

TORO®

MODEL NO. 33677—SERIAL NO. 30001 & UP
 MODEL NO. 33699—SERIAL NO. 30001 & UP

OWNER'S MANUAL ADDENDUM

PARKMASTER® 7 AND 9 WITH DIESEL ENGINE

This addendum covers the features of the diesel-powered Parkmasters not covered in Parkmaster Owner's Manual Form No. 3310-348. Use this addendum with the Owner's Manual and the Perkins Handbook supplied with the unit.

The information in this supplement supersedes that in the manuals, where it applies. For information on the remaining components of the Parkmaster refer to Owner's Manual 3310-348. For further information on the engine refer to the Perkins Handbook.

WORKSHOP MANUAL

A workshop manual covering your engine is available from Perkins Engines, Inc. at a reasonable fee. Write to the address shown below on the card. Be sure to include the model and serial number from the machined pad on the

exhaust manifold side of the engine. Please quote ALL the numbers and letters, and in the same sequence as stamped on the engine.

IMPORTANT NOTICE

MR. OWNER: You are entitled to an inspection and warranty validation of your new engine by a Perkins serviceman. This inspection should be performed between the first 25 to 75 hours of operation. Have your TORO distributor fill out the ADVICE OF ENGINE SALE card (shown below) within 10 days of the date of sale. It is only through receipt of this card that Perkins can notify the Perkins Distributor in your area. This inspection is required to fulfill warranty requirements.

PLEASE NOTIFY YOUR TORO DISTRIBUTOR WHEN THIS INSPECTION IS DUE.

THIS CARD MUST BE COMPLETED WITHIN TEN DAYS OF SALE TO CUSTOMER. ADVICE OF ENGINE SALE		
DISTRIBUTOR		
ENGINE MODEL	ENGINE SERIAL NUMBER	APPLICATION
For P. E. I. use		Name and address of Customer
		DELIVERY DATE TO CUSTOMER
PEI-38 REV. (10-71)		



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 508, FARMINGTON, MICH.

PERKINS ENGINES, INC.

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ATTENTION: SERVICE DEPARTMENT



FUEL

The most important single factor contributing to successful operation of a diesel engine is clean fuel, free of dirt and water. The clearances in the injection pump and the injectors are measured in tenths of thousandths of an inch, and the internal parts are lubricated by the fuel itself, so the need for clean fuel is apparent. The fuel must also be free of water. The engine is equipped with a fuel filter and a water trap. **THEY MUST BE SERVICED REGULARLY.** SEE FIGURES 4 and 5.

Use only No. 2 diesel fuel. CONSULT THE PERKINS HANDBOOK FOR SUGGESTIONS ON HANDLING AND STORING DIESEL FUEL. The Parkmaster tank capacity is 15½ U.S. gallons. Clean filler cap and the spout before filling to prevent the entrance of dirt into the tank.

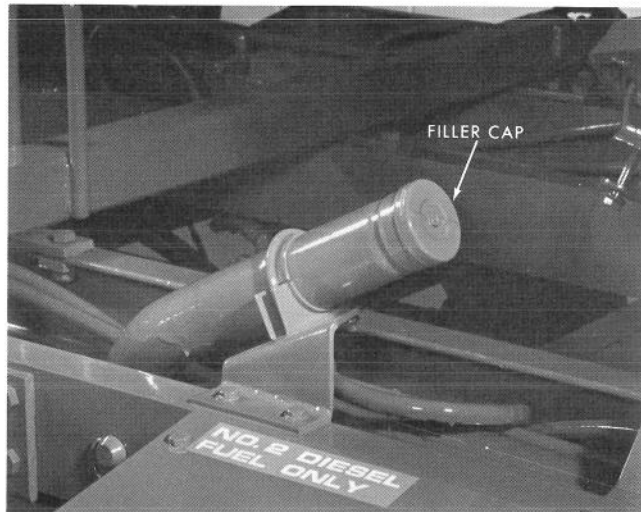


Figure 1

CONTROLS

The controls on the diesel Parkmaster are the same as explained and illustrated in the Owner's Manual Form No. 3310-348, except for the shut-off button and the ignition switch. See Figure 2. The operation of these controls is described below.

STARTING THE ENGINE

A. Warm Weather

1. Move the throttle lever to the mid-range position.
2. Make certain the shut-off button is fully in.
3. Place all controls in neutral and push in the clutch.
4. Turn the key to the "HS" position. As soon as the engine starts, return the key to the "R" position.
5. If the engine does not start after 15-20 seconds of cranking, release the starter and allow the flywheel to stop rotating and the starter to cool before engaging the starter motor again.

B. Cold Weather

The engine is equipped with a Thermo-start cold weather starting aid. See Figure 3. This unit heats the incoming air in the manifold; thus, warm air is drawn into the combustion chamber to aid starting. Proceed as follows:

1. Place the throttle lever in the full speed position.
2. Turn the key to the "H" (heat) position and hold for 15 seconds.

3. Turn the key to the "HS" position.
4. If the engine fails to start after about 15 seconds of cranking, return the key to the "H" position for an additional 10 seconds. Then turn the key to the "HS" position again. When the engine starts, turn the key to the "R" position.
5. In extreme cold conditions (below 0°F or -18°C), it may be helpful to hold the key in the "H" position for an additional 10 seconds after the engine has started.

DO NOT ATTEMPT TO USE THE THERMOSTART WITHOUT A SUPPLY OF FUEL, OR THE THERMOSTART UNIT WILL BURN OUT.

CAUTION: When the engine is equipped with a Thermo-start, it is strictly prohibited to use any type of ether starting aid.

STOPPING THE ENGINE

Pull out the shut-off button and hold until the engine stops. **DO NOT RELEASE THE BUTTON UNTIL THE ENGINE IS COMPLETELY AT REST.** Then return the button to the operating position (in) and turn the key to "O".

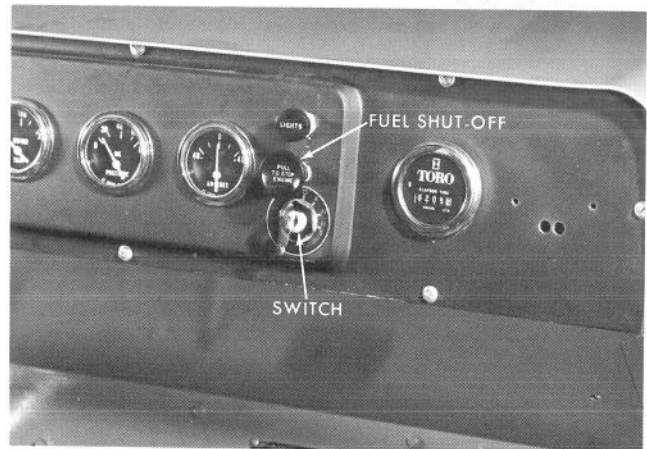


Figure 2

AIR CLEANER

A diesel engine takes in a full charge of air on each intake stroke—there is no carburetor to throttle the air. This engine will use approximately 10,000 cubic feet of air each hour of operation. With this large volume of air entering the engine, it is extremely important to service the air cleaner regularly, as follows:

1. In normal conditions, remove the element every 100 hours of operation and shake out the accumulated dust. In extremely dusty conditions, service daily, or several times a day.
2. **DO NOT WASH THE ELEMENT.**
3. Install a new element every 400 hours of normal operation, or more often if the unit has been subjected to extreme dust conditions.

IMPORTANT: When removing the element, use care to avoid dropping dirt down into the intake manifold.

4. Periodically check to make certain the gasket in air cleaner base is seated against intake manifold port.

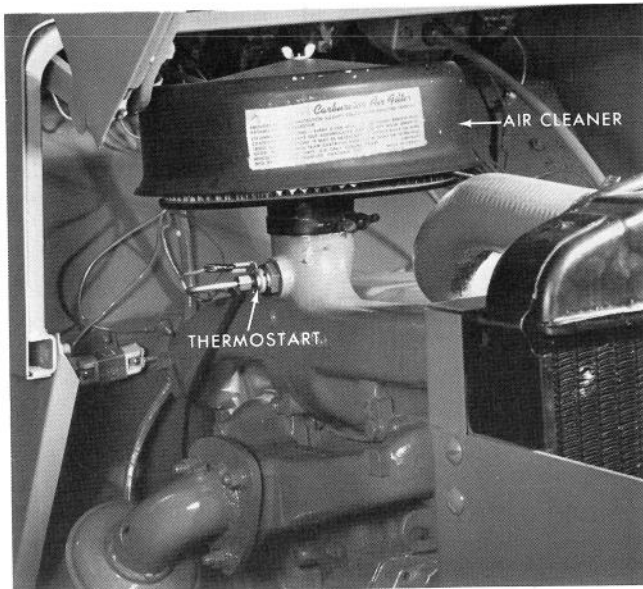


Figure 3

FUEL FILTER

Change the fuel filter element every 400 hours of normal operation, or more often if the tractor is subjected to extremely dusty conditions. If an unexplained loss of power is experienced, change the element immediately.

1. Thoroughly clean the outside of the fuel filter assembly.
2. Loosen the knurled nut and thumb screw and remove the bowl and element from the filter head.
3. Discard the element and the fuel in the bowl.
4. Clean the bowl in cleaning fluid. **DO NOT USE GASOLINE TO CLEAN THE BOWL.**
5. Hold the bowl and new element in position, tighten thumb screw, and secure with knurled nut. If the element and bowl are positioned properly, finger tightening is enough to provide a good seal.
6. After the filter is assembled, the air must be purged from the system. Loosen the vent plug on the filter head two or three turns.

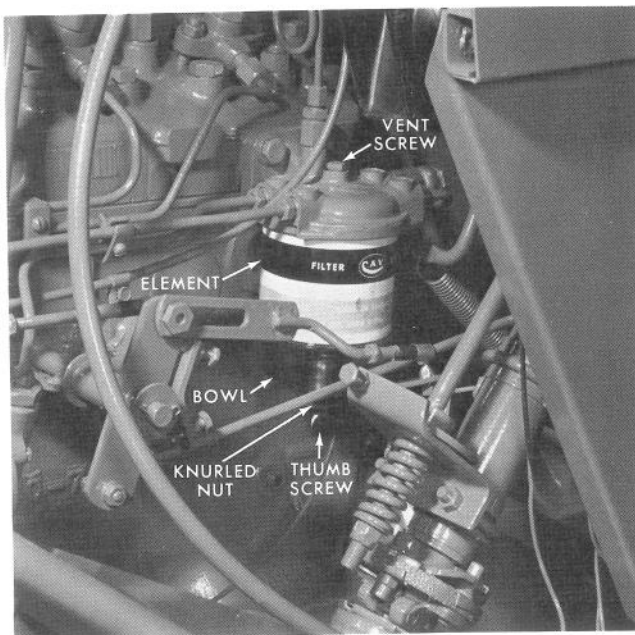


Figure 4

7. Operate the priming lever on the fuel lift pump until pure fuel, free from bubbles, comes out around the vent screw. Tighten the vent screw.

NOTE: If the priming lever cannot be moved fully, it means that the camshaft lobe is up. The engine must be turned over one revolution so the lobe is down, and the pump can be operated. See Figure 6.

8. Loosen the union at the injection pump inlet (See Figure 12). Operate the priming lever until pure fuel, with no bubbles, is being forced out around the threads. Tighten the union.
9. Wipe off the fuel forced out around the pump inlet and the filter vent screw.
10. The engine is now ready for starting.

FUEL WATER TRAP

The fuel water trap is installed between the tank and the fuel pump. Water, being heavier than the fuel, collects at the bottom of the trap. **THE WATER MUST BE DRAINED OUT REGULARLY, BEFORE IT CAN REACH THE PUMP AND INJECTORS.**

Every 200 hours of operation, loosen the thumb screw shown in Figure 5, allow the collected water to drain out, and re-tighten the thumb screw. We suggest filling the fuel tank at the end of the day's operation, to prevent condensation in the tank overnight.

NOTE: If the engine is being operated in an area of high humidity, it may be necessary to drain the water trap more often. When the engine is new, we suggest draining the trap frequently into a glass container about the size of the fuel trap. You can see how much water is collected, and can determine the proper interval for draining for your area.



Figure 5

FUEL LIFT PUMP

The lift pump is camshaft-operated to pump fuel from the tank to the filter and the injection pump. It is also used to manually prime the filter and pump after running out of fuel, changing the filter element, or any time the fuel lines are disturbed. Pump the lever up and down to operate the pump. If the lever cannot be moved fully, apparently the camshaft lobe is up, and the engine must be turned over

one complete revolution to get the cam lobe down so the lever can be operated.

Every 400 hours, or once a year (whichever comes first), remove the pump cover and diaphragm. Clean the sediment chamber and check the diaphragm. If the diaphragm has holes, cracks, or is brittle, discard it and install a new one. When reassembling, tighten the cover screw just enough to make a tight sealing joint. **DO NOT OVER TIGHTEN.** Prime the fuel system.



Figure 6

FUEL RETURN LINE

The fuel line shown in Figure 7 returns unused fuel from the injectors to the tank. A small amount of fuel is metered back past the injector nozzles for lubricating purposes. This fuel must be evacuated to prevent a hydraulic lock and faulty nozzle operation. Be sure the return line is not pinched or crimped shut.

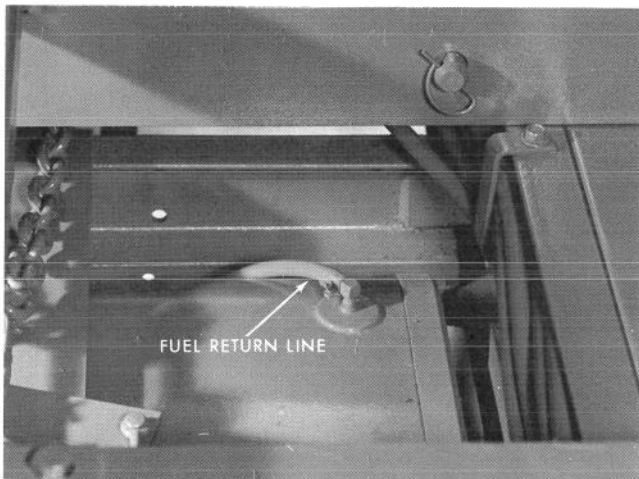


Figure 7

FUEL INJECTION PUMP

The injection pump is operated by the engine camshaft. The pump is lubricated by the fuel it pumps. The release pressure in the injectors is approximately 2500 PSI. All adjustments on the pump except the idle speed stop screw are sealed. **IF THE SEALS ARE BROKEN OR DISTURBED, THE WARRANTY IS VOIDED.**

If you encounter any problems with the fuel system, check

all other components (filter, lift pump, injectors, etc.) before removing the injection pump. The pump itself is relatively trouble-free if the fuel is kept clean.

FUEL INJECTORS

The injectors are set at a 2500 PSI minimum operating pressure. The symptoms of injector troubles are usually one or more of the following:

1. Misfiring.
2. Knocking in one or more cylinders.
3. Loss of power.
4. Smoky exhaust (black).
5. Increased fuel consumption.

The faulty injector can be isolated by disconnecting the fuel line to each injector in turn, with the engine running at a fast idle. The disconnected injector which **LEAST** affects engine operation and speed is the defective one. Remove the defective injector and cap the fuel line.

IMPORTANT: Do not attempt to repair or adjust an injector without the proper equipment. It is impossible to adjust an injector properly, and it could be dangerous, since the working pressure is sufficient to cause the fuel oil to penetrate the skin. Take the injector to your TORO distributor or to a Perkins distributor.

When reinstalling the new or serviced injector, clean the carbon out of the recess in the cylinder head, use a new copper washer, and torque the injector nuts evenly and gradually to 12 ft. lbs. Be sure to tighten the nuts alternately, a little at a time, to avoid cocking the injector, which could bind the nozzle or misdirect the spray.

HYDRAULIC SYSTEM

The hydraulic pump is coupled directly to the front crankshaft pulley, and is equipped with a flow divider valve to operate both the frame hydraulic system and the tractor power steering system. The total pump capacity is 10.5 GPM at 1200 RPM (pump speed) and 1500 PSI. The primary flow rate (power steering) is 2 GPM, 1250 PSI relief valve setting.

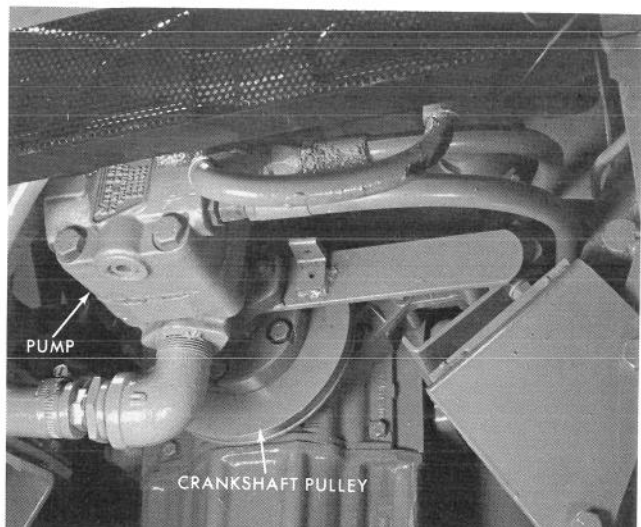


Figure 8

The hydraulic reservoir and filter assembly is located between the radiator and the front grill.

Check the level of the hydraulic fluid daily. Use a 9/16" wrench to free the dip stick. Check the level with the cutting units UP, and the oil warm. Maintain the level between the two marks on the dip stick. Replenish as necessary with Type "A", Suffix "A", Automatic Transmission Fluid.

Clean the cone-shaped screen in a solvent before adding fluid. (The screen is located under the filler cap.)

Clean the breather cap in a solvent every 500 hours of operation. Oil lightly with engine oil and shake out the excess oil.

Change the hydraulic filter every 1500 hours of normal operation. Make certain the gasket seating surface on the filter base is clean. Apply a film of clean oil to the sealing gasket on the filter, turn the filter on until the gasket contacts the base, then turn it on 2/3 turn further.

Every 3000 hours, or sooner if the oil is contaminated, drain and flush the hydraulic system. To drain the system, disconnect the pressure hose at the rear of the valve bank, start the engine and allow it to idle. Use a suitable container, and allow the fluid to be pumped out of the system.

IMPORTANT: Stop the engine immediately when the fluid stops running to prevent damage to the pump.

Install clean fluid in the reservoir. The capacity of the reservoir is 7 U.S. quarts. Start the engine and activate all hydraulic components to distribute the fluid. Recheck the level and replenish as necessary.

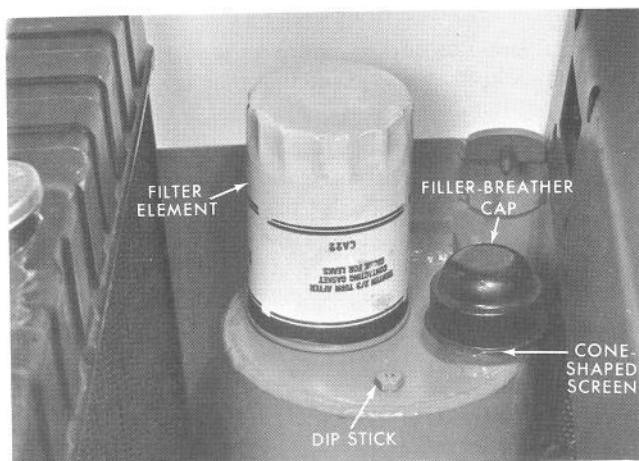


Figure 9

BATTERIES

Two 6-volt, heavy duty batteries, connected in series, are used on the tractor. The batteries provide 12-volt negative ground service. In Figure 10, the cover is removed to show the wiring.

FAN AND ALTERNATOR BELT

The fan and alternator belt must be kept tight enough to drive the fan, water pump and alternator at their proper speeds, but not so tight as to impose an unnecessary load on the bearings.

To adjust, loosen the pivot bolt and the capscrew through the adjusting strap. Pull the alternator outward to tighten the belt. Adjust until the belt deflects about 3/8" (10 mm)

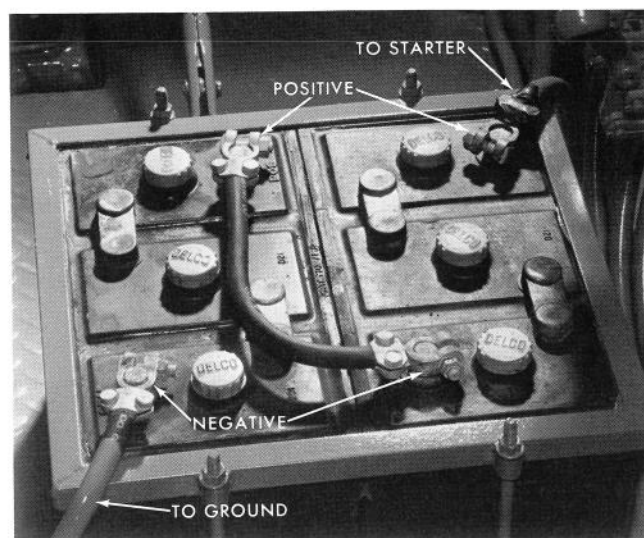


Figure 10

midway between the alternator and crankshaft pulleys, with a force of approximately 10 pounds applied.

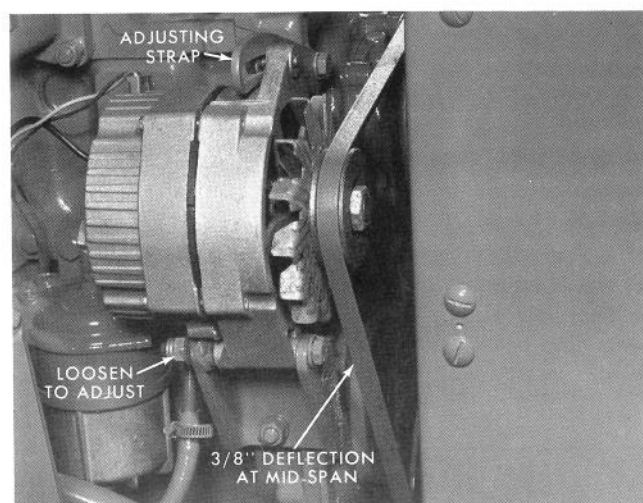


Figure 11

THROTTLE LINKAGE

The throttle lever has sufficient leverage available to damage the internal parts of the injection pump if the lever is FORCED in either direction. For this reason, stops are provided on the linkage to limit movement before damage occurs. Figure 12 shows the idle stop and the high speed

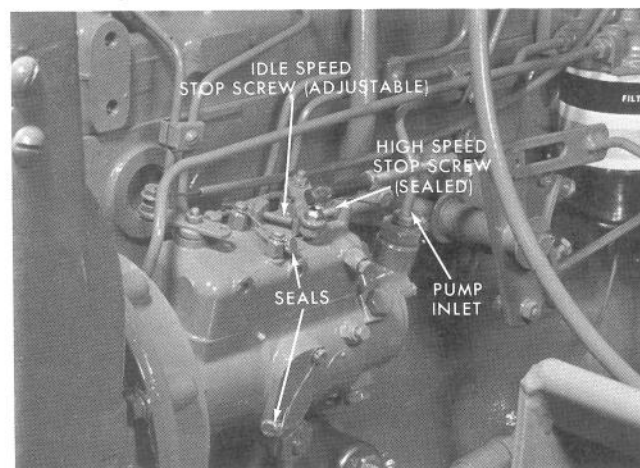


Figure 12

stop on the injection pump. The idle stop can be adjusted; the high speed stop is sealed. IF THIS SEAL IS BROKEN, THE WARRANTY IS VOIDED.

HIGH SPEED STOP

Place the throttle lever in the wide open position. Adjust the upper stop bolt to contact the bell crank when there is approximately .030" clearance between the arm on the pump and the sealed high speed stop screw. THE BELL CRANK MUST CONTACT THE STOP BOLT TO PREVENT THE PUMP ARM FROM CONTACTING THE SEALED STOP SCREW.

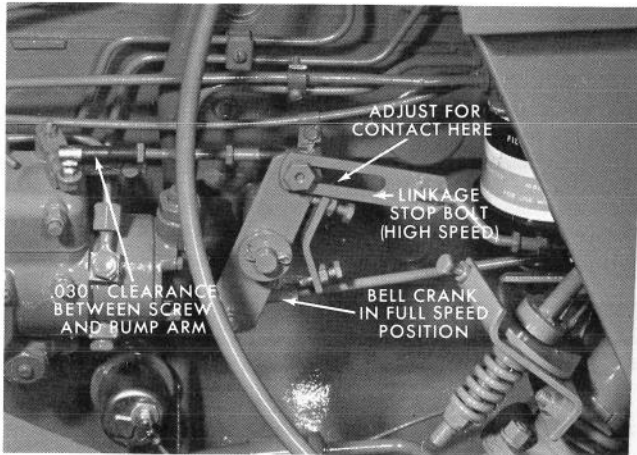


Figure 13

IDLE SPEED STOP

Recommended idle speed is 675 RPM. The idle stop screw on the injection pump is adjustable. However, it should not be necessary to adjust the idle speed unless new components have been installed. If so, adjust the screw to obtain an idle speed of 650 RPM (a little lower than the recommended idle), with the pump arm against the idle adjusting

screw. Then adjust the linkage stop bolt on the bracket to stop the bell crank JUST BEFORE the pump arm would contact the idle screw. Adjusting in this manner will protect the pump linkage and will provide the correct idle speed of 675 RPM.

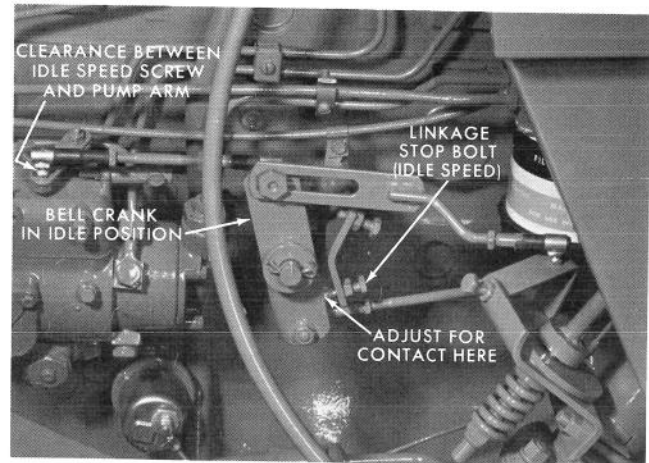


Figure 14

BRAKES

The service brakes on the diesel tractor are self-adjusting. They are 13 inch diameter x 2½ inches wide, double servo brakes, providing 133 square inches total brake shoe area.

DISASSEMBLY

1. Be sure that the parking brake is released.
2. Remove wheel and drum. If shoes interfere with drum removal, hold adjuster lever away from star wheel as shown in Figure 20 while backing off adjustment.

NOTE: Check position of return springs, holddown parts and automatic adjuster parts so that they can be re-installed in same position.

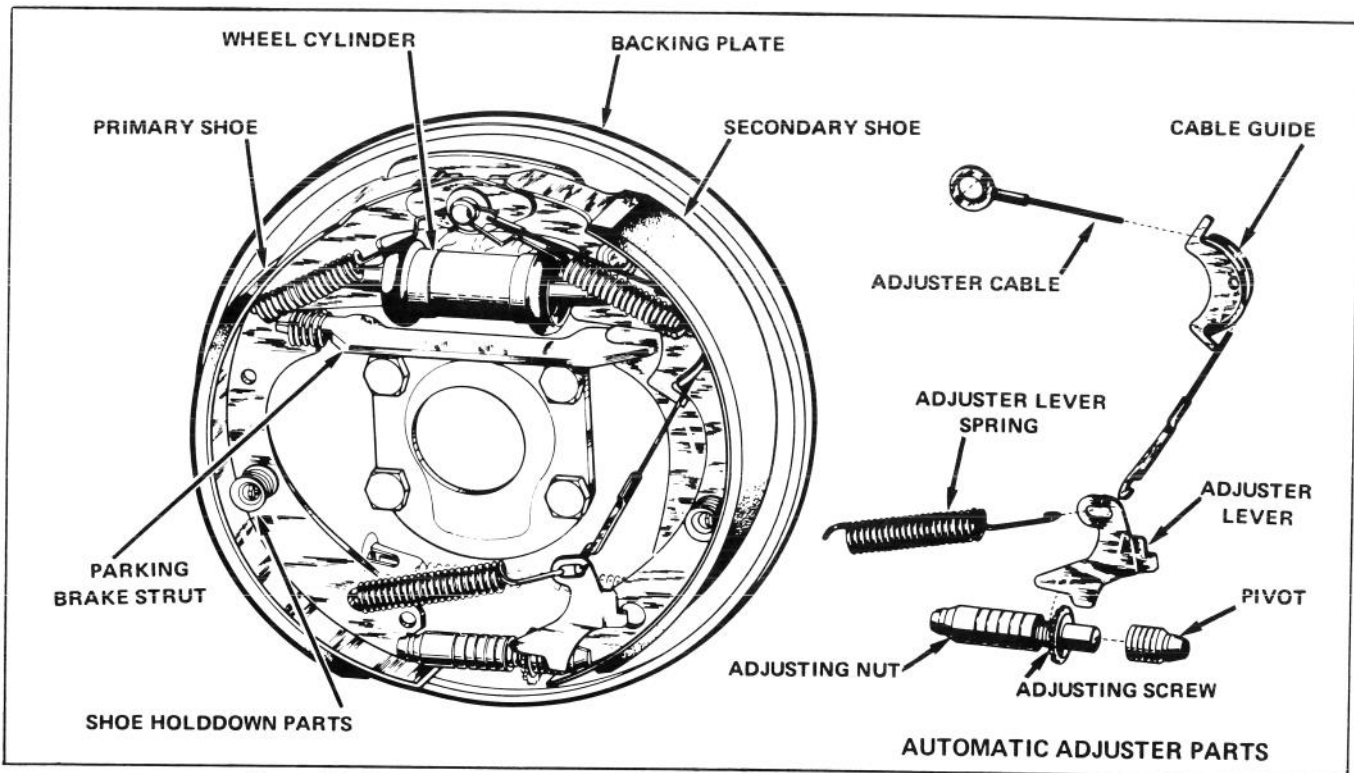


Figure 15. Typical Duo-Servo Brake With Automatic Adjuster (Left Rear Shown)

3. Install wheel cylinder clamp (Figure 16) to hold wheel cylinder pistons in place.

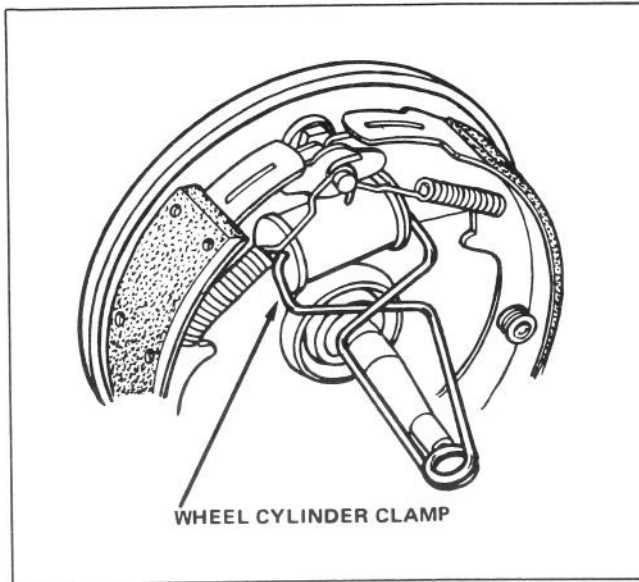


Figure 16. Using Wheel Cylinder Clamp

4. Remove shoe return springs (Figure 17) and automatic adjuster spring. Then remove automatic adjuster cable, cable guide, adjuster lever and shoe guide plate, if used.

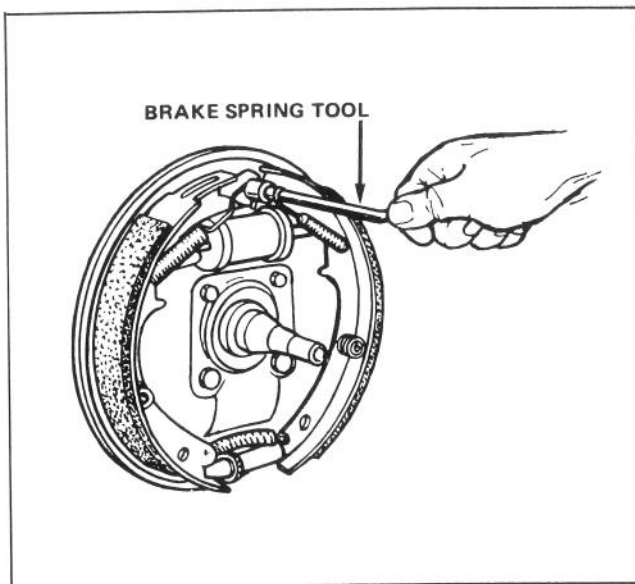


Figure 17. Removing Shoe Return Springs

5. Remove shoe holddown parts and adjusting screw. Remove parking brake strut with anti-rattle spring, and disconnect parking brake lever from secondary shoe.

CLEANING AND INSPECTION

Clean the backing plate. Be sure that shoe support points are smooth and free of rough edges.

Clean the adjusting screw threads, and check for thread damage. Be sure that the adjusting nut turns freely on screw.

Check springs and other parts for loss of tension and damage. Replace weak springs and any damaged or badly worn parts.

RE-ASSEMBLY

1. Apply light coat of high temperature lubricant to shoe support points on backing plate and to adjusting screw threads.
2. Assemble parking brake lever on secondary shoe.
3. Assemble shoes on backing plate, and secure with hold-down parts.
4. Assemble anti-rattle spring on parking brake strut, and then position strut between parking brake lever and primary shoe web.
5. Position shoe guide plate and loop of adjuster cable on anchor pin. Then install primary shoe return spring.
6. Position cable guide on secondary shoe web, and then install secondary shoe return spring. Be sure that wheel cylinder shoe links properly engage shoe webs. Remove wheel cylinder clamp.
7. Assemble adjusting screw between shoe webs at lower end.
8. Attach short hook end of automatic adjuster spring to primary shoe web.
9. Attach other end of spring and hook of adjuster cable to hole in adjuster lever. Then assemble lever, with spring and cable attached, on secondary shoe web.

ADJUSTMENT

When new linings are installed or when the position of the adjusting screw is changed, the brakes should be adjusted.

Preliminary Adjustment Using Gauge

If a brake shoe gauge (Figure 18) is available, set gauge to inside diameter of drum, and tighten set screw.

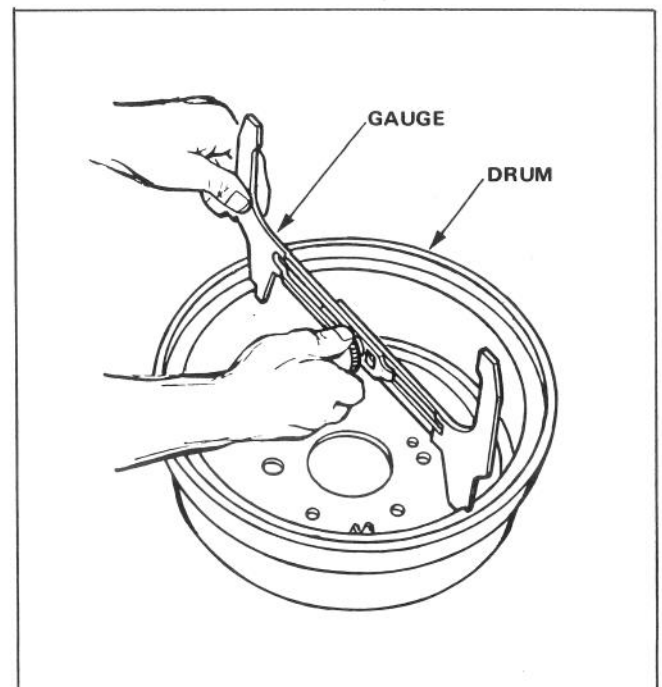


Figure 18. Setting Brake Gauge

Position other end of gauge over brake shoes as shown in Figure 19. Then expand shoes by manually turning star wheel until gauge just slides over linings. Rotate gauge around lining surface to insure proper clearance.

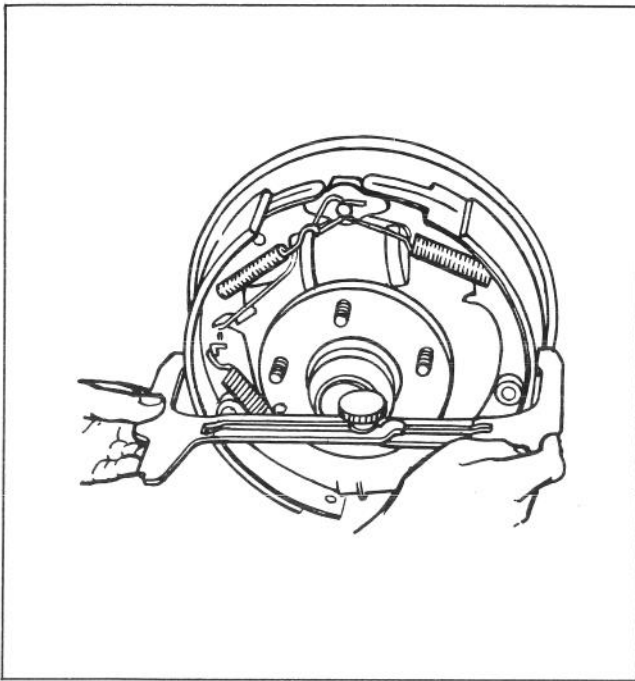


Figure 19. Preliminary Shoe Adjustment

Preliminary Adjustment through Access Slot

If a gauge is not available, the preliminary adjustment may be made through the adjusting screw access slot.

Remove cover from access slot in the backing plate.

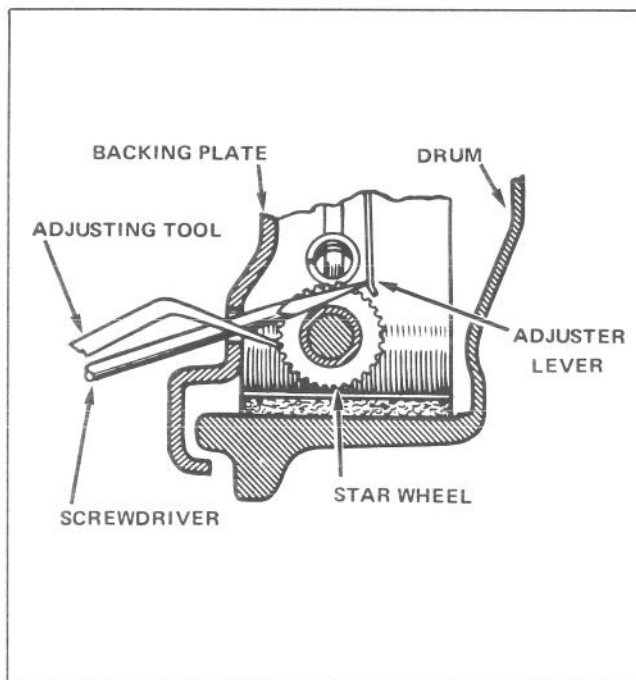


Figure 20. Adjusting Star Wheel

Install drum on shoes. Then insert a brake adjusting tool through slot in backing plate, and turn star wheel to expand shoes until a heavy drag is felt while turning drum.

Back off star wheel until drum is free of drag (20 to 30 notches). Use a screwdriver as shown in Figure 20 to hold adjuster lever away from star wheel while backing off adjustment.

Assemble cover in access slot.

Final Adjustment

WARNING: After making preliminary adjustment, apply firm pressure to brake pedal and be sure that there is adequate pedal reserve before moving tractor.

Operate tractor and make a number of alternate forward and reverse stops applying firm pressure to brake pedal on each stop.

These stops should activate automatic adjusters and build up a normal pedal reserve.

ENGINE LIFTING EYES

If it becomes necessary to remove the engine from the tractor, remove the hood, tag and remove all wires, tubing, hoses, accessories, etc., as necessary, prior to engine removal. Figure 21 shows the lifting eyes. Remove the fasteners and lift the engine up and out with a suitable hoist.

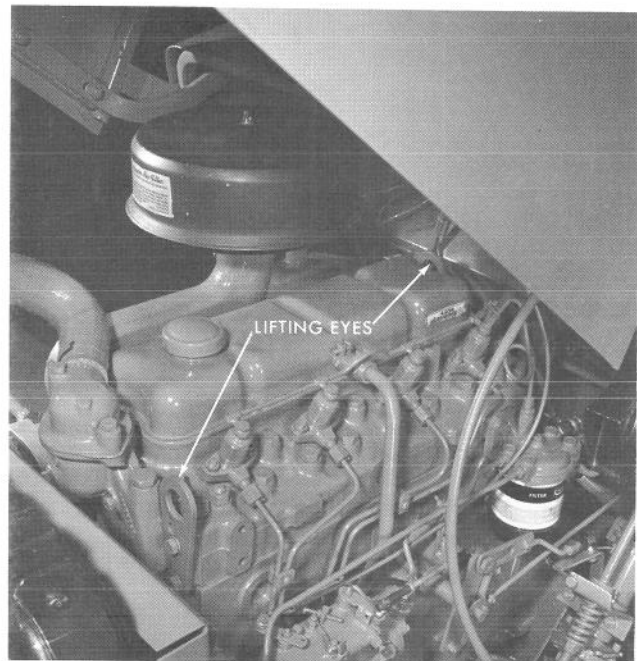


Figure 21

TROUBLE SHOOTING CHART

PROBLEM	POSSIBLE CAUSE	REMEDY
Engine will not start	1. No Fuel at Injectors	
	a) Stop control in "no fuel" position.	Push control to "run" position.
	b) Insufficient fuel in tank, air has been drawn into the system.	Replenish fuel tank, then "bleed" system as detailed in Perkins Handbook.
	c) Fuel lift pump inoperative.	Remove lift pump and rectify or fit replacement pump.
	d) Fuel filters choked or fuel feed pipe blocked.	Check fuel feed to fuel pump and filters.
	e) Fuel pump not delivering fuel to the injectors.	Remove pump for attention of Authorized TORO Distributor and fit replacement. Check fuel pump drive.
	2. Fuel at Injectors	
	a) Injectors require servicing.	Service or fit replacement set.
	b) Wrong type of Thermostart unit fitted.	Fit correct type.
	c) Thermostart unit inoperative.	Visually check unit, fit new unit if unserviceable.
	d) Valve and/or pump timing incorrect.	Check and reset.
	3. Cranking Speed Too Low:	
	a) Battery discharged	Fit fully charged replacement.
	b) Incorrect grade of lubricating oil.	Check oil viscosity against list in Perkins Handbook for temperature range.
	c) Poor electrical connections between battery and starter motor.	Check and tighten or remake connections where necessary.
	d) Starter motor faulty.	Replace or repair.
	4. Poor Compression	
	With poor compression, starting may be difficult in warm weather, but in cold weather the engine may refuse to start. The causes are numerous: worn liners, piston rings, leaking valves, etc.	A top overhaul or a complete overhaul is indicated.
Engine starts, runs for a few moments then stops	a) Partially choked fuel feed pipe or filter.	Trace and rectify.
	b) Fuel lift pump not giving adequate delivery.	Check output of lift pump and rectify or replace.
	c) Fuel tank vent hole blocked.	Unblock.
	d) Restriction in induction or exhaust systems.	Check and clear restrictions.
	e) Air leaking into fuel pipes.	Trace and rectify.
Engine misfiring or running erratically	a) Injectors require attention.	Isolate, remove and test.
	b) Air in fuel system.	Trace and rectify.
	c) Water in fuel pump.	Trace and remove.
	d) Valve and/or pump timing incorrect.	Reset if necessary.
	e) Valve clearances incorrect.	Reset if necessary.
	f) Fuel leaking from high pressure pipe.	Replace pipe.
	g) Faulty fuel injection pump.	Replace for comparison.
	h) Mismatching of fuel injection equipment.	Check parts list for correct parts.
Engine runs evenly but suffers from loss of power	a) Injectors require servicing.	Service or fit a replacement set.
	b) Loss of compression.	Top or major overhaul.
	c) Fuel injection pump not delivering sufficient fuel.	Check throttle linkage travel. Replace pump for comparison.

TROUBLE SHOOTING CHART (Continued)

PROBLEM	POSSIBLE CAUSE	REMEDY
Engine runs evenly but suffers from loss of power	d) Air cleaner restriction.	Service air cleaner.
	e) Fuel pump timing incorrect.	Check and reset.
	f) Brakes binding causing excessive load on engine and apparent loss of power.	Check brake drum(s) for overheating.
Engine runs but with a smoky exhaust	a) Incorrect air/fuel ratio.	Check for restriction to air flow.
	b) Cold starting aid (Thermostart) valve leaking.	Fit new unit.
	c) Valve and/or fuel pump timing incorrect.	Check and reset.
	d) Injectors require servicing.	Service or fit a replacement set.
	e) Excessive oil consumption.	New rings not seated.
	f) Vehicle over-loaded.	Check that the loading is consistent with the manufacturer's load classification.
Engine knocking.	a) Faulty injector (nozzle needle sticking).	Replace.
	b) Fuel pump timing too far advanced.	See your TORO Distributor.
	c) Piston striking a valve.	Check valve timing, piston heights and valve head depth relative to cylinder head face.
	d) Incorrect fuel.	Check that the tank has been filled with diesel fuel and not gasoline.
	e) Worn or damaged bearings, etc.	Overhaul engine.
	f) Piston slap—worn bores or rings.	Rebore and/or re-ring.
Engine overheating	a) Coolant level too low.	Replenish and check if leakage is taking place.
	b) Radiator or system blocked.	Flush system to remove sediment or scale.
	c) Blockage or restriction due to ice formation.	Observe frost precautions.
	d) Fan belt slipping or incorrect type of fan fitted.	Check belt tension and fan type.
	e) Valve and/or fuel pump timing incorrect.	Check and reset.
	f) Thermostat stuck in the closed position.	Replace
	g) Cylinder head gasket failure.	Check bow of head and block. Fit new gasket.
Low oil pressure	a) Oil level in sump too low.	Rectify.
	b) Incorrect grade or inferior oil being used.	Change to Approved Grade.
	c) Oil leaking externally from engine.	Rectify.
	d) Pressure gauge or oil warning light switch inaccurate.	Check with master unit.
	e) Oil pump worn or pressure relief valve sticking open.	Replace
	f) Suction pipe to oil pump allowing air to be drawn in.	Rectify.
	g) Worn main or big end bearings.	Overhaul engine.
High oil pressure	a) Incorrect grade of oil being used.	Change to Approved Grade.
	b) Pressure gauge inaccurate.	Check with master unit.
	c) Pressure relief valve sticking closed.	Rectify.
Excessive crankcase pressure	a) Partially choked breather pipe.	Remove and clean.
	b) Worn or sticking piston rings.	Examine.

SPECIFICATIONS

Parkmaster 7 (Model No. 33677) and Parkmaster 9 (Model No. 33699) Diesel Tractors

ENGINE: See page 11, Perkins Handbook

THE SPECIFICATIONS IN OWNER'S MANUAL FORM 3310-348 APPLY TO THE DIESEL PARKMASTERS, EXCEPT FOR THE FOLLOWING:

CLUTCH: 11 7/8 inch diameter, lever type, spring loaded, foot operated with torsional dampener for smooth engagement.

RADIATOR: Tube & fin construction. Core 24.66 x 16.33 x 1.95 thick. Stamped brass top and bottom tanks. 15 PSI pressure cap. 16 quart capacity. Coolant, permanent type ethylene glycol anti-freeze.

SPEED: 20 MPH can be attained in 4th gear and under ideal conditions, and is to be considered maximum.

BRAKES: 13 inch diameter x 2½ inch wide, self-adjusting, double servo hydraulic brakes on rear wheels, providing 133 inches total brake shoe area. Torque capacity, approximately 49,000 in. lbs.

Master Cylinder: One inch diameter piston with spring return.

Parking Brake: Provided with compound hand lever, multi-stranded cable & conduit, actuating brake shoes.

BATTERIES: Two 6-volt, heavy-duty batteries. SAE Group size 1M4. Cranking power @ 0°F.—2500 watts average. 256 minutes reserve capacity. Batteries provide 12-Volt service.

STARTING ASSIST: The engine is equipped with a Thermostart device that operates by burning a small quantity of diesel fuel in the intake manifold, which heats the incoming air. This provides easy starting down to 0°F.

HYDRAULIC PUMP: Vane type pump with priority flow divides valve to operate both the Parkmaster Frame hydraulic system and the tractor power steering system.

Total Pump Capacity—10.5 G.P.M. at 1200 RPM and 1500 P.S.I.

Primary Flow Rate (Power Steering)—2 G.P.M., 1250 P.S.I. relief valve setting for power steering. Pump shaft is coupled directly to front engine crankshaft pulley. Pump is prevented from rotating by a torque arm which is mounted in rubber cushions.

