



**644 and 646**

**Wheel Loader**

**Operator's Manual No. 9-4324**

casecoltingersoll.com

**J I Case**  
A Tenneco Company





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

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

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

751253



# 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.



**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.

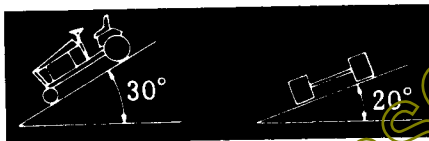
Avoid operating tractor on hillsides and slopes. To minimize the possibility of accidents while operating on hills and/or rough terrain, obey a combination of rules, practices and good common sense.

These include:

1. Reading, understanding, and obeying all written safety messages appearing on 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.

Case Lawn and Garden Tractors are designed and built to comply with the Voluntary Standard ANSI B71.1 - 1972 and B71.1a - 1974 (American National Standards Institute).



The diagram depicts the maximum angles that the stationary tractor, less mounted equipment, was subjected to without tipping, measured on a perfectly flat, smooth, and hard surface. This illustration does not recommend safe operating limits as the slope, type of terrain and all applicable factors as discussed in this manual must be taken into consideration by any person whenever operating the 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 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.

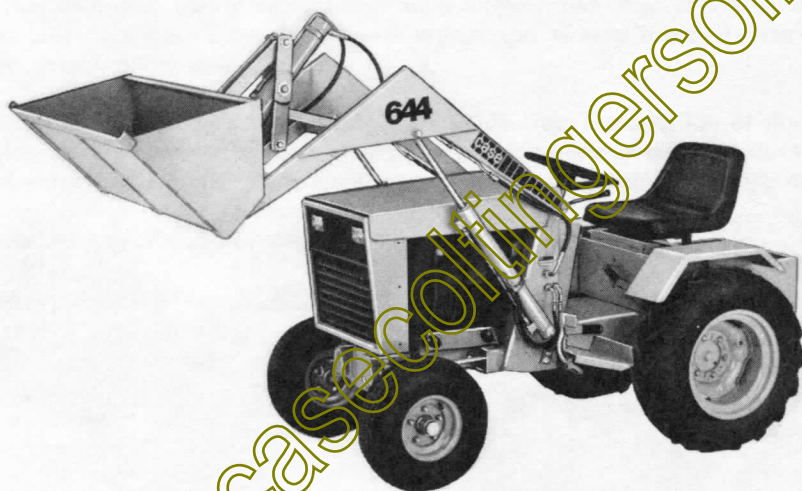
If in doubt of your safety - STAY OFF THE SLOPE.





**FIGURE 1.**

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



**FIGURE 2.**

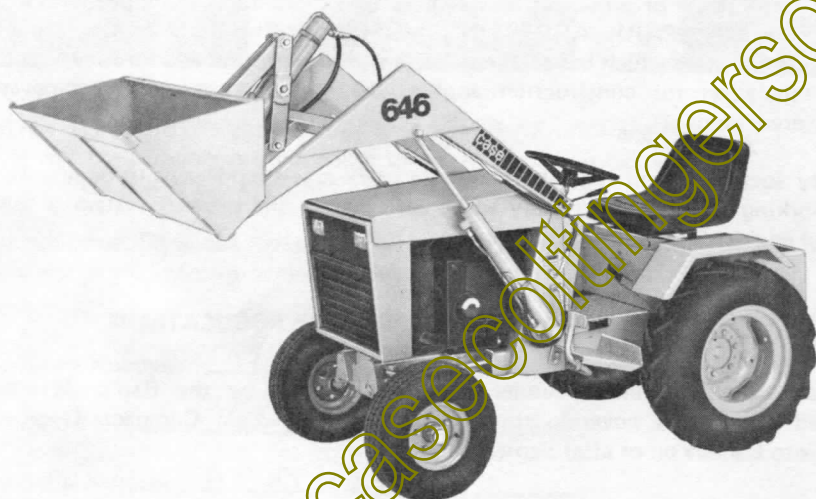
**Left Hand View of Model 644 Compact Wheel Loader With Standard 44" Material Bucket and Counterweight Box.**





**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 PURCHASER OF A CASE TRACTOR

The care you give your new Case Tractor will greatly determine the satisfaction and service life you will obtain from it. Use this manual as your guide. By observing the instructions and suggestions in this manual, your Case Tractor will serve you well for many years.

As an Authorized Case Dealer, we stock Genuine Case Parts, which are manufactured with the same precision and skills as the original equipment. Our factory trained staff is kept well informed on the best methods of servicing Case equipment and is ready and able to help you.

Should you require additional aid or information, contact us.

*Your Authorized Case Dealer*

### NOTICE

Laws of some states or provinces may require that this unit be equipped with a SPARK ARRESTOR OR SPARK ARRESTING MUFFLER. The State of California, as an example, is one state which has such regulations for agricultural and forestry applications, plus a regulation for construction applications in forest-covered, brush-covered, or grass-covered lands.

Typically such laws and regulations require spark arresting devices to be maintained in good working order and typically to be attached to the exhaust system of naturally aspirated engines (engines without a turbo charger).

### CANADIAN RADIO INTERFERENCE REGULATIONS

The Canadian Government, under authority granted by the Radio Act, has promulgated regulations covering this gasoline powered Case Compact Tractor if imported into Canada on or after September 1, 1976.

The spark plug(s) in this machine when replaced must have a resistor type spark plug installed.

The certification label applied to the engine must not be removed or obliterated.

3-78-SL-1000

U.S. PRICE \$1.05

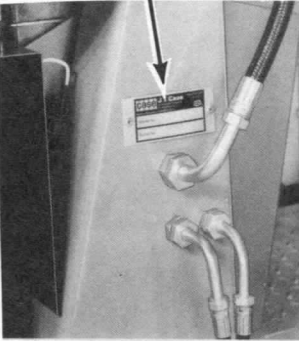
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## SERIAL NUMBER

When ordering parts from your Authorized Case Dealer and in all contacts or correspondence with your dealer relative to the tractor always specify the Serial, Model and Engine Numbers of your tractor.

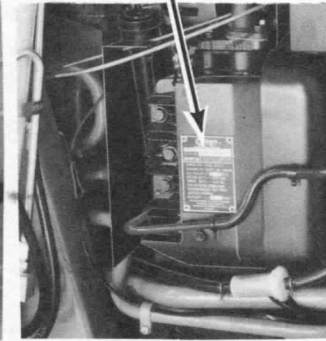
The Wheel Loader Model and Serial Numbers are stamped on the plate located on the left hand frame tower, Figure 5. The Model 646 Wheel Loader Engine Model, Serial and Specification Numbers are stamped on a plate fastened to the right side of the engine, Figure 6. The Model 644 Wheel Loader Engine Model, Serial and Specification Numbers are stamped on a plate located on the upper front side of the engine, Figure 7.

**TRACTOR MODEL AND  
SERIAL NUMBER**



**Figure 5.**

**646 ENGINE MODEL  
SERIAL & SPECIFICATION  
NUMBERS**



**Figure 6.**

**644 ENGINE MODEL,  
SERIAL & SPECIFICATION  
NUMBERS**



**Figure 7.**

**NOTE:** The terms "Right Hand", "Left Hand", "Front" and "Rear" whenever used in this manual apply to the loader when facing in the direction the loader will move in forward operation.

For reference, fill in the Serial Number, Model Number and Engine Numbers of your wheel loader in the spaces provided below.

Loader Model Number 646  
Loader Serial Number 9791078  
Engine Model Number CCKA-MC-2566J  
Engine Serial Number A80049114  
Engine Specification Number \_\_\_\_\_

## GENERAL SPECIFICATIONS

### COOLING SYSTEM

Blower ..... Forced air with baffles directing air around finned cylinder and head area

### HYDRAULIC SYSTEM

Independent 12 quart (11.4 l) reservoir, pump, control valve, hydraulic motor and heat exchanger. Pump delivers approximately 9 gallons (34 l) per minute at 3600 RPM. Maximum operating pressure (main relief valve) setting: 2300 psi (16 000 kilopascal). Implement lift relief valve setting is 1600 psi (11 000 kilopascal).

### BRAKE

Type ..... Mechanical Contracting Band, with the drum shaft driven from transmission differential. Includes parklock.

### TRANSAXLE

Type ..... Hydraulic Driven, Dual Gear Range  
Differential ..... Automotive Type Bevel Gear  
Oil Capacity ..... 3 Quarts (2.8 l)

### SPEED RANGE

#### FORWARD

#### REVERSE

Low

0 to 2.5 MPH (4.0 km/h) 0 to 2.5 MPH (4.0 km/h)

High

0 to 6.5 MPH (10.5 km/h) 0 to 6.5 MPH (10.5 km/h)

### WHEELS & TIRES

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

## ENGINE SPECIFICATIONS

### GENERAL

**644**

**646**

Type .....	Kohler	Onan
Model .....	K321A (prior to S/N 9757919)	CCKA
	K321AS (S/N 9757919 and after)	
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 <sup>3</sup> )	49.8 cu. in. (816.1cm <sup>3</sup> )
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)

### ELECTRICAL SYSTEM

Type of System .....	12V. Negative Ground	12V. Negative Ground
Breaker Point Gap .....	.020" (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 Gap .....	.025" (0.64mm)	.025" (0.64mm)
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
	12V Bendix Drive (S/N 9757919 and after)	
Charging System .....	12V, 12A Starter- generator (prior to S/N 9757919)	12V, 20A Flywheel Alternator
	12V 15 Amp Flywheel Alternator (S/N 9757919 and after)	



## OVERALL MEASUREMENTS

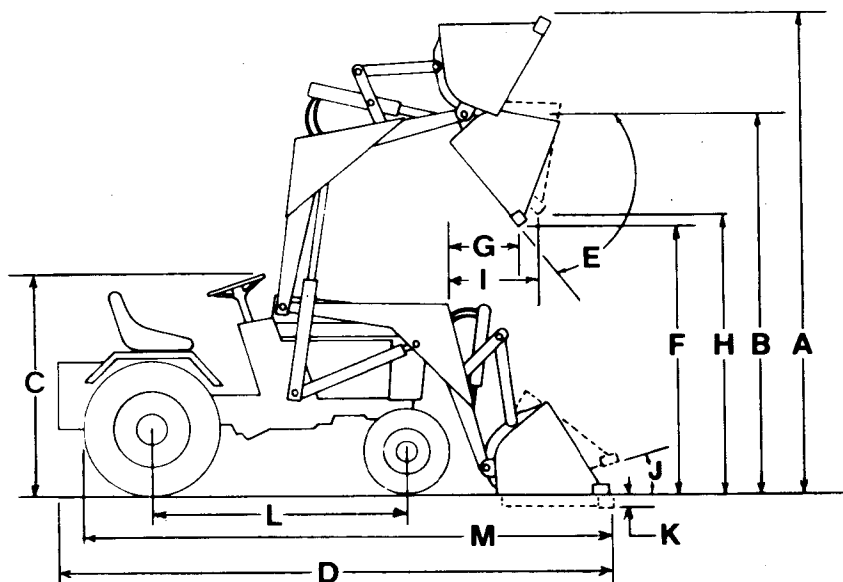


FIGURE 8.

## OPERATIONAL DATA

- A 92" (2340 mm) - overall operating height fully raised
- \*B 71.75" (18020 mm) - height to bucket hinge pin
- C 43.25" (1100 mm) - overall height with bucket on ground
- D 108.00" (2740 mm) - overall length including wt. box and bucket
- \*E 54° - maximum dump angle
- F 52.88" (1340 mm) - dump clearance at max height 54° dump angle
- G 13.75" (350 mm) - reach at max height and 54° dump angle
- \*H 54.50" (1380 mm) - clearance at 45° dump angle
- \*I 16.88" (430 mm) - reach @ 45° dump angle
- \*J 18° - bucket roll back
- \*K 2" (50 mm) digging depth-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

Overall Width	Rear Wheels 41" (1040 mm)
	Std. Bucket - 44" (1120 mm)
Weight (less weight box)	644 - 1130 lbs. (513 kg)
	646 - 1190 lbs. (540 kg)

These specifications conform to ICED definitions. ICED definitions are not established for specifications not preceded by a\*.

## ENGINE LUBRICATION

### SELECTION OF OIL

It is extremely important that you select and use a detergent type, high quality, SE or CC, API Service Classification Oil.

#### OIL SAE VISCOSITY RATING MODEL 644

SAE 30 or 20W-40 . . . . . Air Temperatures 30° F (-1° C) and Above  
SAE 10W-30 . . . . . Air Temperatures 0° F (-18° C) to 30° F (-1° C)  
SAE 5W-20 . . . . . Air Temperatures 0° F (-18° C) or Below

#### OIL SAE VISCOSITY RATING MODEL 646

SAE 5W-30 . . . . . Air Temperature 30° F (-1° C) and Below  
SAE 30 . . . . . Air Temperature 30° (-1° C) and Above

### OIL CHANGE

Drain and refill the crankcase at least every 25 hours for Model 644 and 50 hours for Model 646. Replace the oil filter on the Model 646 every 100 hours.

If possible, run engine just prior to changing oil--the oil will flow more freely and carry away a greater amount of contaminant when hot.

If the engine service is severe - (frequent stopping and starting, high or low operating temperature) - the crankcase should be drained more often to prevent the formation of sludge or harmful deposits in the engine.

### IMPORTANT

1. When the crankcase is drained, refill with 3 measured pints (1.4 l) of oil for Model 644 and 3-1/2 measured quarts (3.3 l) of oil for Model 646 (4 measured quarts (3.8 l) with filter).
2. Operate the engine for a few minutes, allow sufficient time for the oil to run down off the engine parts, then check the oil level with the dipstick.
3. This will prevent overfilling or underfilling the crankcase, either of which can be detrimental to the engine service life and will give you false oil consumption records.



# LUBRICATION

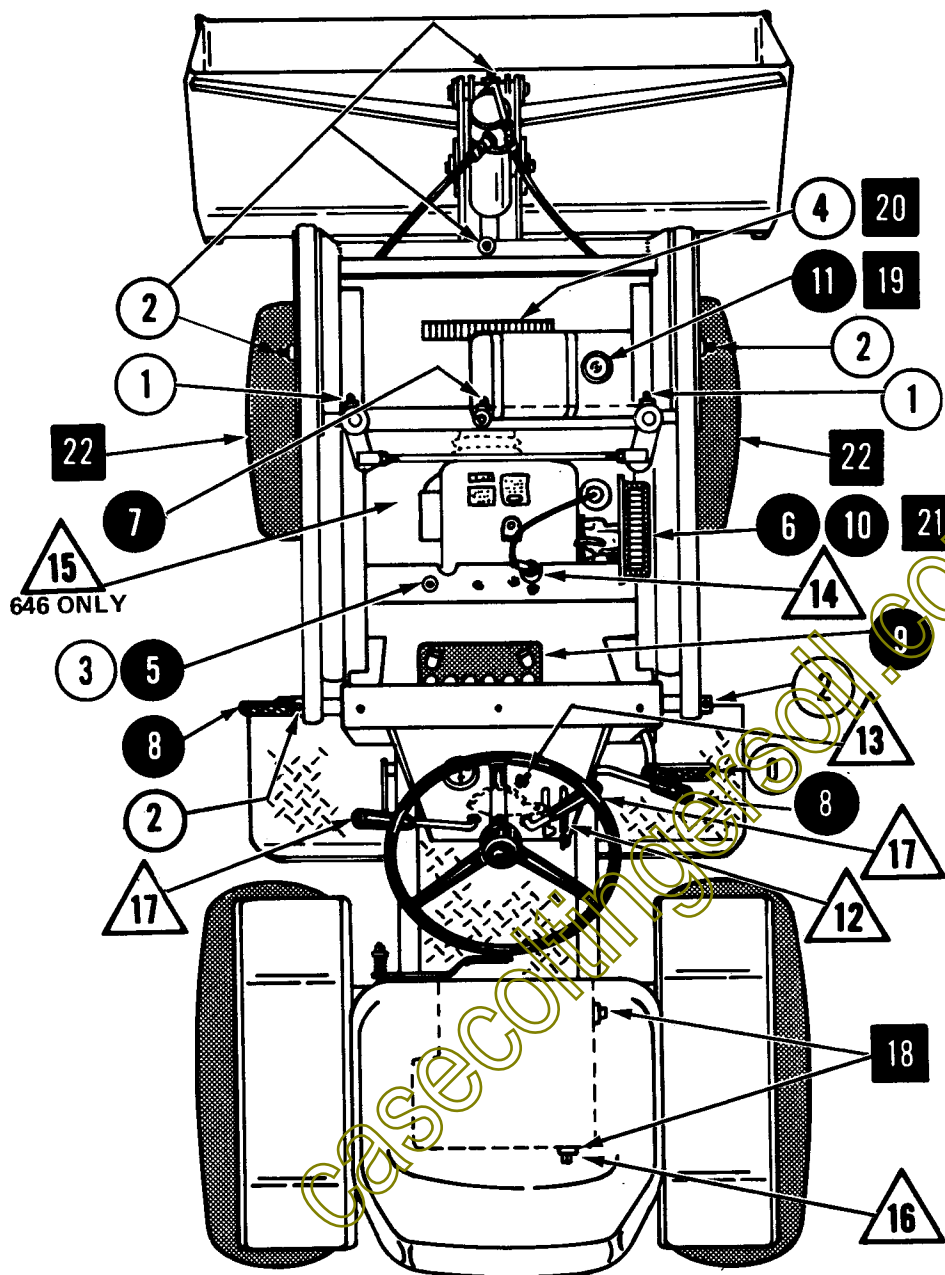






FIGURE 9

REF. NO.	SERVICE POINTS	NO. OF POINTS	GREASE	DRAIN	CHECK	CLEAN	CHANGE	OIL (Few Drops)	FREQUENCY
0	Travel Pedal	2							 8 HOURS OR DAILY
1	Front Spindles (king pins)	2							
2	Loader Fittings	9							
3	Engine Oil *	1							
4	Blower Air Intake Screen - 644 only	1							
5	Engine Oil * (50 hrs. on 646)	2							 25 HOURS OR WEEKLY
6	Air Leaks **	**							
7	Front Axle Pivot Pin	1							
8	Implement Lever and Brake Linkage	6							
9	Battery	1							
10	Air Cleaner ***	1							 100 HOURS OR MONTHLY
11	Hydraulic Oil +	2							
12	Throttle and Choke Control	2							
13	Steering Gear Pivot Pin	1							
14	Spark Plug °	1							
15	Oil Filter (646 only)	1							 500 HOURS OR YEARLY
16	Transmission Oil +	1							
17	Travel and Lift Lever and Linkage	3							
18	Transmission Oil +	2							
19	Hydraulic Oil +	1							
20	Engine and Heat Ex Cooling Fins ***	1							
21	Air Cleaner Element ***	1							
22	Front Wheel Bearings	2							

\* Keep oil level between marks on dipstick. See page 9 for engine lubrication recommendations.

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

\*\*\* More often in dusty conditions.

° Clean and regap

+ Hydraulic System: Use SAE 5W-20 Motor Oil in winter (below 32° F. - 0° C.) and SAE 20W-40 Motor Oil in summer. Use only oil which is rated as API engine service classification SE or CC. Prior service classifications for these oils were "MS" or "DM". Use SAE 20-W-40 Motor Oil or SAE No. 80 EP Gear Lube in transmission the year around.

The hydraulic system reservoir is located under the hood ahead of the engine. Maintain oil level between two and three inches from the top of the filler opening. The drain plug is located on the bottom side of the travel valve.

Use number 1 gun grease (Lithium Base) for all pressure fittings (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

CARBURETION ON SMALL GASOLINE ENGINES IS ALWAYS CRITICAL OF DIRT. IT IS RECOMMENDED THAT A FILTERING FUEL FUNNEL ALWAYS BE USED ALONG WITH CLEAN GASOLINE.

AT ANY EVIDENCE OF FUEL STARVATION, CLEAN THE FILTER IN THE TANK OUTLET FITTING.

DO NOT MIX OIL WITH GASOLINE FOR THIS ENGINE.

## GASOLINE

Engines used in Case Tractors are designed to operate on REGULAR GRADE gasoline having a minimum research method rating of 90.7 Octane. This will give full power and economy together with long engine life and low maintenance cost.

The typical Octane number ratings for regular grade gasoline (March 1967).

Motor Method	86.2 Octane Number
Research Method	<u>94.2</u> Octane Number
Average	90.2 Octane Number

These two Octane ratings are used to define the anti-knock quality of gasoline. It has become common practice in the Petroleum Industry to refer only to the RESEARCH METHOD RATING although in the United States the average of the two figures is posted on gasoline pumps.

When only one Octane rating is given for gasoline and the rating method is not specified, it can be assumed to be the average rating in the United States or the Research Method Rating elsewhere in the World.

Non-leaded gas is a suitable alternative for use in all 4-cycle air cooled engines used on Case Compact Tractors and Loaders provided the Average Octane Rating in the United States and the Research Method Octane Rating elsewhere in the World is 90 or higher.



## OPERATING INSTRUCTIONS

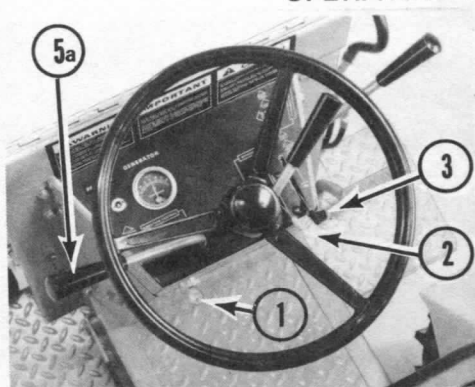


FIGURE 11.

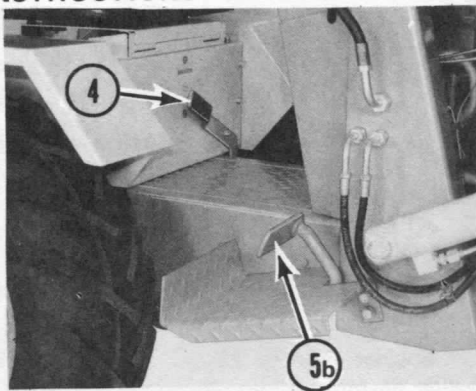


FIGURE 12.



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**--Turn the key to the right (Start) position to start the engine. When shutting the engine off, turn the key to the left (Off) position.

**NOTE:** Make certain the travel pedal is released and the Attachment Drive lever is in the "Off" position before trying to start the engine.

2. **CHOKE**--To start a cold engine, push the choke lever forward. Pull the lever slowly rearward when engine is started. Little or no choking is required if starting a warm engine.
3. **THROTTLE**--When the throttle lever is all the way rearward, the engine should be idling. To increase the engine RPM, push the lever forward until the desired throttle setting is obtained. As a general rule, set the throttle as low as possible to obtain maximum fuel economy but high enough to prevent engine lug-down or labor which will cause overheating.

**NOTE:** When starting a cold engine in temperatures below 32° F (0° C) do not set the throttle more than 1/3 open and allow it to run for a few minutes at this setting to warm the hydraulic system. When cold, the hydraulic system is noiser at higher engine RPM. The quickest way to warm up a cold hydraulic system is to position the High-Low Range Shift Lever in neutral, place the Travel Control Lever in Forward or Reverse and depress the Travel Pedal to circulate the oil through the hydraulic motor.

4. **HIGH-LOW RANGE SHIFT LEVER**--When shifting into low or high range, make certain the lever is located past the neutral locking pin. When shifting to neutral, the lever must be locked to the pin. Gear damage can result if the tractor is operated while the shift lever is not fully engaged beyond the locking pin.



**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.

## 5. DIRECTIONAL CONTROL LEVER AND TRAVEL PEDAL--

- a. Directional Control Lever--This lever alone does not place the tractor in motion. The lever can be located in Forward, Neutral, or Reverse as shown on the console decal.
- b. Travel Control Pedal--This pedal is located on the right hand foot rest. With the travel control lever placed in forward or reverse, slowly depress the pedal to place the tractor in motion. The travel speed can be regulated by the distance the pedal is depressed. The use of the Travel Pedal results in almost limitless speed control when desired for operating in close quarters and when approaching a vehicle to dump.

**NOTE:** The Directional Control Lever does NOT return to NEUTRAL when the Brake is applied.



**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.

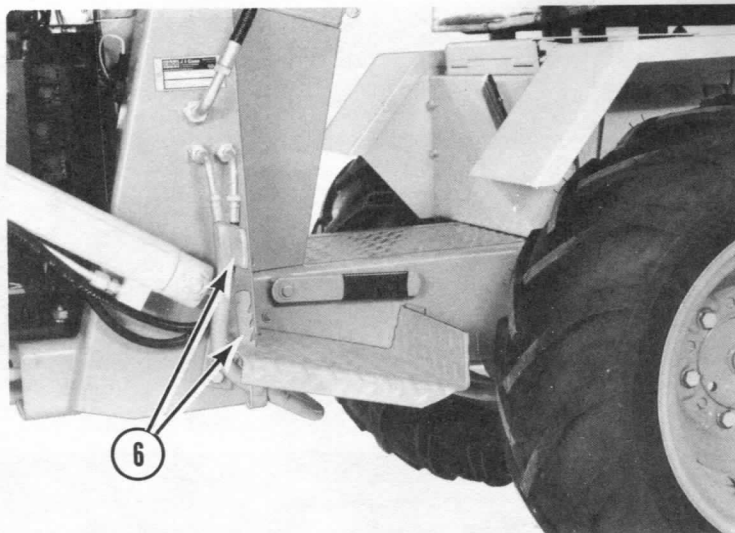


FIGURE 13.

6. BRAKING AND PARKING--On a level surface the loader will come to a normal stop when your foot is removed from the Travel Control Pedal. If on an incline or if a fast stop is necessary, release your foot from the Travel Control Pedal and depress the Brake Pedal.

7. SINGLE LEVER LOADER CONTROLS--The upper right hand side of the console decal calls out the Single Control Lever position for RAISE, LOWER, FLOAT, DUMP, and ROLL BACK. While raising the lift arms the Bucket can also be simultaneously leveled by moving the single control lever toward the lower right corner. Likewise, while the lift arms are being lowered, the bucket can be returned to the filling position by moving the single control lever toward the upper left corner.

IMPORTANT: Do not lower the bucket unless the engine is running as this can cause the oil reservoir to overflow or burst.

8. HEADLIGHTS--The headlights are turned on when the ignition key is turned to the "Light" position after the engine is started. Do not operate the headlights unless the engine is running and the ammeter indicates no discharge.

9. AMMETER--When the engine is started and running above idle speed, the ammeter should show charge and gradually fall back as the battery becomes charged. If a no charge or discharge rate is indicated with a freshly started engine above half throttle, stop the engine immediately and have the cause corrected.

10. OIL PRESSURE LIGHT--Model 646 ONLY. This light should go off as soon as the engine is started and remain off even at low engine speed. If the light does not go off as soon as the engine is started or should go on while operating, turn off the engine immediately and have the cause corrected. CHECK ENGINE OIL LEVEL DAILY.



11. **ATTACHMENT LIFT LEVER**--The lower right hand side of the console decal identifies the Attachment Lift Lever positions for RAISE, LOWER and FLOAT. Pull the lever to the rear to raise. Push the lever ahead to lower or to apply "down-pressure". Move the lever further ahead into detent to keep the lever in a "hold" position allowing the attachment to "float".

The "float" position is recommended for garden plowing or tilling operations. "Down-pressure" can be used to advantage with rear mounted dozing and ground leveling attachments.

**NOTE:** Refer to instructions furnished with each attachment for specific information covering lift lever operation and recommended depth or height settings.

12. **ATTACHMENT DRIVE CLUTCH LEVER**--This lever is located against the left hand frame rail above the foot rest. To engage the Attachment Drive Clutch pull the lever upward until clutch is locked in the engaged position. Push the lever downward to stop the attachment. Be sure this lever is in the "OFF" position when parking or starting the tractor.

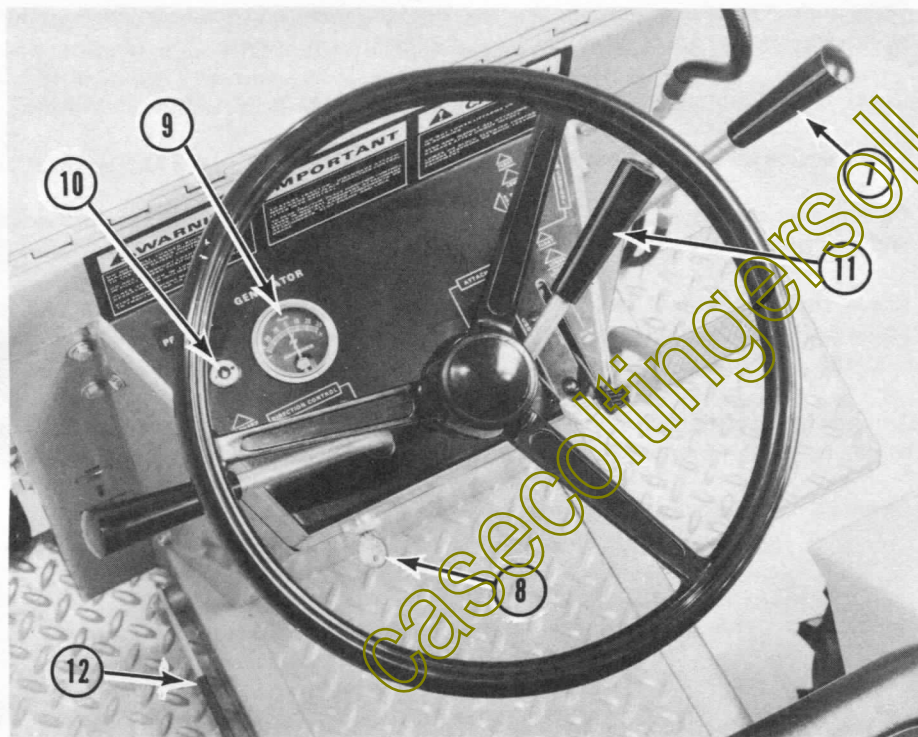


FIGURE 14.

## RUN-IN PROCEDURE

Your new tractor should be subjected to a run-in period before it is operated at full load. Drive the tractor for approximately an hour to get the feel of operation. Actuate the travel control through its full range during the run in period.



**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.

## PRE-STARTING CHECK LIST

Before starting your new Case Tractor for the first time and before each operating period thereafter, check the following.

1. Make sure everyone responsible for the tractor's operation and maintenance understands the importance of clean fuel, oils, containers and funnels.
2. Check that all lubricating fittings are serviced as directed in the Lubrication Chart.
3. Check engine oil level and add as necessary.
4. Be sure that air cleaner, and blower air intake screen on engine are free of obstructions and excessive dirt.
5. Check that tractor fuel tank is filled with clean fuel that meets requirements listed under Fuel Specifications. Always wipe fuel tank cap clean before removing it. Be sure vent hole in fuel tank cap is open.
6. This tractor is equipped with a "neutral start" feature. The Travel Control Pedal must be up and the Attachment Drive Lever must be OFF to start the engine.
7. Check all operating controls for proper function.

**IMPORTANT:** Do Not Attempt To Start Tractor By Pushing Or Towing As Serious Damage To The Drive System May Result.

## STARTING PROCEDURE

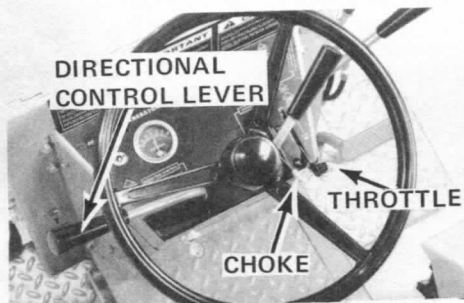


FIGURE 15.

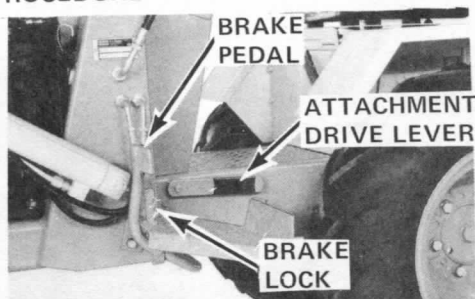


FIGURE 16.

1. Place the directional control lever in the NEUTRAL position and do not depress the travel pedal. The "NEUTRAL START" feature prevents the engine from starting unless the travel pedal is up and the attachment drive lever is in the off position.
2. Place the attachment drive lever down in the OFF position.
3. Engage and lock the brake pedal.
4. Close the choke by pushing the choke lever forward. More or less choking may be necessary due to variations in temperature, grade of fuel, etc. Little or no choking will be needed when engine is warm. In cold weather, it is advisable to position the throttle lever about one-third open.
5. Turn the starter key all the way to the right to start engine.

**IMPORTANT:** Do not use the starter longer than 30 seconds without interruption. Wait at least 3 minutes so the starter can cool down between periods of usage.

6. After the engine starts and runs, slowly pull the choke control lever all the way rearward. Always allow engine and hydraulic system to warm up before applying a load. For cold weather starting and warm-up recommendations refer to "Note" following paragraph 3 in the OPERATING CONTROLS AND INSTRUCTIONS section of this manual.

**NOTE:** Under normal operating conditions it is recommended the throttle be set approximately 3/4 open (if operating under light load, the throttle can be set 1/2 open or less. For maximum economy, operate at a throttle setting which will perform the job without lugging or laboring and subsequent overheating of the engine.

## STOPPING THE ENGINE

1. An engine that has been working under load should idle for a few minutes so the engine parts can cool evenly before it is shut off.
2. Turn starter key to "OFF" position.



## PREVENTIVE MAINTENANCE



FIGURE 17

PREVENTIVE MAINTENANCE IS IMPORTANT TO YOU.

AS THE OWNER OF A CASE TRACTOR, YOU POSSESS A MACHINE THAT IS MADE TO HIGH STANDARDS.

PREVENTIVE MAINTENANCE BY YOU OR YOUR OPERATOR IS THE EASIEST AND MOST ECONOMICAL MEANS OF ASSURING MANY SATISFACTORY PRODUCTIVE HOURS OF OPERATION.

The preceding sections of this operator's manual have dealt with instructions necessary for daily operation of your tractor. The following subjects present detailed instructions concerning the care and adjustments of the Tractor.

## BRAKE ADJUSTMENT

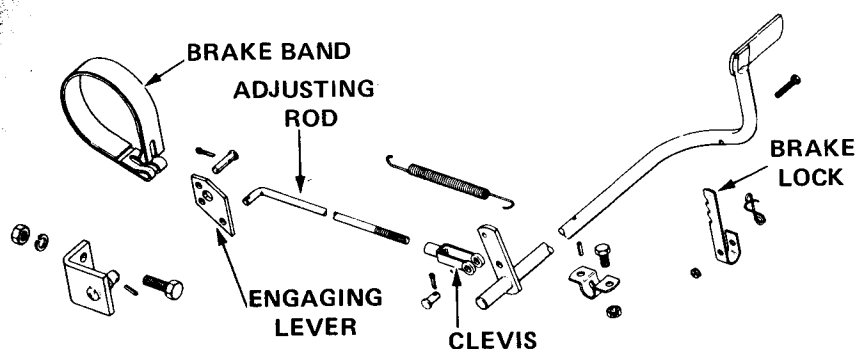


FIGURE 18.

The brake is properly adjusted when depressing the pedal brings the tractor to a prompt stop after releasing the travel control pedal. Also firm foot pressure should be required to depress the pedal far enough to engage the top notch of the brake lock.

To increase the brake band tension, disconnect the "adjusting rod" from the "engaging lever". See Figure 18. With the brake pedal in the fully released position, turn the "adjusting rod" further into the clevis. Reconnect the adjusting rod to the engaging lever and secure with cotter pin.

Be careful not to overtighten the linkage as this will cause the brake lining to "drag" on the drum and wear prematurely. Replace the brake band before the lining becomes worn through in any area to prevent damaging the drum.

## AIR CLEANER

Remove and clean element after each 25 hours or weekly. Install a new element every 500 hours or yearly or when loss of power is noticeable.

Tap element lightly on a flat surface to cause the loose dirt to fall off. Handle the element with care to avoid damage.

Replace the element with a new one if dirt does not drop off easily or if it is damaged. When replacing the element, be sure it fits snugly around the inside edge of the air cleaner base. Then replace the cover and tighten the wing nut finger tight.

An optional, washable, precleaner is available from your J I Case dealer and will extend the life of the air cleaner element.

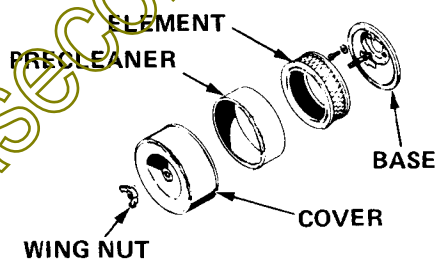


FIGURE 19.

## MODEL 644

### CARBURETOR

The carburetor has three simple adjustments:

1. High Speed Mixture Adjustment
2. Idle Mixture Adjustment
3. Idle Speed Adjustment

#### HIGH SPEED ADJUSTMENT

Before starting the engine, turn the high speed adjusting screw counterclockwise approximately 2 turns from the closed position.

With engine running and throttle fully open, turn the adjusting screw clockwise (in) until the engine misfires or falls off; then turn the adjusting screw counterclockwise (out) until the engine runs smoothly, approximately two turns.

Place the tractor under load and observe how the engine handles the load. Loss of power, tendency to stall, or excessive backfiring all indicate a lean mixture. Turn adjusting screw counterclockwise not more than 1/8 of a turn and again try the engine performance. When the high speed screw is correctly adjusted, it will not be necessary to reset the carburetor unless load conditions or fuel quality have been radically changed.

Operating an engine on too lean a mixture causes loss of power and high exhaust heat.



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

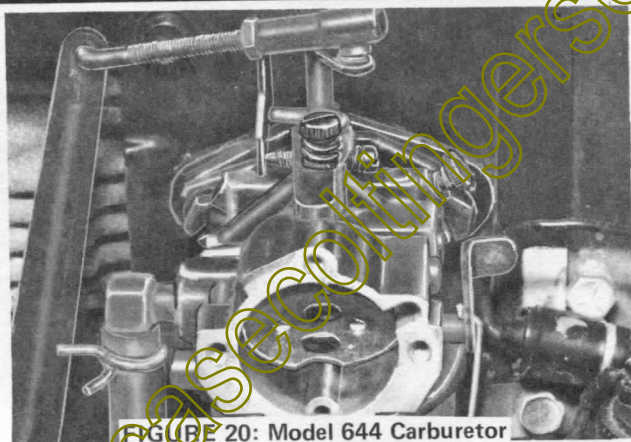


FIGURE 20: Model 644 Carburetor

#### IDLING SPEED AND IDLING MIXTURE ADJUSTMENT

Turn the idle mixture screw, Figure 20, counterclockwise approximately 1-1/4 turns from the closed position. Place the throttle in 1/2 open position and start engine. With the throttle all the way up, turn the idle speed adjusting screw, Figure 20, until 1000 RPM is obtained. The idle mixture screw can be adjusted in or out until the engine runs smoothly while maintaining 1000 RPM with the idle speed adjusting screw.

## MODEL 646

### CARBURETOR

The carburetor has a fuel idle adjustment. Engines prior to S/N 0674812310 have an adjustable main fuel jet which should be set between 1-1/4 and 1-3/4 turns open.

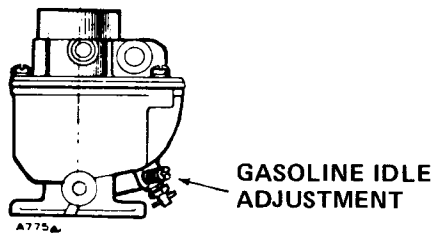


FIGURE 21: Carburetor Adjustment

IMPORTANT: Do not force needle against it's seat.

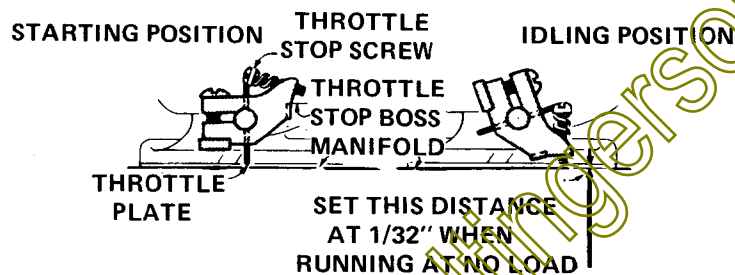


FIGURE 22: Throttle Adjustment

Before final adjustment, allow the engine to warm up. Make the idle adjustment under no load.

Set the throttle stop screw (located on carburetor throttle lever) with the engine running at a low speed setting, under no load. Turn the screw to give 1/32 inch clearance between the screw and pin.



# MODEL 646

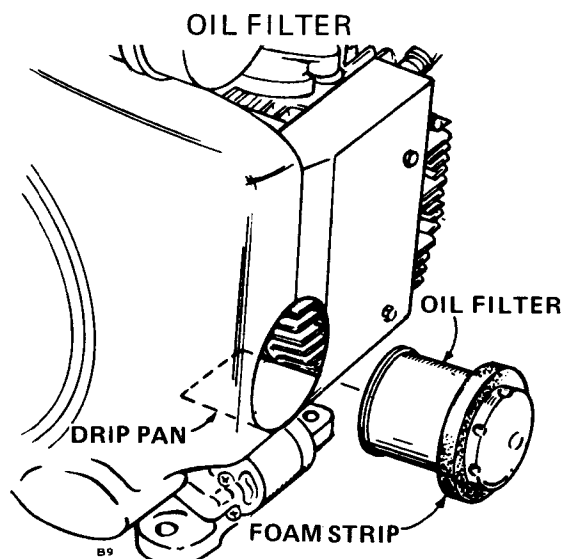


FIGURE 23: Oil Filter Location

**OIL FILTER:** Replace oil filter every 100 hours; replace more often in dusty conditions. When installing, always reinstall the foam strip around the filter. Tighten the filter finger tight plus one quarter to one half turn.

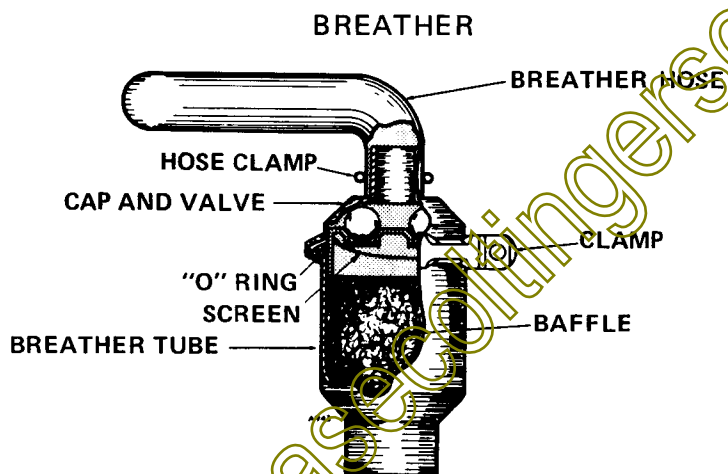


FIGURE 24: Crankcase Breather System

**CRANKCASE BREATHER:** This engine uses a crankcase breather valve for maintaining crankcase vacuum. No maintenance is generally required. If the crankcase becomes pressurized as evidenced by oil leaks at the seals, clean baffle and valve in a suitable solvent.

## TOE-IN ADJUSTMENT

1. Locate the tractor on a hard level surface preferably concrete. Place front wheels in a straight ahead position.
2. Make sure the front tire pressures are equal.
3. The front tires should show a mold part-line which coincides with the centerline of the tire. If the centerline of the tire is not readily visible, then the wheel can be raised off the ground, spun and marked at the approximate centerline location.
4. Measure the distance between the tire center lines or the chalk marks.

MEASUREMENT "A" MUST BE 1/8 TO 3/8-INCH (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.

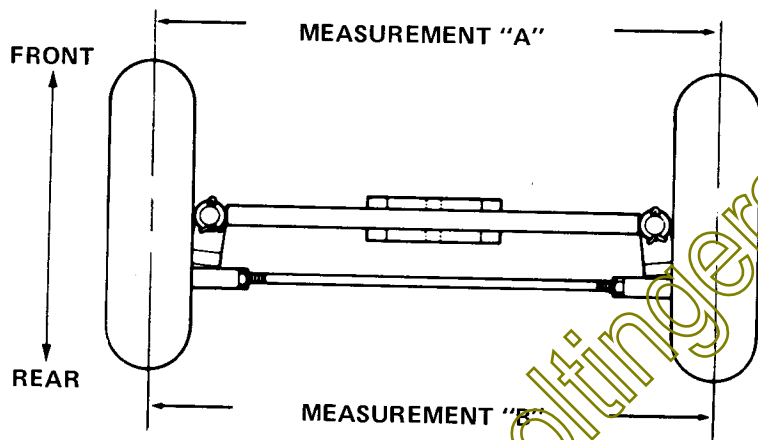


FIGURE 25

1. Loosen both tie rod jam nuts.
2. Turn the tie rod in or out of the ball joints as required. Retighten the jam nuts when correct toe in is obtained. One ball joint has left hand threads and the other right hand so it is unnecessary to disconnect it from the king pin lugs. Turning the joints off the tie rod increases the toe in. Turning the joints on the tie rod decreases the toe in.

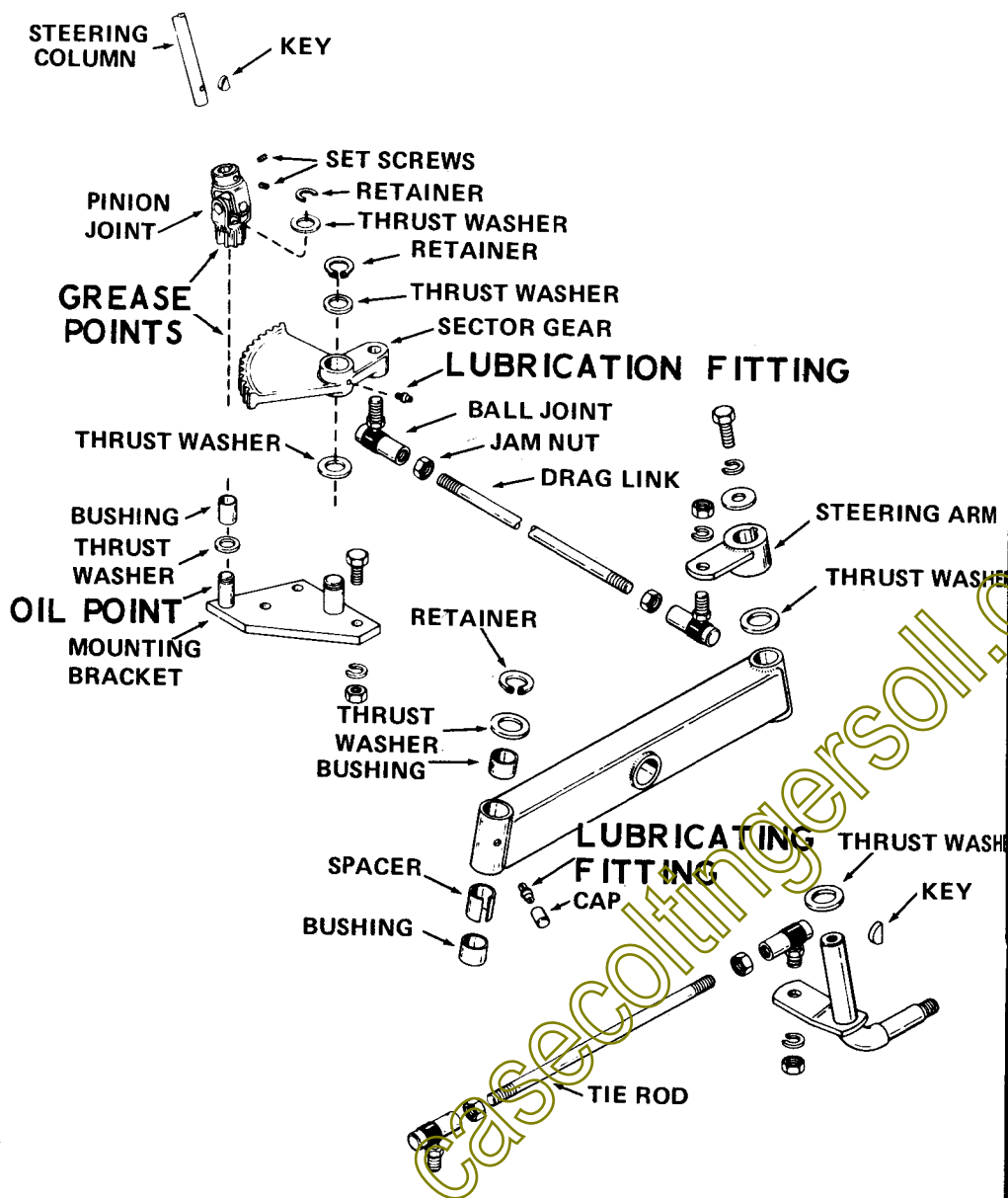


FIGURE 26

## STEERING ADJUSTMENT

**TURNING RADIUS**--The turning radius should be approximately the same in both the right and left directions. To adjust the turning radius, loosen both jam nuts on the drag link and turn the drag link in or out of the ball joints as required. One ball joint has left hand threads and the other right hand so it is not necessary to disconnect them from the steering arm and gear.

To adjust for shorter left turn, lengthen the drag link. Shorten the drag link to obtain sharper right turn. Tighten the jam nuts when correct turning radius is obtained. Properly adjusted, the pinion joint will be centered in the sector gear when the wheels are pointed straight ahead. This can be checked by removing the service panel under the console and counting the number of sector gear teeth on each side of the center meshed pinion joint tooth.

**STEERING WHEEL FREE PLAY**--Free play should not exceed two inches at the outside diameter of the steering wheel. If free play is excessive, first check to make certain all ball joints are properly tightened to the king pins, tie rod, steering arm, sector gear and drag link. Visually check each pivot point in the steering system to determine the source of free play. Thrust washers and bushings are located at the front axle, pinion joint and sector gear as shown in Figure 26.

**IMPORTANT:** If the bushings in the front axle are replaced, make certain the spacers are reinstalled with the "split" in line with the lubrication holes.

**LUBRICATION**--Fittings are provided for the front axle king pins and the sector gear pivot pin. Lubricate the king pins every 8 hours and the sector gear pin at least every 100 hours. Also coat the sector gear and pinion joint teeth with grease at least every 100 hours. At the same time apply a few drops of oil to the pinion joint pivot pin.

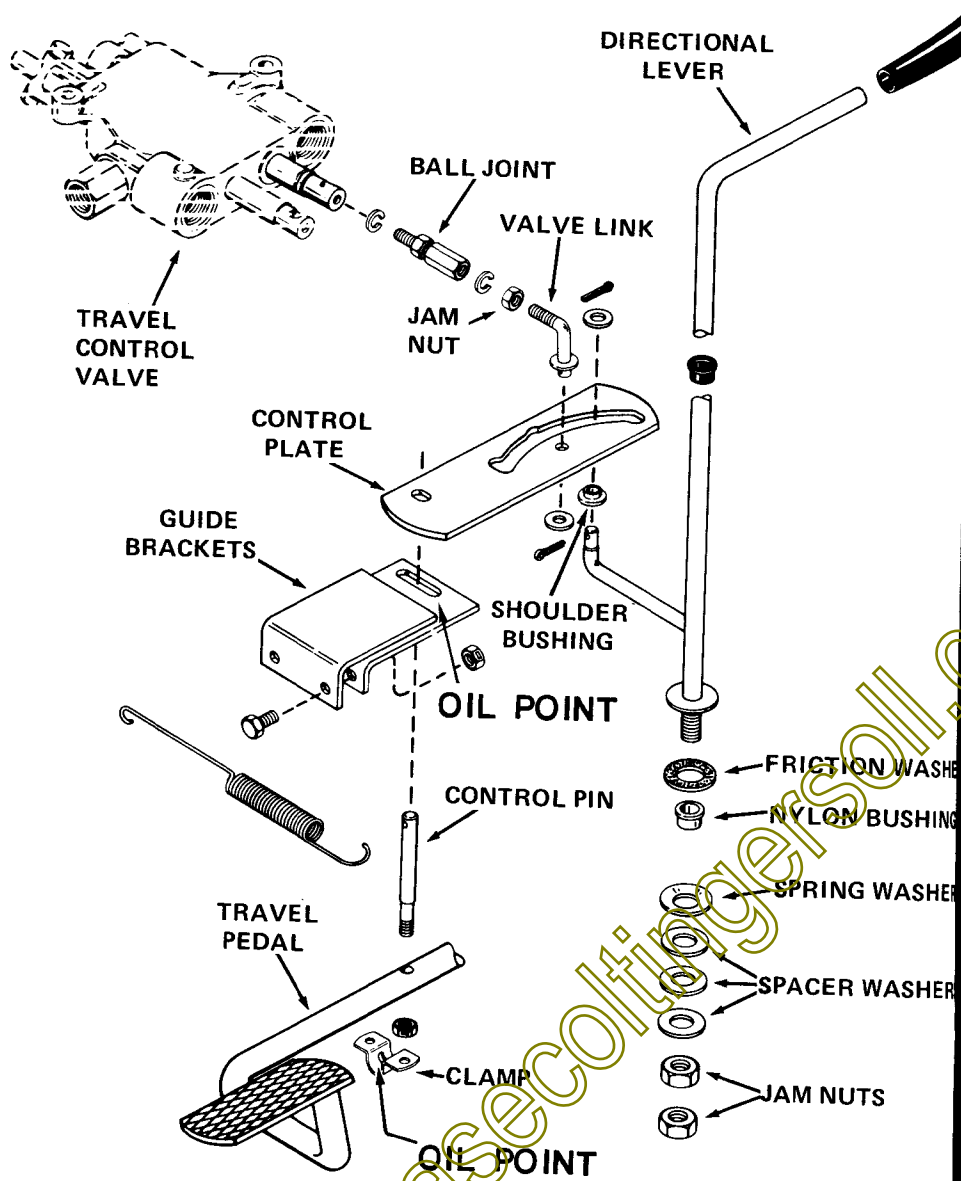


FIGURE 27



## DIRECTIONAL LEVER, TRAVEL PEDAL AND CONTROL VALVE LINKAGE

**DIRECTIONAL LEVER**--The directional lever should remain in the position it is placed when the travel pedal is depressed. If the lever tends to move back toward "neutral" when engaging the travel pedal, the friction washer, Figure 27, may be worn or additional tension may be required. If the lever does not stay in the full forward or reverse position, full speed and power will not be available in that direction.

The friction washer can be replaced by disconnecting the directional lever and valve link from the control plate and raising the directional lever above the frame member. The nylon bushing should always be replaced when replacing the friction washer.

To adjust the tension on the directional lever turn the upper jam nut until the lever remains in the full forward and reverse positions when the travel pedal is depressed. Using one wrench to hold the upper nut in position, securely tighten the lower jam nut using a second wrench.

Periodically check the condition of the shoulder bushing located on the directional lever where it connects to the slot in the control plate. Proper travel control valve function is dependent on a snug connection between the directional lever and control plate. The bushing must be installed as shown so it fits into the slot on the control plate and a plain washer and cotter pin used to secure the directional lever. Replace this bushing if it becomes worn to insure positive control valve action.

**TRAVEL PEDAL AND CONTROL VALVE LINKAGE** keep the control pin tightened securely to the travel pedal. This will insure positive operation of the control plate.

Tractor speed and power should be equal in forward or reverse. Should the tractor lack power or speed in one direction, the adjusting nuts on the control valve links may be loose or out of position. Always use two wrenches, one on each nut, when making adjustments to the valve linkage. It is important that the ball joint is tightened securely to the valve spool.

Be sure that the travel pedal does not bottom out against the floor plate, or that the control pin does not strike the end of its slot before the valve spool has moved full stroke. Full speed and power may only be obtained if the valve spool can move its full stroke.

Apply a few drops of oil periodically at the travel pedal mounting clamps and the control plate guide brackets to keep the system operating smoothly.

## FRONT WHEEL BEARINGS

Remove, clean, inspect, and repack the front wheel bearings every 500 hours or annually, whichever occurs first. Also inspect the bearing races in the wheel hubs for scoring or damage. See Figure 28. Clean any dirt or moisture from the inside of the hubs. Inspect the dust seals for damage or wear and replace if necessary. Also check for and polish off any rough spots on the spindles. Fill the center area of the hubs with a good grade of wheel bearing grease. Pack the bearings using a bearing packer if available.

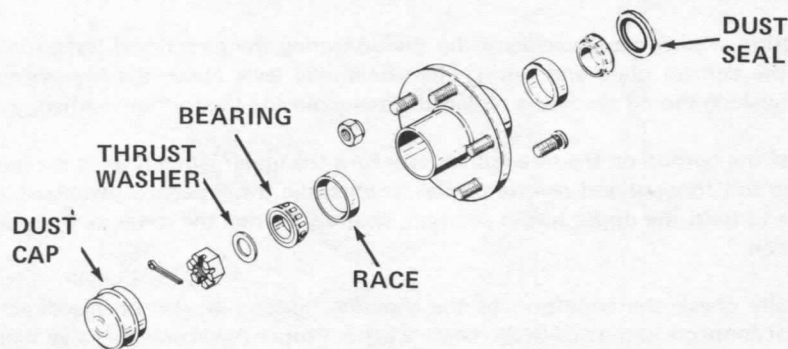


FIGURE 28

If a bearing packer is not available, a hand packing method is illustrated in Figure 29. Place the grease in the palm of one hand and work the bearing into it with a wiping motion until grease comes through at the top of the rollers. Continue rotating the bearing until all of the rollers are fully packed.



FIGURE 29

During reassembly, make certain the thrust washer is installed between the outer bearing and castle nut. Tighten the castle nut until the bearings and races (See Figure 28) are seated together; then back off castle nut until hole appears between nearest slots. Install cotter pin and dust cap.

# LOADER SINGLE LEVER CONTROL LINKAGE

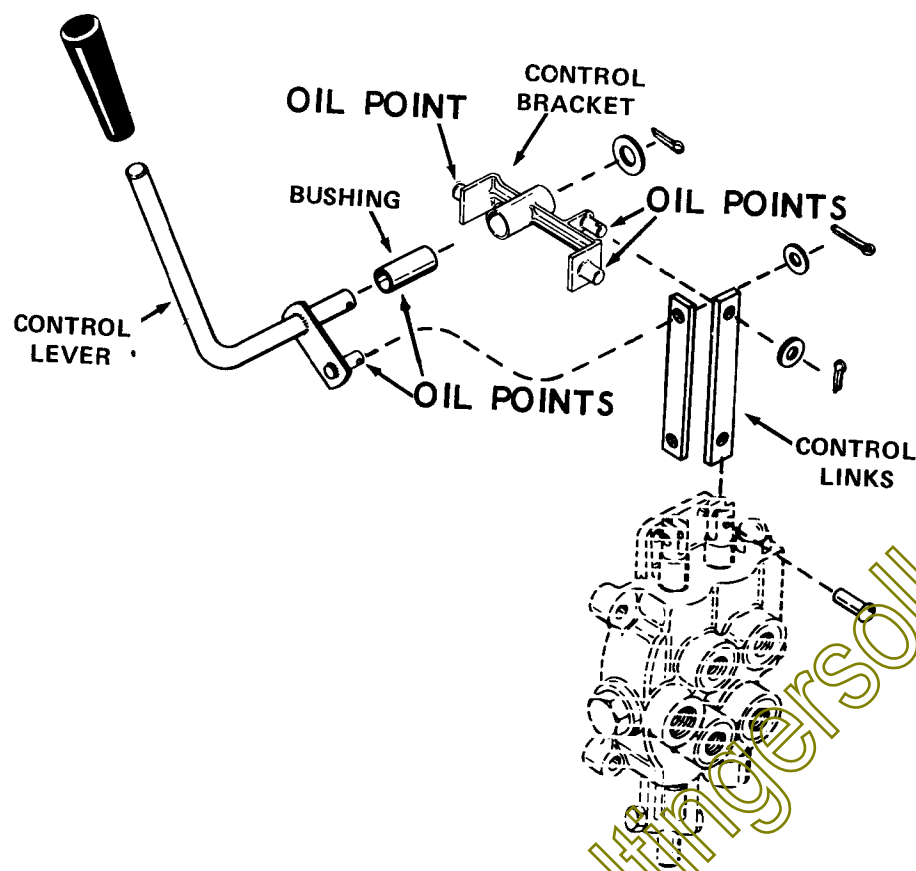


FIGURE 30

The control lever should always self-return to neutral from both the lift arm and bucket control positions. Figure 30 illustrates the control mechanism and lubrication points. Oil the points indicated every 30 days or more often if necessary to keep the control lever operating freely.

## ELECTRICAL SYSTEM

### HEADLIGHTS

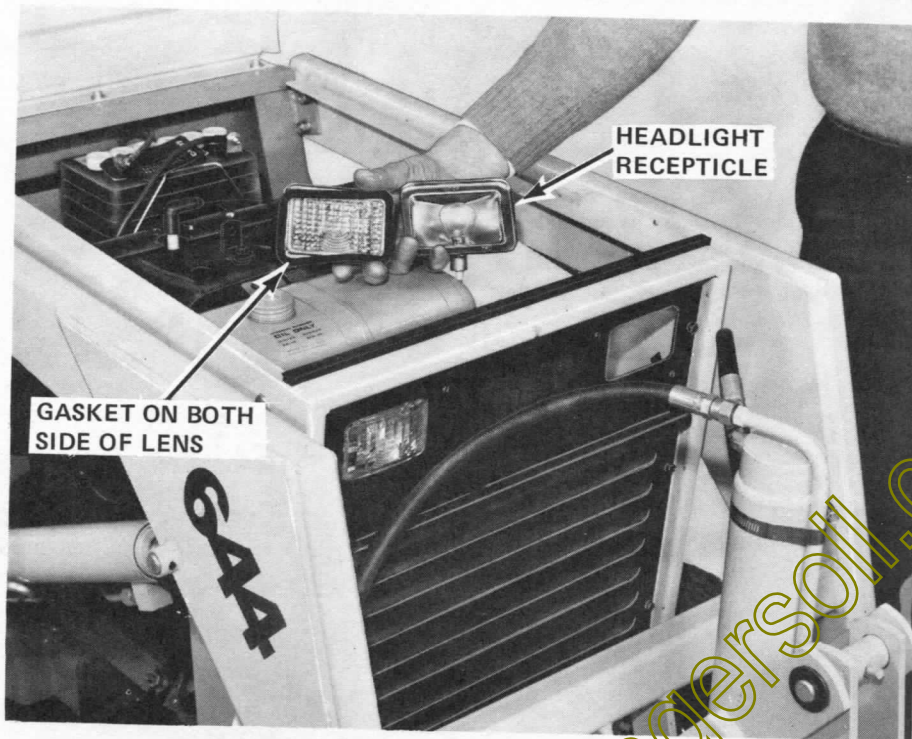


FIGURE 31

To install a new Case 12 volt replacement headlight bulb, remove the two screws and retainers which attach the headlight to the inside of the headlight panel. Lift out the headlight and disconnect the wire at the connector.

Remove the old bulb by pushing inward and turning it counterclockwise. Install the new Case bulb and replace the receptacle making certain one gasket is located between the lens and grille and the other is properly seated between the lens and receptacle.

The new bulb will not light unless the receptacle is reinstalled or manually grounded to a metal part on the tractor. After installing, make sure all the connections and mounting screws are tight.



## 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:** It is possible that under unusual conditions, "colder" type spark plug may be required. Consult your Authorized Case Dealer regarding the proper type spark plug to use for your particular condition.

The spark plug plays a very important part in the power, fuel economy and general performance of your engine. The outside of the plug should be cleaned frequently to prevent shorting of the plug.

The spark plug should be removed, checked, cleaned and gapped at the end of every 100 hours of operation.

### REMOVING

It is important to select the exact size spark plug wrench. The wrong size or type wrench may cause distortion and insulator breakage. Always use a spark plug wrench or a thin wall deep socket wrench of the recommended size.

Thoroughly clean the spark plug, including the threads, with a pen knife or wire brush and solvent. A very slight drag should be felt when the gauge wire passes between the electrodes.

Reset the gaps by bending the side electrode only. Never bend the center electrode.

### INSTALLING

Install the spark plug in the engine, with a new gasket, and seat the plug finger tight on the gasket. Tighten the plug about 3/4 of a turn after the plug is seated firmly on its gasket. If a torque wrench is available, tighten the plug to 27 foot-pounds (36.6 Newton-metre). This will assure proper seating and sealing of the spark plug.

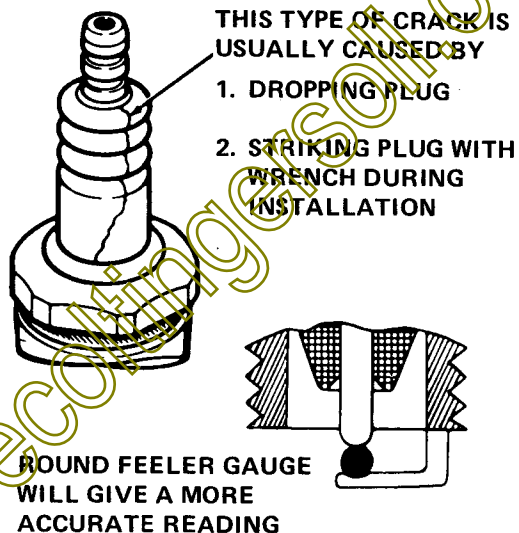


FIGURE 32

Do not use abrasive cleaning machines.



## STORAGE BATTERY



**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.



**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.

### RULES FOR BATTERY CARE

1. Add pure or distilled water, as needed, to keep the separators covered. Check every 25 hours or weekly depending on air temperature. Normal water consumption would be approximately 1 ounce every 25 hours of operation. If it is greater, either the case is leaking or the rectifier regulator is overcharging and must be replaced.
2. Keep the battery in a healthy state of charge as shown by hydrometer readings.
3. Make sure the battery is securely fastened in position. Cable leading from the battery should not touch cell connectors or lay on the battery container.
4. Keep the battery clean and dry.

If a battery will not hold a charge, replace it with a new one meeting the specifications as listed in the specification section.

**IMPORTANT:** The full charge gravity reading will usually be specified on the battery. A battery having a reading of 1.175 will freeze at approximately 0° Fahrenheit (-18° C) temperature.

## ADDING WATER

Unless the tap water in your area is "approved" (water free of scale-forming minerals), always add distilled water to the battery.

When water is added during freezing weather, the battery must receive a charge immediately to mix the water and electrolyte. If it is not mixed, the water will remain at the top and freeze.

Check the liquid level in each cell weekly by removing the vent plugs. Add water before the tops of the separators become exposed. **DO NOT OVERFILL.**

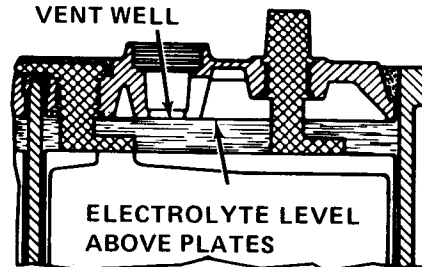


FIGURE 33

## VENT PLUGS

Always keep the vent plugs in place and tight. Be sure the vent holes are free of dirt to prevent gas pressure in cells from breaking the seal of the container.

## CABLE TERMINALS AND BATTERY POSTS

The battery terminals must be kept clean and tight. A good method of cleaning terminals is to remove all excess corrosion with a wire brush, then wash with a weak baking soda solution or ammonia. After cleaning, a thin coating of vaseline or light cup grease will retard further 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 in active use, the battery will require a charge at sufficient intervals to keep the hydrometer reading at or above 1.250. An idle storage battery will slowly discharge.

## HOW TO JUMP START WITH BOOSTER CABLES AND BOOSTER BATTERY

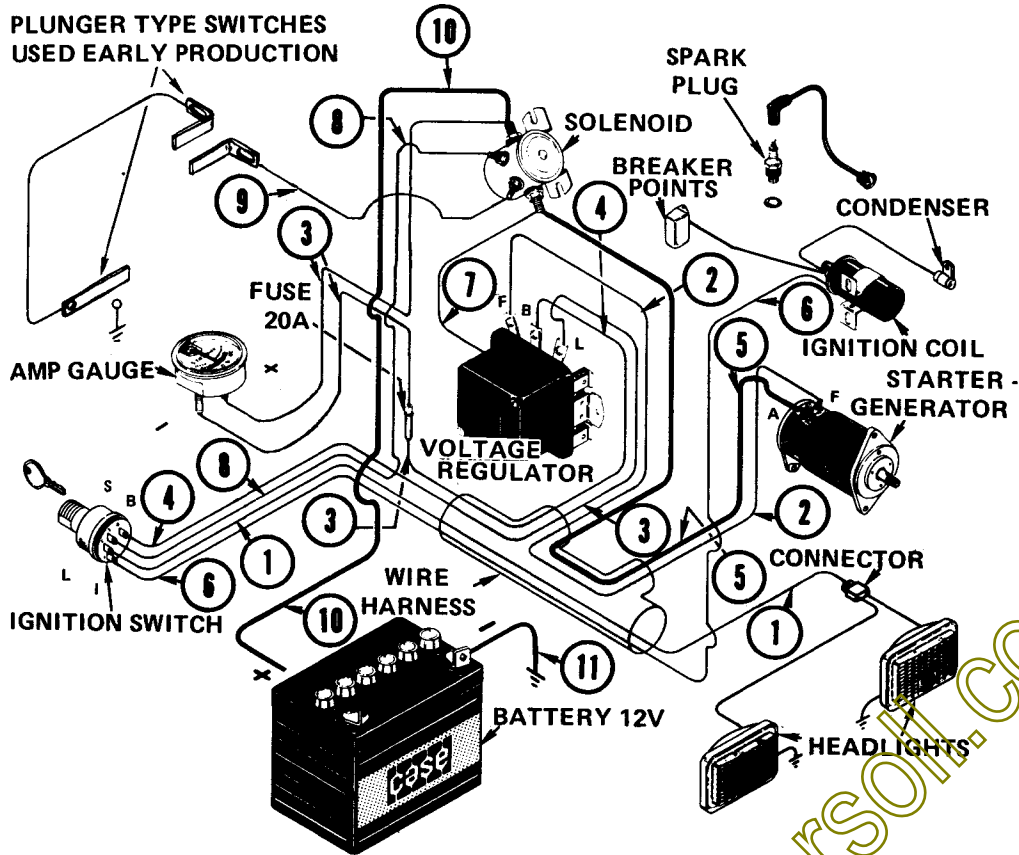
ALWAYS SHIELD EYES WITH GOGGLES, ETC. WHEN WORKING NEAR BATTERIES. PROTECT SKIN AND CLOTHING AGAINST ACID.

1. Connect one end of first booster cable to battery terminal on starter solenoid.
2. Connect other end of first booster cable to the positive terminal post of the booster battery.  
That is: Positive to Positive.
3. Connect the first end of second booster cable to the negative terminal of the booster battery. With the last end of the second booster cable make the final connection to the ENGINE BLOCK of the machine with the discharged battery. Connect as far away as possible from battery to prevent any possible sparks near the battery. Make certain machines do not touch.
4. TO REMOVE BOOSTER CABLES: Remove last connection at the engine block FIRST, then remove all other connections in reverse order. Keep booster cable ends from touching to prevent sparks.



**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.

## WIRING DIAGRAM



### WIRE COLOR CODE AND ROUTING

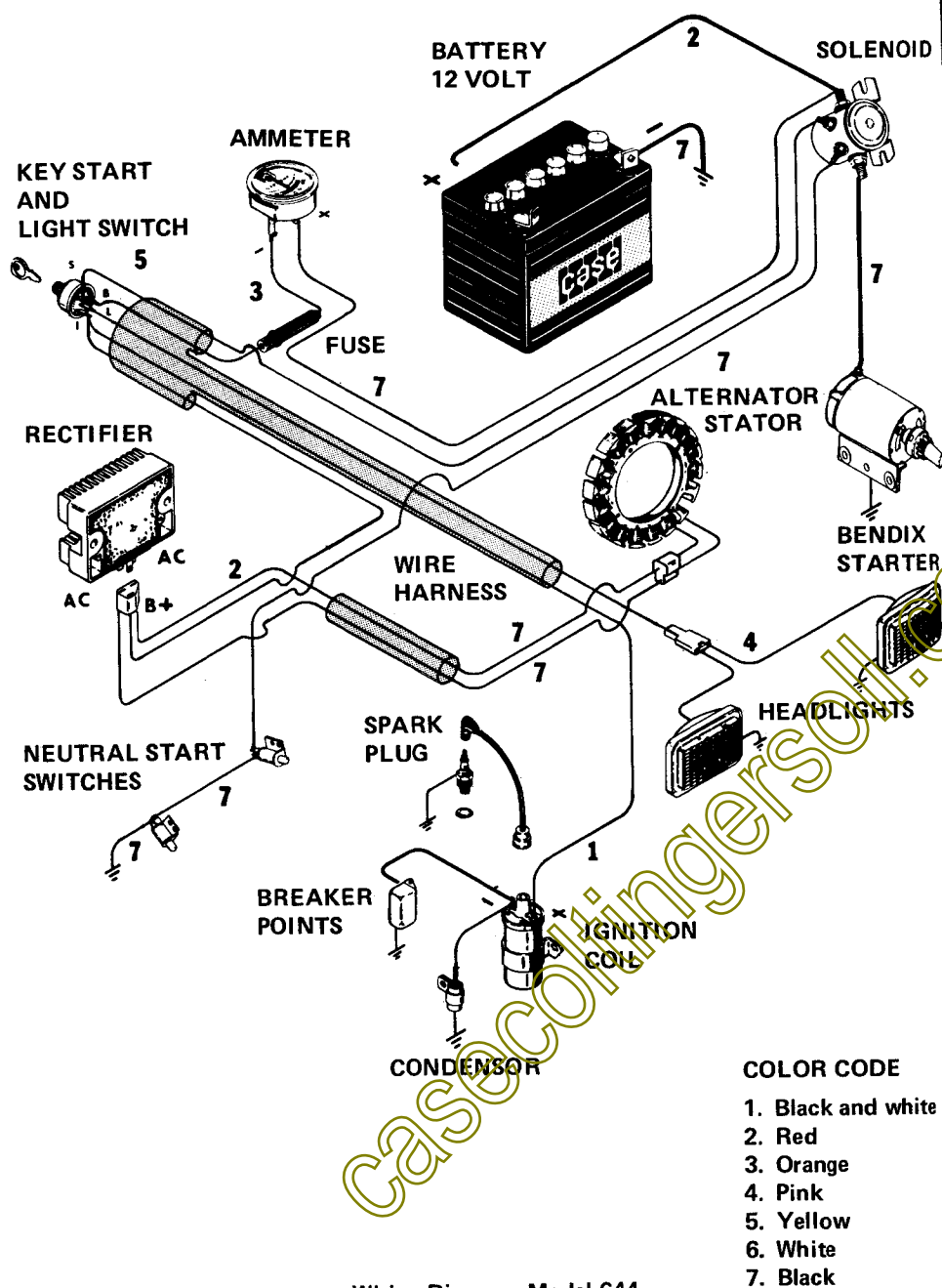
- 1 - Pink
- 2 - Green
- 3 - Orange
- 4 - Red
- 5 - Black
- 6 - Black/White
- 7 - White
- 8 - Yellow
- 9 - Black
- 10 - Red
- 11 - Black

Wiring Diagram, Model 644

Prior to S/N 9757919

FIGURE 34

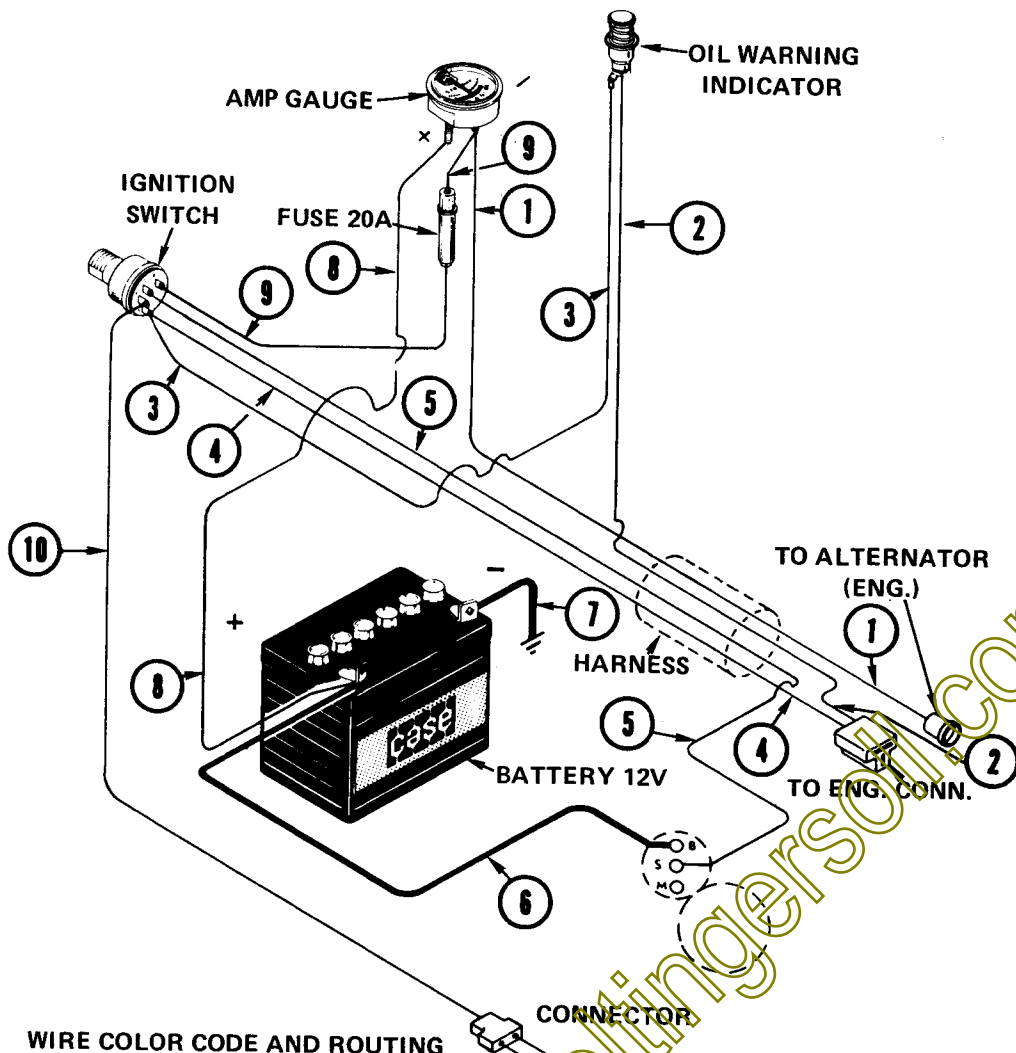
# WIRING DIAGRAM



Wiring Diagram, Model 644.  
S/N 9757919 and After.  
FIGURE 35



# WIRING DIAGRAM



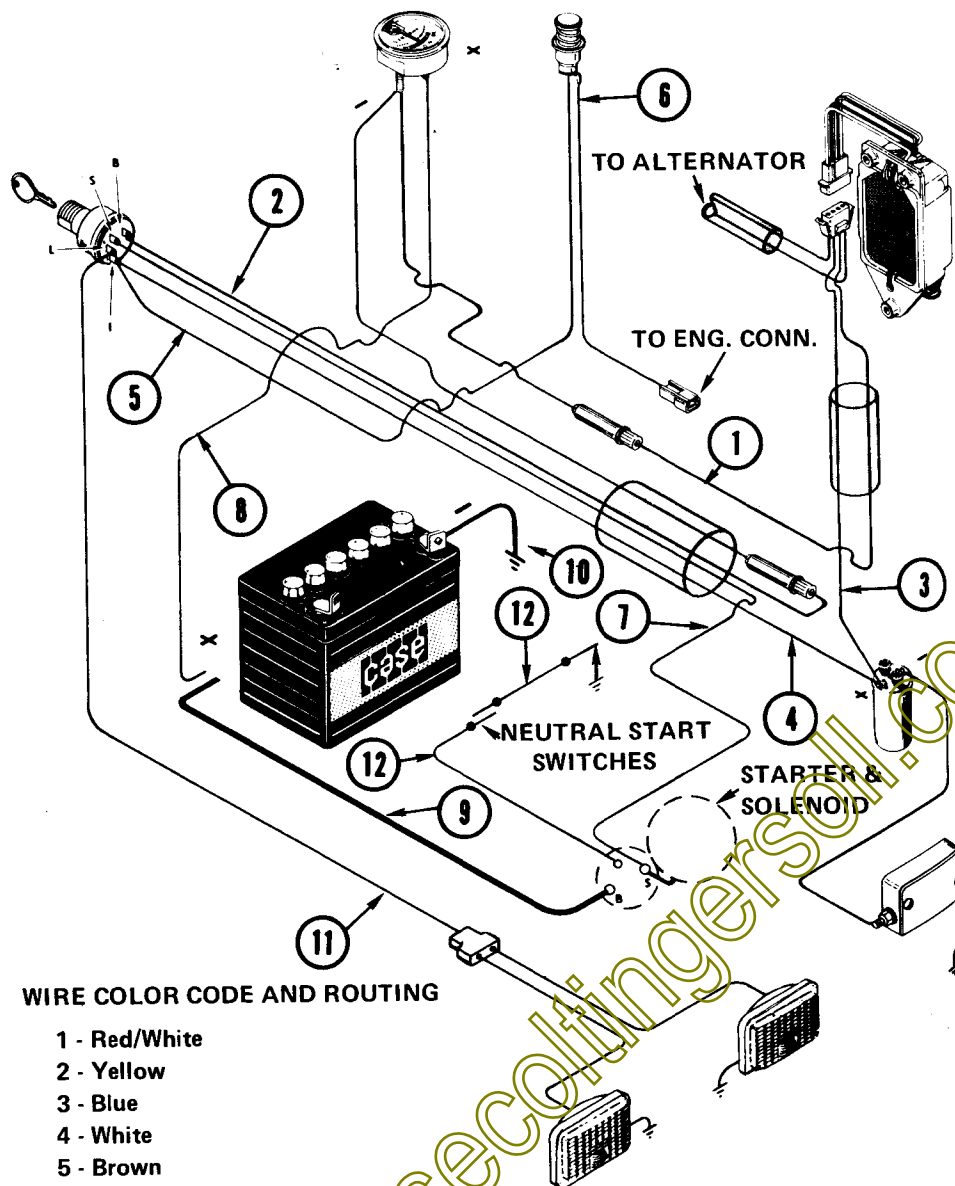
## WIRE COLOR CODE AND ROUTING

- 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 36

# WIRING DIAGRAM



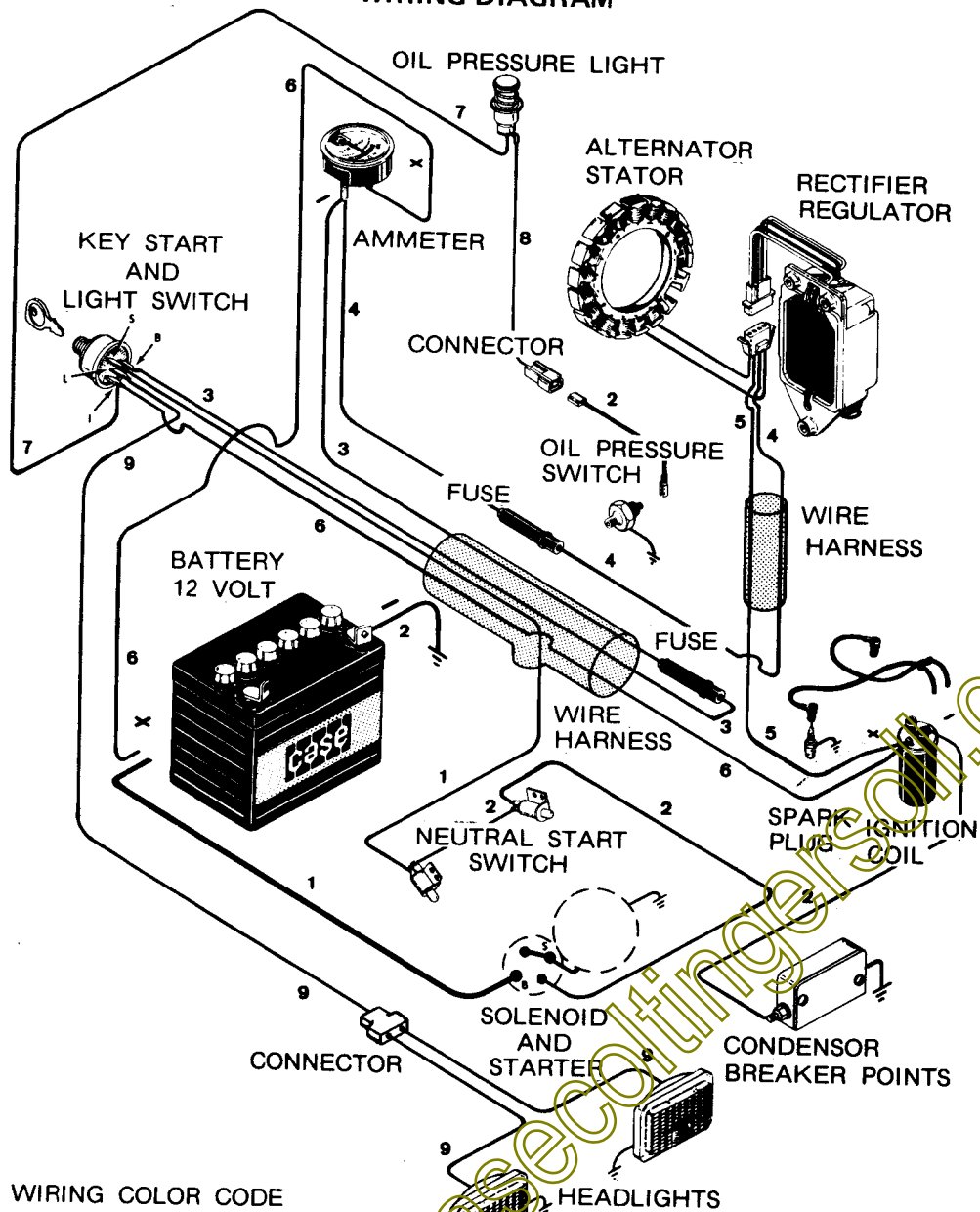
## WIRE COLOR CODE AND ROUTING

- 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 37

# WIRING DIAGRAM



## WIRING COLOR CODE

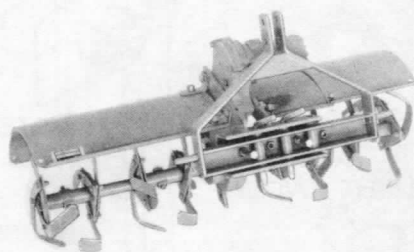
- 1 - Red
- 2 - Black
- 3 - Yellow
- 4 - Red/white
- 5 - Blue
- 6 - White
- 7 - Brown
- 8 - Black/white
- 9 - Pink

Wiring Diagram, Model 646 S/N 9732190 and After  
FIGURE 38

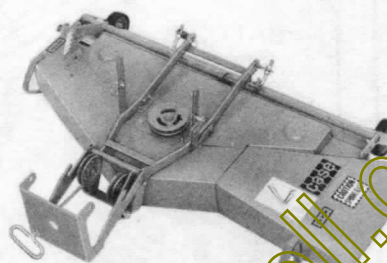
## AVAILABLE ATTACHMENTS



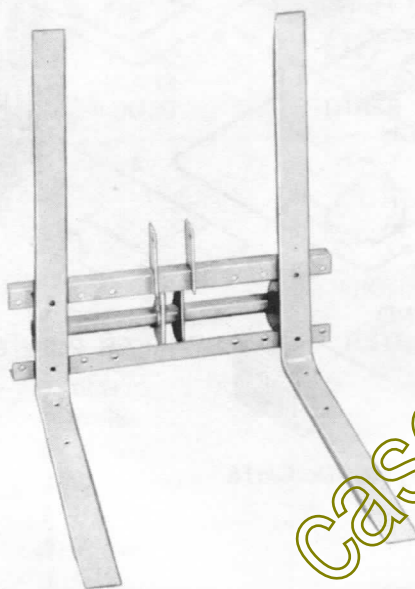
CATEGORY "O" 3-POINT HITCH  
AND HYDRAULIC  
POWER-TAKE-OFF KIT.



41" (1040 mm) HYDRAULIC DRIVEN TILLER  
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 —

At the time your Case Dealer delivers your new tractor, he will acquaint you with its operation and maintenance as outlined in the "Owner Warranty Registration and Delivery Report". When your Dealer has completed these instructions, he will ask you to sign the report and will then hand you a copy for your records.

**AFTER DELIVERY CHECKUP**

The Authorized Case Dealer from whom you purchased your new tractor will perform the "After Delivery Checkup" outlined on the following page, if you will arrange to bring your tractor to his Service Shop within --

60 days after date of delivery or 100 hours of operation (whichever occurs first).

**NOTE:** The only charge your dealer will make for this inspection will be for oil, filter, or other accessories.



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