



Trojan
**Service, Part, &
Operator's Manual
204A
Front End Loader**

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TR-SOP-204A+

Service, Part, & Operator's Manual

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(See Rear of Manual)

SAFETY PRECAUTIONS

The Trojan Tractor Shovel has been designed to incorporate every safety device possible.

The Trojan "Safety Curve Lift Arms*" which has been widely imitated but never equalled completely eliminates the shear hazard present in many other tractor shovels.

Your Trojan has large, well-positioned steps with adequate hand holds so the operator can easily climb to the seat without having to step on a slippery tire.

However, with all these safety features which have been incorporated in the design of the Trojan Tractor Shovel there are still the dangers of running over a man . . . dropping the bucket on him, etc. And therefore, the operator must be extremely careful in the operation of a big tool such as this. In order to help prevent accidents the following safety rules should be observed at all times:

1. Never leave the operators seat with the arms raised.
2. Never leave the seat with the engine running.
3. Set the parking brake before leaving the seat.
4. Always look carefully before starting the machine in motion. Have someone on the ground give a hand signal that all is clear.
5. Never lift the bucket over a ground crew or truck cab.
6. Never carry a rider in the bucket.
7. Keep the brakes properly adjusted.
8. Always stop the engine to make adjustments or lubricate the machine.

* Patented in the United States and Canada.

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PREPARATION FOR OPERATION

Before starting your Trojan Tractor Shovel, place it on level ground and make the following checks:

1. Look at all the serial number plates and enter the numbers in the parts and operators manual.
 2. Check the entire machine for damage in transit.
 - a. See that all the bolts and nuts are tight.
 - b. Pay particular attention to the axle, transmission, wheel nuts, and engine bolts. See torque chart.
 3. Check all the drain plugs, drain cocks, filler openings, fuel lines, cooling system, brake lines, and air cleaner connections to see that they are tight and do not leak.
 4. Fill the fuel tank.
 5. Be sure that the battery plates are covered with water. Add only clean distilled water.
 6. Check to see that the cooling system is filled. Check the strength of the anti-freeze if freezing conditions prevail.
 7. Grease all lubrication points, referring to the lubrication section of this manual for location and type of lubricant required.
 8. Check the oil level of the following, referring to the lubrication chart as a guide for location, quantity and type of lubrication:
 - a. Engine crankcase.
 - b. Front drive axle.
 - c. Rear drive axle.
 - d. Main hydraulic system.
 - e. Steering hydraulic system.
 - f. Transmission hydraulic system.
 - g. Service brake hydraulic system.
- Read the sections on instruments, controls, and operating instructions before starting the engine.

INSTRUMENTS AND SWITCHES

It is a good practice for the operator to be completely familiar with all the instruments and their function so that he can glance at them frequently and tell that all the parts of the machine are functioning properly. Figure 3 shows all the switches and instruments and their location on the instrument panel. Find the following items as listed:

Item No. 1

ENGINE OIL PRESSURE GAUGE: Indicates pressure in the engine lubrication system. This gauge will register between 30 and 70 pounds pressure under normal conditions. If the gauge fails to register pressure, stop the engine immediately and find out the cause.

Item No. 2

ENGINE WATER TEMPERATURE GAUGE: Indicates the temperature of the engine coolant. The gauge will register in the vicinity of 180° for normal operation.

Item No. 3

FUEL GAUGE: Indicates the amount of fuel in the fuel tank when the ignition is on. When the ignition switch is turned off the pointer drops back to the empty mark.

Item No. 5

The **HORN BUTTON** located in the center of the steering wheel, operates the electric horn.

Item No. 6

AMMETER: Shows the current flow to and from the batteries. When the batteries are being charged by the generator the gauge registers on the charge "plus" side.

Item No. 7

TRANSMISSION CLUTCH PRESSURE GAUGE: Indicates the pressure at the control valve which actuates the transmission clutches. This pressure should be between 160 and 200 p.s.i. at idle. If the clutch pressure falls below 160 p.s.i., investigate the cause immediately or transmission clutch slippage may result and cause considerable damage.

Item No. 8

IGNITION SWITCH: Energizes all the gauges and switches on the instrument panel and the starting motor circuit. Always turn the ignition switch off before leaving the lockpit.

Item No. 9

TORQUE CONVERTER TEMPERATURE GAUGE:

Indicates the temperature of the torque converter oil as it leaves the torque converter. It will normally register in the range of 200 to 220 F. When the temperature approaches 250, shift to a lower gear. An excessive or climbing temperature might mean clogging on the radiator cooler or a lack of torque converter oil flows. Investigate immediately if the torque converter temperature is above normal.

Item No. 10

LIGHT SWITCH: Operates the dash light, head lights, and back-up lights in the first position. In the second position, the dash lights and head lights remain on but the back-up lights go off and the tail lights come on. Pull the switch to operate it.

Item No. 11

MAIN HYDRAULIC PRESSURE GAUGE: Indicates the pressure at the hydraulic valve for operating the lift arms and bucket. Gauge should read 1500 p.s.i. maximum. (For Machines Having Serial No. 21443 thru 64-1029).

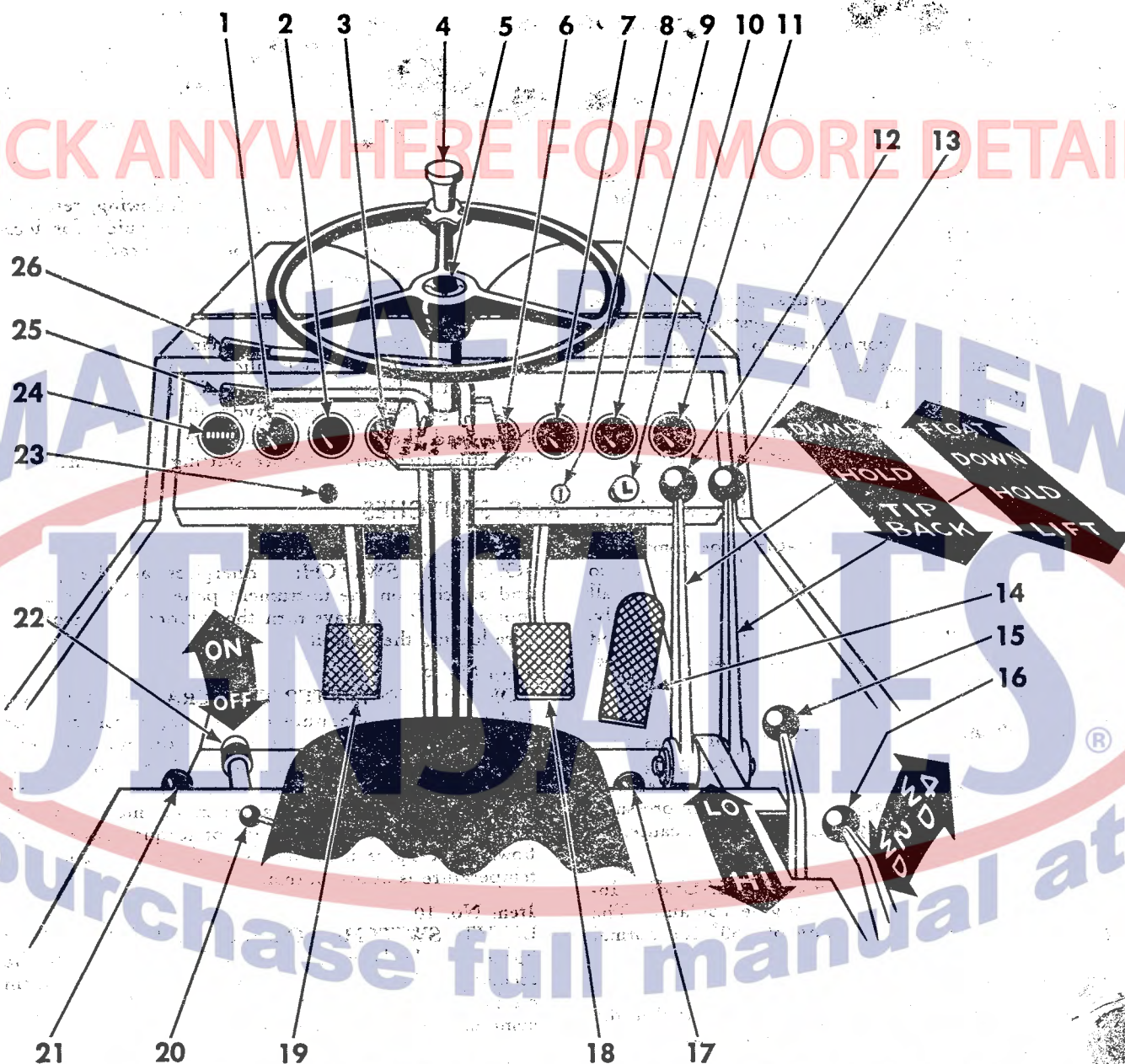
AIR PRESSURE GAUGE:

(For Machines Having Serial No. 64-1030 & Higher). Indicates the air pressure in the reservoir available for brake operation. Gauge should read between 80 and 105 psi. This machine should not be moved unless there is 60 pounds or more air pressure available.

Item No. 23

STARTER SWITCH: Closes the circuit to the cranking motor to start the engine. Press the switch to operate. Release when the engine starts. Crank the engine only for about 30 seconds in one period or the starting motor may heat up and be damaged. The brake pedal must be depressed to start the engine.

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- | | |
|---------------------------------------|--|
| 1. Engine Oil Pressure Gauge | 17. Emergency Stop Knob (G.M. Diesel Only) |
| 2. Water Temperature Gauge | 18. Foot Brake (For Machine Having Serial No. thru 64-1029. |
| 3. Fuel Gauge | 19. Foot Brake (with Clutch Cutout) |
| 4. Steering Wheel Spinner | 20. Seat Adjustment Knob |
| 5. Horn Button | 21. Engine Shut Down Knob (G.M. Diesel Only) |
| 6. Ammeter | 22. Hand Brake Lever |
| 7. Clutch Pressure Gauge | 23. Starter Button |
| 8. Ignition Switch | 23A. Clutch Cut Out Selector Valve (For Machines Having Serial No. 64-1030 & Higher, Not Illustrated). |
| 9. Torque Converter Temperature Gauge | 24. Engine Hourmeter |
| 10. Light Switch | 25. Speed Range Control Lever |
| 11. Main Hydraulic Pressure Gauge | 26. Direction Control Lever (Start in Neutral) |
| 12. Bucket Control Lever | |
| 13. Lift Control Lever | |
| 14. Accelerator Pedal | |
| 15. Hi-Lo Range Lever | |
| 16. Four Wheel Drive Lever | |

Fig. No. 3. Operator's Compartment

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Item No. 16

FOUR WHEEL DRIVE SELECTION LEVER:

Located at the right hand side of the seat to the rear of the cockpit. In the rear position all four wheels are engaged. In the forward position, the front two wheels are engaged, but the rear two wheels are disengaged. This two wheel drive position should be used for roading the machine to minimize tire wear.

Item No. 18 & 19

BRAKE PEDAL: The Brake Pedal is so designed as to permit service brake application with either the left or right foot. Both pedals operate a Hydrovac for applying vacuum boosted hydraulic brakes at all four wheels. As pedal pressure increases, brake application becomes more severe. The left foot pedal also operates a hydraulic shut-off valve in the transmission control valve which in turn shuts off all hydraulic oil pressure to the forward and reverse clutches, thus disengaging the transmission. (For Machines Having Serial Nos. thru 64-1029 only.)

Item No. 19

BRAKE PEDAL: (For Machines Having Serial No. 64-1030 & Higher). The pedal is operated by the left foot. It operates on air valve for applying the air boosted hydraulic brakes to all four wheels.

Item No. 20

The OPERATORS SEAT can be moved forward and backward to suit each operator. The lever on the left hand side of the seat is pulled forward to release the catch and move the seat to the desired position.

Item No. 22

The PARKING BRAKE is located at the left hand side of the cockpit. To set the brake, pull the brake lever up and back. Always remember to release the parking brake lever before starting the machine in motion for the machine is so powerful that it will overcome the parking brake and burn up the linings.

Item No. 25

RANGE SELECTOR LEVER

The Range Selector Lever is the lowermost lever located to the left of the steering wheel. When the lever is in a middle position the machine is in neutral. There is a selection of two work ranges (1st and 2nd), and two travel ranges (3rd and 4th).

Item No. 26

DIRECTIONAL LEVER

The Directional Lever is the uppermost lever located to the left of the steering column and is easily accessible to the operator. For forward travel, push the lever forward from neutral position until fully engaged. For backward travel, pull the lever back from neutral until fully engaged.

CAPACITIES

Cooling System (IHC Gas)	26 U.S. Qts.
Cooling System (GM Diesel)	22 U.S. Qts.
Fuel Tank	30 U.S. Gals.
Hydraulic System	30 U.S. Gals.
Transmission Hydraulic System	24 U.S. Qts.

Front Axle, Differential	11 U.S. Qts.
Front Axle, Hubs	2 1/2 U.S. Qts.
Rear Axle, Differential	11 U.S. Qts.
Rear Axle	2 U.S. Qts.

PRESSURES

Main Hydraulic	1500 psi.
Steering Hydraulic	1500 psi.
Transmission Clutch	
(at Engine Idle)	240 p.s.i. Min.—270 p.s.i. Max.

*Bucket Circuit Relief Valve	1100 psi.
Tires: 14.00-24	45 psi.
16.00-24	45 psi.

* For Machines Having Serial No. 64-1051 & Higher

ELECTRICAL SYSTEM

System Voltage	12v.
Ground	Positive
Head lamps	12v.
Back-up Lamps	12v.

Tail Lamps	12v.
Lamp Circuit Fuse	30 amp.
Gauge Circuit Fuse	2 amp.
Circuit Breaker	12v.

START-UP — SHUT-DOWN PROCEDURE

Before attempting to start the engine, the operator should read carefully engine starting instructions in the engine manufacturers operator's manual. Attempting to run the engine before studying those instructions may result in permanent damage to it.

With the machine fully serviced and the operator completely familiar with the location and function of the OPERATING CONTROLS, INSTRUMENTS AND SWITCHES, the Tractor Shovel is then started according to the following instructions:

IN WARM WEATHER:

1. Place directional control lever in neutral position.

2. Turn switch key to on position.
3. Set accelerator pedal at full fuel position. (Item 14, Fig. 3).
4. Press starter button firmly to start engine. Crank engine for no more than 30 seconds in one period, to avoid overheating starting motor.

CAUTION: If the engine fails to start DO NOT repress button until starting motor stops rotating. Failure to do this may result in serious damage to engine.

Indicates Revision

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OPERATING THE TRACTOR SHOVEL

LOADING THE BUCKET: Place the speed range lever in first gear and the directional lever in the forward position. When loading from a stock pile, drive into the pile with the cutting edge parallel to the ground. Push the cutting edge into the pile until the bucket is nearly filled. Pull the lift arm control lever back and alternately pull the bucket control lever back, so that the lift arm raises and the bucket tips back a little bit at a time. Continue to raise until the bucket is full. Push the lift arm control lever to neutral. Back away from the pile keeping the load low, and carry the load to where it is to be dumped.

When grading or excavating, the bucket should be adjusted so that the pointer on the right hand cylinder indicates the bucket is in a level position. The bucket is then tipped slightly forward, toward the dump position, to get some penetration. When the cutting edge penetrates, use the bucket control lever to adjust the bucket to the right angle to prevent excessive penetration. The bucket control lever can be worked slightly forward and back to maintain a grade as the machine moves forward. To hold a grade properly, the foot throttle should be held at about half throttle in low gear. When the bucket is full and the end of cut is reached, pull backward on the bucket control lever to tip the bucket back against the stops and raise the lift arms slightly off the ground for carrying the load.

TRANSPORTING THE LOAD: When transporting the load, travel speed of the machine will depend on the length of the haul and the kind of surface over which the machine must pass. Rough terrain calls for fairly slow speed as do sharp corners. When the bucket is full, it should be carried approximately 14 inches

off the ground. Never transport the load with the bucket raised more than half way. The nearer to the ground that the bucket is held, the better the stability of the machine; especially on slopes or when turning.

DUMPING THE BUCKET: Raise the bucket so that it clears the top edge of the truck side or the bin. Keep the machine perpendicular to the truck side or bin so the load can be dumped evenly inside the dumping area. With the lift arm control lever in the neutral or hold position, push forward on the bucket control lever to dump the load. Do not push the lever all the way forward immediately—the load may dump too quickly and damage the truck body. Pull backward on the bucket control lever to return the bucket to a level position and back the machine away from the truck or bin. Put the lift arm control lever in float position to lower the bucket and proceed back to the pile to get another load.

TRAVELING WITHOUT A LOAD IN THE BUCKET: When the machine is taken from job to job the bucket should be raised about 14 inches off the ground. The machine can be driven in one of the higher gears to the new job site. Some operators prefer to drive the machine in reverse to get higher speed, with more steering control. This procedure is not recommended because of the relatively poor visibility of the operator over the rear hood of the machine and also because of the danger of over heating the engine. The impact air coming through the radiator from traveling backwards neutralizes the air flow from the pusher fan. Engine over heating may result.

HYDRAULIC SYSTEMS

There are four separate hydraulic systems on this machine. Each is serviced differently.

- A. Main Hydraulic System. In addition to an Oil Reservoir, Main Pump, two Double Acting Lift and Bucket Cylinders, Connecting Hoses and Fittings, there is a two Spool Control Valve with three Safety Check Valves and a Pressure Relief Valve built as an integral unit located behind the reservoir. Installed in the reservoir is a full flow MONEL filter to protect the system against dirt and foreign material. Use SAE-10W Hydraulic Oil.
- B. Steering Hydraulic System consists of an Oil Reservoir, Steering Pump attached to the Torque Converter, Control Valve located at the base of the Steering Column, Pressure Relief Valve, one Steering Cylinder, one full flow MONEL filter mounted in the reservoir, one Replaceable element Type Filter mounted behind the reservoir, and Connecting Hoses and Fittings. Use SAE-10W Hydraulic Oil.
- C. Transmission Hydraulic System consists of an Oil Supply in the Transmission Sump, Charging Pump, Control Valve and Pressure Relief Valve built integrally with the Torque Converter, Transmission, and Connecting Hoses and Fittings. Use Type A Suffix A, Automatic Transmission Fluid.
- D. Service Brake Hydraulic System consists of an Oil Supply in the Brake Master Cylinder, Safety Starting Switch attached to the Master Brake Cylinder, Selector Valve in Transmission Clutch Cut-Off Circuit to enable dual service braking system; armored heavy duty brake hoses, and steel connecting lines. Use Super Heavy Duty Brake Fluid to conform to SAE Spec. 70R3. (For Machines Having Serial No. thru 64-1029 Only).
- D. For Machines Having Serial No. 64-1030 & Higher the Service Brake Hydraulic System consists of an Oil Supply in the Power Cluster Master Cylinder, Transmission Clutch cut-off Selector Valve to enable dual braking system, Power Cluster to convert low air pressure to high hydraulic pressure, armored heavy-duty brake hoses, and steel connect-lines. Use Super Heavy Duty Brake Fluid to conform to SAE Spec. 70R3.

Any hydraulic system regardless of design requires regular attention. The Trojan hydraulic systems consist of the most modern components present day engineering can provide. These systems are the heart of your machine, a thorough preventative maintenance program such as outlined in the Lubrication and Service Section of this manual is of paramount importance.