

JOHN DEERE 720 SERIES SPARK IGNITION TRACTORS

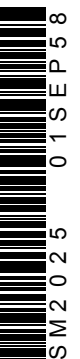


SERVICE MANUAL JOHN DEERE 720 SERIES SPARK IGNITION TRACTORS

SM2025 (01SEP58) English

JOHN DEERE TRACTOR WORKS
SM2025 (01SEP58)

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ENGLISH



SERVICE MANUAL FOR JOHN DEERE DEALERS

720 **SERIES** SPARK IGNITION **TRACTORS**

TABLE OF CONTENTS

	Section
Description, Operation and Specifications	10
Predelivery, Delivery, After-Delivery and 150-Hour Services	20
Tune-Up and Adjustment	40
Engine	60
Governor, Fan Shaft and Ventilator Pump	70
Ignition and Electrical Systems	80
Cooling System	90
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
Power Steering and Front Axles	170
Manual Steering	175
Custom Powr-Trol	180



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TO THE JOHN DEERE SERVICEMAN

This Service Manual contains maintenance instructions for the John Deere "720" Series, Spark Ignition Tractors. Included are complete instructions for removal, disassembly, inspection, repair, assembly and installation of the major parts and assemblies of the tractor. In addition, the manual contains brief descriptions of the more complicated systems of the tractor, and tells how they operate. Dimensions of many new wearing parts are given as an aid in determining when parts replacement is necessary. Tests and adjustments, required to keep the tractor operating efficiently, are explained in detail.

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, carburetors, 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."*

Complete information concerning the gasoline, All-Fuel and LP-Gas carburetors used on the "720" Tractor is contained in *Service Manual SM-2024, "Carburetors for John Deere Tractors and Engines."*

Complete instructions for all components of the electrical and ignition systems of the tractor are being prepared at the present time and will be published in *Service Manual SM-2026, "John Deere Electrical Systems."* Similar information is currently available in *Service Manual SM-2000, "Tractors and Engines (General)."* SM-2000 can be referred to in case of electrical and ignition problems until such time as SM-2026 becomes available.

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, Spark Ignition Tractors. However, most of the information it contains applies equally to Model "70" Tractors, and also to "730" Series Tractors. Most of the components of the three tractors are similar or identical, as are also the service procedures applicable to the components. Where variations exist in the components and procedures, they are of such a minor nature that the serviceman will be able to apply the information in this manual to "70" and "730" Tractors 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.

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.

INDEX

	Page		Page
A			
After-Delivery Service.....	20-15-4	Control Linkage, Speed.....	110-5-1
Air Cleaner.....	110-15-1	Convertor (LP-Gas).....	40-10-7
Air Cleaner Temperature-Oil Weight Chart.....	40-10-1	Cooling System.....	40-5-2, 40-10-10, 90-5-1
Air Intake System.....	40-10-1	Countershaft—Specifications.....	130-20-1
Air Pressure, Tires.....	160-15-1	Countershaft, Transmission.....	130-5-1, 130-15-1
Axle, Front—Standard Tread.....	170-20-1	Coupling, Breakaway.....	20-10-17
Axle, Front—Wide Adjustable-Tread..	170-15-1	Cranking Motor.....	80-10-1
B			
Backlash—Steering Mechanism.....	40-15-4	Crankshaft.....	60-20-1
Ballast.....	160-15-3	Crankshaft and Main Bearings—Speci- fications.....	60-30-3
Batteries.....	80-20-1	Custom Powr-Trol.....	180-5-1
Battery.....	20-10-4	Cylinder Block.....	60-15-1
Battery Specific Gravity.....	20-10-6	Cylinder Block—Specifications.....	60-30-3
Battery—Specifications.....	10-15-1	Cylinder Head.....	60-10-1
Bearings, Connecting Rods—Specifica- tions.....	60-30-3	Cylinder Head Gasket.....	40-10-2
Bearings, Front and Rear Wheel.....	40-15-3	Cylinder Head Stud Nuts.....	20-10-17, 40-10-2
Bearings, Main.....	60-20-1	Cylinder, Remote—Bleeding.....	20-10-18
Bearings, Main—Specifications.....	60-30-3	Cylinder, Remote—Double-Acting.....	20-10-18
Belt, Generator.....	40-10-6	Cylinder, Remote—Single-Acting.....	20-10-18
Belt Pulley—Specifications.....	10-15-1	Cylinder Valve Housing, Remote.....	180-10-1
Bleeding Remote Cylinder.....	20-10-18	D	
Block, Cylinder.....	60-15-1	Delivery Service.....	20-15-1
Brackets, Standard Front Axle.....	170-20-1	Description, Tractor.....	10-5-1
Brakes.....	40-15-4, 150-5-1	Differential.....	140-5-1
Brake Adjustment.....	150-5-5	Differential—Specifications.....	140-15-1
Brake Adjustment, Powershaft.....	135-10-10	Dimensions, Tractor.....	10-15-2
Brake, Pulley.....	40-15-1, 120-5-1	Distributor.....	80-5-1
Breakaway Couplings.....	20-10-17	Distributor, Installing and Timing to Engine.....	40-10-4
Breaking-In Period.....	20-15-2	Distributor Points.....	40-10-4
C			
Cam Followers.....	60-25-1	Distributor—Specifications.....	10-15-1, 80-5-2
Cam Follower Guide.....	60-25-1	Double-Acting Remote Cylinder.....	20-10-18
Camshaft.....	60-25-1	Double Front Wheels.....	160-5-1
Capacities.....	10-15-1	Drawbar.....	20-10-9
Carburetor.....	110-5-1	Drive, Final.....	140-5-1, 140-10-1
Carburetor.....	40-10-7	Drive, Final—Specifications.....	140-15-1
Charts, Lubrication.....	20-10-13	Drive Gear, Oil Pump.....	60-25-1
Cleaner, Air.....	110-15-1	Drive Gear and Shaft, Transmission	130-5-1, 130-15-1
Clutch.....	40-15-1, 120-5-1, 120-10-1	Drum, Brake.....	150-5-2
Clutch Adjustment.....	120-5-5	Drum and Oil Pump, Powershaft Clutch	135-15-1
Clutch Facing Replacement.....	120-5-2	E	
Clutch Lubrication.....	120-5-4	Electrical System.....	40-5-2, 40-10-4, 80-5-1
Clutch, Powershaft.....	40-15-2, 135-10-1, 135-15-1	End Play—Powershaft.....	135-10-9
Clutch and Pulley—Specifications.....	120-15-1	End Play—Steering Mechanism.....	40-15-4
Coil, Ignition.....	80-5-1	Engine.....	40-5-2, 60-5-1
Compression Ratio.....	10-15-1, 60-5-2	Engine Knocks.....	60-35-4
Compression Test.....	40-10-3	Engine Misses.....	60-35-5
Condenser—Specifications.....	80-5-2	Engine Oil Pressure Too High.....	60-35-4
Connecting Rods.....	60-15-1	Engine Oil Pressure Too Low.....	60-35-4
Connecting Rods and Bearings—Speci- fications.....	60-30-3	Engine Overheats.....	60-35-2
		Engine Runs Irregularly.....	60-35-5
		Engine Specifications.....	10-15-1

**Tractor, "720" Series, Spark Ignition—
Index**

	Page		Page
Engine Speeds.....	10-15-1, 40-10-7	I	
Engine Tune-Up.....	40-10-1	Ignition and Electrical Systems.....	40-10-4
Engine Uses Too Much Fuel.....	60-35-5	Ignition System.....	80-5-1
Engine Uses Too Much Oil.....	60-35-3	Inflation Chart, Tires.....	160-15-1
Engine Water Pump.....	90-10-1	Intake Valves—Specifications.....	60-30-1
Exhaust Valves—Specifications.....	60-30-1	K	
F			
Fan Shaft.....	40-15-1, 70-5-1, 70-15-1	Knee Assemblies.....	170-15-2, 170-15-5
Fan Shaft, Specifications.....	70-25-1	Knuckle and Spindle Assemblies.....	170-15-4, 170-20-2
Fast Idle Adjustment.....	40-10-9	Knuckle, Steering.....	170-20-2
Felt Washers, Final Drive.....	140-10-1	L	
Filter, Fuel.....	110-10-1	Lack of Power.....	60-35-1
Filter, Oil.....	100-10-1	Leakage, Oil and Water.....	40-5-1
Final Drive.....	140-5-1, 140-10-1	Lights.....	80-20-1
Final Drive—Specifications.....	140-15-1	Linkage, Speed Control.....	110-5-1
First Reduction Gear Cover.....	120-10-1	Liquid Weight, Tires.....	160-15-2, 160-15-3
Float-Ride Seat.....	145-5-1	Load Adjustment.....	40-10-9
Flow Control Valve, Power Steering...	170-5-7	Lubrication.....	20-10-10
Flywheel.....	60-20-1	Lubrication Charts.....	20-10-13
Front Axle, Standard Tread.....	170-20-1	Lubrication, Clutch.....	120-5-4
Front Axle, Standard Tread—Specifi- cations.....	170-25-1	Lubrication System.....	100-5-1
Front Axle, Wide Adjustable-Tread...	170-15-1	Lubrication, Transmission.....	130-5-5
Front End Weights.....	160-15-3	M	
Front End Wide Adjustable-Tread— Specifications.....	170-25-1	Main Bearings.....	60-20-1
Front Wheels.....	160-5-1, 170-5-2	Manifold.....	60-10-1
Front Wheel Bearings.....	40-15-3	Manifold Heat Valve.....	20-10-5
Front Wheel Toe-In.....	20-10-7, 170-20-4	Manual Steering.....	175-5-1
Fuels.....	10-20-1	Mechanism, Shifter.....	130-10-1
Fuel, Engine Uses Too Much.....	60-35-5	Mechanism, Shifter—Specifications...	130-20-1
Fuel Filter.....	40-10-6, 110-10-1	Motor, Cranking.....	80-10-1
Fuel System.....	40-5-2, 40-10-6, 110-5-1	O	
Fuel Tanks.....	110-10-1	Oil.....	10-20-1
Fuel Valve.....	110-10-1	Oil Classification.....	20-10-3
G			
Gasket, Cylinder Head.....	40-10-2	Oil, Engine Uses Too Much.....	60-35-3
Gasoline Recommended.....	20-10-3	Oil Filter.....	100-10-1
Gauge, Oil Pressure.....	100-15-1	Oil Leakage.....	40-5-1
Gear Cover, First Reduction.....	120-10-1	Oil Pressure.....	40-10-10
Gear and Shaft, Transmission Drive	130-5-1, 130-15-1	Oil Pressure Adjustment.....	100-15-1
Gear Shaft Gears, Sliding—Specifica- tions.....	130-20-1	Oil Pressure Gauge.....	100-15-1
Gear Shaft, Sliding.....	130-5-1, 130-15-1	Oil Pressure Regulator.....	100-10-1
Generator.....	80-15-1	Oil Pressure—Specifications.....	100-20-1
Generator Belt.....	20-10-6, 40-10-6	Oil Pressure Too High.....	60-35-4
Generator—Specifications.....	80-15-1	Oil Pressure Too Low.....	60-35-4
Governor.....	70-5-1, 70-10-1	Oil Pump Drive Gear.....	60-25-1
Governor Adjustments.....	70-20-1	Oil Pump—Specifications.....	100-20-1
Governor, Specifications.....	70-25-1	Oil Pump and Drum, Powershaft Clutch	135-15-1
H			
Hitch, 3-Point.....	40-5-2	Oil Pump and Pipes.....	100-5-1
Hitch, 3-Point—Lubrication.....	20-10-15	Oil Weight-Temperature Chart.....	20-10-4, 20-10-10
Horsepower Rating.....	10-15-1	Oil Weight-Temperature Chart—Air Cleaner.....	40-10-1
Housing, Rockshaft.....	180-10-1	Oil Weight-Temperature Chart— Hydraulic System.....	180-10-2
Hydraulic System.....	20-10-17, 180-5-1	Oil Weight-Temperature Chart—Powr- Trol.....	40-15-5
		Oil Weight-Temperature Chart—Trans- mission.....	130-5-6
		150-Hour Service.....	20-10-1



**Tractor, "720" Series, Spark Ignition—
Index**

3

	Page		Page		
Opening Pressures, Relief Valve, Powr-Trol.....	40-15-6	Relief Valve Opening Pressures, Powr-Trol.....	40-15-6		
Overinflation of Tires, Effects of.....	160-15-2	Relief Valve, Power Steering.....	170-5-7		
P					
Pinion and Rack Adjustment—Rear Wheels.....	160-10-2	Remote Cylinder, Bleeding.....	20-10-18		
Pistons.....	60-15-1	Remote Cylinder, Double-Acting.....	20-10-18		
Piston Rings.....	60-15-1	Remote Cylinder, Single-Acting.....	20-10-18		
Pistons—Specifications.....	60-30-2, 60-30-3	Remote Cylinder Valve Housing.....	180-10-1		
Points, Distributor.....	40-10-4	Rings, Piston.....	60-15-1		
Power-Adjusted Rear Wheels.....	160-10-3	Rockshaft Housing.....	180-10-1		
Power, Lack of.....	60-35-1	Rods, Connecting.....	60-15-1		
Powershaft.....	130-5-5, 135-5-1	Roll-O-Matic.....	170-10-1		
Powershaft Brake.....	40-15-3	Roll-O-Matic Front Wheels.....	160-5-1		
Powershaft Brake Adjustment.....	135-10-10	Roll-O-Matic, Specifications.....	170-25-1		
Powershaft Clutch.....	40-15-2, 135-10-1, 135-15-1	Rubber Tire Inflation Chart.....	160-15-1		
Powershaft Driving Mechanism.....	135-5-1	S			
Powershaft End Play Adjustment.....	135-10-9	Seat Cushions.....	145-5-1		
Powershaft Shifting Mechanism.....	135-5-1	Seat, Float-Ride.....	145-5-1		
Power Steering.....	170-5-1	Service Policy.....	20-15-1		
Power Steering Pump.....	170-5-8	Shaft, Drive Gear, Transmission.....	130-5-1, 130-15-1		
Power Take-Off Specifications.....	10-15-2	Shaft, Fan.....	40-15-1, 70-5-1, 70-15-1		
Powr-Trol Mechanism.....	40-5-2, 40-15-5	Shaft, Fan—Specifications.....	70-25-1		
Powr-Trol Pump.....	180-5-1	Shaft Gears, Sliding Gear—Specifications.....	130-20-1		
Powr-Trol Relief Valve Opening Pressures.....	40-15-5, 180-5-1	Shaft, Sliding Gear.....	130-5-1, 130-15-1		
Powr-Trol System.....	20-10-17, 180-5-1	Shifter Mechanism.....	130-10-1		
Powr-Trol Temperature-Oil Weight Chart.....	40-15-5, 180-10-2	Shifter Mechanism—Specifications.....	130-20-1		
Predelivery Services.....	20-10-1	Shifting Mechanism, Powershaft.....	135-5-1		
Pressure, Oil.....	40-10-10	Shifter Shafts, Transmission.....	130-10-1, 130-10-6		
Pressure, Oil—Regulator.....	100-10-1	Shifters, Transmission.....	130-10-1		
Pressure, Oil—Too High.....	60-35-4	Shipping Weights.....	10-15-2		
Pressure, Oil—Too Low.....	60-35-4	Single-Acting Remote Cylinder.....	20-10-18		
Pressure, Tires.....	160-15-1	Single Front Wheel.....	160-5-3		
Pulley, Belt.....	10-15-1	Sliding Gear Shaft.....	130-5-1, 130-15-1		
Pulley Brake.....	40-15-1, 120-5-1, 120-10-1	Sliding Gear Shaft Gears—Specifications.....	130-20-1		
Pulley Brake Adjustment.....	120-10-4	Slow Idle Adjustment.....	40-10-8		
Pulley and Clutch—Specifications.....	120-15-1	Spacing, Rear Wheel.....	20-10-7		
Pump Drive Gear, Oil.....	60-25-1	Spark Plugs.....	80-5-1		
Pump, Oil.....	100-5-1	Spark Plug Gap.....	40-10-4		
Pump, Oil—Specifications.....	100-20-1	Spark Plugs, Specifications.....	10-15-1		
Pump, Power Steering.....	170-5-8	Specific Gravity, Batteries.....	20-10-6		
Pump, Powr-Trol.....	180-5-1	Specifications, Axles, Front and Power Steering.....	170-25-1		
Pump, Ventilator.....	70-5-1, 70-15-1	Specifications, Battery.....	10-15-1		
Pump, Ventilator—Specifications.....	70-25-1	Specifications—Bearings, Main.....	60-30-3		
Pump, Water.....	40-10-10, 90-10-1	Specifications—Belt, Pulley.....	10-15-1		
Q					
Quadrant, Transmission.....	130-10-1	Specifications—Clutch and Pulley.....	120-15-1		
R					
Rack Adjustment—Rear Wheels.....	160-10-2	Specifications—Condenser.....	80-5-2		
Radiator.....	90-5-1	Specifications—Connecting Rods and Bearings.....	60-30-3		
Radius Rod, Standard Front Axle.....	170-20-2	Specifications—Crankshaft and Main Bearings.....	60-30-3		
Rear Wheels.....	160-10-1	Specifications—Cylinder Block.....	60-30-3		
Rear Wheel Bearings.....	40-15-3	Specifications—Differential.....	140-15-1		
Rear Wheel Spacing.....	20-10-7	Specifications, Distributor.....	10-15-1, 80-5-2		
Reduction Gear Cover, First.....	120-10-1	Specifications, Engine.....	10-15-1		
Regulator, Oil Pressure.....	100-10-1	Specifications—Exhaust Valves.....	60-30-1		
Regulator, Voltage.....	80-15-1	Specifications—Fan Shaft.....	70-25-1		
Regulator, Voltage—Specifications.....	80-15-1	Specifications—Final Drive.....	140-15-1		
		Specifications, Front Axles and Power Steering.....	170-25-1		
		Specifications—Generator.....	80-15-1		
		Specifications—Governor.....	70-25-1		

**Tractor, "720" Series, Spark Ignition—
Index**

	Page		Page
Specifications—Intake Valves	60-30-1	Thermostat	90-5-4
Specifications—Oil Pressure	100-20-1	3-Point Hitch	40-5-2
Specifications—Oil Pump	100-20-1	3-Point Hitch—Lubrication	20-10-15
Specifications—Pistons	60-30-2, 60-30-3	Throttle Control Linkage	40-10-7
Specifications, Power Steering and Front Axles	170-25-1	Timing Distributor to Engine	40-10-4
Specifications, Power Take-Off	10-15-2	Timing, Valve	40-10-2
Specifications—Pulley Belt	10-15-1	Tires	160-15-1
Specifications—Pulley and Clutch	120-15-1	Tire Inflation Chart	160-15-1
Specifications—Pump, Ventilator	70-25-1	Tire Pressure, Checking	160-15-2
Specifications—Shaft, Fan	70-25-1	Tire Sizes	160-15-1
Specifications—Spark Plugs	10-15-1	Tires and Wheels, Specifications	10-15-2
Specifications—Starting Motor	80-10-2	Toe-In, Front Wheel	20-10-7, 170-20-4
Specifications—Stud Nut Tensions	60-30-3	Torque Wrench, Use of	140-10-6
Specifications—Tappet Levers and Shaft	60-30-2	Transmission	130-5-1
Specifications, Tires and Wheels	10-15-2	Transmission Lubrication	130-5-5
Specifications—Transmission	130-20-1	Transmission—Specifications	130-20-1
Specifications—Ventilator Pump	70-25-1	Tread Adjustment—Rear Wheels	160-10-1, 160-10-4
Specifications—Voltage Regulator	80-15-1	Trouble Shooting, Engine	60-35-1
Specifications—Wheels and Tires	10-15-2	Tune-Up and Adjustment	40-5-1
Speed Control Linkage	110-5-1	Turning Angle, Standard Front Axle	170-20-4
Speeds, Engine	10-15-1, 40-10-7	V	
Spindle and Knuckle Assemblies	170-15-4, 170-20-2	Valves	60-10-1
Standard Tread Front Axle	170-20-1	Valve Core and Cap, Tires	160-15-2
Standard Tread Front Axle, Specifica- tions	170-25-1	Valves, Exhaust—Specifications	60-30-1
Starting Difficulties	60-35-2	Valve, Fuel	110-10-1
Starting the Engine	10-10-1	Valve Housing, Remote Cylinder	180-10-1
Starting Motor—Specifications	80-10-2	Valves, Intake—Specifications	60-30-1
Steering Knuckle	170-20-2	Valve, Manifold Heat	20-10-5
Steering Mechanism	40-15-4	Valve Timing	40-10-2
Steering Shaft and Pedestal	175-5-1	Ventilator Pump	70-5-1, 70-15-1
Steering Shaft, Power Steering	170-5-5	Ventilator Pump—Specifications	70-25-1
Steering Shaft Bind, Power Steering	170-5-4	Visual Inspection	40-5-1
Steering Shaft and Worm, Specifications	170-25-1	Voltage Regulator	80-15-1
Steering Spindle and Pedestal, Specifica- tions	170-25-1	Voltage Regulator—Specifications	80-15-1
Steering Wheel	175-5-1	W	
Stopping the Engine	10-10-2	Water Leakage	40-5-1
Stud Nuts, Cylinder Head	20-10-17, 40-10-2	Water Pump	40-10-10
Stud Nut Tensions—Specifications	60-30-3	Water Pump, Engine	90-10-1
T		Weights, Front End	160-15-3
Tanks, Fuel	110-10-1	Weight, Shipping	10-15-2
Tappet Lever Clearance Adjustment	40-10-2	Weights, Wheel	160-15-2
Tappet Levers and Shaft—Specifications	60-30-2	Wheels	160-5-1
Temperature-Oil Weight Chart	20-10-4, 20-10-10	Wheels, Front	160-5-1, 170-5-2
Temperature-Oil Weight Chart—Air Cleaner	40-10-1	Wheels, Rear	160-10-1
Temperature-Oil Weight Chart— Hydraulic System	180-10-2	Wheel Spacing, Rear	20-10-7
Temperature-Oil Weight Chart—Pow- er-Trol	40-15-5	Wheels and Tires, Specifications	10-15-2
Temperature-Oil Weight Chart—Trans- mission	130-5-6	Wheel Weights	160-15-2
		Wide Adjustable-Tread Front Axle	170-15-1
		Wide Adjustable-Tread Front End, Spe- cifications	170-25-1
		Wide Adjustable-Tread Front Wheels	160-5-1
		Wiring Diagram	80-20-2
		Wiring Harness	80-20-1

Section 10

DESCRIPTION, OPERATION, AND SPECIFICATIONS

Group 5 DESCRIPTION

The John Deere "720" Series Tractor is a general-purpose tractor with sufficient power to pull five 14-inch plow bottoms or the equivalent under most soil conditions. The tractor has six forward speeds and one reverse speed.

The features of the tractor are described briefly in the paragraphs which follow. Full descriptions of each of the components or assemblies are contained in the various Sections throughout this Manual.

Serial Numbers

Each tractor bears a serial number located on the right side of the main case just in front of the pulley (Figure 10-5-1).

The distributor and the Powr-Trol valve hous-

ing also bear serial numbers.

Engine

The tractor is powered by a two-cylinder, cast-in-block, valve-in-head engine with a displacement of 360.5 cubic inches. Rotation is counterclockwise when viewed from the flywheel side.

The engine has aluminum alloy, sleeve-type main bearings and replaceable, precision-type connecting rod bearings. All bearings and other parts of the engine are pressure lubricated by a force-feed pressure system with a full flow oil filter. The system includes a replaceable filter element. The crankcase is ventilated by a pump located on the rear end of the fan shaft. Engine speeds are controlled by a flyweight type governor driven by the camshaft.

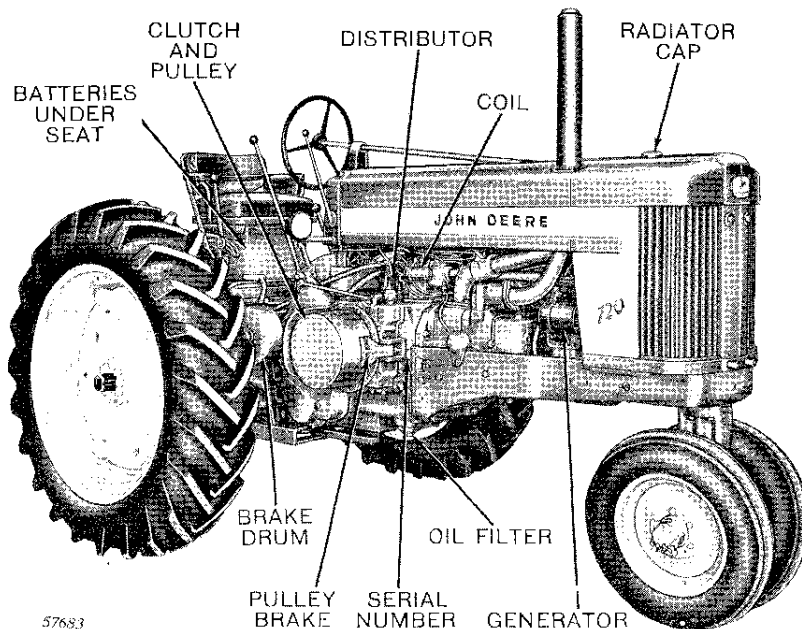


Figure 10-5-1—John Deere "720" Series General-Purpose Tractor—Pulley Side

Fuel System

Gasoline, LP-Gas and All-Fuel tractors are available.

Tractors are equipped with a dual-induction carbureting system using a gravity-fed, natural-draft, double-barrel carburetor and individually ported valves. The All-Fuel tractor has two fuel tanks—a large tank for fuel and a small auxiliary tank for gasoline which is used when starting the All-Fuel engine.

An oil-wash air cleaner assures clean air for the engine.

Ignition

The tractor has a battery-distributor type ignition system with automatic spark advance. A 12-volt battery, generator, starter and lights are standard equipment. The lights consist of two front lights which can be made bright or dim, and a rear combination white and red warning light.

Cooling System

The engine is water cooled. The cooling system includes a centrifugal-type water pump, thermostat, and a by-pass system for quick warm-up.

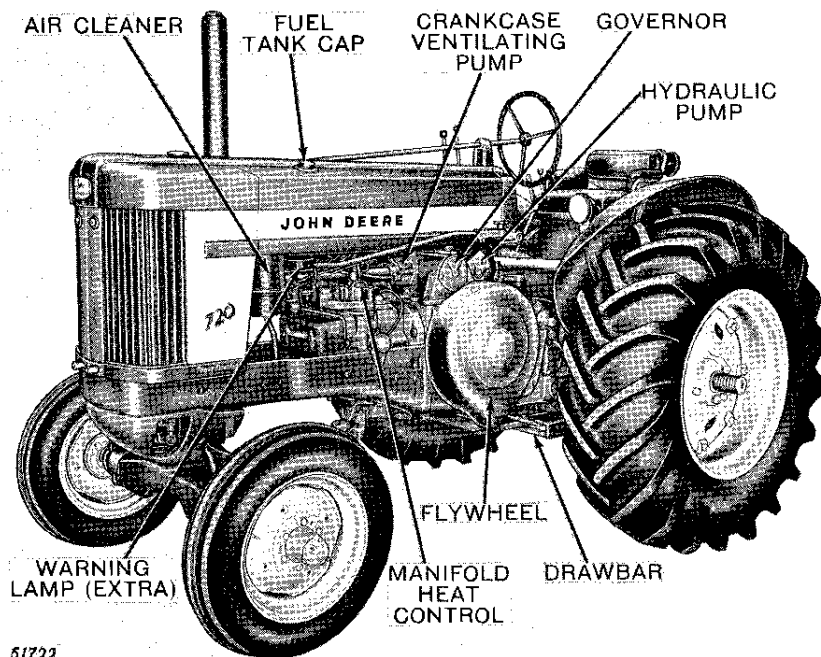
Clutch

A dry disk, hand-operated clutch is enclosed within the belt pulley. The clutch contains six 10-inch dry disks. The belt pulley is engaged by the clutch lever and rotates at crankshaft speed whenever the clutch is engaged. When the clutch is disengaged, an adjustable pulley brake prevents pulley rotation.

Transmission and Differential

The transmission lies crosswise in the main case. Shifting through the entire range of six forward speeds and one reverse speed is accomplished by one shift lever.

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



51722

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

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.

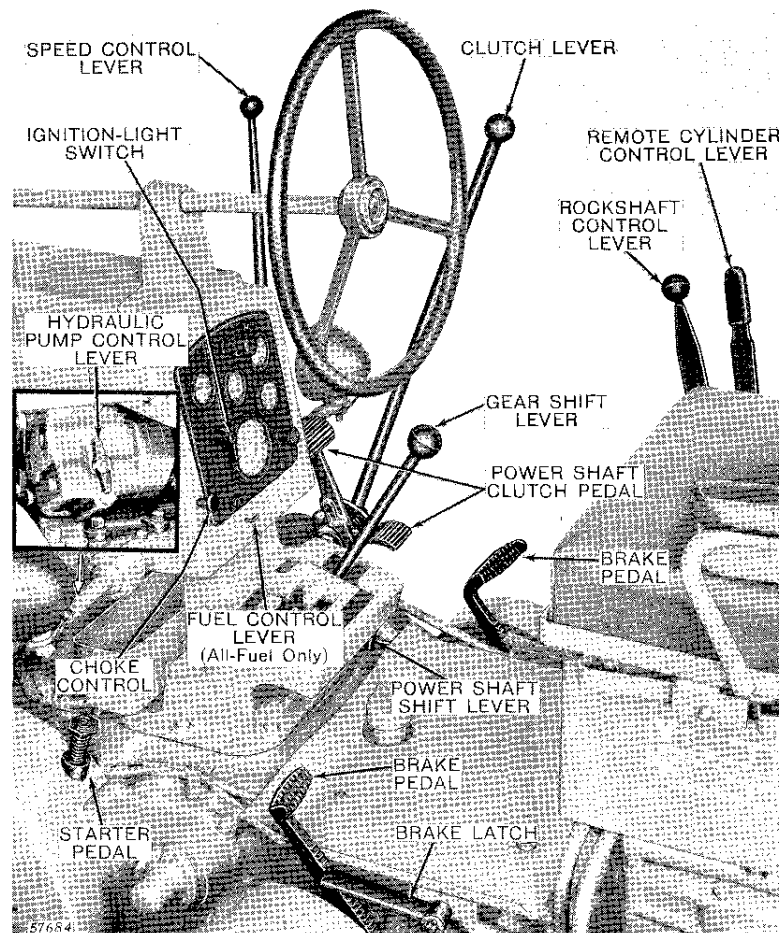


Figure 10-5-3—Operating Controls

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 attached to the governor case and is driven through an idler gear by the cam gear.

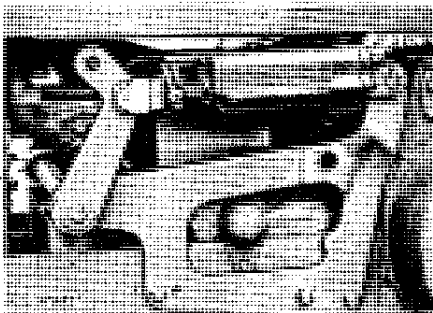


Figure 10-5-4—Left-Hand Side of Both "Solid" and "Split" Front-Mounted Rockshafts

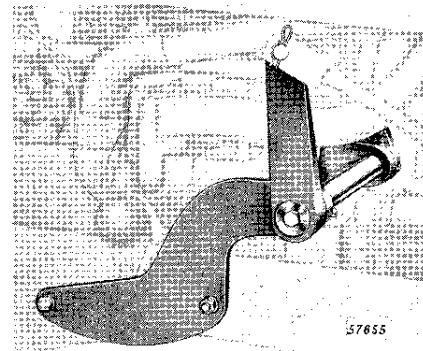


Figure 10-5-6—Right-Hand Side of "Solid" Front-Mounted Rockshaft Operated by One Remote Cylinder

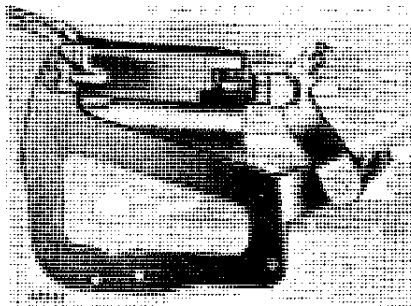


Figure 10-5-5—Right-Hand Side of "Split" Front-Mounted Rockshaft Operated by Two Remote Cylinders

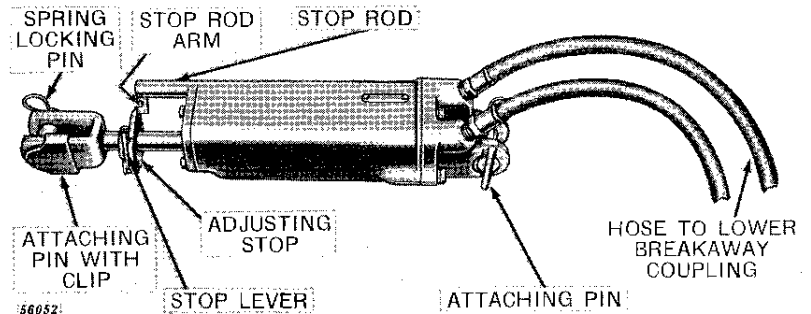


Figure 10-5-7—Remote Cylinder Attaching and Adjusting Parts

Group 10 STARTING AND STOPPING THE ENGINE

ALL ENGINES

Set gearshift lever in neutral and disengage engine clutch (Figure 10-10-1).

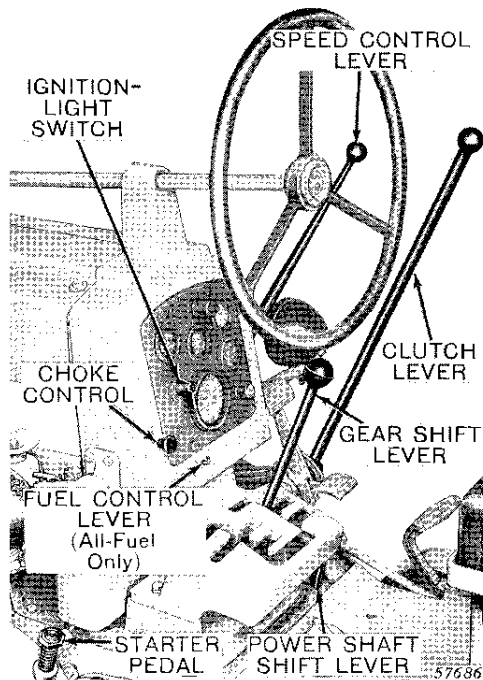


Figure 10-10-1—Starting Controls

In cold weather disengage hydraulic pump and powershaft shift lever to relieve drag on cranking motor caused by cold oil.

Pull speed control lever all the way to the rear.

GASOLINE ENGINES

Turn ignition-light switch to "I" position.

Pull out the choke control.

Crank engine with cranking motor.

ALL-FUEL ENGINES

Close carburetor drain cock.

Turn on gasoline by turning fuel control lever to mark "G."

Turn ignition-light switch to "I" position.

Pull out choke control.

Crank engine with cranking motor.

For satisfactory operation of All-Fuel engines on tractor fuel, the engine should be up to operating temperature before turning fuel control lever to mark "F" to switch from gasoline to tractor fuel.

LP-GAS ENGINES

Open vapor withdrawal valve slowly (Figure 10-10-2). If the valve is opened too fast, it may cause the excess flow valve to close and prevent normal flow of vapor. If this happens, close vapor withdrawal valve to reset excess flow valve, then open vapor withdrawal valve slowly.

Turn ignition-light switch to "I" position.

Step on the starter pedal.

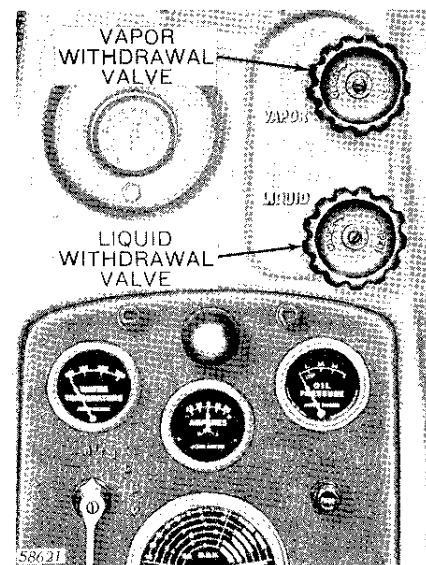


Figure 10-10-2—Liquid and Vapor Withdrawal Valves

In cold weather, if the engine fails to start immediately, pull fuel choke control lever all the way out, then gradually push it in until engine starts. Normal running position of fuel choke control lever is all the way in.

After the engine is started, operate it on vapor until the coolant in the cooling system is warm, then slowly open liquid withdrawal valve and close vapor withdrawal valve.

ALL ENGINES

As soon as engine starts, push choke control in except in cold weather when it may be necessary to leave choke control partially out for the first few minutes.

Regulate engine speed with the speed control lever. The engine is set to run at the correct speed when the tractor leaves the factory; 600 rpm for slow idle; 1125 rpm for rated load, and approximately 1260 for fast idle. **Caution: Under no circumstances should the engine be operated at a fast idle speed in excess of 1270 rpm.**

Watch the oil pressure gauge when the engine starts. If the hand on the gauge does not register between "M" and "H" when the speed control lever is pushed all the way forward, **stop the engine immediately** and determine the cause of low pressure.

STOPPING THE ENGINES

ALL ENGINES

Operate the engine at 1000 rpm for at least one or two minutes before stopping. This will allow the engine to cool off gradually preventing extreme contraction of parts, possible backfiring,

and coking of lubricating oil on piston rings, valve guides, etc.

Never drain water immediately after the engine is stopped.

GASOLINE ENGINE

Set the speed control lever to run the engine at 1000 rpm and allow to run at least 1-1/2 minutes. Without moving the speed control lever, turn ignition-light switch to the "OFF" position.

ALL-FUEL ENGINES

Set the speed control lever to run the engine at 1000 rpm. Turn the fuel control lever to the "O" position and allow the engine to run until it stops. Turn ignition-light switch to "OFF" position. Drain carburetor bowl.

CAUTION: Do not turn ignition-light switch to the "OFF" position until the engine stops. Otherwise several charges of unburned low-cost fuel will remain in the cylinders to foul the spark plugs and wash the lubricating oil off the piston rings and cylinders. This can cause hard starting and premature engine wear.

LP-GAS ENGINES

Set the speed control lever to run the engine at 1000 rpm. Close the withdrawal valves and allow engine to run until the fuel in the convertor is exhausted and the engine stops. Turn ignition-light switch to the "OFF" position.

If liquid fuel is left in the lines when the engine is stopped, hard starting can result as this liquid will tend to flood the engine. **Be sure withdrawal valves are left closed.**

Group 15 SPECIFICATIONS

PERFORMANCE:

Capacity for Work:
Five 14-inch plow bottoms or the equivalent under normal conditions.

Maximum Belt Horsepower:

Gasoline.....	59.12
LP-Gas.....	59.61
All-Fuel.....	45.33

Maximum Drawbar Horsepower:

Gasoline.....	53.05
LP-Gas.....	54.17
All-Fuel.....	41.29

**Maximum Pull:
(2nd Gear)**

Gasoline.....	6600
LP-Gas.....	6697
All-Fuel.....	6552

CAPACITIES (U.S. MEASUREMENTS):

Gasoline Tank:

Gasoline Tractor.....	26-1/2 Gals.
All-Fuel Tractor.....	1 Gal.
Fuel Tank (All-Fuel).....	24-1/2 Gals.
LP-Fuel Tank (85% Full).....	33 Gals.
Crankcase.....	10 Qts.
Transmission.....	8 Gals.
Powr-Trol.....	13 Qts.
Powershaft Clutch.....	4-1/2 Qts.
Remote Cylinder.....	1 Qt.
Cooling System.....	7 Gals.
First Reduction Gear Cover..	1-1/2 Qts.
Power Steering.....	5 Qts.

SPEEDS:

Gear	13.6-38 Tires	15-30 Tires
1	1-1/3 mph	1-1/3 mph
2	2-1/4 mph	2-1/4 mph
3	3-1/2 mph	3-1/2 mph
4	4-1/3 mph	4-1/3 mph
5	5-3/4 mph	5-1/2 mph
6	11-1/4 mph	11 mph
Reverse	3-1/3 mph	3-1/4 mph

ENGINE:

Type... Two-cylinder, cast-in-block, valves-in-head.

Engine Speeds:

Load.....	1125 rpm
Idle.....	1260 rpm
Slow Idle.....	600 rpm
Bore and Stroke.....	6 x 6-3/8
Displacement.....	360.5 cubic inches

Compression Ratio:

Gasoline.....	6.39 to 1
LP-Gas.....	7.94 to 1
All-Fuel.....	4.6 to 1

LUBRICATION SYSTEM:

Type... Full force-feed pressure system with replaceable oil filter element.

FUEL SYSTEM:

Type..... Pressure regulated, gravity feed.
Carburetor.. Natural-draft duplex type.
Air Cleaner.. Oil-wash type.

COOLING SYSTEM:

Type... Pressure system centrifugal pump with engine temperature controlled by heavy-duty thermostat.

IGNITION SYSTEM:

Type..... Battery-Distributor
Distributor Point Gap..... .022"
Spark Plugs:
Size..... 18 mm
Spark Plug Gap..... .030"

ELECTRICAL SYSTEM:

Battery Voltage..... 12 Volts
Generator Regulation.... Voltage Regulator
Battery..... Group 1

CLUTCH:

Type... Hand-operated, six 10-inch dry disks.

BELT PULLEY:

Diameter..... 12-7/8"
Width..... 7-3/8"
Rpm (Load)..... 1125
Belt Speed..... 3790 feet per minute

TRANSMISSION:

Type..... Six speeds forward and one in reverse.
Gears..... Selective-type, straight spur-cut gears, forged and heat-treated.
Bearings... Shafts operate on four roller bearings, four tapered roller bearings and four ball bearings.

REAR AXLES:

Diameter..... 3-1/8"
 Bearings..... Four tapered roller bearings.
 Types Available... Regular, long and extra long.

REAR WHEELS AND TIRES:

General-Purpose... 13.6-38 6-ply tires on cast disk wheels (Recommended for average field conditions). 15.5-38, 6-ply tires also available.
 Standard..... 15-30, 6-ply tires mounted on cast disk wheels. 6-ply and 18-26, 8-ply tires also available.

REAR WHEEL BRAKES:

Type... Two automotive-type internal-expanding rear wheel brakes.

FRONT WHEELS AND TIRES:

General-Purpose.
 Double and Adjustable Type:
 Reversible for added clearance.
 Bearings..... Four tapered roller bearings.
 Tires..... 6.00 x 16", 4-ply.
 6.00 x 16", 6-ply, also available.
 Single Type:
 Bearings..... Two tapered roller bearings.
 Tires..... 7.50 x 16", 10-ply
 Standard:
 Bearings..... Four tapered roller bearings.
 Tires..... 6.50 x 18, 4-ply
 7.50 x 18, 4-ply
 7.50 x 18, 6-ply

	Double Front Wheel	Single Front Wheel	Adjustable Tread Front Axle (42" Rear Wheel)	Standard
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POWER TAKE-OFF:

Shaft Diameter.....	1-3/8"	1-3/8"	1-3/8"	1-3/8"
Shaft rpm.....	547	547	547	547
Splined End Ahead of Hitch.....	14"	14"	14"	14"
Splined Shaft Above Ground.....	25"	25"	25"	22-5/8"

DIMENSIONS:

Wheel-Base.....	91-3/8"	90-5/8"	93-7/8"	82-3/8"
Over-All Length.....	135-1/4"	135-1/4"	135-1/4"	130-1/4"
Over-All Height.....	88-1/4"	88-1/4"	88-1/4"	87-3/8"
Height to Top of Steering Wheel.....	81-1/4"	81-1/4"	81-1/4"	81"
Width Over Axles.....	86-5/8"	86-5/8"	86-5/8"	86-5/8"
Tread Adjustments.....	60-88"*	60-88"*	60-88"*	62-80"*
Clearance.....	26"	26"	Front 23" Rear 26"	Front 13" Rear 25-1/4"
Turning Radius.....	9' 6"	9' 6"	14' 9"	14'

SHIPPING WEIGHT..... 6790 Lbs. 6470 Lbs. 7090 Lbs. 7380 Lbs.

(Weights are for Tractors dry and with wheel equipment as shown under "Front Wheels" and "Rear Wheels.")

*Available with long axles providing tread of 62-1/2" to 97-1/4" and with offset wheels, a tread of 60" to 104" is provided.

Extra long axles provide a tread of 66-1/2" to 105-1/4" and with offset wheels, a tread of 60" to 112".

Power-Adjusted Rear Wheels on long axles provide a tread of 63" to 104", on extra long axles provide a tread of 63" to 112".

Group 20 FUELS AND OILS

FUELS

GASOLINE

The gasoline engine is designed to operate economically on regular grade gasoline as designated by ASTM Designation 439-53T.

The gasoline should have a minimum octane number rating of 80 (Motor Method) or 86 (Research Method).

The distillation range, or volatility is adjusted by the petroleum producers for local climatic conditions and also for seasonal variations.

Avoid carrying over gasoline purchased in one season for another season's work. For example, gasoline furnished for summer use is less volatile than that sold in the winter season. Attempts to use summer grade of gasoline in cold weather can result in poor starting of the engine.

LP-GAS

Many companies furnish LP-Gas fuel of different composition for winter or summer use. The fuel is properly blended to give best performance during the prevailing season. Avoid carry-over of summer grade fuel into the winter season.

LP-Gas burning engines are designed to use a mixture of propane and butane LP-Gas not to exceed 60% butane. A greater percentage of butane can result in excessive detonation under heavy loads in hot weather due to lower octane rating of this fuel. Also, difficult starting in cold weather can result due to lack of vapor pressure.

ALL-FUEL

All-Fuel burning engines are designed to operate on gasoline or "farm tractor fuel" as defined by ASTM Designation D-1215-52T. This includes either the "Light Grade" or "Regular Grade" having ASTM distillation 10% point recovered at 40°F. maximum and a 95% point recovered at 518°F. maximum and a minimum octane number of 35 (Motor Method) or 38 (Research Method).

OILS

It is impossible to determine from the appearance of an oil whether it is best suited to the engine.

The petroleum industry markets several types of crankcase oils. These types are defined by the American Petroleum Institute as follows:

SERVICE ML

Oil suitable for service typical of gasoline and other spark ignition engines operating under light loads and favorable service conditions.

SERVICE MM

Oil suitable for service typical of gasoline and other spark ignition engines operating under moderate to severe service conditions.

SERVICE MS

Oil suitable for service typical of gasoline and other spark ignition engines operating under unfavorable or severe types of service conditions.

For average service conditions, oil specified "**For Service MM**" is recommended for use in the "720" Series, spark ignition, engine.

For exceptionally severe service, combinations of heavy loads and high temperatures, or low temperature start and stop service, engine life can be greatly extended by use of oils specified "**For Service MS.**"

In some cases where owners have had successful experience with certain brands of oils specified "**For Service ML,**" it is possible to continue the use of these oils but, due to wide variations likely to be encountered between various brands, their use cannot be generally recommended.