

720 Series Diesel Tractor



JOHN DEERE

SERVICE MANUAL

720 Series
Diesel Tractor

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John Deere Waterloo Works
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**SERVICE MANUAL FOR
JOHN DEERE DEALERS**

720
SERIES **DIESEL TRACTOR**

TABLE OF CONTENTS

	Section
Description, Operation and Specifications	10
Predelivery, Delivery, After-Delivery and 150-Hour Services	20
Tune-Up and Adjustment	40
Diesel Engine	60
Cranking Engine and Accessories	65
Governor and Speed-Control Linkage	70
Electrical System	80
Cooling System	90
Diesel Engine Lubrication System	100
Fuel System	110
Pulley, Clutch and Pulley Brake	120
Transmission	130
Powershaft	135
Differential and Final Drive	140
Float-Ride Seat	145
Brakes	150
Wheels and Tires	160
Steering Mechanism and Front Axle	170
Custom Powr-Trol	180



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.

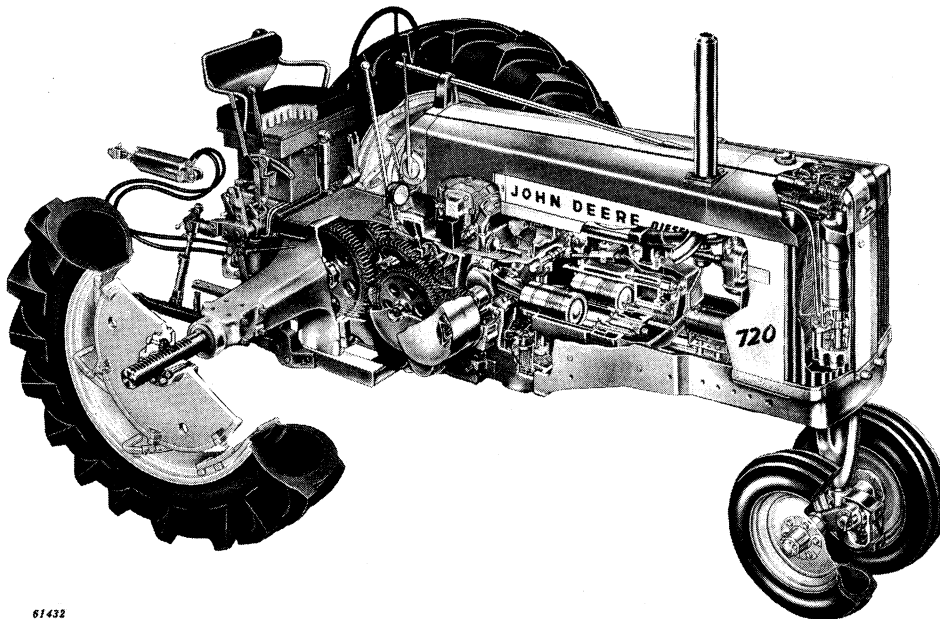
The manual also contains complete instructions for performing the predelivery, delivery, after-delivery and 150-hour services outlined in the Service Policy which accompanies each tractor. By using this information, you will be sure that the tractor is ready to perform efficiently and economically when 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

	Page		Page
A			
Accessories—Cranking Engine.....	65-5-1	Brush Tension, Generator.....	80-5-1
Adjustable-Tread Front Axle.....	170-15-1	Bushing and Bearing, Pulley.....	120-5-3
Adjustable-Tread Front End, Wide— Specifications.....	170-25-1	Bushings, Crankshaft—Cranking En- gine.....	65-5-12
Adjustment, Pressure—Fuel Transfer Pump.....	110-15-1	C	
Adjustment and Tune-Up.....	40-5-1	Cam Followers—Diesel Engine.....	60-25-1
After-Delivery Services.....	20-5-1	Camshaft—Cranking Engine.....	65-5-8
After-Delivery Service.....	20-15-4	Camshaft—Diesel Engine.....	60-25-1
Air, Bleeding from Fuel System.....	20-10-6, 40-10-4, 110-20-1	Camshaft—Specifications—Diesel En- gine.....	60-30-2
Air Cleaner—Cranking Engine... 40-20-4, 65-25-3		Capacities—Engine.....	10-15-1
Air Cleaner—Diesel Engine... 20-10-5, 110-35-1		Cap Screws and Nuts.....	20-15-4
Air Cleaner Oil Level—Cranking Engine 20-10-4		Cap Screw Tensions—Specifications— Diesel Engine.....	60-30-2
Air Cleaner—Temperature-Oil Weight Chart.....	20-10-6, 40-10-2	Carburetor.....	40-20-4, 65-25-3
Air Intake System—Diesel Engine.....	40-10-1	Cetane Number, Diesel Fuel.....	110-5-2
Air Pressure, Tires.....	20-10-3, 160-15-1	Changing Fuel Filter Elements.....	110-20-1
Axle, Front—Wide Adjustable-Tread... 170-15-1		Cleaner, Air—Cranking Engine... 40-20-4, 65-25-3	
Axle, Front—Specifications.....	170-25-1	Cleaner, Air—Diesel Engine... 20-10-5, 110-35-1	
Axle Housing, Rear.....	140-5-2, 140-5-6	Cleaning Fuel Tanks—Diesel Engine... 110-10-1	
B			
Backlash—Steering Gear.....	20-10-9, 40-15-4	Clutch.....	20-15-3, 40-15-1, 120-5-1
Ballast.....	20-10-7, 160-15-3	Clutch—Cranking Engine.....	20-10-8, 40-20-1, 40-20-6, 65-20-1
Battery.....	20-10-4, 20-10-6, 80-10-1	Clutch—Diesel Engine.....	10-5-3, 20-10-8, 120-5-1, 120-5-6
Battery Registration.....	20-15-3	Clutch Facing Replacement.....	120-5-2
Bearings, Connecting Rod—Diesel En- gine.....	60-15-1	Clutch and Pulley Brake.....	20-10-15
Bearings, Differential.....	140-5-3	Clutch and Pulley—Specifications.....	120-15-1
Bearings, Final Drive.....	140-10-3	Clutch, Powershaft.....	20-10-8, 40-15-3, 135-10-1, 135-15-1
Bearing, Lower—Steering Spindle.....	170-5-4	Clutch—Specifications.....	10-15-1
Bearings, Main—Diesel Engine.....	60-20-1	Coil, Ignition—Cranking Engine.....	65-25-6
Bearings, Main—Specifications—Diesel Engine.....	60-30-2	Coil Tester—Cranking Engine.....	65-25-6
Belt, Generator Drive.....	20-10-6	Compression Test.....	40-10-3, 40-20-1
Belt Pulley—Specifications.....	10-15-1	Condenser—Cranking Engine.....	65-25-6
Bevel Gear Assembly and Drive Shaft —Powershaft.....	135-5-3	Connecting Rods—Cranking Engine... 65-5-10	
Bevel Gear and Spur Pinions, Differen- tial.....	140-5-3	Connecting Rods—Diesel Engine.....	60-15-1
Bevel Pinions, Differential.....	140-5-4	Connecting Rods—Diesel Engine— Specifications.....	60-30-2
Bleeding Air from Fuel System.....	20-10-6, 40-10-4, 110-20-1	Controls.....	20-15-2
Body, Oil Filter.....	100-10-2	Control Rod, Speed.....	40-10-10
Bowl, Sediment—Diesel Engine Fuel System.....	110-10-1	Coolant Level in Radiator.....	20-10-3
Brakes.....	10-5-3, 20-10-15, 20-15-3, 40-5-2, 40-15-5, 150-5-1	Cooling System... 10-5-3, 20-10-5, 20-15-2, 40-5-2, 40-15-6, 65-10-1, 90-5-1	
Brake Adjustment.....	20-10-8, 135-10-10	Cooling System—Specifications.....	10-15-1
Brake, Pulley.....	20-10-8, 20-10-15, 40-15-2, 120-5-1, 120-5-6, 120-10-1, 120-10-3	Countershaft, Transmission... 130-5-1, 130-15-1	
Brake Shoe Assembly.....	150-5-2	Countershaft—Specifications.....	130-20-1
Brakes—Specifications.....	10-15-1, 150-5-3	Counterweights, Crankshaft.....	60-10-3
Breaking-In Period.....	20-15-2	Cover, First Reduction Gear... 60-20-8, 120-10-1	
		Cover, Rockshaft Housing.....	180-10-2
		Crankcases, Oil Level.....	20-10-3
		Crankcase, Oil Type—Cranking Engine 65-15-4	
		Crankcase Ventilation.....	20-15-2, 60-5-2
		Cranking Engine.....	10-5-2, 20-10-5, 65-5-1

**Tractor, "720" Series Diesel—
Index**

	Page
Cranking Engine Clutch Adjustment	20-10-8, 40-20-6
Cranking Engine— Specifications	10-15-1, 65-30-1
Cranking Engine, Starting	10-10-1
Cranking Engine, Stopping	10-10-3
Cranking Engine Trouble Shooting	65-35-1
Cranking Engine Tune-Up	40-20-1
Cranking Motor, Electric	65-25-1
Cranking Motor and Ignition-Light Switch	20-10-6, 20-15-3
Crankshaft—Diesel Engine	60-20-1
Crankshaft—Diesel Engine—Specifica- tions	60-30-2
Crankshaft and Bushings—Cranking Engine	65-5-12
Crankshaft Counterweights	60-10-3
Crankshaft End Play—Diesel Engine	60-20-6
Crankshaft End Play Adjustment	40-10-3
Cushions, Seat	145-5-1
Custom Powr-Trol	20-10-16, 20-15-3, 40-5-2, 40-15-5, 180-5-1
Cylinder Block—Diesel Engine	60-15-1
Cylinder Block—Diesel Engine—Speci- fications	60-30-2
Cylinder Head—Diesel Engine	60-10-1
Cylinder Sleeves—Cranking Engine	65-5-11
Cylinder Valve Housings, Remote	180-10-1
D	
Decompression Linkage Adjustment	40-10-3
Decompression Shaft—Diesel Engine	60-25-1
Delivery Services	20-5-1, 20-15-1
Description, Tractor	10-5-1
Diesel Engine	10-5-2, 20-10-15, 60-5-1
Diesel Engine Clutch and Pulley Brake	20-10-8
Diesel Engine, Components	60-5-1
Diesel Engine Fuel System	10-5-3, 110-5-1
Diesel Engine Lubrication System	100-5-1
Diesel Engine Oil Pressure	40-10-11
Diesel Engine Specifications	10-15-1, 60-30-1
Diesel Engine Speeds	40-10-10
Diesel Engine, Starting	10-5-3, 10-10-2
Diesel Engine, Stopping	10-10-3, 40-10-10
Diesel Engine Tune-Up	40-10-1
Diesel Engine Water Pump	90-15-1
Differential	10-5-3, 140-5-1
Differential—Specifications	140-15-1
Disks, Clutch	120-5-5
Distributor—Cranking Engine	40-20-2, 65-25-5
Double Wheel Front Wheels	160-5-1
Draft Links	180-10-3
Drawbar	20-15-3
Drawbar Position	20-10-9
Drive, Fan (Power Steering Tractor)	70-15-1
Drive, Fan—Specifications	70-20-1
Drive, Final	140-10-1
Drive Gear and Shaft, Transmission	130-5-1, 130-15-1
Drive Gear, Powershaft—Diesel Engine	60-20-5
Driving Mechanism, Powershaft	135-5-1
Drum, Brake	150-5-2
Drum and Oil Pump, Powershaft Clutch	135-15-1

	Page
E	
Electric Cranking Motor—Cranking En- gine	65-25-1
Electrical System	20-10-6, 40-5-2, 80-5-1
Electrical System—Specifications	10-15-1
Electrolyte—Battery	80-10-1
Elements, Changing Filter	110-20-1
End Play—Crankshaft	40-10-3
End Play—Steering Gear	40-15-4
Engine, Cranking	10-5-2, 20-10-5, 65-5-1
Engine, Cranking—Clutch Adjustment	20-10-8, 40-20-6
Engine, Cranking— Specifications	10-15-1, 65-30-1
Engine, Cranking—Starting	10-10-1
Engine, Cranking—Stopping	10-10-3
Engine, Cranking—Trouble Shooting	65-35-1
Engine, Cranking—Tune-Up	40-20-1
Engine, Diesel	10-5-2, 20-10-15, 60-5-1
Engine, Diesel—Clutch and Pulley Brake	20-10-8, 120-5-1
Engine, Diesel, Engine Components	60-5-1
Engine, Diesel—Fuel System	10-5-3, 110-5-1
Engine, Diesel—Lubrication System	100-5-1
Engine, Diesel—Oil Pressure	40-10-11
Engine, Diesel—Specifications	10-15-1, 60-30-1
Engine, Diesel—Speeds	40-10-10
Engine, Diesel—Starting	10-5-3, 10-10-2
Engine, Diesel—Stopping	10-10-3, 40-10-10
Engine, Diesel—Tune-Up	40-10-1
Engine, Diesel—Water Pump	90-15-1
Engine Knocks—Diesel Engine	60-35-5
Engine Misses—Diesel Engine	60-35-5
Engine Overheats—Diesel Engine	60-35-3
Engine Runs Irregularly—Diesel Engine	60-35-6
Engine Speeds—Cranking Engine	40-20-5
Engines, Starting and Stopping	20-15-2
Engine Tune-Up, Diesel	40-10-1
Engine Uses Too Much Oil—Cranking Engine	65-35-2
Engine Uses Too Much Oil—Diesel En- gine	60-35-3

	Page
F	
Facing, Clutch—Replacement	120-5-2
Fan Drive (Power Steering Tractor)	70-15-1
Fan Drive—Specifications	70-20-1
Fan Shaft (Manual Steering Tractors Only)	40-15-2
Fan Shaft Assembly	70-10-1
Fan Shaft—Specifications	70-20-1
Fast Idle Speed—Diesel Engine	40-10-10
Field Current, Generator	80-5-1
Filters, Fuel	110-20-1
Filter, Oil	100-10-1
Final Drive	140-10-1
Final Drive—Specifications	140-15-1
First Reduction Gear Cover	60-20-8, 120-10-1
Float Level, Carburetor	40-20-4
Float-Ride Seat	145-5-1
Flow Control Valve, Power Steering	170-5-12
Flywheel—Cranking Engine	65-20-1
Flywheel—Diesel Engine	60-20-1
Flywheel Timing Marks	40-10-6



	Page		Page
Front Axle—Specifications	170-25-1	Housing, Rockshaft	180-10-3
Front Axle, Wide Adjustable-Tread	170-15-1	Hydraulic System	10-5-4, 20-10-16, 180-5-1
Front End Weights	160-15-3	I	
Front End, Wide Adjustable-Tread— Specifications	170-25-1	Idle Adjustment—Cranking Engine	40-20-5
Front Wheels	10-5-3, 20-15-3, 160-5-1	Ignition-Light and Cranking Motor Switch	20-10-6, 20-15-3
Front Wheel Bearings	40-15-3	Ignition System	20-10-7, 20-15-3
Front Wheels and Tires—Specifications	10-15-2	Ignition System—Cranking Engine— Specifications	10-15-1
Fuels	20-10-4	Inflation Chart, Tires	20-10-3, 160-15-1
Fuel, Engine Uses Too Much—Diesel Engine	60-35-6	Injection Nozzles, Fuel	40-10-5, 60-10-5, 110-30-1
Fuel Filters	110-20-1	Injection Nozzle Sleeves	60-10-2
Fuel Injection Nozzles	20-10-6, 40-10-5, 60-10-2, 60-10-5, 110-30-1	Injection Pumps, Fuel	40-10-4, 110-25-1
Fuel Injection Pumps	40-10-4, 110-25-1	Injection Pump Timing	40-10-5
Fuel Injection System	20-10-6	Injection Pump Timing Marks	40-10-7
Fuel Leaks—Diesel Engine	60-35-2	Injection System	20-10-6
Fuel Recommended—Diesel Engine	110-5-1	K	
Fuel Specifications	110-5-1	Knee Assemblies	170-15-2, 170-15-5
Fuel System	20-15-2, 40-5-2, 40-10-4, 110-5-1	Knuckle and Spindle Assemblies	170-15-4
Fuel System—Cranking Engine	20-10-5, 65-25-3	L	
Fuel System—Diesel Engine	10-5-3, 20-10-5, 110-5-1	Lack of Power—Cranking Engine	65-35-1
Fuel System—Specifications	10-15-1	Leakage, Oil and Water	40-5-1
Fuel Tank, Diesel Engine	110-10-1	Leaks, Fuel Tank—Diesel Engine Fuel System	110-10-1
Fuel Transfer Pump	40-10-4, 110-15-1	Leaks, Testing for—Radiator	90-10-1
G			
Gasoline Tank—Cranking Engine	65-25-3	Lever Adjustment, Governor	40-10-9
Gear Backlash, Steering	20-10-9	Lift Link	180-10-3
Gear Cover, Reduction	60-20-8, 120-10-1	Light-Ignition and Cranking Motor Switch	20-15-3
Gears, Final Drive	140-10-4	Lights	80-10-1
Gear Housing, Timing	60-20-1	Light Switch	20-10-6
Gear, Powershaft Drive	60-20-5	Lines, Oil—Diesel Engine	100-10-1
Gear, Pulley	120-5-3	Links, Draft	180-10-3
Gear and Shaft, Transmission Drive	130-5-1, 130-15-1	Link, Lift	180-10-3
Gear Shaft Gears, Sliding—Specifica- tions	130-20-1	Link, Upper	180-10-3
Gear Shaft, Sliding	130-5-1, 130-15-1	Linkage Adjustment, Decompression	40-10-3
Gear, Spider and Ring—Differential	140-5-4	Linkage, Throttle—Cranking Engine	40-20-4
Gear, Steering	40-15-4, 170-5-1	Liquid Weight, Tires	160-15-2, 160-15-3
General-Purpose Tractor Lubrication Chart	20-10-12	Load Adjustment—Cranking Engine	40-20-5
Generator	20-10-15, 80-5-1	Load-and-Depth Control	20-10-16, 180-5-1
Generator Drive Belt	20-10-6	Lubrication	20-10-9, 20-15-2
Generator Specifications	80-5-1	Lubrication Chart (General-Purpose Tractor)	20-10-12
Governor Case	70-10-1	Lubrication Chart (Standard Tractor)	20-10-13
Governor, Cranking Engine	65-5-8	Lubrication Chart (3-Point Hitch)	20-10-14
Governor Lever Adjustment	40-10-9	Lubrication—Diesel Engine	60-5-2
Governor Shaft Assembly	70-5-1	Lubrication—Manual Steering	170-5-9
Governor, Specifications	70-20-1	Lubrication—Power Steering	170-5-9
Guides, Valve—Diesel Engine	60-10-2	Lubrication System—Cranking Engine	65-15-1
H			
Head, Oil Filter	100-10-2	Lubrication System—Diesel Engine	100-5-1
Heat Exchanger	10-5-3, 110-35-1	Lubrication System—Specifications	10-15-1
Hitch, 3-Point	20-10-4, 40-5-2, 180-5-1	Lubrication, Transmission	130-5-5
Housing Cover, Rockshaft	180-10-2	M	
Housing and Pivot Bracket Assembly, Front Axle	170-15-2	Main Bearings—Diesel Engine	60-20-1
		Manual Steering	170-5-1
		Manual Steering—Lubrication	170-5-9
		Mechanism, Shifter	130-10-1, 180-5-3
		Mechanism, Shifter—Specifications	130-20-1

	Page		Page
N			
Nozzles, Fuel Injection.....	20-10-6, 40-10-5, 60-10-2, 60-10-5, 110-30-1		
O			
Oil, Engine Uses Too Much—Cranking Engine.....	65-35-2	Power, Lack of—Diesel Engine.....	60-35-1
Oil, Engine Uses Too Much—Diesel En- gine.....	60-35-3	Power Steering.....	170-5-2
Oil Filter.....	100-10-1	Powershaft.....	130-5-5, 135-5-1
Oil Filter Body and Head.....	100-10-2	Powershaft Brake Adjustment.....	135-10-10
Oil Level, Air Cleaner—Cranking En- gine.....	20-10-5	Powershaft Clutch....	40-15-3, 135-10-1, 135-15-1
Oil Level in Crankcases.....	20-10-3	Powershaft Drive Gear.....	60-20-5
Oil Lines—Diesel Engine.....	100-10-1	Powershaft Driving Mechanism.....	135-5-1
Oil Pressure.....	20-10-15	Powershaft End Play Adjustment.....	135-10-9
Oil Pressure—Cranking Engine..	40-20-5, 65-15-3	Powershaft Shifting Mechanism.....	135-5-1
Oil Pressure, Diesel Engine....	40-10-11, 60-35-4	Power Steering—Lubrication.....	170-5-9
Oil Pressure Regulator—Diesel Engine.	100-10-1	Power Steering Operating Adjustments.	170-5-10
Oil Pressure Relief Valve—Diesel Engine	100-10-3	Power Take-Off Clutch Adjustment....	20-10-8
Oil Pump—Cranking Engine.....	65-15-1	Power Take-Off Shaft.....	10-5-4, 20-10-19
Oil Pump—Diesel Engine.....	100-5-1	Power Take-Off Shaft—Specifications..	10-15-2
Oil Pump Specifications—Diesel Engine	100-15-1	Powr-Trol Hydraulic System.....	20-10-16, 20-15-3, 180-5-1
Oil Pump and Drum, Powershaft Clutch	135-15-1	Powr-Trol Mechanism.....	40-5-2, 40-15-5
Oil and Water Leakage.....	40-5-1	Powr-Trol Pump.....	180-5-2
Oil Weight-Temperature Chart..	20-10-4, 20-10-11	Powr-Trol Pump Engagement.....	20-10-8
Oil Weight-Temperature Chart—Crank- ing Engine..	65-15-4	Powr-Trol Rockshaft.....	180-10-1
Oil Weight-Temperature Chart—Diesel Engine Air Cleaner..	20-10-6, 40-10-2, 110-35-2	Powr-Trol Temperature-Oil Weight Chart.....	180-5-4
Oil Weight-Temperature Chart—Powr- Trol.....	180-5-4	Predelivery Services.....	20-5-1, 20-10-1
Oil Weight-Temperature Chart—Trans- mission.....	130-5-6	Pressure Adjustment, Fuel Transfer Pump.....	110-15-1
150-Hour Services.....	20-5-1, 20-10-2	Pressure, Oil—Cranking Engine..	40-20-5, 65-15-3
Operating Pin, Brake Pulley.....	120-10-2	Pressure, Oil—Diesel Engine....	40-10-11, 60-35-4
Operating Sleeve, Pulley.....	120-5-3	Pressure, Tires.....	20-10-3, 160-15-1
Operating Temperature, Low—Diesel Engine.....	60-35-2	Pulley, Belt.....	120-5-1
Operation—Diesel Engine.....	60-5-2	Pulley, Belt—Specifications.....	10-15-1
Operation, Tractor.....	20-15-4	Pulley Brake.....	20-10-8, 40-15-2, 120-5-1, 120-5-6, 120-10-1, 120-10-3
Operation, Transmission.....	135-5-2	Pulley Brake and Clutch.....	20-10-15
Operator's Manual.....	20-15-4	Pulley Brake—Specifications.....	120-15-1
Output—Generator.....	80-5-1	Pulley Bushing and Bearing.....	120-5-3
Overheated Engine—Diesel Engine....	60-35-3	Pulley Casting.....	120-5-3
Overinflation of Tires, Effects of.....	160-15-2	Pulley and Clutch—Specifications....	120-15-1
P			
Pedestal—Steering Spindle.....	170-5-4, 170-5-6	Pulley Gear.....	120-5-3
Performance—Specifications.....	10-15-1	Pump—Cranking Engine Cooling Sys- tem.....	65-10-1
Pinion and Rack Adjustment—Rear Wheels.....	160-10-2	Pump Engagement, Powr-Trol.....	20-10-8
Pipes, Air Cleaner—Diesel Engine.....	110-35-1	Pumps, Fuel Injection.....	40-10-4, 110-25-1
Pistons—Cranking Engine.....	65-5-10	Pump, Oil—Diesel Engine.....	100-5-1
Pistons—Diesel Engine.....	60-15-1, 60-15-3	Pump, Powr-Trol.....	180-5-2
Pistons—Diesel Engine— Specifications.....	60-30-1, 60-30-2	Pump Timing, Injection.....	40-10-5
Pivot Bracket Assembly, Front Axle...	170-15-2	Pump Timing Marks, Injection.....	40-10-7
Plugs, Spark—Cranking Engine.....	65-25-5	Pump Timing and Rack Setting, Injec- tion.....	20-10-6
Position-Responsive Rockshaft.....	180-5-1	Pump, Transfer.....	40-10-4, 110-15-1
Power Adjusted Rear Wheels.....	160-10-3	Pump, Oil—Cranking Engine.....	65-5-1
Power, Lack of—Cranking Engine.....	65-35-1	Pump, Water—Cranking Engine.....	65-10-1
		Pump, Water—Diesel Engine.....	90-15-1
Q			
		Quadrant, Transmission.....	130-10-1
R			
		Rack Adjustment—Rear Wheels.....	160-10-2
		Rack Setting, Fuel Pump.....	20-10-6
		Radiator.....	90-10-1
		Radiator, Check Coolant Level in....	20-10-3
		Rear Axle Housing.....	140-5-2, 140-5-6
		Rear Axles—Specifications.....	10-15-2

	Page		Page
Rear Wheels	10-5-4, 160-10-1	Specifications—Final Drive	140-15-1
Rear Wheel Bearings	40-15-4	Specifications—Front Axle	170-25-1
Rear Wheels and Tires—Specifications	10-15-2	Specifications, Fuel	110-5-1
Reduction Gear Cover	60-20-8, 120-10-1	Specifications—Fuel System	10-15-1
Regulator, Oil Pressure—Diesel Engine	100-10-1	Specifications—Generator	80-5-1
Regulator, Voltage	80-5-1	Specifications—Governor	70-20-1
Relief Valve—Cranking Engine Lubrication System	65-15-3	Specifications—Ignition System (Cranking Engine)	10-15-1
Relief Valve, Oil Pressure—Diesel Engine	100-10-3	Specifications—Lubrication System	10-15-1
Relief Valve, Power Steering	170-5-12	Specifications—Oil Pump	100-15-1
Remote Cylinders	20-10-17	Specifications—Pulley and Clutch	120-15-1
Remote Cylinder Valve Housings	180-10-1	Specifications—Roll-O-Matic	170-25-1
Rim Clamp Nuts, Rear Wheels	20-10-7	Specifications—Steering Mechanism	170-25-1
Rings, Piston—Diesel Engine	60-15-1	Specifications—Transmission	130-20-1
Rockshaft	20-10-16	Specifications—Voltage Regulator	80-5-1
Rockshaft Housing	180-10-3	Specifications, Wheel Spindles	170-10-3
Rockshaft Housing Cover	180-10-2	Specific Gravity—Battery	80-10-1
Rockshaft, Position-Responsive	180-5-1	Speed Control Rod, Adjustment of	40-10-10
Rockshaft, Powr-Trol	180-10-1	Speeds, Cranking Engine	40-20-5
Rods, Connecting—Cranking Engine	65-5-10	Speeds, Diesel Engine	40-10-10
Roll-O-Matic Front Wheels	160-5-1, 170-10-1	Speeds, Engine	10-15-1
Roll-O-Matic—Specifications	170-25-1	Spider and Ring Gear, Differential	140-5-4
Rubber Tire Inflation Chart	20-10-3, 160-15-1	Spindle and Knuckle Assemblies	170-15-4
S			
Safety in Operation	20-15-4	Spindle, Steering	170-5-4, 170-5-6, 170-5-8
Seals, Final Drive	140-10-3	Spindles, Wheel—Specifications	170-10-3
Seat	20-10-9	Spur Pinions, Differential	140-5-3
Seat Cushions	145-5-1	Standard Tractor Lubrication Chart	20-10-13
Seat, Float-Ride	145-5-1	Starting the Engines	10-10-1, 20-15-2
Sediment Bowl, Diesel Engine Fuel System	110-10-1	Starting Difficulties—Cranking Engine	65-35-1
Service Policy	20-5-1, 20-10-1, 20-15-1, 20-15-4	Starting Difficulties—Diesel Engine	60-35-3
Servicing Valves—Cranking Engine	65-5-6	Starting Mechanism—Diesel Engine	10-5-3
Shaft Assembly, Fan	70-10-1	Starting Motor—Cranking Engine	65-25-1
Shaft Assembly, Governor	70-5-1	Steering Gear	40-15-4
Shaft, Drive Gear, Transmission	130-5-1, 130-15-1	Steering Gear Backlash	20-10-9
Shaft, Fan—Specifications	70-20-1	Steering, Manual	170-5-1
Shaft Gears, Sliding Gear—Specifications	130-20-1	Steering Mechanism	10-5-3, 20-10-15, 40-5-2, 170-5-1
Shaft, Sliding Gear	130-5-1, 130-15-1	Steering Mechanism—Specifications	170-25-1
Shifter Mechanism	130-10-1, 180-5-3	Steering, Power	170-5-2, 170-5-10
Shifter Mechanism—Specifications	130-20-1	Steering, Power—Operating Adjustments	170-5-10
Shifter Shafts, Transmission	130-10-1, 130-10-6	Steering Valve	170-5-11
Shifters, Transmission	130-10-1	Stopping the Cranking Engine	10-10-3
Shifting Mechanism, Powershaft	135-5-1	Stopping the Diesel Engine	10-10-3, 40-10-10
Signatures	20-15-4	Stopping the Engines	10-10-1, 20-15-2
Single Front Wheel	160-5-3	Stud Nut Tensions—Diesel Engine	60-30-2
Sleeve, Clutch Operating	120-5-3	T	
Sleeves, Injection Nozzle	60-10-2	Tank, Fuel—Cranking Engine	65-25-3
Sliding Gear Shaft	130-5-1, 130-15-1	Tank, Fuel—Diesel Engine	110-10-1
Sliding Gear Shaft Gears—Specifications	130-20-1	Tappet Adjustment—Cranking Engine	40-20-3
Slow Idle Speed—Diesel Engine	40-10-10	Tappet Adjustment—Diesel Engine	60-10-5
Spark Plugs—Cranking Engine	40-20-2, 65-25-5	Tappet Lever Assembly—Diesel Engine	60-10-4
Specifications—Brakes	150-5-3	Tappet Lever Clearance Adjustment—Diesel Engine	40-10-2
Specifications—Clutch and Pulley	120-15-1	Tappet Levers and Shaft—Specifications—Diesel Engine	60-30-1
Specifications—Cooling System	10-15-1	Temperature Chart—Thermostat	90-10-4
Specifications—Cranking Engine	65-30-1	Temperature, Low Operating—Diesel Engine	60-35-2
Specifications—Differential	140-15-1	Temperature-Oil Weight Chart	20-10-4, 20-10-11
Specifications—Electrical System	10-15-1	Temperature-Oil Weight Chart—Cranking Engine	65-15-4



**Tractor, "720" Series Diesel—
Index**

	Page		Page
Temperature-Oil Weight Chart—Diesel Engine Air Cleaner . . .	20-10-6, 40-10-2, 110-35-2	Valve Timing	40-10-6
Temperature-Oil Weight Chart—Powr-Trol	180-5-4	Voltage Regulator	80-5-1
Temperature-Oil Weight Chart—Transmission	130-5-6	Voltage Regulator—Specifications	80-5-1
Tester—Thermostat	90-10-4	W	
Thermostat—Cranking Engine	65-10-3	Warm-Up Period	10-10-3
Thermostat—Diesel Engine	90-10-3	Water and Oil Leakage	40-5-1
3-Point Hitch	40-5-2, 180-5-1	Water Pump—Cranking Engine	65-10-1
3-Point Hitch Lubrication Chart	20-10-4	Water Pump—Diesel Engine	90-15-1
Throttle Linkage—Cranking Engine	40-20-4	Weights, Front End	160-15-3
Timing Distributor—Cranking Engine	40-20-3	Weights, Wheel	160-15-2
Timing Gear Housing	60-20-1	Wheels	20-10-7, 160-5-1
Timing, Injection Pump	20-10-6, 40-10-5	Wheels, Front	10-5-3, 20-15-3, 40-15-3, 40-15-4, 160-5-1
Timing Marks, Flywheel	40-10-6	Wheel Hub Cap Screws and Rim Clamp Nuts	20-10-7
Timing Marks, Injection Pump	40-10-7	Wheel Spindles—Specifications	170-10-3
Timing, Valve	40-10-6	Wheels, Rear	10-5-4, 160-10-1
Tires	20-10-7, 20-10-8, 20-15-2, 40-5-2, 160-15-1	Wheels and Tires—Specifications	10-15-2
Tires, Deflate to Operating Pressure	20-10-3	Wheel Weights	160-15-2
Tire Inflation Chart	20-10-3, 160-15-1	Wide Adjustable-Tread Front End—Specifications	170-25-1
Tire Pressure, Checking	160-15-2	Wide Adjustable-Tread Front Wheels	160-5-1
Tire Sizes	160-15-1	Wiring Diagram	80-10-2
Tires and Wheels—Specifications	10-15-2	Worm Assembly, Steering	170-5-4, 170-5-8
Toe-In Adjustment	170-15-6		
Transfer Pump	40-10-4, 110-15-1		
Transmission	10-5-3, 20-10-15, 130-5-1		
Transmission—Cranking Engine	65-20-1		
Transmission Lubrication	130-5-5		
Transmission—Specifications	10-15-1, 130-20-1		
Tread Adjustment—Rear Wheels	160-10-1, 160-10-4		
Tread Adjustments—Specifications	10-15-2		
Trouble Shooting—Cranking Engine	65-35-1		
Trouble Shooting—Diesel Engine	60-35-1		
Tune-Up and Adjustment	40-5-1		
Tune-Up, Cranking Engine	40-20-1		
Tune-Up—Diesel Engine	40-10-1		

U

Underinflation of Tires, Effects of	160-15-2
Upper Links	180-10-3

V

Valves—Cranking Engine	65-5-5
Valves—Diesel Engine	60-10-1
Valve Assembly, Steering	170-5-3
Valve Core and Cap, Tires	160-15-2
Valve, Flow Control—Power Steering	170-5-12
Valve Guides—Diesel Engine	60-10-2
Valve Housing, Power Steering	170-5-11
Valve Housings, Remote Cylinder	180-10-1
Valve, Power Steering	170-5-11
Valve, Relief—Cranking Engine Lubrication System	65-15-3
Valve, Relief—Diesel Engine—Oil Pressure	100-10-3
Valve, Relief—Power Steering	170-5-12
Valves, Servicing—Cranking Engine	65-5-6
Valves—Specifications—Diesel Engine	60-30-1



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.

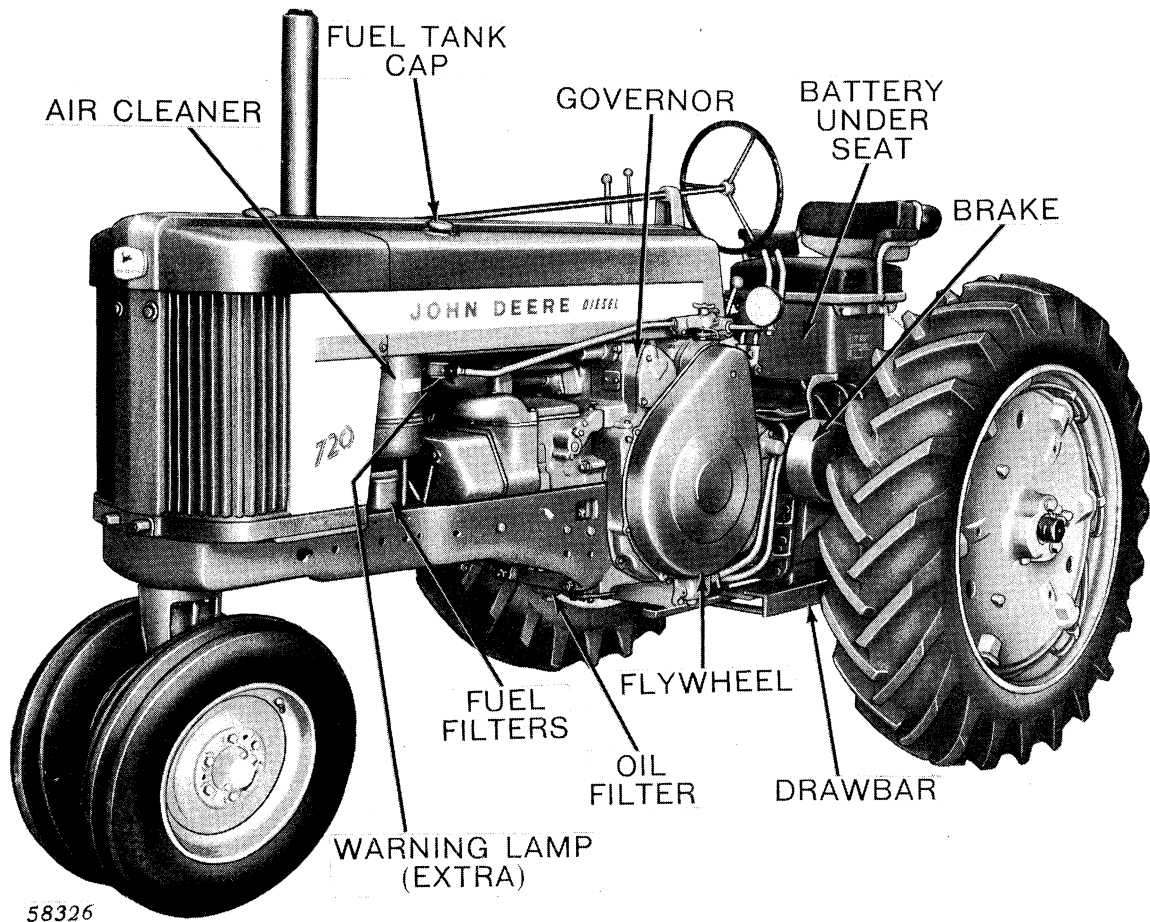


Figure 10-5-1—John Deere "720" Series General-Purpose Diesel Tractor—Flywheel Side

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.

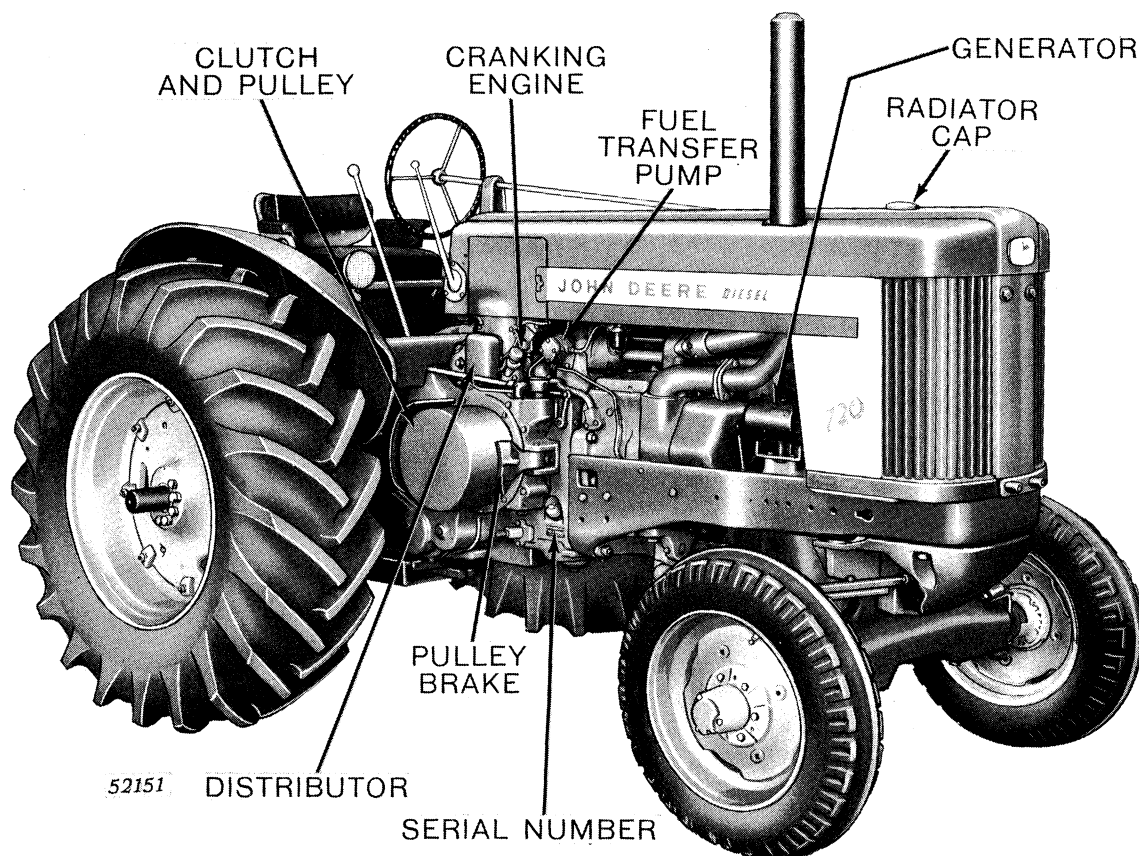


Figure 10-5-2—John Deere "720" Series Standard Diesel Tractor—Pulley Side

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, dual 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-con-

tained 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.

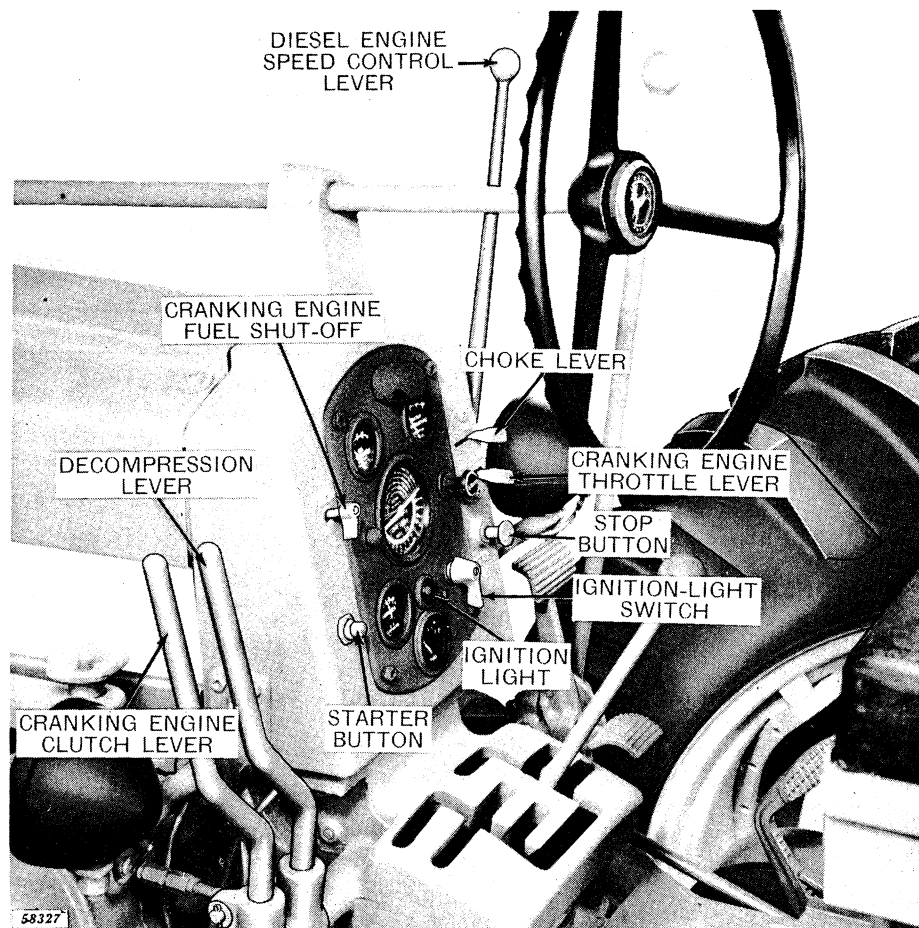


Figure 10-5-3—Starting Controls

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 counter-clockwise (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).

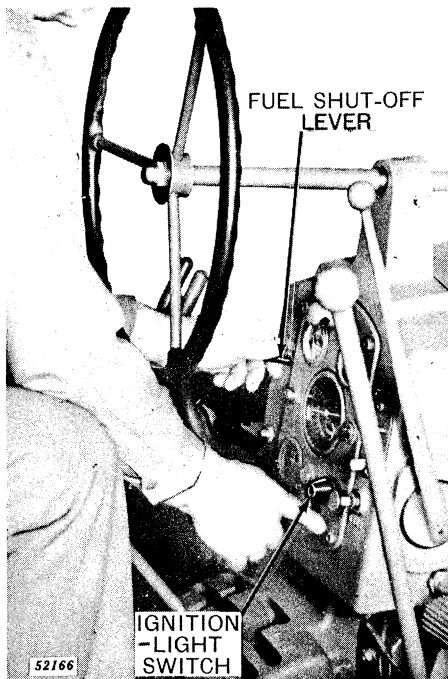


Figure 10-10-1—Operating Fuel Shut-Off Valve and Ignition Switch

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 engine motor. Release button when engine begins to run (Figure 10-10-2).

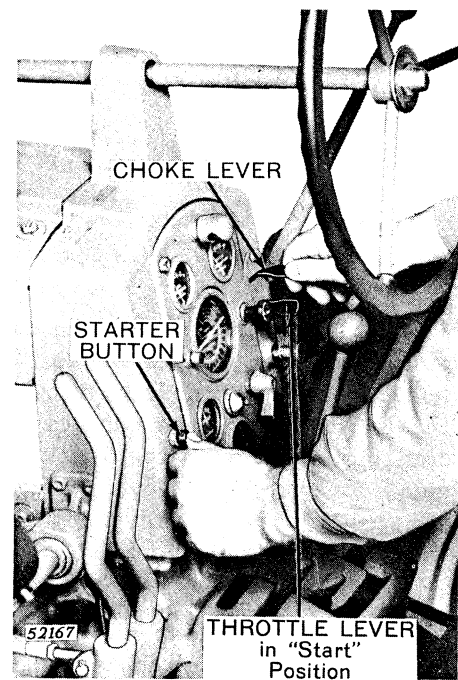


Figure 10-10-2—Operating the Choke Lever and Starter Button

Click on the image link below for the full version of the service manual

