# John Deere 4000 Series Tractors

JOHN DEERE

## SERVICE MANUAL

John Deere 4000 Series
Tractors

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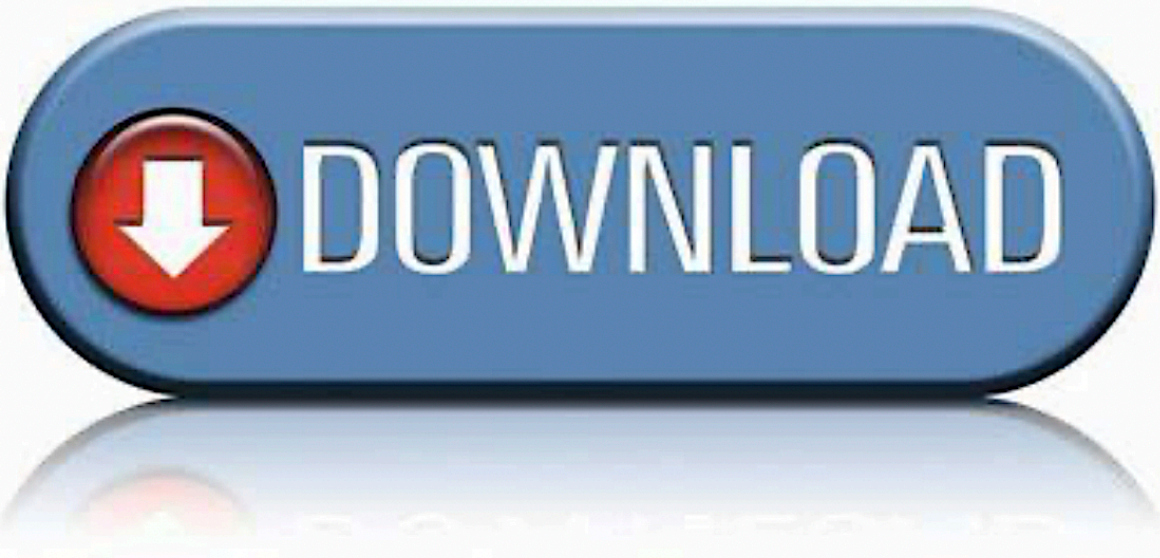
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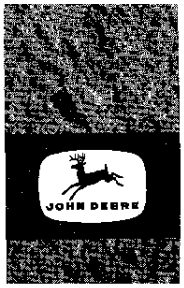
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SERVICE MANUAL

# JOHN DEERE

# 4000 SERIES

# TRACTORS

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# TO THE JOHN DEERE SERVICEMAN

This service manual contains maintenance instructions for John Deere 4000 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. Tests and adjustments, required to keep the tractor operating efficiently, are explained in detail.

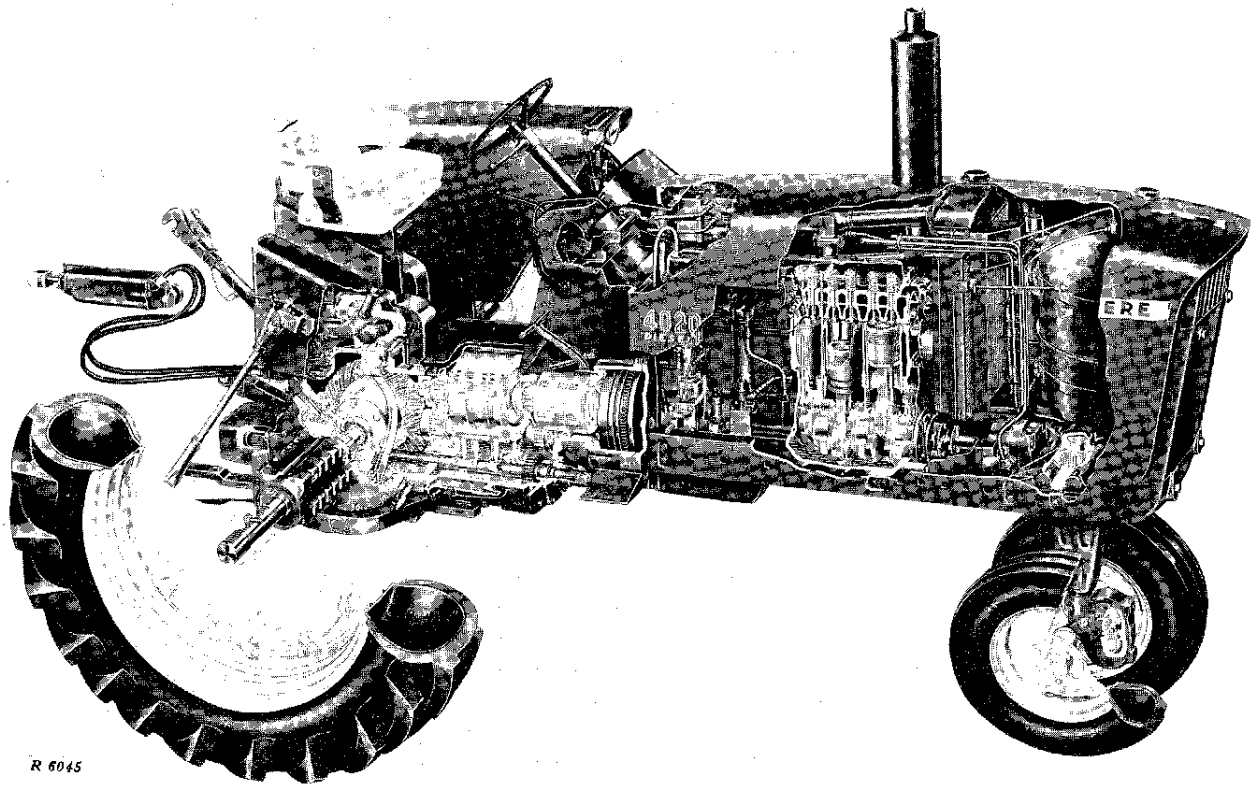
A section on "Specifications" lists dimensions of many new wearing parts as an aid in determining when parts replacement is necessary.

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.

A section on "Special Tools" lists special tool equipment which enables the serviceman to service the tractor efficiently with a minimum of time expended.

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.




*Cutaway of John Deere 4020 Row-Crop Tractor with Diesel Engine*

Section 10

# DESCRIPTION, OPERATION, AND SPECIFICATIONS

## Group 5
## DESCRIPTION

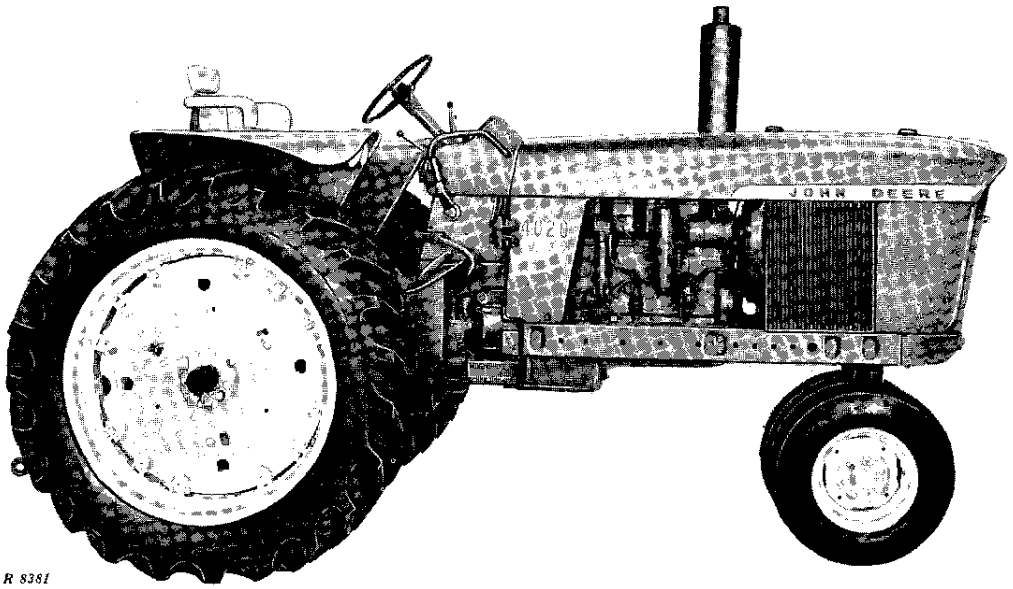



*Fig. 10-5-1—Right-Hand Side View of John Deere 4020 Row-Crop Tractor with Diesel Engine and Power Shift Transmission*

John Deere 4020 Tractors (Fig. 10-5-1) are heavy-duty tractors available in three basic styles, Row-Crop, Standard, and Hi-Crop.

These tractors may have a Syncro-Range transmission providing eight forward and two reverse speeds, or a Power Shift transmission providing eight forward and four reverse speeds.

John Deere 4010 Tractors were available in three basic styles: Row-Crop, Standard and Hi-Crop (Fig. 10-5-3).

These tractors have a Syncro-Range transmission providing eight forward and three reverse speeds.

In all styles the majority of parts and components are identical.

The features of the tractors are described briefly in the paragraphs which follow. Full descriptions of their various assemblies are given in the other sections throughout this manual.

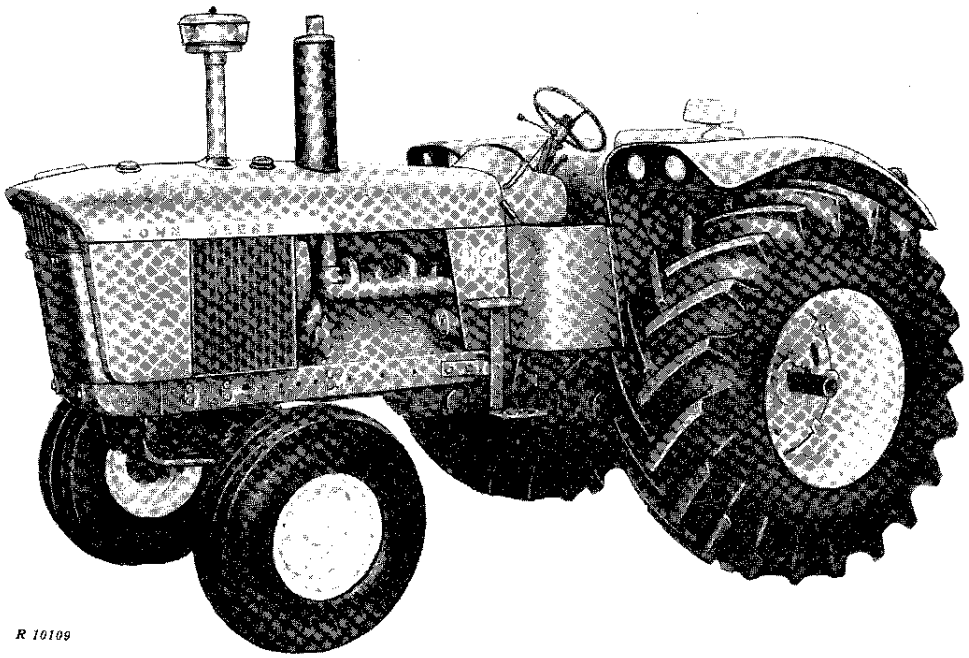



*Fig. 10-5-2—Left-Hand Side View of John Deere 4020 Standard Tractor with Diesel Engine (Serial No. 91000 and After)*

## SERIAL NUMBERS

Each engine bears a serial number on the generator mounting pad on the front right side of the cylinder block.

The tractor serial number is located to the right of the center link attaching bracket on the rear of the transmission case.

LP-Gas fuel tanks each bear a serial number.

## MODEL NUMBERS

Model numbers are carried by the distributor on spark ignition engines, the fuel injection pump on diesel engines, the main hydraulic pump, rockshaft valve housing, and remote cylinder selective control valve housings.

## ENGINE

Three types of variable-speed engines are furnished for the tractor. Two are spark ignition engines - one using gasoline for fuel, the other using LP-Gas. The third is a compression-- ignition diesel engine.

All engines have six in-line cylinders. At 2200 rpm, 4020 engines develop up to 88 horsepower measured at the PTO, and 4010 engines up to 80 horsepower. (These are maximum observed horsepower ratings.)

## CRANKCASE VENTILATING SYSTEM

Crankcase ventilation is accomplished by a liquid-seal, impeller-type ventilating pump.

## CLUTCH

Both 4020 and 4010 Tractors, equipped with Syncro-Range transmissions, have spring-loaded dry-disk-type transmission clutches located in a recess at the rear of the engine flywheel. These clutches are operated by a pedal at the left side of the operator's platform.

Power Shift transmissions (optional equipment) in 4020 Tractors are hydraulically-actuated, having no spring-loaded transmission clutch.

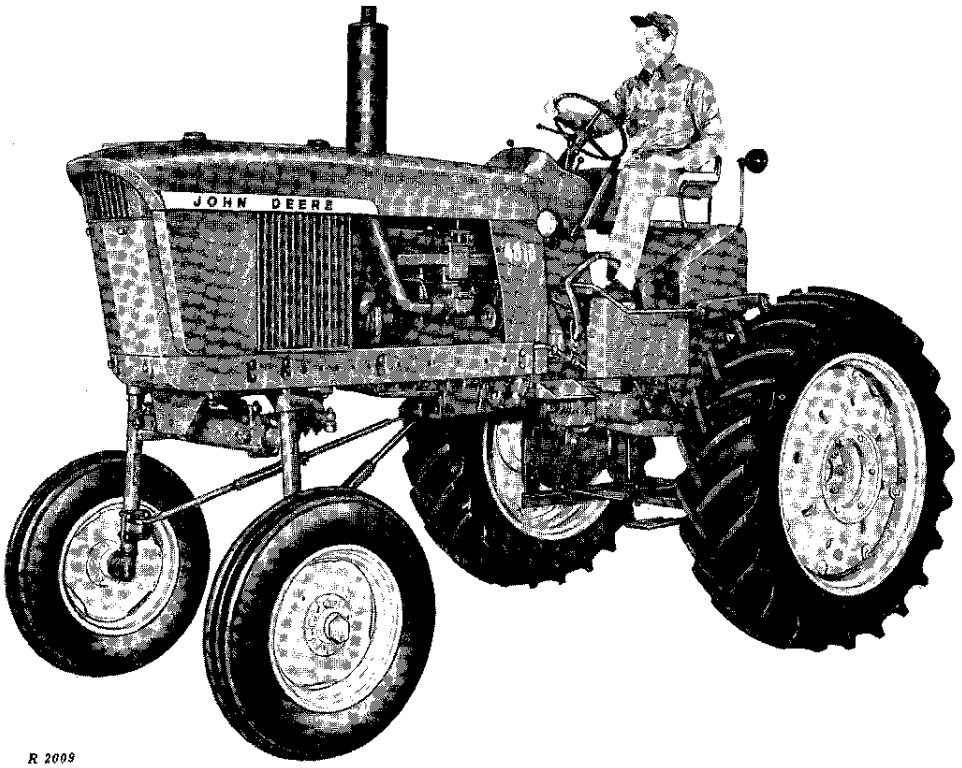



*Fig. 10-5-3–Left-Hand Side View of John Deere 4010 Hi-Crop Tractor with Gasoline Engine*

A pedal, located at the left side of the operator's platform, can be used for "inching" the tractor or for emergency stops.

A spring-loaded clutch, located in a recess at the rear of the engine flywheel, provides a means of disengaging the engine from the transmission for easier cold weather starting.

The clutch is operated by the engine disconnect lever located to the left of the control support. Pulling the lever to the rear disengages the engine. The lever will latch in this position. The engine is engaged by pulling back slightly on the lever while pulling the latch button at the left rear of the steering support and allowing the clutch to engage.

## FUEL SYSTEM

The large-capacity fuel tank on all tractors is located at the front of the tractor just ahead of the radiator.

### DIESEL

In diesel systems a fuel pump, driven by the camshaft, provides a constant supply of fuel to the injection pump.

A large-capacity fuel filter is connected between the fuel pump and the injection pump.

The filter contains two replaceable micronic filtering elements.

### GASOLINE

In gasoline systems, a fuel pump driven from the camshaft, assures a constant supply of gasoline to the updraft carburetor. A filter and sediment bowl on the fuel pump, and a screen in the carburetor, insure that the gasoline flowing to the engine is clean.

### LP-GAS

The LP-Gas fuel system includes a converter which assures that the fuel is in vapor form when supplied to the engine updraft carburetor. The converter uses the heat from the engine coolant for its operation.

A combination filter and electric solenoid valve is incorporated in the system. The valve is opened electrically when the ignition switch is turned on and closes when the switch is turned off. This prevents leakage of the gas into the engine when it is not in operation.

## ELECTRICAL SYSTEM

Tractors with spark ignition engines have a 12-volt grounded-type electrical system. A three-unit generator regulator is used to control generator output. An enclosed, solenoid-shift starter is used to start the engine.

Diesel tractors use a 24-volt split-load-type electrical system. In this system a 24-volt generator with a three-unit regulator supplies current to maintain the charge in two 12-volt batteries.

The lighting and accessory circuits are of the grounded type, using current at 12 volts.

## IGNITION SYSTEM

Spark ignition engines are equipped with a battery ignition system. The distributor is located at the right rear of the engine block. It is driven at one-half engine speed from the engine camshaft. The distributor has a centrifugal advance mechanism.

The ignition system is of the bypass type using current at 12 volts while cranking the engine to improve starting. After cranking is stopped, the current is cut down by a resistor to 6 volts to supply the 6-volt ignition coil.

## COOLING SYSTEM

All 4000 Series Tractors have a pressure-type cooling system with a centrifugal-type pump that provides continuous circulation of the coolant. Two thermostats maintain constant engine coolant temperature.

The system is of the bypass type which permits circulation of coolant through the engine without passing through the radiator. This feature allows the engine to reach operating temperature in a shorter length of time. After the coolant reaches operating temperature, the thermostats open allowing circulation of the coolant through the radiator to maintain constant operating temperature.

## TRANSMISSION

### SYNCRO-RANGE

Syncro-Range transmissions are furnished as optional equipment on 4020 Tractors and as regular equipment on all 4010 Tractors. This transmission has four shift "stations" with synchronized shifting within stations and collar shifting between stations.

The transmission has eight forward speeds. 4020 Tractors have two reverse speeds; 4010 Tractors three reverse speeds. Shifting is accomplished by a shift lever located at the right of the instrument panel.

Normally, shifting is accomplished within stations while the tractor is on the move, but the tractor should be stopped to shift between stations.

Constant-mesh, helical gears are used in all transmission speeds.

### POWER SHIFT

The planetary-type, hydraulically actuated Power Shift transmission is optional on 4020 Tractors. Any forward or reverse speed can be obtained while the tractor is on the move.

The Power Shift transmission has eight forward and four reverse speeds.

Transmission speed changes are accomplished by a speed selector located on the right side of the tractor dash.

A mechanical disconnect, at the rear of the transmission permits disengaging the final drive assembly from the transmission when towing the tractor. The tow lever, used in making the disconnect, is located at the left rear of the operator's platform.

A pedal located at the front left of the operator's platform, is used for "inching" the tractor or for emergency stops. It is not necessary to use the "inching" pedal for normal shifting. However, the pedal must be depressed to actuate the starter safety switch when starting the engine.

4020 transmission-hydraulic systems in tractors with Power Shift have two micronic oil filter assemblies to assure clean oil at all times.

An oil cooler keeps the transmission oil temperature at a satisfactory level.

## DIFFERENTIAL AND FINAL DRIVE

A differential with spiral bevel ring gear and pinion is used in the tractor. A planetary gear assembly for final drive provides the final gear reduction in the drive gear train. This design reduces strain on the transmission gear train.

A differential lock is available as optional equipment on 4020 tractors, Serial No. 91000, and after. This device enables the operator to lock the differential, causing both rear wheels to turn at the same speed, facilitating operation in unusual conditions.

## POWER TAKE-OFF (PTO) AND BELT PULLEY

Tractors are available without power take-off, with straight 1000 rpm power take-off, or 1000 rpm front and selective 540 or 1000 rpm rear power take-off. The front PTO operates at 1000 rpm only.

On 4020 Tractors, the PTO clutch operating lever is located at the right of the control support. On 4010 Tractors the lever is at the left of the support.

A belt pulley is available for mounting on the rear PTO shaft. The pulley is 12 inches in diameter with 3025 fpm belt speed at 1900 rpm rated engine speed.

Detailed instructions for using the PTO and belt pulley are included in Sections 160 and 170 of this manual.

## DRAWBAR

Tractors can be purchased with regular or wide-swing drawbar. The regular drawbar is used on tractors equipped with rear rockshaft and Universal 3-Point Hitch. The wide-swing drawbar is used on tractors which are not equipped with rear rockshaft and Universal 3-Point Hitch. Instructions for using the drawbar are included in Section 300 of this manual.

## FRONT WHEEL ASSEMBLIES

The tractor may be equipped with a variety of front end assemblies. For the row-crop tractor these include Roll-O-Matic, double front wheels, wide adjustable front axle, and single front wheel. The standard tractor may be equipped with fixed or adjustable front axles. For detailed information, see Sections 210 and 220 of this manual.

## REAR WHEELS

On both row-crop and standard tractors, rear wheel tread adjustment is made by a pinion (located in the wheel hub) which engages a rack on the axle. Extreme adjustments are made by changing the position of the rim and tire on the wheel. Row-crop tractors may be equipped with regular-length, long, or extra-long rear axles.

Some 4010 Row-Crop Tractors were furnished with power-adjusted rear wheels, which made it possible to change rear wheel tread by engine power without jacking up the tractor. See Section 220 of this manual.

Power-adjusted wheels are not available for 4020 Tractors.

## HYDRAULIC SYSTEM

All tractors are equipped with a constant-running hydraulic pump as regular equipment. Mounted below and ahead of the radiator, it is driven at engine speed from the engine crankshaft. The hydraulic pump supplies oil under pressure for power steering, power brakes, rear rockshaft, and remote hydraulic cylinders.

The hydraulic system is constant pressure, closed center, and "live": That is, it can be operated when the engine is running, whether the tractor is moving or not. The system may be equipped with either one or two remote cylinder selective control valves and one or two pairs of breakaway couplers.

The single selective control valve operates one remote hydraulic cylinder only. Two selective control valves permit use of two remote cylinders, which can be operated either separately or simultaneously. The cylinders may be either of the single-acting or double-acting type.

Tractors can be equipped with rear rockshaft and Universal 3-Point Hitch which utilize hydraulic power to control implements to best advantage in various soil conditions.

## POWER BRAKES

The power brakes are operated by two pedals located at the right front of the operator's platform. The brakes can be applied independently or simultaneously. The brakes are of the disk type, operating in oil, and are hydraulically power activated. Hydraulic oil, under pressure, to operate the brakes is supplied by the main hydraulic pump.

The power brakes are so designed that if the supply of pressure oil should fail they would operate in much the same manner as conventional hydraulic brakes.

## STEERING

Hydraulic power steering is regular equipment on all tractors. Movement of the steering wheel activates a steering valve which directs a flow of oil, under pressure, to the steering motor which turns the front wheels. In the event of power oil supply failure, the tractor can be steered manually.

## SEATS

All 4020 Tractors are equipped with a deluxe seat which contains a steel compression spring and shock absorber to provide "Float-Ride" suspension. The deluxe seat is also equipped with a flexibly-mounted padded backrest and semi-circular foam padding which surrounds the operator.

4010 Tractors were equipped optionally with the deluxe seat or a regular seat cushioned by no-sag springs and foam padding.

Regular seats are not available on 4020 Tractors shipped from the factory.

# Group 10
# OPERATION

## STARTING CONTROLS

Figures 10-10-1 through 10-10-5 illustrate starting controls for 4020 and 4010 Tractors with various engine and transmission options.

4020 LP-Gas Tractor starting controls are not illustrated but are similar to those used on 4010 Tractors.

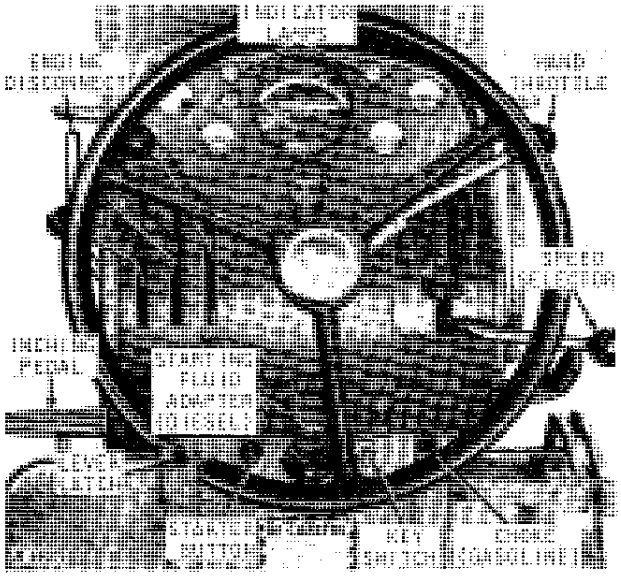


*Fig. 10-10-1–Starting Controls (4020 with Power Shift Transmission, Serial No. 91000 and After)*

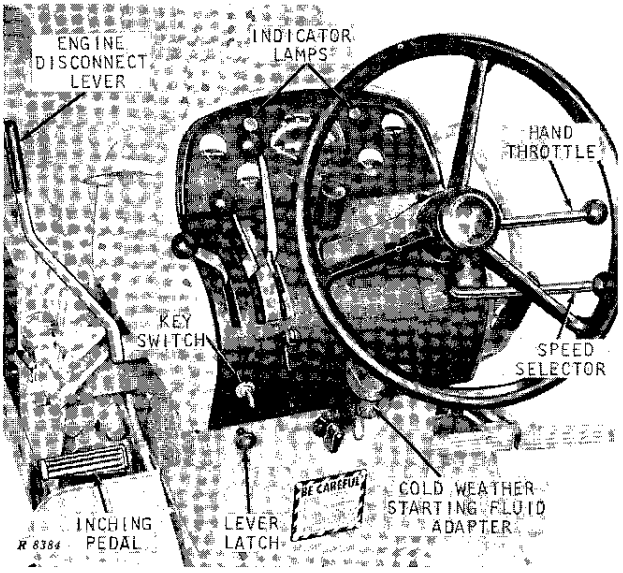



*Fig. 10-10-3–Starting Controls (4020 Diesel with Power Shift Transmission, Prior to Serial 91000)*

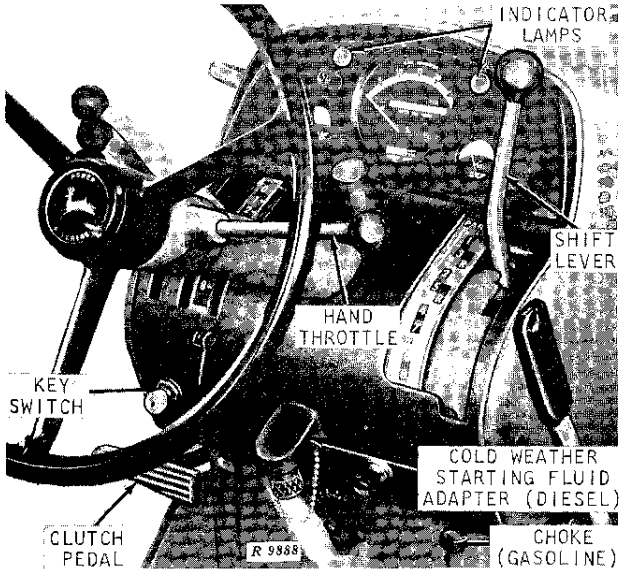



*Fig. 10-10-2–Starting Controls (4020 with Syncro-Range Transmission*

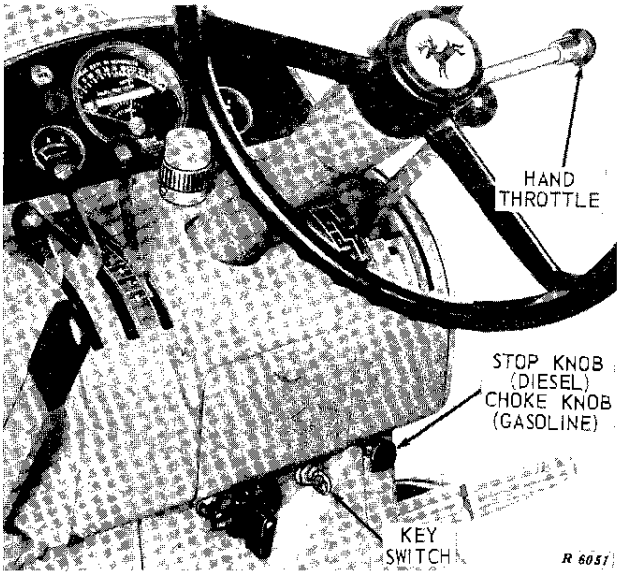



*Fig. 10-10-4–Starting Controls (4010 Diesel and Gasoline)*

## PRE-STARTING INSPECTION

(1) Check the engine crankcase oil level.

(2) Check the radiator coolant level.

(3) Check radiator hose and connections for leaks.

(4) Make sure the fuel shut-off valve on the bottom of the fuel tank is open (tractor with gasoline or diesel engine).

(5) Turn on vapor withdrawal valve (tractor with LP-Gas engine).

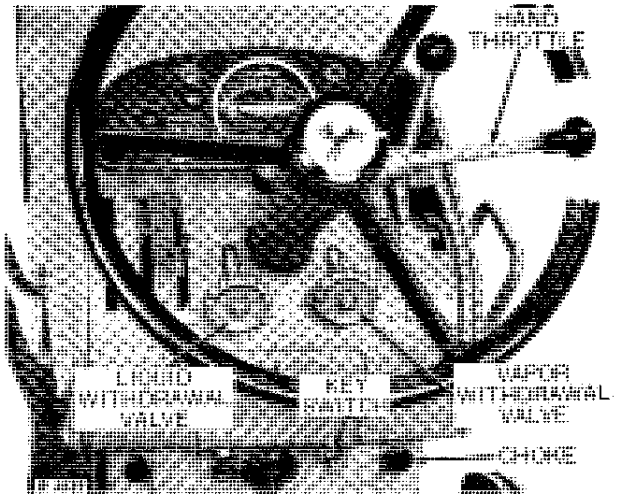



*Fig. 10-10-5–Starting Controls (4010 LP-Gas)*

## STARTING THE ENGINE

| Diesel | Gasoline | LP-Gas | |
|---|---|---|---|
| X | X | X | Place shift lever (or speed selector) in park position. Depress clutch (or inching) pedal. |
| X | | | Place hand throttle in 1200 rpm position. |
| | X | X | Place hand throttle in slow idle position. |
| X | X | X | Turn key switch clockwise to first position. Generator and oil pressure indicator lamps should light. If either lamp fails to light, turn key switch off and determine cause. See Section 190 of this manual. |
| | | | During cold weather it may be necessary to: |
| X | X | X | Use cold weather starting aids. See page 10-10-3. |
| | X | X | Pull out choke knob on gasoline and LP-Gas engines. |
| X | X | X | Pull engine disconnect lever rearward on all tractors with Power Shift transmission. |
| X | X | X | Press the starter button (Serial No. 91000 and After). Turn key switch clockwise all the way (Prior to Serial No. 91000). If engine is not at operating temperature, momentarily pull choke knob out while starting gasoline or LP-Gas engine.<br>*NOTE: Do not operate starter more than 30 seconds at a time; to do so may overheat the starter.*<br>If engine does not start the first time, wait a minute or two before trying again. If it does not start after four such attempts, refer to Section 310 of this manual. |
| | X | X | As soon as engine starts, push choke knob in. During cold weather it may be necessary to leave choke partially out for first few minutes. |
| X | X | X | As the engine begins to run, note whether generator and oil pressure indicator lamps go out. If either lamp remains lighted, stop engine and determine cause. See Section 190 of this manual. |

## STARTING THE ENGINE (Continued)

| | | | |
|---|---|---|---|
| | | X | Allow engine to run until coolant in cooling system is warm, then slowly open liquid withdrawal valve and close vapor withdrawal valve. |
| X | X | X | If the engine disconnect was used on Power Shift tractors, pull the engine disconnect lever slightly to the rear while pulling out on the latch. Allow the lever to move to its full forward position. |
| X | X | X | On Power Shift tractors, the transmission oil pressure gauge should indicate oil pressure. |
| X | X | X | Check for water, oil, and hydraulic leaks. |

## COLD WEATHER STARTING

COLD WEATHER STARTING FLUID ADAPTER (Diesel Tractor)

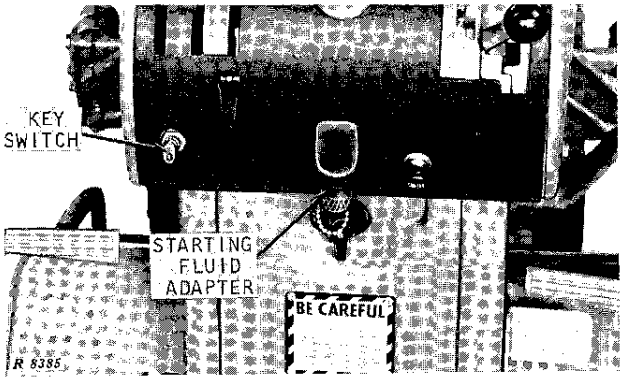



*Fig. 10-10-6–Cold Weather Starting Fluid Adapter (4020 Tractor Illustrated)*

Diesel tractors are equipped with a cold weather starting fluid adapter (Fig. 10-10-6) which is used to inject atomized starting fluid into the engine intake system. Starting fluid, which aids fuel combustion, is provided in pressurized cans.

To use the can of starting fluid, remove the safety cap and plastic spray button from the can. Remove the cap from the adapter and position the can under the adapter.

To inject a "shot" of starting fluid, momentarily push up on the can.

**CAUTION: To avoid damage, turn engine with starter one or two revolutions before injecting starting fluid and inject starting fluid only while the engine is turning.**

Relax pressure on the can between "shots" of starting fluid. Stop injecting fluid after the engine starts. If the engine begins to die during the first few minutes of operation, inject another "shot" of fluid. When the engine is operating satisfactorily, remove the can from the adapter and replace the safety cap on the can.

Be sure to install the cap on the adapter when it is not in use. This will prevent dust from being drawn into the engine.

Store starting fluid cans where they will not be subject to extreme cold or warm temperatures. For best results, store fluid at room temperature.

**CAUTION: Ether starting fluid is highly flammable.**

ENGINE DISCONNECT LEVER

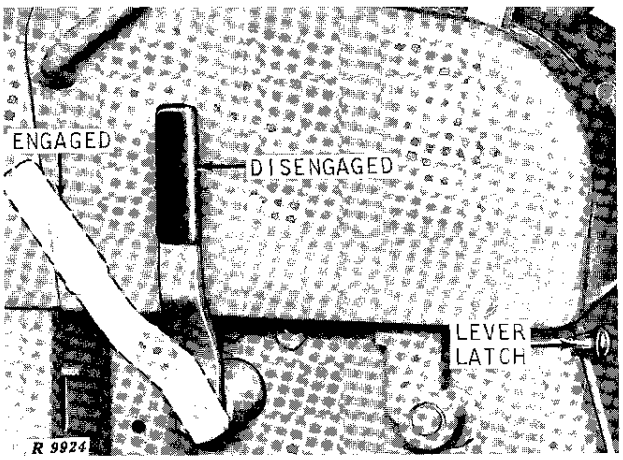



*Fig. 10-10-7–Engine Disconnect Lever (4020 Power Shift)*

All 4020 Tractors with Power Shift transmission have a spring-loaded clutch, located in the engine flywheel, for use during cold weather starting. When the engine disconnect lever (Fig. 10-10-7) is pulled to the rear until it latches, the engine is disengaged from the transmission, thus decreasing the cranking load.

After the engine is running the clutch is engaged by holding the lever to the rear, pulling latch, and allowing the lever to move forward to the stop.

**CAUTION: Do not operate engine with engine disconnect clutch disengaged for more than ten minutes. To do so will damage the main hydraulic pump.**

CRANKCASE OIL HEATER

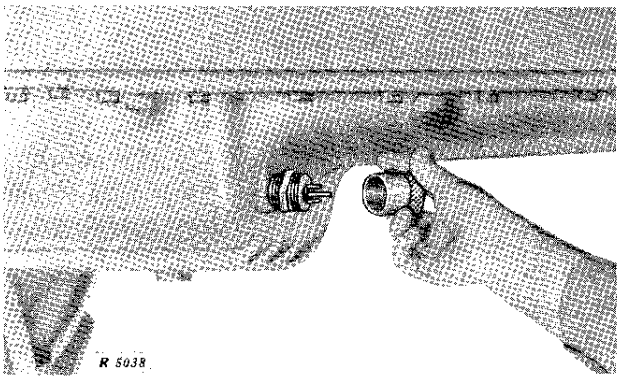



*Fig. 10-10-8—Removing Cap from Crankcase Oil Heater*

Tractors are designed to permit use of a 240-watt electrical crankcase oil heater. The heater warms the oil in the crankcase to facilitate engine starting.

To install the crankcase oil heater, remove the heater plug from the crankcase and drain the crankcase oil. Apply thread paste to the threads of the heater, insert the heater in the opening and refill the crankcase. When the heater is to be put into use, remove the protective cap (Fig. 10-10-8), attach the cord, and plug the cord into any convenient 115-volt electrical source with suitable ground. The connector on the cord has a release lever to lock the connector and heater terminal connection. Press the release lever when connecting or disconnecting the heater cord.

ADDITIONAL BATTERIES

Cold weather starting can be made easier by connecting an additional 12-volt battery in parallel with the 12-volt battery on the tractor.

**CAUTION: Gas given off by batteries is explosive. To avoid injury or battery damage, avoid sparks near the batteries.**

Make sure all electrical switches or accessories are turned off and make the last connection or the first disconnection at some point away from the battery.

On gasoline or LP-Gas tractors, connect a jumper cable to the NEGATIVE post of a 12-volt booster battery and to the NEGATIVE post of the tractor battery. Connect one end of the other jumper cable to the positive (+) post of the booster battery and the other end to a good ground on the tractor frame away from the battery. NEVER connect jumper cable to pipes or thin sheet metal.

*NOTE: On diesel tractors 91000 and after, the only battery ground connection is a light gauge ground wire. To prevent damage to the ground wire, never connect a booster battery to the diesel tractor frame.*

On diesel tractors, use two 12-volt batteries and four jumper cables. Connect first jumper cable to the positive (+) post of the first booster battery and to the positive (+) post of the right-hand tractor battery. Connect the second jumper cable from the negative post of the second booster battery and to the negative post of the left-hand tractor battery. Connect one end of the third jumper cable to the negative post of the first booster battery. Connect one end of the fourth jumper cable to the positive (+) post of the second booster battery. To make the last connection away from the batteries, connect together the other ends of the third and fourth jumper cables.

SHUTTING OFF HYDRAULIC PUMP

The starter speed may be increased during cold weather by shutting off the hydraulic pump so it will not build up pressure. The hydraulic pump shut-off screw on early designed 4010

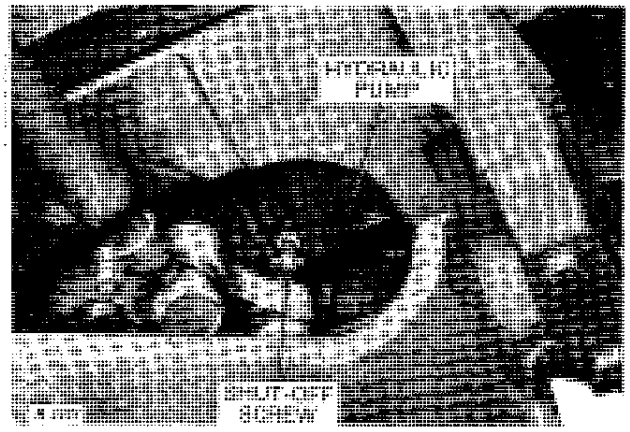


*Fig. 10-10-9—Hydraulic Pump Shut-Off Screw (Early Design 4010)*

tractors is at the bottom of the hydraulic pump (Fig. 10-10-9). On late designed 4010 Tractors, the shut-off screw is on top of the hydraulic pump (Fig. 10-10-10).

Hydraulic pumps on 4020 Tractors do not have shut-off screws. However, they can be obtained for field installation.

To adjust the pump out-of-stroke, turn the shut-off screw in (clockwise) one turn with a screwdriver. Then turn the screw in by hand until resistance is felt. Turn the screw in one more turn.

After the engine has started, use a screwdriver to back the shut-off screw all the way out (turn the screw counterclockwise). The pump will now build up pressure.

*NOTE: Oil will leak past the shut-off screw if it is not backed all the way out against the internal stop.*

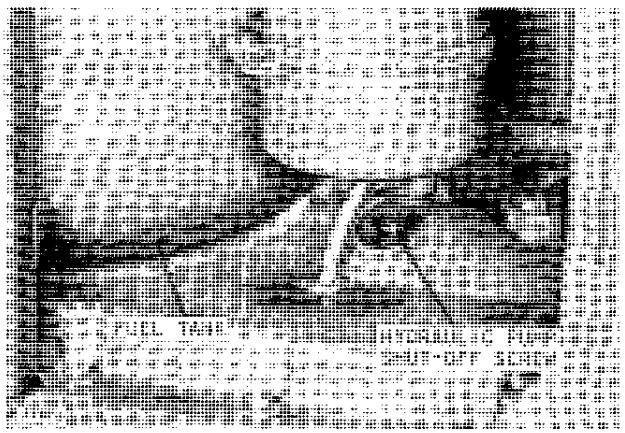


*Fig. 10-10-10—Hydraulic Pump Shut-Off Screw (Late Design 4010)*

TANK-TYPE COOLANT HEATER

A thermostatically controlled tank-type coolant heater will improve cold weather starting by keeping the coolant warm to reduce oil drag and will shorten engine warm-up.

## ENGINE BREAK-IN

*NOTE: If the coolant temperature rises above the "N" range, operate in a lower gear to reduce the load on the engine.*

With the following exceptions, the engine is ready for normal operation:

During the first 20 hours, using the foot throttle is not recommended. To facilitate break-in, avoid prolonged periods of engine idling, particularly for the first 100 hours of service.

After the first 100 hours of service, change the engine oil and oil filter. Thereafter, change the oil and filter at the normal 200-hour interval. If during the first 100 hours it is necessary to add oil to a diesel engine, use the proper single viscosity engine oil meeting specification Mil-L-2104B. If it is necessary to add oil to a gasoline or LP-gas engine, use SAE 10W-30 Service MS oil.

## STOPPING THE ENGINE

Place the shift lever or speed selector in "PARK" and allow the engine to idle a few minutes. Sudden stopping of a hot engine may allow some parts to overheat momentarily and cause possible damage.

DIESEL ENGINES

Stop 4020 diesel engines by moving throttle lever counterclockwise (knob out) to stop position. Turn off key switch.

Stop 4010 diesel engines by pulling out on stop knob (see Fig. 10-10-4). After a few revolutions the engine will stop. Turn off key switch.

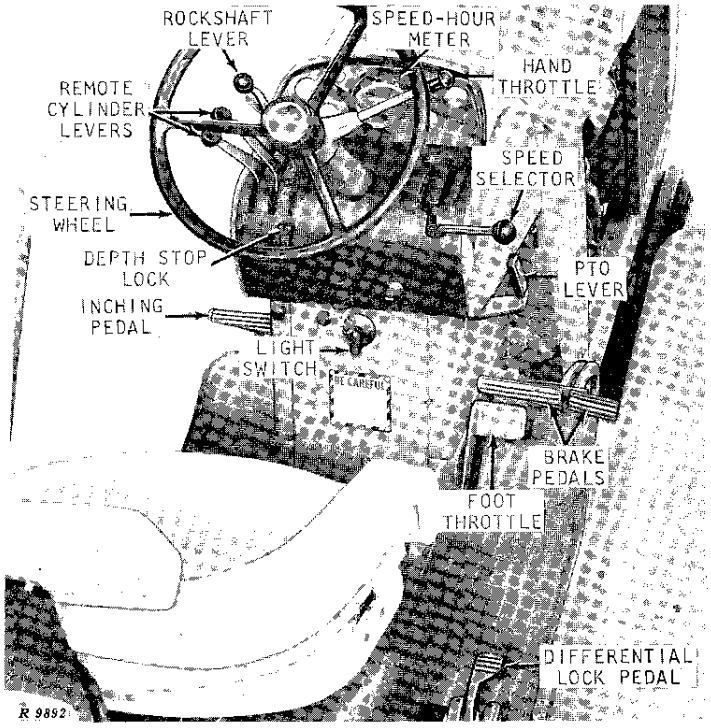



*Fig. 10-10-11–4020 Diesel Tractor Operating Controls (Power Shift Transmission, Serial No. 91000 and After)*

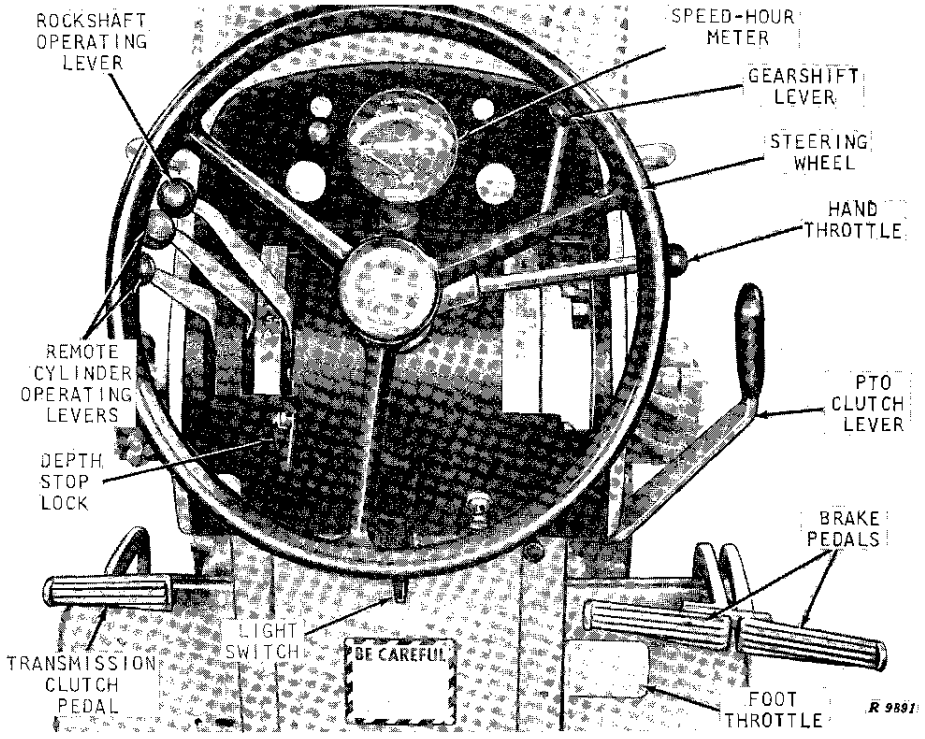



*Fig. 10-10-12–4020 Tractor Operoting Controls (Syncro-Range Transmission, Prior to Serial No. 91000)*

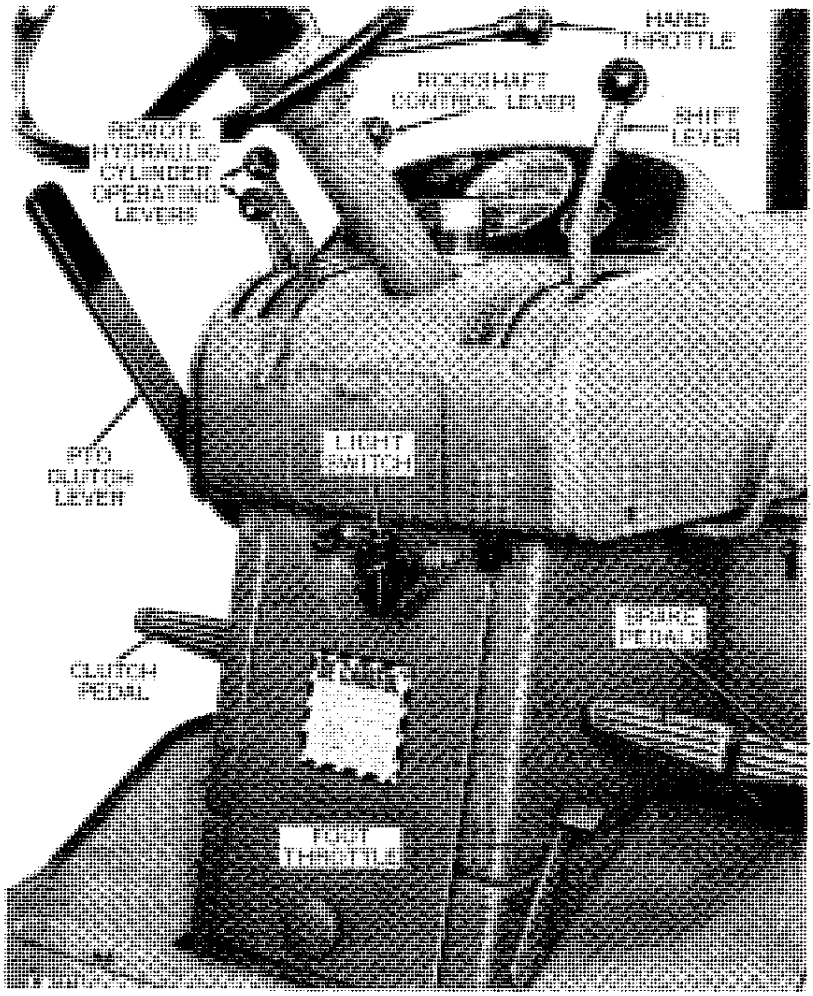



*Fig. 10-10-13–4010 Tractor Operating Controls*

GASOLINE ENGINES

Pull out on the hand throttle knob and push the throttle up into the idle position for engine shut-off. Stop the engine by turning the key switch off. If engine continues running after the switch is off, be sure hand throttle is all the way up into the idle position for engine shut-off.

LP-GAS ENGINES

Close the withdrawal valves and let the engine run until all fuel is exhausted from the lines and the engine stops. Turn the key switch off.

**CAUTION: Never leave liquid fuel in the lines with the withdrawal valves closed. To do so can damage the fuel system. Never leave the tractor with the valves open.**

ALL ENGINES

After stopping the engine, remove the key from the switch to prevent tampering and unauthorized operation. Removing the key also prevents the switch from being accidentally left in the on position and causing battery discharge.

## OPERATING THE TRACTOR

Figures 10-10-11 and 10-10-12 illustrate the operating controls on 4020 Syncro-Range and Power Shift Tractors. Figure 10-10-13 illustrates operating controls on 4010 Tractors.

TRACTOR WARM-UP

Always be sure the tractor is warmed up properly before operating under a full load.

A good way to do this is first to idle the engine at about 1500 rpm for 5 minutes and then operate at 1900 rpm on very light load (such as driving to the field) for the next 5 or 10 minutes.

It is also good practice to operate the tractor for the first 30 minutes at a lower speed than is normally required for the load. This allows the oil to reach operating temperature, gives it a chance to circulate freely, and prevents undue wear on engine or transmission parts.

ENGINE SPEEDS

The tractor engine is designed to operate at working speeds ranging from 1500 to 2200 rpm. These are variable governed speeds, and the engine can be operated at any speed between the two extremes to meet various working conditions.

To operate the power take-off at the ASAE power take-off speed, operate the engine at 1900 rpm.

In addition, engine speeds may be varied between 2200 and 2500 rpm to save you time when traveling on highways or on smooth-surfaced roads.

Normal slow idle speed is 600 rpm for diesel tractors and 650 rpm for spark ignition tractors. On a gasoline tractor, a 420-rpm idle speed for engine shut-off is provided. On LP-Gas tractors, the idle for engine shut-off speed is 500 rpm.

*Using the Hand Throttle*

Use the hand throttle to select slow idle or any of the variable governed working speeds from 1500 to 2200 rpm (Fig. 10-10-14).

Move the hand throttle counter-clockwise to the slow idle stop to obtain slow idle speed. To obtain 1900 rpm load speed, move throttle clockwise to 1900 rpm stop.

To obtain working speeds between 1900 rpm and 2200 rpm, move hand throttle (knob out) clockwise.

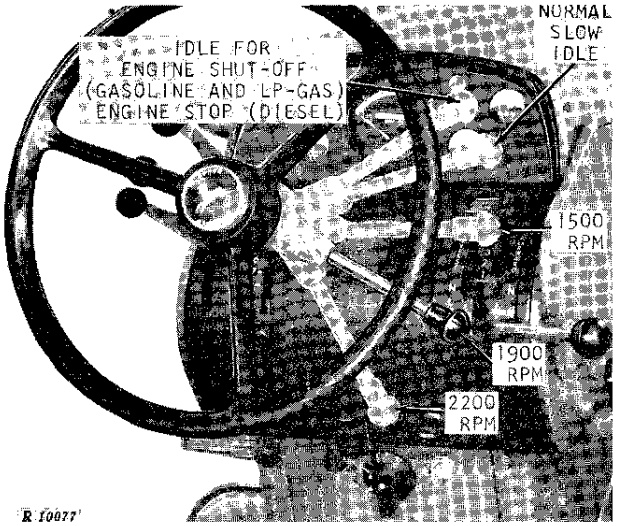



*Fig. 10-10-14—Range of Hand Throttle Positions*

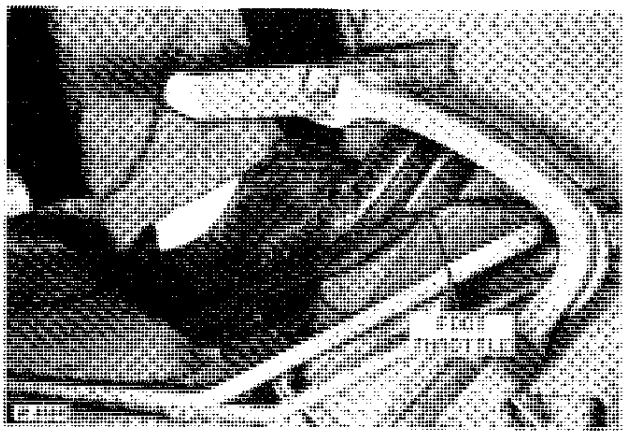


*Fig. 10-10-15—Using Foot Throttle*

To obtain engine stop position, move throttle counter-clockwise as far as possible with knob out.

*Using Foot Throttle*

The foot throttle (Fig. 10-10-15) is used to obtain engine transport speeds or to raise speed momentarily. When the foot throttle is pushed all the way downward, the engine operates at 2500 rpm load speed.

*NOTE: The foot throttle should not be used to increase the normal engine working speed.*