720 Series
Diesel Tractor

JOHN DEERE

SERVICE MANUAL

720 Series
Diesel Tractor

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ENGLISH

SERVICE MANUAL FOR JOHN DEERE DEALERS

720 SERIES DIESEL TRACTOR

TABLE OF CONTENTS

SM-2020 (12-57)

TO THE JOHN DEERE SERVICEMAN

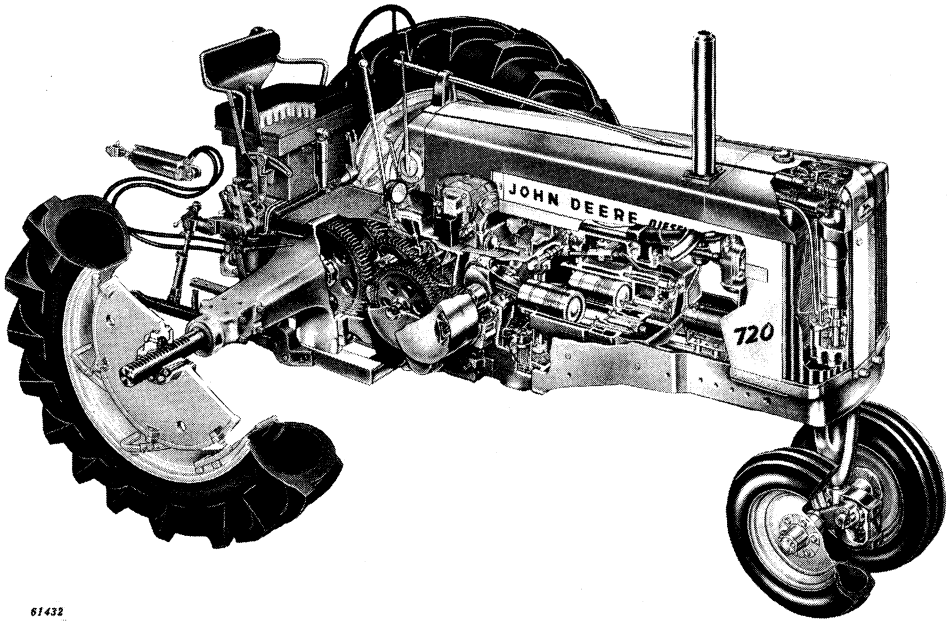
This Service Manual contains maintenance instructions for the John Deere "720" Series Diesel Tractor. Included are complete instructions for removal, disassembly, inspection, repair, assembly and installation of the major parts and assemblies of the tractor. In addition, the manual contains brief descriptions 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.

The manual also contains complete instructions for performing the predelivery, delivery, after-delivery and 150-hour services outlined in the Service Policy which accompanies each tractor. By using this information, you will be sure that the tractor is ready to perform efficiently and economically when it is delivered to its new owner and that it will be restored to peak efficiency when it is brought into your shop for after-delivery services. 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.

The sections in this manual concerning the power steering mechanism, fuel injection pumps and nozzles, electrical equipment and Powr-Trol are limited mainly to removal and installation instructions. Full maintenance instructions for the power steering mechanism are given in *Service Manual SM-2016, "Power Steering for John Deere Tractors."* When additional information, concerning the fuel injection pumps and nozzles, is required, see *Service Manual SM-2018, "Testing and Servicing Fuel Injection Pumps and Nozzles."* Instructions for testing, repairing and adjusting the generator and electric cranking motor are given in *Service Manual SM-2000, "Tractors and Engines (General)."* For additional information concerning the Custom Powr-Trol mechanism, consult *Service Manual SM-2022, "Custom Powr-Trol."*

This manual is written specifically for "720" Series Diesel Tractors with Serial Numbers above 7214900. However, most of the information it contains applies equally to tractors with Serial Numbers below 7214900. Where procedures are completely different, the exceptions are noted and described. When variations are minor, the serviceman will be able to apply the information without difficulty.

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.



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Cutaway View of John Deere "720" Series Diesel Tractor with Gasoline Cranking Engine

INDEX

Section 10
DESCRIPTION, OPERATION, AND SPECIFICATIONS

Group 5
DESCRIPTION

The John Deere "720" Series Diesel Tractor has sufficient power to pull five 14-inch plow bottoms or the equivalent under normal conditions. The tractor is available in two basic styles: general-purpose or standard. In both styles the majority of parts and components are identical. Both types have six forward speeds and one reverse.

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 the manual.

SERIAL NUMBERS.

Each tractor bears a serial number located on the right-hand side of the main case just in front of the belt pulley.

Cranking engines on tractors with serial number 7214900 and up have a serial number located on the cylinder block at the clutch housing flange.

The cranking engine distributor, Powr-Trol valve housing, and hydraulic remote cylinder also bear serial numbers.

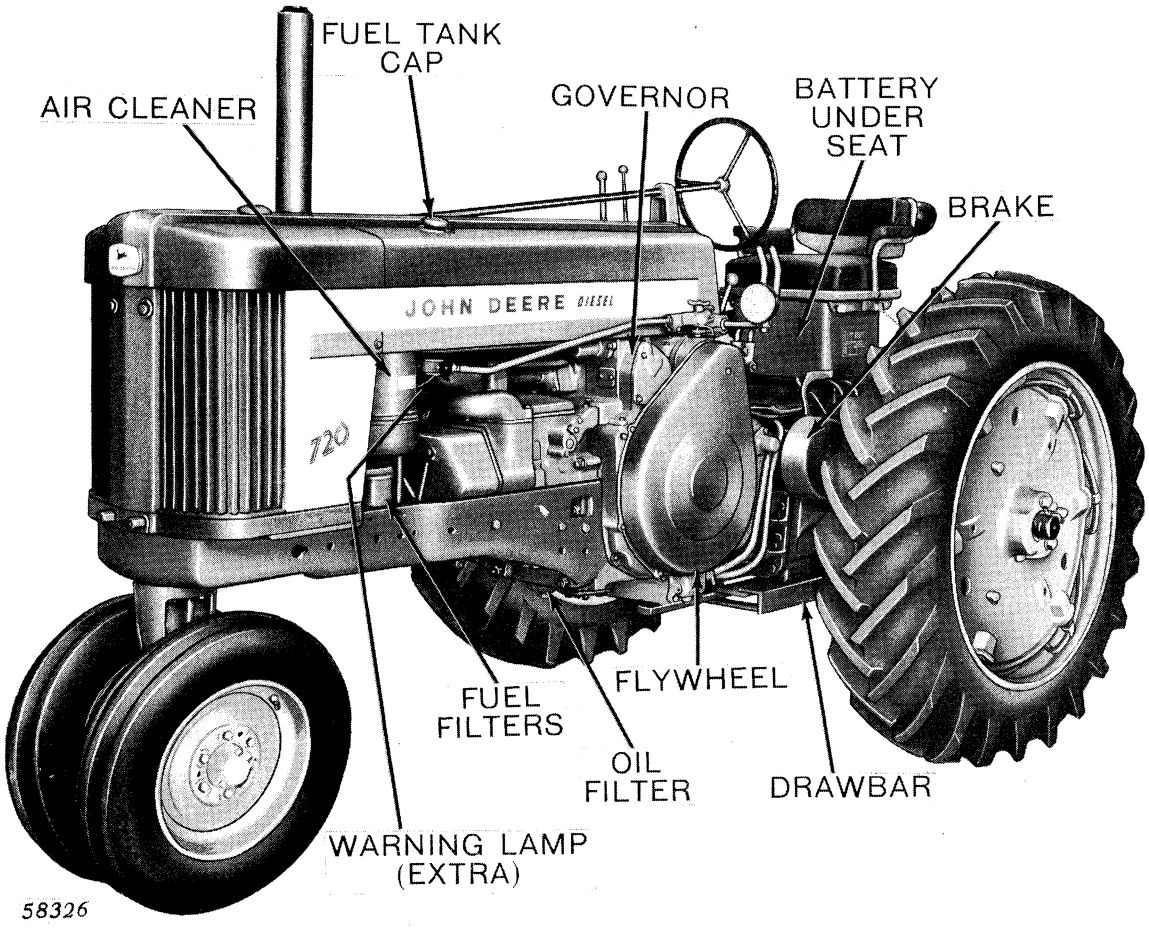

Figure 10-5-1—John Deere "720" Series General-Purpose Diesel Tractor—Flywheel Side

DIESEL ENGINE.

The tractor is powered by a full Diesel four-stroke-cycle two-cylinder, valve-in-head, horizontal, cross-mounted engine with a displacement of 376 cubic inches. The bore is 6-1/8 inches. The stroke 6-3/8 inches and the rated load speed is 1125 rpm.

The crankshaft is supported in three main bearings. Rotation is counter-clockwise when viewed from the flywheel side. All moving parts of the engine are pressure-lubricated by a force-feed pressure oiling system with a full-flow oil filter. Engine speeds are controlled by a fly-weight type governor. Full automatic crankcase ventilation is provided by clean air drawn through the cranking engine air cleaner.

CRANKING ENGINE.

The Diesel engine is started by means of a four-cylinder V-type gasoline cranking engine having a 2-inch bore, 1-1/2-inch stroke and a rated speed of 4500 rpm. Engine speeds are controlled by a variable speed centrifugal type governor. The engine is equipped with a separate oil pump to assure pressure lubrication of moving parts, and with a water pump to provide circulation of the coolant when the cranking engine is running.

The cranking engine fuel system consists of a 1-quart gasoline tank mounted on the inside of the cranking engine compartment door and a down-draft carburetor. Tractors with serial number 7214900 and up have a fuel filter located under the tank. Clean air is assured by a separate oil-wash type air cleaner. A six-volt battery, coil and distributor furnish ignition. The distributor contains two sets of points—one set for each bank of cylinders, but no spark-advance mechanism. The cranking engine is started by means of a six-volt automotive-type cranking motor.

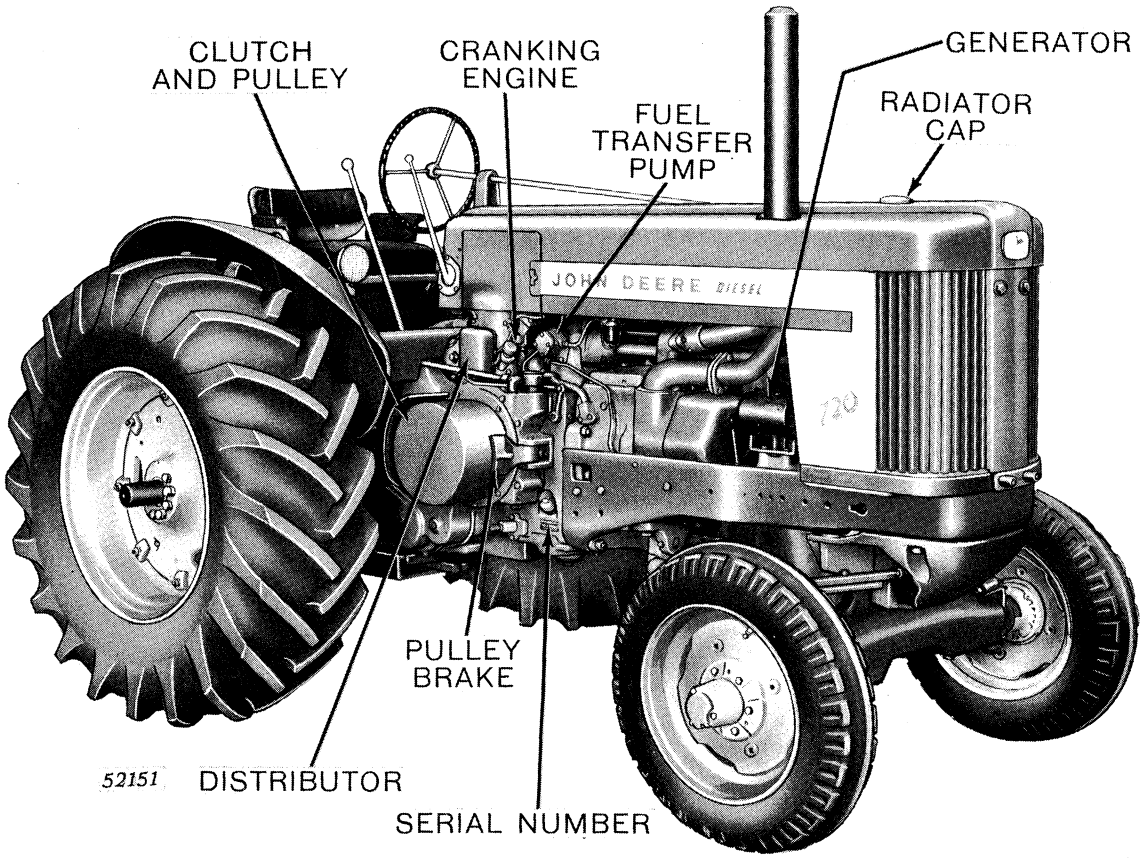

Figure 10-5-2—John Deere "720" Series Standard Diesel Tractor—Pulley Side

DIESEL ENGINE STARTING MECHANISM.

A transmission with automotive-type clutch is used to connect the cranking engine to the Diesel engine for starting. The transmission includes an overrunning clutch to protect the cranking engine when the Diesel engine starts. Two levers are used to start the Diesel engine.

For detailed starting instructions see *Group 10* of *this Section.*

HEAT EXCHANGER.

Hot exhaust gases from the cranking engine are piped to a chamber surrounding the Diesel engine air intake pipe where they warm the incoming air to make Diesel engine starting easier. After flowing through the heat exchanger the cranking engine exhaust is expelled to the atmosphere.

COOLING SYSTEM.

Both engines are cooled by an interconnected pressure-type cooling system with a capacity of 7 U.S. gallons. Adequate circulation through the Diesel engine is assured by a centrifugal-type water pump located to the rear of the radiator bottom tank. The pump is driven by the generator belt. Proper engine temperature is maintained by a thermostat in the upper water manifold.

DIESEL ENGINE FUEL SYSTEM.

A 20 U.S. gallon tank is provided for Diesel fuel. A sediment bowl with fuel shut-off is located beneath the fuel tank. Two stages of micronic-type fuel filters prevent entry of dirt or other foreign substances into the fuel injection system.

Fuel is injected into the cylinders under high pressure at precisely the right moment by two injection nozzles which protrude into the combustion chambers through the cylinder head. Fuel is supplied to the nozzles by two injection pumps located in a compartment on top of the cylinder block. The pumps are operated by the engine camshaft. The amount of fuel delivered by the pumps to the nozzles is controlled by the governor and by the position of the speed control lever.

An adequate supply of fuel from the filters to the pumps is assured by a fuel transfer pump driven by the right-hand end of the Diesel engine governor shaft.

CLUTCH.

A dry disk, hand-operated clutch is located within the belt pulley. When the clutch is disengaged a pulley brake prevents pulley rotation.

TRANSMISSION AND DIFFERENTIAL.

The overdrive-type transmission lies crosswise in the main case. Shifting through the six forward speeds and reverse is accomplished by one shift lever.

The differential is of the conventional type with a ring gear and spider driven directly by a pinion in the transmission.

BRAKES.

Two individually operated foot brakes are provided to stop the tractor, hold it on inclines, or assist in making short turns. Each brake has two internal-expanding shoes and a drum with a shaft and gear which meshes with the final drive gear. The brakes can be held in the engaged position by brake latches.

STEERING MECHANISM.

The tractor may be equipped with manual steering or optional hydraulic power steering. The manual system utilizes a worm and gear with adjustments provided to compensate for all wear. The power system contains a gear-type hydraulic pump driven by the fanshaft, a valve assembly controlled by the steering shaft, and a hydraulic cylinder and vane which impart turning motion to the steering spindle and front wheels.

FRONT WHEEL ASSEMBLIES.

The tractor may be equipped with a variety of front end assemblies. For the general-purpose tractor these include Roll-O-Matic, duel front wheels, wide adjustable front axle, single front wheel, and 38-inch fixed tread. The standard tractor may be equipped with fixed or adjustable front ends.

REAR WHEELS.

On both general-purpose 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. General-purpose tractors may be equipped with regular-length, long, or extra-long rear axles.

General-purpose tractors may also be equipped with power-adjusted rear wheels which make it possible to change rear wheel tread width by engine power without jacking up the tractor. The wheel disks have six "jack screws" which clamp the disks to spiral rails on the rims. Tread adjustment is changed by loosening the jack screws and, by means of engine power, rotating the wheel disk within the rim. As the disk rotates, the jack screws slide along the spiral rails, causing the wheel rim to shift in or out.

POWER TAKE-OFF SHAFT.

Tractors can be furnished with an engine-driven "live" type power take-off shaft with self-contained clutch, permitting operation of PTO equipment independent of tractor ground travel. The powershaft conforms to ASAE-SAE standards.

HYDRAULIC SYSTEM.

Both general-purpose and standard tractors may be equipped with Custom Powr-Trol to provide effortless control of all types of equipment. The system may consist of a "position-responsive" rockshaft, or a combination of rockshaft with one or two remote cylinders, and also a choice of "solid" or "split" front-mounted rockshaft. Standard tractors may or may not be equipped with rockshaft.

A tractor with position-responsive rockshaft may have a Universal 3-Point Hitch for use with integral implements and Load-and-Depth Control which improves performance. For complete description of the Powr-Trol system, see *Service Manual SM-2022, "Custom Powr-Trol."*

The gear-type Powr-Trol hydraulic pump is located in a cavity at the lower left center of the main case. The pump is driven by the crankshaft through a crankshaft gear and an idler gear.

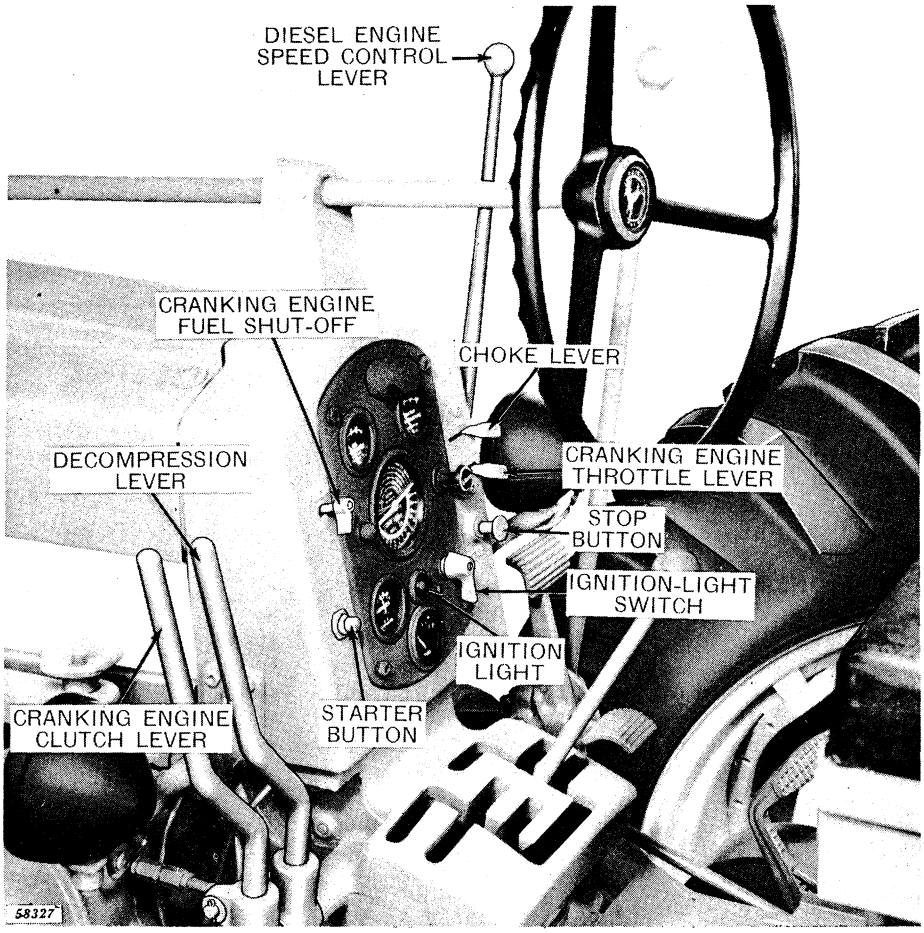

Figure 10-5-3—Starting Controls

Group 10
STARTING AND STOPPING THE ENGINES

PRELIMINARY STEPS

(1) Set gear shift lever in neutral and pull the clutch lever back into disengaged position.

(2) In cold weather, set powershaft shift lever in disengaged position to relieve drag on engine caused by cold transmission oil. If powershaft is to be used, permit engine to warm up before engaging powershaft shift lever.

(3) Make sure fuel shut-off valve at sediment bowl (located under main fuel tank) is open.

(4) See that Diesel engine speed control lever is in the "stop" position (all the way to the rear with stop pin pulled out).

STARTING THE CRANKING ENGINE

(1) Open cranking engine fuel shut-off valve two or three turns by turning the lever counterclockwise (Figure 10-10-1).

(2) See that cranking engine throttle lever is to the right in "Start" position.

(3) Turn ignition switch to "I" position (Figure 10-10-1).

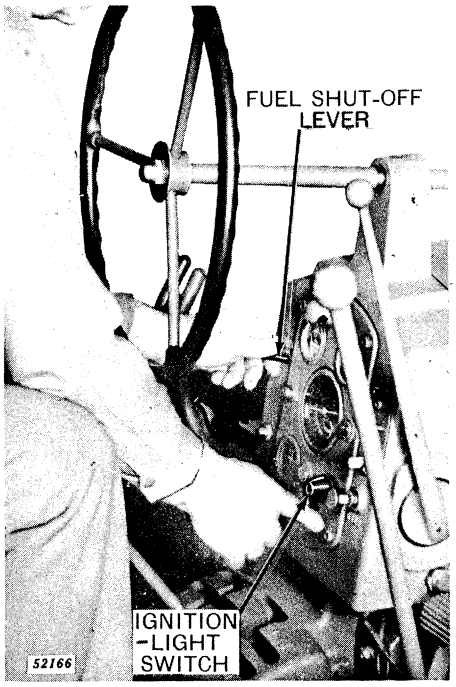

Figure 10-10-1—Operating Fuel Shut-Off Valve and Ignition Switch

NOTE: A red light, located to the left of the ignition switch, is connected to both the ignition and the cranking engine oiling systems. The light should come on when the ignition switch is turned to the "I" position; then, after the engine is started and oil pressure is present, the light should go out. If it does not, it is an indication that there is no oil pressure and the engine should be stopped and the cause determined.

(4) Hold choke lever to the left. The cranking engine will not continue to run with the choke in this position; therefore, when engine starts, release the choke lever. It is not always necessary to choke the engine.

(5) Push starter button to operate the cranking motor. Release button when engine begins to run (Figure 10-10-2).

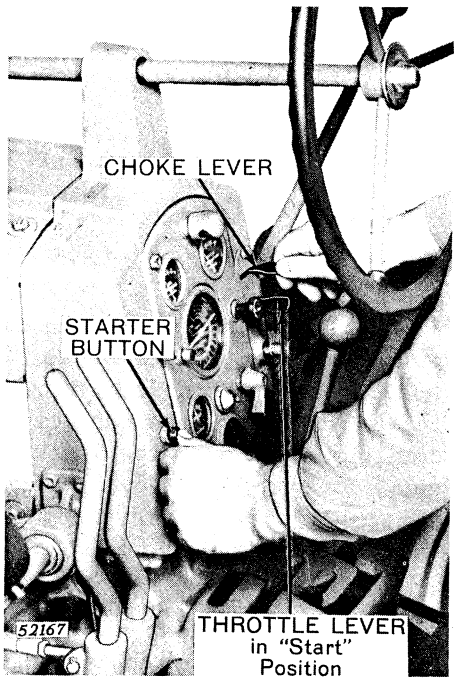

Figure 10-10-2—Operating the Choke Lever and Starter Button