

3/17/2000

**CALL**

**NEWBURGH POWER EQUIPMENT**

Sales • Svc. • Parts • Rentals • Hardware  
988 Little Britain Rd. (Rt. 207)  
NEW WINDSOR, NEW YORK 12553  
(914) 564-6960 or 564-6135 / 1 800-834-6960

**for service**



**Ingersoll**

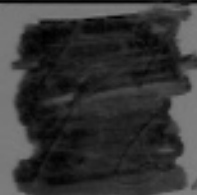
**LOADER/TRACTOR**

**6018L & 6018BH**

**Operator's Manual 8-59730**

OIL :

Fill



1.65

Liter

30W - Summer

10W-30 - Winter

Pg 21

Pg 30 + Pg 31

S/N

17192706

Mod. 6018

*Handwritten signature or initials.*



QUALITY IN THE AMERICAN TRADITION

Ingersoll Equipment Co., Inc.

Winneconne, Wisconsin 54986-9576

3/17/2000

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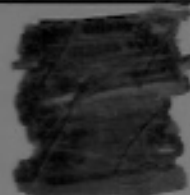
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## SAFETY MESSAGES

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 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 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.

- 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.



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



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



**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.



**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:

- Mow only in daylight or in good artificial light.
- Never make a cutting height adjustment while the engine (motor) is running if the operator must dismount to do so.
- Shut the engine (motor) off when removing the grass catcher or unclogged chute.
- 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.



Never operate machine while under the influence of drugs or alcohol.



**CAUTION:** Set parking brake, shut off engine, remove key 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.



**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.



**WARNING:** Highway travel should be avoided. Before operating on roads or highways, check local government regulations on the proper use of lights, flags, SMV (Slow Moving Vehicle) emblem, rotating beacon, etc.



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



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



**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 reassembling, 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:** 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 explodes because of too much pressure, injury can result.



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



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



**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:** 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; **EYE**, flush with water for 15 minutes and get prompt medical attention. Keep out of reach of children.



**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 would result in uncontrolled machine movement.



**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 750 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.



**WARNING:** Know the location of underground cables, water mains, gas lines, etc. A ruptured gas line or cut electrical line could result in personal injury.



**CAUTION:** Be sure the operator's area and steps are free of oil, loose objects or ice. During operation, stop and take time to clear the operator's area as required. Remove or secure all maintenance or personal items. Failure to keep these areas clean could cause a serious accident.



**CAUTION:** Keep alert. Clear the operating area of all unauthorized persons. Know the location of fellow workers in your area.



**CAUTION:** Operate tractor from proper seat position only. Any other method could result in a serious injury.



**WARNING:** Be fully aware of the location of all the controls before operating this machine. **BE PARTICULARLY CAREFUL IF THIS IS NOT THE MACHINE YOU NORMALLY OPERATE.** Proper machine operation can help to prevent accidents.



**CAUTION:** Before each operating period, test the machine for proper steering, braking and operation. A properly operating machine can prevent accidents. If required, repair or adjust machine before operating.



**WARNING:** Always drive the machine slowly when on hillsides, ramps or rough terrain. Be extremely careful when working around trenches or banks. Failure to follow the above recommendations could cause the machine to roll over. Personal injury could result.



**CAUTION:** Understand the machine's limitations. Keep it under control at all times. **DO NOT TRY TO DO TOO MUCH TOO FAST.**



**CAUTION:** Be extremely careful when working close to an open trench. Serious injury could result from a trench cave-in.



**CAUTION:** Understand correct maintenance procedures before attempting repairs. There is no disgrace in asking for help. Proper maintenance procedures can help prevent accidents.

**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 dealer.



**DANGER:** Keep all machine parts away from live electrical lines. If work must be done close to high voltage lines, have the utility disconnect them. It is not necessary to actually contact a power line for the electricity to ground through the machine. If power does ground through the machine, remain on the machine and **DO NOT TOUCH THE MACHINE STRUCTURE.** Refer to the following Chart.

Conductor Voltage	Minimum Working Clearance from Conductor	Minimum Transit Clearance from Conductor
50,000 volts or less	10'3 (3m)	4' (1.2m)
Over 50,000 volts	10' (3m) plus 0.4" (10.2 mm) for each 1,000 volts over 50,000	10' (3m)
345,000-750,000 volts		16' (4.8 m)

**NOTE:** IF ABOVE REQUIREMENTS ARE LESS STRINGENT THAN STATE REQUIREMENT, THE STATE REQUIREMENTS SHALL APPLY.



## BACKHOE SAFETY MESSAGES



**CAUTION:** Operate tractor and backhoe from proper seat position only. Any other method could result in a serious injury.



**WARNING:** Lower stabilizers to operating position before "stretching out" the backhoe (lowering boom and extending dipper). If the stabilizers are not lowered, an unbalanced condition will result and could cause the machine to tip.

To reposition machine when trenching, either raise boom to full height and retract dipper or lower backhoe close to ground before raising stabilizers.



**WARNING:** Never dig under the backhoe stabilizers. The machine could tip into the excavation if the bank caves in.



**WARNING:** When driving up an incline, always back up with the backhoe on the uphill side. Always use extreme care in rough or uneven terrain and inclines.



**CAUTION:** Before dismounting, set the parking brake, lower the backhoe bucket to the ground and shut off the engine.



**CAUTION:** Never grease, oil or perform any maintenance with the engine running unless so instructed in the operator's manual or service manual. If the attachment must be raised in order to perform the operation, block up the attachment securely.



**CAUTION:** Always use both hands when climbing on or off the machine. Never get on or off a machine while it is moving.



**CAUTION:** Do not use the control levers as a handhold for getting on or off the machine.



**WARNING:** Gas carried in pipelines is flammable/explosive. Use proper precautions to avoid igniting gas which could cause personal injury.



**WARNING:** Before operating in an unfamiliar area, walk around the full length of the proposed trench site and check for hidden holes, drop-off or obstacles that could cause an accident.



**WARNING:** Use extreme caution when loading backhoe on trailer. Place the two speed transaxle in low range. Always back-up the ramp or trailer when loading; drive down when unloading. When unit is on trailer, set the parking brake and lower the front and rear attachments so they are resting on the trailer floor. Rest loader bucket, if equipped, in full dump position. Block wheels securely and attach transport chains.



**WARNING:** Before swinging the boom be sure there is ample room and that all persons are clear of the operating area.



**CAUTION:** The new operator should adjust the throttle so that the backhoe operates at a reduce speed. Engine speed should be increased only as fast as the operator's proficiency will allow.



**CAUTION:** Wear the proper safety equipment—avoid loose clothing. Obtain additional safety equipment when your safety may be in doubt. Hard hat, safety shoes, ear protectors, reflective clothing, safety goggles and heavy gloves may be required.



**WARNING:** Guards are provided for the protection of your feet. Since the boom swings very close to upper frame, keep your feet behind the guards provided.



**CAUTION:** Wear safety glasses when servicing the machine, especially when pounding or grinding. Flying particles can cause permanent eye injury.



**WARNING:** Do not swing too far to one side when craning as it may cause machine to tip. Do not swing too fast as the load may start to swing out of control.



**WARNING:** When operating on a slope, always position the machine to swing the backhoe to the uphill side if possible. Swinging the backhoe to the downhill side could tip the machine and result in personal injury.



**WARNING:** Extend and lower backhoe boom, dipperstick and bucket to ground, turn tractor engine off and remove key. Move backhoe controls through the full range of operation to relieve hydraulic system pressure before performing any service of maintenance.

When completing a maintenance or service function, make sure all safety shields are installed before placing backhoe in service.



**CAUTION:** Make sure all bystanders are clear of the maximum backhoe swing reach or the area where stabilizers could contact them.

Do not dig with backhoe unless stabilizers are down and on firm footing. Stay clear of steep areas or excavation banks that are soft or could give away.

Do not operate backhoe in any position other than properly positioned in backhoe seat.



**CAUTION:** Understand correct maintenance procedures before attempting repairs. There is no disgrace in asking for help. Proper maintenance procedures can help prevent accidents.



**WARNING:** Before operating, read manual for additional information on safety, operation, service and maintenance.

Backhoe digging forces can lift and turn tractor over; to avoid serious injury or death: operate backhoe only from seat and with all safety shielding in place. Make sure stabilizer pads are on firm ground; avoid soft or steep banks.

Never allow riders or operate backhoe with bystanders in the maximum swing area.

A minimum 25% of tractor and equipment weight must be on tractor front wheels with backhoe in transport position.

Before transporting, attach slow moving vehicle (SMV) sign and engage transport locks.

Before leaving unattended, raise boom and install transport lock, lower dipperstick, shut engine off and remove key.

If high-pressure oil penetrates skin, it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

Know location of and avoid contacting all underground cables, pipelines, overhead wires and other hazards in digging area.



**CAUTION:** Make sure the seat is securely latched in the raised position. Injury can result if the seat is not securely latched and gives way.



**CAUTION:** Always engage transport lock bar/pin and swing lock pin before transporting backhoe to prevent personal injury and damage to equipment. Make sure slow moving vehicle emblem is installed when transporting on public roads.



**WARNING:** Be fully aware of the location of all the controls before operating this machine. **BE PARTICULARLY CAREFUL IF THIS IS NOT THE MACHINE YOU NORMALLY OPERATE.** Proper machine operation can help to prevent accidents.



**CAUTION:** Before each operating period, test the machine for proper steering, braking and operation. A properly operating machine can prevent accidents. If required, repair or adjust machine before operating.



**WARNING:** Always drive the machine slowly when on hillsides, ramps or rough terrain. Be extremely careful when working around trenches or banks. Failure to follow the above recommendations could cause the machine to roll over. Personal injury could result.



**CAUTION:** Understand the machine's limitations. Keep it under control at all times. **DO NOT TRY TO DO TOO MUCH TOO FAST.**



**CAUTION:** Be extremely careful when working close to an open trench. Serious injury could result from a trench cave-in.

**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 Ingersoll dealer.



**DANGER:** Keep all machine parts away from live electrical lines. If work must be done close to high voltage lines, have the utility disconnect them. It is not necessary to actually contact a power line for the electricity to ground through the machine. If power does ground through the machine, remain on the machine and **DO NOT TOUCH THE MACHINE STRUCTURE.** Refer to the following Chart.

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345,000-750,000 volts		16' (4.8 m)

**NOTE:** IF ABOVE REQUIREMENTS ARE LESS STRINGENT THAN STATE REQUIREMENT, THE STATE REQUIREMENTS SHALL APPLY.

## 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/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.

**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 tractor's 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 tractor's 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
- 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 gear and regulate the throttle control lever slowly and smoothly to maintain this safe speed. Do not stop on a hill or slope to change gears.

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, changes your tractor's 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 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 or rain 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

**AVAILABLE ATTACHMENTS**

DUMP CART  
WOOD SPLITTER  
HYDRAULIC TILLER  
PALLET FORKS  
HYDRAULIC BRUSH CUTTER  
HYDRAULIC FINISH CUT MOWER

## TO THE OWNER

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

We are a factory authorized dealer. We have replacement parts which are the same as the original equipment.

If you need additional aid or information, contact us.

Your Authorized Dealer

**NOTE:** Ingersoll Equipment Co., Inc. reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

### 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 (engine without a turbocharger).

### RADIO INTERFERENCE REGULATIONS OF CANADA

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 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.

PRODUCT IDENTIFICATION NUMBERS (P.I.N.)  
OR  
SERIAL NUMBERS

3/17/2008

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

1. Tractor Model Number
2. Product Identification Number (P.I.N.)
3. Engine Model Number
4. Engine Serial Number
5. Engine Specification Number
6. 3-Point Hitch Serial Number
7. Backhoe Model Number (if equipped)
8. Backhoe Serial Number (if equipped)

For reference, write numbers on lines below.

6018-1  
17192706  
LX770- 10905H  
A99X076732  
/  
/  
/

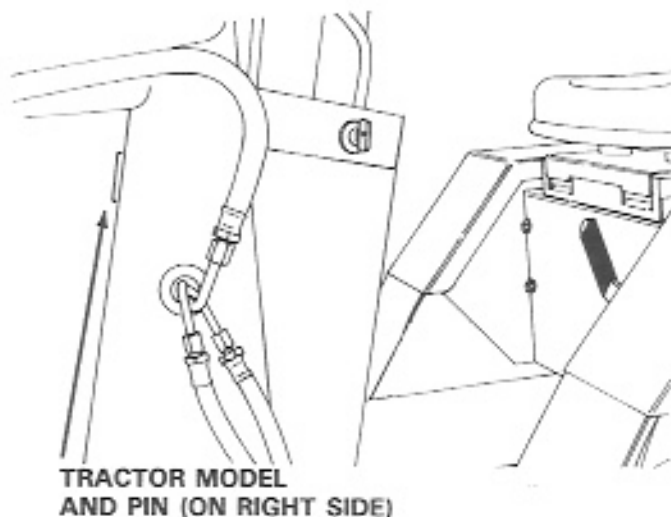


FIGURE 2

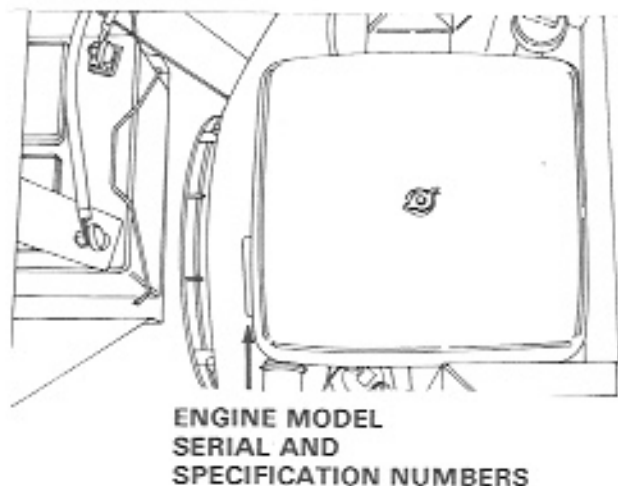


FIGURE 3



## OPERATING INSTRUCTIONS

### OPERATING CONTROLS AND INSTRUMENTS

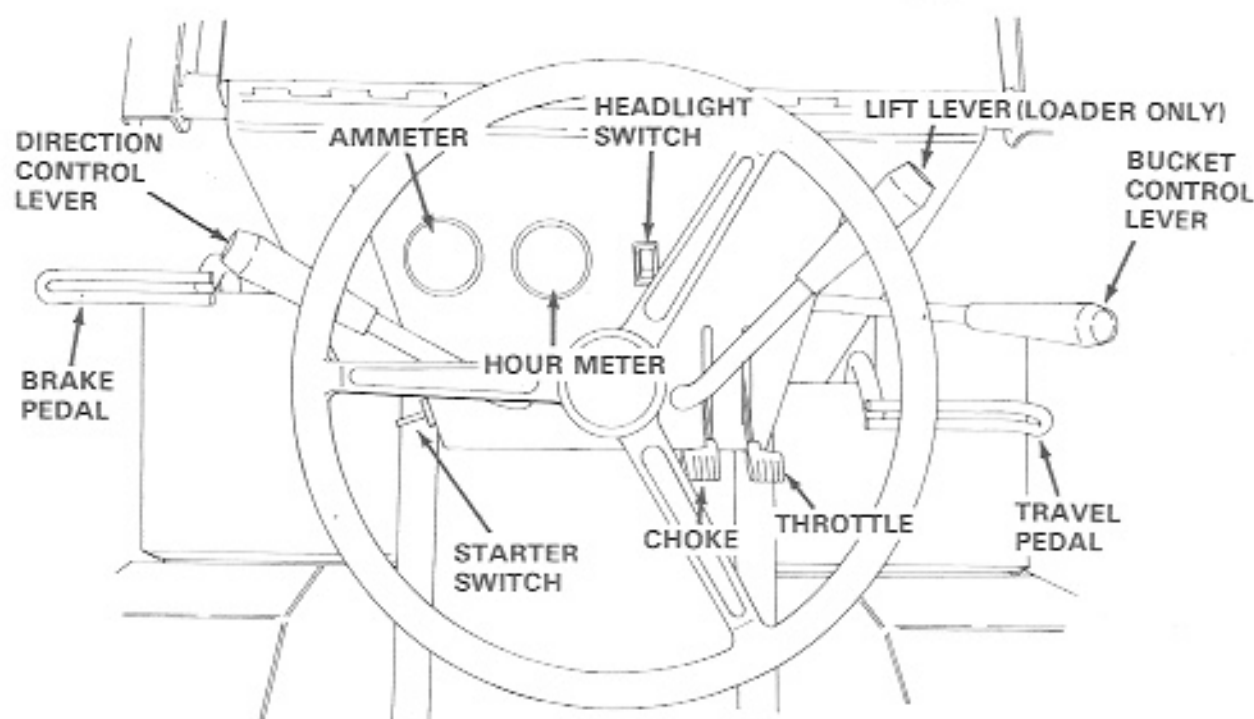


FIGURE 4



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



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



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

#### 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.

#### 2. CHOKE

**TO 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:** Do not change the engine governor settings or overspeed the engine.

#### 4. HEADLIGHTS

**TO ILLUMINATE:** Press the switch to illuminate the headlights.

**TO TURN OFF:** Press the switch to turn off the headlights.

#### 5. 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 "O" when the battery voltage is low.
- If the ammeter continues to give a high reading.

#### 6. HOUR METER

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

#### 7. HYDRAULIC ATTACHMENT LIFT LEVER (Not on units equipped with a backhoe)

**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.

#### 8. 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.

#### 9. 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.

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

#### 10. BRAKE PEDAL

**TO ACTUATE THE BRAKE:** Push the brake pedal fully down.

**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.

## 11. 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.

## 12. PARKING BRAKE LOCK

**TO SET:** Push the brake pedal fully down. Pull the parking brake lock 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.

## 13. 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.

**NOTE:** If the range shift does not move easily, rotate the gears:

To rotate the gears:

1. Move the direction control lever 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.

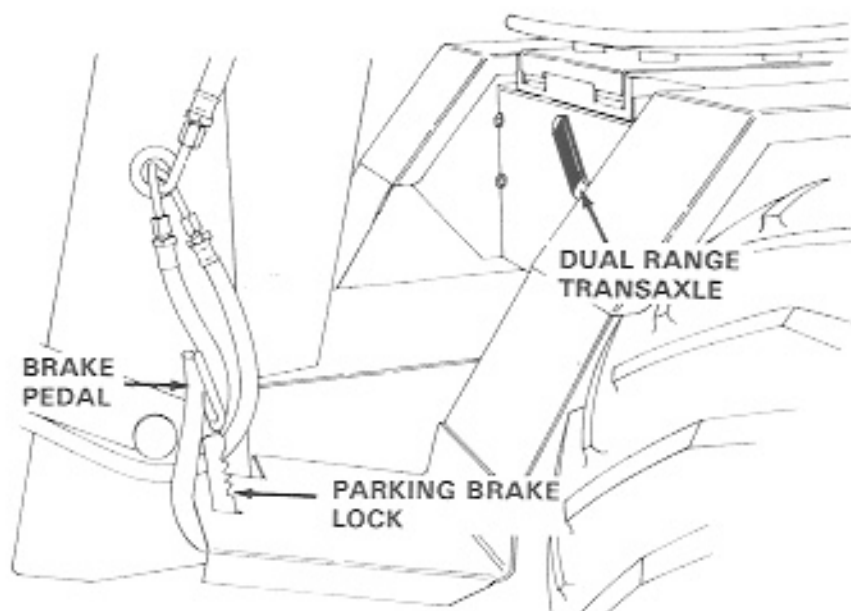


FIGURE 5

## 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.



Never operate machine while under the influence of drugs or alcohol.



**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.



**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:** Do not smoke when working near fuel.

5. Fill the fuel tank with clean fuel. Clean the area around the fuel cap before you remove the cap. The requirements are listed in the Fuel Specifications Section of this manual.
6. Check the ventilation hole in fuel tank cap and clean as required.
7. Check all operating controls and instruments for correct function before using the tractor.

## STARTING PROCEDURE (Operating the tractor)



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



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

1. Put the direction control lever in the "NEUTRAL" position
2. Do not push down on the travel pedal.



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

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:** 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.

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 warm before applying a load.

**NOTE:** The hydraulic system must be warm before you use the tractor when air temperatures are 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 cold.
8. Set the throttle lever approximately 3/4 of the way between the "SLOW" and "FAST" positions for normal operation.

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

Do not permit engine lugging. Lugging will cause more than normal heat and damage to the engine.

**IMPORTANT:** DO NOT TRY TO START THE TRACTOR BY PUSHING OR TOWING. SERIOUS DAMAGE WILL RESULT TO THE DRIVE SYSTEM.



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.



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

## STOPPING PROCEDURE (OPERATING THE TRACTOR)

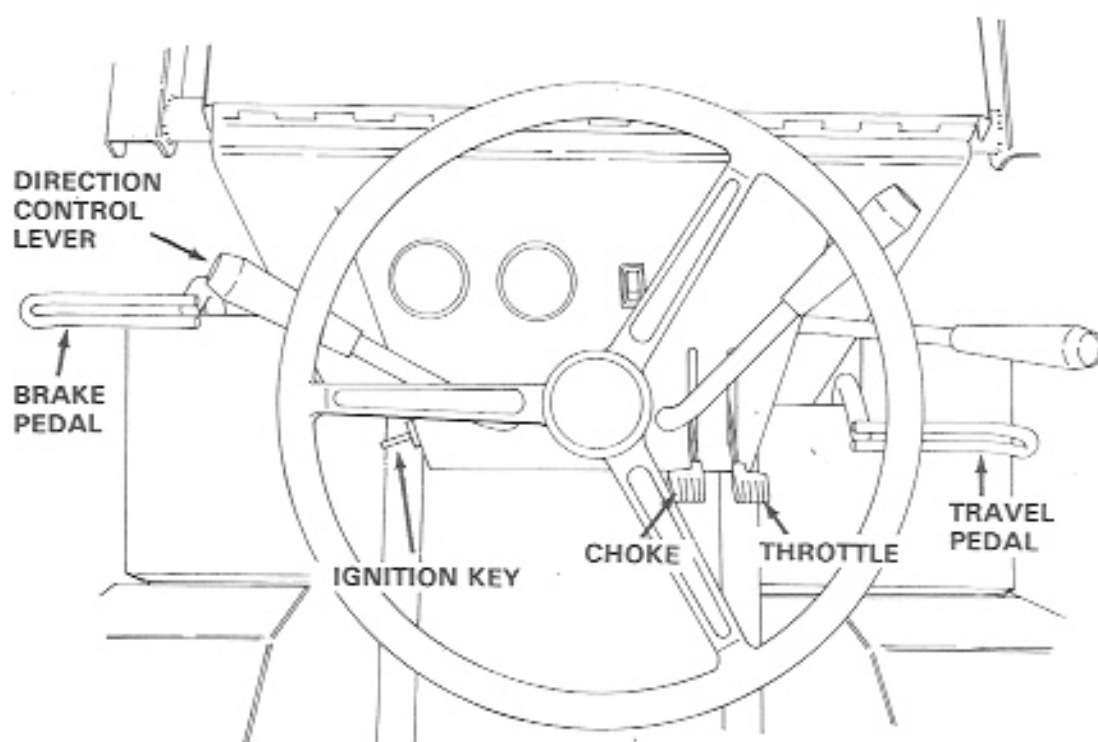


FIGURE 6



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

1. Move the travel control lever to the "NEUTRAL" position.
2. Completely stop the tractor. Actuate the brake pedal 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 for several minutes if the work load was severe.

**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.

**NOTE:** Muffler after bang can be prevented by closing the choke at the same time the key switch is turned to the "OFF" position. This action prevents the entry of air into the muffler as the engine comes to a stop and therefore prevents combustion within the muffler.

6. Turn ignition key to the "OFF" position. Remove key.



**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:** Disengage power to attachments(s) when transporting or not in use.

## OPERATING THE TRACTOR

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. Always use "LOW" range on hillsides or inclines.



**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 counterweights(s) or wheel weights when suggested in the owner's manual.
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 "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:

- a. Put the direction control lever into the "FORWARD" position.
- b. Slowly push the travel pedal down until you reach the needed speed. Hold the travel pedal in this position for operation.

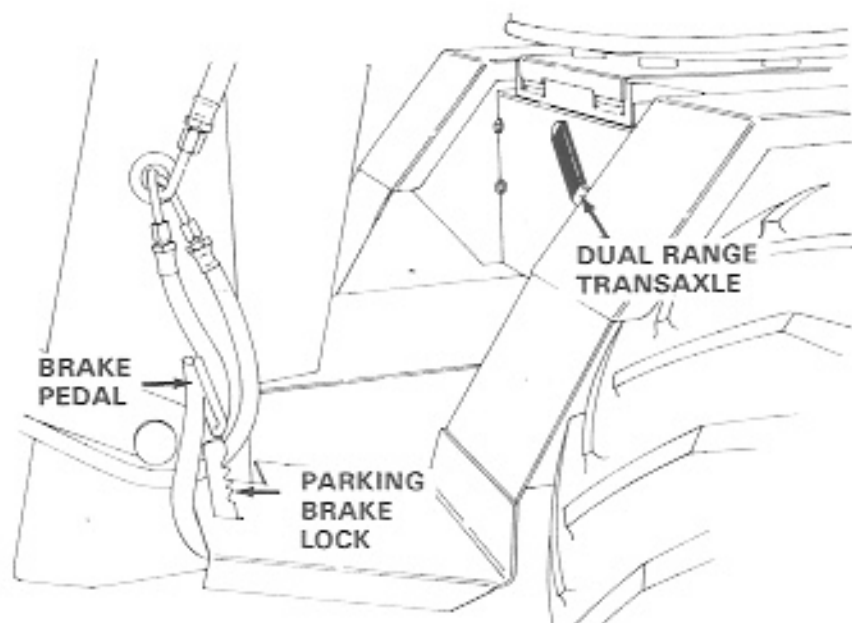


FIGURE 7



- c. Release the travel pedal to stop tractor travel.
- d. Apply the brakes fully if the tractor does not stop after you release the travel pedal.

#### 7. FOR REVERSE TRAVEL:

- a. Put the direction control lever into the "REVERSE" position.
- b. Slowly push the travel pedal down until the needed speed is reached. Hold the travel pedal in this position for operation.
- c. Release the travel pedal to stop tractor travel.
- d. 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.



**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)



**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.

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

#### 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:

- a. Turn the steering wheel at a normal rate of speed.
- b. Run the engine at fast idle speed.
- c. Make sure the hydraulic oil is at operating temperature.
- d. Do not hold the attachment lift or loader bucket circuits (or backhoe if equipped) 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.



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

- 12. See your attachment operator's manual for more information.

## OPERATING THE LOADER

### 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.

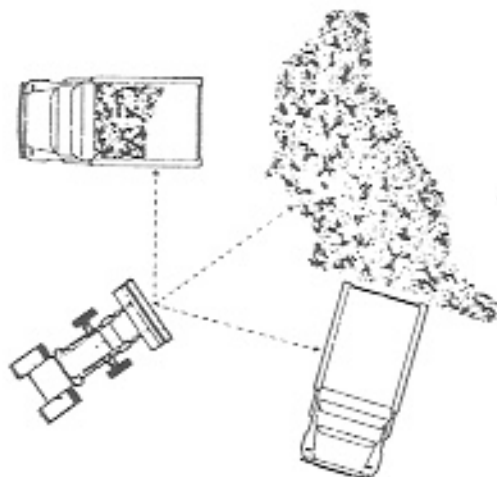


FIGURE 8

2. Fill the bucket

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

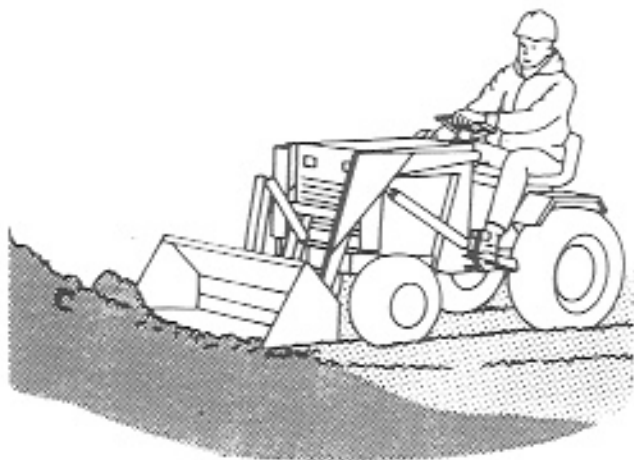


FIGURE 9

- 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 squealing sound will be heard. Release the travel pedal slightly to allow the relief valve to close.

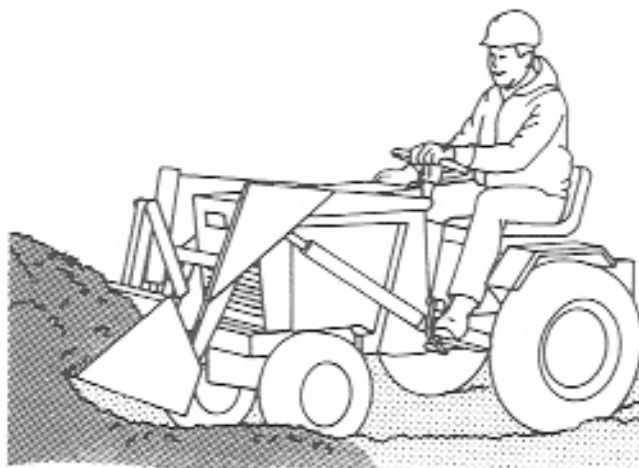


FIGURE 10

- 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 pile.

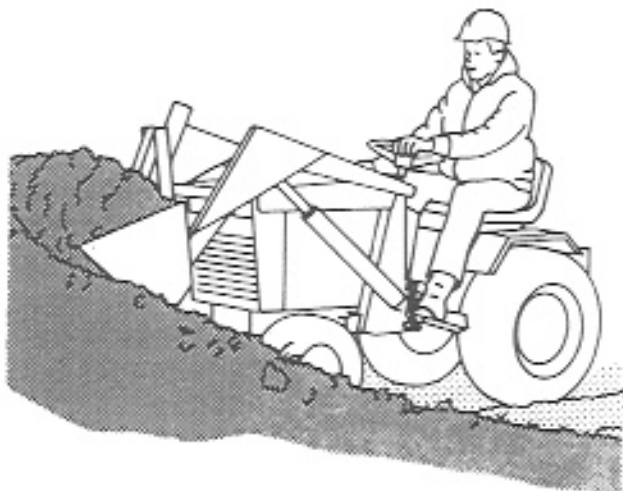


FIGURE 11

### 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 12

### 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.

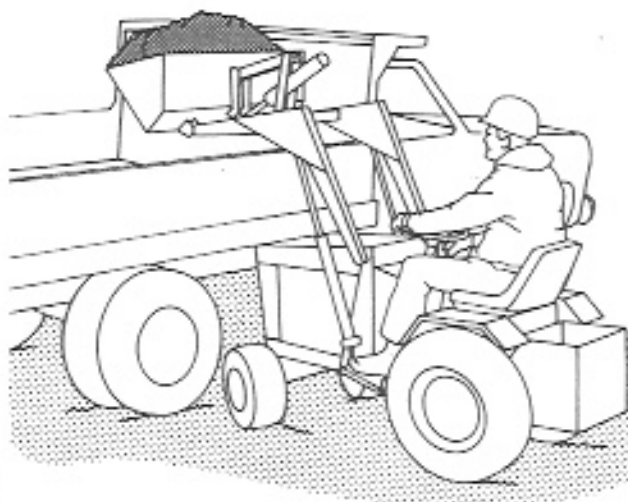


FIGURE 13

### 5. Dumping the bucket

Dump the bucket.

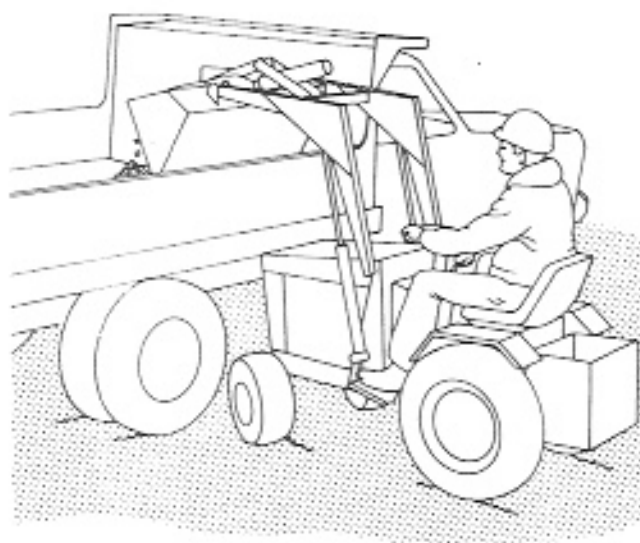


FIGURE 14

### CUTTING BELOW GRADE

The 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.

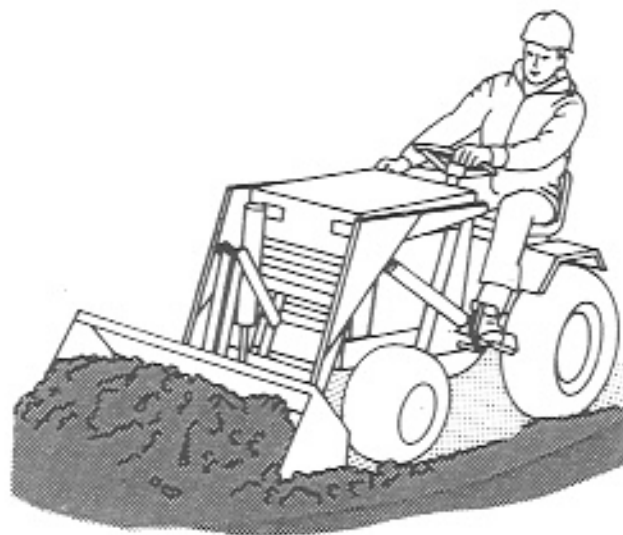


FIGURE 15

## BACKDRAGGING

Soil can be spread and an uneven 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.

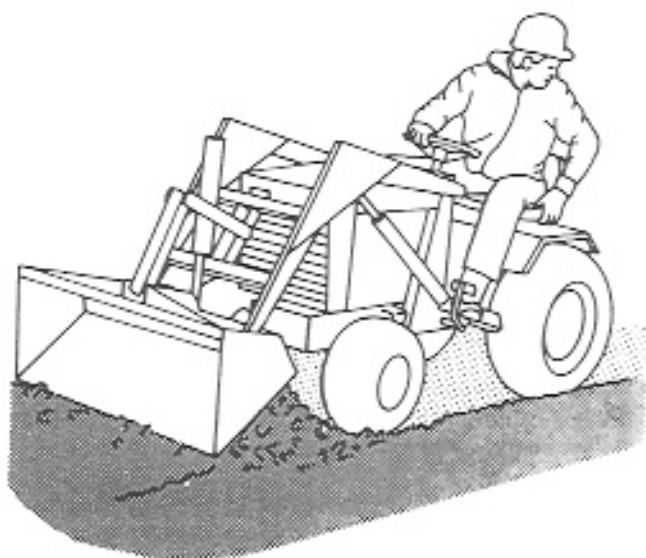


FIGURE 16

### 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.

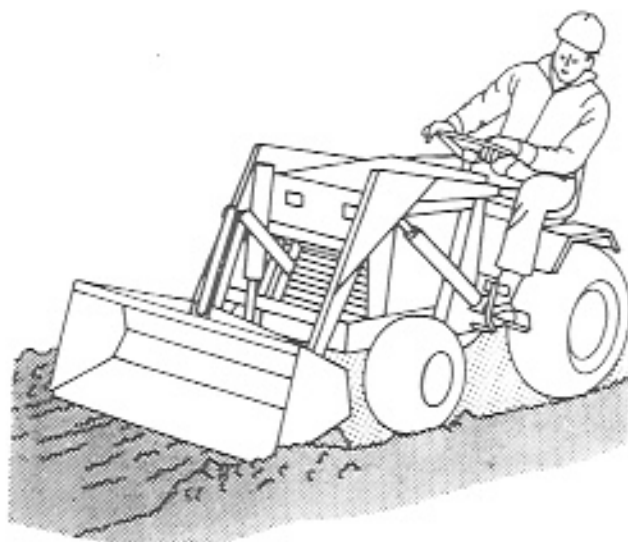


FIGURE 17

## OPERATING THE HYDRAULIC PTO



**CAUTION:** Always lower any rear or front mounted implement to the ground when leaving the tractor unattended.



**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 reassembling, 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.

1. Move the PTO lever inward (toward PTO valve) to engage attachment in forward rotation.
2. Move PTO lever outward (away from PTO valve) to engage attachment in reverse rotation.

(NOTE: DO NOT move the PTO LEVER outward unless your attachment permits reverse operation. Motor damage may occur. (Consult your attachment owners manual.)

### MAINTENANCE:

Periodically check for leaks and the condition of your hoses. Always keep the quick couplers (if equipped) clean and install dust caps or plugs when not in use.



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

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



**CAUTION:** Only operate controls while seated in the operator's seat.

**DO NOT ENGAGE THE PTO WITHOUT A HYDRAULIC ATTACHMENT PROPERLY INSTALLED AND HOSES CONNECTED. SPIKE PRESSURES MAY OCCUR THAT COULD CAUSE PUMP DAMAGE.**

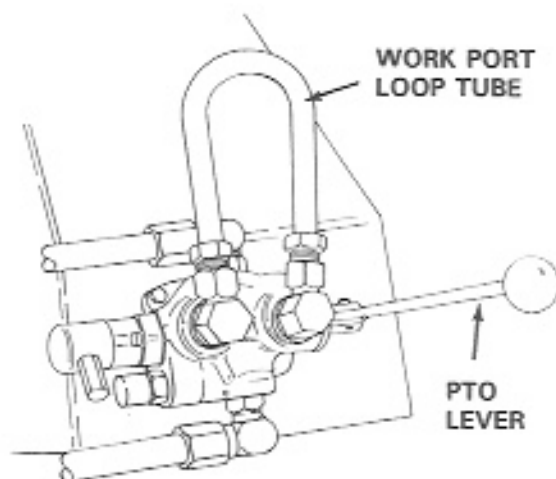


FIGURE 18

### 3-POINT HITCH OPERATION



**CAUTION:** Always lower any rear or front mounted implement to the ground when leaving the tractor unattended.



**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 reassembling, 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.



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



**CAUTION:** Only operate controls while seated in the operator's seat.

**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. Decals are available from your dealer.

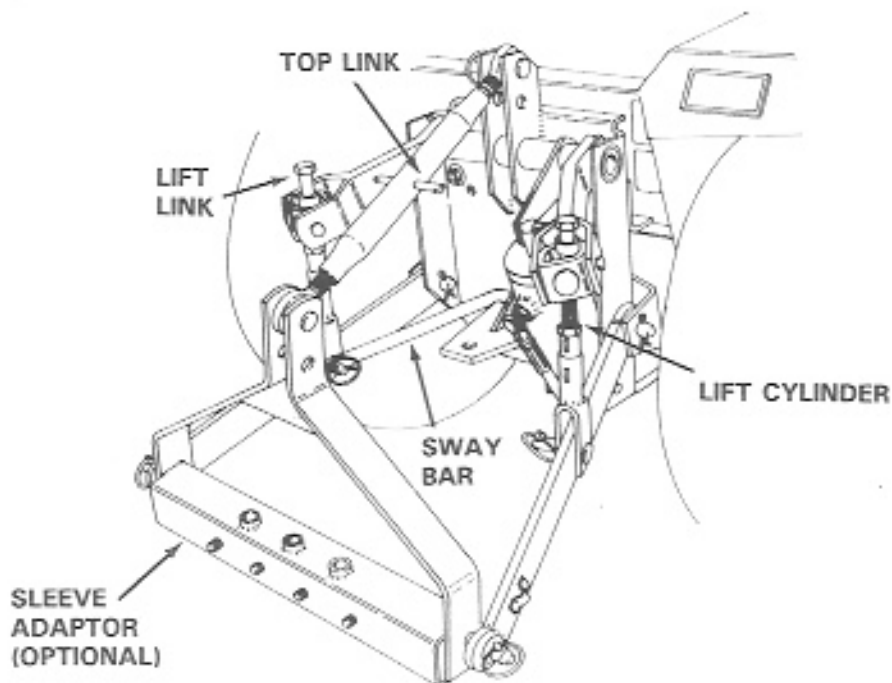


FIGURE 19

## OPERATING CONTROLS AND ADJUSTMENTS

**IMPORTANT:** Read this manual section carefully before operating your hydraulic 3-Point hitch.

The 3-Point hitch is designed in accordance with ASAE Specification, Category "O" and will accommodate all attachments manufactured to this standard.



**CAUTION:** Only operate controls while seated in the operator's seat.

### 1. Hydraulic Lift

The 3-Point hitch is connected to the tractor hydraulic lift circuit and is equipped with a double-acting hydraulic cylinder.

**RAISE**—Pull the hydraulic lift lever rearward to raise the hitch.

**LOWER**—Push the hydraulic lift lever partly forward to lower the hitch. Down pressure is applied when the hitch is in its lowest position (cylinder fully retracted).

## MAINTENANCE

1. Grease two fittings on hitch rockshaft daily.
2. Apply oil to pivot pins and attachment mounting pins daily.
3. Do not oil ball joints as this may cause abrasive foreign material to lodge between the ball and retainer.
4. Check for tightness. After first two hours of operation, tighten all bolts which secure hitch to the tractor.
5. A certain amount of oil will normally accumulate at the rod end cap of the lift cylinder during operation. This provides lubrication for the moving parts. There is no requirement for service or repair unless leakage is excessive.
6. Maintain tractor as described in Tractor Operator's Manual.

The hydraulic lift centering spring returns the valve to neutral after raising or lowering the hitch.

**FLOAT**—Push the hydraulic lift lever fully forward for the float position. The lever will be held in float by a detent and must be manually returned to neutral.

The float position allows the attachment to follow the ground and is recommended for tilling or plowing.

### 2. Lift Links

The lift links are threaded and adjustable. Use them to level a mounted attachment or to compensate for the right wheels being in the furrow when plowing.

### 3. Top Link

The top link is threaded and is used to set the fore-aft pitch of the attachment. Two mounting holes for the top link are provided on the hitch frame to aid in setting fore-aft pitch adjustment.

### 4. Sway Bar

The sway bar must be kept anchored to the tow bracket to prevent interference with rear wheels.

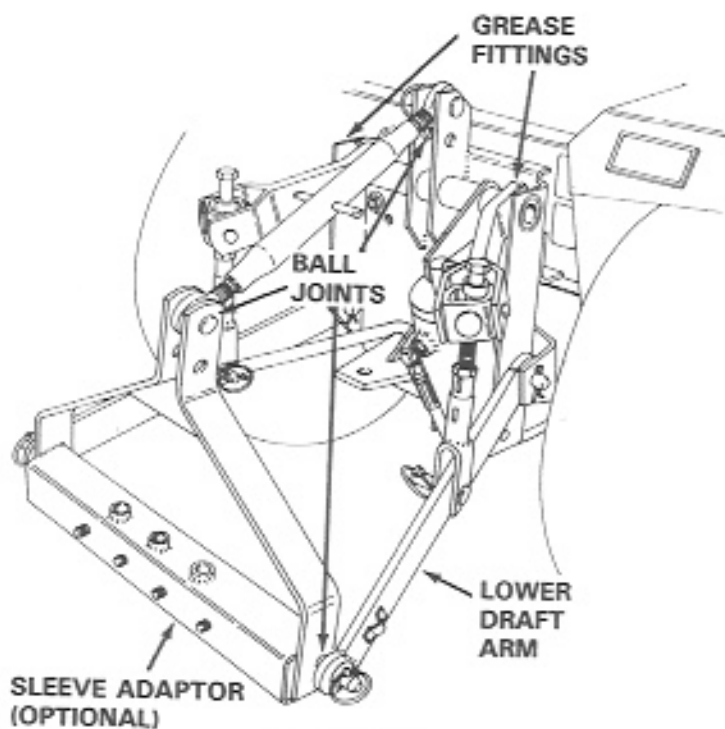


FIGURE 20



## SLEEVE ADAPTOR (OPTIONAL)



**CAUTION:** Always lower any rear or front mounted implement to the ground when leaving the tractor unattended.

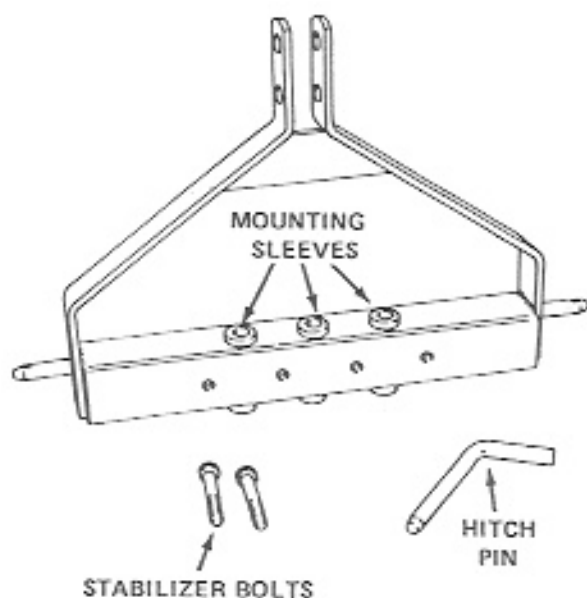


FIGURE 21

The sleeve adaptor converts the 3-Point Hitch to accept sleeve type mounted implements.

1. Two implement stabilizing bolts are furnished with the sleeve adaptor for use at two of the four threaded holes. Use these bolts to prevent excessive movement of the attachment. A plow should not be stabilized at this point.
2. There are three mounting sleeves on the sleeve adaptor to permit centering or offsetting implements. When mounting a plow, be careful to select the mounting position which will allow the plow to cut cleanly to the edge of the previous furrow and to the inside of the right rear wheel.

## NOTES

## LOADING UNIT ONTO A TRAILER

Place backhoe (if equipped) in the transport position before transporting.

Move unit on a trailer between job sites. Do not drive the unit long distances.

The type of trailer used will determine the loading arrangement of the machine. The unit must be backed up the ramp or trailer when loading. Lower the backhoe boom or rear attachment and loader bucket on the trailer to help anchor and stabilize the unit during transport. Chain the unit securely.



**WARNING:** Use extreme caution when loading unit on trailer. Place the two speed transaxle in low range. Always back-up the ramp or trailer when loading; drive down when unloading. When unit is on trailer, set the parking brake and lower the front and rear attachments so they are resting on the trailer floor. Rest loader bucket, if equipped, in full dump position. Block wheels securely and attach transport chains.



**WARNING:** Before operating, read manual for additional information on safety, operations, service and maintenance.

Backhoe digging forces can lift and turn tractor over; to avoid serious injury or death: Operate backhoe only from seat and with all safety shielding in place. Make sure stabilizer pads are on firm ground; avoid soft or steep banks.

Never allow riders or operate backhoe with bystanders in the maximum swing area.

A minimum 25% of tractor and equipment weight must be on tractor front wheels with backhoe in transport position.

Before transporting, attach slow moving vehicle (SMV) sign and engage transport locks.

Before leaving unattended, raise boom and install transport lock, lower dipperstick, shut engine off and remove key.

If high-pressure oil penetrates skin, it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

Know location of and avoid contacting all underground cables, pipelines, overhead wires and other hazards in digging area.

## PREVENTIVE MAINTENANCE

You as the owner of an Ingersoll tractor, 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 in good working condition.

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.



**WARNING:** Extend and lower backhoe boom, dipperstick and loader bucket to ground, turn tractor engine off and remove key. Move backhoe and loader controls through the full range of operation to relieve hydraulic system pressure before performing any service or maintenance.

When completing a maintenance or service function, make sure all safety shields are installed before placing unit in service.



## SPECIFICATIONS

## ENGINE

Make	Onan
Model	P218 G-I/10742B
Cycle	4 cycle
Number of Cylinders	2
Horsepower	18(13.4kw)
Cylinder Bore	3-1/4" (82.5mm)
Piston Stroke	2-7/8" (73mm)
Displacement	47.7 in <sup>3</sup> (780cm <sup>3</sup> )
Maximum No Load Speed	3600 RPM
Low Idle Speed	1200 RPM
Compression Ratio	7.0 to 1
Intake Valve Clearance (cold)	.005" (.13mm)
Exhaust Valve Clearance (cold)	.013" (.33mm)
Spark Plug Gap	.025" (.64mm)
Spark Plug Thread	14mm
Spark Plug Type	Champion RH18Y or equivalent
Ignition Timing	20° BTDC
Cooling	Air Cooled

## ELECTRICAL SYSTEM

Battery . . . . 12 Volt, 32 Ampere Hour, 300 CCA  
 Starter . . . . . 12 Volt Gear Drive  
 Head Lights . . . . . 12 Volt, 32 Candle Power  
 Fuse . . . . . 30 AMP  
 Charging System . . 20 AMP Flywheel Alternator

## TRANSAXLE

Type . . . . .Hydraulically driven, two gear ranges  
Differential . . . . .Standard Bevel Gear

## HYDRAULIC SYSTEM

Reservoir . . . . . Atmospheric with vented fill cap  
Pump . . . . . Gear type double pump  
Output rated at 3600 RPM  
Outlet Port No. 1 - 4.8 GPM (18.2LPM)  
Outlet Port No. 2 - 8.8 GPM (33.3LPM)

## Valve

Travel and lift control valve . . . . . 2 spool, open  
center with relief  
Power Take off valve 1 spool, open center with relief  
Loader bucket control valve . 2 spool, open center  
Power Steering . . . . . Hydrastatic hand pump  
Backhoe Valve . 6 section stack valve with reliefs

**Relief Valve Pressure Settings:**

Travel Control . . . . .	2750 PSI (18,900 kPa)
Power Take Off . . . . .	2500 PSI (17,200kPa)
Power Steering . . . . .	1500 PSI (10,300kPa)
Backhoe (if equipped) Main	1950 PSI (13,400kPa)

## CAPACITIES

## LOADER HYDRAULIC SYSTEM

Refill .....	8 qts. (7.51l)
Total System .....	13 qts. (12l)

### LOADER BACKHOE HYDRAULIC SYSTEM

Refill .....	8 qts.(7.5l)
Total System .....	20 qts.(18.9l)

ENGINE CRANKCASE ..... 1.8 qts. (1.61)

FUEL TANK . . . . . 6.4 gallons (24.2l)

TRANSAXLE ..... 3 qts. (2.8l)

### LOADER BUCKET CAPACITY

Bucket Capacity (struck) . . . . . 5.35cu.ft. (.15m<sup>3</sup>)  
Width . . . . . 48 in. (1.22m)  
Load Lift Capacity (full height) . 750 lb. (340.2kg)  
Breakout Capacity . . . . . 1375lb. (623.7kg)

### TIRES—LOADER

TYPE	SIZE	PLY	PRESSURE
Front	20x8.00-10	4	12 PSI (80kPa)
Rear	27x10.5-15	4	20 PSI (140 kPa)

#### TIRES—LOADER BACKHOE

TYPE	SIZE	PLY	PRESSURE
Front	20x8.00-10	4	12 PSI (80 kPa)
Rear	29x12.50-15	4	20PSI (140 kPa)



**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.

**SPEED RANGE** (forward and reverse)

LOADER	LOW RANGE 2.8MPH (4.5 kph)	HIGH RANGE 5.6mph (9kph)
LOADER/ BACKHOE	3.0MPH (4.8KPH)	6.0MPH (9.6KPH)

## MEASUREMENTS (LOADER TRACTOR)

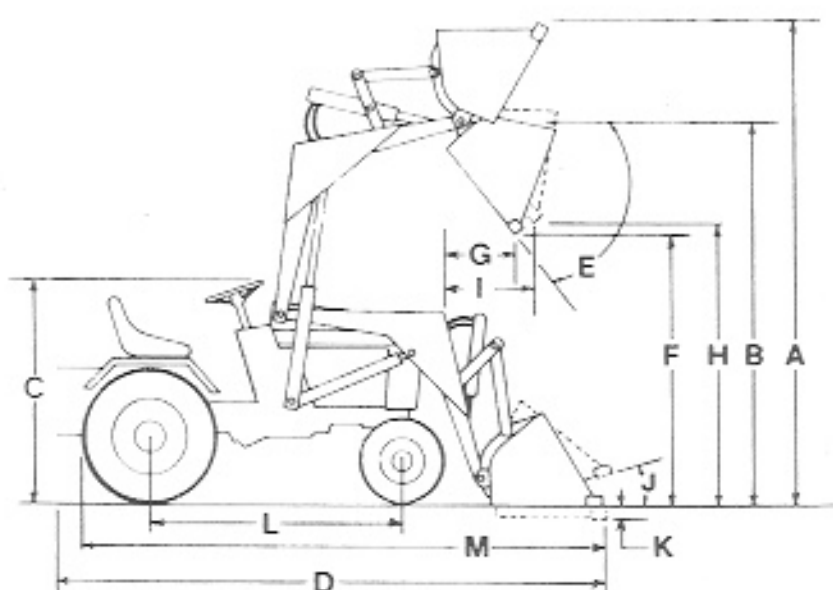


FIGURE 22

## MEASUREMENTS (LOADER TRACTOR)

A	Overall operating height fully raised	93.5"(2375mm)
B	Height to bucket hinge pin	72"(1825mm)
C	Overall height with bucket on ground	45.25"(1150mm)
D	Overall length including 3-point hitch and bucket	108"(2.7m)
E	Maximum dump angle	59°
F	Dump clearance at maximum height 59° dump angle	53.25"(1.3m)
G	Reach at maximum height and 59° dump angle	14"(350mm)
H	Clearance at 45° dump angle	55"(1.4m)
I	Reach at 45° dump angle	15"(380mm)
J	Bucket roll back	18°
K	Digging depth—bucket flat	1"(25.4mm)
L	Wheelbase	48"(1.2m)
M	Length—bucket to rear tire	98.5"(2.5m)
	Ground Clearance (tractor)	7.0"(1.8m)
	Turning Radius	59.0"(1.5m)
	Tread Width (Front)	40.5"(1.02m)
	Tread Width (Rear)	42"(1.1m)

### CYLINDER SIZE

#### LOADER LIFT CYLINDER

Bore	2"(51mm)
Stroke	18.1"(0.46m)

#### LOADER BUCKET CYLINDER

Bore	2.5"(64mm)
Stroke	13"(0.33m)

## BRAKE

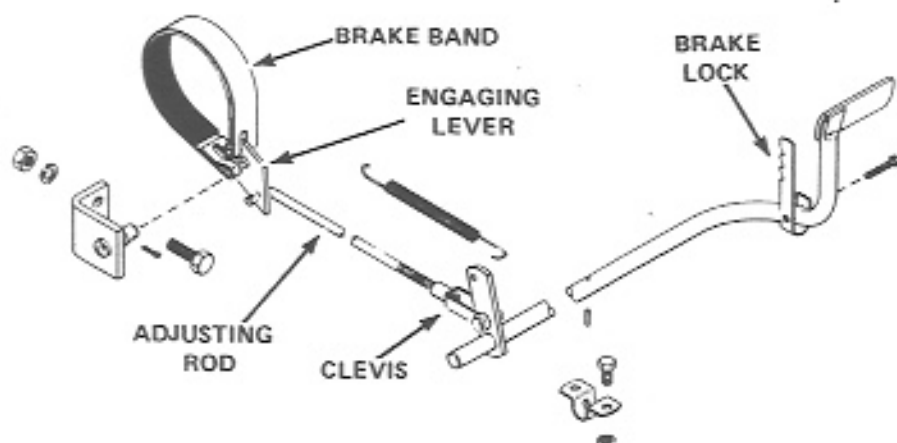


FIGURE 23

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.

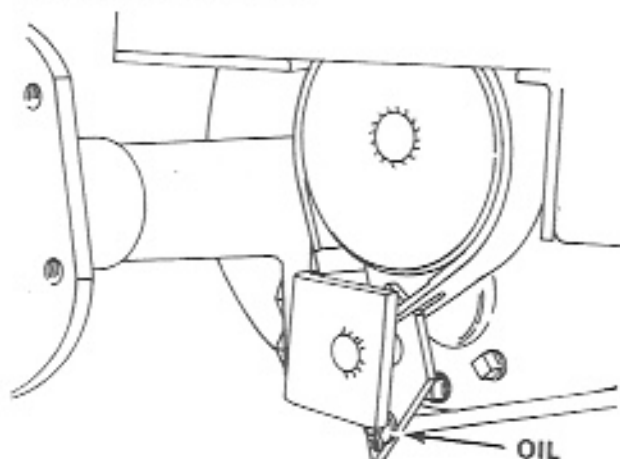


FIGURE 24

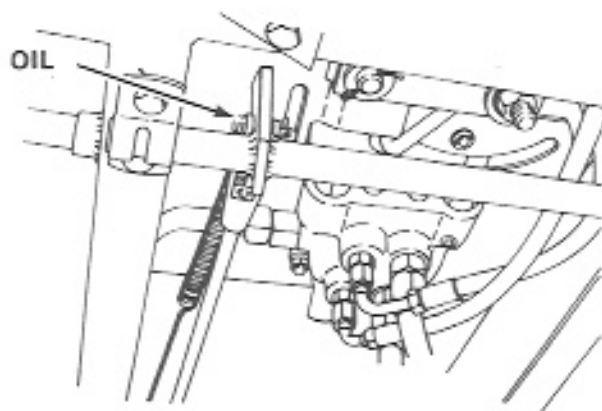
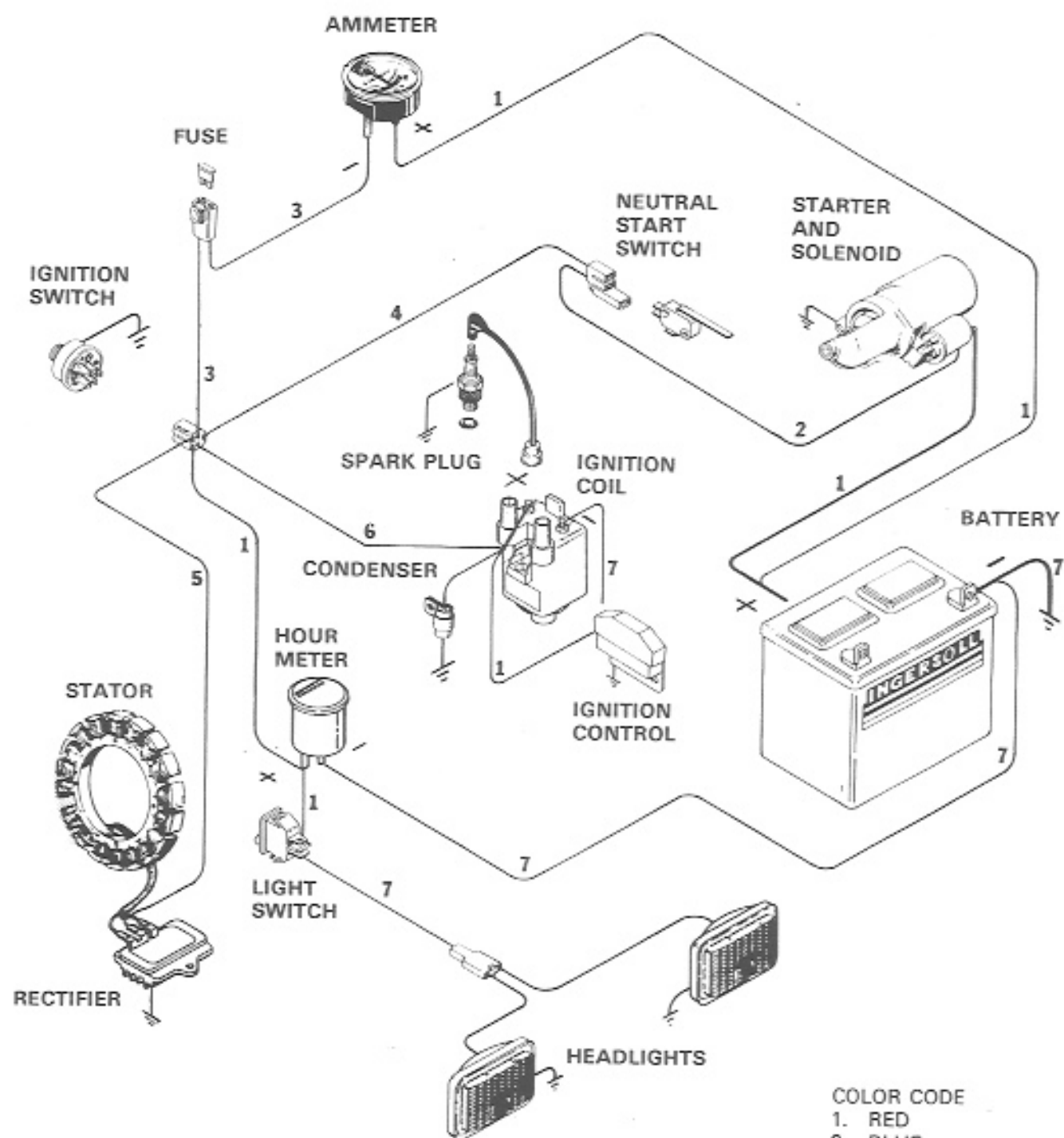


FIGURE 25

# WIRING DIAGRAM



- COLOR CODE
- 1. RED
  - 2. BLUE
  - 3. ORANGE
  - 4. GREEN
  - 5. RED AND WHITE
  - 6. BLACK AND WHITE
  - 7. BLACK

FIGURE 26



## STORAGE BATTERY



**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.



**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:** 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.

### BATTERY MAINTENANCE

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 (30ml) every 25 hours of operation. More than normal water consumption indicates.
  - a. a battery with a leak
  - b. a charging system 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.

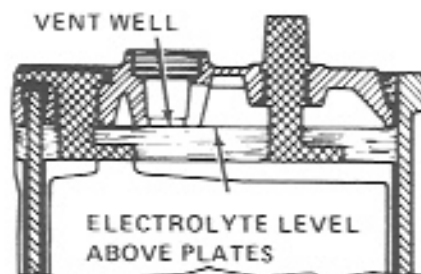


FIGURE 27

Make a weekly check of the electrolyte level.

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 filler tubes.

### BATTERY CAPS

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

## CABLE TERMINALS AND BATTERY POSTS

Keep the battery terminals clean and tight.

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.

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

## 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.

## 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.

BATTERY TERMINAL  
ON THE SOLENOID

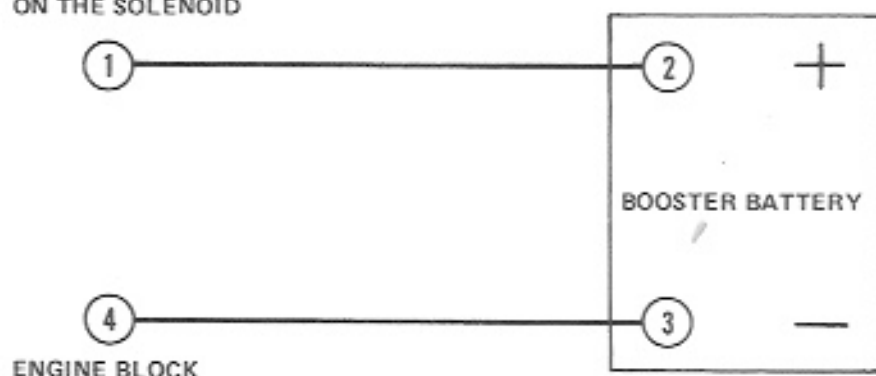


FIGURE 28



**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.

## SPARK PLUG

The original spark plug in your engine has a medium heat range. For correct replacement, consult the engine specification chart in the manual.

**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.

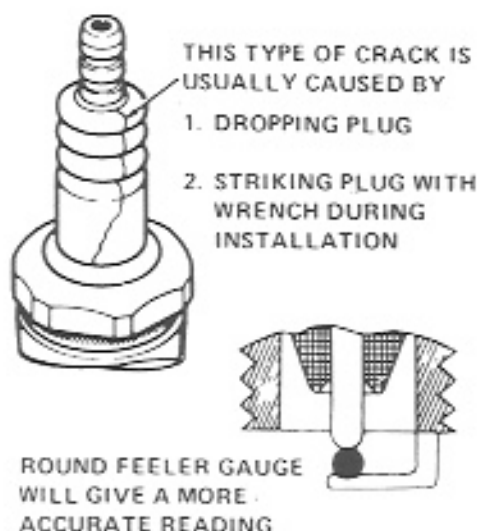


FIGURE 29

**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.

## HEADLIGHTS

To replace the headlights 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.

## FUSE

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

Use the following procedure to replace a fuse:

- a. Pull the fuse from its socket.
- b. Inspect socket for damage or corrosion. Replace the socket if necessary.
- c. Install the new fuse.

## CARBURETOR

Carburetors are set at the factory and normally should not have to be adjusted.

### MAIN FUEL ADJUSTMENT

The carburetor on your engine has a fixed jet main fuel orifice which is not adjustable.

### IDLE FUEL ADJUSTMENT

1. Stop engine.
2. Turn idle fuel adjusting screw clockwise until it bottoms lightly.

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

3. Turn idle fuel adjusting screw counterclockwise 1-1/8" turns from bottom.
4. Start and run the engine until the operating temperature is reached.

5. 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 ADJUSTMENT

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" (0.8mm).



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



**WARNING** The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

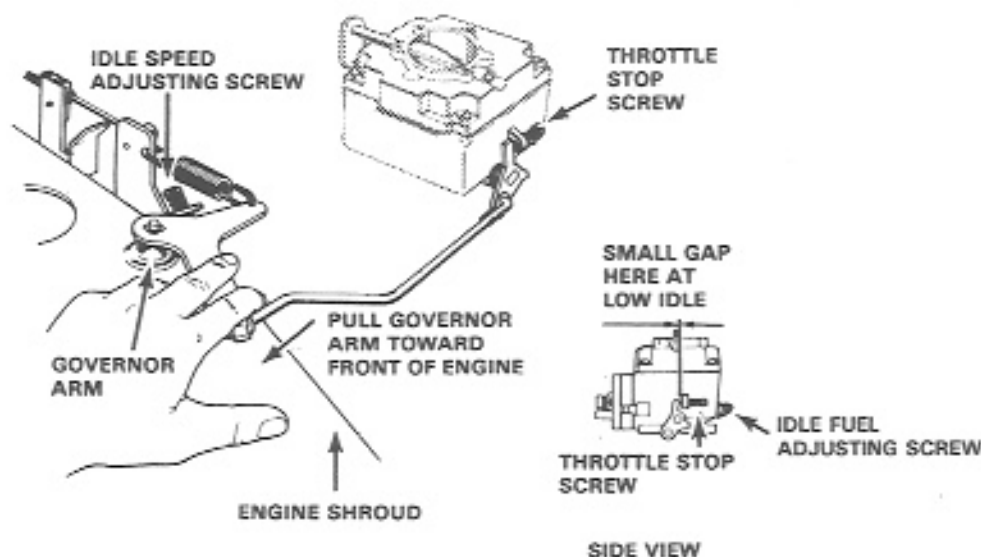


FIGURE 30

## AIR CLEANER

Your tractor is equipped with a dry type air cleaner.

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 loader and loader-backhoe 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.

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.

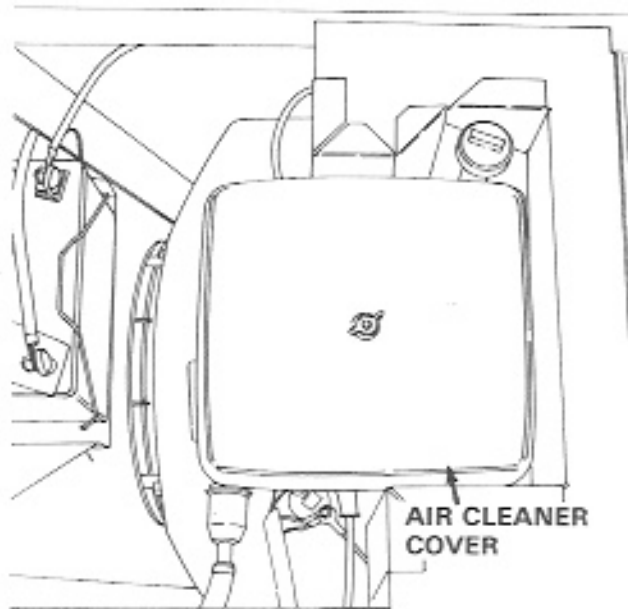


FIGURE 31

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

### WASHING AND OILING INSTRUCTION FOR AIR CLEANER PRECLEANER (if used)

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

Carefully remove the precleaner from the paper filter element.

Wash the precleaner thoroughly in a solution of detergent and water. Squeeze the precleaner dry and allow it to air dry.

Apply two tablespoons (28 grams) of SAE 30 engine oil to the precleaner. Squeeze the precleaner gently to distribute the oil and remove excess oil.

Install the precleaner over the paper filter element.

**NOTE:** Make sure precleaner is completely dry before oiling. Do not apply more than two tablespoons of oil to the precleaner. Restriction of the paper element and poor engine operation can occur if the precleaner is installed wet or with excess oil.

1. WASH
2. SQUEEZE DRY
3. COAT WITH OIL
4. INSTALL OVER PAPER ELEMENT



FIGURE 32

## ENGINE OIL

Check the engine oil level. The equipment must be parked on a level surface and the engine stopped. To get an accurate reading, wait a minute or so to allow the oil to settle in the crankcase if the engine has been running.



**CAUTION:** Crankcase pressure can blow hot engine oil out the fill tube causing severe burns. Always stop the engine before removing the oil fill cap.

Turn the oil fill cap counterclockwise and then lift it from the fill tube (Figure 33). Wipe the dip stick clean and push it back into the oil fill tube until the cap seats and then withdraw it to check the oil level.

If the oil level is low, add API Class SG or SH oil (also SG/CD, SG/CE, SH/CD or SH/CE) having an SAE viscosity grade appropriate for the expected temperatures, as indicated.

**DO NOT FILL TO A LEVEL ABOVE THE FULL MARK ON THE DIPSTICK.** Drain the excess oil if too much has been added.

**IMPORTANT:** Too much oil can cause high oil consumption, high operating temperatures and oil foaming. Too little oil can cause severe engine damage. Keep the oil level between the Full and Add marks on the dipstick.

Reinstall the dipstick and cap after checking or adding oil, turning it clockwise until it is secure.

Ingersoll Custom Blend motor oil is recommended. This oil is a special blend for small air-cooled engines.

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

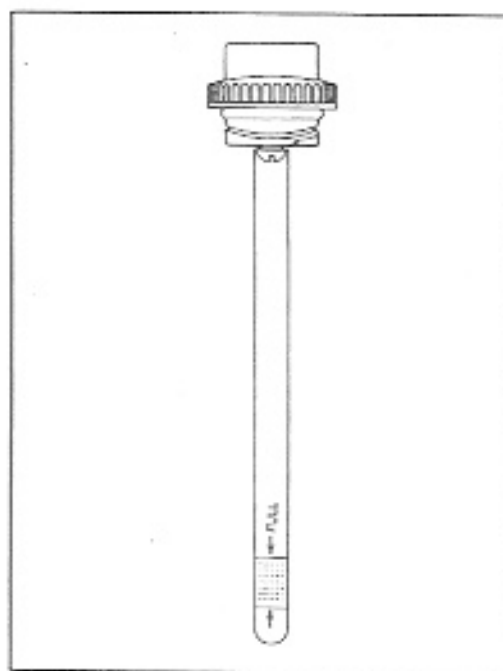


FIGURE 33. OIL FILL CAP AND DIPSTICK

## 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 50 HOUR interval of operation or sooner if the oil becomes discolored. Change the oil filter at every 50 HOURS of operation. **CHANGE OIL MORE FREQUENTLY UNDER DIRTY, DUSTY CONDITIONS.** (Most loader and loader-backhoe working conditions are considered dirty and/or dusty.)

### OIL CHANGE PROCEDURE

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

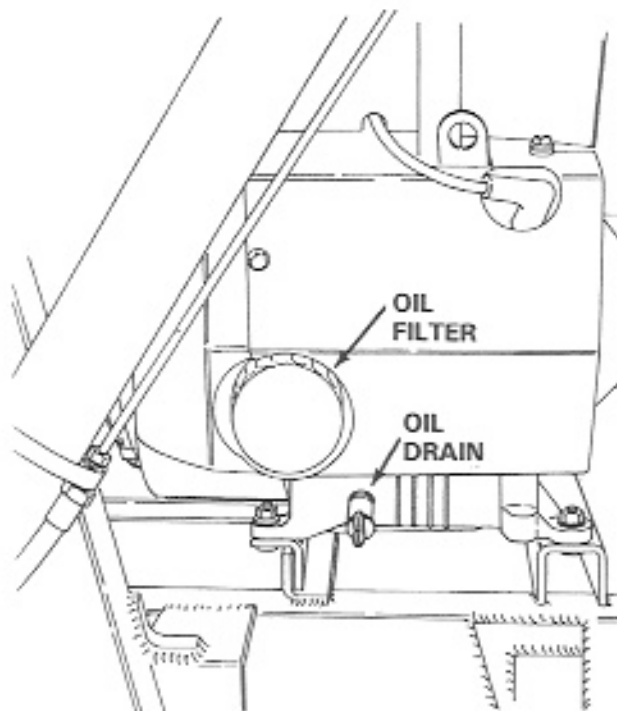


FIGURE 34

**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 under "oil change procedure".
2. Remove and discard the oil filter.
3. Install the new filter finger tight plus 1/4 to 1/2 turn.
4. Install the drain plug.
5. 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.

6. Run the engine for 30 seconds at 1/2 throttle to fill the oil filter.
  7. 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 force out the dipstick opening if the dipstick is removed while the engine is running.
8. Reinsert the dipstick. Push it all the way down.
  9. Pull the dipstick and read the oil level.
  10. Add oil through the dipstick opening to bring the oil level up to, but not over, the "F" mark on the dipstick.



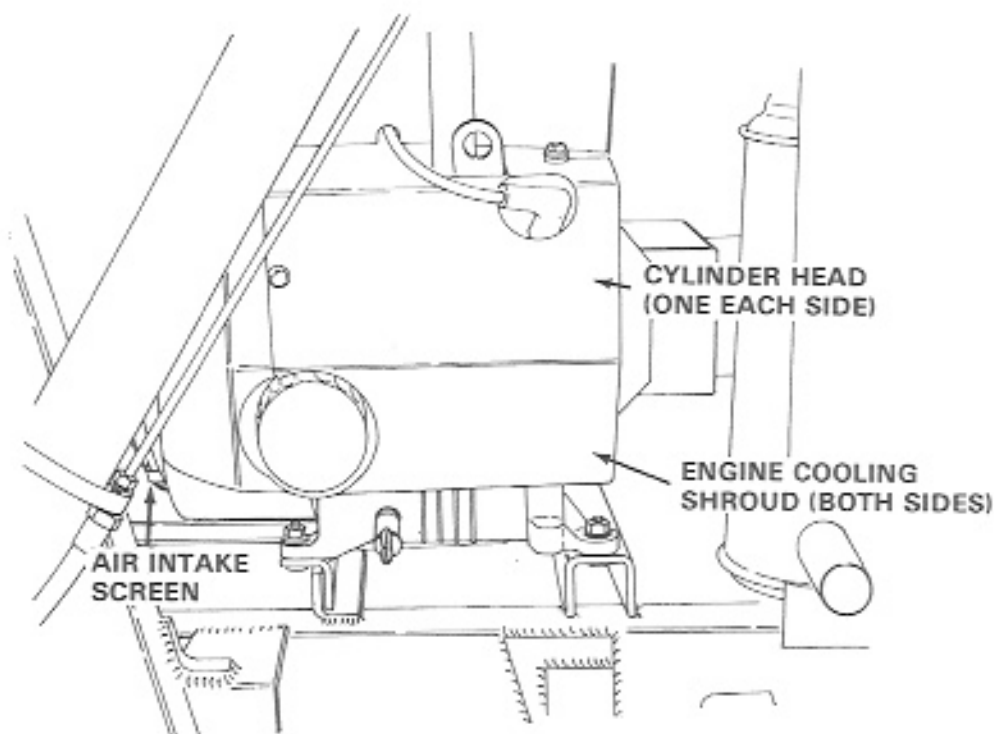


FIGURE 35

## 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.

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 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.

## ENGINE VALVE SERVICE

The valve tappet clearances must be checked and adjusted (if necessary) after each 1,000 HOURS of operation. 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 filter. 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.



**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.



**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:** Do not smoke when working near fuel.

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, replace the filter and clean the vent in the fill cap.

**IMPORTANT:** Damage to fuel system 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.

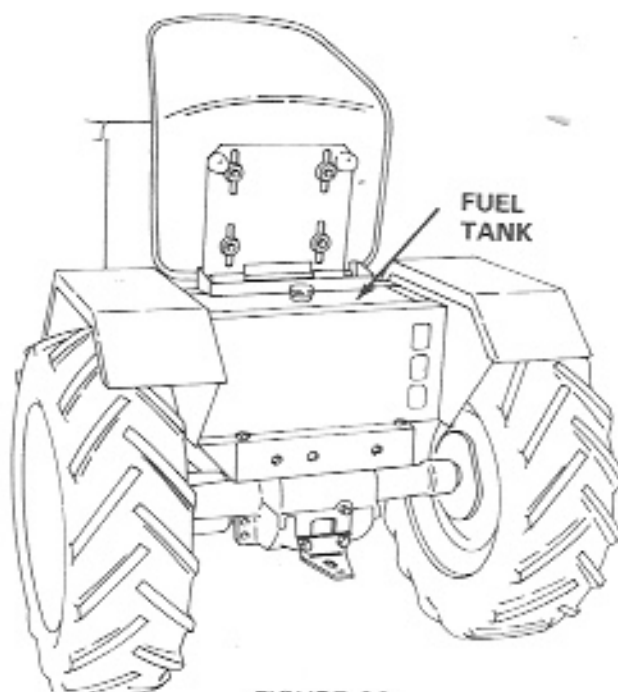


FIGURE 36

## FUEL FILTER

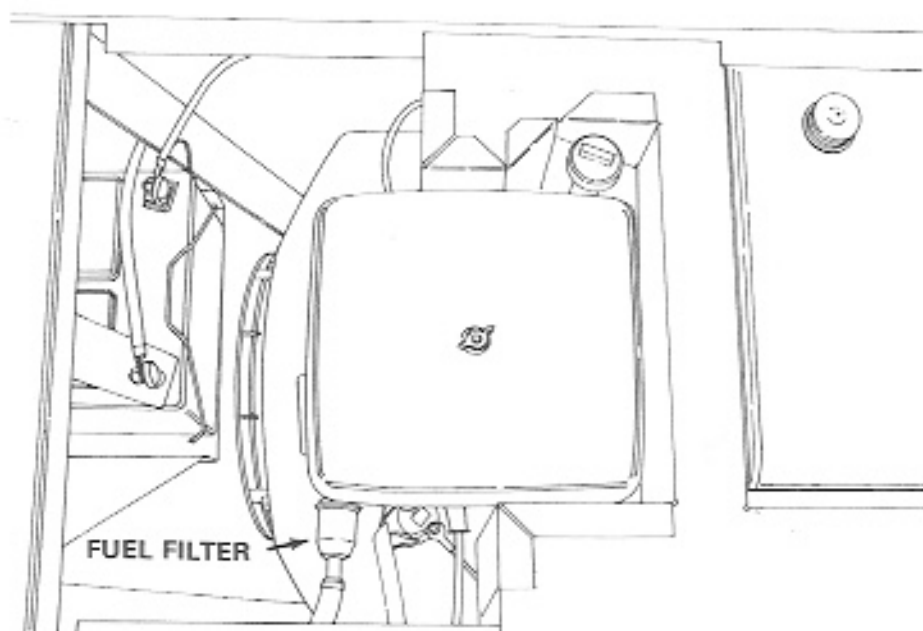


FIGURE 37

Replace the fuel filter after each 500 HOURS of use or when contamination or restriction is evident.

Use the following procedure to replace the fuel filter:

1. If possible, plan to replace the fuel filter when the fuel tank is as near empty as possible.
2. Place a piece of air tight plastic wrap under the fuel tank cap. This will block the vent in the cap and retard leakage of remaining gasoline when the filter is disconnected.

**NOTE:** Be sure to remove the plastic wrap after the fuel filter is replaced.

3. Place an approved container and funnel under the filter to catch spilled fuel.



**CAUTION:** Do not smoke when working near fuel.

4. Make sure that there is no source of ignition (such as flame, spark or cigarette) near by. Remove the fuel line from the engine side of the filter. Hold the filter as high as possible to minimize leakage.
5. Remove the filter from the fuel line.
6. Install the new filter insuring that the fuel flow direction arrow points toward the engine.
7. Insure that the clamps are secure.
8. Put approximately one quart of fuel in the tank and check for leaks. Repair any leaks before filling the fuel tank full.

## HYDRAULIC OIL

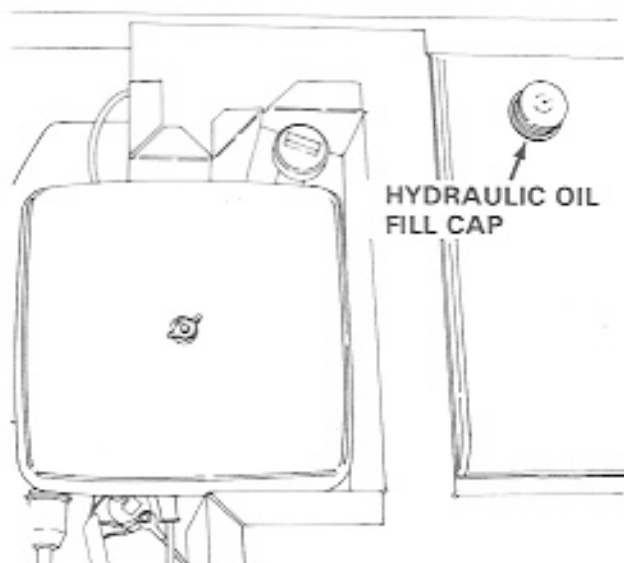


FIGURE 38

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

AIR TEMPERATURE	OIL VISCOSITY
Above 32 F(0° C) .....	SAE20W40*
Below 32 F(0° C) .....	SAE5W20*

\*Use API Service Classification SE, CC or CD.

Ingersoll Custom Blend motor oil is recommended.

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

Use the following procedure to drain the hydraulic system:

1. Remove the spark plug(s) from the engine.
2. Ground the spark plug wires(s) to the engine block.
3. Place an oil drain pan with a minimum capacity of two gallons under the travel control valve.
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 2" to 3" (50 mm to 75 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 operate backhoe controls (if equipped). Check the oil level again.

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

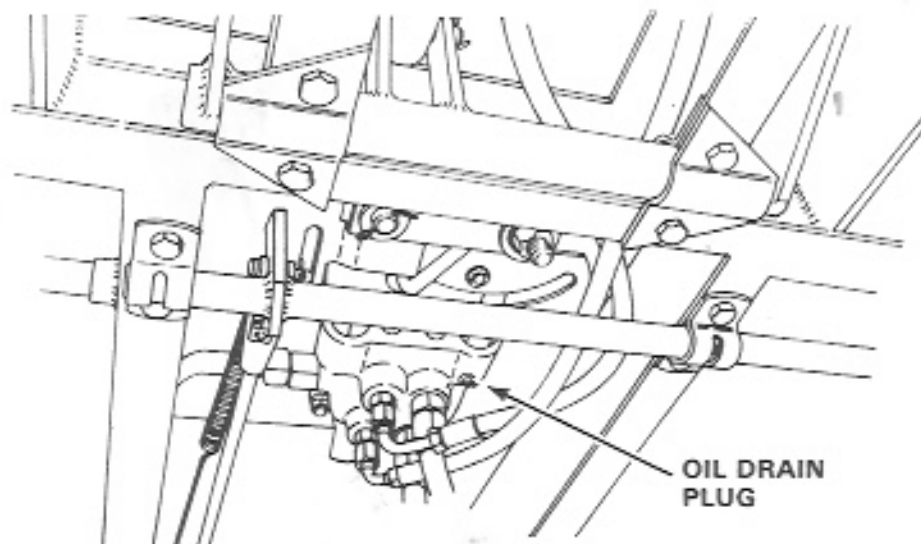


FIGURE 39

## HYDRAULIC OIL FILTER

Your tractor is equipped with a return line disposable canister filter.

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

Service Procedure:

- drain hydraulic oil.
- remove filter from mount.
- apply fresh oil to filter lip.
- hand tighten new filter to mount.
- tighten filter 1/2 turn with wrench or until oil does not leak.
- refill hydraulic system.

## HYDRAULIC OIL COOLER

The hydraulic oil cooler is located at the rear of the engine.

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, remove the access panel and clean the debris off.

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

## LOADER CONTROL LEVER LINKAGE

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

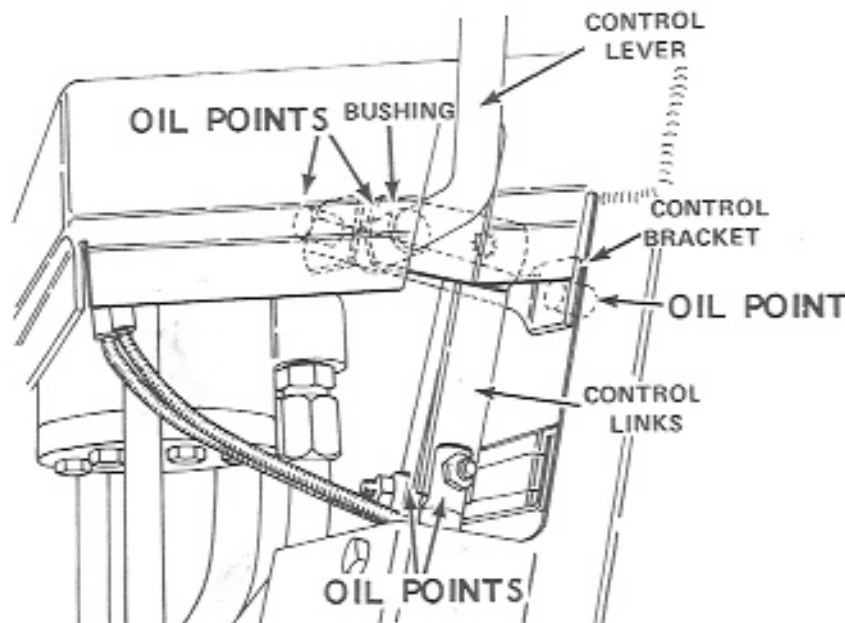


FIGURE 40

## 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.

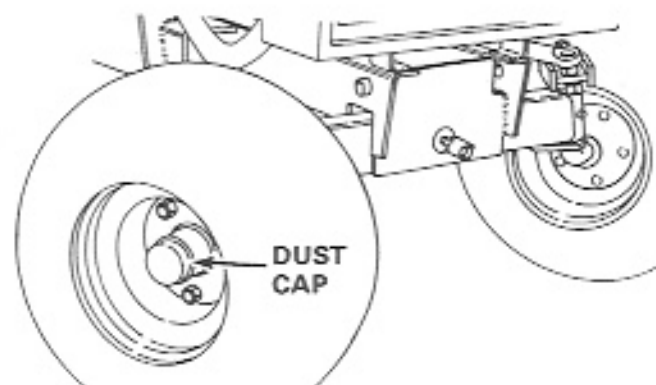


FIGURE 41

3. Check the bearing races for scoring or damage. Replace if the damage is severe.
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.
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.

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.

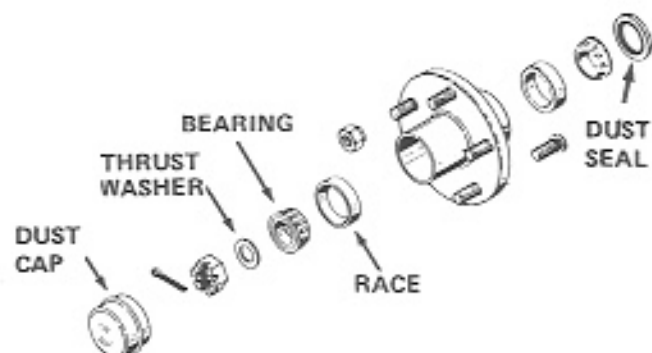


FIGURE 42

## SEAT

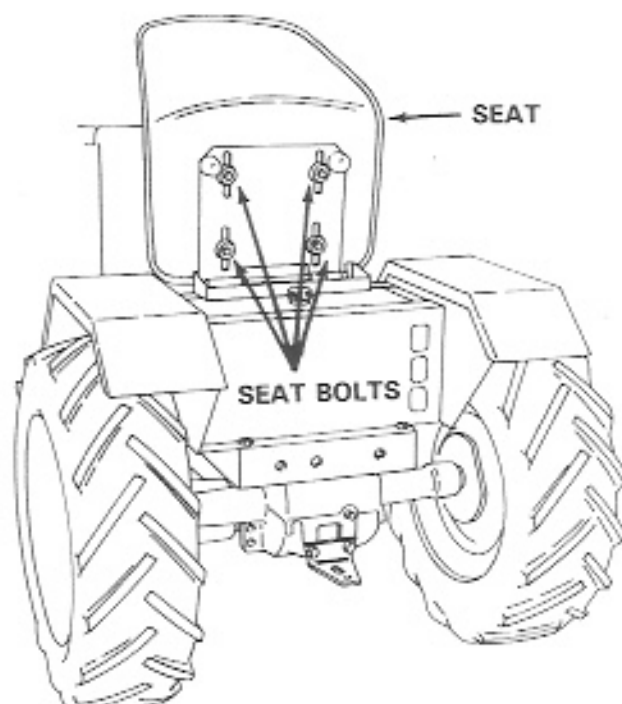


FIGURE 43 - Loader Seat

### LOADER SEAT

To adjust loader seat:

1. Loosen the four bolts that hold the seat to the seat mounting plate.
2. Move the seat either forward or rearward to get desired position.
3. Re-tighten mounting bolts

### BACKHOE SEAT

To Raise Backhoe Seat:

1. Turn seat latch to the left (clockwise).
2. Raise and rotate the seat to face the backhoe controls.
3. Lift and make sure that the seat latch locks the seat in the raised position.



**CAUTION:** Make sure the seat is securely latched in the raised position. Injury can result if the seat is not securely latched and gives way.

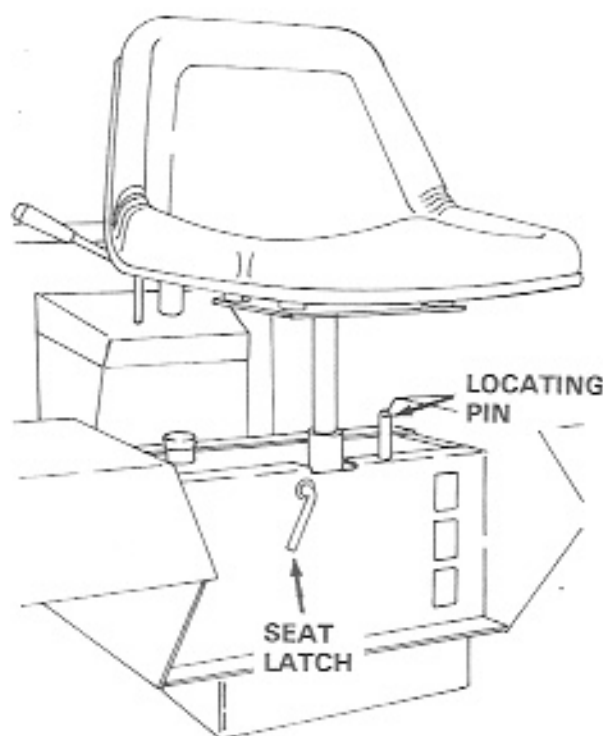


FIGURE 44 - Backhoe Seat

To Lower the Backhoe Seat:

1. Turn seat latch to the left (clockwise).
2. Rotate the seat to face the loader controls
3. Push down and insure that the seat engages the locating pin and the seat latch.

### 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.



## 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 to full speed and power.

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

1. Find the position of the lock nut on the bottom end of the directional lever shaft.
2. Turn the nut clockwise to get more tension on the friction washer.
3. 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 direction control lever cannot be adjusted correctly check the friction washer for wear and replace if necessary. To replace:

1. Disconnect the direction lever and valve link from the control plate.
2. Remove the lock nut from the direction control lever.
3. Pull the lever up and remove the washers from the lever shaft.
4. Replace the worn friction washer and also replace the nylon bushing at the same time.
5. Install the remaining washers according to the diagram.
6. Connect the control plate to valve link and direction control lever.
7. Adjust the lever tension according to steps above.

### 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. 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 actuate 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.

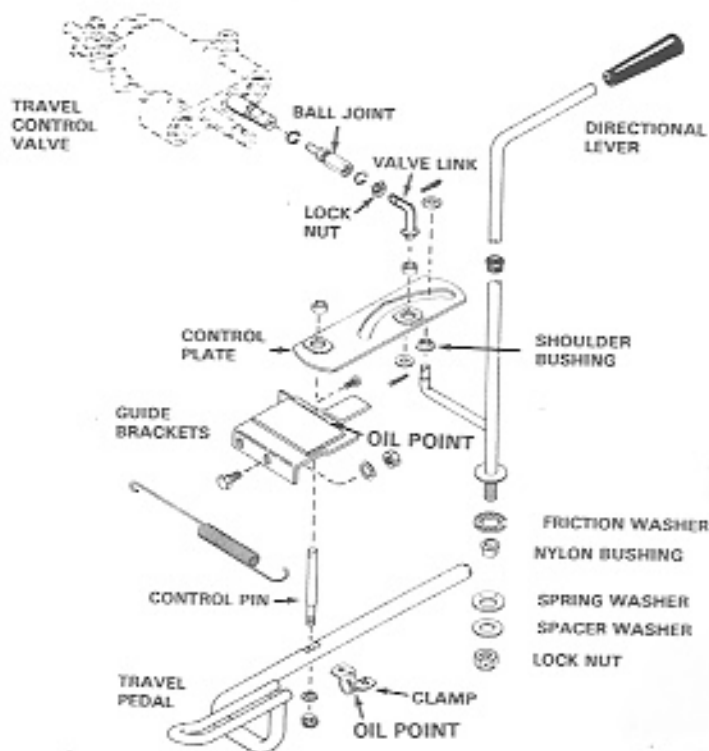


FIGURE 45

## 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 a 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.



**CAUTION:** Never grease, oil or perform any maintenance with the engine running unless so instructed in the operator's manual or service manual. If the attachment must be raised in order to perform the operation, block up the attachment securely.



**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.

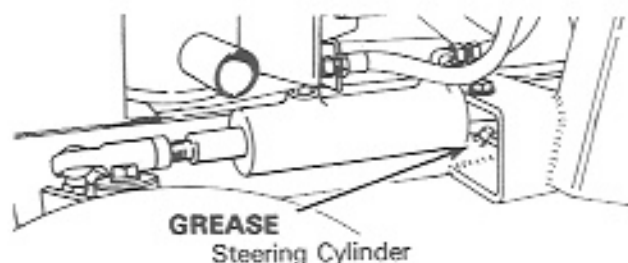
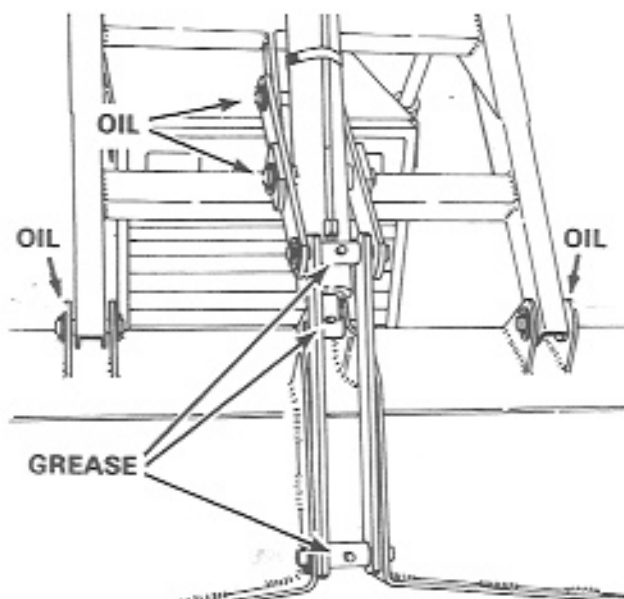


FIGURE 47



Bucket Pivot Points

FIGURE 48

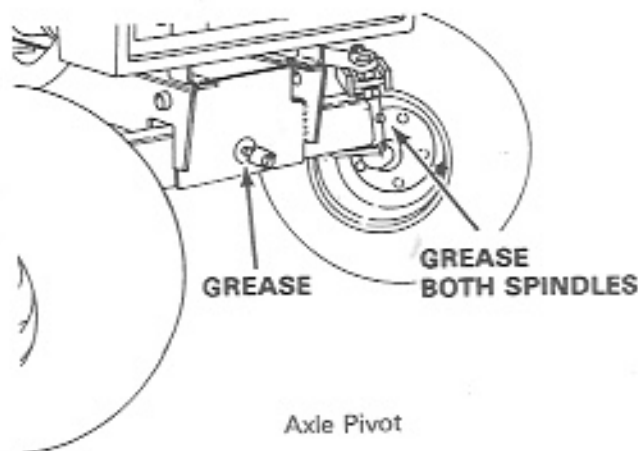
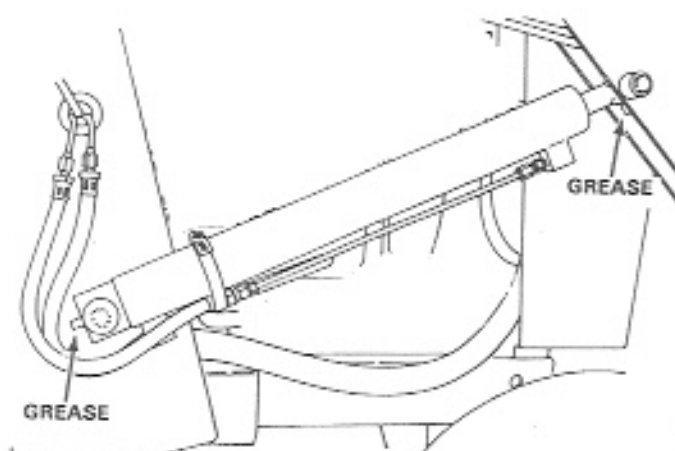


FIGURE 46



Loader Arm Pivots

FIGURE 49

## TRANSAXLE

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

The oil drain plug is located on the right hand side of the transaxle housing.

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

### AIR TEMPERATURE

All Temperatures

### OIL TYPE & VISCOSITY

API Service  
Class SE, CC, or CD,  
SAE 20W40 or  
SAE 80 EP Gear Lube

Capacity is 3 quarts (2.8l).

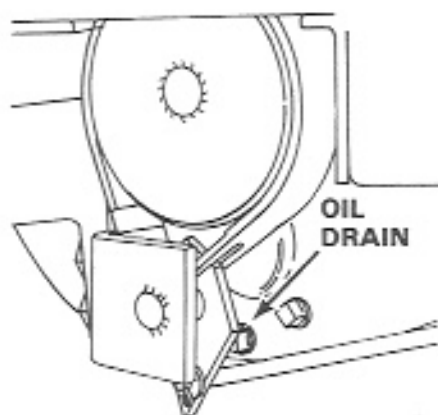


FIGURE 50



FIGURE 51

## TOE-IN ADJUSTMENT

1. Put the tractor on a hard and level surface such as 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 cannot 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.

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.

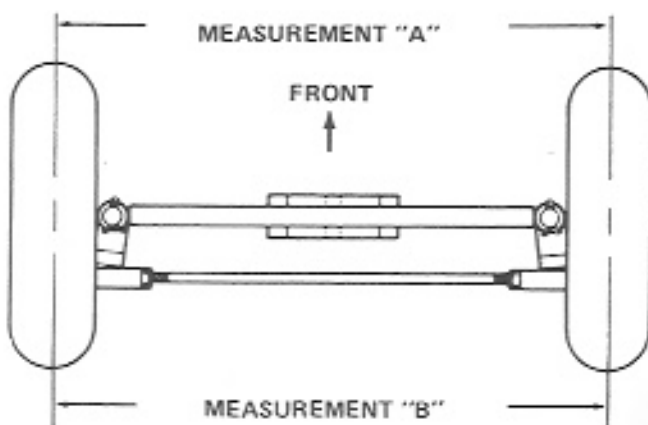


FIGURE 52

## HYDRAULIC HOSES AND FITTINGS

Examine hoses daily and replace if worn or damaged. Use a fitting to connect new hose to old hose and pull new hose into place.

Hose routing is very important. Make certain hoses can move freely, without kinking and cannot be damaged by pinching or cut by loader or backhoe action.

When tightening hoses and fittings, always use two wrenches, one to hold and one to tighten fitting. This will prevent hose from becoming twisted or kinked.

Always loosen locknut and screw fitting all the way in for fittings that must be positioned and use O-rings for sealing. Then hold fitting in position and tighten lock nut.

**IMPORTANT:** Fittings with O-rings and flange do not require additional sealant.

**IMPORTANT:** Teflon tape should be used to seal pipe threads. Use care when applying teflon tape to prevent it from entering the hydraulic system.



**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 reassembling, 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.

## STORAGE

If your loader or loader backhoe is to be stored for 30 days or more, it should be moved to a dry, protected place and, if possible, put inside a heated building. Certain precautions must be taken to prevent rust, corrosion and deterioration of parts.

Place wood planking on the ground and lower the loader and backhoe onto the planking. After the engine has stopped, move the control levers in both directions to relieve pressure in hydraulic system. Coat cylinder rods and all unpainted metal surfaces with grease to prevent corrosion.

### BATTERY

The battery should be recharged monthly as described under BATTERY MAINTENANCE. Under no conditions should the battery be allowed to stand with a specific gravity of 1.225 or less.

Recharge completely when battery is returned to service.

### ENGINE

1. To prevent gum deposits from forming in the fuel system, completely drain fuel tank and run engine until gasoline in carburetor is completely consumed.
2. While engine is still warm, drain oil from crank case and refill with fresh oil. See engine oil section for proper type and weight.
3. Remove spark plug, pour 2 or 3 tablespoons (30 ml) of SAE 30 oil into cylinder and crank momentarily to distribute oil. Replace spark plug.
4. Clean dirt and chaff from cylinder head fins and blower housing.

## TROUBLESHOOTING CHART

PROBLEM	CAUSES	REMEDIES
1. Noisy pump caused by cavitation.	a. Oil too heavy. b. Suction line plugged or too small.	a. Change to proper viscosity. b. Clean line and check for size.
2. Oil heating.	a. Oil supply low. b. Contaminated oil.  c. Setting of relief valve too high or too low. d. Oil in system too light.	a. Fill reservoir. b. Drain reservoir, change filter and refill with clean oil. c. Set to correct pressure. d. Drain reservoir and refill with proper viscosity oil.
3. Foaming oil.	a. Low oil level. b. Air leaking into suction line. c. Wrong kind of oil. d. Moisture in oil.	a. Fill reservoir. b. Tighten fittings. c. Drain and fill reservoir with specified oil. d. Replace oil or purge system.
4. Boom drops as dipperstick or bucket cylinder lever is activated while boom control is in raised position.	a. Pump speed too slow. b. Oil too light.  c. System hot. d. Attempting to run with all controls fully actuated.	a. Increase engine RPM. b. Drain reservoir and refill with proper viscosity oil. c. See problem 2 above. d. Proper operation requires feathering of various functions to obtain desired results.

Dealers