

INGERSOLL

644 AND 646
WHEEL LOADER
Operator's Manual No. 9-7091





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

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

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

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WARNING

BEFORE STARTING ENGINE

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

**LEARN & PRACTICE SAFE USE OF
CONTROLS BEFORE OPERATING**

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

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SAFETY MESSAGES

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

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

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



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



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



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



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



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



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



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



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



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



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



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



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



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



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

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



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



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



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

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



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



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



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



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



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



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

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



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



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



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



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



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



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



CAUTION: Do not smoke when working near fuel.



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



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



CAUTION: Keep all shields in place.

Before starting engine: Disengage attachment drive and place travel control lever into neutral.

To park tractor: Place travel control lever into neutral, set parking brake, disengage attachment drive, shut off engine and remove ignition key.

When operating on incline, place transmission in low range.

Stop engine and wait for all movement to stop before dismounting tractor, before servicing or making adjustments to tractor and/or attachments.

Keep people and pets a safe distance away from the machine.



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



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



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



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



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

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

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



CAUTION: When adjusting steering wheel free play make certain that some free play remains between the sector gear and pinion gear, since a tight fit, with no clearance between the two gears may cause binding and tooth failure.



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



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



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



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



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



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



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



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



WARNING: Do not roll loaded bucket to the maximum roll back position when lifting to the full raised position.
Do not transport loader with bucket in fully raised position.
Place tractor in low range when operating on inclines.
Stop engine before making adjustments to tractor and/or attachments.



CAUTION: Always keep bucket as near ground level as possible when transporting loader.



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

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



CAUTION: 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.

For 644 prior to PIN 9771567

646 prior to PIN 9771784



CAUTION - Do not travel down steep grades. If it is necessary to travel down grades or inclines, the hydraulic drive system is equipped with a retard position to help provide a controlled rate of descent. To utilize this feature, place the two speed transaxle in low range, run the engine at full throttle, and depress the travel pedal slightly until the dynamic braking effect of the retard position is felt. Depressing the pedal too far may cause the tractor to override the oil flow and run free. Never back down grades or inclines.

In addition to the brake pedal, the hydraulic drive system may be used to help stop tractor forward motion. This method of braking assist is accomplished as follows: a) momentarily release the travel pedal and place the directional control lever in reverse. b) Depress the travel pedal sufficiently to apply reverse power to the rear wheels.

The operator should become thoroughly familiar with the machine before operating on hills or inclines.

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

HILLSIDE (SLOPE) OPERATION



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

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

These include:

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

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

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

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

Read, Understand, Obey:

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

Learn to Operate:

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

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

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

Know the Terrain:

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

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

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

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

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

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

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

Learn to Compensate for Changes in Operating Conditions:

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

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

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

Tractive conditions will vary with weather and terrain and equipment.

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

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

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

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

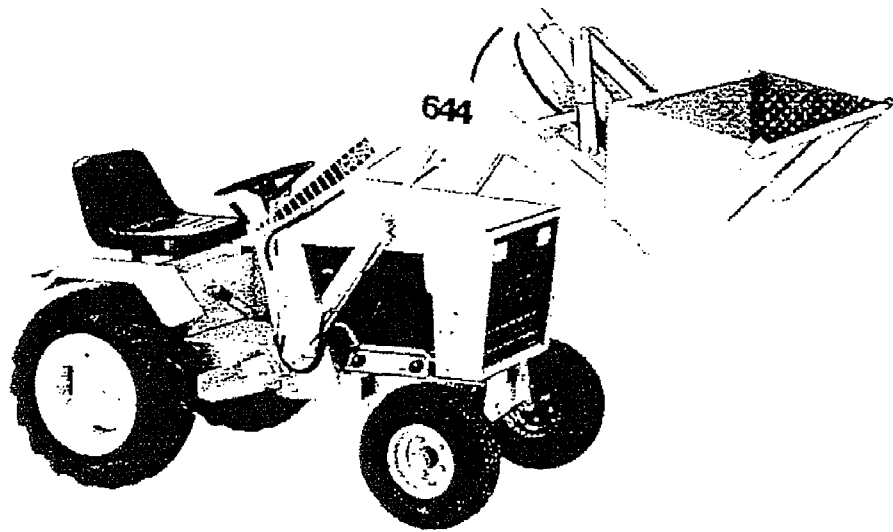


FIGURE 1.

Right Hand View of Model 644 Compact Wheel Loader With Standard 44" Material Bucket and Counterweight Box.

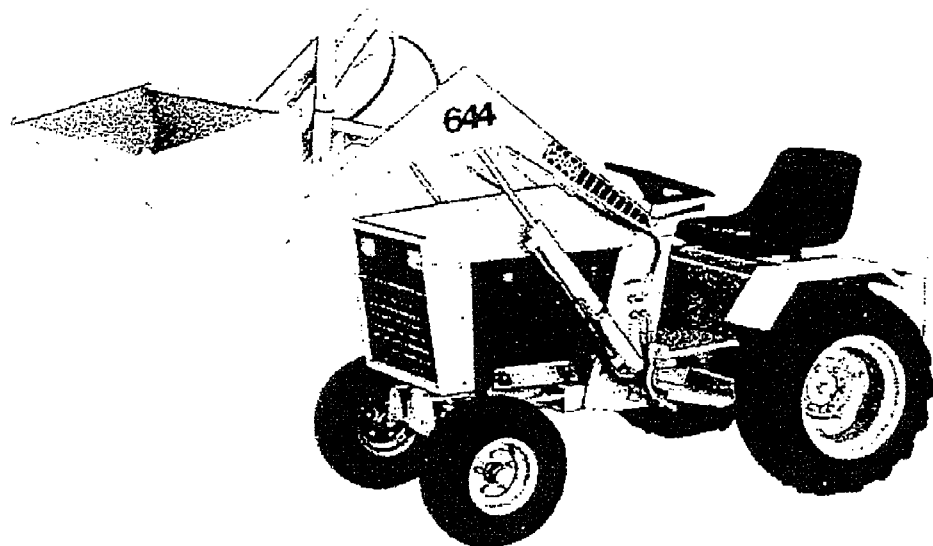


FIGURE 2.

Left Hand View of Model 644 Compact Wheel Loader With Standard 44" Material Bucket and Counterweight Box.

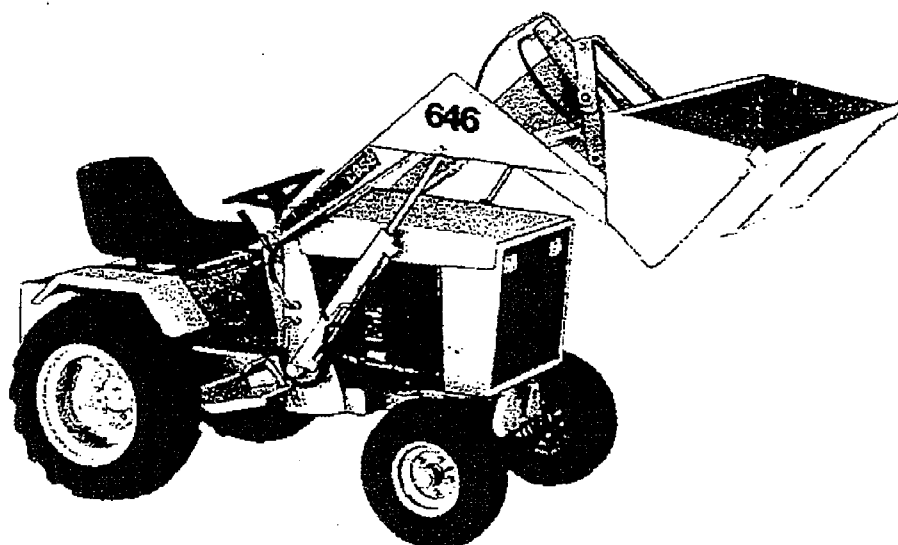


FIGURE 3.

Right Hand View of Model 646 Compact Wheel Loader With Standard 44" Material Bucket and Counterweight Box.

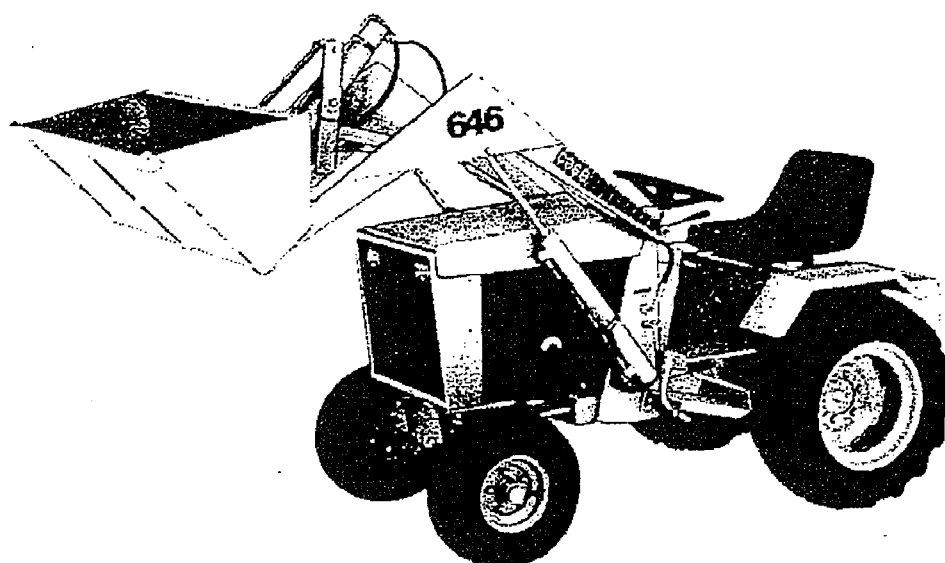


FIGURE 4.

Left Hand View of Model 646 Compact Wheel Loader With Standard 44" Material Bucket and Counterweight Box.

TO THE OWNER OF A CASE TRACTOR

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

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

If you need additional aid or information, contact us.

Your Authorized Case Dealer

NOTICE

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

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

RADIO INTERFERENCE REGULATIONS OF CANADA

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

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

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

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SERIAL NUMBER

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

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

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

TRACTOR MODEL AND
SERIAL NUMBER



Figure 5.

646 ENGINE MODEL
SERIAL & SPECIFICATION
NUMBERS

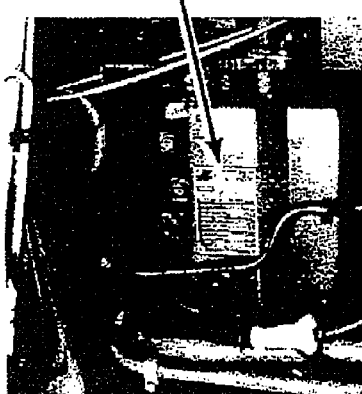


Figure 6.

644 ENGINE MODEL,
SERIAL & SPECIFICATION
NUMBERS

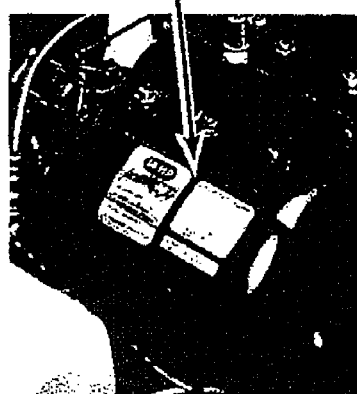


Figure 7.

For reference, write the numbers on the lines below.

Tractor Model Number _____

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

Engine Model Number _____

Engine Serial Number _____

Engine Specification Number _____

GENERAL SPECIFICATIONS

HYDRAULIC SYSTEM

Independent 12 quart (11.4 l) system including a reservoir, pump, control valve, hydraulic motor and heat exchanger. The pump moves approximately 9 gallons (34 l) of oil per minute at 3600 RPM. Maximum operating pressure (main relief valve setting): 2300 PSI (16,000 kPa). Implement lift relief valve setting: 1200 PSI (8300 kPa).

BRAKE

Type..... Mechanical compression band. The drum shaft is driven from the transmission differential. Includes a parking brake lock.

TRANSAXLE

Type..... Hydraulic drive, dual gear range

Differential..... Standard type of bevel gear

Oil Capacity..... 3 quarts (2.8 l)

ELECTRICAL SYSTEM

	644	646
Type of System	12V. Negative Ground	12V. Negative Ground
Battery	12V 32 Amperehours	12V 32 Amperehours
Headlights	Std - 12-Volt	Std - 12-Volt
Starter	12V Starter-generator (prior to S/N 9757919) 12V Bendix Drive (S/N 9757919 and after)	12V Bendix drive
Charging System	12V, 12A Starter- generator (prior to S/N 9757919) 12V 15 Amp Flywheel Alternator (S/N 9757919 and after)	12V, 20A Flywheel Alternator

WHEELS & TIRES

Tire Size	PLY	TYPE	Recommended Pressure		Max. Pressure	
			PSI	(kilopascal)	PSI	(kilopascal)
5.70-8	4	Front	45	(310)	50	(350)
		Transport				
27 x 8.50-15	2	Rear	12	(80)	14	(100)
		Traction				

SPEED RANGE

	<u>FORWARD</u>	<u>REVERSE</u>
Low	0 to 2.5 MPH (4.0 km/h)	0 to 2.5 MPH (4.0km/h)
High	0 to 6.5 MPH (10.5km/h)	0 to 6.5 MPH (10.5km/h)

ENGINE SPECIFICATIONS

GENERAL

	644	646
Type	Kohler	Onan
Model	K321A (prior to S/N 9757919) K321AS (S/N 9757919 and after)	CCKA
Cycle	4	4
Cylinders	1	2
Cylinder Bore	3-1/2" (88.9mm)	3-1/4" (82.6mm)
Stroke	3-1/4" (82.6mm)	3" (76.2mm)
Piston Displacement	31.27 cu. in (512.4cm ³)	49.8 cu. in. (816.1cm ³)
Horsepower	14 H.P. (10.4kw)	16.5 H.P. (12.3kw)
Compression Ratio	6.0 to 1	7.0 to 1
Full Load Speed	3500 RPM	3500 RPM
No Load Speed	3600 RPM	3600 RPM
Idle Speed	1000 RPM	1200 RPM
Valve Clearance Cold (Intake)010 in. (0.25mm)	.007 in. (0.18mm)
Valve Clearance Cold (Exhaust)020 in. (0.51mm)	.016 in. (0.41mm)

PISTON AND CONNECTING ROD

Piston	Aluminum	Aluminum
Compression Rings	2	2 - Per Piston
Oil Rings	1	1 - Per Piston
Connecting Rod	Aluminum	Forged Steel, Ht

FUEL SYSTEM

Fuel Pump	Mechanical Diaphragm	Vacuum Diaphragm
Carburetor	Adjustable Main Jet	Fixed Main Jet
Fuel Filter	In Tank Outlet Fitting	In Tank Outlet Fitting
Fuel Tank Capacity	5 gal. (18.9 l)	5 gal. (18.9 l)

IGNITION SYSTEM

Breaker Point Gap020" (0.51mm)	.020" (0.51mm)
Ignition Timing	SP Mark (20° BTC)	20° BTC
Spark Plug	Prestolite 14L7 (14RL7 or equivalent in Canada)	Champion H8 (RH8 or equivalent in Canada)
Thread Size	14mm	14mm
Spark Plug Gap025" (0.64mm)	.025" (0.64mm)

COOLING SYSTEM

Blower	Air cooled with baffles that send the air around fins on the cylinder and head area
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MEASUREMENTS

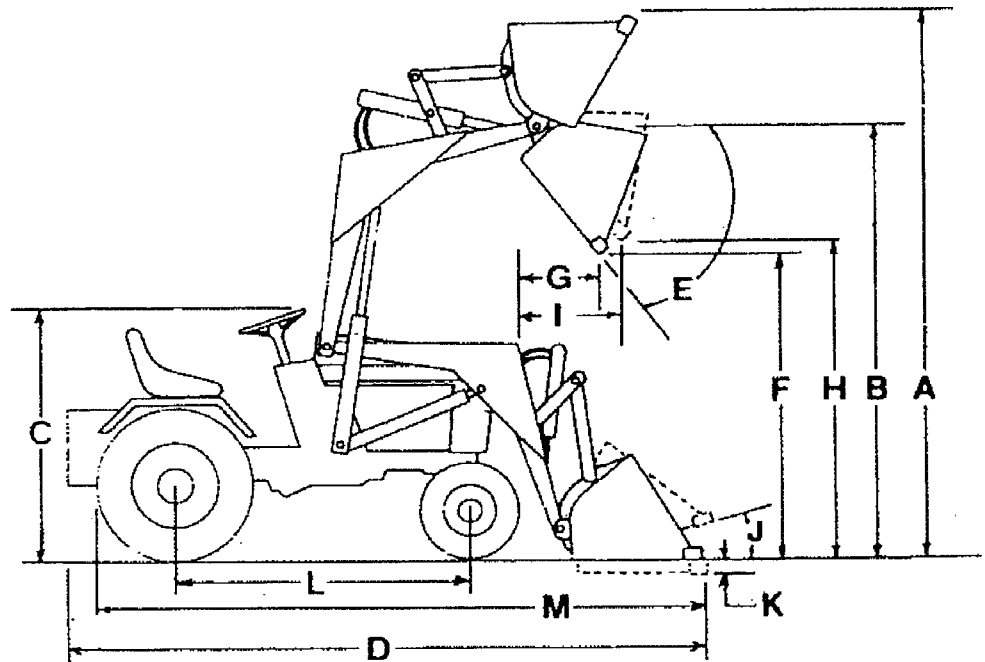


FIGURE 8.

OPERATION INFORMATION

- A 92" (2340 mm) - operating height fully raised
- *B 71.75" (18020 mm) - height to bucket hinge pin
- C 43.25" (1100 mm) - height with bucket on ground
- D 108.00" (2740mm) - length including wt. box and bucket
- *E 54° - maximum dump angle
- F 52.88" (1340 mm) - dump clearance at max. height 54 degree dump angle
- G 13.75" (350 mm) - reach at max. height and 54 degree dump angle
- *H 54.50" (1380 mm) - clearance at 45 degree dump angle
- *I 16.88" (430 mm) - reach at 45 degree dump angle
- *J 18° - bucket roll back
- *K 2" (50 mm) - digging depth with bucket flat
- *L 48" (1220 mm) - wheel base
- *M 99" (2510 mm) - length, bucket to rear tire
- 8-1/4" (210 mm) - chassis ground clearance

Width

Rear Wheels 41" (1040 mm)

Standard Bucket - 44" (1120 mm)

Weight (less weight box)

644 - 1130 lbs. (513 kg)

646 - 1190 lbs. (540 kg)

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

LUBRICATION

ENGINE LUBRICATION

SELECTION OF OIL

It is very important to use a detergent type, high quality oil. Select SE or CC, API service classification oil.

SAE OIL VISCOSITY RATING (Model 644)

SAE 30 Air Temperature 32°F (0°C) or more

SAE 5W-20 or 5W-30 Air Temperature 32°F (0°C) or less

SAE OIL VISCOSITY RATING (Model 646)

SAE 30 Air Temperature 32°F (0°C) or more

SAE 5W-30 Air Temperature 32°F (0°C) or less

OIL CHANGE

MODEL	CHANGE OIL	OIL CAPACITY	CHANGE OIL FILTER
644	25 hours	3 pt. (1.4 l)	N/A
646	50 hours (25 hours first oil change)	3-1/2 qt. (3.3 l) (4 qt. (3.8 l) with filter)	100 hours

Run the engine just before you change the oil. Hot oil will flow more freely and hold more foreign material.

If operating conditions are severe (stopping and starting frequently, very hot or cold air temperature) change the oil more often.

IMPORTANT: After an oil change, run the engine for a few minutes. Stop the engine. Wait a few minutes for the oil to flow off the engine parts. Check the oil level with the dipstick.

Do not fill the crankcase with too much or too little oil. This can decrease the engine life and give wrong oil consumption records.



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

LUBRICATION CHART

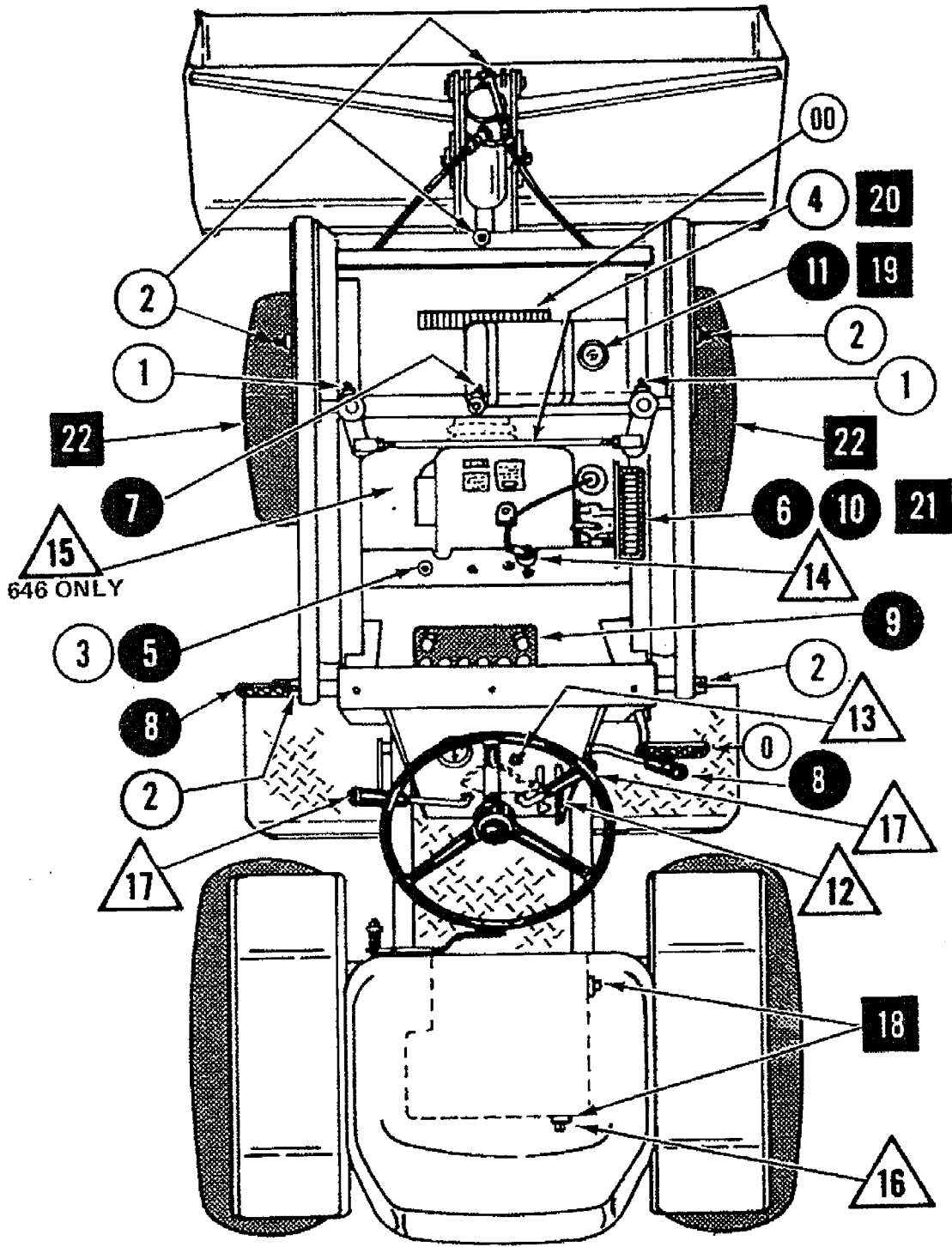






FIGURE 9

REF. NO.	SERVICE POINTS	NO. OF POINTS	GREASE	DRAIN	CHECK	CLEAN	CHANGE	OIL (Few Drops)	FREQUENCY
00	Heat Exchanger	1							 8 HOURS OR DAILY
0	Travel Pedal	2							
1	Front Spindles (king pins)	2							
2	Loader Lubrication Fittings	9							
3	Engine Oil *	1							
4	Blower Air Intake Screen - 644 Only	1							 25 HOURS OR WEEKLY
5	Engine Oil * (50 hrs. on 646)	2							
6	Air Leaks **	**							
7	Front Axle Pivot Pin	1							
8	Implement Lever and Brake Linkage	6							
9	Battery	1							 100 HOURS OR MONTHLY
10	Air Cleaner ***	1							
1	Hydraulic Oil +	2							
12	Throttle and Choke Control	2							
13	Steering Gear Pivot Pin	1							
14	Spark Plug °	1							 200 HOURS OR YEARLY
15	Oil Filter (646 only)	1							
16	Transmission Oil ++	1							
17	Travel and Lift Lever and Linkage	3							
18	Transmission Oil ++	2							
19	Hydraulic Oil +	1							
20	Engine Cooling Fins ***	1							
21	Air Cleaner Element ***	1							
22	Front Wheel Bearings	2							

*Keep the oil level between the marks on the dipstick. See the Engine Lubrication section for specifications.

**Make sure there are no leaks between gaskets, joints at carburetor, air cleaner and cylinder block.

***More during severe conditions.

°Clean and set the gap.

+Hydraulic System: Use SAE 5W-20 motor oil with air temperatures less than 32°F (0°C). Use SAE 20W-40 motor oil with air temperatures more than 32°F (0°C). Use only API engine service classification SE or CC oil.

The location of the reservoir for the hydraulic system is under the hood, in front of the engine. Keep the oil level between 2" and 3" (50 mm and 75 mm) from the top of the filler opening. The location of the drain plug is on the bottom of the travel valve.

+Transmission: Use SAE 20W-40 motor oil or SAE No. 80 EP gear lubricant.

Use number 1 gun grease, lithium base, for all pressure fittings. Use as many strokes as required.

FUEL SPECIFICATIONS

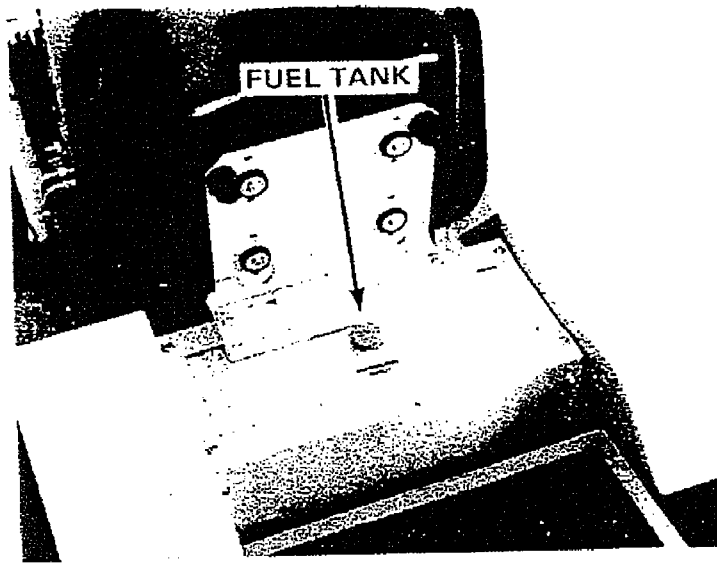


FIGURE 10

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: 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.

GASOLINE

Clean gasoline is important for correct carburetion in small engines. Always use clean gasoline and a funnel with a filter.

If a restriction of fuel occurs, clean the filter in the outlet of the fuel tank.

Do not use a mixture of oil and gasoline in this engine.

Engines used in Case tractors can operate on Regular or Unleaded gasoline with the minimum octane ratings as follows:

Research Method	90.7	Octane Number
Motor Method	82	Octane Number
Average	86	Octane Number

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.

OPERATING INSTRUCTIONS



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

OPERATING CONTROLS AND INSTRUMENTS

1. IGNITION KEY AND STARTER SWITCH

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

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

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

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.

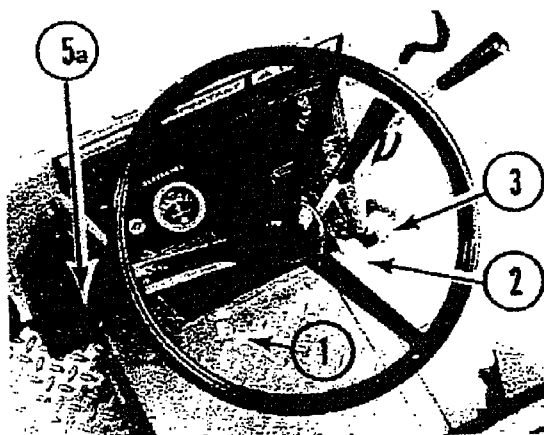


FIGURE 11.

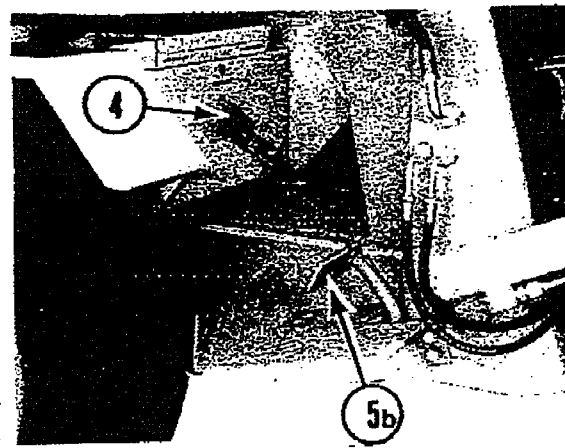


FIGURE 12.



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



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

4. DUAL RANGE TRANSAXLE

TO SELECT LOW RANGE: Release the travel pedal.

Stop the tractor.

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

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

TO SELECT NEUTRAL: Release the travel pedal.

Stop the tractor.

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

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

TO SELECT HIGH RANGE: Release the travel pedal.

Stop the tractor.

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

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

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

To rotate the gears:

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

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

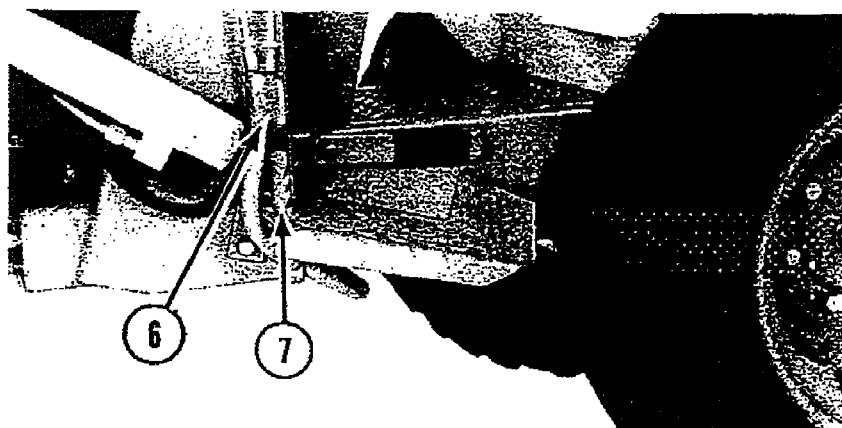


FIGURE 13.

5. DIRECTION CONTROL LEVER AND TRAVEL PEDAL

TO STOP TRAVEL: Release the travel pedal.

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

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

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

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

For 644 prior to PIN 9771567
646 prior to PIN 9771784



CAUTION - Do not travel down steep grades. If it is necessary to travel down grades or inclines, the hydraulic drive system is equipped with a retard position to help provide a controlled rate of descent. To utilize this feature, place the two speed transaxle in low range, run the engine at full throttle, and depress the travel pedal slightly until the dynamic braking effect of the retard position is felt. Depressing the pedal too far may cause the tractor to override the oil flow and run free. Never back down grades or inclines.

In addition to the brake pedal, the hydraulic drive system may be used to help stop tractor forward motion. This method of braking assist is accomplished as follows: a) momentarily release the travel pedal and place the directional control lever in reverse. b) Depress the travel pedal sufficiently to apply reverse power to the rear wheels.

The operator should become thoroughly familiar with the machine before operating on hills or inclines.

Do not operate at full speed in reverse travel.

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

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

6. BRAKE PEDAL

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

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

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

7. PARKING BRAKE LOCK

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

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

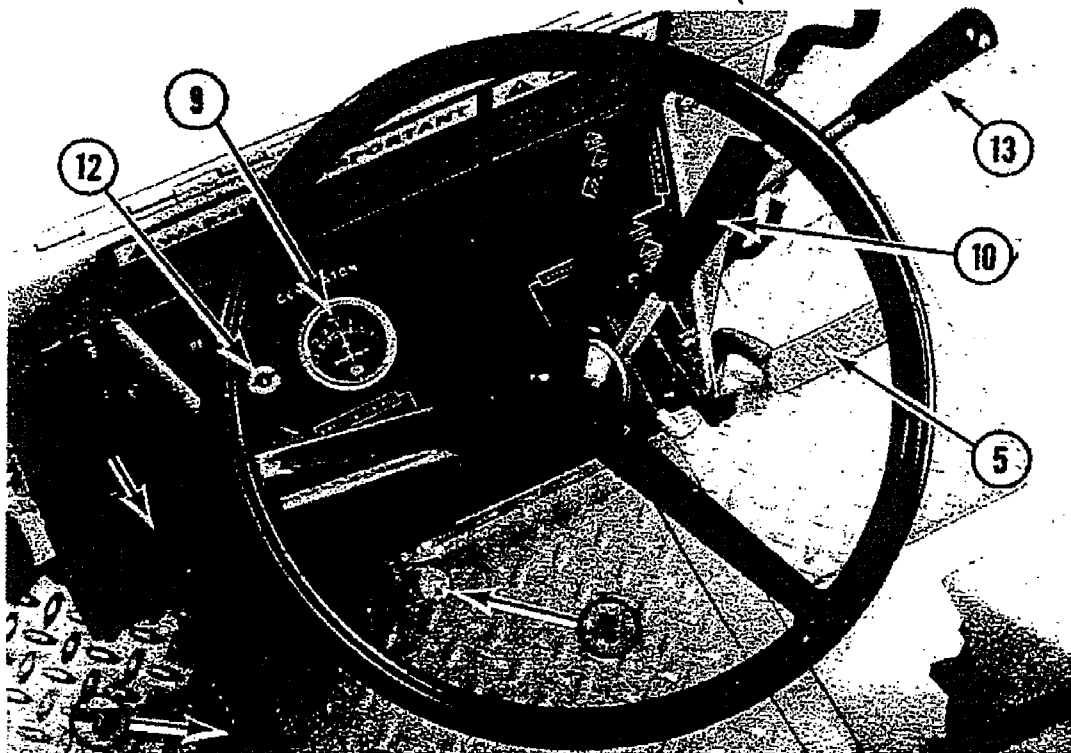


FIGURE 14.

8. HEADLIGHTS

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

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

9. AMMETER

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

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

Stop the tractor and have the cause corrected if:

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

10. HYDRAULIC ATTACHMENT LIFTER LEVER

TO LIFT: Run the engine.

Pull the lever rearward.

Release the lever when the needed height is reached.

TO LOWER: Run the engine.

Push the lever forward a small amount.

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

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

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

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

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

11. ATTACHMENT DRIVE LEVER

TO ENGAGE: Pull the lever fully up.

TO DISENGAGE: Push the lever fully down.

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

12. OIL PRESSURE LIGHT (Model 646 Only)

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

Stop the engine and correct the problem if the light:

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

13. 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.

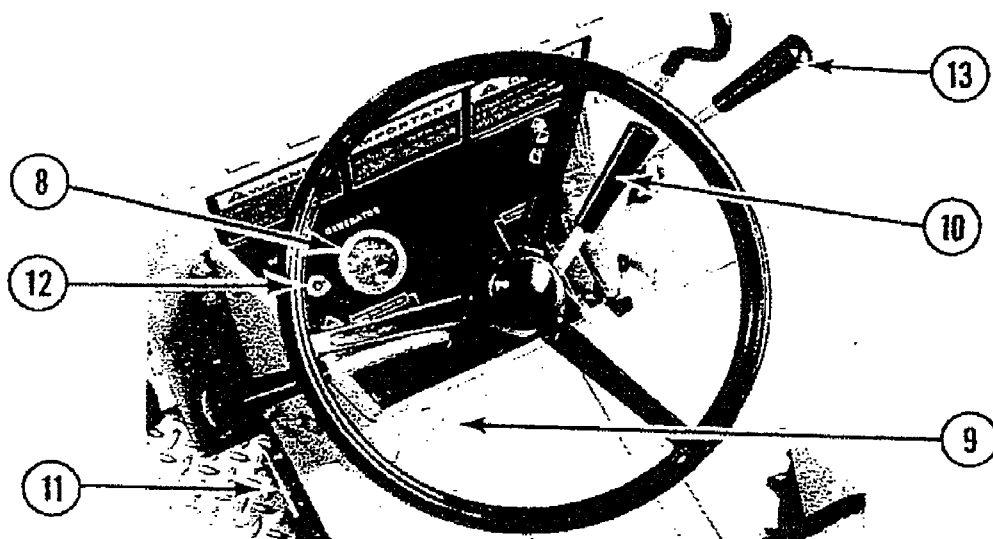


FIGURE 14A.

PRESTARTING CHECK LIST



CAUTION: Keep all shields in place.

Before starting engine: Disengage attachment drive and place travel control lever into neutral.

To park tractor: Place travel control lever into neutral, set parking brake, disengage attachment drive, shut off engine and remove ignition key.

When operating on incline, place transmission in low range.

Stop engine and wait for all movement to stop before dismounting tractor, before servicing or making adjustments to tractor and/or attachments.

Keep people and pets a safe distance away from the machine.



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



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

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

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

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

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



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

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



CAUTION: Do not smoke when working near fuel.

STARTING PROCEDURE

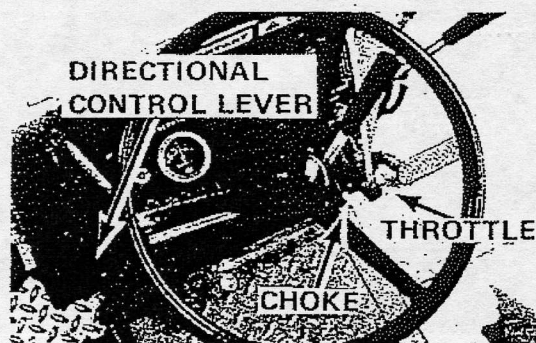


FIGURE 15.

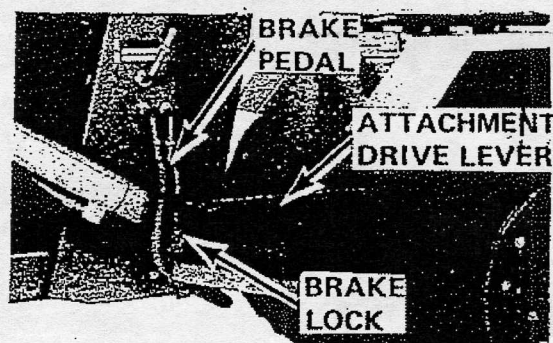
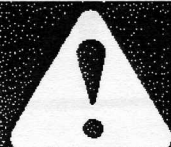


FIGURE 16.



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



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



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

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

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

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



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

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

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

6. Pull the choke lever rearward slowly after the engine starts running.

7. Permit the engine to become warm before applying a load.

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

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

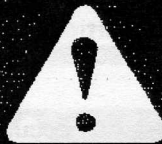
Decrease the engine speed during most operations for maximum fuel efficiency.

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

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

STOPPING PROCEDURE

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



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



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



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

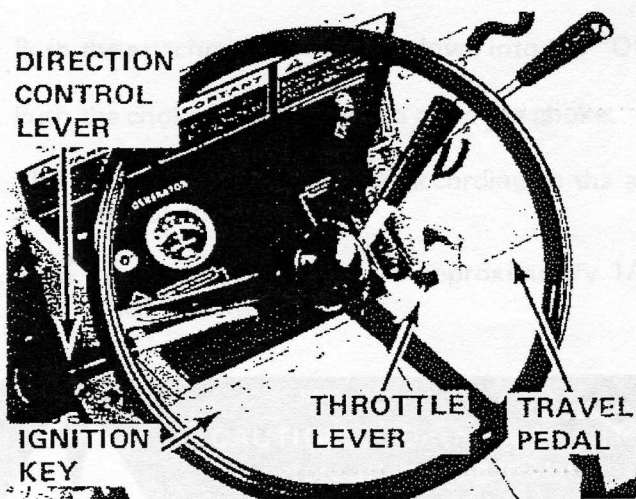


FIGURE 16A.

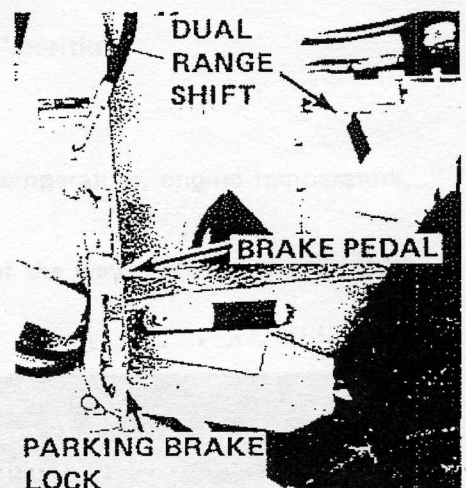


FIGURE 16B.

OPERATING PROCEDURE

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

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



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

For 644 prior to PIN 9771567
646 prior to PIN 9771784



CAUTION - Do not travel down steep grades. If it is necessary to travel down grades or inclines, the hydraulic drive system is equipped with a retard position to help provide a controlled rate of descent. To utilize this feature, place the two speed transaxle in low range, run the engine at full throttle, and depress the travel pedal slightly until the dynamic braking effect of the retard position is felt. Depressing the pedal too far may cause the tractor to override the oil flow and run free. Never back down grades or inclines.

In addition to the brake pedal, the hydraulic drive system may be used to help stop tractor forward motion. This method of braking assist is accomplished as follows: a) momentarily release the travel pedal and place the directional control lever in reverse. b) Depress the travel pedal sufficiently to apply reverse power to the rear wheels.

The operator should become thoroughly familiar with the machine before operating on hills or inclines.

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

To rotate the gears:

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

- b. Release the travel pedal.

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

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

6. FOR FORWARD TRAVEL:

- 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.
- 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.

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

11. Engage the attachment drive before you put a work load on the attachment.
12. Engage the mower drive over an area of light or short grass.
13. Engage the tiller in the raised position. Then lower the tiller to the needed depth.
14. See your attachment operator's manual for more information.



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



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

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

PREVENTIVE MAINTENANCE

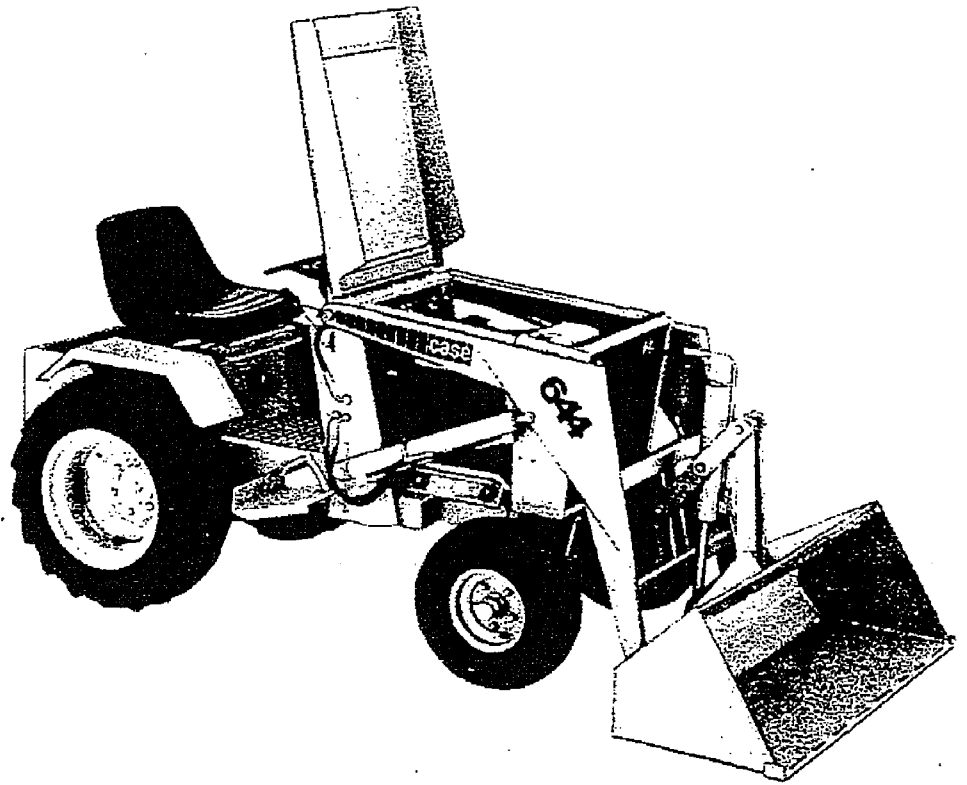


FIGURE 17

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

Preventive maintenance is important to you.

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

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

BRAKE

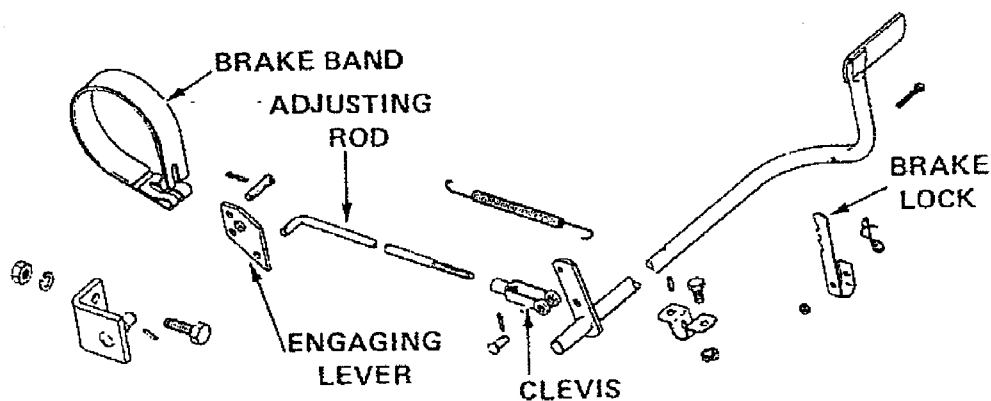


FIGURE 18.

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.

AIR CLEANER

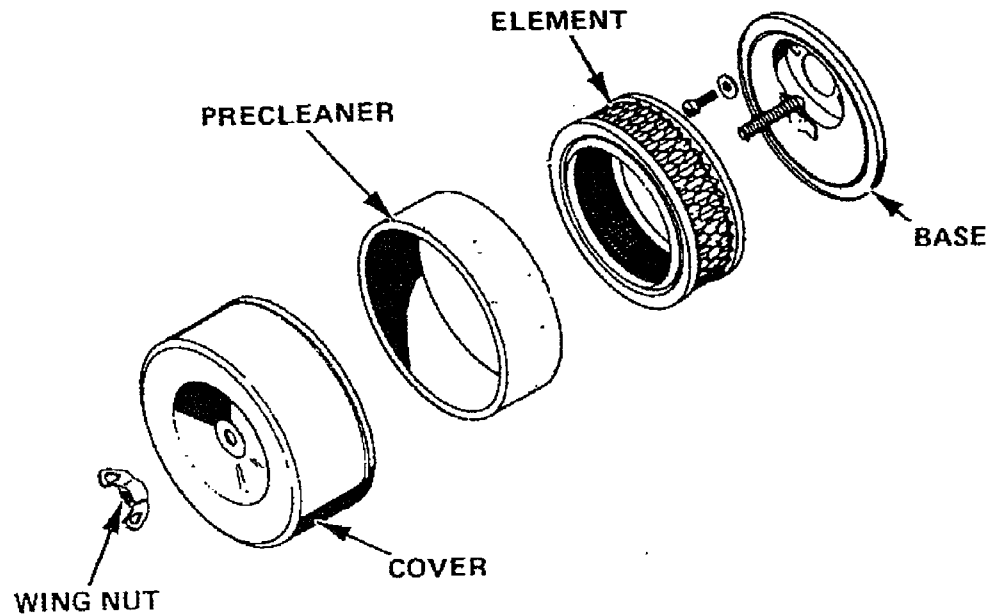


FIGURE 19.

Remove and clean the element after each 25 hours of operation or at weekly intervals.

Lightly hit the element on a flat surface until the dirt falls off. Handle the element carefully to prevent damage.

Replace the element if:

1. Damage is found.
2. The dirt can not be easily removed.

Make sure the new element fits tightly around the inside edge of the air cleaner base. Replace the cover. Install the wing nut.

An optional precleaner is available from your J I Case dealer. The precleaner can be washed. The precleaner will increase the life of the air cleaner element.

CARBURETOR

MODEL 644

HIGH SPEED ADJUSTMENT

Before you start the engine:

1. Turn the adjusting screw for high speed to the fully closed position (in).
2. Open this adjusting screw approximately 2 turns (counterclockwise).

Start the engine and put the throttle lever in the "FAST" position.

1. Turn the adjusting screw clockwise (in) until the engine runs bad.
2. Turn the adjusting screw counterclockwise (out) until the engine runs smoothly. (Approximately 2 turns.)

Apply a work load to the tractor. If the engine does not run smoothly turn the adjustment screw counterclockwise 1/8 of a turn. Repeat this procedure until the engine runs good while a work load is applied. Use this procedure to adjust the carburetor if the work load changes.

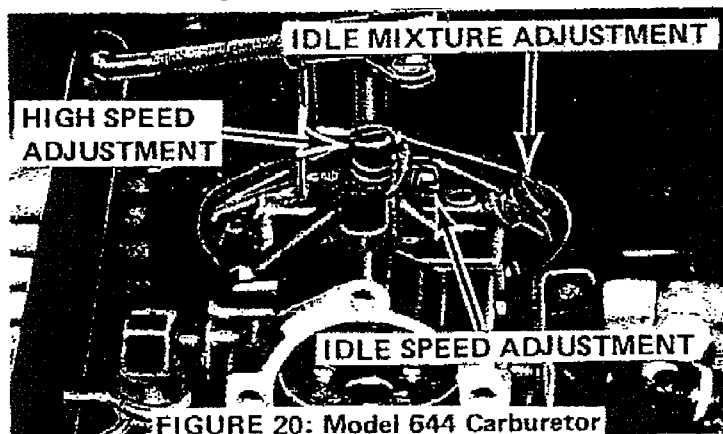


FIGURE 20: Model 644 Carburetor

LOW IDLE SPEED and MIXTURE ADJUSTMENT

Before you start the engine:

1. Turn the adjusting screw for low idle speed to the fully closed position (in).
2. Open this adjusting screw approximately 1-1/4 turns.
3. Start the engine. Put the throttle lever in the "SLOW" position.
4. Turn this adjusting screw until the engine is running at 1000 RPM.
5. Turn the adjusting screw for low idle mixture until the engine runs smoothly.
6. Adjust the idle speed if necessary to keep the engine running at 1000 RPM.

CARBURETOR MODEL 646

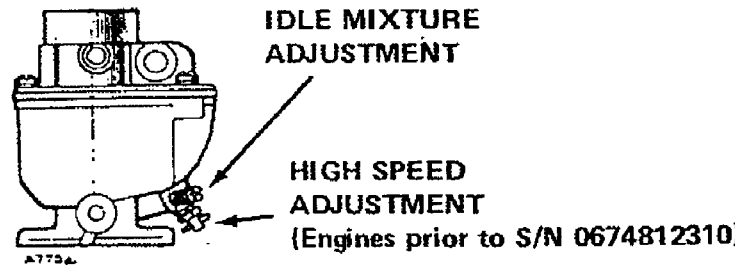


FIGURE 21: Carburetor Adjustment

IDLE ADJUSTMENT

1. Permit the engine to become warm.
2. Set the throttle at low idle with no engine load.
3. Turn the idle adjustment needle out (counterclockwise) until the engine begins missing ignition or begins to slow.
4. Turn the idle adjustment needle in (clockwise) until the engine begins missing ignition or begins to slow.

IMPORTANT: Do not use force while turning the needle against the seat.

5. Turn the idle needle back to a position half way between steps 3 and 4.

THROTTLE ADJUSTMENT

1. Start the engine.
2. Set the throttle at low idle with no engine load.
3. Adjust the stop screw to give 1/32" (1 mm) clearance between the screw and the stop

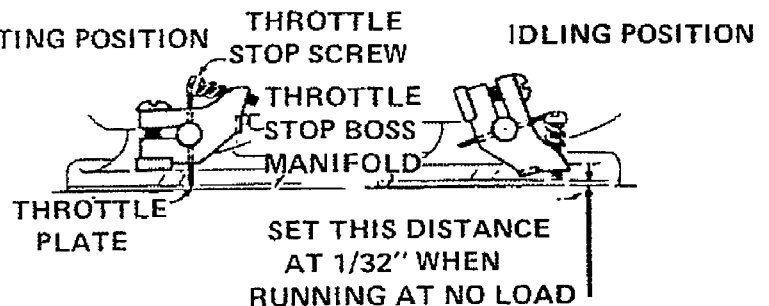


FIGURE 22: Throttle Adjustment

OIL FILTER (646)

Replace the oil filter at 100 hour intervals.

To replace:

1. Follow the procedure for oil change. Drain the oil from the crankcase.
2. Remove the old oil filter.
3. Remove the foam strip from the old filter and install on the new filter.
4. Manually install the new filter until tight.
5. Use a filter wrench to finish tightening the filter an additional quarter to half a turn.
6. Finish the oil change procedure.
7. Check for clearance between the filter and loader lift cylinder. See your Case dealer if contact between the filter and lift cylinder can occur.

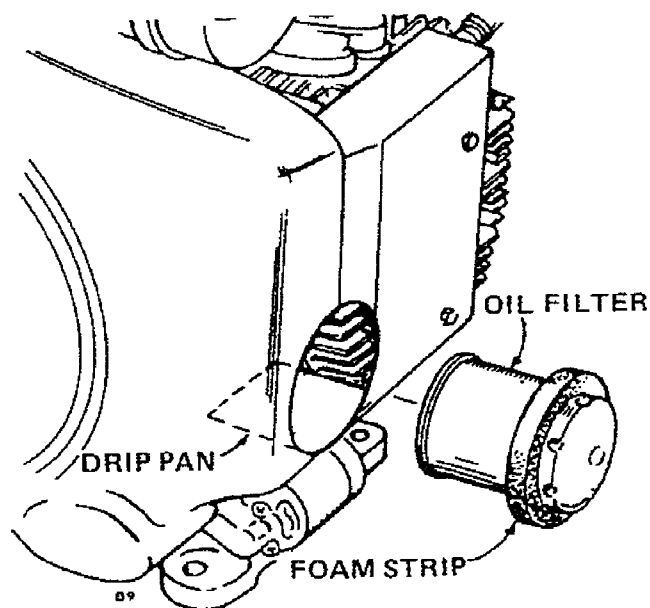


FIGURE 23: Oil Filter Location

CRANKCASE BREATHER (646)

The breather valve is used to keep vacuum in the engine crankcase. If crankcase pressure increases, oil leaks will show. Clean the baffle in the breather valve if needed.

1. Remove the breather valve from the engine.
2. Disassemble the breather valve.
3. Clean the baffle with a solvent.
4. Assemble the valve and install the valve on the engine.

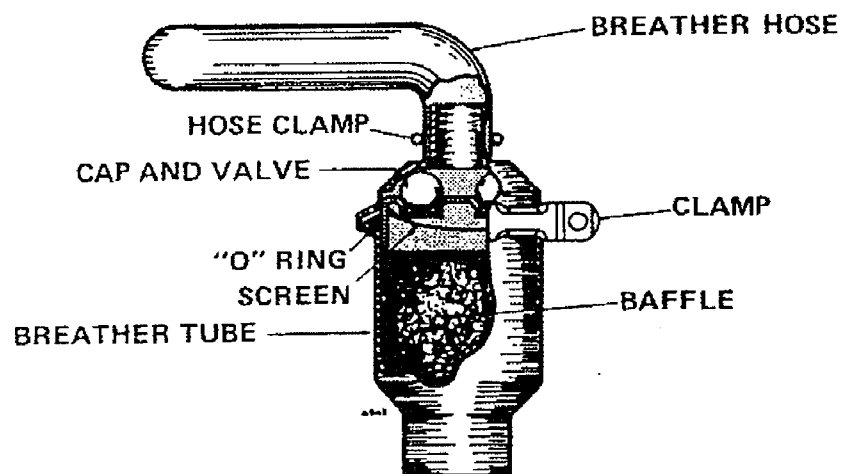


FIGURE 24: Crankcase Breather System

TOE-IN ADJUSTMENT

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

Measurement "A" must be $\frac{1}{8}$ to $\frac{3}{8}$ " (3.2 mm to 9.5 mm) less than measurement "B".

Both measurements, front and rear, must be taken at spindle height above the floor.

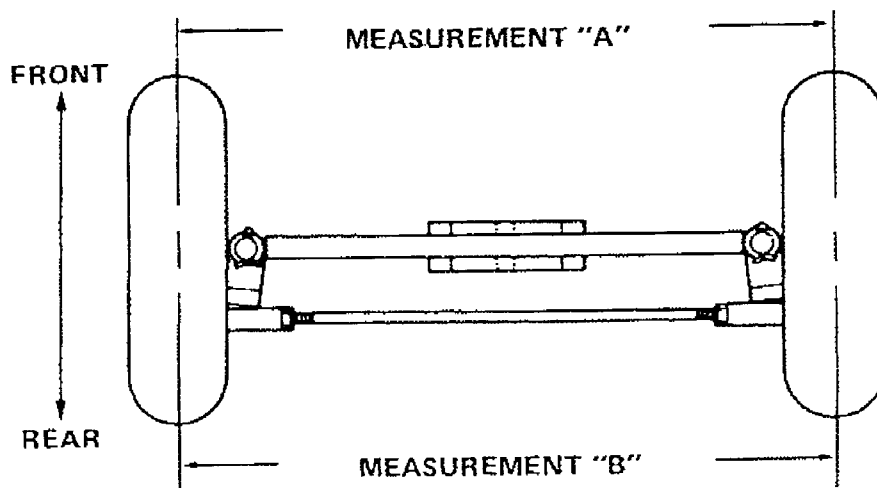


FIGURE 25

6. Loosen both lock nuts on the tie rod.

NOTES: Do not remove the ball joints from the king pins. Turn the tie rod to change the toe-in.

7. Turn the ball joints off of the tie rod to increase the toe-in.
8. Turn the ball joints onto the tie rod to decrease the toe-in.

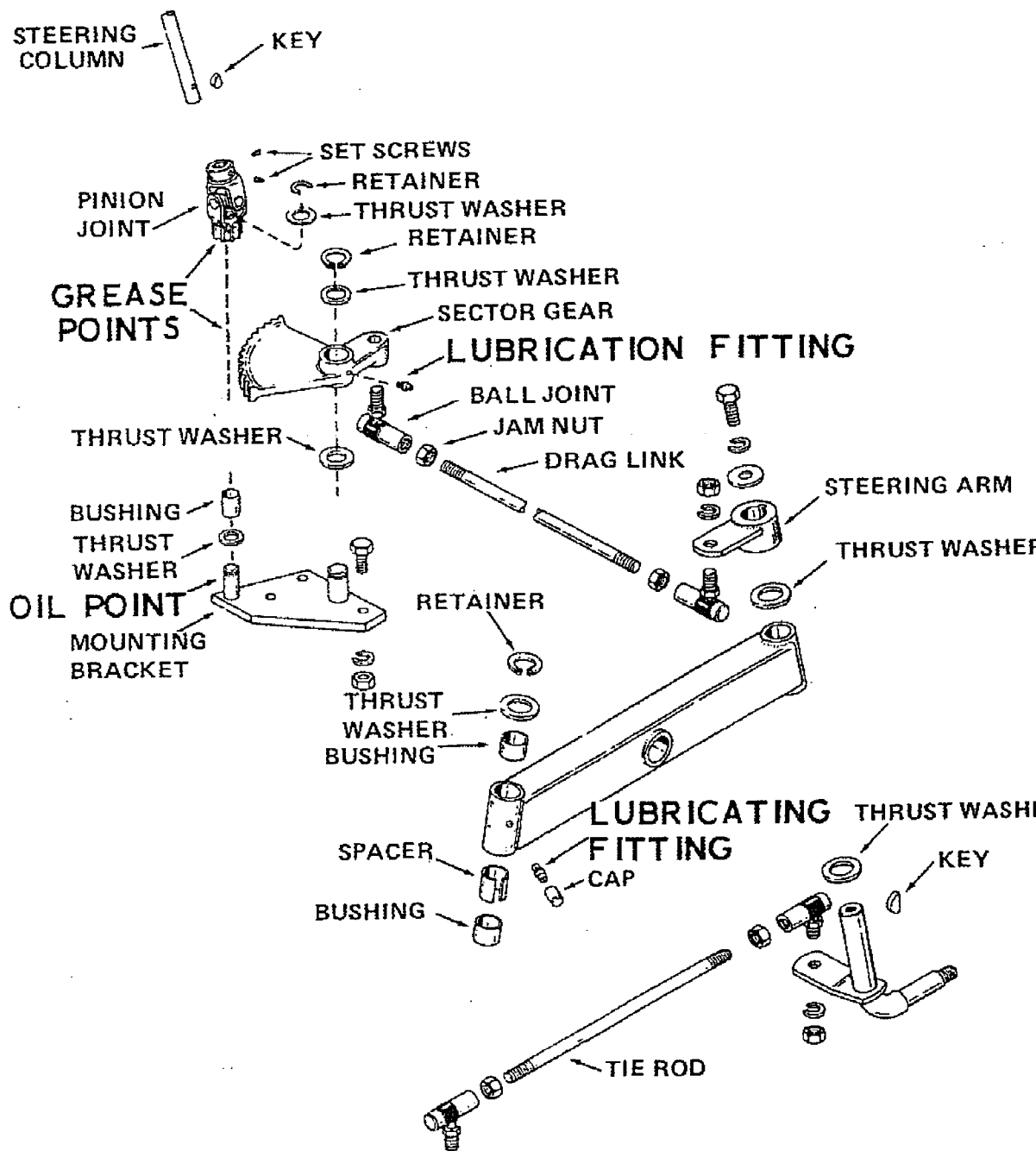


FIGURE 26

STEERING ADJUSTMENT

TURNING RADIUS

The turning radius must be approximately the same in both right and left directions.

To adjust:

1. Loosen the nuts at both ends of the drag link.
2. Turn the link into the ball joints for a shorter right turn.
3. Turn the link out of the ball joints for a shorter left turn.
4. Tighten the nuts on both ends of the drag link.

STEERING WHEEL FREE MOVEMENT

The free movement of the steering wheel must not be more than 2" (50 mm) at the outside diameter. If the steering wheel free movement is more than 2" (50 mm):

1. Check all the ball joints for correct fit. Tighten or replace as needed.
2. Visually check each pivot point for wear. Replace any bushing that are worn.

IMPORTANT: When replacing bushings in the front axle make sure the spacers are installed correctly. The split in the spacer must align with the hole for the lubrication fitting.

3. Tighten the lock nut on the steering wheel if needed. A small amount of free movement up and down is necessary to allow the steering wheel to turn freely.

Apply grease to the teeth of the steering gear after each 50 hours of operation.

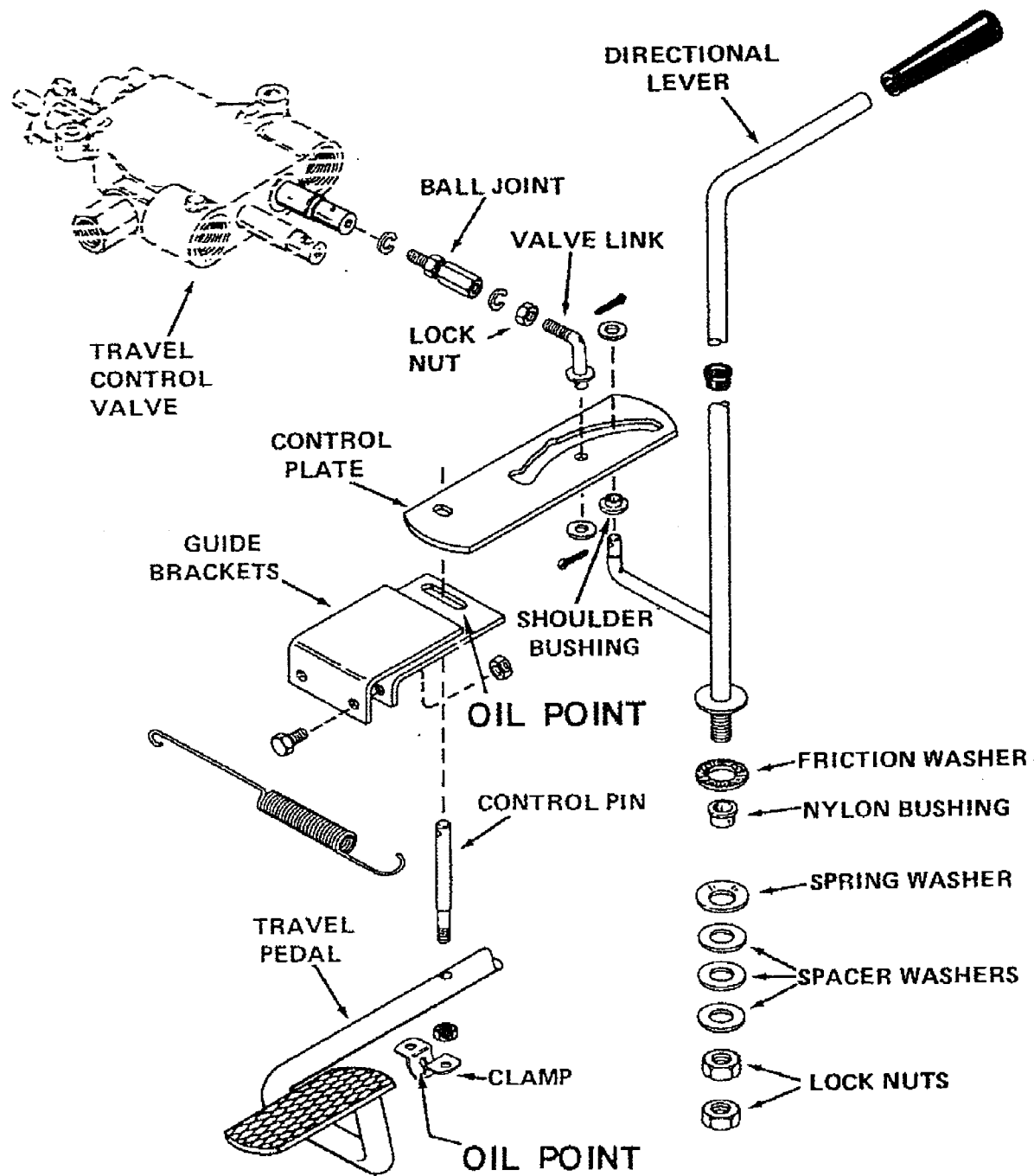


FIGURE 27

TRAVEL CONTROLS

DIRECTION CONTROL LEVER ADJUSTMENT

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

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

1. Find the position of the two lock nuts on the lever shaft.
2. Turn the top 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.
4. After you have the correct tension, tighten the bottom nut against the top nut. Hold the top nut with a wrench while you tighten the bottom nut.

FRICION WASHER REPLACEMENT

If the travel control lever can not 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 two nuts 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 the 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 in Figure 27. 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.
3. At regular intervals apply some oil to:
 - a. the mounting clamps of the travel pedal.
 - b. the guide brackets of the control plate.

FRONT WHEEL BEARINGS

Service the front wheel bearings every 500 hours of operation or yearly.

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

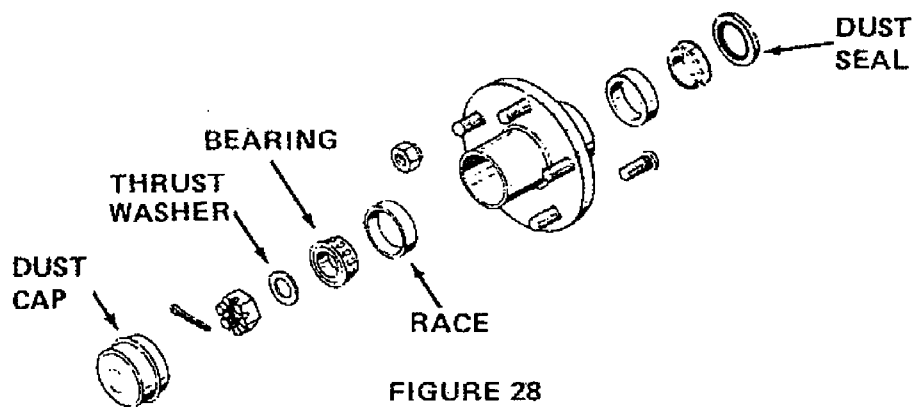


FIGURE 28

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. See Figure 29.
 - 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.

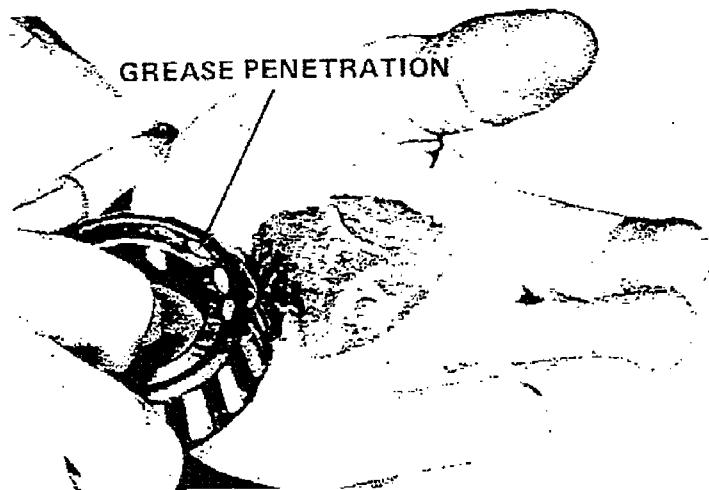


FIGURE 29

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.

LOADER CONTROL LEVER AND LINKAGE

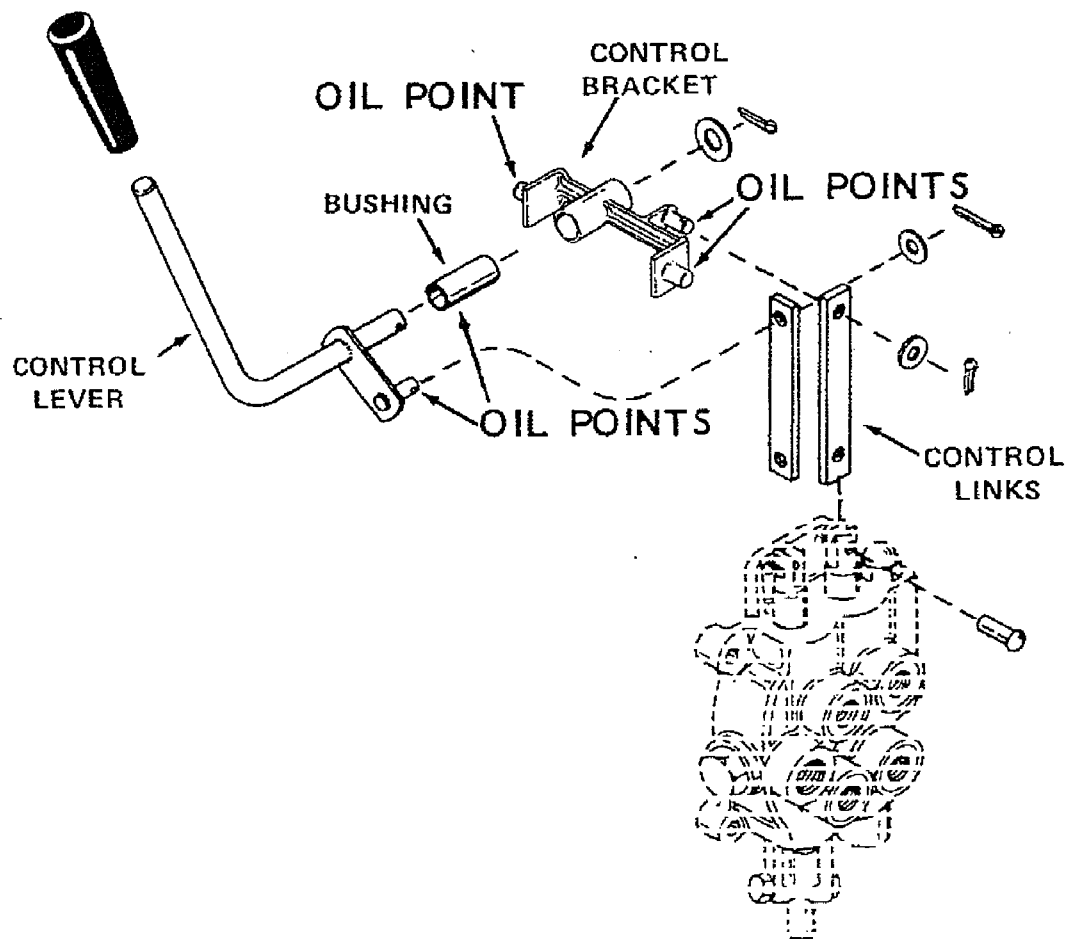


FIGURE 30

The loader control lever automatically returns to the "NEUTRAL" position after each use.

Apply oil every month, or as needed, to keep the lever moving freely. See the oil points in Figure 30.

ELECTRICAL SYSTEM

HEADLIGHTS

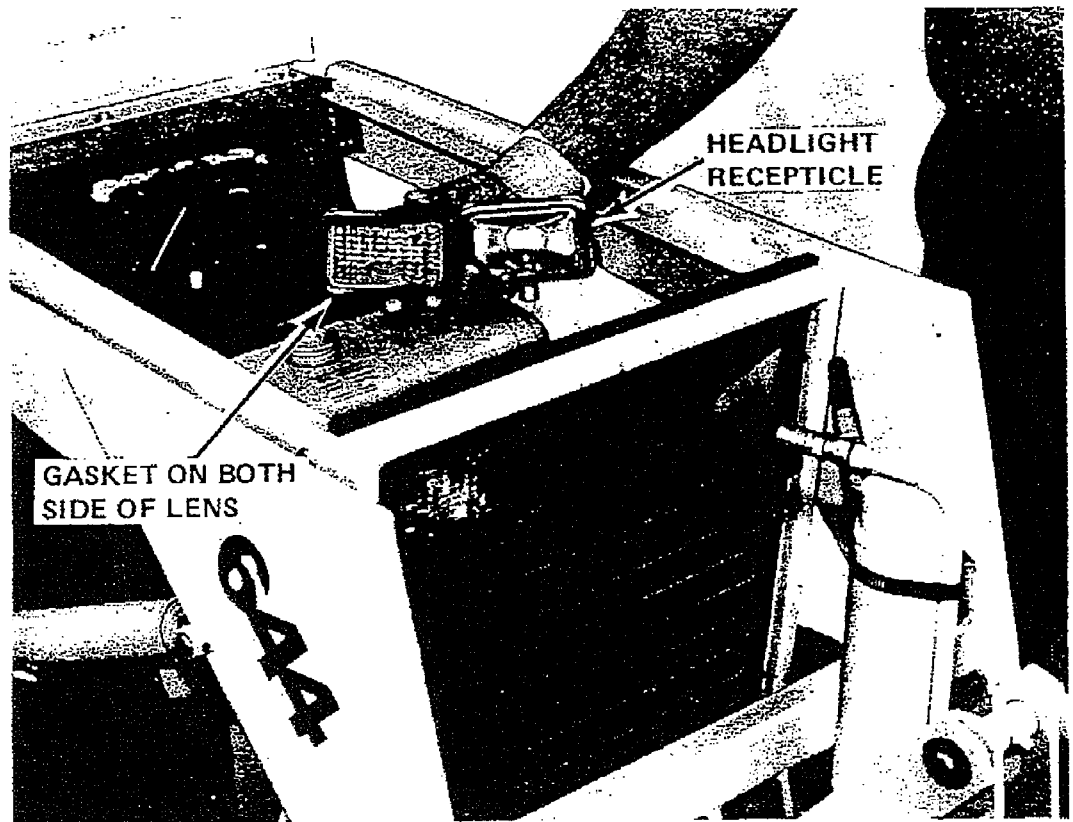


FIGURE 31

To replace the headlight bulb:

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

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

SPARK PLUG

Model 644	Prestolite 14L7 or equivalent (14RL7 or equivalent in Canada)
Model 646	Champion H8 or equivalent (RH8 or equivalent in Canada)
Thread Size	14 MM
Gap Setting	.025 Inch (0.64 MM)

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

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

REMOVING THE SPARK PLUG

Always use the exact size wrench. The wrong size or type of wrench can cause distortion or break the spark plug.

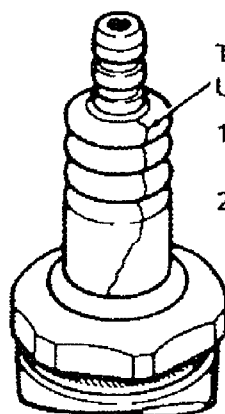
Use a spark plug wrench or deep socket wrench with a thin wall. Make sure the wrench is the correct size.

CLEANING AND SETTING THE GAP

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

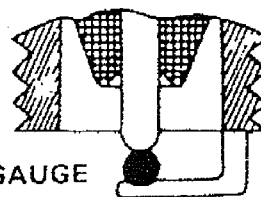
1. Use a small knife or wire brush to clean the tip and threads.
2. Wash with a solvent to remove loose carbon and oil.
3. Dry with a clean cloth.
4. Set the gap. You will feel a small amount of pressure on the feeler gauge when the gap is correct.

IMPORTANT: Do not bend the center tip.



THIS TYPE OF CRACK IS USUALLY CAUSED BY

1. DROPPING PLUG
2. STRIKING PLUG WITH WRENCH DURING INSTALLATION



ROUND FEELER GAUGE
WILL GIVE A MORE
ACCURATE READING

INSTALLING THE SPARK PLUG

1. Put a new gasket on the spark plug.
2. Manually turn the spark plug into the engine until tight.
3. 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 has the correct seat and seal.

FIGURE 32

STORAGE BATTERY

BATTERY MAINTENANCE



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



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



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



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

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

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

ADDING WATER

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

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.

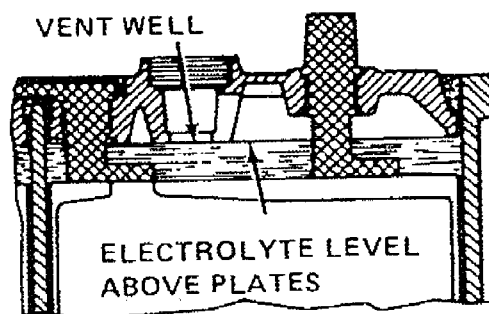


FIGURE 33

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



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

BATTERY TERMINAL
ON THE SOLENOID

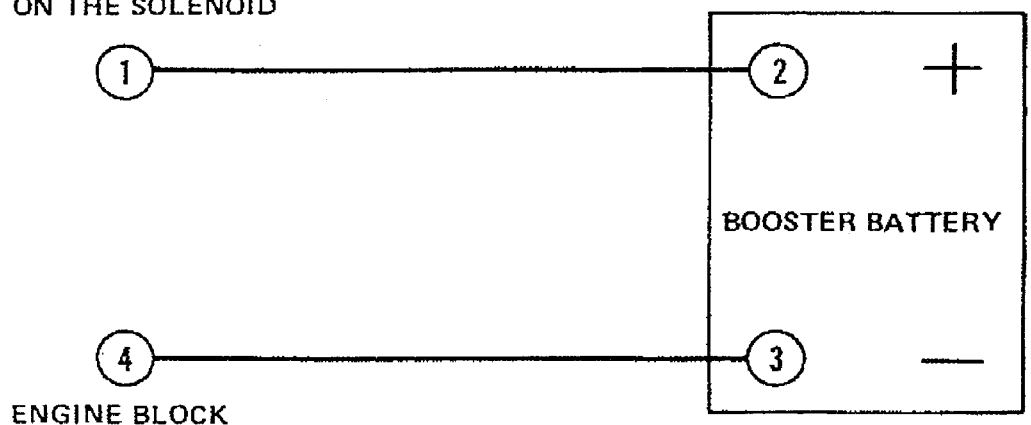
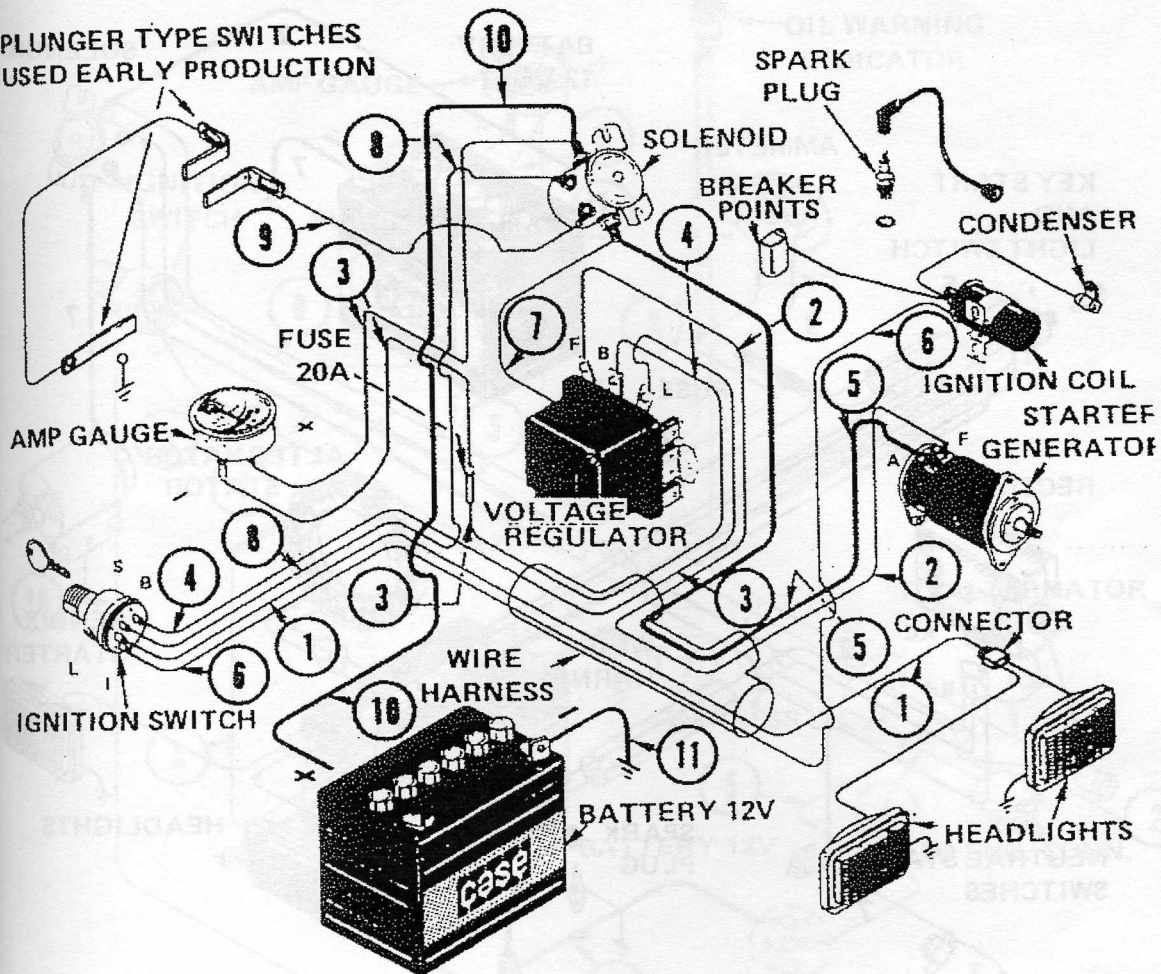


FIGURE 34

WIRING DIAGRAM

PLUNGER TYPE SWITCHES
USED EARLY PRODUCTION



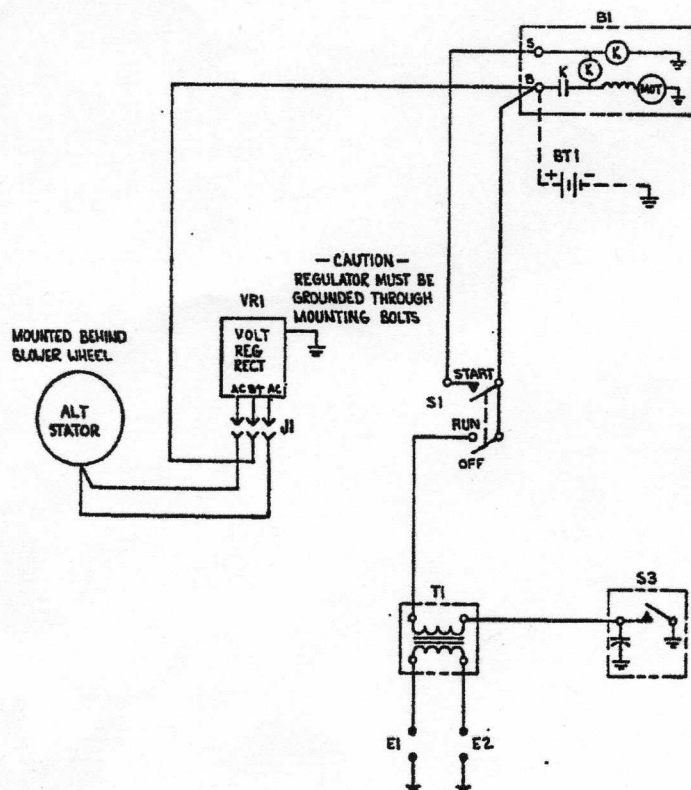
WIRE COLOR CODE AND ROUTING

- 1 - Pink
- 2 - Green
- 3 - Orange
- 4 - Red
- 5 - Black
- 6 - Black/White
- 7 - White
- 8 - Yellow
- 9 - Black
- 10 - Red
- 11 - Black

Wiring Diagram, Model 644

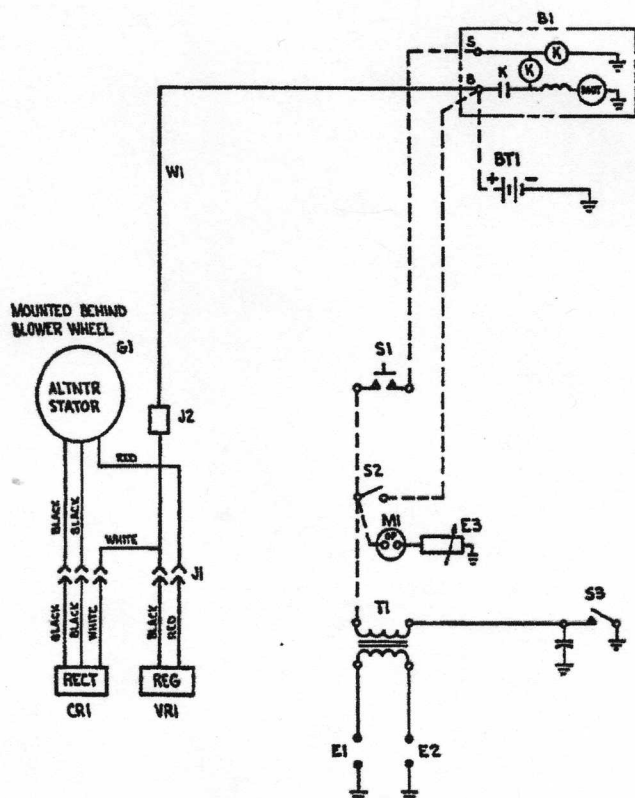
Prior to S/N 9757919

FIGURE 35



**WIRING DIAGRAM FOR FLYWHEEL
ALTERNATOR (PHELOX 15 AMP)**
(622-0386)

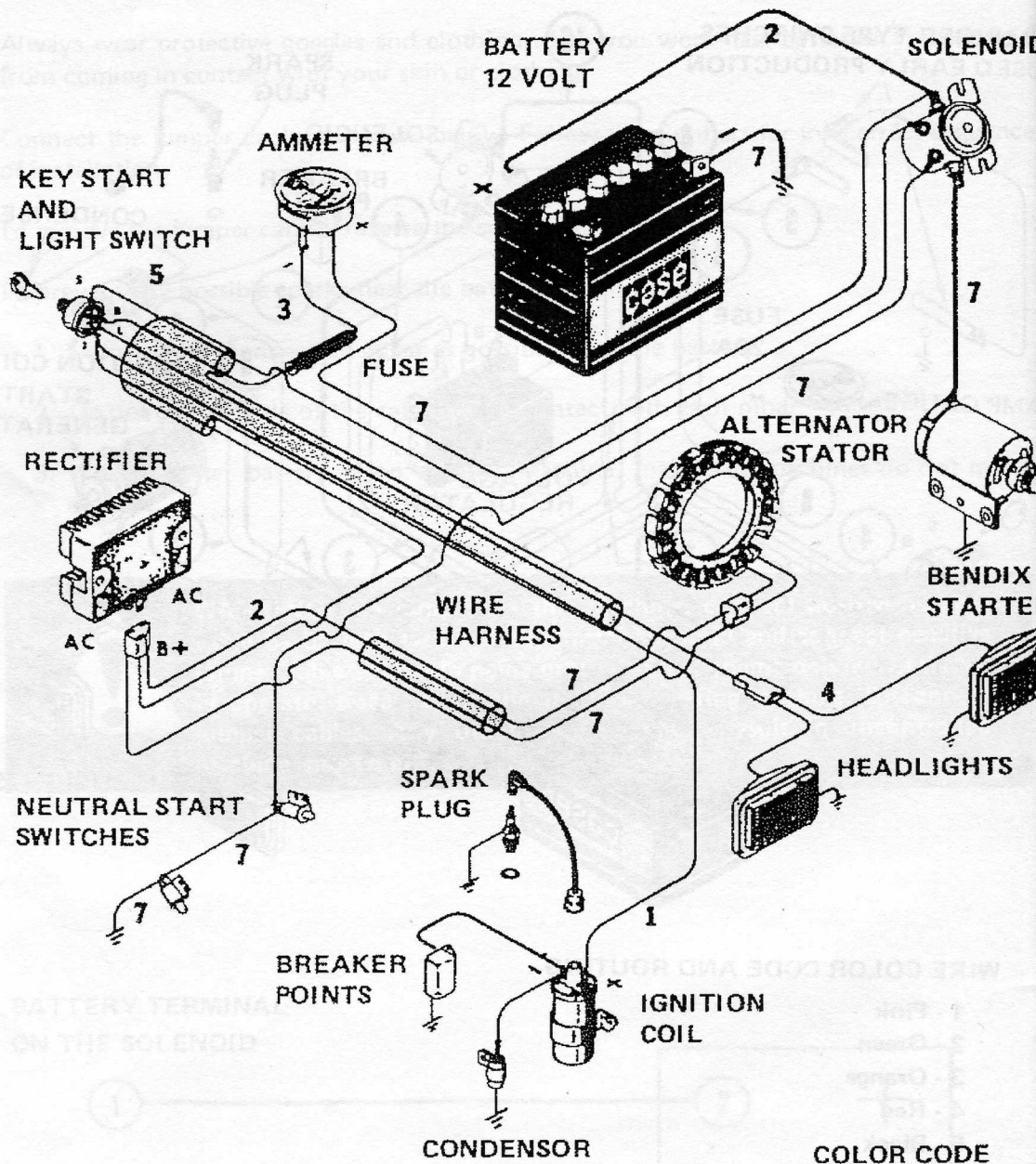
REF. DES.	DESCRIPTION
B1 BT1 E1 & 2	Starter & Solenoid-Engine Battery, 12 V. Spark Plug
G1 J1	Alternator-Flywheel 15 Amp Connector
S1 S2 T1 VR1	Switch-Start, Run Off Breaker & Cap Assembly Ignition Coil (Onan) Regulator-Rectifier Voltage



**WIRING DIAGRAM FOR FLYWHEEL
ALTERNATOR (SYNCO 20 AMP)**
(622-0382)

REF. DES.	DESCRIPTION
B1 BT1 CR1 E1, E2	Starter & Solenoid - Engine Battery, 12 V. Rectifier Assy. Spark Plug
E3 J1 J2 M1	Sender, Oil Pressure Connector Connector - Faston Meter - Oil Pressure
S1 S2 S3 T1 VR1 W1 G1	Switch - Start Switch - Ignition Breaker & Cap Assy. Ignition Coil Regulator - Voltage Lead Assy. Alternator - Flywheel 20 Amp.

WIRING DIAGRAM



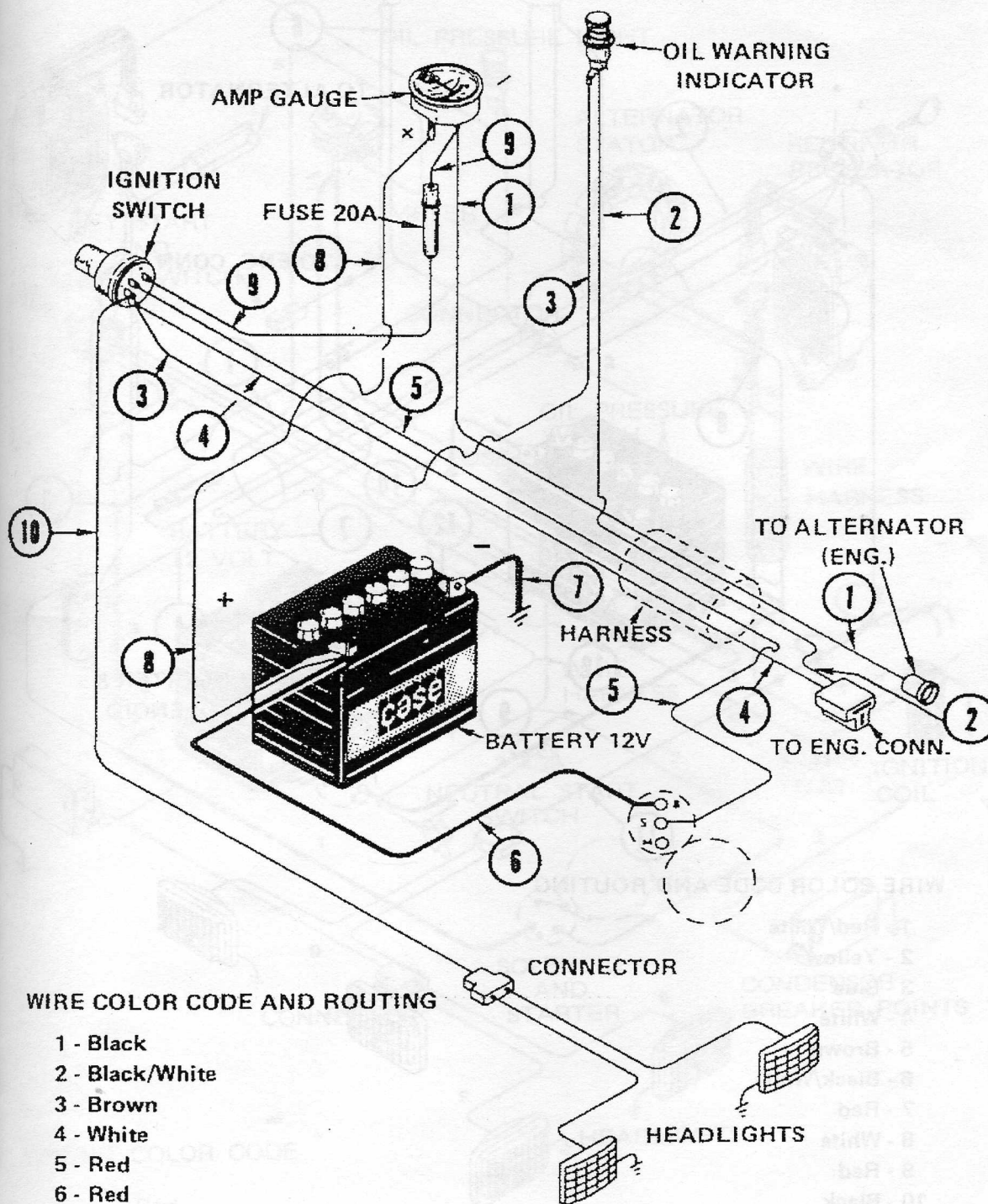
COLOR CODE

1. Black and white
2. Red
3. Orange
4. Pink
5. Yellow
6. White
7. Black

Wiring Diagram, Model 644.
S/N 9757919 and After.

FIGURE 36

WIRING DIAGRAM



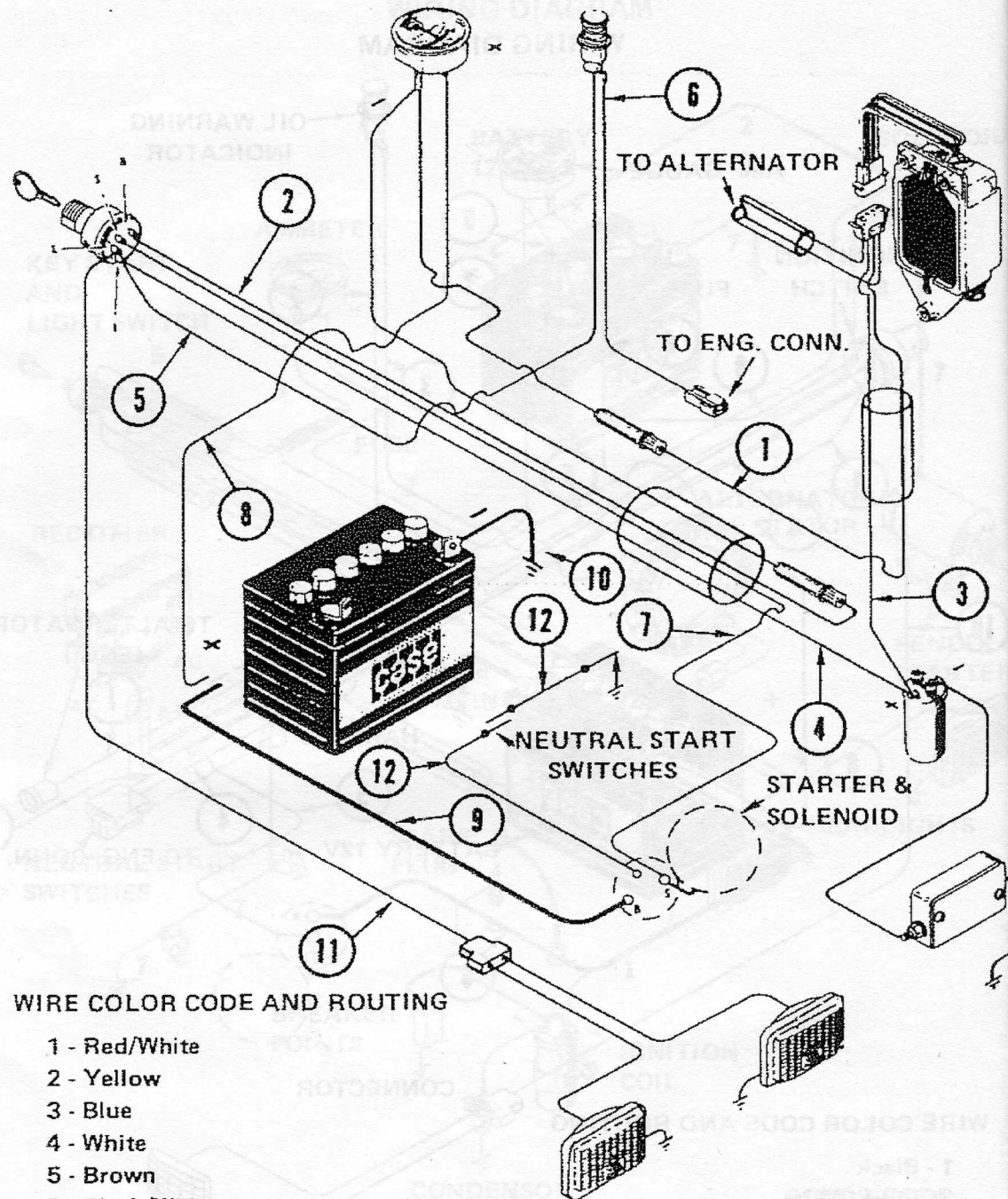
WIRE COLOR CODE AND ROUTING

- 1 - Black
- 2 - Black/White
- 3 - Brown
- 4 - White
- 5 - Red
- 6 - Red
- 7 - Black
- 8 - White
- 9 - Yellow
- 10 - Pink

Wiring Diagram, Model 646 Prior to S/N 9663323

FIGURE 37

WIRING DIAGRAM



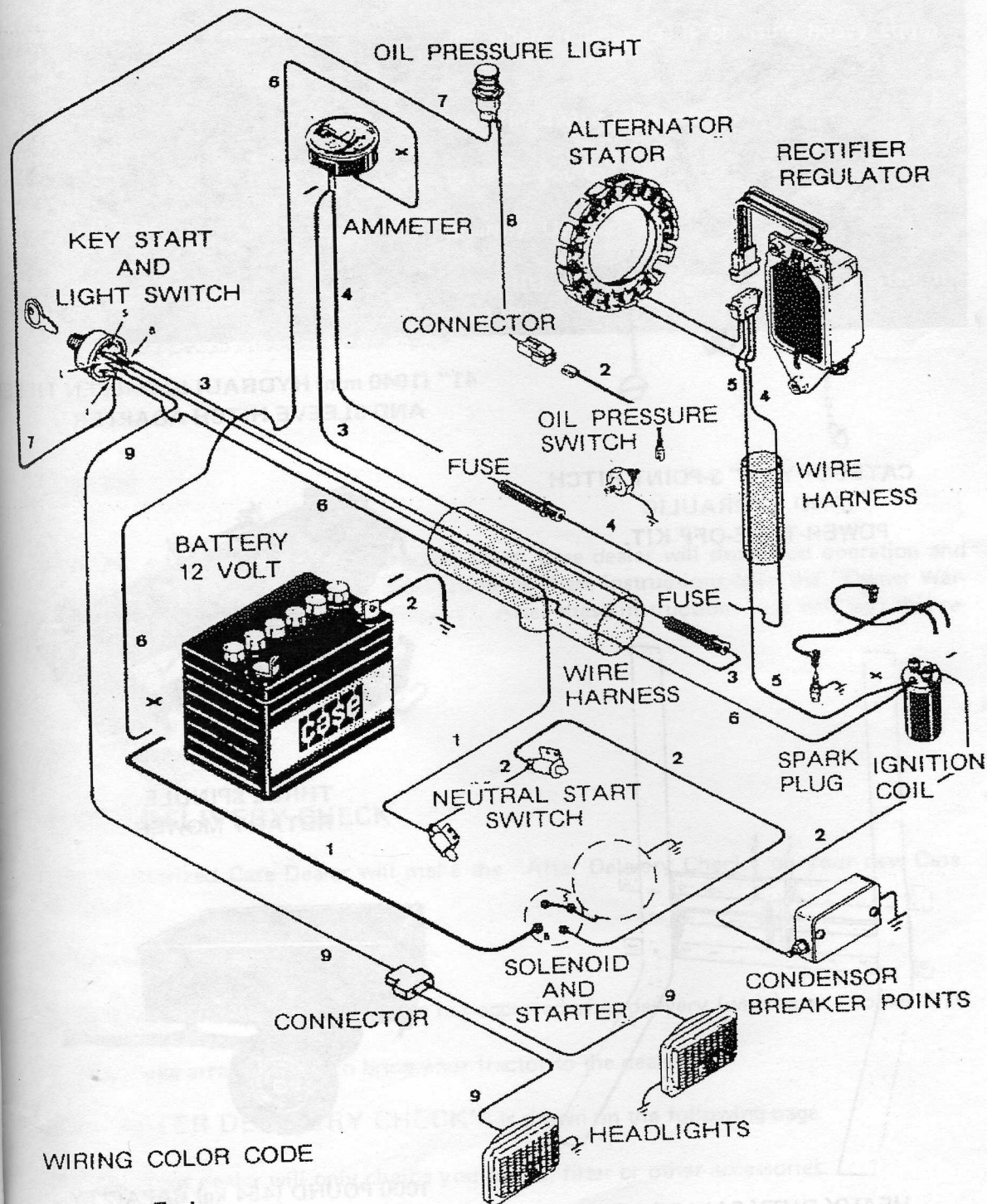
WIRE COLOR CODE AND ROUTING

- 1 - Red/White
- 2 - Yellow
- 3 - Blue
- 4 - White
- 5 - Brown
- 6 - Black/White
- 7 - Red
- 8 - White
- 9 - Red
- 10 - Black
- 11 - Pink
- 12 - Black

Wiring Diagram, Model 646 S/N 9663323 to 9732190

FIGURE 38

WIRING DIAGRAM

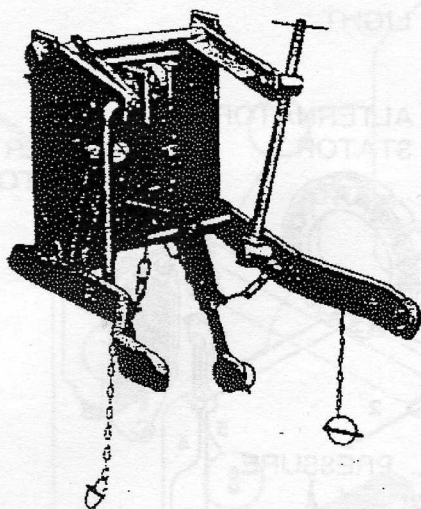


WIRING COLOR CODE

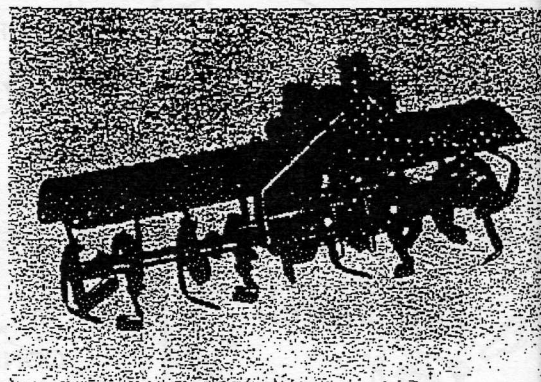
- 1 - Red
- 2 - Black
- 3 - Yellow
- 4 - Red/white
- 5 - Blue
- 6 - White
- 7 - Brown
- 8 - Black/white
- 9 - Pink

Wiring Diagram, Model 646 S/N 9732190 and After
FIGURE 39

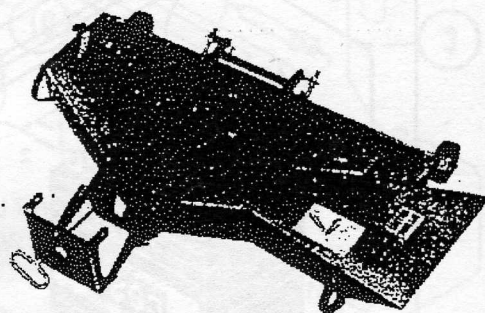
AVAILABLE ATTACHMENTS



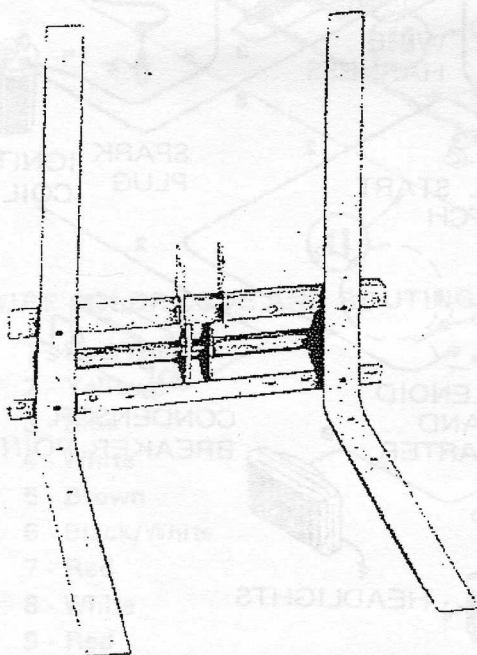
CATEGORY "O" 3-POINT HITCH
AND HYDRAULIC
POWER-TAKE-OFF KIT.



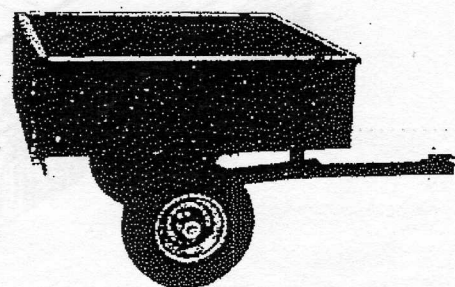
41" (1040 mm) HYDRAULIC DRIVEN TILL
AND SLEEVE HITCH ADAPTER



THREE SPINDLE
ROTARY MOWER



HEAVY DUTY PALLET FORK



1000 POUND (454 kg) CAPACITY
DUMP CART

MANY OTHER USEFUL ATTACHMENTS ARE
AVAILABLE THROUGH YOUR J I CASE DEALER.

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



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

NOTICE

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

AFTER DELIVERY CHECK

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

1. He sold you the tractor.
2. 60 days or 100 hours of operation has occurred after delivery (whichever comes first).
3. You make arrangements to bring your tractor to the dealer.

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

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



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