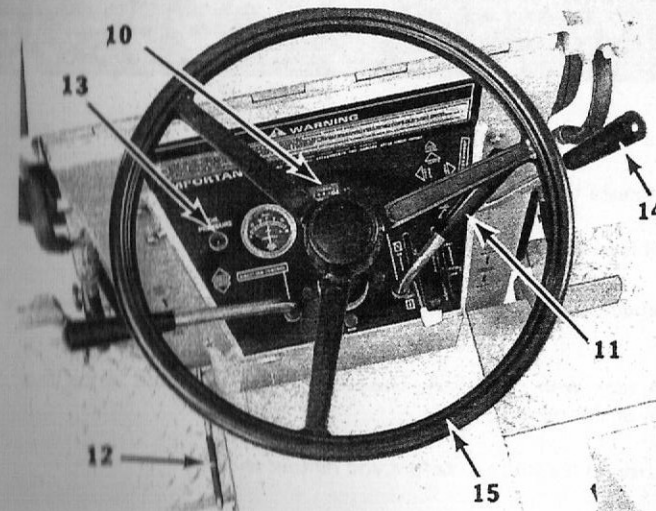


FIGURE 9

PRESTARTING CHECK LIST

WARNING: Before starting engine - study safety messages in Operator's Manual. Read all safety signs on machine. Clear area of other persons. Learn and practice safe use of controls before operating.

To start engine - disengage attachment drive and release travel pedal.

To prevent load from spilling on machine and operator: Do not roll bucket back completely when lifting to the full height.

To prevent possible loss of control and injury: Do not transport with the bucket fully raised. Use low range when operating on inclines that can be safely negotiated - see Operator's Manual.

Keep all shields in place.

To park loader or dismount, or to service or adjust loader and/or attachments, lower or block all components or attachments, set parking brake, stop engine, and remove key.



CAUTION: Do not wear loose clothing which may catch in moving parts.



CAUTION: Disengage power to attachment(s) and stop the engine (motor) before making any repairs or adjustments.

1. Use only clean fuel, oil, container and funnel.
2. Apply oil or grease to all the specified points shown in the Lubrication Chart.
3. Check the oil level in the engine and add oil as required.
4. Check the engine air cleaner and air intake screen, for dirt or obstructions. Clean as required.
5. Fill the fuel tank with clean fuel. The requirements are listed in the Fuel Specifications Section of this manual.

Clean the area around the fuel cap before you remove the cap.

Check the ventilation hole in fuel tank cap and clean as required.

CAUTION: Handle gasoline with care - it is highly flammable.



- a. Use approved gasoline container.
- b. Never remove the cap of the fuel tank or add gasoline to a running or hot engine, or fill the fuel tank indoors. Wipe up spilled gasoline.
- c. Open doors if the engine is run in the garage - exhaust fumes are dangerous. Do not run the engine (motor) indoors.

6. Check all operating controls and instruments for correct function before using the tractor.



CAUTION: Do not smoke when working near fuel.

STARTING PROCEDURE

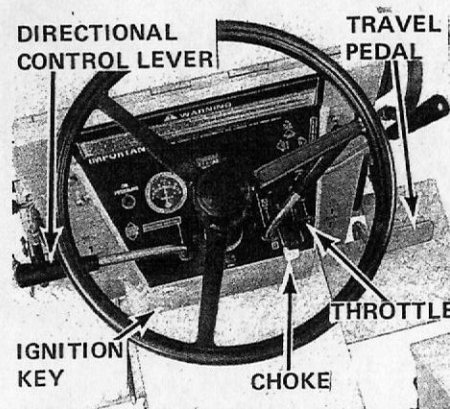


FIGURE 10

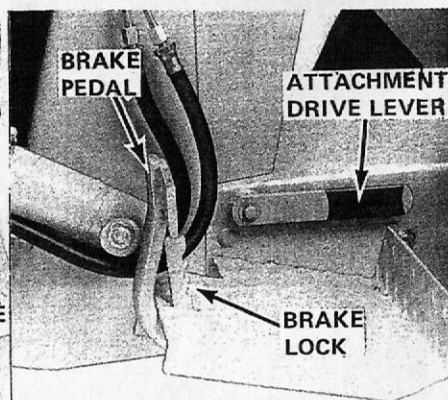


FIGURE 11



CAUTION: Only operate controls from the operator's seat to prevent injury.



CAUTION: Do not allow children to operate the vehicle. Do not allow adults to operate it without proper instruction.



CAUTION: Do not carry passengers. Keep children and pets a safe distance away.

1. Put the direction control lever in the "NEUTRAL" position. Do not push down on the travel pedal.
2. Push the attachment drive lever down into the "OFF" position.
3. Push the choke lever forward to close the choke.

The choke setting will change according to the air temperature, engine temperature, and grade of fuel.

4. Push the throttle lever forward approximately 1/3 of the way between the "SLOW" and "FAST" positions.



CAUTION: Disengage all attachment clutches and shift into neutral before attempting to start the engine (motor).

5. Turn the ignition key to the right and hold in the "START" position. Release the key to the "RUN" position when the engine starts running.

NOTE: Release the key immediately when the engine starts. If you hold the key in the "START" position after the engine is running, damage can occur. Release the key after 30 seconds if the engine does not start running. Wait 3 minutes before you try again.

6. Pull the choke lever rearward slowly after the engine starts running.
7. Permit the engine to become warm before applying a load.

NOTE: The hydraulic system must be warm before you use the tractor with air temperatures less than 32°F (0°C). Use the following procedure:

- a. Set the throttle 1/3 of the way between the "SLOW" and "FAST" position.
 - b. Select the "NEUTRAL" position of the dual range transaxle.
 - c. Move the direction control lever to the full "FORWARD" position. Push the travel pedal fully down.
 - d. Run for several minutes before operating the tractor. A noise can occur when the hydraulic system is cool.
8. Set the throttle lever approximately 3/4 of the way between the "SLOW" and "FAST" positions for most jobs.

Decrease the engine speed during most operations for maximum fuel efficiency.

Do not permit engine lugging. Lugging will cause too much heat and damage to engine.

IMPORTANT: DO NOT PUSH OR TOW THE TRACTOR TO START THE ENGINE. SERIOUS DAMAGE WILL HAPPEN TO THE DRIVE SYSTEM.

STOPPING PROCEDURE

1. Release the travel pedal. Put the direction control lever in the "NEUTRAL" position.
2. Stop the tractor. Apply the brake if necessary.
3. Engage the parking brake lock.
4. Pull the throttle lever rearward to the "SLOW" position.
5. Permit the engine to cool. Run the engine at idle speed for several minutes if the work load was severe.
6. Turn the ignition key to the left to the "OFF" position.
7. Remove the ignition key.



CAUTION: Always shut off engine, remove key, set parking brake, and wait until all engine and attachment motion has stopped before dismounting from the operator's seat.



CAUTION: Take all possible precautions when leaving the vehicle unattended, such as disengaging the power take-off, lowering the attachment(s), shifting into neutral, setting the parking brake, stopping the engine, and removing the key.



CAUTION: Know the controls and how to stop quickly. READ THE OWNER'S MANUAL.

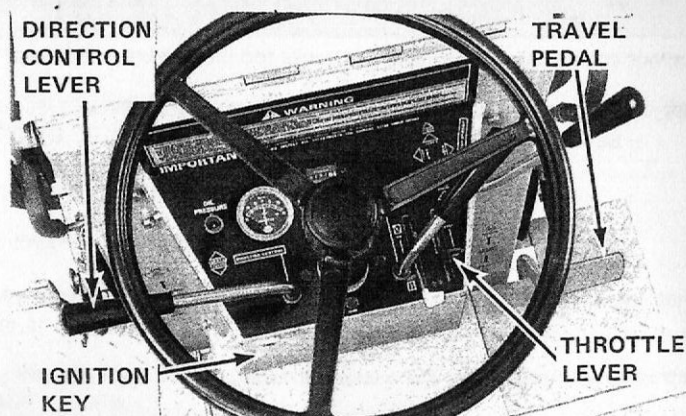


FIGURE 12

OPERATING PROCEDURE

Operate the tractor for the first time on a flat area, clear of obstructions and persons. Learn the operating characteristics of your tractor before trying the first job.

1. Select the correct gear range for the job.
2. "LOW" range is for all working operations and hillside use. Only use "LOW" range on hillsides or inclines.



WARNING: Improper operation of your tractor on hillsides and slopes can be dangerous. Avoid improper operation! Read and follow the instructions given in the section titled "Hillside Operation" in this manual before operating your tractor.

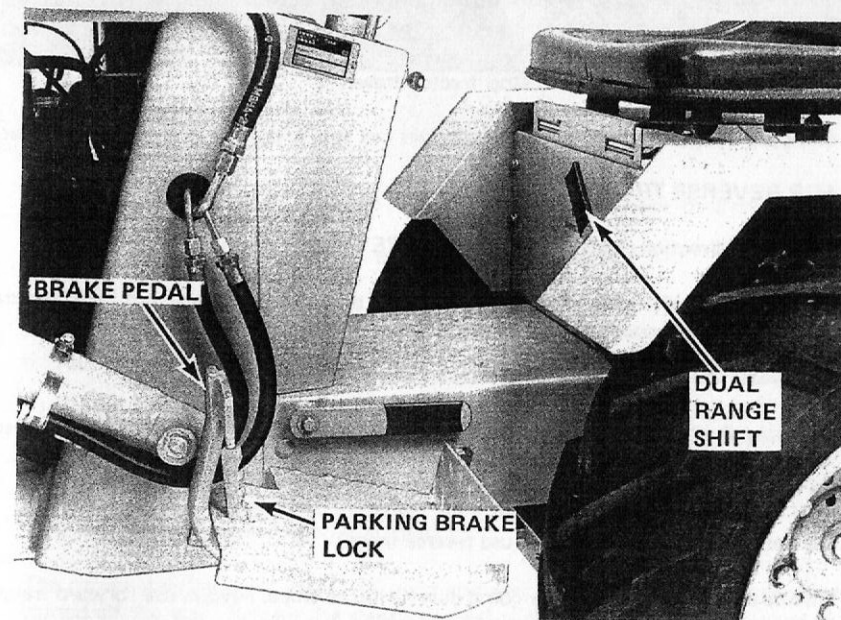


FIGURE 13

3. "HIGH" range is for transport only. "HIGH" range must not be used for hillside operation.
4. If the range shift does not move easily, rotate the gears.

To rotate the gears:

- a. Move the direction control lever into the "FORWARD" position. Push the travel pedal down a small amount.

- b. Release the travel pedal.

IMPORTANT: Completely stop the tractor motion before changing the gear range. The range shift lever must be beyond the "NEUTRAL" locating pin when in the "LOW" or "HIGH" range. Gear damage will occur if the lever is not in the correct position.

5. Push the throttle lever forward until you get the needed engine speed. Reduce engine speed during operation to obtain maximum fuel efficiency. Do not cause engine lugging. Lugging will cause too much heat and damage to the engine.

6. FOR FORWARD TRAVEL:

- Put the direction control lever into the "FORWARD" position.
- Slowly push the travel pedal down until you reach the needed speed. Hold the travel pedal in this position for operation.
- Release the travel pedal to stop tractor travel.
- Apply the brakes fully if the tractor does not stop after you release the travel pedal.

7. FOR REVERSE TRAVEL:

- Put the direction control lever into the "REVERSE" position.
- Slowly push the travel pedal down until the needed speed is reached. Hold the travel pedal in this position for operation.
- Release the travel pedal to stop tractor travel.
- Apply the brakes fully if the tractor does not stop after you release the travel pedal.

Be very careful and look behind as you move rearward.

Do not use full speed when you use reverse travel.

Do not use reverse travel while going down a hill or slope. Always use forward travel to go down a hill. Use reverse travel to go up a hill.

8. The travel pedal controls both the speed and power available to the rear wheels of the tractor.

Change the travel pedal position during operation to adjust for changes in the work load.

9. Do not move the direction control lever from "REVERSE" to "FORWARD" while the tractor is in motion. This action can cause the front of the tractor to raise off the ground. Loss of control will result.
10. Decrease travel speed before you make a turn. Release the travel pedal or decrease the throttle setting. Use low range in the dual speed transaxle.



CAUTION: Reduce speed on the slopes and in sharp turns to prevent tipping or loss of control. Exercise extreme caution when changing direction on slopes.



CAUTION: Use care when pulling loads or using heavy equipment.

- Use only approved drawbar hitch point.
- Limit loads to those you can safely control.
- Do not turn sharply. Use care when backing.
- Use counterweight(s) or wheel weights when suggested in the owner's manual.

11. TO STEER:

Turn the steering wheel at a normal rate of speed in the direction desired.

To insure the least force necessary to turn the steering wheel:

- Turn the steering wheel at a normal rate of speed.
- Run the engine at fast idle speed.
- Make sure the hydraulic oil is at operating temperature.
- Do not hold the attachment lift or loader bucket circuits against the relief valve. (Power to the attachment lift and loader bucket circuits is reduced if the power steering is held against the relief valve.)

The power steering relief valve will open and make a noise when the front wheels are turned all the way. Release the steering wheel slightly when this noise occurs. After a small amount of practice you will know when to stop turning the steering wheel before the relief valve opens.

NOTE: Damage will occur if the tractor is operated with the power steering relief valve open for long periods of time.

12. Engage the attachment drive before you put a work load on the attachment.
13. Engage the mower drive over an area of light or short grass.



CAUTION: When using any attachments, never direct discharge of material toward bystanders nor allow anyone near the vehicle while in operation.



CAUTION: Clear the work area of objects which might be picked up and thrown.

14. Engage the tiller in the raised position. Then lower the tiller to the needed depth.
15. See your attachment operator's manual for more information.

LOADING FROM A PILE

1. Position the truck so the "fill - transport - dump" cycle is as short as possible.

Keep the work area level and smooth. This will shorten cycle time, be less tiring for the operator and reduce the possibility of equipment failure.

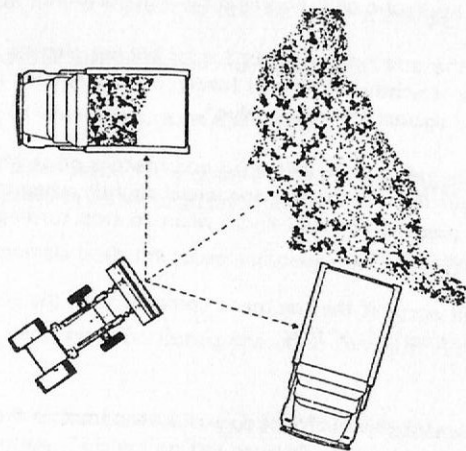


FIGURE 14

2. Fill the bucket

- a. Place the bucket flat on the ground and drive into the pile.

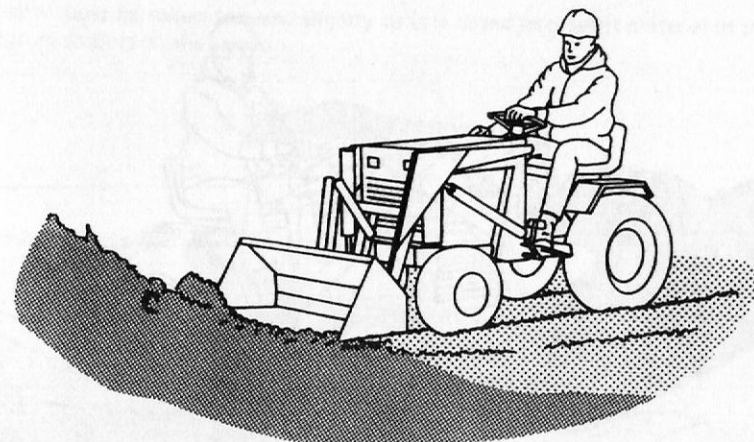


FIGURE 15

- b. Raise and roll back the bucket in a coordinated motion while crowding into the pile.

The hydraulic system main relief valve can open during this procedure. If the main relief valve opens a squeeling sound will be heard and loss of hydraulic power to the loader and steering circuits will result. Release the travel pedal slightly to allow the relief valve to close. When the relief valve closes, hydraulic power will be restored to the loader and steering circuits.

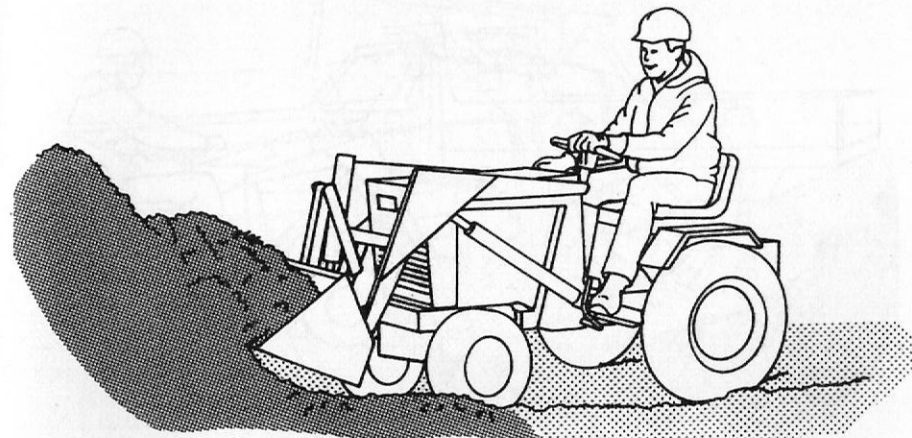


FIGURE 16

c. Continue to raise and rollback the bucket until full rollback is obtained. Raise only enough to fill the bucket or clear the pile.

d. Back away from the pile.

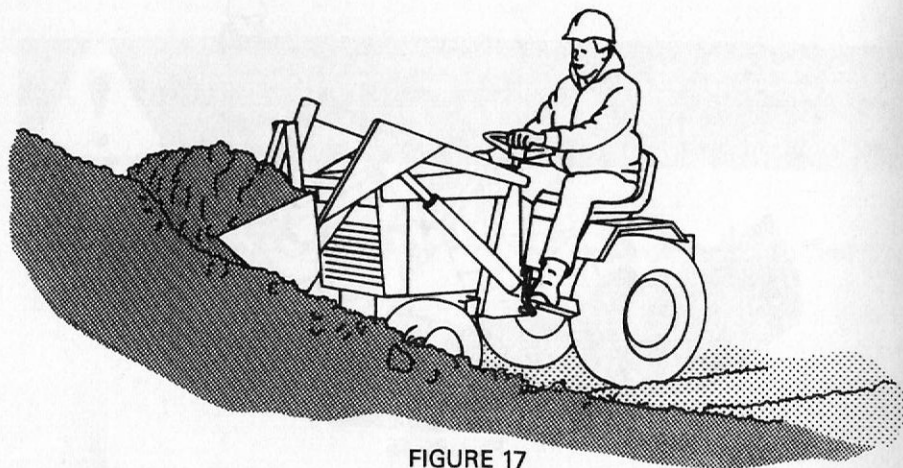


FIGURE 17

3. Driving with a full bucket

Raise the bucket high enough to clear ground obstructions and no higher. Driving with the full bucket raised higher than this makes the loader difficult to control, less stable, and can cause spillage.

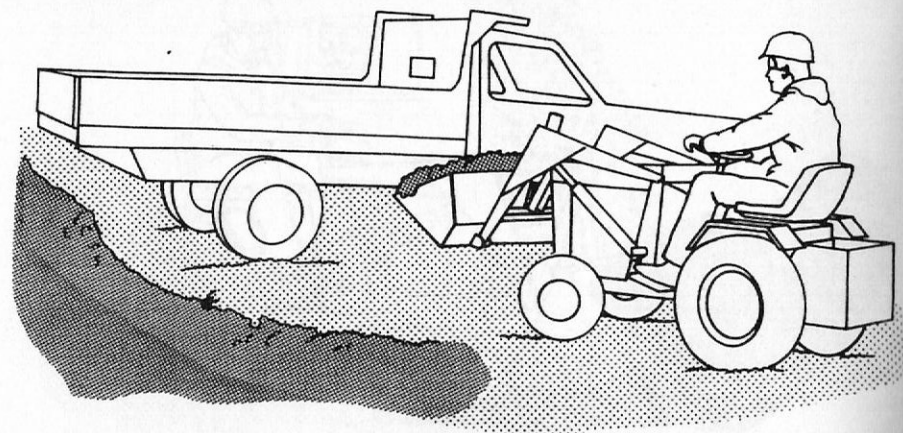


FIGURE 18

4. Raising the full bucket

Position the loader so the front wheels are turned to the straight position.

Raise the bucket and roll the bucket forward slightly as you drive toward the truck.

The bucket must be rolled forward slightly as it is raised to prevent material in the bucket from spilling on the tractor.

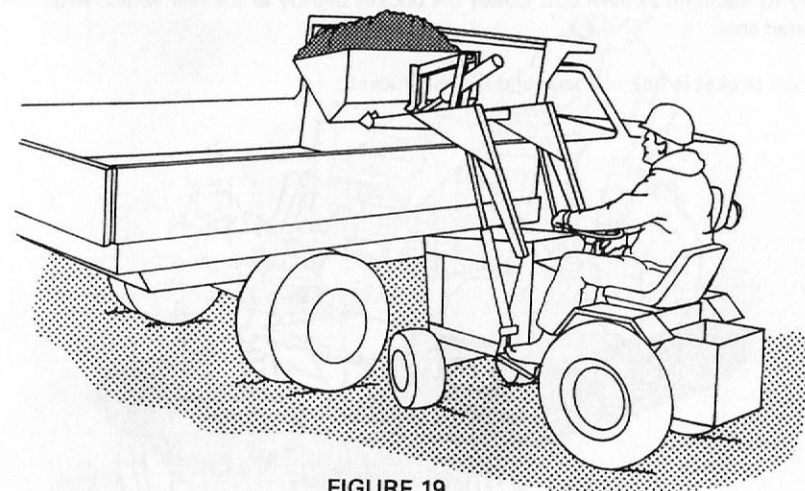


FIGURE 19

5. Dumping the bucket

Dump the bucket.

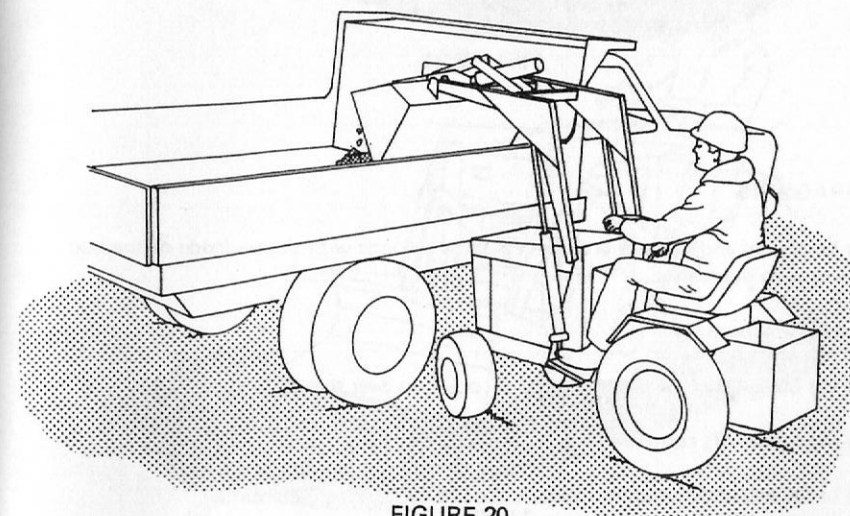


FIGURE 20

CUTTING BELOW GRADE

The 648 loader can be used for excavation of loose material.

Place the bucket in the full "lower" position and roll the bucket forward slightly. This will allow the cutting edge to penetrate the soil.

As the front wheels of the loader enter the excavated area, roll back the bucket slightly to maintain an even cut. Lower the bucket slightly as the rear wheels enter the excavated area.

When the bucket is full, rollback and lift the bucket.

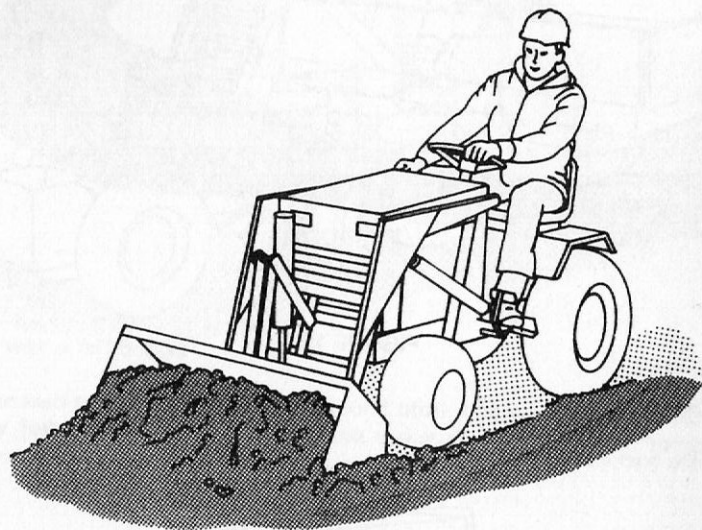


FIGURE 21

BACKDRAGGING

Soil can be spread and an even area can be made smooth with the backside of the bucket when driving in reverse.

1. Backdragging loose soil

Place the bucket in a partially "dumped" position over the pile to be spread.

Place the loader lift control in the "float" position.

Drive in reverse and gradually rollback the bucket as the pile is spread.

2. Backdragging firm soil

Place the bucket in an almost fully "dumped" position over the pile to be spread.

Do not place the loader lift control in the "float" position.

Drive in reverse and gradually rollback and lower the bucket as the pile is spread.

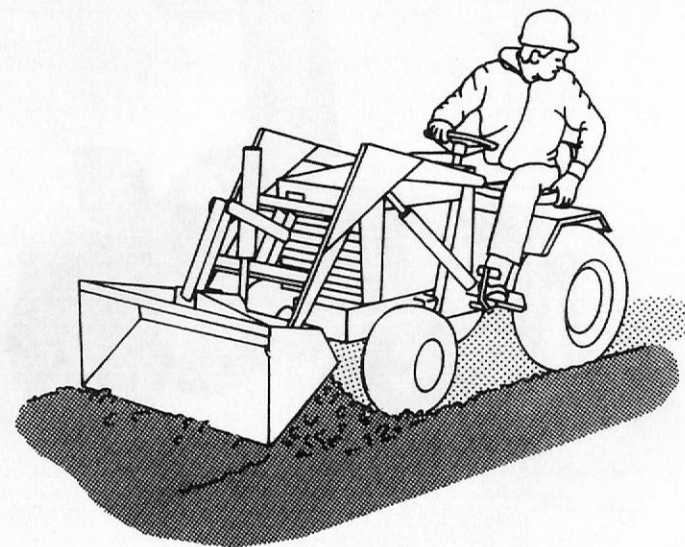


FIGURE 22

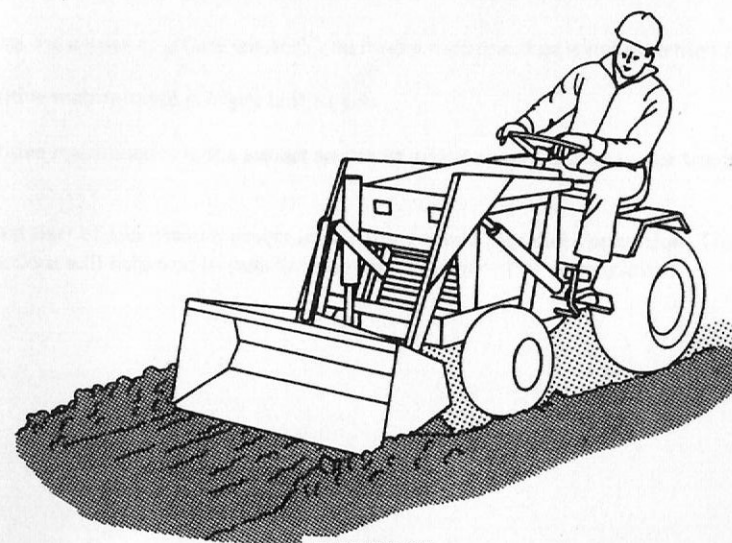


FIGURE 23

NOTES

PREVENTIVE MAINTENANCE

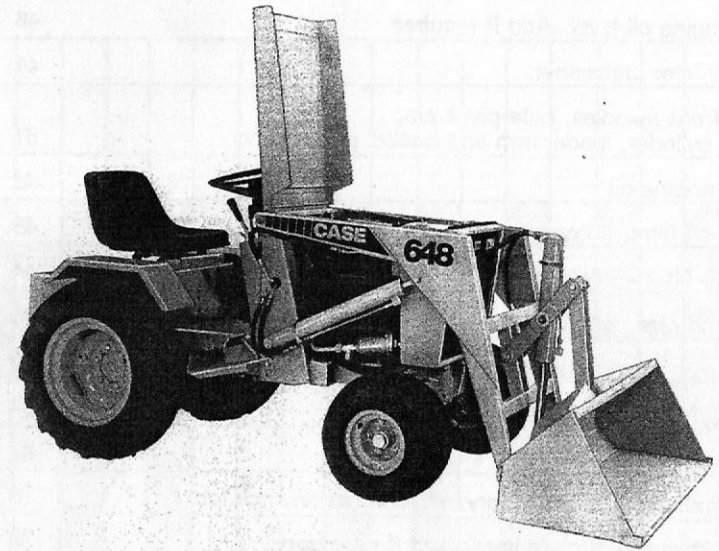


FIGURE 24

You are the owner of a Case tractor. You have a machine that is made to high standards.

Preventive maintenance is important to you.

Preventive maintenance is the easiest and most efficient way to keep your tractor working good.

The first part of this manual covers instructions needed for daily operation. The following instructions will help you in maintenance and adjustment of your tractor.

MAINTENANCE PROCEDURE

MAINTENANCE RECORD

- 27 -

SPECIFICATIONS

ENGINE

Make	Onan
Model	B48M/GAO18
Cycle	4 Cycle
Number of Cylinders	2
Horsepower	18 (13.4 kw)
Cylinder Bore	3-1/4" (82.5 mm)
Piston Stroke	2-7/8" (73 mm)
Displacement	47.7 in. ³ (780 cm ³)
Maximum No Load Speed	3600 RPM
Low Idle Speed	1200 RPM
Compression Ratio	6.6:1
Intake Valve Clearance (Cold)007 - .008 in. (0.17 - 0.20 mm)
Exhaust Valve Clearance (Cold)012 - .013 in. (0.30 - 0.33 mm)
Spark Plug Gap025" (0.64 mm)
Spark Plug Thread	14 mm
Spark Plug Type	Champion RH18Y or equivalent
Breaker Point Gap021 in. (0.53 mm)
Ignition Timing	21° BTDC
Cooling	Air Cooled with baffles that direct air around fins on the cylinder and cylinder head.

ELECTRICAL SYSTEM

Battery	32 Ampere Hour at 20 Hour Rate 12 Volt Negative Ground
Starter	12 Volt. Gear Drive
Headlights	12 Volt. 32 Candle Power
Fuse	SAE 30 AMP
Flywheel Alternator	12 Volt, 15 AMP with Rectifier/Regulator

TRANSAXLE

Type - Hydraulically driven, two gear ranges

Differential - Standard Bevel Gear

HYDRAULIC SYSTEM

Reservoir - Atmospheric with vented fill cap

Pump - Gear type positive displacement 8 GPM (30 l/min) @ 3000 RPM

Valve - Two spool - Open center with relief

Travel Circuit Relief Valve - 2300 PSI (16,000 kPa)

Lift Circuit Relief Valve 1150 PSI (7,900 kPa)

SPEED RANGE

	FORWARD AND REVERSE
Low Range	2.5 MPH (4 km/H)
High Range	6.5 MPH (10.5 km/H)

TIRES

TYPE	SIZE	PLY	PRESSURE
Front	18x8.50-8	4	22 PSI (150 kPa)
Rear	29x8.50-15	2	12 PSI (83 kPa)
Rear	26x12-12*	2	10 PSI (69 kPa)

*used with Backhoe

Consult your attachment Operator's Manual



CAUTION: Too much air pressure in the tires can cause tire or rim failure. Never put more air pressure in a tire than specified in the operator's manual or on the sidewall of the tire. If the tire or rim explode because of too much pressure, injury can result.

MEASUREMENTS

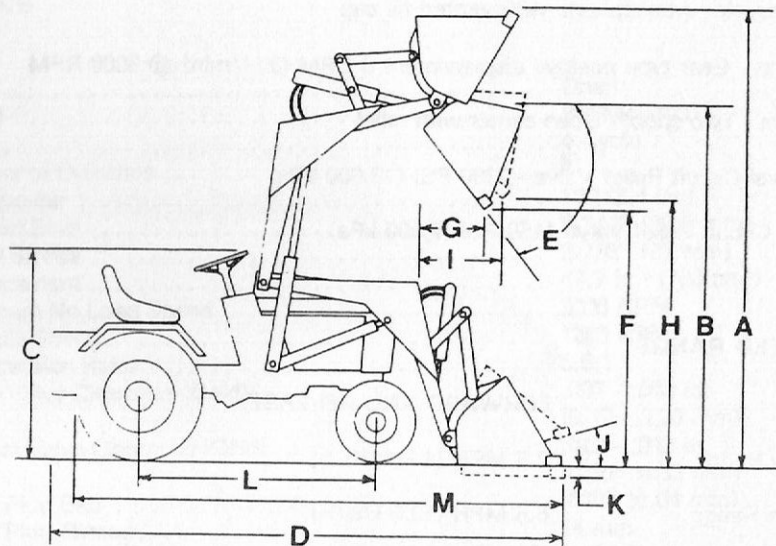


Figure 5

OPERATION INFORMATION

- A 92" (2340 mm) - operating height fully raised
- *B 71.75" (18020 mm) - height to bucket hinge pin
- C 44-3/4" (1137 mm) - height with bucket on ground
- D 108.00" (2740mm) - length including wt. box and bucket
- *E 54° - maximum dump angle
- F 52.88" (1340 mm) - dump clearance at max. height 54 degree dump angle
- G 13.75" (350 mm) - reach at max. height and 54 degree dump angle
- *H 54.50" (1380 mm) - clearance at 45 degree dump angle
- *I 16.88" (430 mm) - reach at 45 degree dump angle
- *J 18° - bucket roll back
- *K 2" (50 mm) - digging depth with bucket flat
- *L 48" (1220 mm) - wheel base
- *M 99" (2510 mm) - length, bucket to rear tire
- 8-1/4" (210 mm) - chassis ground clearance

Width	Rear Wheels 41" (1040 mm)
	Standard Bucket - 44" (1120 mm)
Weight (less weight box)	1067 lbs. (485 kg)

These specifications are according to ICED descriptions. ICED descriptions are not available for specifications that do not have a (*).

CAPACITIES

HYDRAULIC SYSTEM

REFILL - 8 qts. (7.5 l)

TOTAL SYSTEM - 13 qts. (12 l)

TRANSAXLE

3 quarts (2.8 l)

ENGINE CRANKCASE

1.75 qt. (1.6 l) without filter

2 qts. (1.8 l) with filter

FUEL TANK

5 gallons (18 l)

BRAKE

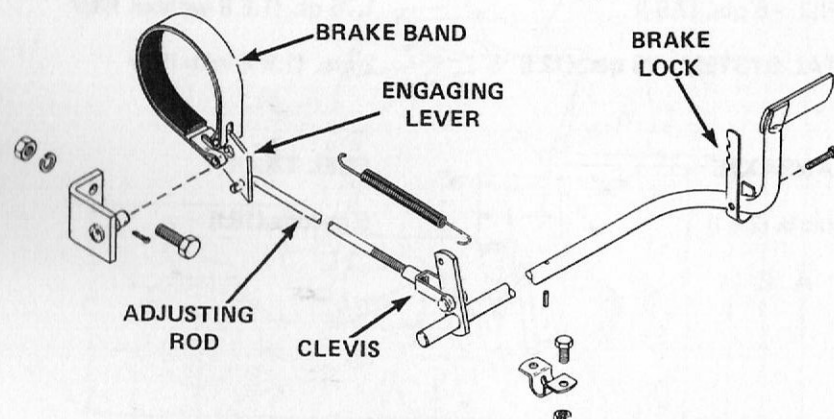


FIGURE 25

The brake is correctly adjusted when:

1. You push the pedal and the tractor stops fast after the travel pedal is released.
2. The brake lock will engage correctly.

BRAKE ADJUSTMENT

1. Put the tractor on a level, concrete surface.
2. Put the dual range transaxle in the "NEUTRAL" position.
3. Release the brake pedal.
4. Disconnect the adjusting rod from the engaging lever.
5. Turn the adjusting rod into the clevis a half a turn at a time. Temporarily connect the adjusting rod to the engaging lever after each adjustment. Manually push the tractor with a medium force to check the adjustment.
6. When the tractor cannot be pushed with medium force, loosen the rod about a half a turn. Make sure the brake band does not drag on the drum.
7. Connect the adjusting rod to the engaging lever and fasten with the cotter pin.
8. If you cannot get correct adjustment, check the brake band for wear. Always replace the brake band before the lining wears through. This will prevent damage to the brake drum.

BRAKE LUBRICATION

Apply a few drops of oil to each pivot point after each 50 HOURS of use.

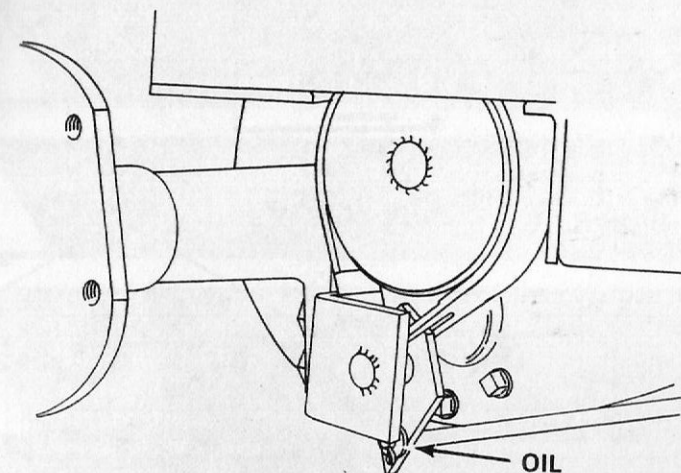


FIGURE 26
Brake Linkage

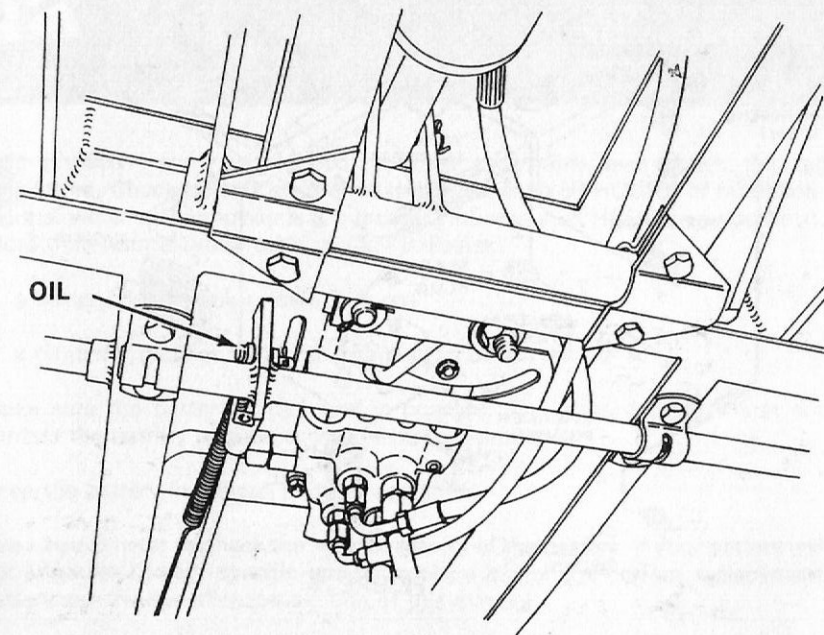


FIGURE 27
Brake Clevis

WIRING DIAGRAM

COLOR CODE

1. Black and White
2. Red
3. Orange
4. Blue
5. Yellow
6. White
7. Black
8. Brown
9. Dark Blue

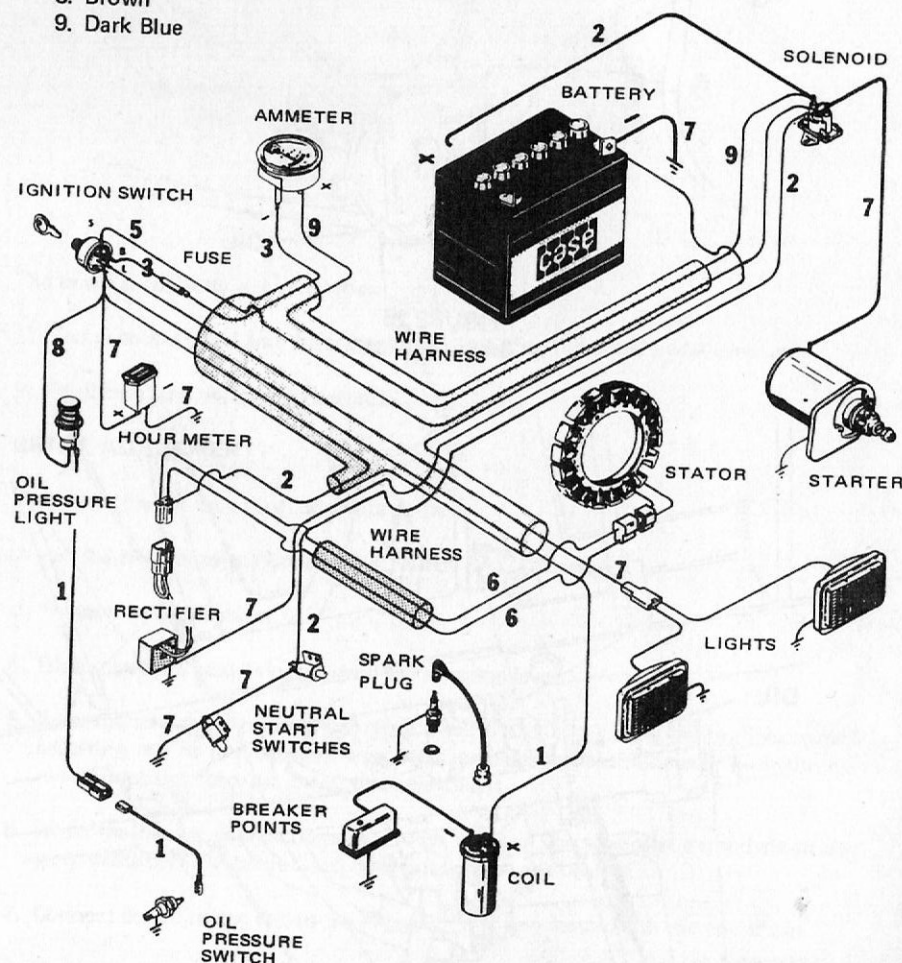
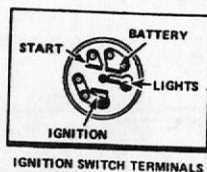


FIGURE 28

STORAGE BATTERY

BATTERY MAINTENANCE



DANGER: Batteries produce explosive charges. Keep sparks, flame and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.



CAUTION: Never wear rings or metal watch bands when working with the tractor electrical system or battery as you may ground a live circuit.



CAUTION: When working around storage batteries, remember that all of the exposed metal parts are "live". Never lay a metal object across the terminals as a spark or short circuit may result. Sparks, lighted matches and exposed flames must be kept away from the battery due to the presence of explosive gas in the battery. The liquid in the batteries is acid. Use care not to spill it on hands or clothing.



POISON: Batteries contain sulfuric acid which can cause severe burns. Avoid contact with skin, eyes or clothing. Antidote: **EXTERNAL**, flush with water; **INTERNAL**, drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately; **EYES**, flush with water for 15 minutes and get prompt medical attention. Keep out of reach of children.

1. Add distilled water, as required, to keep the water level above the cell separators. Check battery electrolyte level after each 50 HOURS of operation. Normal water consumption is 1 ounce (30 ml) every 25 HOURS of operation. More than normal water consumption indicates:
 - a. a battery with a leak or defective cell
 - b. a regulator rectifier that is charging too much
2. Make sure the battery is fastened in position. The battery cables must not contact the battery surface except at the connection.
3. Keep the battery in a clean and dry condition.
4. Use a hydrometer to check the specific gravity of the battery. If your battery will not keep the correct specific gravity, replace it. For the correct replacement battery see the specification section of this manual.

IMPORTANT: A battery having a specific gravity reading of 1.175 will become frozen at approximately 0°F (-18°C).

ADDING WATER

Always use mineral free or distilled water in your battery. When the temperature is 32°F (0°C) or less, immediately charge the battery after adding water. This will mix the water and electrolyte. If the water is not mixed, it will stay on top and become frozen.

Check the battery electrolyte level after each 50 HOURS of operation.

1. Remove the battery caps.
2. Visually check each cell.
3. Add water before you see the separators.

NOTE: Do not fill too much. Keep the electrolyte level below the base of the vent well.

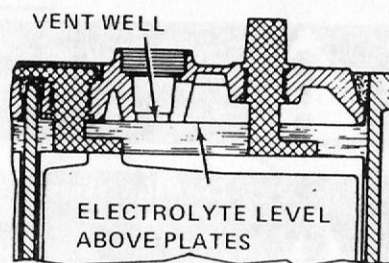


FIGURE 29

BATTERY CAPS

Always keep the battery caps in place and tight. Make sure the hole in the caps are open. Ventilation must occur to prevent pressure in the cells.

CABLE TERMINALS AND BATTERY POSTS

1. Remove all corrosion with a wire brush.
2. Wash with a neutral solution.
3. Apply a thin layer of light grease to prevent corrosion.

IDLE BATTERY

When the tractor is not used regularly, the storage battery will slowly lose voltage. Charge the battery at regular intervals to keep the hydrometer reading at 1.250 or more.



CAUTION: When removing a battery, always disconnect the (-) negative ground cable first. When installing the battery, always connect the (-) negative ground cable last.

HOW TO USE JUMPER CABLES AND A BOOSTER BATTERY

Always wear protective goggles and clothing when you work near batteries. Prevent acid from coming in contact with your skin or clothing.

Connect the jumper cables as shown below. Follow the numbers for the correct sequence of installation.

To remove the jumper cables, reverse the sequence.

To prevent any possible sparks near the battery:

1. Make sure the last connection is as far as possible from the battery.
2. Do not let the ends of the cables make contact with each other.
3. If the booster battery is on another machine, make sure machines do not make contact.



WARNING: To jump start this machine, connect positive jumper cable to battery terminal on starter solenoid and connect negative jumper cable to good engine ground. Start engine only when seated in operator's seat. Stop engine before leaving machine. Disconnect jumper cables. Any other method could result in uncontrolled machine movement.

BATTERY TERMINAL ON THE SOLENOID

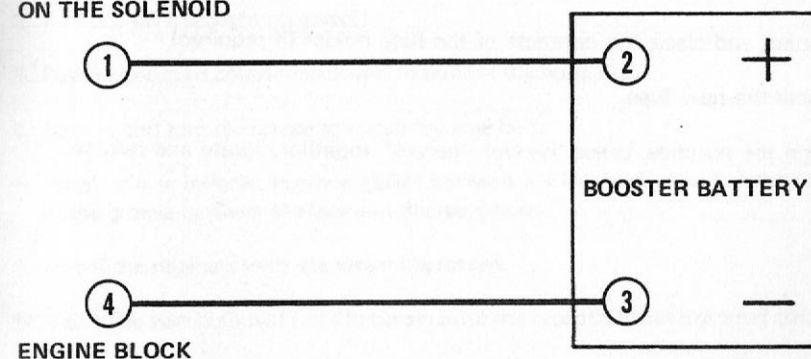


FIGURE 30

FUSE

The SAE 30 amp fuse is located behind the access panel of the dash tower. This fuse protects all circuits except the starter motor.

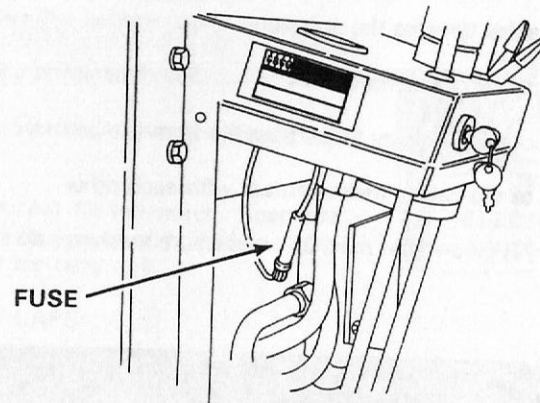


FIGURE 31

Use the following procedure to replace a fuse:

- a. Press the two "halves" of the fuse holder together, rotate and pull the halves apart.
- b. Remove the fuse.
- c. Inspect and clean the contacts of the fuse holder (if required).
- d. Install the new fuse.
- e. Align the notches, press the two "halves" together, rotate and release.

HEADLIGHTS

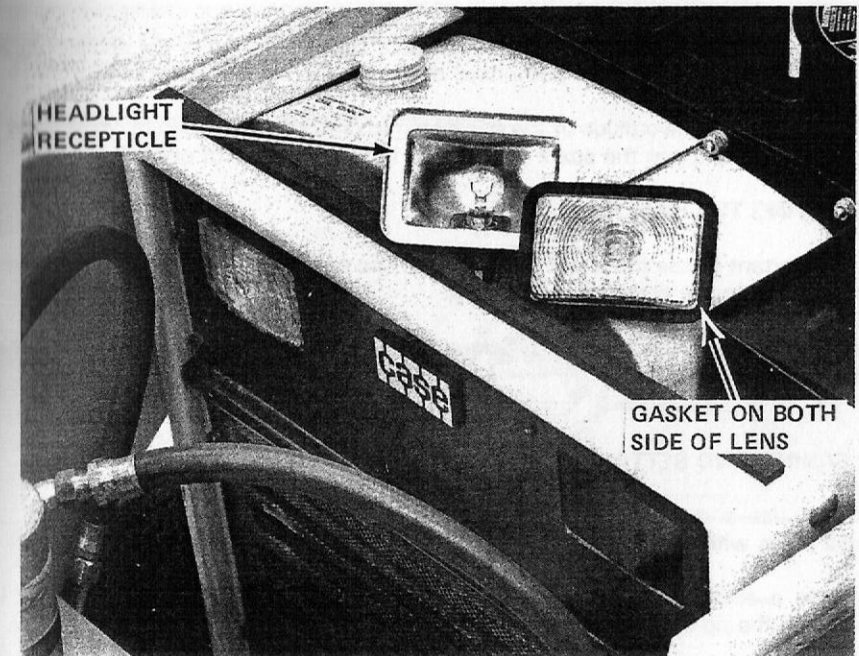


FIGURE 32

To replace the headlight bulb:

1. Remove the two screws and retainers
2. Remove the headlight receptacle
3. Push in and turn counterclockwise to remove the bulb.
4. Push in and turn clockwise to install the new bulb.
5. Install the receptacle. Put one gasket between the lens and grille. Put the other gasket in the groove between the lens and the receptacle.
6. Install the retainers with the mounting screws.

NOTE: The new bulb will not illuminate until the receptacle has a ground connection.

SPARK PLUG

Type	Champion RH18Y or equivalent
Thread size	14 mm
Gap setting	.025" (0.64 mm)

NOTE: During severe conditions of operation, the heat range of the spark plug is important. See your authorized dealer for the correct spark plug.

Frequently clean the outside of the spark plug to prevent a short circuit of the spark. Check, clean and gap the spark plug at 100 HOUR intervals of operation.

REMOVING THE SPARK PLUG

It is important to use the exact size wrench. The wrong size or type of wrench can cause distortion or break the spark plug.

Use a spark plug wrench or deep socket wrench with a thin wall. Make sure it is the correct size.

CLEANING AND SETTING THE GAP

Do not use a machine that cleans the spark plugs with grit.

1. Use a small knife or wire brush to clean the tip and threads.
2. Wash with a solvent to remove loose carbon and oil.
3. Dry with a clean cloth.
4. Set the gap. You will feel a small amount of pressure on the feeler gauge when the gap is correct.

IMPORTANT: Do not bend the center tip.

INSTALLING THE SPARK PLUG

1. Put a new gasket on the spark plug.
2. Turn the spark plug into the engine.
3. After the spark plug is seated, tighten 3/4 of a turn with a wrench. Use a torque specification of 27 foot pounds (36.6 newton metre) with a torque wrench. This will make sure that the spark plug seats and seals correctly.

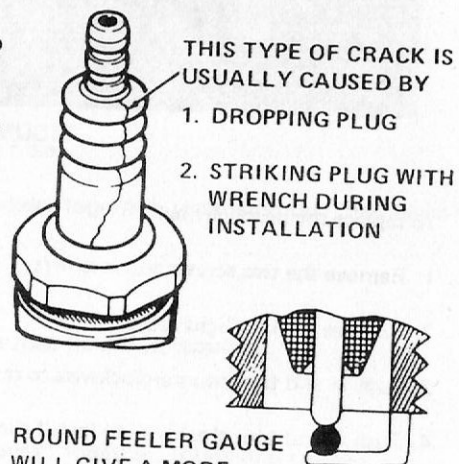


FIGURE 33

BREAKER POINTS AND CONDENSER

Remove the breaker point cover and inspect the breaker points for wear, burning or pitting. Perform this service at 100 HOUR intervals of operation.

The breaker points and condenser should be replaced and the ignition timing adjusted if burning or pitting is evident. The breaker point gap must be adjusted to .021" (.53 mm) when fully open.

See your authorized Case dealer for this service.

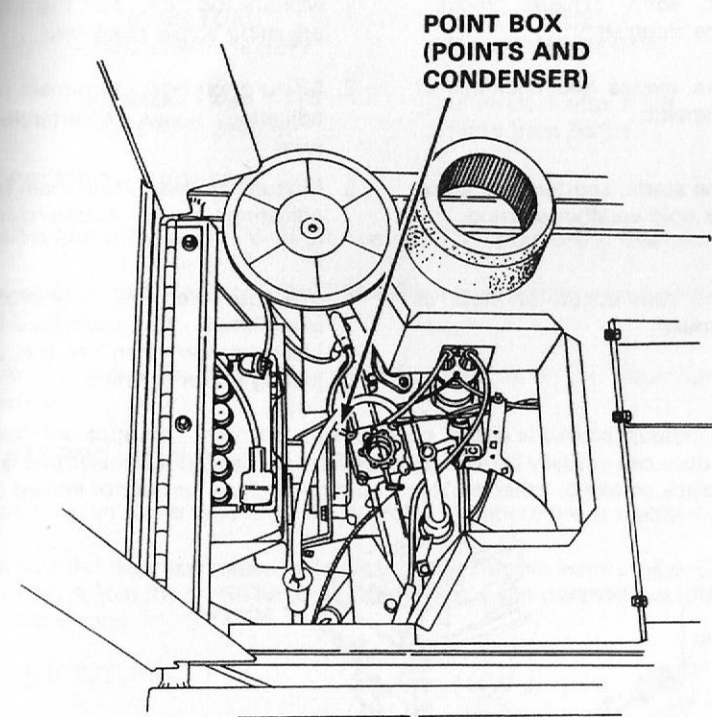


FIGURE 34

CARBURETOR

Carburetors are set at the factory and normally should not have to be adjusted. If your engine exhibits conditions similar to those found in the following table, it may be necessary to adjust your carburetor.

An incorrect carburetor setting can cause a fouled spark plug, overheating, excessive valve wear or other problems. See your J I Case dealer for assistance.

CONDITION	POSSIBLE CAUSE/PROBABLE REMEDY
1. Black, sooty exhaust smoke*, engine sluggish.	1. Mixture too rich - turn main fuel adjusting screw clockwise.
2. Engine misses and backfires at high speed.	2. Mixture too lean - turn main fuel adjusting screw counterclockwise.
3. Engine starts, sputters and stops under cold weather starting.	3. Mixture too lean - turn main fuel adjusting screw counterclockwise.
4. Engine runs rough or stalls at idle speed.	4. Idle speed too low or improper idle mixture - turn idle speed adjusting screw, then idle fuel adjusting screw if needed.

*If black exhaust smoke is noted, check the air filter first - an apparent "over-rich" mixture can actually be a clogged air filter element. If, after element is replaced, black smoke or other problems continue, adjust carburetor immediately.

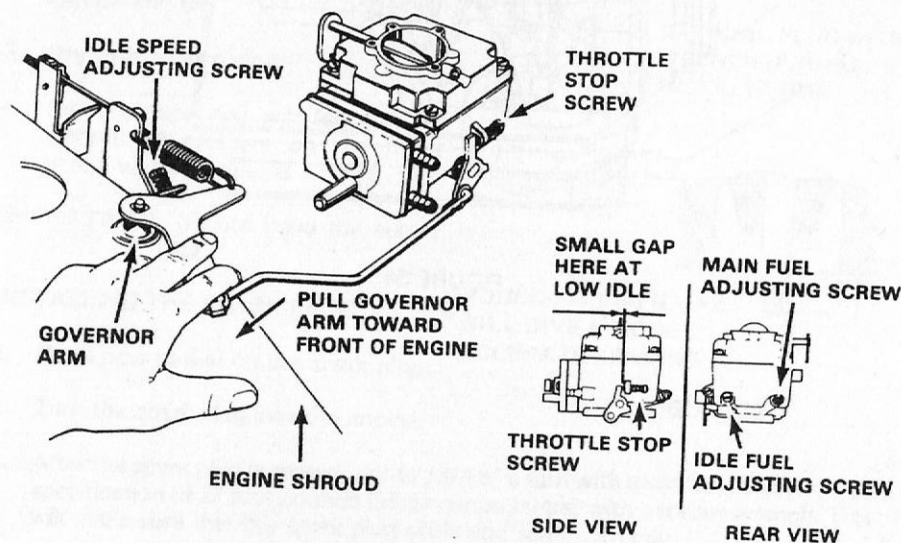


FIGURE 35

TO ADJUST CARBURETOR

Stop engine, turn main fuel and idle fuel adjusting screws clockwise, until they bottom lightly.

IMPORTANT: Damage to main fuel and idle fuel adjusting screws will result if they are turned in forcefully. Adjusting screws are screw-type needle valves which taper to critical dimensions.

PRELIMINARY SETTING

MAIN FUEL ADJUSTING SCREW

Counterclockwise 1-1/4 turns from bottom

IDLE FUEL ADJUSTING SCREW

Counterclockwise 1-1/8 turns from bottom

FINAL SETTING - MAIN FUEL

1. Start and run the engine until the operating temperature is reached.
2. Adjust the throttle lever to 3,000 RPM. Put a load on the engine until you reach 2,800 RPM.
3. Turn the screw for the main fuel adjustment until the maximum RPM is reached.

FINAL SETTING - IDLE FUEL

1. Start and run the engine until the operating temperature is reached.
2. Remove the load from the engine. Adjust the throttle lever until 1,200 RPM is reached. Adjust the screw for low idle until you reach the maximum RPM at this throttle setting.

IDLE SPEED SETTING

1. Put the throttle lever in the "SLOW" position.
2. Turn the adjustment screw for the low idle speed in or out until 1,200 RPM is reached.
3. Adjust the throttle stop screw while the engine is running at 1,200 RPM. Make sure there is no load applied to the engine. Set the gap at approximately 1/32" (0.8 mm).



CAUTION: Do not change the engine governor settings or over-speed the engine.

AIR CLEANER

Your tractor is equipped with a dry type air cleaner.

Remove and wash the air filter precleaner after each 25 HOURS of operation.

Remove and clean or replace the dry element after each 50 HOURS of operation.

Remove and clean the element more frequently under extremely dirty, dusty conditions (most lawn and garden tractor working conditions are considered dirty and/or dusty).

Replace the element if (a) it is damaged or (b) dirt can not be easily removed.

IMPORTANT: Operating with a dirty or damaged air cleaner for only a brief period of time can ruin an engine.

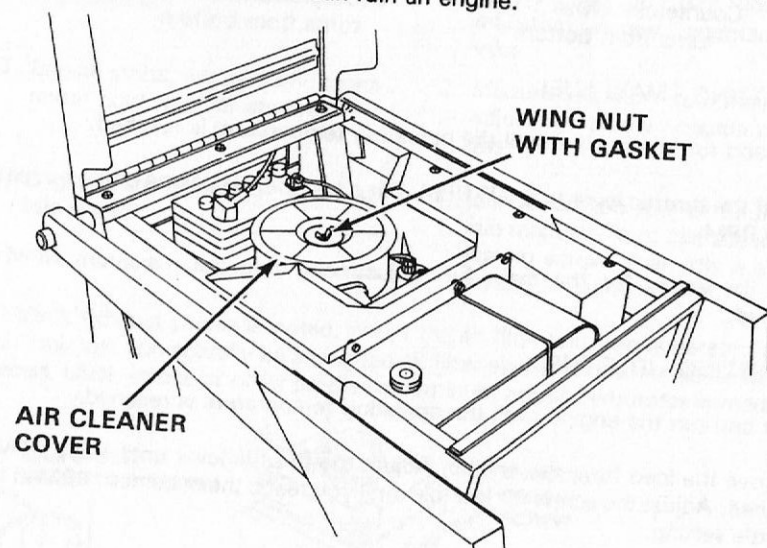


FIGURE 36

Clean the element by tapping it lightly on a flat surface until the dirt falls off. Handle the element carefully to prevent damage.

Do not wash the element in any liquid or blow dirt off with compressed air. Both of these procedures will destroy the elements' ability to filter.

With the air cleaner disassembled, check the base plate to make sure it is secure and not bent or damaged. Also check other air cleaner and carburetor components such as the cover and gaskets for air leaks. Damaged or loose components could allow unfiltered air into the engine causing premature wear and failure.

The air cleaner wing nut with its sealing gasket/washer must be finger tightened one-half to one full turn after the nut contacts the cover. Do not overtighten.

ENGINE COOLING SYSTEM

The engine cooling air intake screen must be kept clean and unobstructed at all times.

Check the engine cooling air intake screen DAILY before operating your tractor and frequently during use.

If debris builds up on the screen during engine operation, STOP engine immediately and clean the debris off.

An obstructed screen can cause the engine to overheat and fail prematurely.

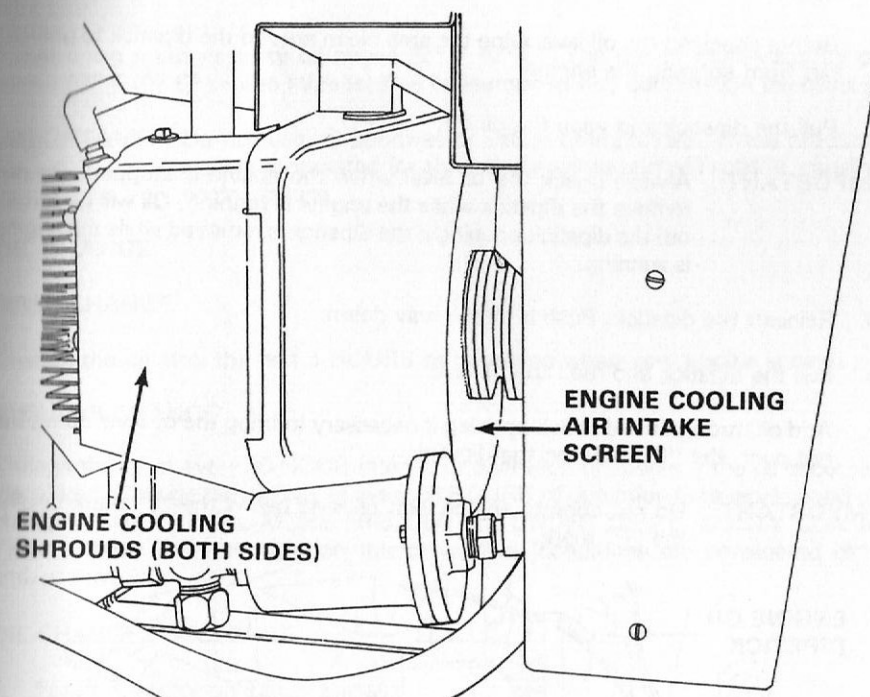


FIGURE 37

Remove the cooling shrouds and clean the cooling fins every 50 HOURS of operation (more often in extremely dusty conditions). Clean the external surfaces of your engine of dust, dirt and oil which can restrict cooling.

Reinstall the cooling shrouds before operating the engine. Operating the engine without the cooling shrouds in place can cause overheating and damage to the engine.

ENGINE OIL

The importance of checking and changing crankcase oil cannot be overemphasized.

DIRTY OIL CAUSES PREMATURE ENGINE WEAR AND FAILURE.

Oil level check:

Check the oil level in the engine crankcase **BEFORE EACH USE** when the engine is cool and the oil has drained back into pan.

- Position the tractor (engine) on a level surface when checking the oil. Stop the engine.
- Before checking the oil level wipe the area clean around the dipstick to prevent dirt from entering the engine.
- Pull the dipstick and wipe the oil off.

IMPORTANT: Always check the oil level when the engine is stopped. Do not remove the dipstick while the engine is running. Oil will be forced out the dipstick opening if the dipstick is removed while the engine is running.

- Reinsert the dipstick. Push it all the way down.
- Pull the dipstick and read the oil level.
- Add oil through the dipstick opening if necessary to bring the oil level up to, but not over, the "F" mark on the dipstick.

IMPORTANT: Do not operate engine with oil level below the "L" mark or over the "F" mark.

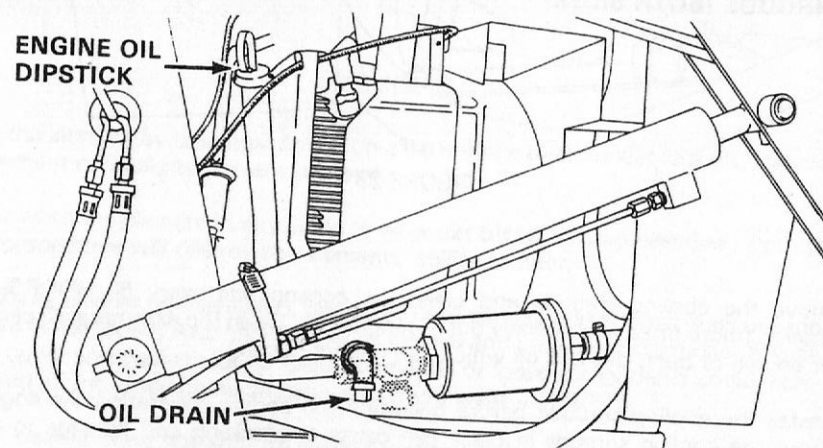


FIGURE 38

OIL TYPE

Use oil meeting the requirements of API service class "SE" or "CC". Select oil viscosity based on the air temperature at the time of operation, as shown.

AIR TEMPERATURE	OIL VISCOSITY
Above 32° F (0° C)	SAE-30
0° F (-20° C) to 32° F (0° C)	SAE 10W-30
Below 0° F (-20° C)	SAE 5W-20

Avoid using multi-viscosity oil above 32° F (0° C). The use of multi-viscosity oil above 32° F (0° C) causes increased oil consumption and combustion deposits.

IMPORTANT: Do not use oil additives or viscosity improvers. These products are not formulated for air cooled engines and will solidify, causing engine failure.

OIL CHANGE

FIRST CHANGE

Change the oil after the first 5 HOURS of operation when your engine is new.

REGULAR CHANGE

Change the oil at every 25 HOUR interval of operation or sooner if the oil becomes discolored. Change the oil filter at every 50 HOURS of operation (or every second oil change). **CHANGE OIL MORE FREQUENTLY UNDER DIRTY, DUSTY CONDITIONS.** (Most lawn and garden tractor working conditions are considered dirty and/or dusty.)

OIL CHANGE PROCEDURE

- Position tractor on a level surface.
- Drain oil while engine is still warm from operation. Warm oil will flow more freely and carry away more impurities.
- Install the drain plug.
- Fill through the dipstick opening to the "F" mark on the dipstick with the proper oil. See the OIL TYPE section of this manual.

NOTE: Tractor (engine) **MUST** be level when checking or changing the oil.

IMPORTANT: Do not operate engine with oil level below "L" mark or over the "F" mark.

OIL FILTER CHANGE PROCEDURE

1. Drain the engine oil as explained on the previous page.
2. Remove and discard the oil filter. Save the foam ring to use with the new filter.
3. Install the new filter finger tight plus $1/4$ to $1/2$ turn.
4. Slip the foam ring over the new filter and push tight against the sheet metal.
5. Install the drain plug.
6. Fill through the dipstick opening to the "F" mark on the dipstick with the proper oil. See the OIL TYPE section of this manual.

NOTE: Tractor (engine) MUST be level when checking or changing the oil.

IMPORTANT: DO NOT operate engine with oil level below "L" mark or over the "F" mark.

7. Run the engine for 30 seconds at $1/2$ throttle to fill the oil filter.
8. Stop the engine. Let the tractor stand five minutes, then pull the dipstick and wipe the oil off.

IMPORTANT: Always check the oil level when the engine is stopped. Do not remove the dipstick while the engine is running. Oil will be forced out the dipstick opening if the dipstick is removed while the engine is running.

9. Reinsert the dipstick. Push it all the way down.
10. Pull the dipstick and read the oil level.
11. Add oil through the dipstick opening to bring the oil level up to, but not over, the "F" mark on the dipstick.

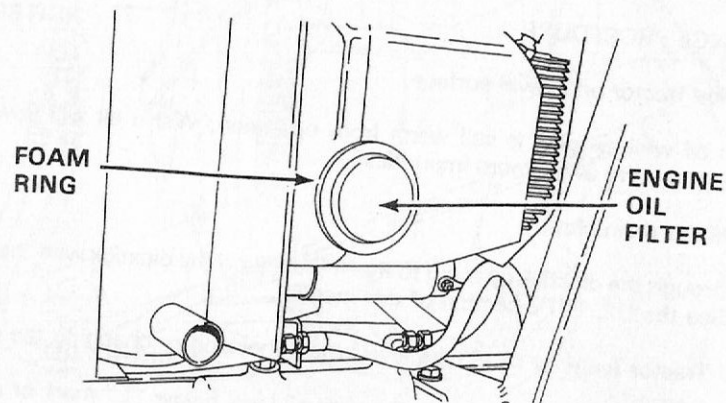


FIGURE 39

ENGINE CYLINDER HEAD SERVICE

The cylinder head must be removed and the buildup of carbon and other deposits must be cleaned periodically to prevent premature engine wear. This must be done after each 200 HOURS of operation if leaded gasoline is used and after each 400 HOURS of operation if unleaded gasoline is used. Have this service done by an authorized dealer.

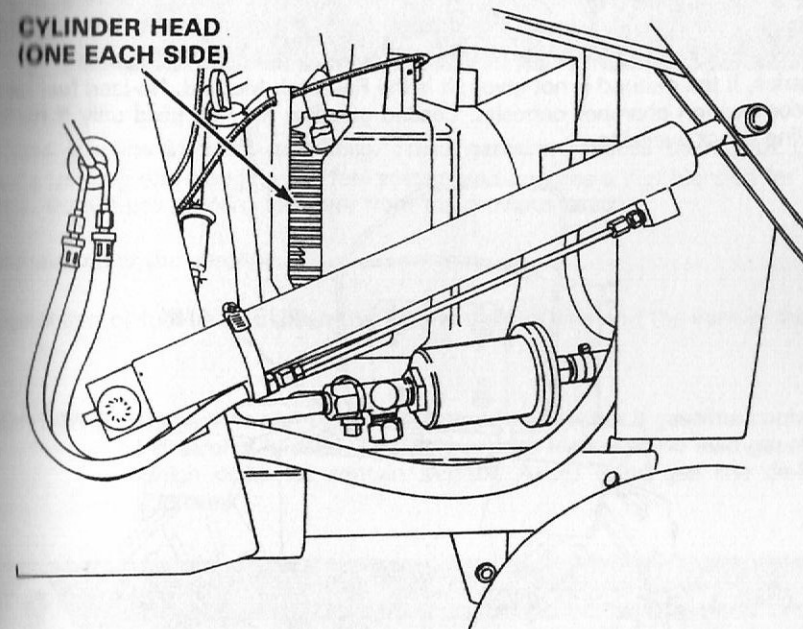


FIGURE 40

ENGINE VALVE SERVICE

The valve tappet clearances must be checked and adjusted (if necessary) after the first 50 HOURS of operation and after each 200 HOURS of operation thereafter. The correct valve clearances are listed in the specification section of this manual. Have this service done by an authorized dealer. The crankcase breather in the valve cover must be cleaned at this time.

FUEL

Always use clean, fresh gasoline and a funnel with a filter. Use regular leaded gasoline for the first 25 HOURS of operation. After the first 25 HOURS, use regular no-lead gasoline with minimum octane ratings as follows:

Research Method 90

Motor Method 82

Average 87

In the United States the average octane rating is shown on gasoline pumps. In other countries, if the method is not given, it is the Research Method. No-lead fuel leaves less combustion chamber deposits. Leaded gasoline may be used only if no-lead gasoline is not available.

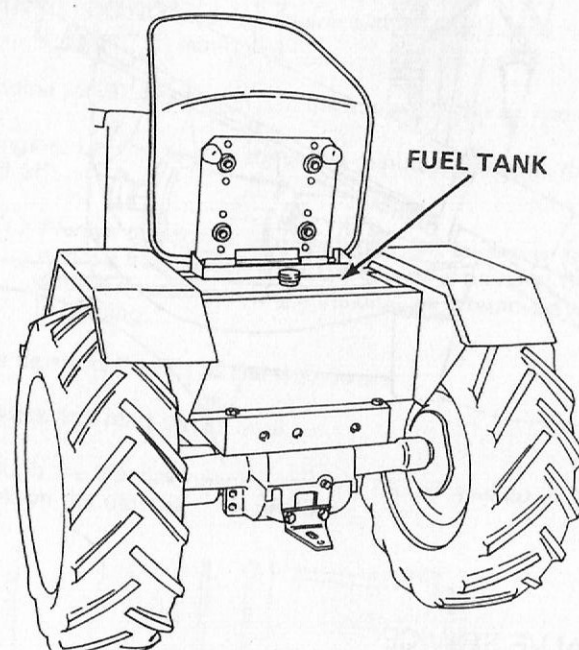


FIGURE 41



CAUTION: Do not smoke when working near fuel.

CAUTION: Handle gasoline with care — it is highly flammable.



- Use approved gasoline container.
- Never remove the cap of the fuel tank or add gasoline to a running or hot engine, or fill the fuel tank indoors. Wipe up spilled gasoline.
- Open doors if the engine is run in the garage — exhaust fumes are dangerous. Do not run the engine (motor) indoors.

Purchase gasoline in small quantities. Fresh gasoline reduces chance of gum deposits forming and clogging the fuel system and ensures a fuel blended for the season. Do not use gasoline left over from the previous season.

Do not add oil to the gasoline.

If a restriction of fuel occurs, clean the filter in the fuel line and the vent in the fill cap.

IMPORTANT: Damage to carburetor components will occur if gasoline containing alcohol is used. Use only regular leaded or no lead gasoline which does not contain alcohol. Avoid using gas line de-icer additives.



CAUTION: Never store the equipment with gasoline in the tank inside a building where fumes may reach an open flame or spark. Allow the engine to cool before storing in any enclosure.

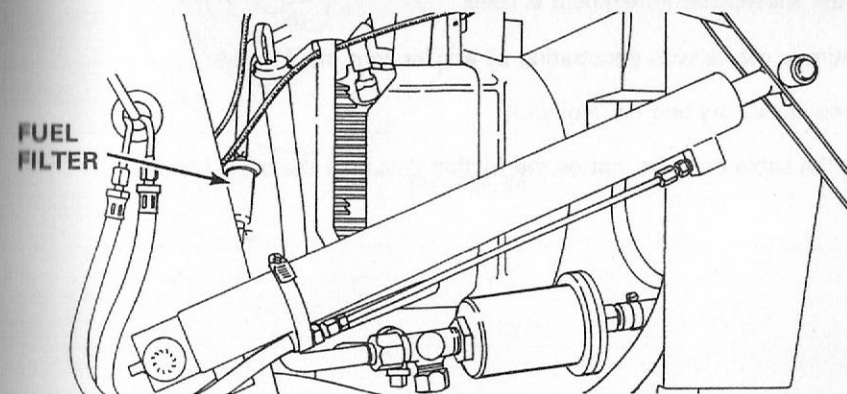


FIGURE 42

THROTTLE AND CHOKE CABLES

Oil the cables with penetrating oil and/or light weight motor oil after each 50 HOURS of use. Do not oil the pivot at the handles as this will reduce the ability of the cable to hold its proper setting.

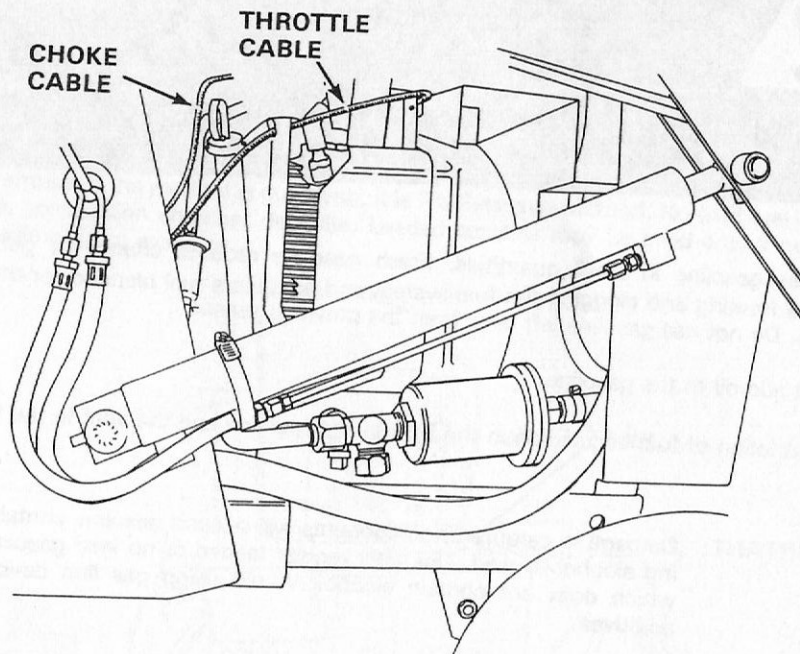


FIGURE 43

The following steps can be taken to prevent freezing of choke and throttle cables when the snowcaster attachment is used:

1. Saturate cables with penetrating oil and/or light machine oil.
2. Keep cables dry and oil frequently.
3. Oil the cable only. Do not oil the friction device at the cable handle.

HYDRAULIC OIL COOLER

The hydraulic oil cooler must be kept clean and unobstructed at all times.

Check the hydraulic oil cooler DAILY before operating your tractor and frequently during use.

If debris builds up on the screen during tractor operation, STOP the tractor engine immediately and clean the debris off.

An obstructed hydraulic oil cooler can cause the tractor hydraulic system and engine to overheat and fail prematurely.

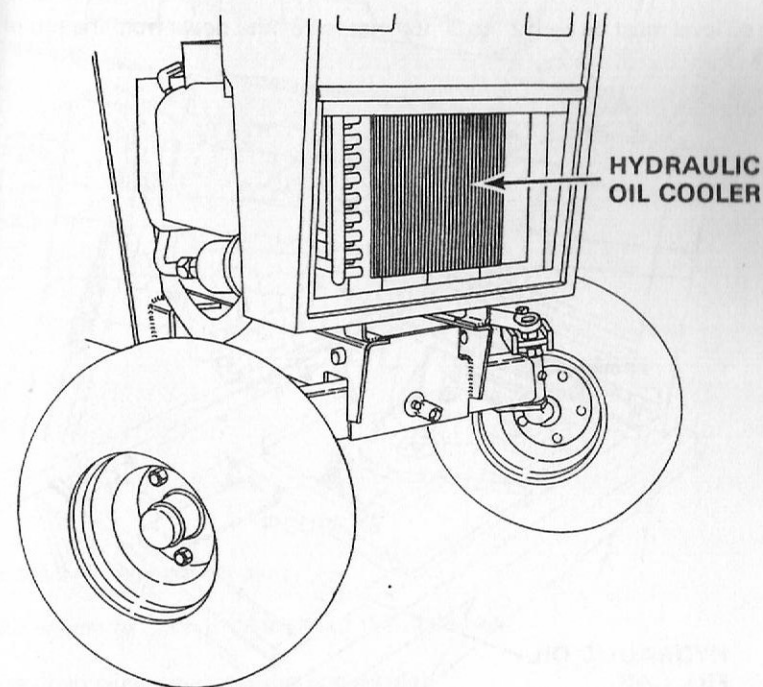


FIGURE 44

HYDRAULIC OIL

Change the hydraulic oil after each 500 HOURS of use. Replace the hydraulic oil seasonally according to the chart below.

AIR TEMPERATURE

Above 32° F (0° C)

Below 32° F (0° C)

OIL VISCOSITY

SAE 20W40*

SAE 5W20*

*Use API Service Classification SE or CC.

The oil level must be kept 2" to 3" (50 mm to 75 mm) down from the top of the filler neck.

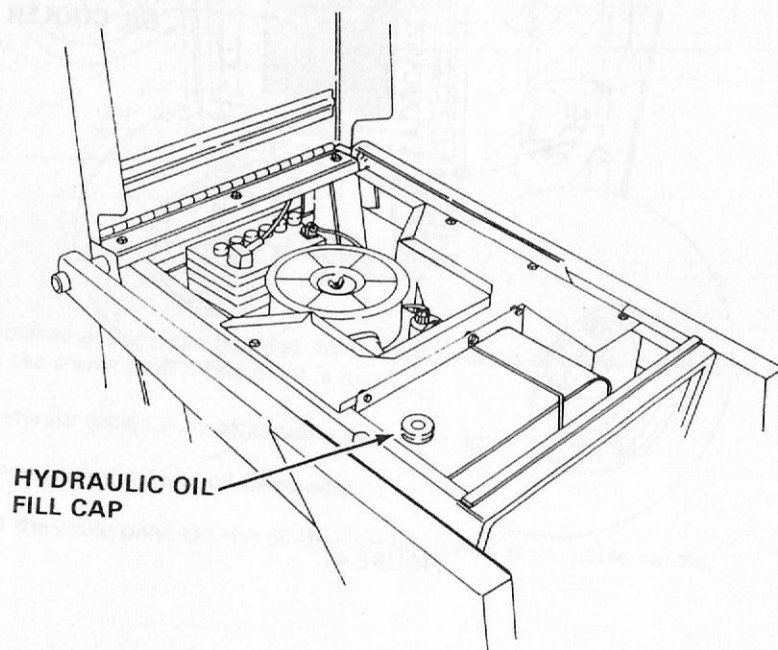


FIGURE 45

Use the following procedure to drain the hydraulic system:

1. Remove the spark plug(s) from the engine.
2. Ground the spark plug wire(s) to the engine block.
3. Place an oil drain pan with a capacity of two gallons under the travel control valve.

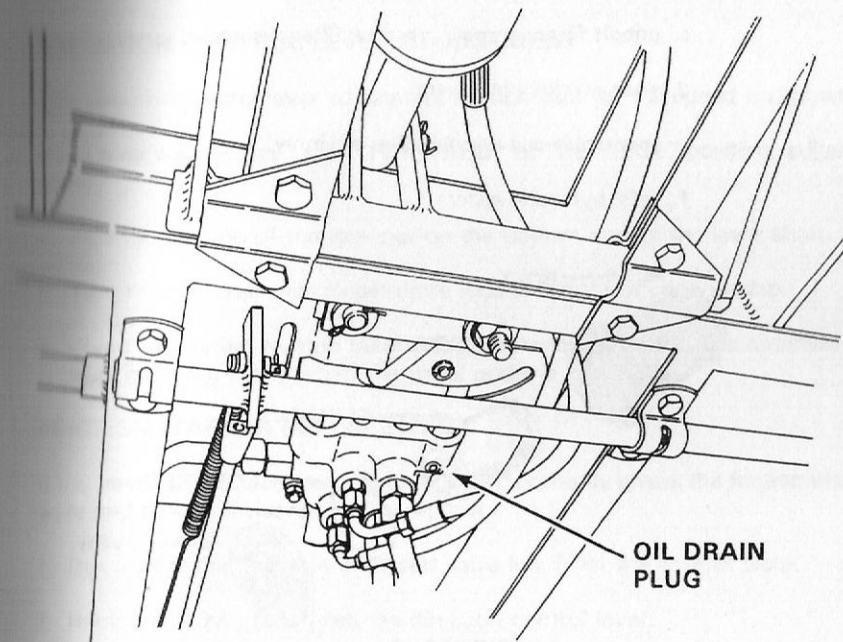


FIGURE 46

4. Remove the 1/4" hex socket plug.
5. Crank the engine to "pump" the oil out the drain hole.
6. Install the drain plug, spark plug(s) and wire(s).
7. Fill the reservoir to 5" (120 mm) from the top of the filler neck.
8. Run the engine and (a) drive forward and reverse a short distance, (b) raise and lower the hydraulic lift two times, and (c) raise, lower and dump the bucket two times. Check the oil level again.

IMPORTANT: Make sure oil reservoir is filled to the proper level. Overfilling will cause oil leakage. Underfilling will cause cavitation and intermittent drive.

HYDRAULIC OIL FILTER

Your 648 is equipped with a return line hydraulic oil filter screen.

Service Interval: 500 HOURS or yearly when changing hydraulic oil.

- Service Procedure:
- drain hydraulic oil.
 - remove filter assembly at tubing nuts and hose clamp as indicated.
 - unbolt filter assembly, unscrew filter element.
 - wash carefully in solvent.
 - reassemble and reinstall filter assembly.
 - refill hydraulic system

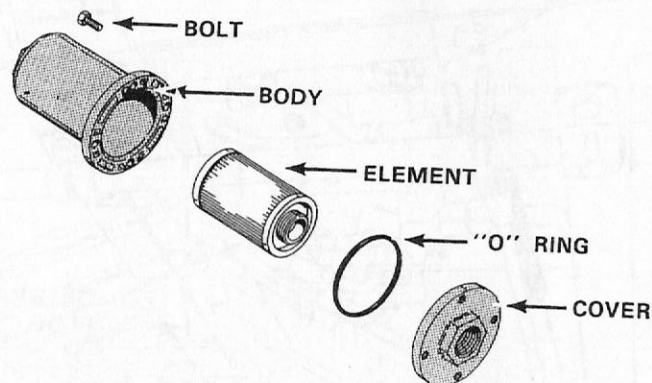


FIGURE 47

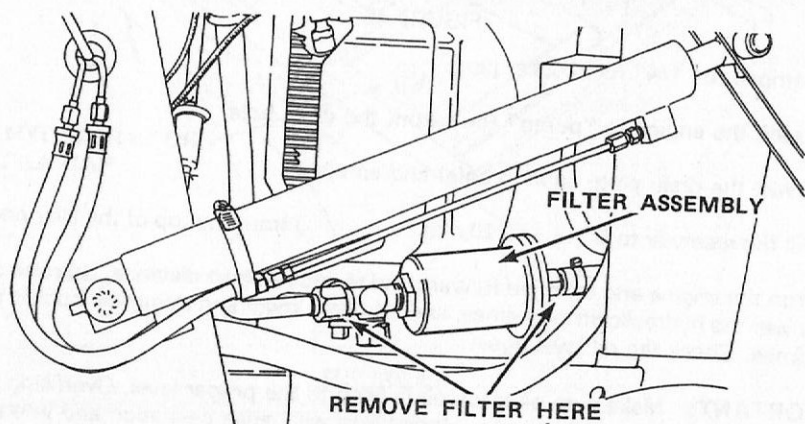


FIGURE 48

TRAVEL CONTROLS

LUBRICATION

Apply several drops of oil to all pivot points (except the friction washer) after each 50 HOURS of operation.

DIRECTION CONTROL LEVER ADJUSTMENT

The direction control lever adjustment is important for full speed and power.

If the lever will not stay in full "FORWARD" or "REVERSE" position, adjust as follows:

- Find the position of the lock nut on the bottom end of the lever shaft.
- Turn the nut clockwise to get more tension on the friction washer.
- Check for correct tension by pushing on the travel pedal. The direction control lever must not move when the travel pedal is actuated.

FRICTION WASHER REPLACEMENT

If the travel control lever can not be adjusted correctly check the friction washer for wear and replace if necessary. To replace:

- Disconnect the direction lever and valve link from the control plate.
- Remove the two nuts from the direction control lever.
- Pull the lever up and remove the washers from the lever shaft.
- Replace the worn friction washer and also replace the nylon bushing at the same time.
- Install the remaining washers according to the diagram.
- Connect the control plate to valve link and direction control lever.
- Adjust the lever tension according to steps above.

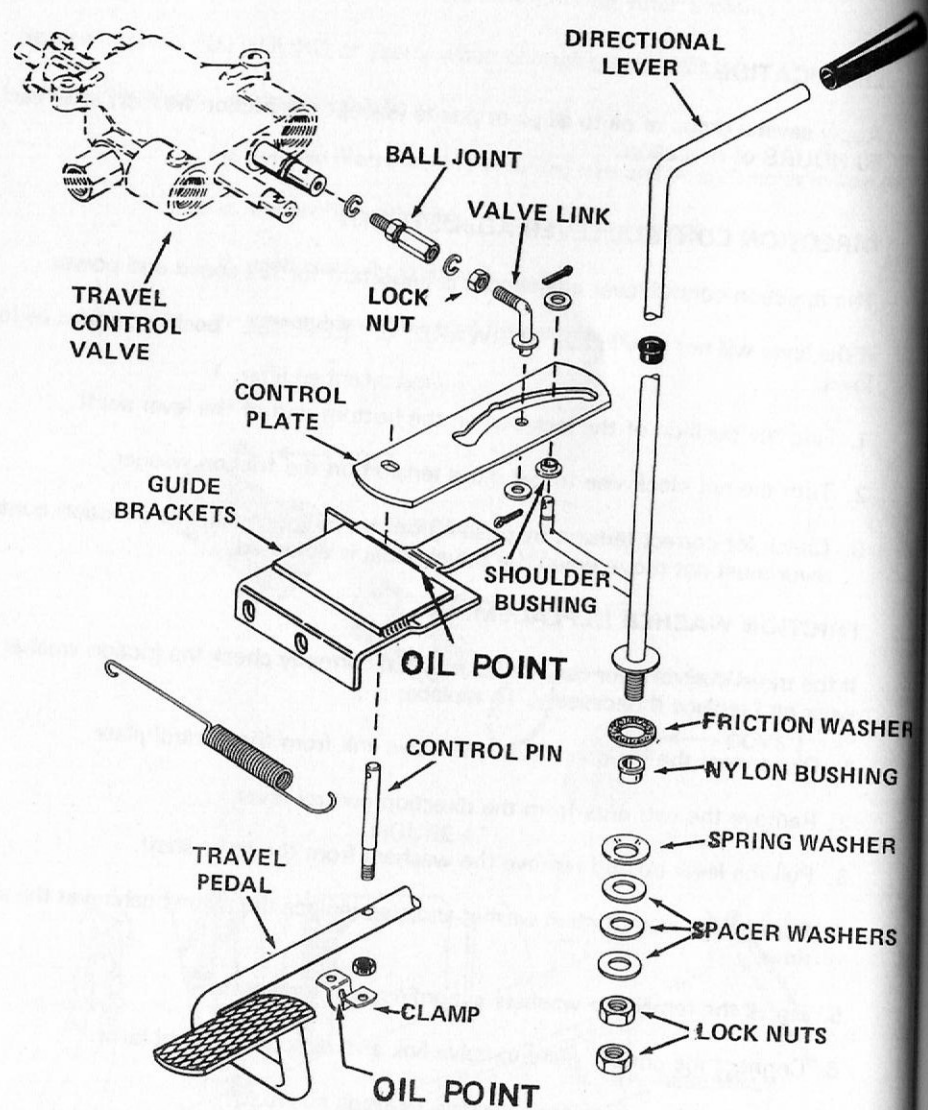


FIGURE 49

SHOULDER BUSHING REPLACEMENT

The direction control lever is connected to the control plate with a shoulder bushing.

Check the condition of this bushing at regular intervals. The bushing must fit tight for correct function of the control valve.

To replace:

1. Remove the cotter pin and washer.
2. Free the bushing from the control plate and remove.
3. Install the new bushing as shown in Figure 49. The smaller diameter of the bushing must fit into the slot in the control plate.
4. Fasten with the washer and cotter pin.

TRAVEL PEDAL AND LINKAGE FOR THE CONTROL VALVE

For full speed and power the travel pedal and linkage must work correctly. When you operate the travel pedal:

1. The pedal must not hit the foot rest.
2. The control pin must not hit the end of the slot in the control plate.

If this occurs, check the linkage for wear or check the ball joint adjustment. Make sure the control pin is tightened fully.

1. Replace any worn linkage parts.
2. Adjust the ball joints. Turn either in or out to get equal speed and power in both "FORWARD" or "REVERSE" travel. Make sure ball joints are tightened fully.

LIFT LINKAGE LUBRICATION

Apply a few drops of oil to all pivot points after each 50 HOURS of operation.

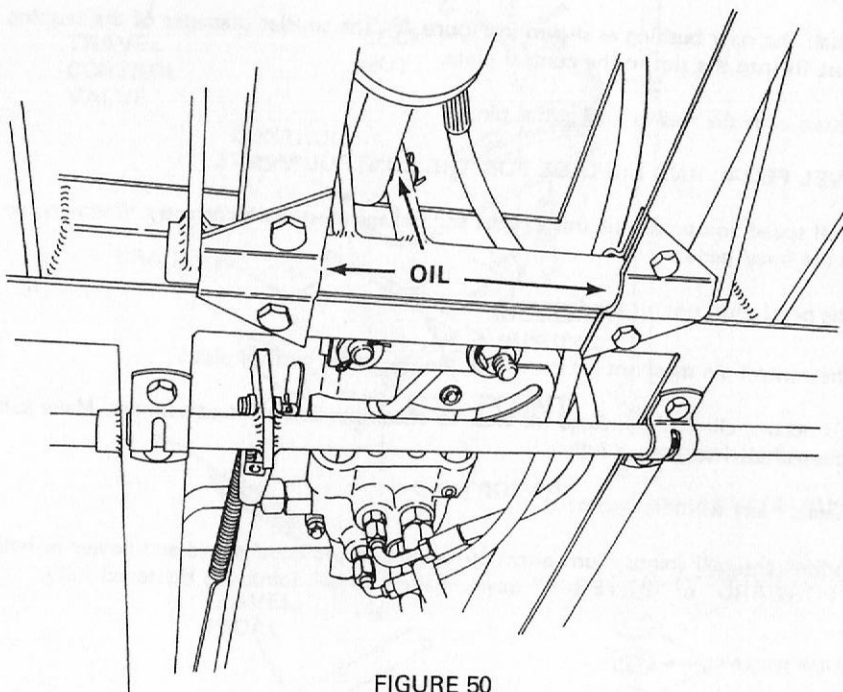


FIGURE 50

LOADER CONTROL LEVER LINKAGE

Apply several drops of oil to all pivot points after each 50 HOURS of operation.

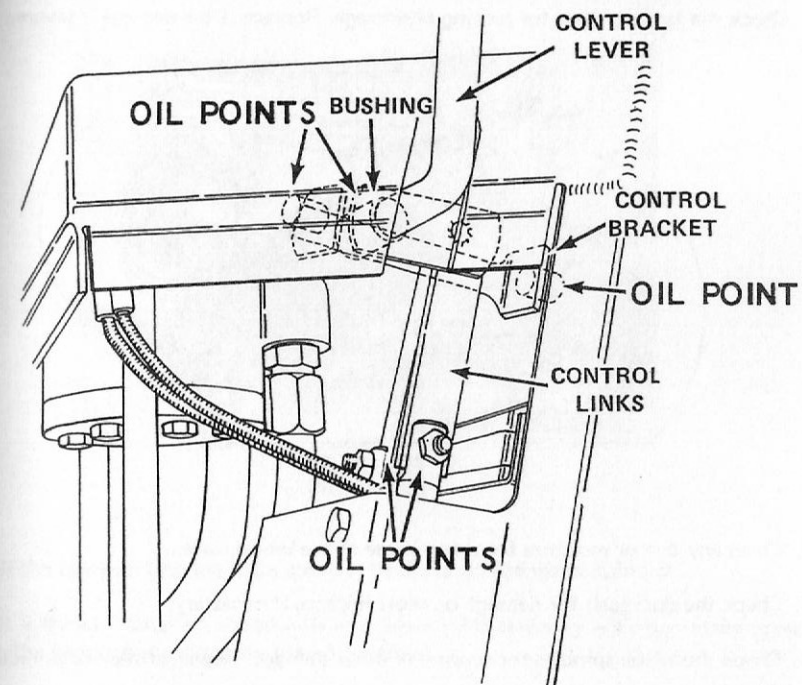


FIGURE 51

FRONT WHEEL BEARINGS

Service the front wheel bearings every 500 HOURS of operation.

1. Support the front of the tractor with acceptable repair stands.
2. Remove the front wheels.
3. Check the bearing races for scoring or damage. Replace if the damage is severe.

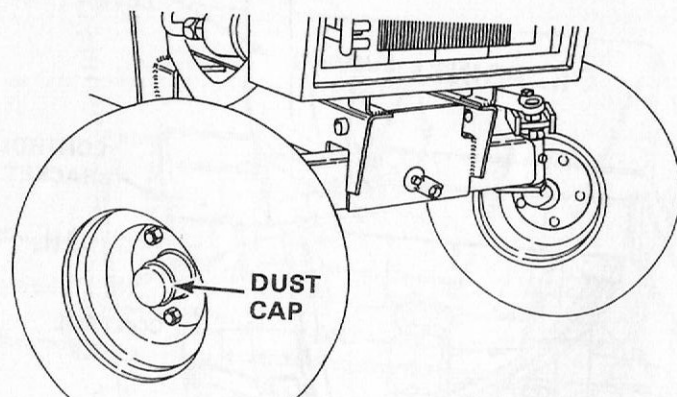


FIGURE 52

4. Clean any dirt or moisture from the inside of the wheel hubs.
5. Check the dust seals for damage or wear. Replace if necessary.
6. Check the wheel spindles for scoring or other damage. Repair or replace as required.
7. Fill the inside area of the wheel hub with number 1 gun grease with a lithium base.

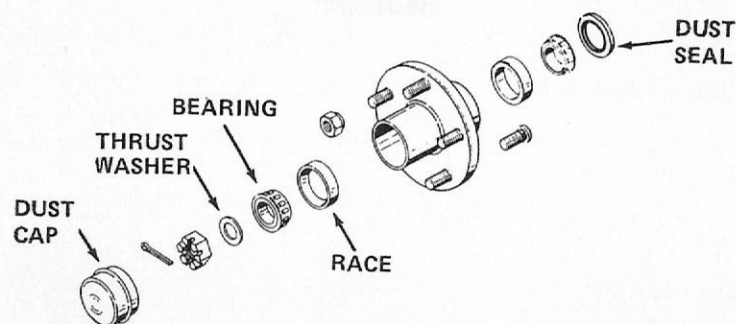


FIGURE 53

8. Apply number 1 gun grease with a lithium base to the bearings. If you do not have a machine for grease application use the following procedure:

- a. Put the grease in one hand.
- b. Use force to push the bearing through the grease and against your hand. Slide the bearing across your hand to work the grease in. Rotate the bearing and repeat this procedure until the bearing is full of grease.

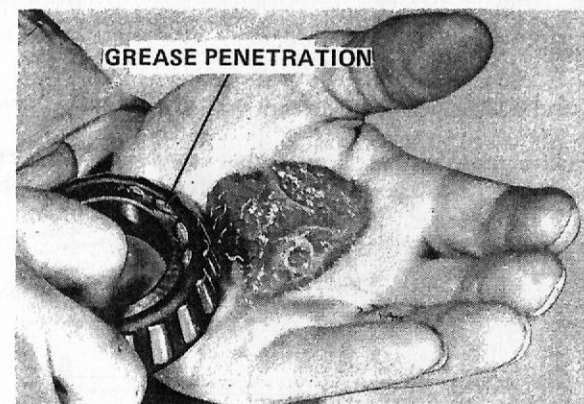


FIGURE 54

9. Install the bearings into the hubs and put the hubs on the wheel spindles.
10. Install a thrust washer on the spindle and tighten this assembly with the retaining nut. When the bearings and races are seated together:
 - a. Turn the nut counterclockwise until the hole in the spindle aligns with the nearest slot.
 - b. Install a cotter pin through the spindle hole.
 - c. Install the dust cap.

CHASSIS LUBRICATION

Apply grease after every 25 HOURS of operation to the:

- a. Front wheel spindles

NOTE: Lift front of tractor to permit grease to flow from top and bottom of spindle.

- b. Axle pivot pin
- c. Steering cylinder
- d. Loader arms and bucket (also apply a few drops of oil to other pivot points)

Use number 2 multi-purpose grease (Lithium Base) for all lubrication fittings. Use as many strokes as required, until you see grease pushing out of assembly.

Always wipe dirt from fitting before applying the grease gun.

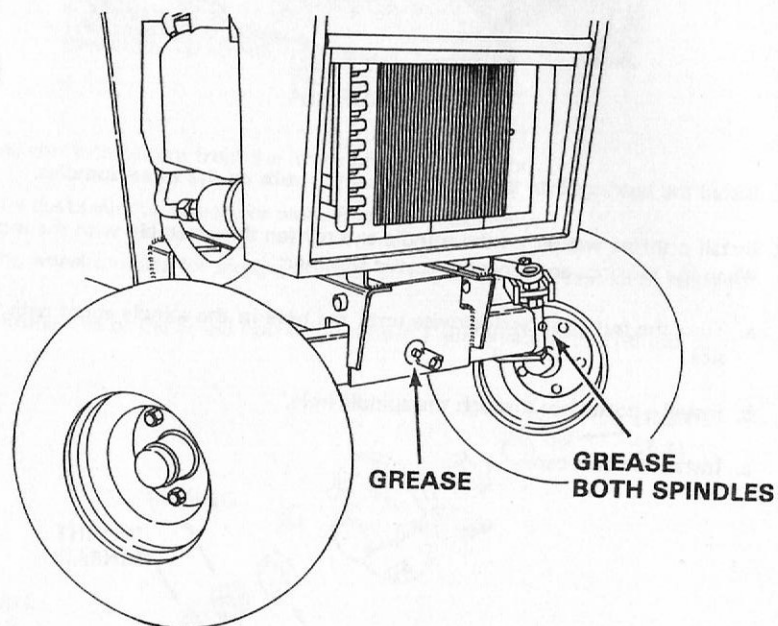


FIGURE 55

Front Wheel Spindles and Axle Pivot Pin

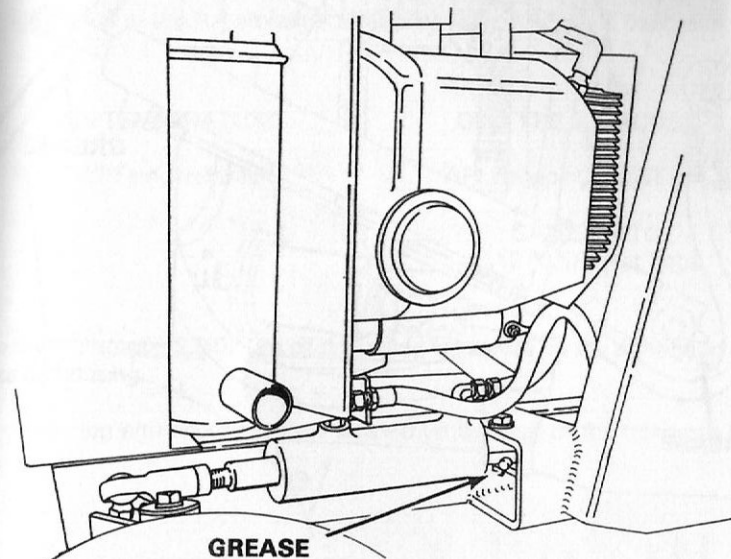


FIGURE 56 Steering Cylinder

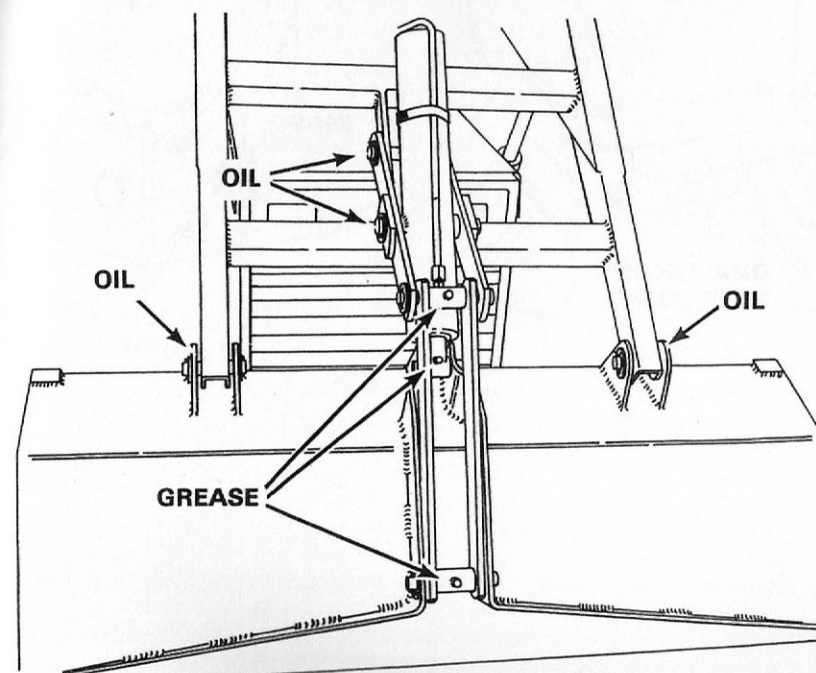


FIGURE 57 Bucket Pivot Points

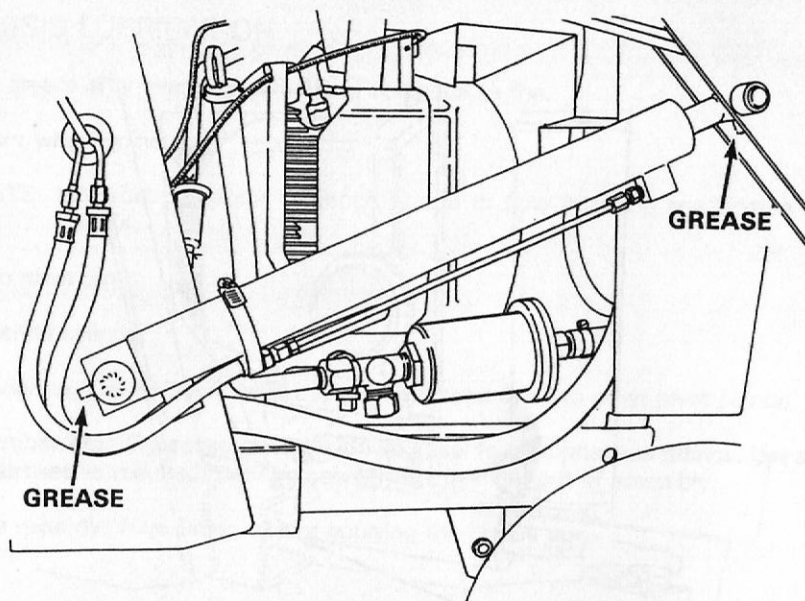


FIGURE 58
Loader Arms Pivot Points

TRANSAXLE

Change the oil in the transmission after each 500 HOURS of operation.

AIR TEMPERATURE

All Temperatures

OIL TYPE & VISCOSITY

API Service Class SE or CC

SAE 20W40 or
SAE 80 EP Gear Lube

Capacity is 3 quarts (2.8 l). The oil drain plug is located on the right hand side of the transaxle housing.

The oil fill plug and check plug are located on the rear of the transaxle housing.

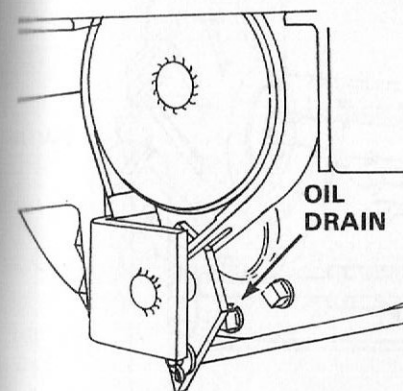


FIGURE 59

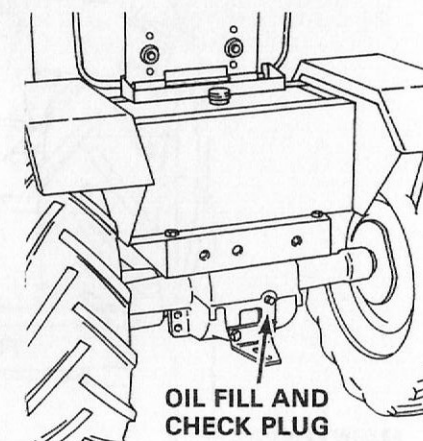


FIGURE 60

SEAT

ADJUSTMENT

1. Remove the four bolts that hold the seat to the seat hinge.
2. Move the seat either forward or rearward to get the correct position on the seat hinge.
3. Install the bolts.

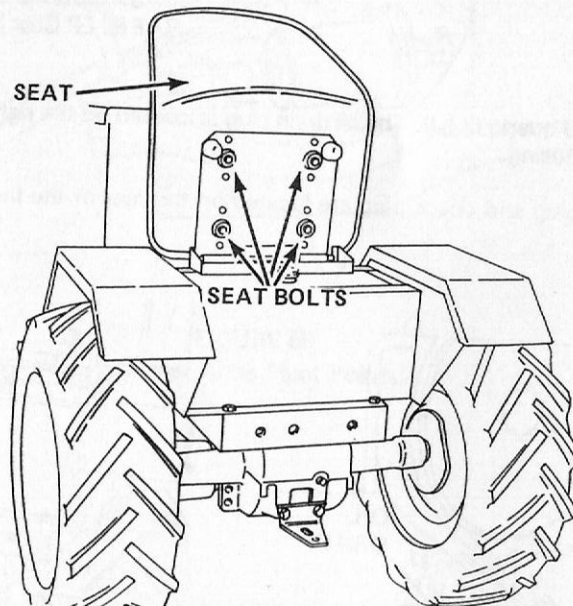


FIGURE 61

MAINTENANCE

1. Clean the seat regularly. Use a special vinyl cleaner. Do not use a solvent as this will damage the seat.
2. Severe heat or cold can damage the seat. Protection from these conditions is important. Put a cover on the seat for protection against weather conditions and water. It is best to put the tractor in a building when not in use.
3. During operation in severe weather conditions, you can easily damage the seat. Be careful not to damage the seat when you get on and off the tractor.
4. If the seat gets a small tear, apply a vinyl repair tape over the damaged area. Vinyl repair tape can be purchased locally.

TOE-IN ADJUSTMENT

1. Put the tractor on a hard and level surface like a concrete floor.
2. Make sure the front tires have equal air pressure.
3. Find the centerline of the front tires. See the figure below.
4. If you can not find the centerline:
 - a. raise the front wheels off the ground
 - b. spin each wheel and put a mark at the centerline with chalk
5. Measure the distance between each centerline or chalk mark.

Measurement "A" must be $1/8$ to $3/8$ " (3.2 mm to 9.5 mm) less than measurement "B". Both measurements, front and rear, must be taken at spindle height above the floor.

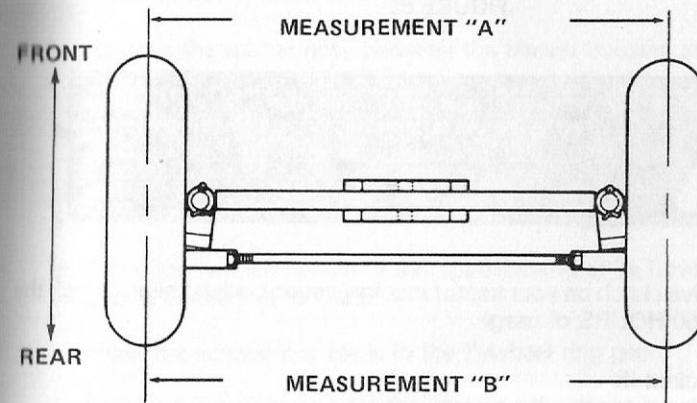


FIGURE 62

6. Loosen both lock nuts on the tie rod.

NOTE: Remove one of the ball joints from the king pin. Turn the tie rod and ball joint equally to change the toe-in.

7. Lengthen the tie rod to increase the toe-in.
8. Shorten the tie rod to decrease the toe-in.

ATTACHMENT DRIVE CLUTCH ADJUSTMENT

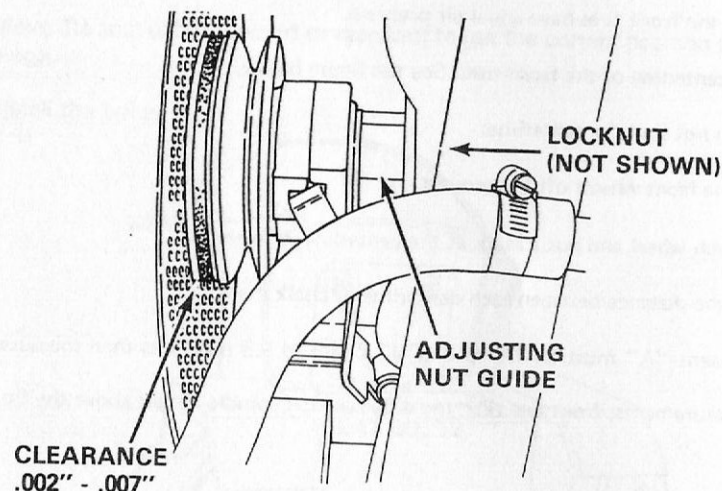


FIGURE 63



CAUTION: Before attempting to service the Attachment Drive Clutch, be sure to remove tractor key and spark plug wire(s).

The attachment drive clutch on your tractor requires periodic adjustment. Check the clutch after every 50 HOURS of usage.

Adjustment is required if:

1. The attachment drive clutch engaging lever lifts "easily". A firm lifting force is required to engage a properly adjusted clutch
or
2. More than .030" (.75 mm) clearance exists between the clutch disc and backing plate when the clutch is in the disengaged position.

IMPORTANT: Adjust the clutch if required before operating an attachment. Operating an attachment when the clutch is in need of adjustment can result in slippage and damage to clutch parts.

ADJUSTMENT PROCEDURE

1. Remove the lower grill section.
2. Remove the two screws securing the oil cooler to the oil cooler mounts.
3. Pull the left side of the cooler out just enough to position a socket and breaker bar over the 3/4" hex nut.
4. Hold the adjusting nut guide with a 1-3/4" open end wrench and loosen the "right hand thread" hex nut.

NOTE: A special 1-3/4" wrench is available from your dealer.

5. Use a 1-3/4" open end wrench to turn adjusting nut guide.

Turn nut in to decrease clearance.

Turn nut out to increase clearance.

There is not enough room for the wrench handle to turn the adjusting nut guide one complete flat. Use the following procedure:

- a. Insert a large screwdriver through the timing sight hole and engage one of the teeth on the flywheel ring gear.

Remove the rubber hose between the blower housing and the air cleaner to uncover the timing sight hole.

- b. Turn the adjusting nut guide in the desired direction until the wrench handle touches an obstruction.
- c. Remove the screwdriver from the flywheel ring gear.
- d. Move the wrench handle to the opposite end of its travel while allowing the engine crankshaft to rotate.
- e. Insert the screwdriver blade in the flywheel ring gear.
- f. Repeat this procedure until the correct adjustment is achieved.

6. Adjust clearance to .002" to .007" (.05 to .17 mm). Measure clearance with two feeler gauges positioned 180° apart.
7. Hold adjusting nut guide and tighten hex nut to 45 lb. ft. (60 Nm).
8. Reassemble the oil cooler and lower grill section.

NOTICE

With the delivery of your new tractor, your Case dealer will show you operation and maintenance instructions. The description of these instructions is in the "Owner Warranty Registration and Delivery Report". After these instructions you will sign this report and get a copy.

AFTER DELIVERY CHECK

Your Authorized Case Dealer will make the "After Delivery Check" on your new Case tractor if:

1. He sold you the tractor.
2. 60 days or 50 hours of operation has occurred after delivery (whichever comes first).
3. You make arrangements to bring your tractor to the dealer.

The "AFTER DELIVERY CHECK" is shown on the following page.

NOTE: Your dealer will only charge you for oil, filter or other accessories.

AFTER DELIVERY CHECK

_____ (Owner's Name)		_____ (Date)
_____ (Owner's Address)		
_____ (Dealer)		_____ (City)
Tractor has been operated _____ days		_____ (Tractor Model and Serial Number)

TRACTOR

- | | |
|---|---|
| <input type="checkbox"/> Operator's Manual included with machine. | <input type="checkbox"/> Cooling system, engine and heat exchanger fins. |
| <input type="checkbox"/> Check attachment drive clutch operation and adjustment. | <input type="checkbox"/> Crankcase oil (change oil if necessary). |
| <input type="checkbox"/> Check operation of brake. | <input type="checkbox"/> Oil level in hydraulic system reservoir. |
| <input type="checkbox"/> Check Travel Control linkage for correct adjustment and full valve spool travel. | <input type="checkbox"/> Oil level in transmission. |
| <input type="checkbox"/> Check tire air pressures. | <input type="checkbox"/> Lubricate all grease fittings. |
| <input type="checkbox"/> Tighten cylinder head and adjust tappets. | <input type="checkbox"/> Check air cleaner. |
| <input type="checkbox"/> Check spark plug(s). | <input type="checkbox"/> Check tension of all belts. |
| <input type="checkbox"/> Check high governed speed with no load and low idle speed. | <input type="checkbox"/> Oil all pivot points. |
| <input type="checkbox"/> Tighten all hydraulic line connections. | <input type="checkbox"/> Check front wheel toe in. |
| <input type="checkbox"/> Tighten all bolts (including rims). | <input type="checkbox"/> Battery, wiring and lights. |
| | <input type="checkbox"/> Check operation of all instruments and controls. |

DEALER: Check carefully with the owner to find what he knows about maintenance and operation. Give instructions on the procedures that are not clear to him.

Checked by

Dealer

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