

John Deere 1000 Series Tractors



SERVICE MANUAL

John Deere 1000
Series Tractors

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John Deere Tractor Works
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ENGLISH



SERVICE MANUAL FOR JOHN DEERE DEALERS

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SERIES

TRACTORS

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TO THE JOHN DEERE SERVICEMAN

This service manual contains maintenance instructions for John Deere 1000 Series tractors. Included are complete instructions for removal, disassembly, inspection, repair, assembly and installation of the major parts and assemblies of the tractor.

In addition, the manual contains brief descriptions of the more complicated systems of the tractor, and tells how they operate. Dimensions of many new wearing parts are given as an aid in determining when parts replacement is necessary. Tests and adjustments, required to keep the tractor operating efficiently, are explained in detail.

A section on "Tune-Up and Adjustment" contains instructions for performing the services necessary to help the tractor perform efficiently and economically after it has been in the field for some time.

This manual was planned and written for the Service Department; its place is in the shop. Use the manual whenever in doubt about correct maintenance procedures. Use it as a text book for training new Service Department personnel who are unfamiliar with John Deere Tractors.

Daily use of the Service Manual as a guide for any and all service problems will reduce error and costly delay to a minimum and assure you the best in finished service work. In many instances your customer's confidence in your work will be improved when he sees you using the Service Manual. He knows you are following approved maintenance procedures and making proper adjustments. There is no guesswork when you use the manual.



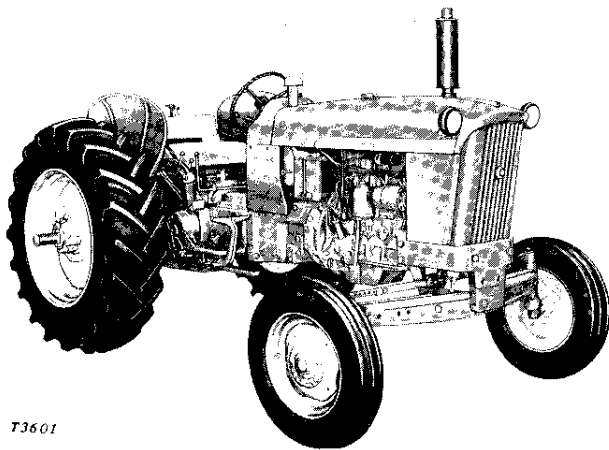
Section 10

DESCRIPTION, OPERATION AND SPECIFICATIONS

Group 5

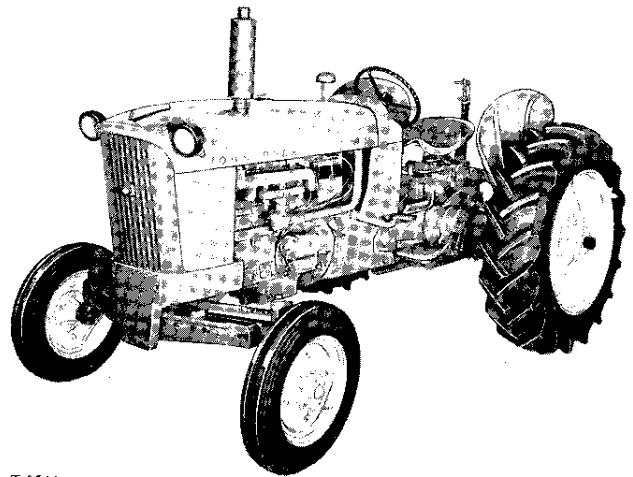
DESCRIPTION

The John Deere 1000 Series includes six basic tire-type tractors. These tractors are illustrated on this and the following pages.



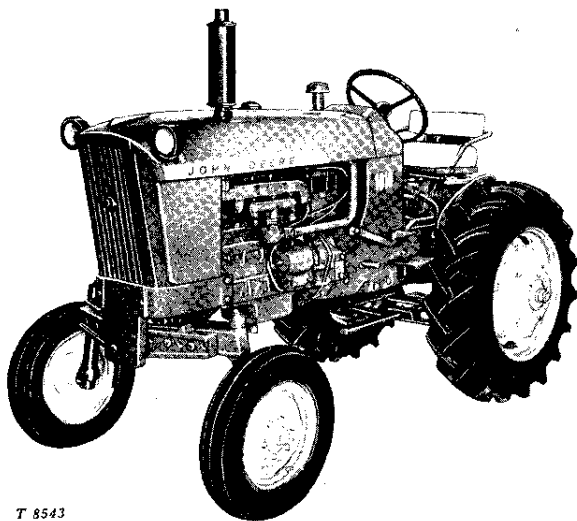
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Fig. 10-5-1—John Deere 1010 Row-Crop Utility (1010 RU)



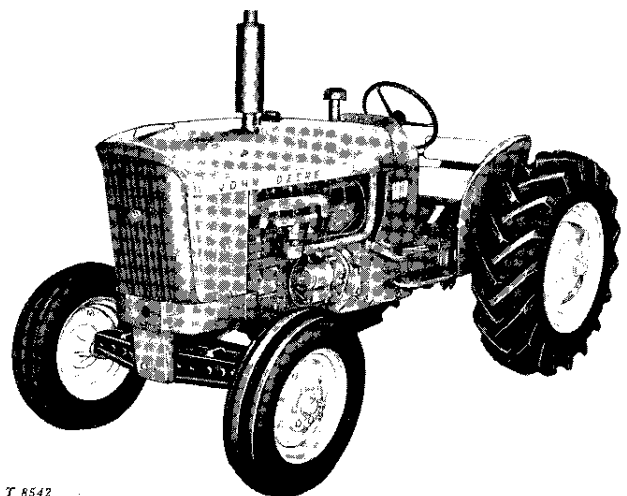
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Fig. 10-5-3—John Deere 1010 Special Row-Crop Utility (1010 RUS)



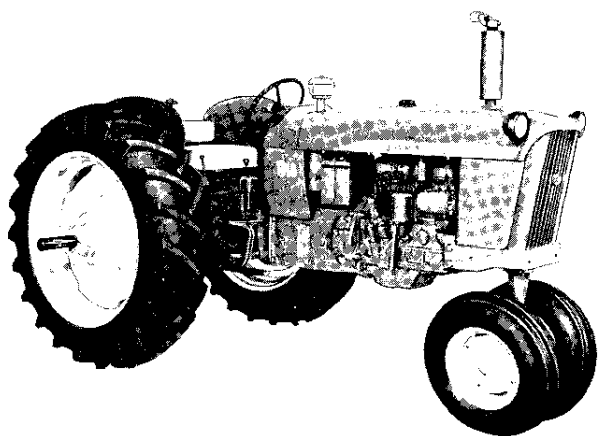
T 8543

Fig. 10-5-2—John Deere 1010 Single Row-Crop (1010 RS)



T 8542

Fig. 10-5-4—John Deere 1010 Utility (1010 U)



T 8612

Fig. 10-5-5—John Deere 1010 Row-Crop (1010 R)

The 1010 Row-Crop Utility (RU) is, as the name implies, an all-round agricultural type tractor. Its longer wheel base and lower center of gravity provide excellent stability even when working under adverse conditions. It is especially suited for use by citrus growers, orchardists, vineyardists, hay growers, and general farmers.

The 1010 Single Row-Crop (RS) is a general-purpose tractor with an adjustable front axle. It is especially useful for one-row planting, cultivating, mowing, seedbed preparation, and similar jobs.

The 1010 Utility (U) is a low-built row-crop cultivating, general-purpose tractor. Like the 1010 Row-Crop Utility, it offers the same excellent stability and ground-hugging features. In addition, it can be equipped with either a mechanical or hydraulic mower for use by highway departments or park commissions.

The 1010 Special Row-Crop Utility (RUS) is a lower-priced version of the Row-Crop Utility. This tractor, with its single rockshaft hydraulic system and 540 rpm PTO, will perform almost all jobs that can be handled by the Row-Crop Utility.

The 1010 Row-Crop (R) combines high clearance (for tall crop cultivation) with utility tractor versatility. This general-purpose tractor can be equipped with Roll-O-Matic, dual front wheels, single front wheel, or an adjustable front axle. It is especially useful for planting and cultivating two, four, or six rows, mowing, seedbed preparation, and similar jobs.

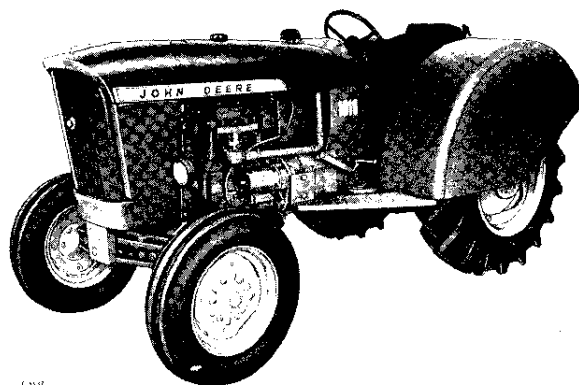


Fig. 10-5-6—John Deere 1010 Grove and Orchard (1010 O)

The 1010 Grove and Orchard (O) is specially designed to work fast, easily, and efficiently in groves, orchards, and vineyards. With its underneath muffler, low-mounted headlights, and wide fenders with side shields, it is without branch-catching obstructions. It handles drawn, PTO, and 3-point equipment for grove and orchard work as well as field and utility jobs.

The tractors in the 1010 Series line are identical in many respects. Features which are common to all types are described briefly in the paragraphs which follow. The distinctive features of each are also mentioned briefly.

COMMON FEATURES

GASOLINE ENGINES

The 1010 Series gasoline engine is a vertical, four-cylinder, valve-in-head, four-stroke cycle, internal combustion engine. A bore of 3-1/2 inches and a stroke of 3 inches give a piston displacement of approximately 115 cubic inches.

The compression ratio is 7.9 to 1. (Pistons are available for high altitude operation which provide a 9.0 to 1 compression ratio.)

A "sleeve and deck" cylinder liner assembly is used. This feature provides lower costs at time of engine overhaul.

Crankshaft rotation is counterclockwise when viewed from the flywheel.

The engine has replaceable precision-type main and connecting rod bearing inserts. All bearings and other parts of the engine are lu-

bricated by a force-feed and splash-type system. The system includes a replaceable filter element. The crankcase is ventilated by means of a vent tube attached to the rocker arm cover. This tube discharges below the crankcase flange. Engine speeds are controlled by a fly-weight-type governor driven by the camshaft.

DIESEL ENGINES

The 1010 Series diesel engine is a vertical, four-cylinder valve-in-head, fuel injection, four stroke cycle, internal combustion engine. A bore of 3-5/8 inches and a stroke of 3-1/2 inches give a piston displacement of approximately 145 cubic inches. The compression ratio of the diesel engine is 19 to 1.

The engine has replaceable precision-type main and connecting rod bearing inserts. All bearings and other parts of the engine are lubricated by a force-feed and splash-type system. The system includes a replaceable filter element. The crankcase is ventilated by means of a vent tube attached to the rocker arm cover and discharging below the crankcase flange. Engine speeds and injection timing are controlled by the fuel injection pump.

A "sleeve and deck" cylinder liner assembly is used on the diesel engine.

Crankshaft rotation is counterclockwise when viewed from the flywheel.

FUEL SYSTEM

The 1010 Series gasoline fuel system is equipped with a 12 U.S. gallon fuel tank. The carburetor is a single-throat, updraft, adjustable idle and load jet type.

The 1010 Series diesel uses a distributor-type fuel injection pump. The fuel system consists of a 12 gallon fuel tank, two-stage fuel filters, fuel strainer, fuel injection pump, fuel injection nozzles, and turbulence chambers. The fuel injection pump is an opposed plunger, inlet metering, distributor type. Injection nozzles are located in turbulence chambers mounted at the top of each cylinder.

IGNITION

Gasoline models have a battery-distributor type ignition system with automatic spark advance. A 12-volt battery, generator, and starter are standard equipment.

The diesel engines are equipped with an electrical pre-heating system called "glow plugs" which are electrical heating elements located above the fuel injectors on the cylinder head and extending into the turbulence chambers. There are four glow plugs on the 1010 Series Diesel Tractors. They are used when starting a cold engine and need not be used when starting a warm engine.

A 12-volt battery actuates the ignition system.

LIGHTING SYSTEM

All lighting equipment is optional and includes hood-mounted headlights, a dash light, a combination white and red rear warning light, auxiliary plug-in light socket, and a tractor warning lamp.

COOLING SYSTEM

The engines are liquid cooled. Coolant is circulated evenly and under pressure in all passages in the block and head, and through the radiator, by a centrifugal water pump located on the cylinder block, and operated by the fan belt. A thermostat and fixed bypass insure a quick and thorough engine warm-up.

CLUTCH

The engine clutch used on the 1010 Series Tractors is a spring-loaded, single dry-disk, foot-operated clutch, located in front of the transmission. Adjustment for clutch pedal free travel can be made externally.

TRANSMISSION

The transmission is a selective sliding gear type and is manually shifted through a range of five forward speeds and one reverse. A conventional ring gear and bevel pinion type differential is enclosed in the rear of the transmission case. Bevel pinion and gear backlash adjustment is made by shims between the ring gear carrier and the bearings (-31000) or between the bearing quills and transmission case (31001-up).

POWER TAKE-OFF

The dual power take-off is an independent, live type, governed by its own separate clutch, and is available with dual speeds of 540 rpm or 1000 rpm. The 540 rpm power take-off is of the conventional transmission-driven type. Both types fully meet all ASAE-SAE standards.

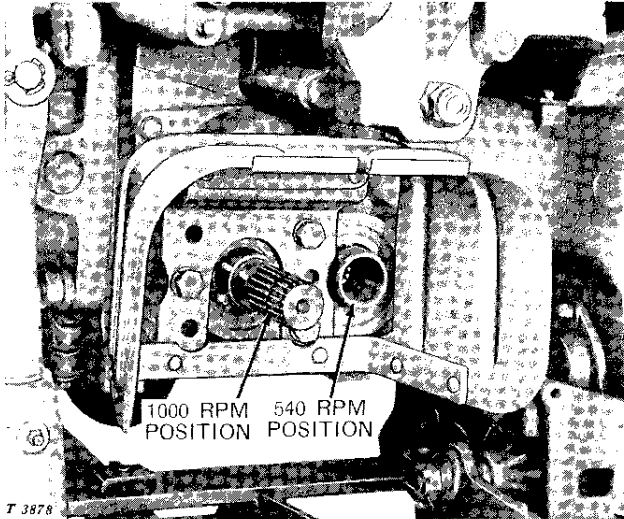


Fig. 10-5-7—Dual PTO

BELT PULLEY

A belt pulley is available as an attachment. The pulley assembly slips over the 540 rpm power take-off shaft and is attached to the transmission rear cover or to the power take-off housing. The belt pulley is driven by the power take-off shaft. With the engine at standard PTO speed of 1900 rpm, the belt speed is 2811 feet per minute.

BRAKES

Two individually or simultaneously operated, self-energizing, double-disk brakes are provided. Braking is applied by pedals through rod and lever linkage.

The brakes on R, RU, and RUS tractors are mounted on the outside of the final drive housings. On RS, U, and O Tractors, the brakes are contained within the final drive housings. Brake adjustments are made externally on all tractors.

STEERING MECHANISM

The 1010 Series Tractors are steered by a cam (worm), which engages a two-pinned lever shaft welded to the top of a vertical shaft. Power steering is optional.

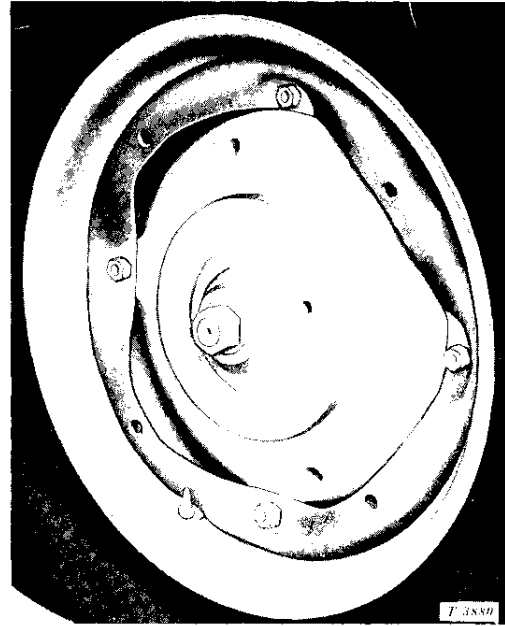
REAR WHEELS

Fig. 10-5-8—Rear Wheels (O, RS, and U)

The regular rear wheels on O, RS (42000), and U tractors consist of a one-piece cast center section, called the web, and a combination rim and flange. Four different tread settings can be obtained by changing flange settings and by reversing the wheels.

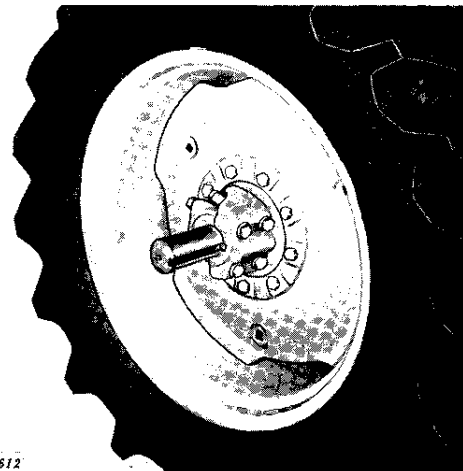
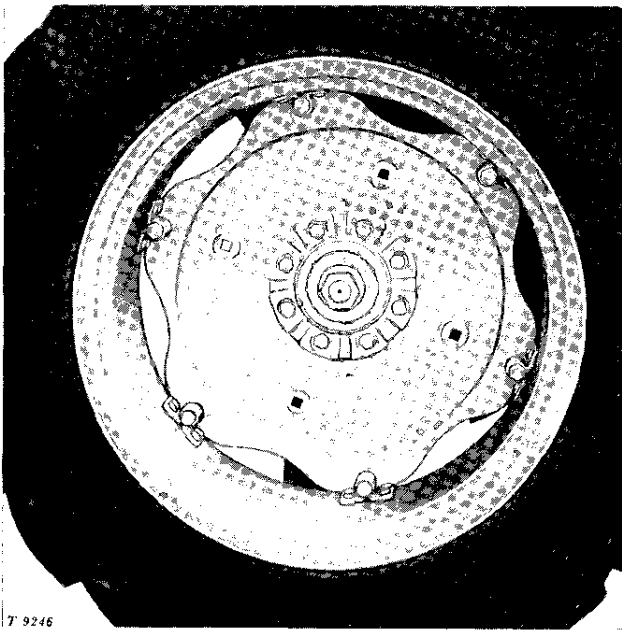


Fig. 10-5-9—Sliding Hub Rear Wheels (R, RU, and RUS)

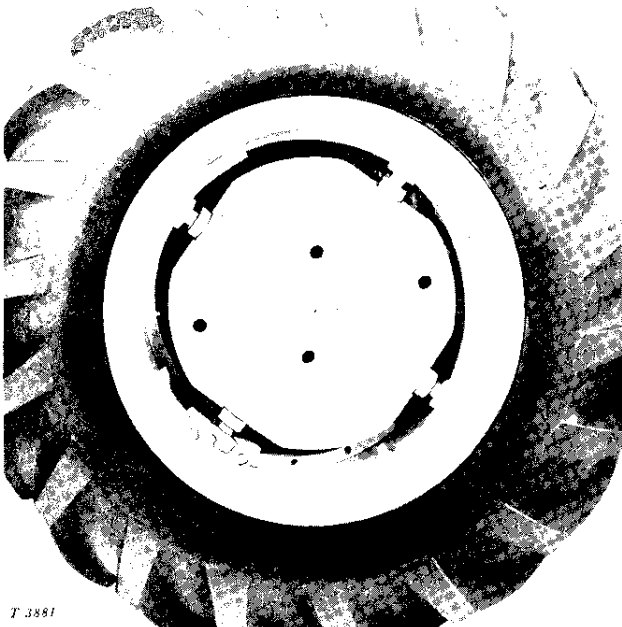
R, RU, and RUS Tractors can be equipped with sliding hub rear wheels (Fig. 10-5-9). The rear tread adjustments for most purposes are made by sliding the wheels in or out on the axle. To obtain narrower or wider settings the dished wheels can be reversed on the hubs. Extreme settings are obtained by reversing the hubs on the axles.



T 9246

Fig. 10-5-10—Demountable Rim Wheel (RU or RUS Shown)

Demountable rim wheels are available for RS, RU, RUS, and U Tractors. Tread settings with these wheels are obtained by dishing the wheel disk, by placing the rim inside or outside the wheel disk, and by reversing the rim.



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Fig. 10-5-11—Power-Adjusted Rear Wheels

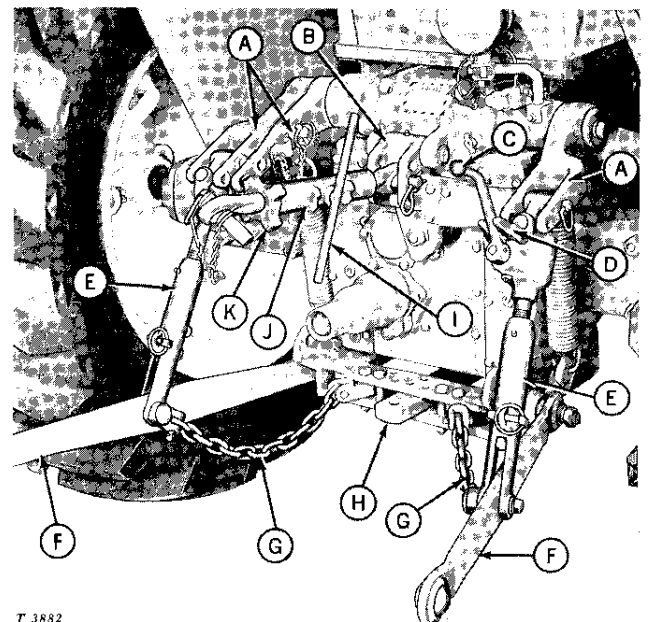
jack screws, and operating the tractor in low or reverse with the brake applied to the opposite wheel, the cast web may be rotated to the desired position on the rails.

FRONT AXLE ASSEMBLIES

Adjustable front axles are available for all tractors. Adjustments on O, RS, and U Tractors (-42000) are obtained by telescoping the end pipes into the center section of the axle. Adjustments on O, RS, and U Tractors (42001-up) and on all R, RU, and RUS Tractors are obtained by positioning axle end sections along the center section.

The 1010 Row-Crop may also be equipped with spindle and knuckle type dual front wheels, Roll-O-Matic, or single front wheel.

HYDRAULIC SYSTEM, 3-POINT HITCH, AND LOAD-AND-DEPTH CONTROL



T 3882

- | | |
|-------------------------|-----------------|
| A - Lift Arms | G - Sway Chains |
| B - Load Control Yoke | H - Drawbar |
| C - Leveling Crank | I - Turnbuckle |
| D - Leveling Crank Lock | J - Center Link |
| E - Lift Links | K - Jam Nut |
| F - Draft Links | |

Fig. 10-5-12—3-Point Hitch

The 1010 Series Tractors may be equipped with a hydraulic system, a category 1 3-point hitch, and a load-and-depth control system.

gral implements to desired depth, or a dual hydraulic system which will raise, lower, or set at desired depth, part of an integral implement independently (such as one side of a two-row cultivator) or all of the implement simultaneously. By simple adjustments, both cylinders may be made to act together, approximately doubling the lifting capacity.

The 3-point hitch (Fig. 10-5-12) on all tractors provides an efficient, versatile means of attaching integral implements to the tractor.

The Load-and-Depth Control System regulates implement working depth over uneven ground, compensating for the effect of ridges and depressions.

The desired working depth is set by the hydraulic control lever. Load-and-depth sensing works as follows: When the tractor front wheels pass over a ridge, the implement mounted at the rear of the tractor is forced downward. This pushes the center link of the 3-point hitch forward, actuating the load control yoke and linkage causing the hydraulic system to raise the implement until the system is again in balance and the implement is working at the correct

depth. When tractor front wheels drop into a depression the implement tends to rise in relation to the ground level. The resulting pull on the center link causes the load-and-depth control to actuate the hydraulic system which lowers the implement to the proper working depth. In addition, when soil conditions change so that the implement is working in abnormally hard soil, the implement is forced backward, causing the center link to push forward. The hydraulic system then raises the implement sufficiently to reduce draft and minimize strain on the tractor and implement. When once more operating in normal soil, the load-and-depth control again actuates the hydraulic system which returns the implement to the operating depth determined by the position of the hydraulic system control lever.

A gear-type positive displacement pump is mounted inside the cowl support panel on top of the center frame. The pump is constant-driven by the transmission outer drive tube and the hydraulic pump drive gear. All 1010 Series Tractors use the same pump (with varying gear sizes and capacities) in the hydraulic systems. Refer to Section 210, Groups, 20, 21, or 22 of this Manual.

Group 10 OPERATION

PRE-STARTING INSPECTION

COOLING SYSTEM

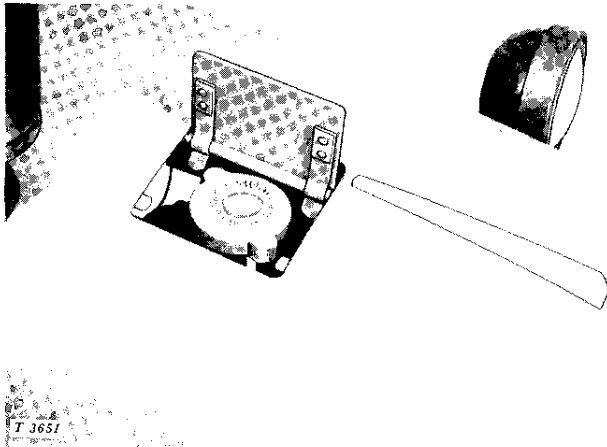


Fig. 10-10-1—Radiator Filler Cap

Check coolant level in radiator. Examine drain cocks and plugs to be sure they are secure. See that hose connections are tight and without evidence of leakage. If coolant is changed, add sealer and rust inhibitor.

CRANKCASE OIL LEVEL

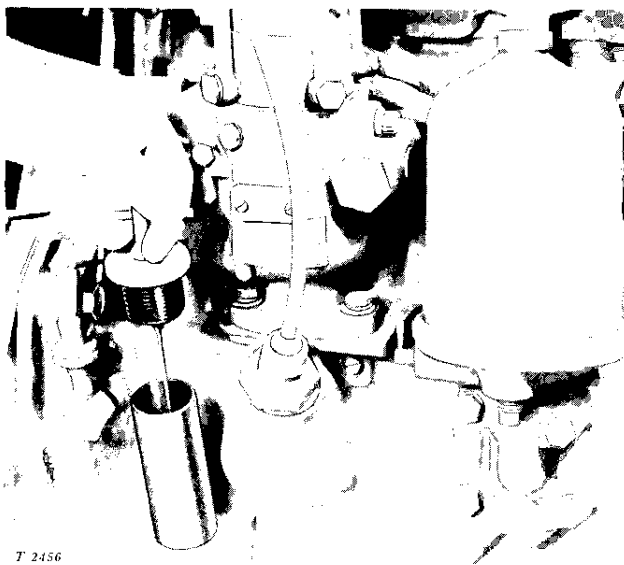


Fig. 10-10-2—Oil Level Rod

Check the crankcase oil level by means of the oil level rod. If oil is below the "ADD 1 QT." mark, add oil of correct weight and viscosity in sufficient amount to bring oil up to the "FULL" mark on the gauge. See Section 30 of this Manual.

FUEL SUPPLY

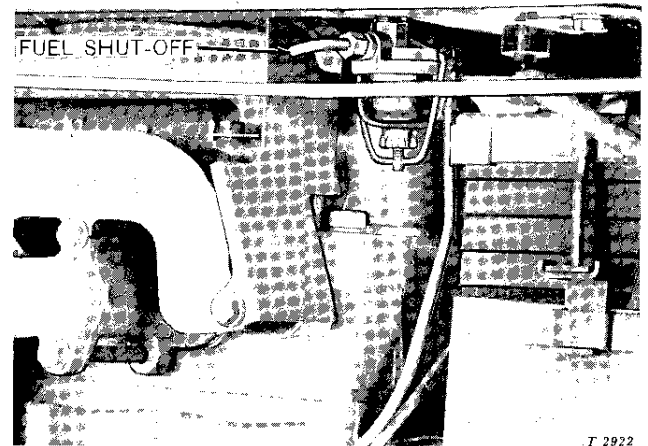


Fig. 10-10-3—Fuel Shut-Off Valve and Fuel Strainer (Gasoline Illustrated)

Inspect fuel strainer for signs of moisture and dirt and clean as necessary. Check to be sure that the fuel shut-off valve located under the fuel tank is in "open" position so that fuel supply to engine is not restricted.

AIR CLEANER AND PRECLEANER

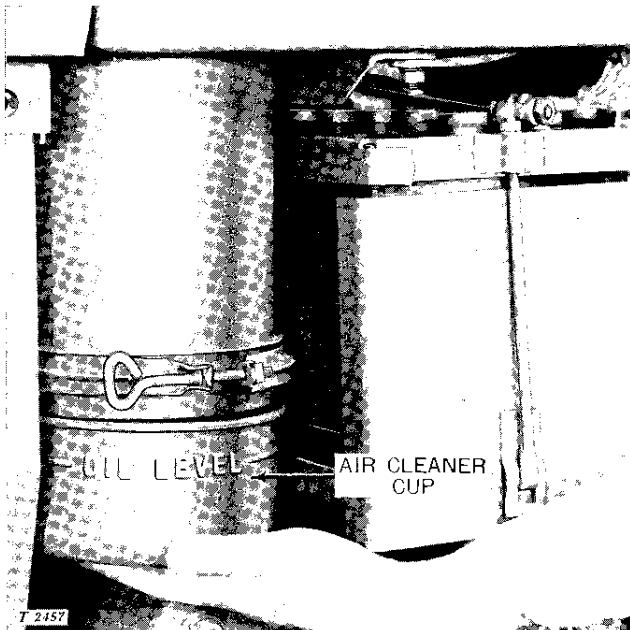


Fig. 10-10-4—Air Cleaner

Check air cleaner connections and make sure they are tight. Remove air cleaner cup and note level of oil. If necessary add oil of proper viscosity until the level is even with the oil level mark on the cup. Empty precleaner if accumulation of foreign material is up to level mark on plastic bowl.

GENERAL LUBRICATION CHECK-OUT

Check oil level of final drives, transmission, belt pulley, hydraulic system, PTO attachment, and steering gear housing.

Lubricate front wheel bearings and all grease fittings. Lubricate generator sparingly. See Section 30 of this Manual.

BATTERY

Check solution level of battery. Battery condition should be checked at least every 200 hours of operation.

STARTING THE ENGINE

GASOLINE MODEL

1. Open shut-off valve below fuel tank.
2. Place shift lever in "neutral," apply brake lock, and depress clutch pedal to decrease drag on engine (Fig. 10-10-9).

3. Advance hand throttle to the halfway open position (Fig. 10-10-9).

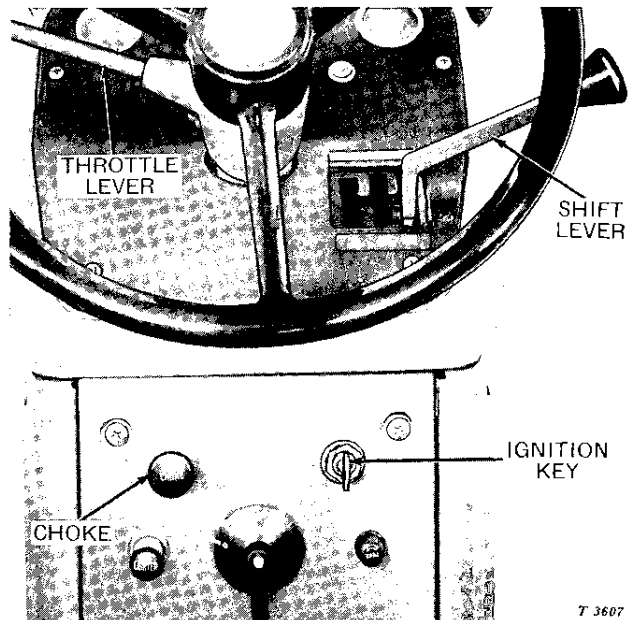


Fig. 10-10-5—Starting Controls (Gasoline)

4. Pull choke control outward full distance. (If tractor engine has been running previously, it may not be necessary to use choke. It is advisable to try starting engine without choking in this case.)

5. Advance hand throttle to the halfway open position.

6. Turn ignition key switch clockwise to actuate starter. Hold in this position until engine has had time to rotate several revolutions.

NOTE: Limit time starter is used to 1/2 minute. If engine does not start within 1/2 minute, let starter rest for two minutes before trying again. This will allow battery to restore charge and give starter time to cool.

7. After engine has started, or after it has turned 4 or 5 revolutions, push choke control all the way in. This will prevent flooding of carburetor. Usually enough gasoline for starting purposes has been drawn into combustion chamber by this time.

8. Regulate engine speed by using hand throttle.

DIESEL MODEL

1. Open the fuel shut-off valve located under the fuel tank. Make sure the engine stop knob is pushed in.

2. Place shift lever in neutral and apply brake lock (Fig. 10-10-9).

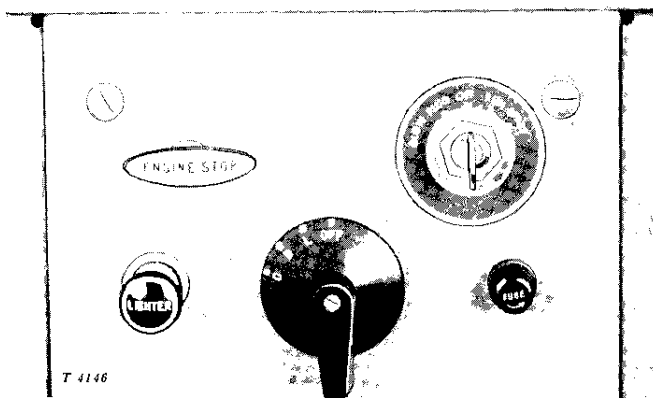
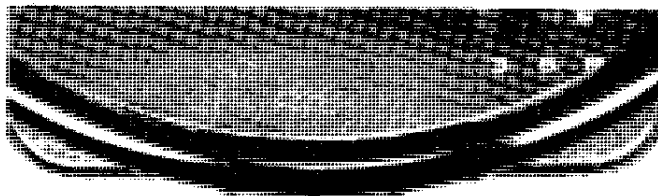


Fig. 10-10-6—Starting Controls (Diesel)

3. Turn key starter switch one-eighth turn counter-clockwise to actuate glow plugs. Key switch is spring loaded, and so must be held in counter-clockwise position throughout desired preheating period. Period of time for actuating glow plugs depends on the air temperature.

Refer to the following chart:

Temperature	Preheat Time
Above 40° F.	1 minute
40° F. to 10° F.	1-1/2 to 2 minutes
10° F. to -10° F.	2 to 3 minutes
-10° F. to -20° F.	3 to 4 minutes

4. To insure delivery of fuel to the injectors, move hand throttle to the full speed position (counter-clockwise) and then move lever back to approximately one-half to three-quarters open.

5. Depress clutch pedal to completely disengage clutch, thus eliminating the need of the starter turning the transmission while starting the engine (Fig. 10-10-9).

6. Turn key starter switch one-eighth turn clockwise to actuate instrument panel; then one-quarter turn clockwise to actuate engine starter.

7. If engine does not begin firing after 15 to 30 seconds of cranking, preheat an additional 1 minute before continuing cranking. Repeat this procedure until the engine starts.

CAUTION: If engine fails to start during the 15 to 30 second cranking period, do not actuate starting switch again until starter stops rotating. Otherwise, serious damage to the starter may result.

If no smoke is expelled from muffler at the initial cranking, it will be necessary to check the fuel system for leaks and to bleed the air out of the system. (See Section 40.)

8. As soon as engine starts, release key starter switch and adjust engine speed to approximately 1000 rpm.

9. Release clutch; warm engine and transmission for five minutes by operating engine at 800 to 1000 rpm. Do not allow engine to operate at idle speed during engine warm up.

COLD WEATHER STARTING

The fuel injected into the turbulence chamber is ignited by the increased temperature due to compression. This temperature is high enough under ordinary operating conditions, but may not be sufficiently high at extremely low outside temperatures to ignite the fuel injected.

NOTE: The engine will start easier while starting at low ambient temperatures if the hand throttle is placed in the one-half speed position and the clutch disengaged. Refer to "Temperature and Preheat Time" table for instructions on proper usage of glow plugs.

If tractor gets completely cold at temperatures below -10° F., it will be necessary to use a booster battery to obtain sufficient cranking speed.

The booster battery and proper preheating should enable starting even under the most severe conditions.

CAUTION: To avoid any possible damage to the engine or starter, it is recommended that ETHER NOT be used as a cold weather starting aid.

AFTER-STARTING INSPECTION

EFFICIENT ENGINE OPERATION (DIESEL)

The Diesel engine should operate SMOKE-FREE. Black smoke from the exhaust stack indicates unburned fuel normally caused by overloading or dirty injection nozzles. A thorough cleaning of the nozzles should eliminate this problem if it is due to dirty nozzles.

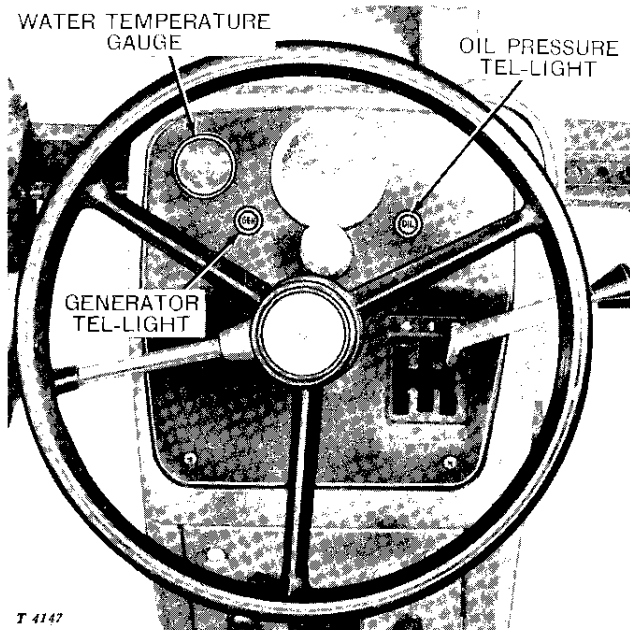


Fig. 10-10-7—Tel-Lights

GENERATOR TEL-LIGHT

The tel-light will glow red for a few seconds after ignition is turned on, during cranking, and after engine has fired. If tel-light continues to glow after engine has been running approximately 10 seconds, the battery is discharging. Check the battery, generator, and regulator to determine source of trouble.

NOTE: Tel-light may glow continuously with engine speed at slow idle. This is normal and does not indicate malfunction unless tel-light continues to glow after increased acceleration.

OIL PRESSURE TEL-LIGHT

With engine running and hand throttle advanced, oil pressure tel-light should go out. If indicator glows bright red after engine has been running 10 seconds ignition key should be turned off and cause of reduced oil pressure determined.

WATER TEMPERATURE GAUGE

(Warm-up Period)

Note appearance of gauge: "C" (cold), "N" (normal), "H" (hot). Before placing load on engine, allow indicator to rise above "C" zone on gauge and into "N" zone. Oil will then circulate freely, preventing excessive wear on piston rings, cylinder liners, and bearings.

If indicator enters "H" zone, stop engine and allow coolant to cool off slowly. If overheating occurs during next operation of engine, discontinue operation until source of trouble has been determined and remedied. Do not race engine during warm-up period. This wastes fuel and causes excessive wear on engine parts.

STOPPING THE ENGINE

Sudden cooling of a hot engine causes extreme contraction of heated parts. For this reason, allow tractor engine to cool off gradually in cold or freezing weather by idling a few minutes before turning off ignition. In freezing weather, never drain water immediately after stopping.

GASOLINE ENGINE

To stop gasoline engine, first allow it to operate for a short time at full throttle. Then turn key ignition switch counter-clockwise to vertical (OFF) position.

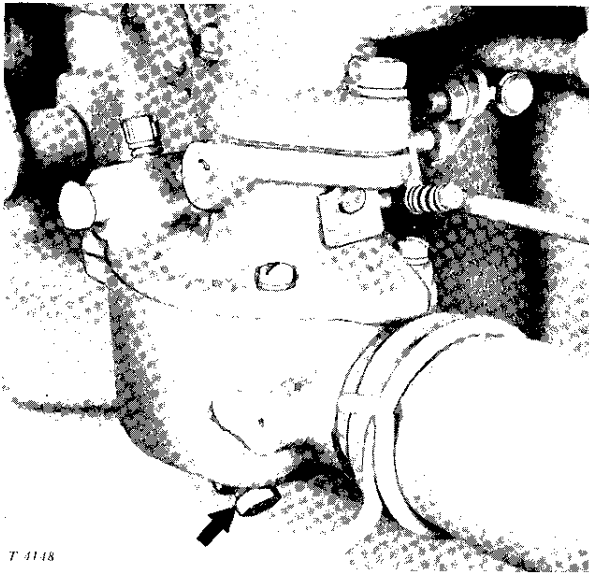


Fig. 10-10-8—Carburetor Drain Plug

If tractor is not to be used for several days, shut off gasoline supply at fuel shut-off valve, located below the gasoline tank. (Fig. 10-10-3.) Open drain plug on underside of carburetor and drain carburetor. Be sure to replace this plug after draining, to prevent dirt from entering carburetor. Draining will prevent accumulation of gum in carburetor, caused by evaporation of gasoline. This gum is a contributing factor to hard starting and poor engine operation.

DIESEL ENGINE

Stop the engine by performing the following sequence of operations.

1. Allow engine to idle at 1000 rpm for a short time.

2. Turn key switch to "OFF" (vertical) position and pull out engine stop knob to cut off fuel. Pulling out the engine stop knob will place the pump in the "NO FUEL" position.

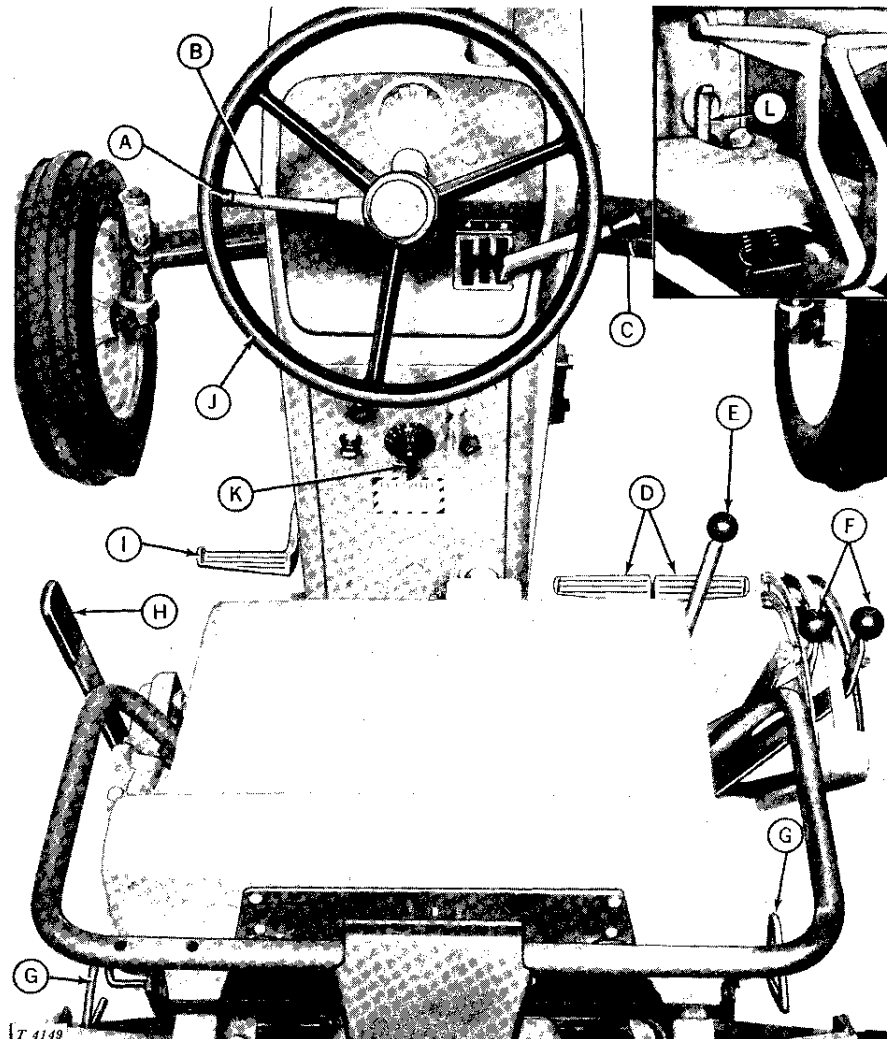
CAUTION: Do not attempt to stop engine by turning off fuel supply at fuel tank shut-off valve. Doing so will cause pump to run dry and damage internal parts.

ENGINE BREAK-IN

Before the tractor was shipped from the factory, all bearings and friction surfaces were correctly fitted, and crankcase was filled with a "breaking-in" oil.

To be sure that all bearing surfaces will be properly lubricated, operate tractor under normal load for the first 20 hours of operation. Light loads and excessive engine idling should be avoided in order that piston rings may be properly seated. Check periodically to be sure that an adequate supply of oil is maintained in the crankcase. If it becomes necessary to add oil during "breaking-in" period either SAE 10W or SAE 5W-20 can be used. At the end of this 20 hour period, "breaking-in" oil should be drained, oil filter changed, and crankcase filled with new oil in accordance with recommendations in Section 30 of this Manual.

OPERATING THE TRACTOR



- | | |
|---------------------------------------------|--------------------------------------|
| A - Hand Throttle Knob | G - Brake Locks (1010 RU) |
| B - Hand Throttle | H - Powershaft Control Lever |
| C - Shift Lever | I - Clutch Pedal |
| D - Brake Pedals | J - Steering Wheel |
| E - Remote Hydraulic Cylinder Control Lever | K - Light Switch |
| F - Hydraulic Control Levers | L - Brake Locks (1010 RS and 1010 U) |

Fig. 10-10-9—Operating Controls

A. HAND THROTTLE KNOB

This knob, if pulled out, will permit the hand throttle to be moved down to accelerate the engine speed past 1900 rpm into overtravel speeds.

B. HAND THROTTLE

The hand throttle controls operation of the engine working speeds. Moving the lever counter-clockwise increases engine speed; moving the lever clockwise decreases engine speed.

C. SHIFT LEVER

The shift lever is used to select any one of the five forward gears and the one reverse gear.

D. BRAKE PEDALS

The brakes are individually controlled by means of dual pedals. Individual control of brakes enables shorter turns at corners; used simultaneously, the brakes will bring the tractor to a quick, safe stop.

E. REMOTE HYDRAULIC CONTROL LEVER

This lever is used to activate the remote hydraulic control cylinder. Moving the lever forward extends the cylinder and moving the lever rearward retracts the cylinder.

F. HYDRAULIC SYSTEM CONTROL LEVER

The hydraulic system is operated by means of a control lever to the right of the operator's seat. When lever is to rear, rockshaft lift arms are in raised position. When lever is moved forward, lift arms are lowered.

G and L. BRAKE LOCK

Each brake is equipped with a lock located on the brake housing. Brake locks are engaged by a quick push on the brake pedal, at the same time pulling up on the locking lever. Brake locks are released by stepping on brake pedals and pushing down on brake lock.

H. POWERSHAFT AND BELT PULLEY CONTROL LEVER

This control lever engages and disengages the power take-off shaft. When the belt pulley is mounted on the power take-off shaft, the lever is used to engage and disengage the belt pulley.

The lever is located at the left-hand side of the seat when equipped with dual PTO and on the transmission top cover when tractor is equipped with the transmission-driven 540 rpm PTO.

I. CLUTCH PEDAL

The clutch pedal interrupts the flow of power from the engine to the transmission and powershaft. The clutch is disengaged by depressing the pedal. Releasing the pedal engages the power from the engine to the transmission.

J. STEERING WHEEL

The steering mechanism is designed to eliminate objectionable wobble and backlash.

K. LIGHT SWITCH

All lights are controlled by the light switch. The switch has four positions as follows:

"OFF" - All lights off.

"L" - Bright front lights and white rear light on.

"B" - Bright front lights and red rear light on.

"D" - Dim front lights and red rear light on.

PROMOTING LONGER ENGINE LIFE

The tractors will handle economically and efficiently all jobs within their range of power. Using tractor on loads beyond its power range places excessive strain on all its parts and will eventually result in unnecessary expense and impaired operating efficiency. An overloaded tractor can usually be detected by gradual slowing down in ground speed and slowing down and laboring of engine.

Since starting the engine is accomplished with no more effort than starting the average automobile engine, there should be no reason for prolonged engine idling. (Stop the engine, as you would your automobile engine, when prolonged idling periods would otherwise occur.) Load may be placed on engine as soon as indicator on water temperature gauge enters "N" zone. A full load should not be placed on a "cold" engine. Low operating engine temperatures causes the development of several conditions detrimental to engine operation and life. Incomplete combustion of fuel in a cold engine causes crankcase dilution and forms lacquer or gummy deposits on valves, pistons, and rings. It also causes rapid accumulation of sludge within the engine.

