

John Deere 4000 Series Wheel Tractors



SERVICE MANUAL John Deere 4000 Series Wheel Tractors

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**SERVICE MANUAL FOR
JOHN DEERE DEALERS**

**4000 WHEEL
SERIES TRACTORS**

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TO THE JOHN DEERE SERVICEMAN

This service manual contains maintenance instructions for John Deere 4000 Series Wheel Tractors. Included are complete instructions for removal, disassembly, inspection, repair, assembly and installation of the major parts and assemblies of the tractor.

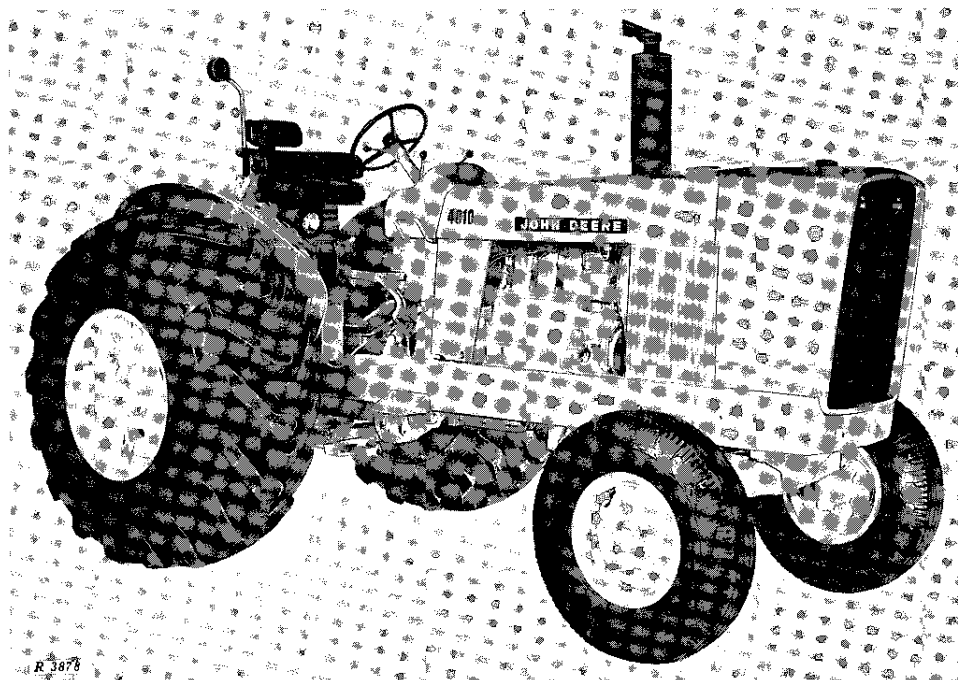
In addition, the manual contains brief descriptions of the more complicated systems of the tractor, and tells how they operate.

In Section 20, "Specifications," dimensions of many new wearing parts are given 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.

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.



John Deere 4010 Wheel Tractor (Gasoline Engine)

Section 10

DESCRIPTION, OPERATION, AND SPECIFICATIONS

Group 5

DESCRIPTION

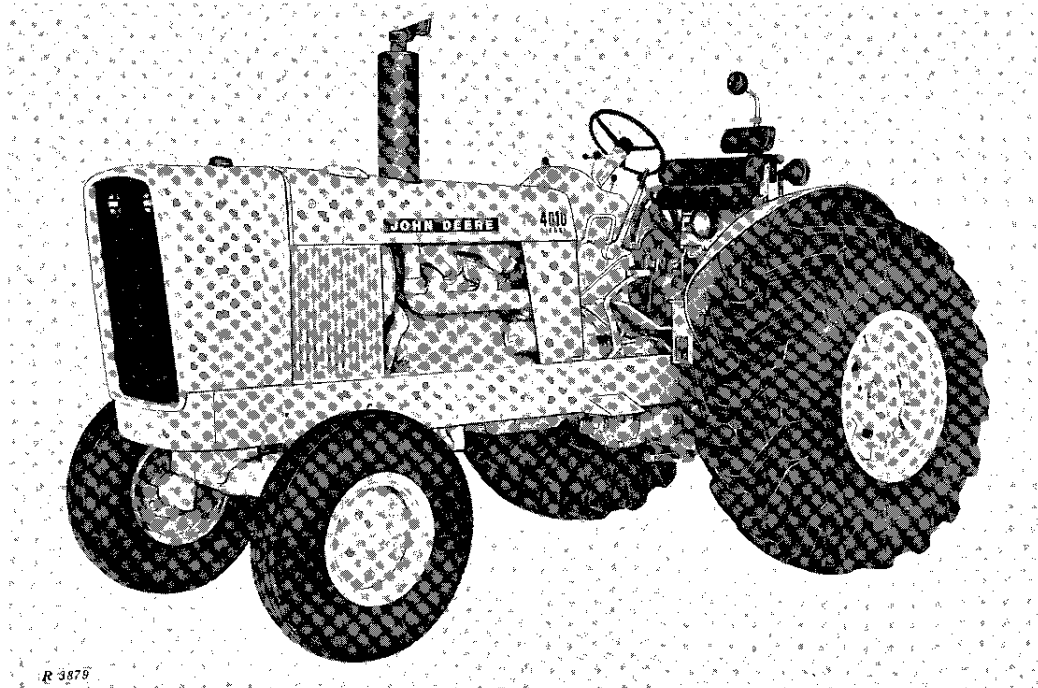


Fig. 10-5-1—John Deere 4010 Wheel Tractor (Diesel Engine)

The John Deere 4010 is a heavy-duty wheel tractor designed to operate with industrial equipment such as bulldozers, loaders, and backhoes, and to perform various pulling or hauling operations on construction projects.

The tractor is available with either a gasoline or a diesel engine. With the exception of the engines the majority of the tractor parts and components are identical.

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

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.

MODEL NUMBERS

The distributor, fuel injection pump, main hydraulic pump, rockshaft housing, and remote cylinder selective control valve housings each bear a model number.

ENGINE

Both the gasoline and diesel variable-speed engines have six in-line cylinders and develop up to 80 horsepower (maximum observed) measured at the PTO at 2200 engine rpm. See Section 50 for additional information.

CRANKCASE VENTILATING SYSTEM

Crankcase ventilation is accomplished by a liquid seal, impeller-type pump. See Section 70.

CLUTCH ASSEMBLIES

The transmission and PTO clutch assemblies are located in a recess in the rear of the engine flywheel.

The spring-loaded type transmission clutch is operated by a pedal on the left side of the tractor.

The PTO clutch is operated by a lever at the left side of the tractor cowl and locks into the engaged or released position.

The clutches are described in detail in Section 110.

FUEL SYSTEM

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

A fuel pump, driven from the camshaft, and provided with a sediment bowl and screen assures a constant supply of clean fuel to the gasoline carburetor or the diesel injection pump.

A large-capacity fuel filter, connected between the fuel pump and the injection pump, filters the diesel fuel before it enters the injection pump. The filter contains two replaceable micron filtering elements.

A screen in the carburetor provides additional filtering of the gasoline.

See Sections 90 and 100 for details.

ELECTRICAL SYSTEM

Diesel-engine-powered tractors use a 24-volt, split-load type electrical system. A 24-

volt generator with a three-unit regulator supplies current for the electrical load and to maintain the charge in two 12-volt batteries. The current in this part of the system is carried entirely by wires, using no part of the tractor frame as a conductor.

Tractors with gasoline engines use the 12-volt grounded-type system. Current is provided by a 12-volt generator. Generator output is controlled by a three-unit regulator.

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

Starting motors with enclosed solenoid shift are used to crank the engines.

See Section 200 for additional information.

IGNITION SYSTEM

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

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

See Section 200 for details.

COOLING SYSTEM

The tractor has a pressure-type cooling system with a centrifugal-type pump to provide circulation of the coolant. Two thermostats maintain constant coolant temperature.

When the thermostats are closed, a bypass allows circulation of the coolant through the engine without passing through the radiator.

This feature allows the engine to reach operating temperature in a shorter length of time. When the coolant reaches operating temperature, the thermostats open allowing circulation of coolant through the radiator to maintain a constant operating temperature.

Section 80 contains detailed information.

TRANSMISSION

The tractor is equipped with a collar-shift transmission with four shift "stations."

The transmission, which has eight forward and three reverse speeds, is shifted by a shift lever located at the right side of the instrument panel. Shifting from low to high or high to reverse can also be accomplished, within stations, by a lever located at the left side of the instrument panel.

Helical cut gears are used in all transmission speeds.

An oil cooler is provided to maintain the transmission oil temperature at a satisfactory level. See Section 130 for details.

DIFFERENTIAL AND FINAL DRIVE

Conventional spiral bevel ring gear and pinion drive is used in the tractor. A planetary gear assembly provides the final gear reduction in the drive gear train. This design reduces strain on the transmission gear train. See Sections 160 and 170.

POWER TAKE-OFF (PTO) AND BELT PULLEY

Tractors can be purchased with or without both front and rear PTO. The rear PTO is adaptable to 540 or 1000 rpm by use of an adapter furnished with the PTO. The front PTO operates at 1000 rpm only. The PTO clutch operating lever is located to the left of the tractor cowl.

A belt pulley is available for mounting on the rear PTO. The 12-inch pulley gives 3035 fpm belt speed at 1900 rpm engine speed. Instructions for belt pulley and PTO are given in Section 180 of this manual.

DRAWBAR

The tractor is equipped with either a regular or wide swing drawbar. The regular drawbar is used on tractors equipped with rear rockshaft and 3-point hitch. Instructions for using the drawbar are included in Section 320 of this manual.

FRONT AXLE

The tractor is equipped with a heavy-duty, non-adjustable front axle. For details see Sections 220 and 230 of this manual.

REAR WHEELS

Heavy-duty rear wheels are attached to the rear axles with no provision for adjustment. However, optional rims can be obtained to provide a rear wheel tread of either 70 or 86 inches. For detailed information, see Section 230 of this manual.

SEATS

The tractor can be equipped with either the regular seat or an optional deluxe seat. The regular seat is cushioned by no-sag springs and foam padding, while the deluxe seat uses a steel compression spring and shock absorber to provide "Float-Ride" suspension. The deluxe seat is also equipped with a flexibly-mounted, padded back rest and semi-circular foam padding which surrounds the operator. Refer to Section 210.

HYDRAULIC SYSTEM

The tractor Hydraulic System is pressurized by a constant-running variable-displacement hydraulic pump as regular equipment. The pump is mounted below and ahead of the radiator and is driven at engine speed from the crankshaft. The hydraulic pump supplies oil under pressure to operate the 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 can be equipped with either one or two selective control valves and breakaway couplers for operation of remote cylinders.

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

The tractor can also be equipped with a rear rockshaft to hydraulically control integral equipment to best advantage.

See Sections 240 through 310 for additional information.

STEERING

Hydraulic power steering is regular equipment on the tractor. Movement of the steering wheel actuates a steering valve which directs a flow of pressure oil to the two steering cylinders which turn the front wheels. In case of pressure oil failure, the tractor can be steered manually. Complete information is given in Section 270.

POWER BRAKES

The power brakes are operated by pedals located at the right side of the operator's platform. The brakes can be applied independently or simultaneously. The brake pedals can be locked together for simultaneous operation if desired. The hydraulically powered, disk-type brakes operate in oil. In case of pressure oil failure, the brakes will operate much the same as conventional hydraulic brakes. Refer to Section 280 for additional information.

Group 10 OPERATION

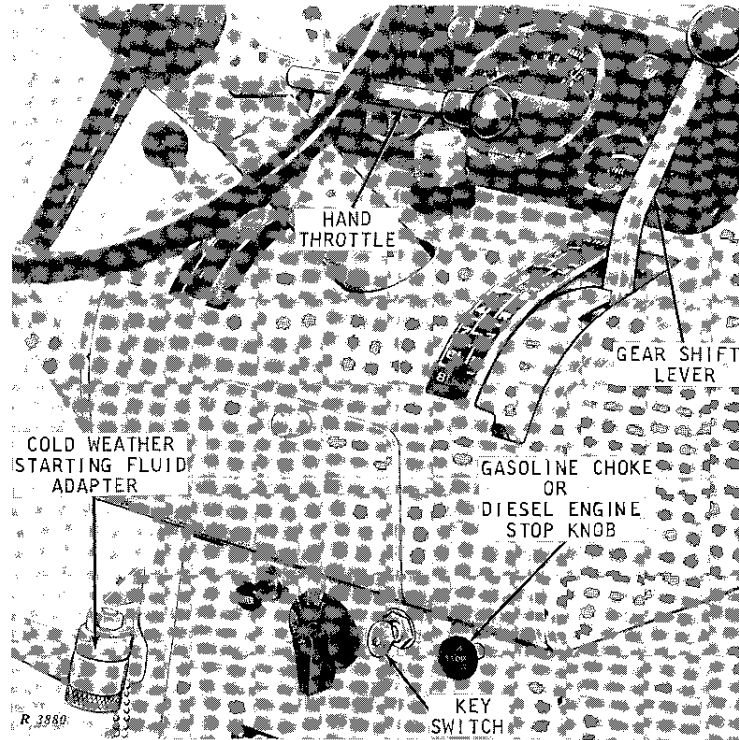


Fig. 10-10-1—Gasoline and Diesel Engine Starting Controls

STARTING CONTROLS

Figure 10-10-1 shows the starting controls for tractors with gasoline or diesel engines.

(3) Check radiator hose and connections for leaks.

PRE-STARTING INSPECTION

(1) Check the engine crankcase oil level.

(4) Make sure the fuel shut-off valve on the bottom of the fuel tank is open.

(2) Check the radiator coolant level.

STARTING THE ENGINE

Gasoline	Diesel	Procedure
X	X	Place shift lever in neutral, "PARK," or "TOW" position and depress clutch pedal to decrease drag on the engine.
	X	Place the hand throttle in the 1200 rpm position, about one-third of the way down in its range of travel.

STARTING THE ENGINE (continued)

Gasoline	Diesel	Procedure
X		Place the hand throttle in slow idle position (650 rpm), all the way up with the knob in.
X	X	Turn key switch clockwise to the first position. The generator and oil pressure indicator lamps should glow. If either lamp fails to glow, turn the key switch off and determine the cause. See Section 200, Group 40 of this manual.
	X	When the prevailing temperature is below 40° F. it may be necessary to use a cold weather starting aid. See pages 10-10-2 and 10-10-3.
X		When the prevailing temperature is below 60°F., pull out on the choke knob.
X	X	Turn the key switch all the way to the right to start the engine. NOTE: Do not hold the key switch in start position for more than 30 seconds at a time. To do so may over-heat the starter.
X	X	If the engine does not start the first time, wait for a minute or two before trying again. If it does not start after four such attempts, refer to Section 330 of this manual.
X		As soon as the engine starts, push the choke knob in. During cold weather it may be necessary to leave choke partially out for the first few minutes.
X	X	As the engine begins to run, check to see that the generator and oil pressure indicator lamps go out. If either of these lamps continues to glow, stop the engine and determine the cause. See Section 200, Group 40 of this manual.

AFTER STARTING INSPECTION

- (1) Check the generator and oil pressure indicator lamps to make sure they go out.
- (2) Check for water, oil, and hydraulic leaks.

COLD WEATHER STARTING**ADDITIONAL BATTERIES**

Starting the gasoline engine in cold weather can be made easier by connecting an additional

12-volt battery in parallel with the 12-volt battery on the tractor.

On diesel tractors, connect two additional 12-volt booster batteries in parallel with the two 12-volt batteries on the tractor.

Use jumper cables to connect the positive (+) terminal of each booster battery to the positive (+) terminal of the tractor battery, and the negative (-) terminal of the booster battery to the negative(-) terminal of the tractor battery.

CRANKCASE OIL HEATER

The tractor is 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, 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 the heater cord.

BATTERY WARMER

This warmer is used to warm the battery, permitting it to operate more efficiently in cold weather.

Install the warmer beneath the battery in the battery compartment and plug the warmer cord into any 115-volt electrical source.

HYDRAULIC PUMP

As an additional aid to cold weather starting, the hydraulic pump can be shut off by taking it "out-of-stroke." Figure 10-10-2 shows the shut-off screw for this adjustment. Turn the shut-off screw in (clockwise) a few turns with a screwdriver. Then turn the screw in by hand until resistance is felt. With a screwdriver, turn the screw in one more turn. The hydraulic pump is now out-of-stroke. After the engine has started, use a screwdriver to back the shut-off screw all the way out (counter-clockwise). 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.

**COLD WEATHER STARTING FLUID ADAPTER
(DIESEL TRACTOR)**

The diesel tractor is equipped with an adapter (Fig. 10-10-3) to inject atomized starting fluid into the engine air intake system. The starting fluid, which aids fuel combustion, is provided in pressurized cans.

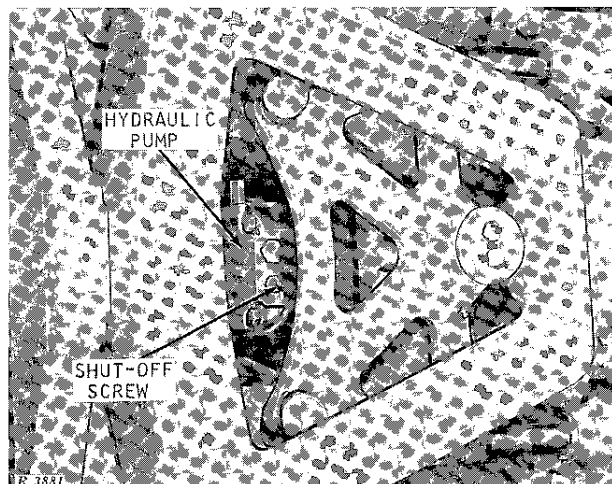


Fig. 10-10-2—Hydraulic Pump Shut-Off Screw

To install the can of starting fluid, remove the cap from the adapter, position the outlet tube of the can on the adapter pilot, and push up gently on the can until it snaps into place.

To inject starting fluid, push the can up 1/16-inch further while turning the key switch to start the engine. Relax pressure on the can between "shots" of starting fluid. Stop injecting the fluid after the engine starts. If the engine starts to die during the first 5 minutes of operation, inject starting fluid to smooth out engine

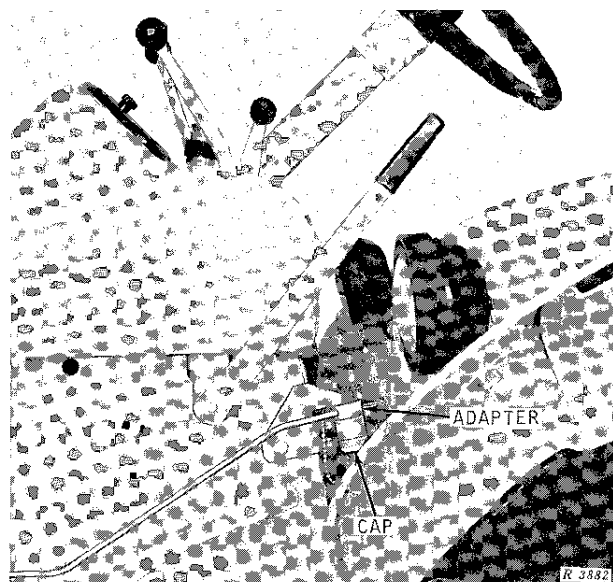


Fig. 10-10-3—Cold Weather Starting Fluid Adapter

operation. Remove the can from the adapter when the engine is operating satisfactorily.

NOTE: Install the cap on the adapter when it is not in use. This prevents dust from being drawn into the engine air intake system.

STOPPING THE ENGINE

ALL ENGINES

Operate the engine at slow idle for at least one or two minutes before stopping. This will allow the engine to cool off gradually, preventing uneven contraction of parts, possible back-firing, and coking of lubricating oil on piston rings, valve guides, etc.

NOTE: Never drain water immediately after the engine is stopped.

GASOLINE ENGINE

Set the hand throttle to run the engine at 450

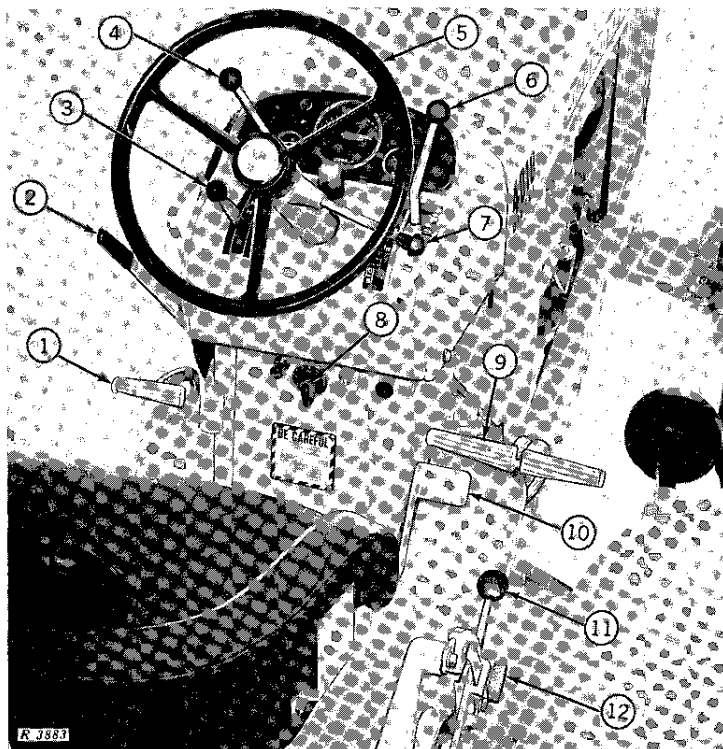
rpm (pull out on the hand throttle knob and push the throttle all the way up) and allow the engine to run for at least 1/2 minute. Without moving the hand throttle, turn the key switch to the off position.

DIESEL ENGINE

Set the hand throttle lever in the slow idle position (600 rpm) and allow the engine to idle for one or two minutes. This permits it to cool gradually. Pull out on the engine stop knob. This causes the engine to stop after a few revolutions. Turn the key switch off.

OPERATING CONTROLS

Operating controls on gasoline and diesel engine tractors are identical (Fig. 10-10-4). The clutch pedal, brake pedals, shift levers, PTO clutch lever, rockshaft control lever, remote cylinder operating levers, hand throttle, and foot throttle are located in the same position on all tractors.



- 1 - Clutch Pedal
- 2 - PTO Clutch Lever
- 3 - Remote Cylinder Operating
- 4 - Left-Hand Gearshift Lever
- 5 - Steering Wheel
- 6 - Right-Hand Gearshift Lever
- 7 - Hand Throttle Lever
- 8 - Light Switch
- 9 - Brake Pedals
- 10 - Foot Throttle Pedals
- 11 - Rockshaft Operating Lever
- 12 - Adjustable Depth Stop

Fig. 10-10-4—Operating Controls

OPERATING THE TRACTOR

ENGINE WARM-UP

Always be sure the engine 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 it at about 1900 rpm for another 5 minutes.

In cold weather it is also good practice to operate the tractor for the first 30 minutes in a lower gear than is normally required for the load. This gives the oil a chance to circulate freely and prevents undue wear on engine or transmission parts.

ENGINE BREAK-IN

To be sure that all bearing surfaces will be properly lubricated during initial operation, break in the tractor engine as follows:

For the first 20 hours of service, the tractor engine should be operated at rated speed (pull hand throttle down to the first stop) with loads up to one-half of its capacity. A gasoline engine should operate between 2050 and 2100 rpm, and a diesel engine should operate between 2000 and 2050 rpm at half load.

After the 20-hour break-in period, drain the oil from the crankcase, replace the crankcase oil filter, and fill the crankcase with new oil of the proper viscosity. The tractor is then ready for normal operation.

NOTE: Observe the engine coolant temperature carefully during the break-in period. If the temperature rises above the normal operating range, shift to a lower gear to reduce the load on the engine.

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.

The rated speed of the engine is 1900 rpm. Use this speed when operating the power take-off or belt pulley.

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.

Slow-idle speed for the diesel engine is 600 rpm. Normal slow-idle speed for the gasoline engine is 650 rpm. A second slow-idle speed of 450 rpm is provided on gasoline engines for engine stopping purposes.

Using Hand Throttle

Use the hand throttle to select slow idle or any of the variable governed speeds from 1500 to 2200 rpm (Fig. 10-10-5).

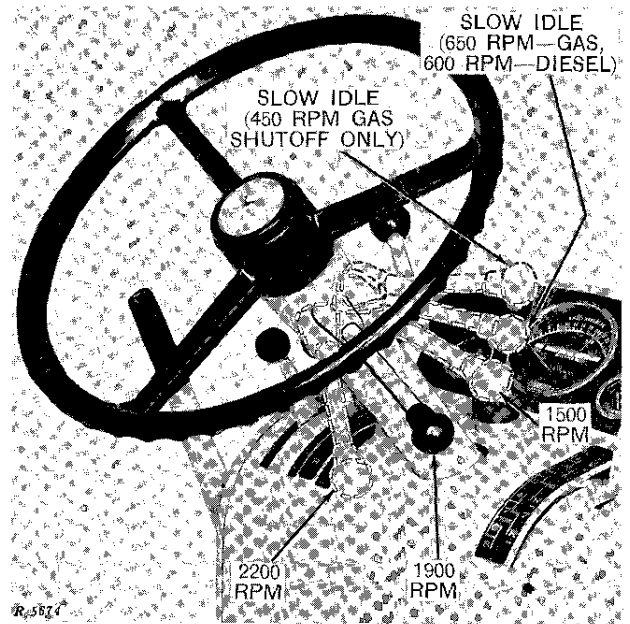


Fig. 10-10-5—Range of Hand Throttle Positions

Push the lever upward as far as it will go to obtain slow idle. To obtain the 1900 rpm rated engine speed, pull the lever downward to the first stop. Placing the lever halfway between slow idle and 1900 rpm gives the 1500 rpm speed. Engine speeds between 1500 and 1900 rpm may be selected by moving the lever between these two positions.

To obtain working speeds above 1900 rpm, pull out on the knob at the end of the hand throttle. With the knob pulled out, pull the throttle downward as far as it will go. This is the 2200 rpm position. Engine speeds between 1900 and 2200 rpm may be selected by moving the lever between these two positions.

Using Foot Throttle

The foot throttle is used to select engine transport speeds from 2200 to 2500 rpm or to change engine speed momentarily.

Press down on the foot throttle to speed up the engine (Fig. 10-10-6). When the pedal is pushed down as far as it will go, the engine operates at 2500 rpm.

The foot throttle operates independent of the hand throttle. When it is not in use, engine speed is determined by the setting of the hand throttle.

NOTE: The foot throttle is not intended as a means of increasing the normal working speed of the engine.

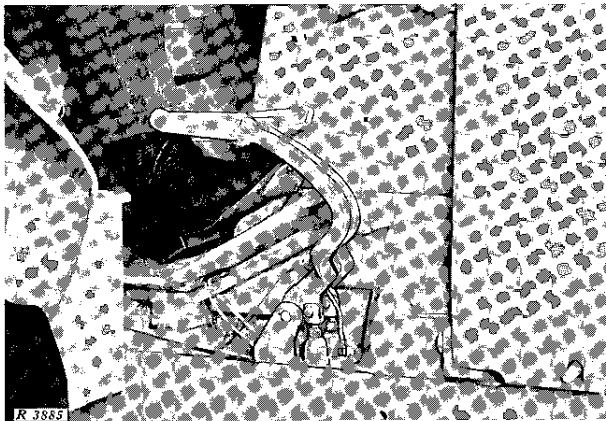


Fig. 10-10-6—Using the Foot Throttle

SELECTING GROUND SPEED

The tractor has 8 forward speeds and 3 reverse speeds for each of the throttle positions that may be used. These combinations enable the operator to balance speed and power for maximum economy and allow him flexibility to meet varying working conditions. For example, for a given ground speed the operator may choose to work in a low gear at high engine speed for maximum reserve power or in a higher gear at a lower engine speed for maximum fuel economy.

Examples of the ground speeds at which the tractor will travel are shown in Group 15 of this section. Engine working speeds may be varied between 1500 rpm and 2200 rpm, and engine transport speeds may be varied up to 2500 rpm.

NOTE: Avoid overloading the tractor engine. Overloading causes undue strain on parts, eventually resulting in poor operation.

SHIFTING FROM NEUTRAL

Having determined the proper speed, depress the clutch pedal to disengage the clutch and move the shift lever from neutral into the slot for the gear desired.

Gradually release the clutch pedal to take up the load smoothly.

SHIFTING FROM ONE SPEED TO ANOTHER

The shift quadrant has four shift stations (Fig. 10-10-7). Stations No. 1, 2, and 3 have two forward speeds and one reverse speed. Station No. 4 has two forward speeds only.

With the clutch pedal depressed the transmission can be shifted with either shift lever from one forward speed to the other forward speed within the same station. For instance, you can shift between 1st and 3rd speeds, 2nd and 5th speeds, 4th and 7th speeds, and 6th and 8th speeds.

You can shift with either shift lever from the highest forward speed in any station to the reverse within the same station.

To shift from one station to another, depress the clutch pedal, stop the tractor, and move the

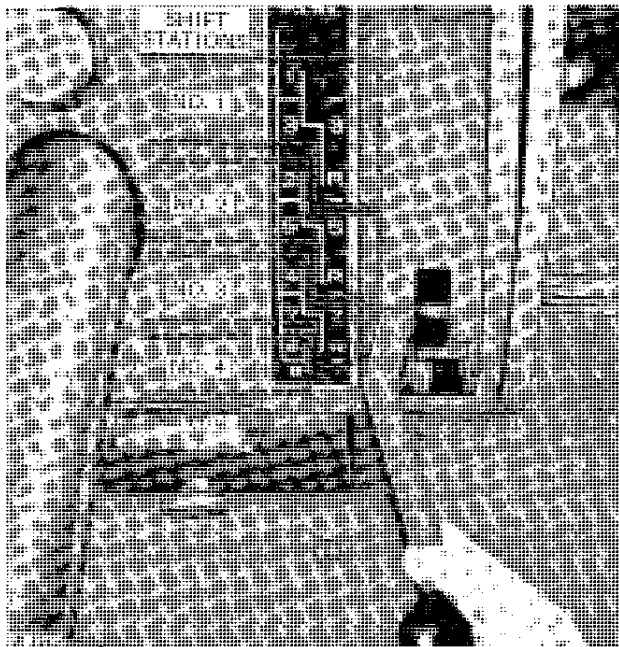


Fig. 10-10-7—Shift Lever in "TOW" Position

right-hand gearshift lever to neutral. Then shift to the desired speed in the new station and gradually release the clutch to take up the load.

CAUTION: Stop the tractor before shifting from one speed to another within a station or from one station to another.

PARKING THE TRACTOR

When the tractor is stopped for parking, for holding it on an incline, or for holding it during PTO or belt work, move the shift lever as far as it will go forward from neutral to the "PARK" position.

CAUTION: Be sure the tractor is stopped before placing the shift lever in "PARK" position.

This automatically holds the tractor stationary. Shifting from "PARK" to neutral or to an operating gear releases the braking action.

TOWING THE TRACTOR

The shift quadrant on your tractor also has a "TOW" position (Fig. 10-10-7). Whenever the tractor is to be towed, move the shift lever to this position. This will eliminate unnecessary wear of transmission parts when the tractor is being towed by another vehicle.

CAUTION: The tractor should never be towed at high speed. Always attach a tow bar or chain to the tractor frame.

HYDRAULIC SYSTEM

The John Deere hydraulic system is a constant pressure, variable displacement, closed center system, that provides a quick, easy means of lifting various pieces of equipment and controlling their working depth.

Pressure and flow are maintained by a variable displacement, constant pressure pump driven by the engine crankshaft. The reservoir for the system is the transmission case and oil is carried through external steel pipes to each hydraulic function. All oil in the system is filtered through a full-flow filter.

POWER BRAKES

The tractor is equipped with fully hydraulic power brakes. The oil used in the transmission and hydraulic systems operates the power brakes. A constant pressure of oil is maintained at all engine speeds. The two brake pedals may

be applied individually to assist in making sharp turns (Fig. 10-10-8). They may also be applied together for slowing or stopping the tractor (Fig. 10-10-9). The brake pedals can be locked together to operate simultaneously if desired.

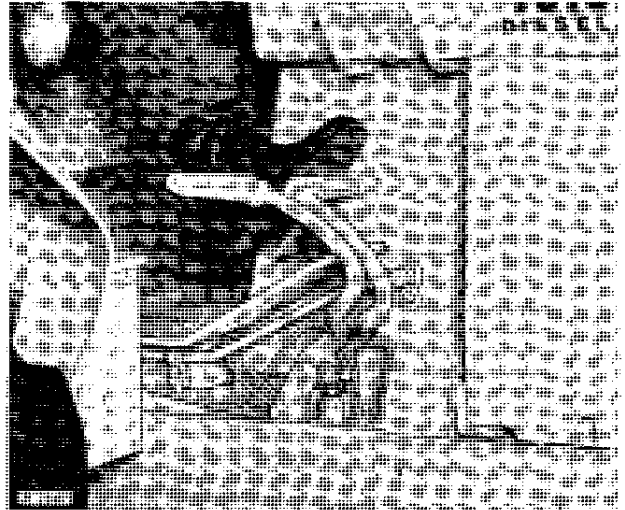


Fig. 10-10-8—Using Power Brakes to Help Make Sharp Left-Hand Turn

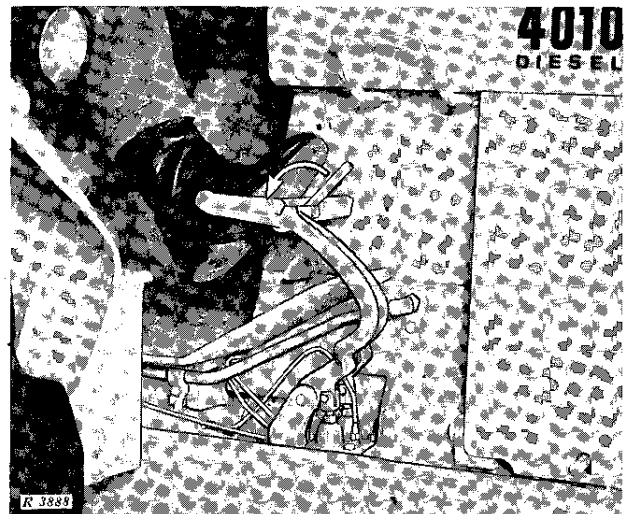


Fig. 10-10-9—Using Power Brakes to Stop Tractor

POWER STEERING

The tractor is equipped with fully hydraulic power steering and, like the power brakes, uses the same oil as the transmission and hydraulic system.

The power steering system consists of a valve, cylinders, and hydraulic pipes. The valve directs the flow of oil to and from the cylinders for either a right- or left-hand turn.

INTEGRAL EQUIPMENT CONTROL SYSTEM

Rockshaft

The tractor can be equipped with a rear rockshaft which can be used to raise, lower, and control a wide variety of integral equipment and 3-point hitch tools.

The position of the rockshaft is in direct relation to the position of the rockshaft control lever (Fig. 10-10-10). Therefore the rockshaft can be quickly moved through its full range of travel or "inched" to any position in between. The rockshaft can be operated whether the tractor is moving or standing still as long as the engine is running.

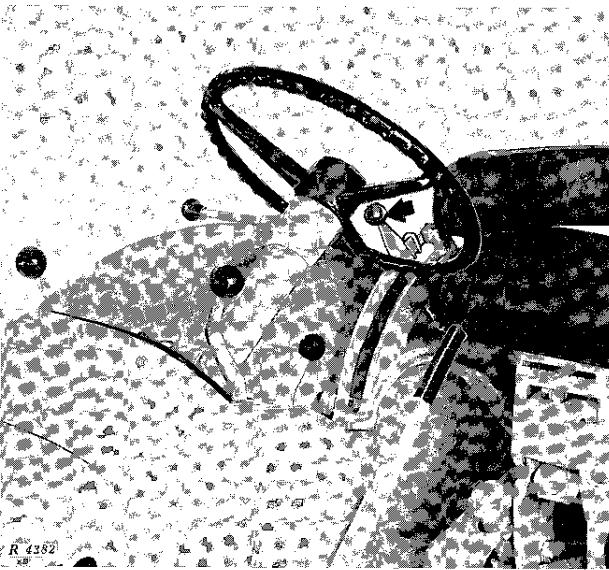


Fig. 10-10-10—Rockshaft Control Lever

3-Point Hitch

The Universal 3-Point Hitch (Fig. 10-10-11) provides a fast, easy means of attaching rear-mounted integral equipment. A Quik Coupler or a hitch bar can be obtained to provide for attaching equipment without the operator leaving the tractor seat.

The rockshaft operates the 3-point hitch. Movement of the rockshaft control lever results in a corresponding movement of the rockshaft, hitch, and any integral equipment attached to it.

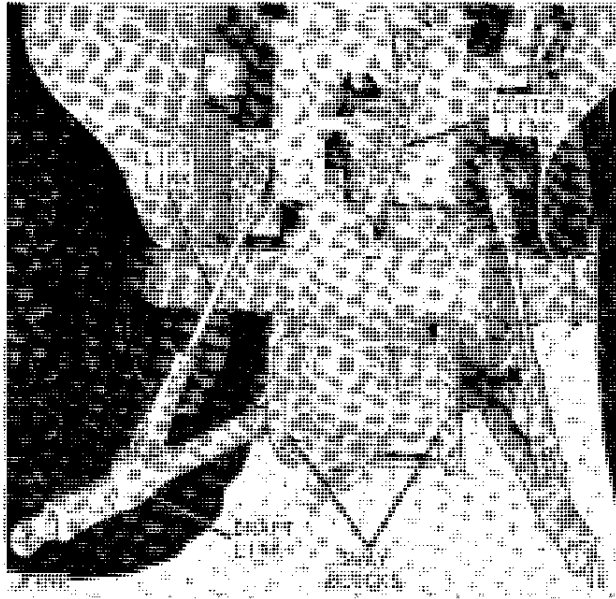


Fig. 10-10-11—Universal 3-Point Hitch

REMOTE CYLINDER SELECTIVE CONTROL

Selective control valves can be obtained for the operation of equipment mounted remote cylinders. Operating levers (Fig. 10-10-12) are located at the left side of the dash.

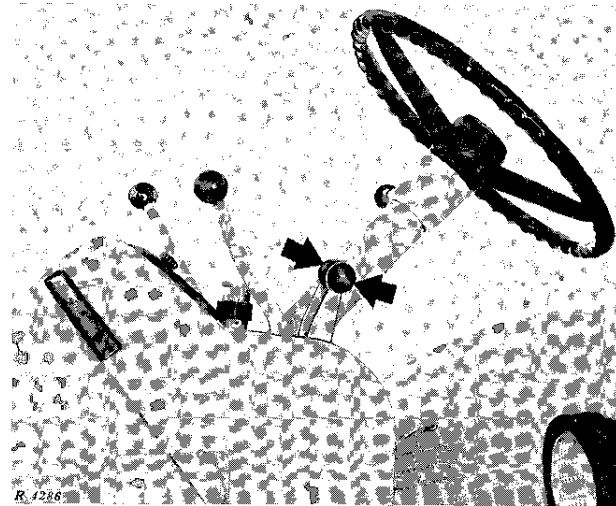


Fig. 10-10-12—Remote Cylinder Operating Levers

Group 15 SPECIFICATIONS

(Subject to change without notice.)

HORSEPOWER (at 2200 engine rpm)

	<i>Gasoline</i>	<i>Diesel</i>
Corrected flywheel*	92.08	94.10
PTO observed	80.96	84.00
Drawbar observed	72.77	73.65

*Factory corrected to standard sea level conditions (29.92 in Hg. and 60° F.)

ENGINE

Type	6-cylinder, in-line, valve-in-head	
<i>Engine Speeds</i>		
	<i>Gasoline</i>	<i>Diesel</i>
Idle for engine shut-off	450 rpm
Normal slow idle	650 rpm	600 rpm
Working speeds	1500 to 2200 rpm	1500 to 2200 rpm
Transport speeds	Up to 2500 rpm	Up to 2500 rpm
Bore and stroke	4 in. x 4 in.	4-1/8 in. x 4-3/4 in.
Displacement	302 cu. in.	380 cu. in.
Compression ratio	7.5 to 1	16.5 to 1
Firing order	1-5-3-6-2-4	1-5-3-6-2-4
Valve clearance (intake)	0.015 in.	0.018 in.
(exhaust)	0.028 in.	0.018 in.
Distributor timing	20° BTDC at 1900 rpm	
Injection pump timing	14° BTDC	

GROUND SPEEDS (18.00-26 tires)

Gear	Hand throttle operating range			Maximum foot throttle speed
	1500 rpm	1900 rpm	2200 rpm	2500 rpm
1st	1.2 mph	1.5 mph	1.7 mph	1.9 mph
2nd	1.9 mph	2.4 mph	2.7 mph	3.1 mph
3rd	2.5 mph	3.1 mph	3.6 mph	4.1 mph
4th	3.2 mph	4.0 mph	4.7 mph	5.3 mph
5th	3.9 mph	5.0 mph	5.8 mph	6.6 mph
6th	5.2 mph	6.6 mph	7.6 mph	8.6 mph
7th	6.7 mph	8.5 mph	9.8 mph	11.2 mph
8th	10.9 mph	13.9 mph	16.1 mph	18.2 mph
3rd reverse	2.4 mph	3.0 mph	3.5 mph
5th reverse	3.8 mph	4.9 mph	5.6 mph
7th reverse	6.5 mph	8.3 mph	9.6 mph

CAPACITIES

	<i>Gasoline</i>	<i>Diesel</i>
Fuel tank	34 U.S. gals.	34 U.S. gals.
Crankcase	8 U.S. qts.	8 U.S. qts.
Hydraulic system	11 U.S. gals.	11 U.S. gals.
Air cleaner	2-3/4 U.S. pints	4-3/4 U.S. pints
Cooling system	24 U.S. qts.	23 U.S. qts.
Belt pulley	2-1/2 U.S. pints	2-1/2 U.S. pints

CLUTCHES

Transmission	Single 12-inch disk, automotive type, foot operated
PTO	Single 11-inch disk, locks in or out, lever operated

LUBRICATION SYSTEM Force feed, pressurized type with full flow oil filter

FUEL SYSTEM

	<i>Gasoline</i>	<i>Diesel</i>
Type	Pressure system	Direct injection
Fuel pump	Diaphragm type	Diaphragm type
Carburetor	Single barrel, updraft	
Injection pump type		Inlet metering distribut- ing type
Air cleaner	Oil-wash type	Oil-wash type

ELECTRICAL SYSTEM

	<i>Gasoline</i>	<i>Diesel</i>
Type	12 volts, grounded	24 volts, split load
Starter, generator	12 volts	24 volts
Lights, accessory	12 volts	12 volts
Batteries	12 volts, 70 ampere- hour, SAE 3 EM Agricultural type	Two 12 volts, 70 am- pere-hour, SAE 3EM Agricultural type, connected in series

TRANSMISSION

Type	Collar-shift, constant mesh
Gear selections	8 forward, 3 reverse
Shifting	4 stations, right- or left-hand shifting in each station

HYDRAULIC SYSTEM

Type	Closed center, variable displacement, constant pressure Includes power steering, power brakes, equipment con- trol and transmission-differential lubrication.
Maximum pressure	2250 psi

STEERING

Type	Hydraulic power with 2 steering cylinders
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