

FINN

CORPORATION



OPERATOR'S MANUAL

MODEL RS SERIAL NO.

Includes
PARTS MANUAL

SAFETY FIRST

With any piece of equipment, new or used, the most important part of its operation is SAFETY!

Finn Corporation encourages you and your employees to familiarize yourselves with your new equipment and to stress safe operation.



This symbol is used throughout this manual to call attention to safe procedures.

- Pay Attention -

Finn Corporation

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OPERATION AND MAINTENANCE MANUAL
FOR
FINN T90 & T120 HYDROSEEDERS®

This manual gives you step by step instructions for the operation and maintenance of the Finn HydroSeeder. For best results and to insure longer life of the equipment, please follow the instructions carefully.

DEFINITION OF HYDROSEEDING: Hydroseeding is the process whereby seed, fertilizer and/or lime and wood fiber mulch (using water as a carrying medium) are applied on the soil for the purpose of establishing turf.

THE FINN HYDROSEEDER AND HOW IT WORKS: The Finn HydroSeeder will apply seed, fertilizer and/or lime, wood fiber mulch, or stabilizing materials in any prescribed or desired combination. The materials placed in the HydroSeeder slurry-tank are mixed with water and kept in suspension by a dual agitation process, recirculation of slurry and mechanical agitation, thus forming a slurry which is pumped to the discharge assembly and directed onto the seedbed by the operator. This equipment is designed to accomplish hydroseeding in one easy operation with maximum efficiency.

MOUNTING THE HYDROSEEDER

For speed and mobility of operation, the HydroSeeder should be mounted on a truck or trailer, however, it is important to select a carrier with sufficient capacity to handle the added weight.

Carrier Vehicle Requirements

<u>HYDROSEEDER</u>		<u>TRUCK REQUIREMENTS</u>	
Type	Maximum Weight (loaded)	Approx. GVW*	Measurements (cab to axle)
T90S	13,100 lbs (5942kg)	18,000 lbs(8200kg)	84"-100"(213-254cm)
T90T	14,000 lbs (6350kg)	Tow Vehicle must be able to support 1800 lbs (820kg) down on its hitch	
T120S	15,800 lbs (7167kg)	23,000 lbs (1050kg)	84"-106" (213-269cm)
T120GN	17,700 lbs (8029kg) (less material stored on top)	Tow Vehicle must be able to support 4500 lbs (2050kg) down. 2-5/16" ball type gooseneck coupler standard.	

*Since truck weight will vary, insure that vehicle's GVWR is sufficient for the particular application. This information can be obtained from the truck manufacturer or dealer.

HydroSeeder is a registered trademark of Finn Corporation.

Once the proper carrier has been selected, the HydroSeeder must be securely mounted to it.



CAUTION - Your FINN HydroSeeder should be mounted by a qualified truck body installer.

When mounting the HydroSeeder to the truck bed, any one of the following methods of mounting is acceptable:

- A. Bolt the HydroSeeder directly to the truck bed.
- B. Mount the HydroSeeder to the truck frame.

IMPORTANT: Before mounting to frame, place hard wood spacers between truck frame and HydroSeeder frame for tire clearance as well as frame twist.

- C. Place chains over the HydroSeeder and around truck bed and secure with binders. Secure the HydroSeeder with blocks tied to the truck bed.

IMPORTANT: When using a truck with a tilt bed-be sure to chain the truck bed down to prevent the bed from being accidentally hoisted.

PRE-START CHECK

Safety check - to insure operator safety:

- 1. Check binders or U-bolts securing HydroSeeder to truck frame.
- 2. Make sure bag cutter is in place and secure.
- 3. All railings in place and secure.
- 4. Check hitch, safety chains, lights and brakes.

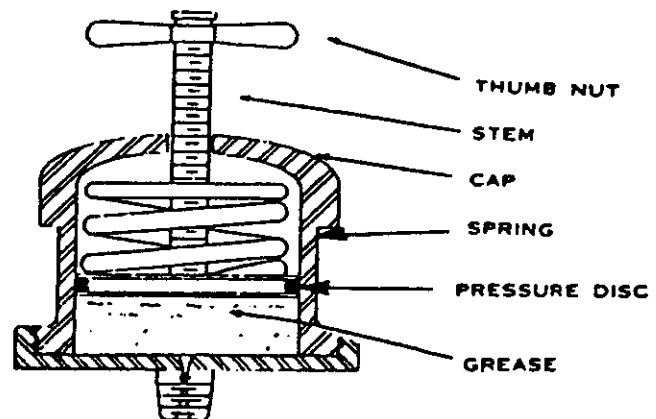
EQUIPMENT CHECK



CAUTION -Equipment check is made with the engine off and all rotating parts stopped.

- 1. See that tool kit contains all prescribed items (see tool kit list in parts book).
- 2. Install discharge assembly (if stored in location other than standard operating position)
 - A. Remove from traveling position.
 - B. Check and clean nozzle of obstructions.
 - C. Place discharge assembly in an upright position through the ring on the guard rail and connect to valve discharge pipe.
 - D. Tighten the wing bolt at the opening around the top of discharge assembly.
- 3. Check engine oil and fuel..for oil refer to the engine manual.
- 4. Inspect air cleaner for dust and dirt, clean if necessary. (see engine manual)
- 5. Check belts for proper tightness. Belts are in proper adjustment when 8 pounds (3.6 kg) pressure in the center of the belt produces 1/8" (3 mm) depression.
- 6. Inspect the "slurry-tank" for foreign objects.

7. Engage and disengage clutch to determine if it "snaps" in and out.
 8. Secure the drain plug on the outside--bottom of the slurry-tank.
 9. Check to be certain pump drain plug is in place.
 10. Check hydraulic oil level (see hydraulic system for oil spec.).
 11. Check pump discharge and recirculation valve handles for free movement. (See page 11 for valve lubrication procedure).
 12. Lubricate equipment - use hand gun only.
 - A. Each lubrication point is marked.
 - B. Check automatic pressure lubricator. If the stem is fully extended with thumb nut all the way up then pressure lubricator contains lubricant - if not, lubricant must be replaced by the following procedure:
 - a) Turn thumb nut clockwise until stem rises to maximum height.
 - b) Remove cap and fill cap with soda (non-lithium) base grease.
 - c) Replace cap.
 - d) Turn thumb nut counter-clockwise until the thumb nut is at the top of the stem. The spring and pressure disc in the lubricator forces the grease, under pressure, to the pump seal.
- IMPORTANT:** When the thumb nut has moved down to within 1/2" (1.25 cm) of touching the cap--reservice the automatic lubricator.



STARTING PROCEDURE

Before starting, open the recirculation valve, close discharge valve, disengage clutch, and place the agitator control in the neutral position.

GASOLINE OPTION

1. Put ignition switch to "on" position. Set throttle about 1/4 open. Pull choke out.
 2. Depress starter button to turn engine over. When engine fires, push choke back in for even running and allow engine to warm up for 3 to 5 minutes.
- NOTE:** This engine has an overheat safety switch which will kill the engine if it should ever get too hot.

DIESEL OPTION

1. Push the engine kill knob in.
2. Set throttle about 1/4 open.
3. While holding in the safety switch button, turn key counterclockwise and hold until the glow plug indicator glows red.
4. Continuing to hold the safety switch in, turn the key clockwise until the starter engages, and the engine starts.
5. Continue to hold the safety switch in for approximately 10 seconds, (until horn does not blow). Allow the engine to warm up for 3 to 5 minutes.

NOTE: This engine has a safety system which will sound a horn if the engine oil pressure drops below 7 psi. or if the water temperature reaches 225 degrees Fahrenheit.

PRIOR TO LOADING

Before placing any dry material in the slurry-tank, the tank must be filled to the required capacity with water. The following tables of capacities should be used. Fill tank with water from any stream or pond using a filling pump.

Other sources of water:

1. Any pressure source, eg. fire hydrant (if water main is used, obtain permission from local authorities and install a check valve in the fill line to prevent material from back flowing into the water main line).
2. Tank - truck.

MATERIAL -CAPACITY-PERFORMANCE

Table #1 using dry material, without wood fiber mulch:

<u>HydroSeeder</u>	<u>Maximum Water cap.</u>	<u>Material Type</u>	<u>Maximum Material Capacity</u>	<u>Discharge Time (Minutes)</u>	<u>Maximum Acreage</u>
T-90	800 gal (3,000 l)	Seed/ Fertilizer/ Lime	2,500 lbs (1,100 kg)	6-12*	2.5 (1 ha)
T-120	1,000 gal (3,785 l)		3,200 lbs (1,455 l)	8-14*	3 (1.2 ha)

Table #2 with wood fiber mulch (do not mix lime with wood fiber mulch in HydroSeeder)

<u>HydroSeeder</u>	<u>Water</u>	<u>Wood Fiber Mulch</u>	<u>**Dry Material Capacity</u>	<u>Discharge Time (Minutes)</u>	<u>Maximum Acreage</u>
T-90	800 gal (3,000 l)	400 lbs (182 kg)	For 1/4 acre (0.1 ha)	6-12*	1/4 (0.1 ha)
T-120	1,000 gal (3,785 l)	500 lbs (227 kg)	For 1/3 acre (.13 ha)	8-14*	1/3 (.13 ha)

*Depending on nozzle used.

**Necessary seed and/or fertilizer for the area which the load is to cover - Example: enough seed and fertilizer for 1/4 acre (0.1 ha), together with 400 lbs. (182 kg) of wood fiber mulch for the T-90 HydroSeeder. Based on 1600 lbs. of mulch per acre.

PRIOR TO APPLICATION

1. Crew chief should familiarize self with area to be seeded and develop a plan to insure uniform application.
2. Develop a plan for communication between operator and driver of the carrying vehicle to signal for start, stop, turn, etc. through the use of the signal horn on the platform.
3. Crew chief takes up position on the platform. From this point application will be controlled by the use of the clutch, valve, discharge assembly and throttle.

DISCHARGE NOZZLE SELECTION

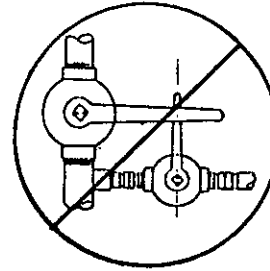
Nozzles are stored in the tool box. This HydroSeeder is equipped with 4 nozzles --two long distance and two ribbon fan nozzles. The smaller long distance nozzle is generally better suited for seed, fertilizer and/or lime application while the large long distance nozzle is better for wood fiber mulch application. Both of the ribbon fan nozzles are generally suited for both types of application.

Nozzle	Distance	Width	Discharge Time	
			T90	T120
Lg Long Distance	Up to 150 ft (60m)	-	6 min	8 min
Sm Long Distance	Up to 110 ft (43m)	-	12 min	14 min
Narrow Ribbon	Up to 55 ft (22m)	10ft (4m)	12 min	14 min
Wide Ribbon	Up to 45 ft (6m)	15ft (6m)	12 min	14 min

TWO VALVE OPERATION

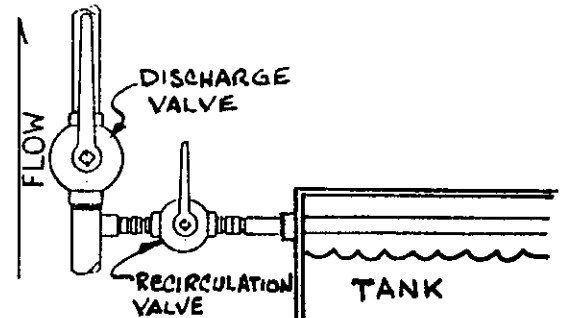
This HydroSeeder is equipped with two independently operated plug valves to control slurry flow. One is located in the recirculation line, and one is located in the discharge line above the recirculation. The handles on these valves are timed so when in line with the valve ports, the valve is open, allowing material to flow through when the slurry pump is running. The valve handles should be positioned as shown below for the particular discharge application required.

WARNING!! Never engage the slurry pump clutch when both valve handles are positioned as shown. Both valves are closed and will result in extreme heat generation that will cause damage or bodily injury if the slurry pump is running.



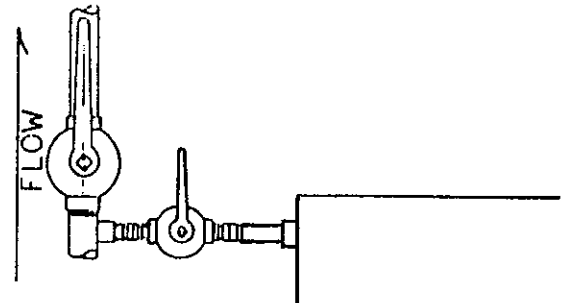
1. Discharge Through Tower:

Flow is through tower with no flow through closed recirculation valve. Flow through tower is controlled by engaging and disengaging slurry pump clutch.



2. Extension Hose Through Tower:

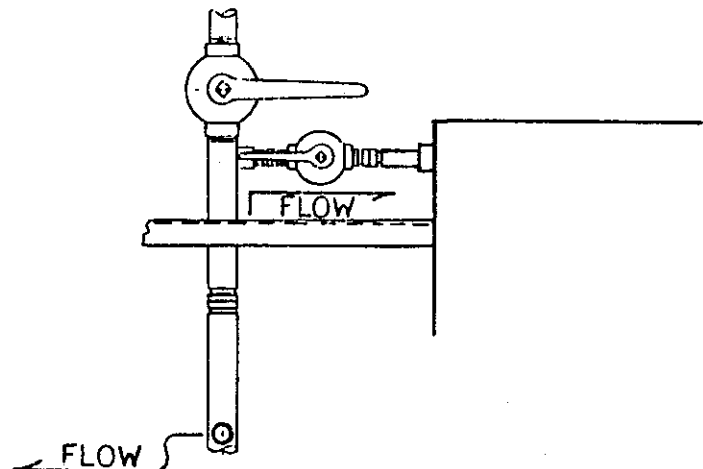
Flow is through tower with no flow through closed recirculation. Extension hose is connected to tower and flow is controlled by engaging and disengaging pump clutch, or controlling the speed of the engine.



DO NOT USE REMOTE VALVE
on this application.

3. Extension Hose or Hose Reel Through Remote Port:

Flow is through recirculation with no flow through closed discharge valve. Flow through extension hose is controlled by engaging and disengaging slurry pump clutch, or by remote valve at end of hose. Open recirculation valve allows flow back into tank.*



***DANGER!!** Recirculation valve must be open and material flowing back into tank when using a remote valve. A closed or plugged recirculation line will cause extreme heat resulting in damage and/or bodily injury.





CAUTION: Take care not to lose pens, lighters, etc. from shirt pockets nor pieces of paper or plastics bags, as these might plug the pump.

1. Fill the slurry-tank to required capacity with water.
2. Start the engine (see starting procedure - page 3).
3. Open both the discharge and the recirculation valves.
4. Move the agitator control to 1/2 speed, reverse.
5. Remove the discharge nozzle and gasket from the discharge tower.
6. Move the throttle to 1/2 engine speed.
7. Aim the discharge assembly away from any persons or obstructions.
8. Engage the clutch and move the throttle to full engine speed.
A spray of water should be coming from the end of the recirculation pipe beside the hatch opening, as well as from the discharge tower.
9. As soon as both systems are clear of fiber, close the discharge valve and check all lines for leaks.
10. If not using lime, disengage the clutch. If liming, see page 10.
11. Move agitator control to full speed, reverse.
12. Start loading dry material, loading the lightest material first.
 - A. Seed - cut the seed bag and dump contents into the slurry-tank.
(When using inoculant, add it in the tank along with the seed.
 - B. Wood Fiber Mulch - empty the whole bag in or cut bag and drop in the sections of fiber. (Depending on type of fiber).
 - C. Fertilizer - stand over the opening on the loading platform and drop the bag onto the bag cutter. Grasp both ends and dump the material.

IMPORTANT: Once operator is thorough familiar with the loading procedure, loading time can be reduced by beginning the material loading process as soon as the water level reaches the agitator centerline.

13. When using wood fiber mulch, keep the discharge valve open and the recirculation valve closed. Control the discharge with the clutch handle.
14. When using oats or other quick swelling seeds; load these just prior to application.
15. When equipment is loaded with dry material and thoroughly mixed, the throttle should be reduced to 2/3 if application is not to start immediately. If wood fiber is being used, the clutch may be disengaged.
16. The slurry should not be recirculated for more than 15 minutes prior to discharge, to reduce wear and keep seed from swelling.
17. Close the hatch lid on the slurry tank.
18. Move the agitator control to full speed in the forward position. After all material is mixed, slow the agitator down to the minimum speed that still creates movement in all corners of the tank. Do not over agitate the slurry. Always discharge with the agitator control in the "forward" position.
19. If foaming occurs - reduce agitator speed.
20. If the agitator stops or a high pitched squeal comes from the hydraulic system (relief valve), reverse rotation for a moment, then return agitator to forward.



CAUTION: Hydraulic system will overheat if agitator shaft is jammed for extended period. This will damage hydraulic oil and system components.

APPLICATION OF SLURRY



DANGER: Do not spray toward powerlines, transformers or other high voltage conductors



CAUTION: The driver of the carrying vehicle should remain alert for hazards to the operator, such as low powerlines, hanging branches, etc. Driver should never start or stop abruptly.

1. A. Seed, fertilizler and lime: Elevate discharge nozzle approximately 10 deg. above the area to be sprayed, allowing slurry to gently rain onto the seedbed.
B. Wood and paper fiber: Aim the stream into the ground at approximately 10 deg below ground level to creat a surface with small poc marks which helps get seed in contact with ground.
2. Move the discharge valve handle to the open position, the recirculation valve handle to the closed position, and engage the clutch. At this time, should the operator want to stop spraying for a short period (up to 30 seconds), disengage the clutch-then re-engage.
3. While moving along area to be seeded, the operator should move the nozzle back and forth in a slow, even arc.
4. It may be necessary to slow the agitator as the tank empties to reduce foaming.
5. When the tank is empty, disengage the clutch, then immediately move the discharge valve to the closed position, and idle the engine. This will maintain moisture in the discharge piping and help prevent plugging.

RELOADING PROCEDURE

1. When the water has reached the agitator centerline, start the engine.
2. Open both the discharge and recirculation valves.
3. Move the agitator to 1/2 speed, reverse.
4. Remove the discharge nozzle and gasket from the discharge tower.
5. Move the throttle to 1/2 engine speed.
6. Aim the discharge assembly away from any persons or obstructions.
7. Engage the clutch, and move the throttle to full engine speed. A spray of water should be coming from the end of the recirculation pipe beside the hatch opening, as well as from the tower.
8. As soon as both streams are clear of fiber, close the discharge valve, and make sure the water is being recirculated back to the tank.
9. If not using lime, disengage clutch. If liming, see page 10.
10. Proceed with steps #12-#20 under "LOADING".

AFTER FIRST 4 - 8 HOURS OF OPERATION

1. Check and adjust belts - see equipment check.
2. Check and adjust clutch - see page 20.
3. Retorque wheel lugs - again after 7 days. (trailer option only).

PROCEDURES WHEN USING HOSES

Always pump clear water through the hose before pumping mulch. If the inside hose liner is dry, it will dewater the mulch causing plugging.

PUMP TAKE OFF SYSTEM WITH REMOTE VALVE

1. When the water has reached the agitator centerline, start the engine.
2. Open both the discharge and recirculation valves.
3. Move the agitator to 1/2 speed, reverse.
4. Remove the discharge nozzle and gasket from the discharge tower.
5. Move the throttle to 1/2 engine speed.
6. Aim the discharge assembly away from any persons or obstructions.
7. Engage the clutch, and move the throttle to full engine speed. A spray of water should be coming from the end of the recirculation pipe beside the hatch opening, as well as from the discharge tower.
8. As soon as both streams are clear of fiber, close the discharge valve, and make sure the water is being recirculated back to the tank.
9. Attach the extension hose to the outlet on the pump discharge pipe just above the pump. Flush hose until the water is clear.
10. Disengage clutch.
11. Load material into tank (see "Loading", page 7).
12. With the engine at 3/4 speed, discharge the load through the remote valve at the end of the hose.*
13. When finished spraying, close the remote valve, disengage the clutch, and stop the engine. If using fiber mulch, retain as much water as possible in the hose by elevating the ends or by coupling the ends together.
14. If another load is to be done, start at step "1". If finished for the day, follow the clean up procedure and flush out the hose.



* **DANGER!!!** The recirculation valve must be open when using a remote valve. If not open, extreme heat which will cause damage and/or bodily injury will occur.

TOWER TAKE OFF SYSTEM - WITHOUT REMOTE VALVE

1. When the water has reached the agitator centerline, start the engine.
2. Open both the discharge and the recirculation valves.
3. Move the agitator to 1/2 speed, reverse.
4. Remove the discharge nozzle and gasket from the discharge tower.
5. Move the throttle to 1/2 engine speed.
6. Aim the discharge assembly away from any persons or obstructions.
7. Engage the clutch, and move the throttle to full engine speed. A spray of water should be coming from the end of the recirculation pipe beside the hatch opening, as well as from the discharge tower.
8. As soon as both streams are clear of fiber, close the recirculation valve.
9. Disengage the clutch.

10. Reinstall the coupler gasket into the discharge tower, and connect the extension hose into the end of the tower.
11. Flush the hose by engaging the clutch.
12. Load material into tank (see "Loading", page 7).



CAUTION: Since the extension hose will be seeing the full output of the pump with the recirculation closed, the equipment operator and individual at the end of the hose should exercise extreme care when operating unit on high pressure. The high pressure on the hose can exert strong forces causing hose operator to lose control of hose or footing. The hose will require additional holders on slopes. Do not rapidly apply full pressure to hose until hose operator is firmly positioned and has firm control of hose.

13. A person controlling the end of the hose directs a second operator at the machine to control the clutch and adjust the engine speed.
14. When finished spraying, disengage the clutch, stop the engine, and close the discharge valve. If using fiber mulch, retain as much water as possible in the hose by elevating the ends or by coupling the ends together.
15. If another load is to be done, start again at step "1". If finished for the day, follow clean up procedure and flush out the hose.

LIMING WITH THE HYDROSEEDER

In using large concentrations of granular solids through the HydroSeeder, it is advisable to keep the slurry moving through the pump at all times. This keeps the solids from settling in the lines, and creating a stoppage.

PROCEDURE

1. When the water has reached the agitator centerline start the engine.
2. Open both the discharge and recirculation valves.
3. Move the agitator control to 1/2 speed, reverse.
4. Remove the discharge nozzle and gasket from the discharge tower.
5. Move the throttle to 1/2 engine speed.
6. Aim the discharge assembly away from any persons or obstructions.
7. Engage the clutch, and move the throttle to full engine speed. A spray of water should be coming from the end of the recirculation pipe beside the hatch opening, as well as from the tower.
8. As soon as both streams are clear, close the discharge valve and make sure water is being recirculated back to the tank.
9. Decrease throttle to 3/4 speed. Increase agitator speed to full, reverse. DO NOT DISENGAGE CLUTCH!
10. Load material (see "Loading" page 7 , steps 12-20).
11. When ready to apply slurry, install gasket and nozzle into tower.
12. Move agitator control to 3/4 speed, forward.
13. With the clutch still engaged, open the discharge valve.



CAUTION To decrease pump wear and increase discharge distance, it may now be desirable to close the recirculation valve. However, the recirculation valve must be open BEFORE closing the discharge valve if the application of slurry is to be interrupted. Extreme heat which will cause damage and/or bodily injury will occur if both valves are closed.

14. Apply the slurry (see "Application of Slurry").
15. If another load is to be applied, start again at step "1".
If finished, follow the clean-up procedure.

CLEANING AND MAINTENANCE

DAILY:

1. Cleaning the HydroSeeder
 - A. Fill the slurry tank to the center of the agitator shaft.
 - B. Move agitator lever to full speed to flush off inside of tank top and walls.
 - C. Remove discharge nozzle and gasket from discharge tower.
 - D. While pointing discharge toward an open area, move discharge valve handle to discharge position and engage clutch. Allow to discharge until clear water is coming out.
 - E. Move recirculation valve handle to recirculation and allow to run for a minute.
 - F. Disengage clutch, idle the engine, move valve handle to discharge position, move agitator handle to neutral and turn off the engine.
 - G. In freezing weather, remove the drain cap and allow the tank to drain. (see page 12)
 - H. Wash the outside of the HydroSeeder, including the radiator (diesel option), to remove any corrosive materials.
 - I. If using lime - the daily maintenance should be performed after every load.
 - J. Cleaning out extension hoses - see page 9.
2. Lubricating the HydroSeeder (use hand gun only) (see lube chart).

IMPORTANT: Lubrication should be performed **IMMEDIATELY AFTER** cleaning of equipment. Engine not running.

- A. Lubricate the agitator shaft bearings located on the outside front and rear of the slurry-tank.
- B. Service the automatic lubricator on the pump as needed (for service see page 3).
- C. Lubricate the discharge and recirculation valves.
 1. The hexagonal plug, located on the moveable part of the discharge valve, should be turned until grease comes out around the stem.
 2. When the hexagonal plug bottoms, remove it and insert a new grease stick and replace the plug.
 3. Move the valve handle back and forth to distribute the grease.
- D. Check the engine oil and replenish when necessary. Change oil and filter every 50 hours. Consult the engine operator's manual for the correct grade of oil and the engine break-in procedure. For gasoline engine also check clutch oil level - see manual.
- E. Lubricate the swivel on the discharge assembly.

WEEKLY OR EVERY 40 HOURS OF OPERATING TIME:

1. Clean the air cleaner following the instructions in the engine operator's manual.

2. Lubricate all the points on the HydroSeeder as outlined in the daily maintenance section and , in addition, lubricate the two grease fittings on the pump bearings and three fittings on the clutch. (diesel only).
3. Check the level in the hydraulic oil reservoir -maintain level at sight gauge.
4. Check the clutch adjustment to insure that it "snaps" in and out of engagement. Adjust the clutch while engine is shut down.
5. Check the anti-freeze in the radiator (diesel option only).
6. Check belts for proper adjustment. See "Equipment Check List" for procedure.
7. Inspect the slurry-tank for build up of residue in the suction area and clear if necessary.

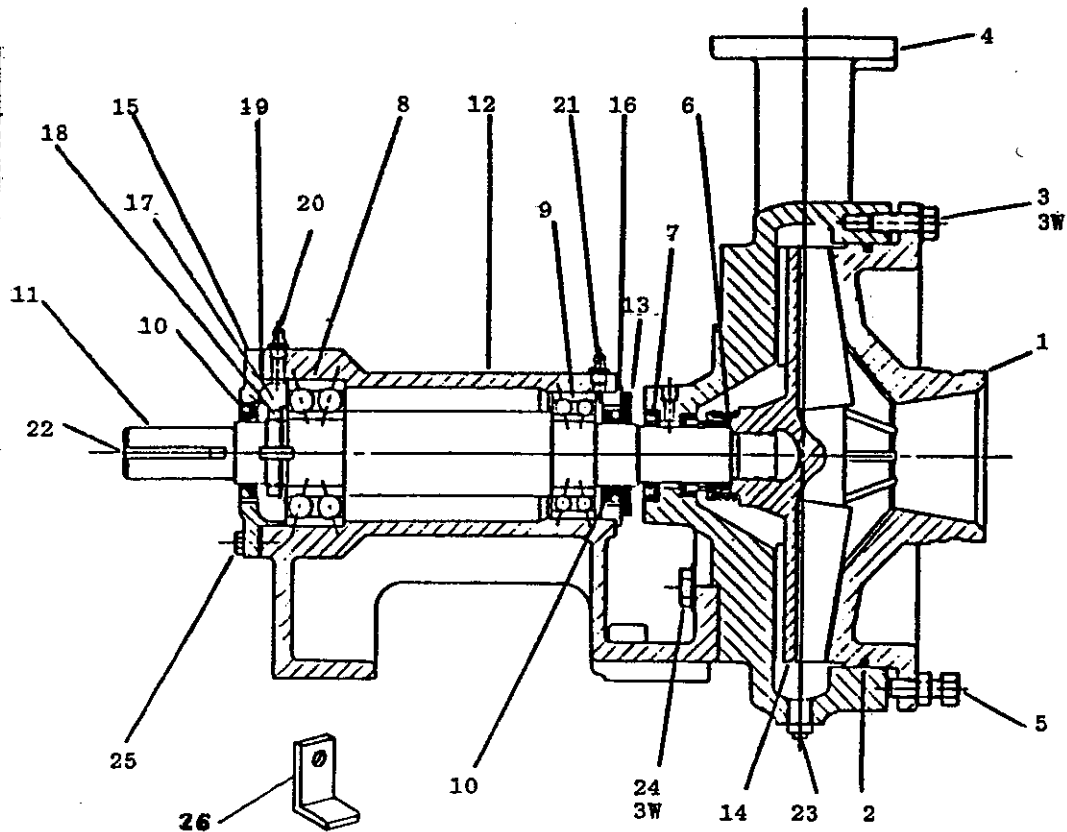
SEASONAL AND WINTER STORAGE MAINTENANCE:

1. Drain the slurry tank of all water prior to storage and leave the drain cap disconnected.
2. Store the HydroSeeder with the discharge and recirculation valve handles in the discharge (open) position. To prevent damage from freezing, it is advisable to remove all slurry valves and store in a heated area.
3. Pour one quart of oil or kerosene into the pump housing and spin pump by hand to prevent rust in the pump. Remove drain plug.
4. Chip and steel brush any interior rust spots in the slurry-tank and touch up with paint.
5. Lubricate all fittings.
6. Disassemble discharge and recirculation valves - clean out grease grooves in plug - reassemble filling chamber, in screwed bottom, with grease.
7. Check anti-freeze in radiator (diesel option only).
8. Lubricate equipment again just prior to starting operation after storage.
9. Change hydraulic oil and filter.



CAUTION: Pump maintenance to be done only while engine is not running.

ITEM	QTY/ PUMP	PART NAME
4	1	CASING
14	1	IMPELLER
15	1	END COVER
8	1	THRUST BEARING
16	1	END COVER
11	1	SHAFT
13	1	DEFLECTOR
18	1	LKNT-06 BRG
9	1	RADIAL BEARING
1	1	SUCTION COVER
21	2	GREASE FITTING
19	2	GASKET
12	1	FRAME
10	2	SEAL
7	1	SEAL
5N	4	HEX NUT
24	4	H CAP SCREW
25	6	H CAP SCREW
3	8	H CAP SCREW
5	4	H CAP SCREW
17	1	LOCK WASHER
6	1	MECHANICAL SEAL
22	1	KEY
23	2	PIPE PLUG
2	1	O-RING
3W	12	WASHER, PLAIN
26	1	IMPELLER WR.



A. FACTORY-TOLERANCES

1. To check pump tolerances loosen the two clamps on the pump suction piping and remove the inlet elbow. Through the pump suction hole, insert a feeler gauge between the pump impeller (14) and the suction cover (1). This measurement on a new pump is between .040-.045 of an inch (100-115 mm).

B. IMPELLER CLEARANCE -To bring the pump back to proper tolerance proceed as follows:

1. Push suction cover (1) into casing (4) until suction cover hits impeller (14). Impeller should be in full contact with suction cover.
2. Tighten cap screws (3) finger tight. Impeller should rub the suction cover and not turn easily through one revolution.
3. Tighten cap screws (5) to 15 lb.ft. Impeller should turn freely through one revolution.
4. Back off cap screws (3) 3/4 turn.
5. Tighten cap screws (5) 3/4 turn and tighten nuts (5N) to 15 lb.ft.
6. Tighten cap screws (3) to 15 lb.ft. Clearance gap should be about .040 inches. Check to see if impeller turns freely through one revolution.

NOTE: Tightening of the cap screws should be in a criss-cross pattern. DO NOT TIGHTEN TO OVER 15 lb. ft. Doing so can crack the flange of the suction cover.

C. CLEANING

1. To clean pump impeller (14), loosen the two victaulic pipe clamps and remove the suction pipe assembly. The eye of the impeller can then be seen through the suction cover plate (1) and is readily accessible for cleaning.
2. To remove impeller, remove the eight bolts (3) holding the cover plate (1) in place. Remove cover plate, being careful not to damage the "O" ring gasket (2).
3. Take the impeller wrench (26), which is stored in the tool box, and position it so that the hole is aligned with any of the eight tapped holes in the front of the pump casing (4). The 90 degree leg of the wrench should face in towards the impeller and be positioned between any two of the impeller fins. Bolt the wrench securely in place with one of the suction cover plate bolts (3). Using a pipe wrench on the shaft (11), unscrew the impeller turning the shaft in a clockwise direction. Be careful not to unscrew the impeller too far before removing the puller wrench.
4. To replace the seal assembly (6), remove pump casing (4) by removing the four bolts (24) holding the casing to the pump frame (12).

INSTALLING NEW SEAL ASSEMBLY (#6) (Do not unwrap the new seal assembly until you are ready to install. All parts of the assembly are packed in sequence of installation).

1. After cleaning all parts including pump shaft, begin the reassembly of the pump. Install seal grease retainer (7) with the cavity portion of the seal facing outward. Rebolt the casing onto the pump frame using the four cap screw (24). Using a light oil lubricant (3 in 1), install the ceramic seat with it's neoprene holder into the seal recess making sure it is square with the shaft. Lubricate the inside of the bellows assembly with a light oil and check to be sure the steel ring is stuck (glued) to the end of the assembly. Slide the bellows assembly onto the shaft and push till the steel ring is against the ceramic seat.
2. Install the seal spring on the hub of the impeller. After coating the threads on the pump shaft with an anti-sieze compound install the impeller - seating it securely.
3. Utilizing the rubber "o" ring gasket (2) reinstall suction cover using the eight cover bolts (3). At this time, check to see that the pump runs freely. If the impeller rubs the cover plate, you do not have the impeller tight on the shaft or the cover plate needs readjustment - see "impeller clearance". Tighten these bolts uniformly using 15 ft.pounds (165 kg/m) on the torque wrench.
4. After reinstalling the suction pipe assembly, lubricate and tighten the victaulic clamps. Service the automatic lubricator.

HYDRAULIC SYSTEM

The hydraulic system on your Finn HydroSeeder is designed to give trouble free service, if maintained. The most important areas of maintenance are the hydraulic oil and filtration. The reservoir holds 17 gallons of Mobil DTE25 or Gulf 46AW or Shell-Tellus 46 hydraulic oil or equivalent. The hydraulic oil should be replaced per the lubrication schedule or if the oil becomes milky or it gives off a burnt odor. The hydraulic oil filter must be replaced on schedule with a 10 micron filter - Finn part #21618.

ATTACHMENTS

1. Extension hoses for reaching remote areas are available in 50 ft. (15m) lengths. All connections are camlock quick operating fittings. The hose is connected to the end of the discharge tower in place of a nozzle. The nozzle is connected to the end of the hose and controlled by the person on the ground. The flow is controlled by a second person on the HydroSeeder. This allows for a full pressure and volume operation.
2. For lower pressure applications, or for close up work ie, around buildings, the remote valve attachment can be used. The attachment includes semi-rigid hose with quick disconnect fittings along with a hand held valve which fits the end of the hose and accepts the standard nozzle assemblies. The hose is connected to the outlet on the discharge pipe above the pump. The machine is run at 1/2 to 3/4 throttle and material is applied where desired.



DANGER: The recirculation valve must be open when using a remote valve. If valve is not open extreme heat will occur resulting in damage and/or bodily injury.

3. Hose Reel. The live hose reel will mount either on the HydroSeeder or on the truck frame. Two styles are available: (1) The handcrank model. (2) The 200 feet of electric rewind will wind up and store empty hose. It can be electrically attached to the HydroSeeder battery.
- NOTE:** Electric hose reels can be wired to truck batteries. Please contact the Finn Corporation Engineering Dept. for instructions on this installation.
4. The irrigation attachment is for spot or temporary irrigation. This attachment will discharge in an adjustable arc of up to 360 degrees. It fits on top of the HydroSeeder in place of the discharge boom.
 5. Filling pumps with the capacity of 5500 GPH (19,000 l/h) or 9,000 GPH (34,000 l/h) can either be carried on the truck or mounted on the HydroSeeder.
 6. Nursery (tree) mulcher has to be ordered with the machine.

TROUBLE SHOOTING YOUR HYDROSEEDER

Because of the tremendous work load usually placed upon the HydroSeeder minor malfunctions will occur from time to time. If these are not remedied immediately, they could lead to poor performance and damage to the equipment. This section describes possible problems and the action to correct them.

1. Foam in the tank and air entrainment.

The mixture of dry materials with water will sometimes cause excessive foaming while others will cause air entrainment. This is noticed primarily in the erratic discharge or the drop of pressure and distance.

Some Solutions Are:

- A. As the slurry level drops in the tank, slow the agitator.
- B. Add 2 to 3 ounces (4 to 6 cl) of an antifoaming agent (Finn Foam Chek®) to the tank.
- C. If you can determine which additive is causing the air problem, either add it last or not at all-unless it's the water.

2. Plugging or clogging:



DANGER: Turn off engine before working on equipment. Serious injury or death can result from moving parts or high pressure spray.

Sometimes when a stoppage occurs, you will not be able to find anything in the line. When this happens, it means that the system became airbound instead of plugged. To remedy this, see "Foaming". Plugging can occur in any one of four places; the valve and recirculation nozzle, the discharge nozzle, the pump area and the sump area. The plugging is caused by either foreign objects or dewatered fiber.

- A. Obstruction in the discharge nozzle is determined by a change or stoppage of the spray pattern.
 - a) Disengage clutch.
 - b) Remove the nozzle
 - c) Clear the nozzle with the nozzle cleaning rod attached to the underside of the guard rail.



DANGER: Severe injury can result from opening clamps when piping is hot. Before loosening any clamps, determine if the pipe is hot. If so, let it cool before attempting repair.

- B. If the recirculation system is not working:
 - a) Disengage the clutch and shut down the engine.
 - b) Remove the two clamps on each side of the recirculation valve.
 - c) Slide the rubber seals back and remove the valve assembly.
 - d) Check the valve assembly, the recirculation nozzle in the discharge pipe, and the recirculation pipe going into the tank. Clear any obstructions.
 - e) Replace the valve assembly and slide the seals back into place. Lubricate the outside of the seals.
 - f) Replace the clamps.

3. Obstruction in the pump, which can be determined by a drop in pressure. If the drop in pressure is accompanied by a frothy or whitish discharge stream, the blockage is in the suction line or sump area. To clear the pump;
 - A. Disengage the clutch and stop the engine.
 - B. Loosen the suction pipe clamps. If there is material in the tank, take the 4" fillport plug and have it ready to stuff into the pipe.
 - C. Remove the clamp closest to the pump.
 - D. Turn the pipe so it points up and install the plug in the suction pipe at the same time.

NOTE: If no water comes out it means that the obstruction is in the sump area.

- E. Reach into the pump and remove the obstruction. If it is jammed, the pump suction cover may have to be removed.
 - F. Reassemble removing pipe "plug" in process.
4. Obstruction in the sump area, which is located at the bottom of the tank on the inside where the suction pipe is attached:
 - A. The easiest way to clear the sump is to back flush through the discharge plumbing with the water supply hose.
 - B. Another method is to remove the drain cap and run a long pole through the opening and into the sump area. Remove the obstruction and replace the drain cap.
 - C. Use a pipe or pole through the loading hatch opening to dislodge the pluggage.

TROUBLE SHOOTING YOUR HYDROSEEDER

<u>Problem</u>	<u>Probable Causes</u>	<u>Suggested Solutions</u>
LEAKS:		
Tank bearing Leaks	Not greased enough- seal worn	Replace seal and and follow lube schedule.
	Bolts not tightened properly	Tighten uniformly to 25 ft.lbs.
Pressure Clamps	Rubber seal cracked, pinched or torn	Replace, always grease rubber before clamping shut.
Suction	Rubber seal cracked, pinched or torn	Replace, always grease rubber before clamping shut
Valve	Not greased often enough	Replace valve, grease after each load
Discharge Swivels	Not greased often enough	Rebuild swivels w/ repair kit (part #6969, 2 req'd)
Pump Shaft	Pressure lubricator not serviced	Replace pump seal, service pressure lubricator daily.

<u>Problem</u>	<u>Probable Causes</u>	<u>Suggested Solutions</u>
Pump Suction Cover	Cover O Ring bad	Replace cover-o ring, use grease
Discharge Boom or Nozzle Camlock fittings	Worn or no gasket	Replace Gasket
MACHINE JUMPS DURING OPERATION:		
Agitator	Agitator bent by heavy object falling on it	Straighten agitator or shim, so it runs true.
Bent Paddles	Loading wood fiber mulch into tank before tank is half full	Straighten agitator paddle, realign agitator to run true.
FOAMING OF SOLUTION AND LACK OF DISTANCE:		
Pump loses prime- lacks distance- leaves excessive amount in tank (100 gal or more 378 liters)	Sucking air in suction lines	Check all suction connections to see that rubber seals are in good shape
	Air entrainment	See page 16
	Low RPM	Reset engine RPM
	Soft water	Slow agitator
	Too much agitation	Slow the agitator
	Pump worn	Reset pump tolerance per manual
	Suction partially plugged	Clean out machine
	High agitator RPM	Slow agitator
	Nozzle worn or plugged	Clean nozzles, replace if necessary
	Fertilizer	Change type
VALVE		
Valve stuck (can't move)	Not lubricated after operation	Disassemble valve, clean & lubricate
	Frozen	Thaw out ice, lubricate Leave in discharge position during storage
Constant plugging during operation	Foreign material in slurry	Drain and clean out tank. Check storage for foreign materials
Constant plugging during loading and discharging	Loading HydroSeeder before tank is half full of water	Reinstruct your operator. (see operator's manual)
	Improper operation by operator	Reinstruct your operator. (see operator's manual)

<u>Problem</u>	<u>Probable Causes</u>	<u>Suggested Solutions</u>
	Clutch slipping	Readjust clutch
	Not moving valve handle far enough	Reinstruct your operator
	Machine not being flushed out prior to reloading	Follow instruction in manual completely
	Machine not being run at correct RPM during loading	Reinstruct your operator. (see operator's manual)
	Belts loose	Readjust V belts as per instructions in manual
Extension hose, plugs after use	Letting water run out leaving wood fiber mulch dry out	If hose has to be uncoupled, seal ends to keep water in hose and prevent wood fiber mulch from drying out
CLUTCH		
Does not pull load or overheats	Too loose adjustment	Readjust clutch (gas instruction in engine manual, diesel instruction in back of this manual)
Jumps out of engagement	Too loose or too tight	Readjust clutch
PUMP		
Excessive wear	Fertilizer with highly abrasive filler	Change fertilizer avoid abrasive fillers
	Overloading machine with dry material	Load machine to recommended capacities
	Too much time allowed between loading and discharging	After loading and mixing has been completed set agitator at 1/2 speed in reverse and disengage pump
Will not turn	Frozen	Warm housing to melt ice
	Jammed with fertilizer or lime	Remove cover and clean interior
	Impeller rusted to suction cover plate	Pull cover and remove rust



CAUTION: Do not turn the shaft backwards with a pipe wrench - this will unscrew the impeller from the shaft. Consequently when clutch is engaged the impeller will screw onto the shaft with such force, it will break the impeller.

CARE AND OPERATION OF ROCKFORD POWER TAKE-OFF

The following brief instructions are a simple outline of duties that the owner and operator must perform for long and satisfactory service from any Rockford Power Take-Off.

ADJUSTMENT

CLUTCH If the clutch does not pull, overheats, or the clutch operating lever jumps out, the clutch must be adjusted. To adjust the clutch remove the hand hole plate in the housing and rotate the clutch until the adjusting lock and lock screw can be reached. Remove or disengage the adjustment ring lock.

HE CLUTCH Turn the adjusting ring counter clockwise to obtain recommended operating lever pressure.

HANDLE PRESSURE

Variation in handle length directly affects the pressure required at the handle for proper clutch adjustment. See table below to determine correct handle pressure:

CLUTCH SIZE	REFERENCE HANDLE LENGTH	PRESSURE AT lever
7½"	7-5/8"	110-130#

A new clutch generally requires several adjustments until the friction surfaces are worn in. Do not let a clutch slip as this will glaze the friction plates and may ruin them.

BEARINGS Power Take-Offs with ball type shaft bearings do not require bearing adjustment.

INSTALLATION OF POWER TAKE-OFF

Avoid jamming, excessive wear or scrubbing of parts. Also misalignment between engine and power take-off.

LUBRICATION

LUBRICANT Any high grade, Lithium Base #2, short fiber grease having an operating temperature of 200° F recommended for roller bearings may be used.

CAUTION

Do not mix Sodium or Calcium base grease with Lithium grease.

ANTI-FRICTION BEARINGS Shaft bearings should be lubricated after each 50 hours of operation through fittings, page (C-3) with a short fiber, high grade, high temperature, Lithium Base #2 lubricant having an operating temperature of 200° F.

CLUTCH LEVERS AND LINKAGE Levers and linkage should be lubricated with engine oil after every 500 hours of operation.

**LUBRICATE SPARINGLY TO AVOID OIL
ON CLUTCH FACINGS.**

REMOVAL OF PTA FROM THE ENGINE

1. Remove all attached parts such as guards, belts, and drive components.
Engage clutch operating handle to hold clutch facings in place, when removing PTA from engine.
2. Attach a suitable lifting device to the power take-off. Remove the hex-head cap screws that secure the power take-off housing to the flywheel housing.

CAUTION should be exercised when removing the power take-off from the engine so that the facings and pilot bearing are not damaged.

3. Support the power take-off on blocks with output end of the shaft down.
4. Remove the (2) screws (T4) and name plate (T2) from the power take-off housing (T1).

DRIVE PLATE REPLACEMENT ONLY A common indication that friction surface is worn out is that the adjusting ring cannot be turned any tighter.

1. Remove all accessory components that would prevent Power Take-Off removal from engine.
2. Remove bell housing to fly wheel housing bolts.
3. With suitable lifting device remove Power Take-Off from engine.
4. In replacing segmented facings the clutch assembly need not be removed from the shaft.

DISASSEMBLY OF HE CLUTCH

REMOVAL OF CLUTCH FROM SHAFT

1. Bend lock tab on lock (T27) away from nut (T26).
2. Remove nut (T26) and lock (T27).
3. Remove clutch from shaft as follows:
Place prybars at opposite side of the clutch housing and behind pressure plate. Exert pressure outward (away from the roller bearings), rap pilot end of the shaft sharply with soft hammer to jar clutch assembly off the taper of the drive shaft.

DISASSEMBLY OF HE CLUTCH

1. Remove clutch release lever (holdback) spring (H12) from clutch release sleeve.
2. Match mark each half of release sleeve collar (H23) to assure that they will be assembled in their same relative position, if so equipped.
3. Remove the two nuts and bolts holding the collar (H23) together, then remove collar from release sleeve (H22), if so equipped.
4. Remove retaining rings (H34) from pins (H33). Remove pins (H33) from links (H30) and levers (H13).
5. Remove retaining rings (H15) from pins (H14) that connect release levers (H13) to the bosses on the clutch body (H1). Remove pins and levers from clutch body. Note the direction the heads of the link to release sleeve and release lever to pressure plate pins are facing before removing so they may be installed in the same direction as they were removed.
6. Remove the adjusting ring lock retaining bolt (H17) lock washer (H18) and lock (H19) from pressure plate (H3).
7. Remove clutch adjusting ring (H9) by turning COUNTER-CLOCKWISE out of the clutch pressure plate.
8. Lift clutch pressure plate (H3) straight up, off bosses of clutch body (H1).
9. Remove the three clutch pressure plate separator springs (H36) from holes in clutch body.

INSPECTION

Wash all parts of the Power Take-Off EXCEPT the CLUTCH FACINGS in clean fuel oil or a good solvent, then, blow dry before inspection.

1. **BALL AND ROLLER BEARINGS** Examine CUPS, RACES, BALLS, and ROLLERS for indications of corrosion or pitting. Apply light engine oil to the bearings, then, while holding the inner race, revolve the bearing and outer race slowly to check for free rolling of the balls or rollers on the races and cup.

Rough or sticking spots of the bearings are cause to reject the bearings from further use.

2. **CLUTCH FACINGS** Examine the clutch FACINGS for being scored, burned or cracked; inspect driving TEETH for wear or damage and measure thickness of the facings. Replace any clutch facing that is badly scarred, burned, or has driving teeth which are worn and/or damaged, or if the facing thickness is worn to under 5/16 of an inch.
3. **PRESSURE PLATES** Inspect the FRICTION SURFACES on the clutch body and pressure plate for being flat, smooth, and free from cracks and heat checks. The drive BOSSES and KEYWAY of the clutch body, and the adjusting ring THREADS and boss NOTCHES of the pressure plate should be examined for wear, and if worn excessively, should be replaced.
4. Inspect the INNER FACE and THREADS of the adjusting ring for wear or damage. If worn excessively, replace adjusting ring.
5. **PINS AND PIN HOLES** Examine all lever and link pins and pin holes in links, release levers, release sleeve and pressure plate for wear. If pins and pin holes in parts are worn excessively, parts must be replaced.
6. **LOCK** Inspect the FINGERS of the adjusting ring lock for wear. Replace lock if fingers are worn excessively or have been damaged. Lock must have sufficient tension to hold adjusting ring from turning when clutch is operating.
7. **CLUTCH RELEASE SLEEVE & COLLAR** Examine the WEARING SURFACE of release sleeve collar and mating surface on release sleeve. If parts show excessive wear, they must be replaced.
8. **CLUTCH RELEASE YOKE** Inspect the surface of the clutch release yoke fingers and mating TRUNNIONS on the release sleeve collar for wear. If parts are worn excessively, they must be replaced.
9. **CLUTCH DRIVE SHAFT** Examine threads, keyways, and pilot bearing surface of drive shaft.
10. **SEPARATOR SPRINGS** Check the pressure plate separator springs for being broken or weak. Approximate spring pressure is 15 to 20 lbs. with spring compressed to 13/16 of an inch.

ASSEMBLY OF CLUTCH

With all the clutch parts cleaned and inspected and necessary parts on hand, the Power Take-Off may be reassembled as outlined in the following

CLUTCH ASSEMBLY Having cleaned, inspected, and replaced all worn parts, assemble clutch as follows:

- 1 Place the clutch body (H1) on workbench with hub end (release lever bosses) of pressure plate up.

2. Place clutch pressure plate separator springs (H36) in holes provided in plate next to release lever bosses. Note: If whole ring facing is to be used it must be installed at this time.
3. Place the pressure plate (H3) on top of the clutch body (smooth face down) with notches in pressure plate in line with the release lever bosses of the clutch body, then lower pressure plate down on the three pressure plate separator springs (H36).
4. Lubricate threads on clutch adjusting ring (H9) and turn it **CLOCKWISE** into pressure plate (H3) until it bottoms.
5. Install clutch release levers (H13) in opening of bosses or clutch body (H1) with notch end of lever up and out.

NOTE

Determine the direction the clutch will rotate when attached to the engine, then install lever pins (H14) with the heads of the pins leading the rotation of the clutch.

CAUTION

Be sure retaining rings (H15) are securely locked on pins (H14).

6. Align holes in levers (H13) with holes in bosses of outer plate then insert pins (H14) through pin holes and secure with retaining rings (H15).
7. Heeding the match marks previously placed on the two halves, lubricate inside diameter of clutch release sleeve collar (H23). Place the two halves together over the shoulder on release sleeve (H22) with machined side of collar down and secure them together with two bolts and nuts. Rotate collar on sleeve to check for free turning. If collar binds on sleeve, it may be necessary to shim between the collar halves to allow running clearance.

CAUTION

Be sure that the tapped hole in release sleeve is facing grease tube when assembled in Power Take-Off.

8. Place clutch release lever (holdback) spring (H12) over end of release sleeve (H25) and up against release collar before installing links (H30) to release sleeve (H25).
9. Place one release lever link (H30) on each side of each hole on clutch release sleeve (H25) with triangular end of release lever link at release sleeve and point of triangle facing toward center of release sleeve.
10. Attach links to release sleeve with link pins (H31) and retaining rings (H32).
11. Place the clutch release sleeve (H25), with other parts assembled, down on clutch with each pair of release links (H30) astride release lever (H13).

CAUTION

When installing pins, all pins must be installed with head leading rotation.

Connect links to levers with pins (H33) and retaining rings (H32).

NOTE

Be sure retaining rings (H32) are securely locked on pins (H33).

12. With the clutch release links (H30) and release levers (H13) connected, slide clutch release lever (holdback) spring (H12) over ends of release lever links and into place on release levers (H13).
13. Insert the clutch facings (H4) (three segments) in between the clutch body (H1) and pressure plate (H3), and center.
14. Lock clutch facings between the pressure plates as follows:
 - A. With the clutch assembly resting on workbench, turn the clutch adjusting ring (H9) **COUNTER-CLOCKWISE** until pressure plate (H3) almost contacts clutch facing (H4).
 - B. Place clutch driving ring over clutch facings with teeth in driving ring in mesh with teeth of clutch facings, and locate the driving ring centrally relative to the pressure plate and clutch body.

NOTE

If driving ring is not properly located relative to pressure plate and clutch body, the clutch cannot be assembled to the flywheel as the teeth of clutch facings will not enter the teeth of driving ring even though the clutch drive shaft enters the pilot bearing.

- C. Engage the clutch by applying pressure on top of release sleeve and collar assembly and lock clutch facings between the pressure plate and clutch body. If clutch facings are still free to move, disengage the clutch and turn adjusting ring **COUNTER-CLOCKWISE** just enough to lock the clutch facings in place when clutch is engaged.

NOTE

The clutch must now be kept engaged until the Power Take-Off assembly is attached to engine.

15. Remove clutch driving ring (H35) from the clutch facings and attach it to the flywheel with the specified bolts and lock washers.

SECTION F

DISASSEMBLY AND ASSEMBLY

OF

BALL BEARING TYPE

POWER-TAKE OFF

DISASSEMBLY OF BALL BEARING

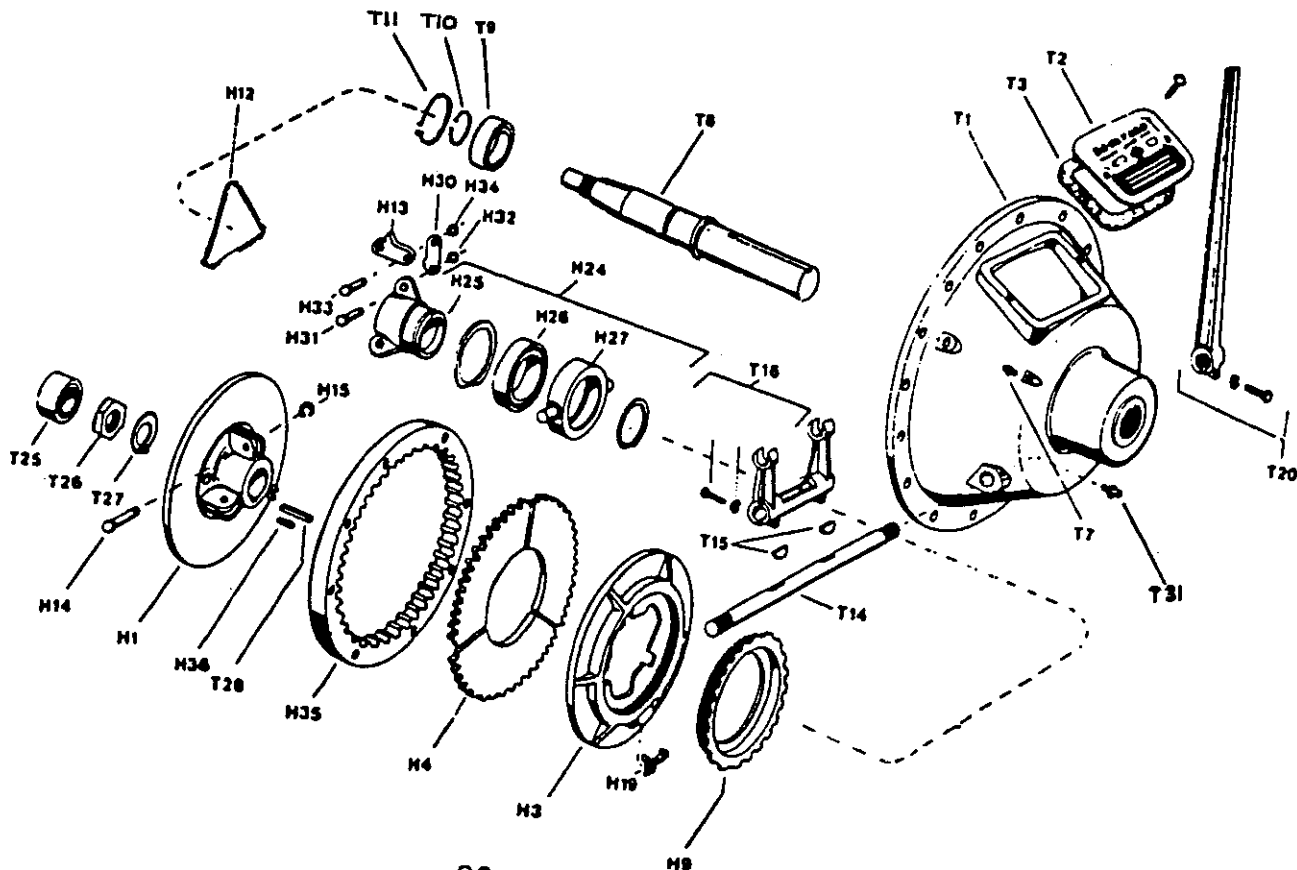
1. With the Power Take-Off housing supported on blocks, use a standard bearing puller and remove the pilot bearing from the clutch shaft.
2. Straighten the tang on lock washer (T27). Hold clutch and shaft, remove clutch shaft nut (T26).
3. Remove the clutch from the clutch shaft (T8) as follows:
Place prybars at opposite sides over the housing and back of the clutch pressure plate. Hold pressure on both bars and rap the pilot bearing end of the shaft sharply with a babbit hammer to free clutch from shaft.
4. Remove clutch and drive key (T28) from drive shaft (T8).
5. Loosen clamp bolt (T22) and remove operating handle (T20) from cross shaft (T14).
6. Loosen the (2) bolts (T18) in yoke (T17).
7. Slide yoke left or right on the cross shaft to expose woodruff keys (T15).
8. Remove woodruff keys (T15) from cross shaft (T14).
9. Withdraw shaft (T14) from yoke (T17) and housing (T1).
10. Remove bearing retainer lock bolt (T12) and lock (T11).

11. Remove bearing retainer (T10) and bearing spacer (T48).
12. Remove the clutch shaft from the front of the Power Take-Off housing by tapping lightly on the output end of the shaft with a soft hammer.
13. Wash the bearing thoroughly with clean fuel oil or solvent. Blow dry with compressed air and examine for wear, corrosion or rough spots. If it is determined that the bearing is unsatisfactory for use it must be removed from the shaft as follows:
A. Remove snap ring (T29).
B. Place the clutch shaft on a press and press the bearing off the shaft.

ASSEMBLY PROCEDURE

Follow disassembly procedure in reverse order to assemble the Power Take-Off, except for bearing installation.

1. Place one snap spring on the shaft, then stand shaft on end.
2. Heat bearing in oil until bearing expands enough to slide on shaft.
3. Tap bearing lightly to seat bearing against snap ring.
4. Install other snap ring against bearing.

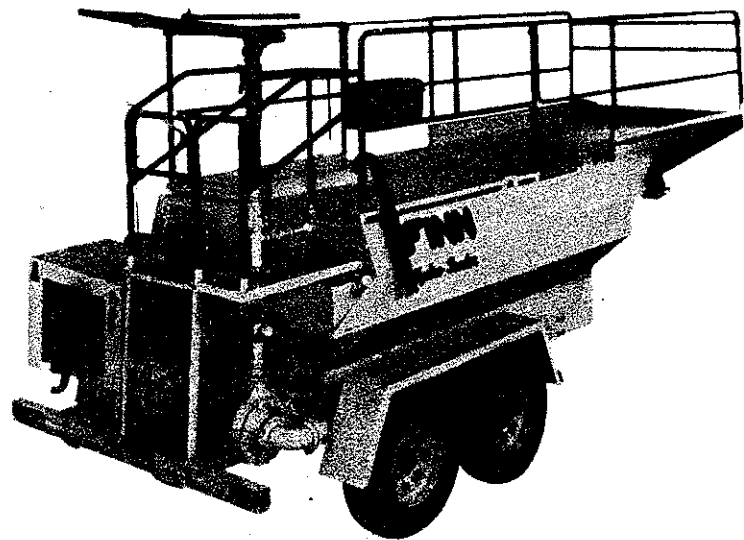


POWER TAKE OFF ASSEMBLY

REF NO.	PART NO.	DESCRIPTION	NO. REQ'D
H1	100207	Body, Clutch	1
H3	100208	Plate, Pressure	1
H4	100209	Facing, Clutch (3 segments)	1
H9	100210	Ring, Adjusting	1
H12	100211	Spring Lever	1
H13	100212	Lever	3
H14	100213	Pin, Pivot Lever	3
H15	100008	Ring, Retaining	3
H19	100214	Lock, Adjusting	1
H24	100327	Release, Sleeve & Bearing Assy.	1
H25	100328	Sleeve, Release	1
H26	100330	Bearing, Release	1
H27	100329	Carrier, Bearing	1
H30	100215	Link, Connecting	6
H31 & 3	100216	Pins, Link	6
H32 & 4	100217	Ring, Retaining	6
H35	100218	Ring, Driving	1
H36	100219	Spring, Seperator	3
H's	100333	Clutch Assembly	1
T1	100221	Housing Clutch	1
T2	100222	Plate, Instruction	1
T3	100054	Gasket, Cover	1
T7	100043	Fitting, Lubrication	1
T8	100223	Shaft, Drive	1
T9	100060	Bearing	1
T10	100055	Snap Ring, External	1
T11	100059	Snap Ring, Internal	1
T14	100041	Shaft Yoke	1
T15	100042	Key, Woodruff	2
T16	100073	Yoke, Clutch	1
T20	031219	Lever, Shifting	1
T25	005151	Bearing, Pilot	1
T26	100045	Nut, Drive, Shaft	1
T27	100047	Washer, Lock	1
T28	100056	Key, Clutch	1
T31	100224	Lube Fitting, Yoke Shaft	2
	031304	Power Take Off Assembly (4-34193)	

FINN

CORPORATION



Hydroseeder

PARTS MANUAL

T90

MODEL NO T120 SERIAL NO. RS

W A R R A N T Y

Finn warrants to the original Purchaser for use (or rental to others for use) all new construction machinery and attachments therefore manufactured by Finn to be free from defects in material and workmanship for a period of 12 months from date of purchase or 1200 hours of use, whichever comes first. Replacement parts provided under the terms of this warranty are warranted for the remainder of the warranty period applicable to the product in which installed, as if such parts were original components of that product. Finn makes no warranty with respect to (a) allied equipment or trade accessories not manufactured by it (such as, but not limited to tires, ignitions, starters, batteries, magnetos, carburetors, engines or like or unlike equipment or accessories), such being subject to the warranty, if any, provided by their respective manufacturers; or (b) second-hand, used, altered, or rebuilt machines. THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Upon notification of Finn within the above-stated warranty period of any failure to conform to this warranty, and upon inspection by Finn to verify said nonconformity and to verify the continuing existence of the warranty period, Finn will provide a new part or a repaired part, whichever Finn elects, to replace the part found to be defective. Such parts will be provided without charge to the Purchaser during normal working hours at a place of business of a Finn dealer or other establishment authorized by Finn to effect said repairs or replacements, but Purchaser shall bear all costs of transporting the product to and from such place of business or establishment. Correction of nonconformities, in the manner and for the period time provided above, shall constitute fulfillment of all liabilities of Finn under this contract.

THE REMEDIES OF THE USER SET FORTH HEREIN ARE EXCLUSIVE, WITHOUT REGARD TO WHETHER ANY DEFECT WAS DISCOVERABLE OR LATENT AT THE TIME OF DELIVERY OF THE PRODUCT TO THE PURCHASER. The essential purpose of this exclusive remedy shall be to provide the Purchaser with repair or replacement of parts that prove to be defective within the period and under the conditions previously set forth. This exclusive remedy shall not have failed of its essential purpose (as that term is used in the Uniform Commercial Code) provided Finn remains willing to repair or replace defective parts within a commercially reasonable time after it obtains actual knowledge of the existence of a particular defect.

IN NO EVENT SHALL FINN BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL OR INDIRECT DAMAGES, INCLUDING LOST PROFITS OR LOST COMMERCIAL OPPORTUNITIES, WITH RESPECT TO THE SALE OF THE ABOVE-WARRANTED PRODUCT OR ANYTHING DONE IN CONNECTION THEREWITH, OR FOR PROPERTY DAMAGE SUSTAINED BY A PERSON CLAIMING TO BE A THIRD-PARTY BENEFICIARY OF A SURVIVING WARRANTY UNDER THE LAW OF ANY JURISDICTION.

Effective October 1, 1989

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LUBRICATION INSTRUCTIONS

PRESSURE LUBRICATOR - SLURRY PUMP

Must be kept filled during operation. Check each time machine is started. Lack of attention will result in premature seal failure. Keep clean at all times. Use soda base grease.

END BEARINGS - AGITATOR

Grease at end of each day's operation using chassis lubricant.

VALVE LUBRICATION - DISCHARGE AND RECIRCULATION

Must be lubricated at end of each day's operation. Turn in valve stem plug two (2) full turns each night. When plug bottoms, remove and install a new stick of lubricant, a box of which is supplied with the machine.

CLUTCH

Check the oil level weekly (follow instructions in engine manual). Fill with engine oil. (Gas engine only)

ENGINE CRANK CASE

Change oil every 50 hours (follow instructions in engine manual).

AIR CLEANER

Check and clean weekly. More often if necessary. Check and clean center tube. Be sure air cleaner tube is connected to engine at all times. Clean pre-cleaner whenever dirty.

SLURRY PUMP

Grease pump bearings every 50 hours using chassis lubricant.
DO NOT OVERFILL.

OIL FILTER

Replace oil filter every 50 hours of operation (follow instructions in engine manual).

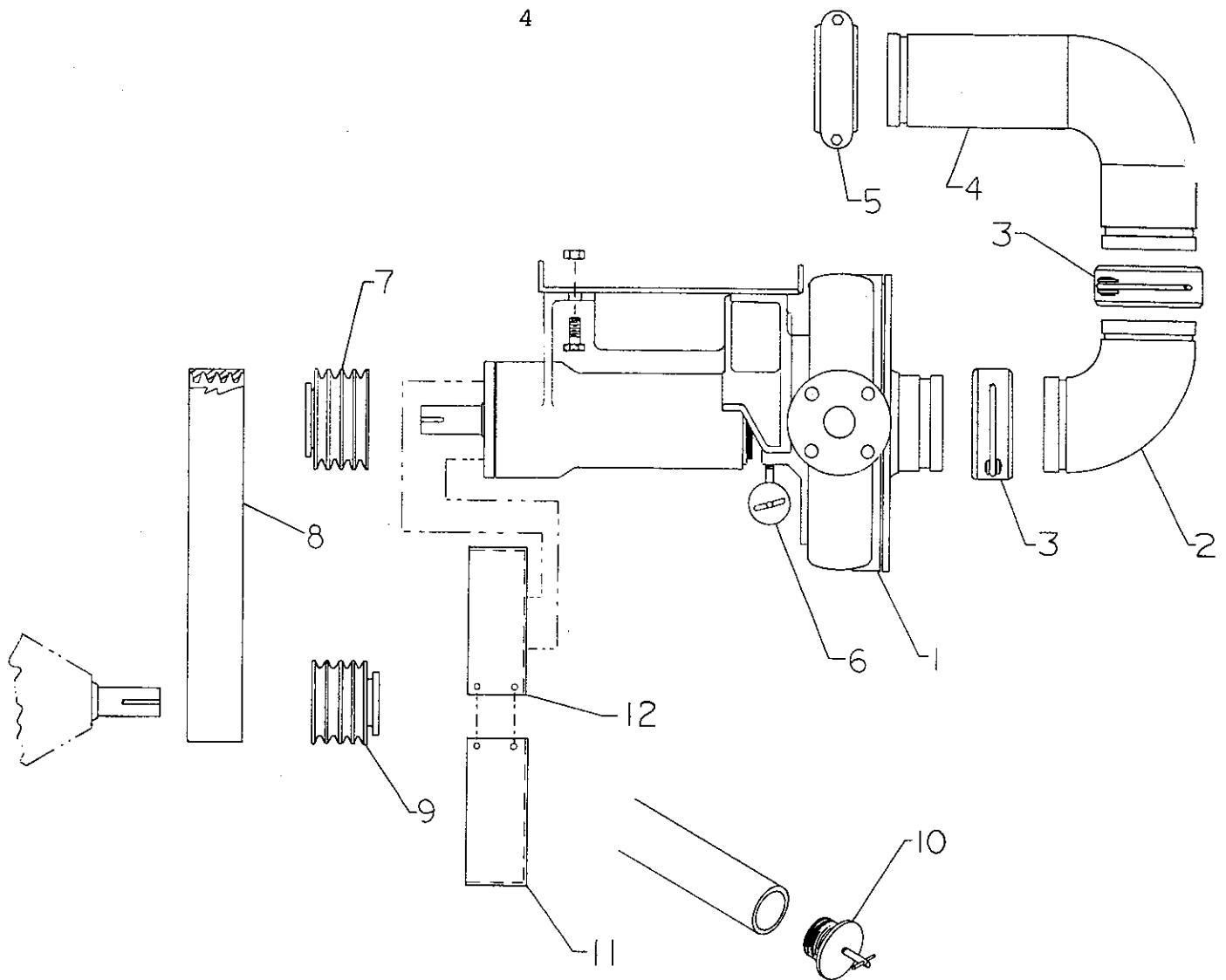
HYDRAULIC SYSTEM

Check fluid level - change oil and filter if milky or after 500 hours. Use Gulf 46AW, Mobile DTE25 or Shell Tellus 46.

TOOL KIT

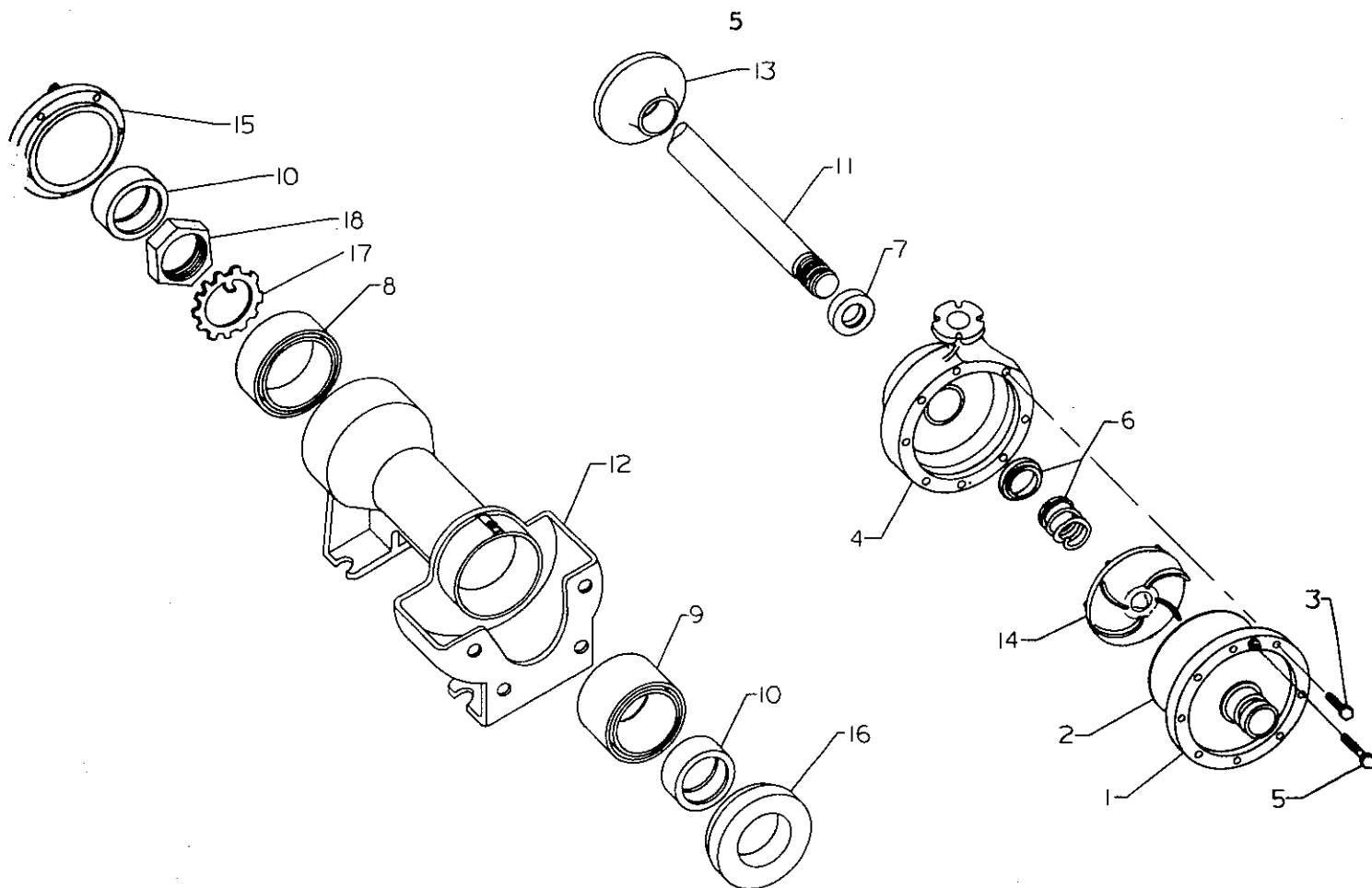
Part No.	Description	No. Req'd
008187	Nozzle, Long Distance	1
006632	Nozzle Assembly, Long Distance	1
	001042 Nozzle, Long Distance	1
	006512 Gasket	1
	006096 Coupling, Male	1
	160540 Nipple	1
	160763 Bushing	1
005224	Nozzle Assembly, Wide Ribbon	1
	004805 Nozzle, Wide Ribbon	1
	006096 Coupling, Male	1
	160761 Bushing	1
006622	Nozzle Assembly, Narrow Ribbon	1
	006605 Nozzle, Narrow Ribbon	1
	006096 Coupling, Male	1
	160761 Bushing	1
005220	Impeller Wrench	1
000698	Automatic Lubricator Grease	1
007469	Sticks, Discharge & Recir Vlv Lub	1
006514	Gasket, Coupler	
007596	Gauge (packed) (optional)	
005020	Gasoline Engine Manual	
005209	Diesel Engine Parts Manual	
	Parts & Instruction Manual	
	Operator's manual	

**WHEN ORDERING PARTS, BE SURE TO STATE
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PUMP, DRIVE, AND SUCTION PIPING

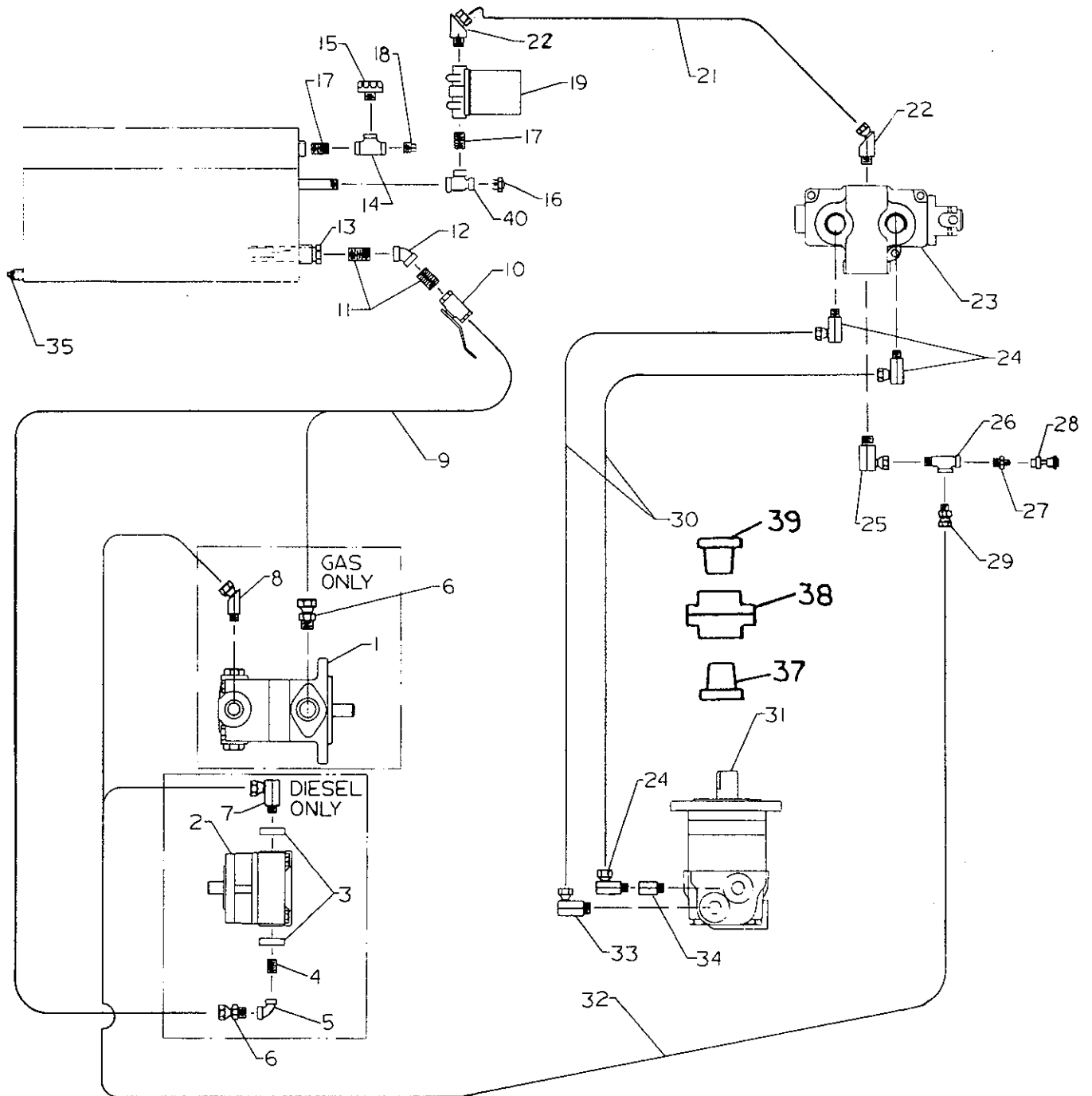
Ref No.	Part No.	Description	No. Req'd
4-1	005143	Slurry Pump	1
		X0828 Bolts,Nuts,Washers	4
4-2	006359	Suction Elbow	1
4-3	006144	Clamp, Snap Style	2
		006145 Rubber Gasket	2
4-4	005063-02	Suction Pipe	1
4-5	006710	Clamp, Bolt Style	1
		006145 Rubber Gasket	1
4-6	002383	Pump Lubricator	1
	160004	Pipe El	1
	160389	Nipple	1
4-7	008236	Driven Sheave	1
		010061 Bushing	1
		007717 Key	1
4-8	004591	Power Band	1
4-9	004592	Drive Sheave	1
		00437B Bushing	1
		000536 Key	1
4-10	004593	Drain Plug	1
4-11	005281-01	Belt Guard-Engine Half	1
4-12	005281-02	Belt Guard-Pump Half	1



Ref No.	Part No.	Description	No. Req'd
	005143	Pump Assembly Consisting Of:	
5-1	005146	Cover, Pump Suction	1
5-2	005150	O-Ring, Suction Cover	1
5-3	X0824	Bolts, Suction Cover	8
5-4	005144	Casing	1
5-5	X0828	Bolts, Adjusting	4
5-6	006443	Seal Assembly (60BC18)	1
5-7	006444	Seal, Grease Retainer	1
5-8	006445	Bearing, Radial	1
5-9	006446	Bearing, Thrust	1
5-10	006447	Seal, Grease Retaining	2
5-11	002945	Shaft	1
5-12	002960	Frame	1
5-13	006450	Slinger, Radial Bearing	1
5-14	005145	Impeller	1
5-15	002961	Retainer, Thrust Bearing	1
5-16	006537	Retainer, Radial Bearing	1
5-17	007366	Lock, Shaft Nut	1
5-18	007367	Nut, Shaft	1

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HYDRAULIC SYSTEM

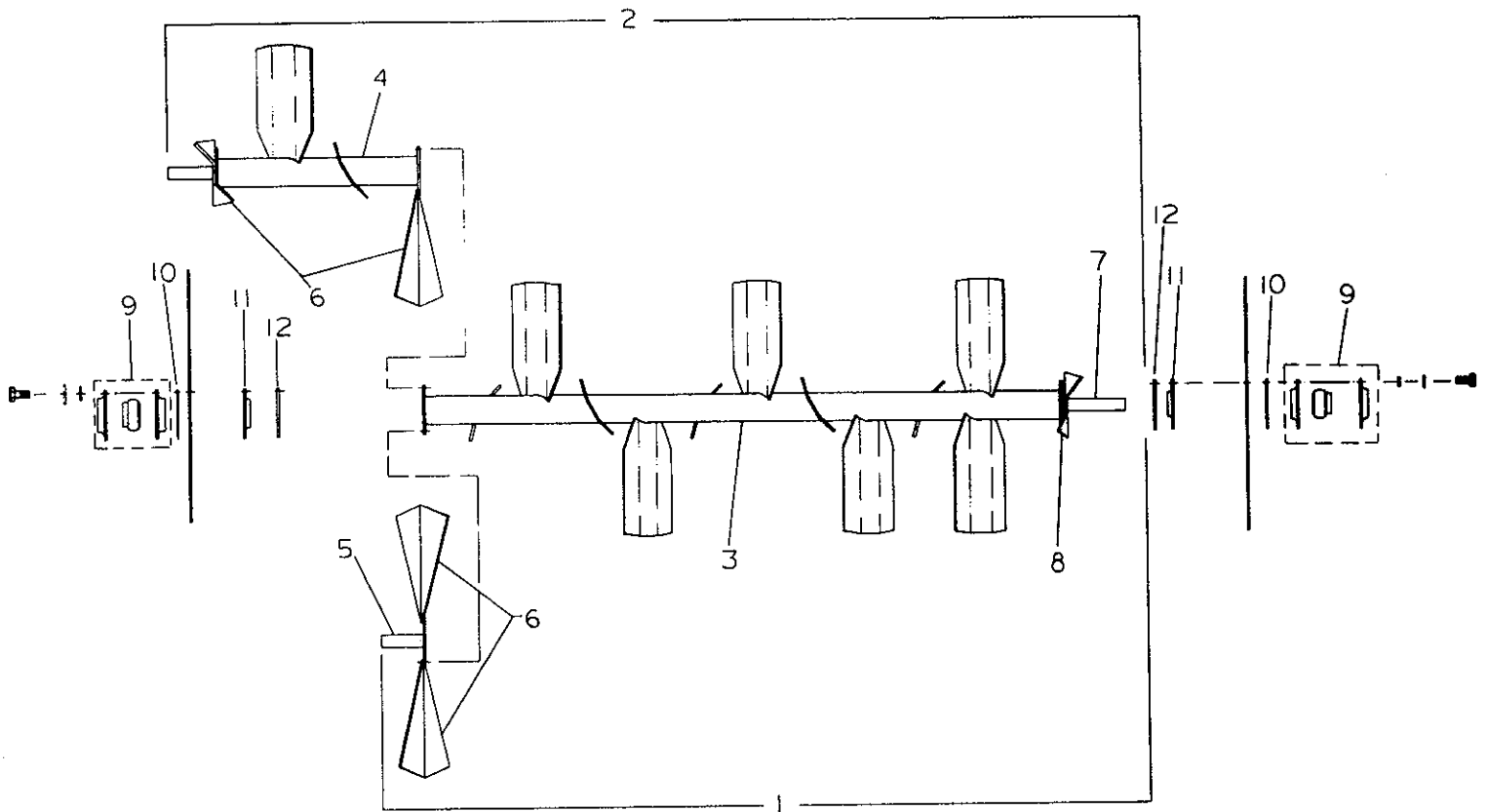


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SERIAL NUMBER OF MACHINE**

HYDRAULIC SYSTEM

REF NO.	Part No.		Description	No. Req'd
	Gas	Diesel		
6-1	022085L		Hydraulic Pump (see pg 28)	1
6-2		005167	Hydraulic Pump (see pg 31)	1
6-3		005204	Adapter Flange	2
			005227 O Ring	2
6-4		160422	Nipple	1
6-5		160111	Reducer Elbow	1
6-6	021802	021802	Straight Swivel Adapter	1
6-7		021669	90 deg Swivel Adapter	1
6-8	011503		45 deg Swivel Adapter	1
6-9	005159	005159	Suction Hose	1
6-10	021559	021559	Ball Valve	1
6-11	160305	160305	Close Nipple	2
6-12	160036	160036	45 deg Elbow	1
6-13	011466	011466	Suction Strainer	1
6-14	160212	160212	Tee	1
6-15	004900	004900	Filler Breather	1
6-16	080015	080015	Sight Glass	1
6-17	160303	160303	Close Nipple	2
6-18	160238	160238	Pipe Plug	1
6-19	021617	021617	Return Line Filter	1
6-21	005158	005158	Return Hose	1
6-22	080234	080234	45 deg Swivel Adapter	2
6-23	008293	008293	Hydraulic Valve (see pg 30)	1
	4683-01	4683-01	Valve Handle (T90 only)	1
	SF310B	SF310B	Valve Handle (T90S, T120GN, T120S)	1
6-24	021669	021669	90 deg Swivel Adapter	3
6-25	023121	023121	90 deg Swivel Adapter	1
6-26	022592	022592	Service Tee	1
6-27	004741	004741	Nipple	1
6-28	022302	022302	Quick Disconnect	1
6-29	022305	022305	Straight Swivel Adapter	1
6-30	070425	070425	Motor Hose	2
6-31	070660	070660	Hydraulic Motor (see pg 2)	1
6-32	005157	005157	Pump Discharge Hose	1
6-33	070407	070407	O Ring Boss Adapter	1
6-34	070408	070408	O Ring Adapter	1
6-35	160236	160236	Pipe Plug	1
6-36	022486	022486	Gauge (Optional)	1
6-37	021440	021440	Bushing - Motor	1
6-38	023156	023156	Coupling	1
6-39	004635	004625	Bushing-Agitator	1
	008278	008278	Hydraulic Motor Mtg. Plate	1
	004630	004630	Rubber Bushing	1
6-40	160213	160213	Reducing Tee	1

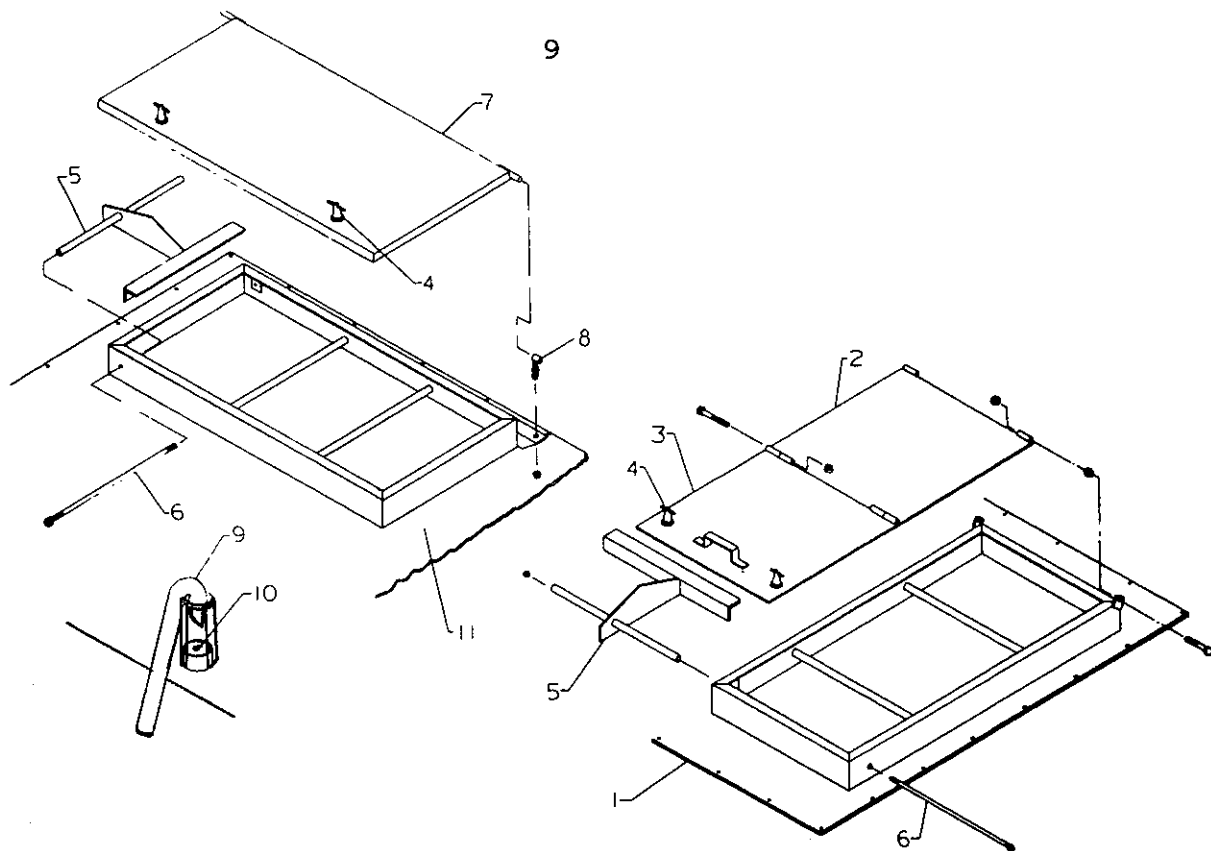
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AGITATOR ASSEMBLY

REF NO.	PART NO.		DESCRIPTION	No. Req'd	
	T90	T120		T90	T120
8-1	005214		T90 Agitator Shaft Assy.	1	
8-2		C05215	T120 Agitator Shaft Assy.		1
8-3	005080	005080	Main Agitator w/Paddles	1	1
8-4		005111	Agitator Extension-Front		1
8-5	005081-03		Agitator Stub Shaft	1	
8-6	005027-03	005027-03	Bolt on Paddle-Front	2	3
			X0820 Bolt and Nut	6	10
8-7	005081-02	005081-02	Agitator Extension-Drive	1	1
8-8	005027-02	005027-02	Bolt On Paddle-Rear	1	1
	005027-01	005027-01	Bolt on Paddle-Rear w/Hole	1	1
			X0820 Bolt and Nut	6	6
8-9	005088	005088	Bearing & Seal Assembly	2	2
			X0824 Bolt & Nut	8	8
8-10			006975 Gasket	2	2
8-11			005207 Seal	2	2
8-12			007417 Seal Plate	2	2
	005091-09	005091-09	Lube Pipe	2	2
	160052	160052	Lube Elbow	2	2
	007705	007705	Grease Fitting	2	2

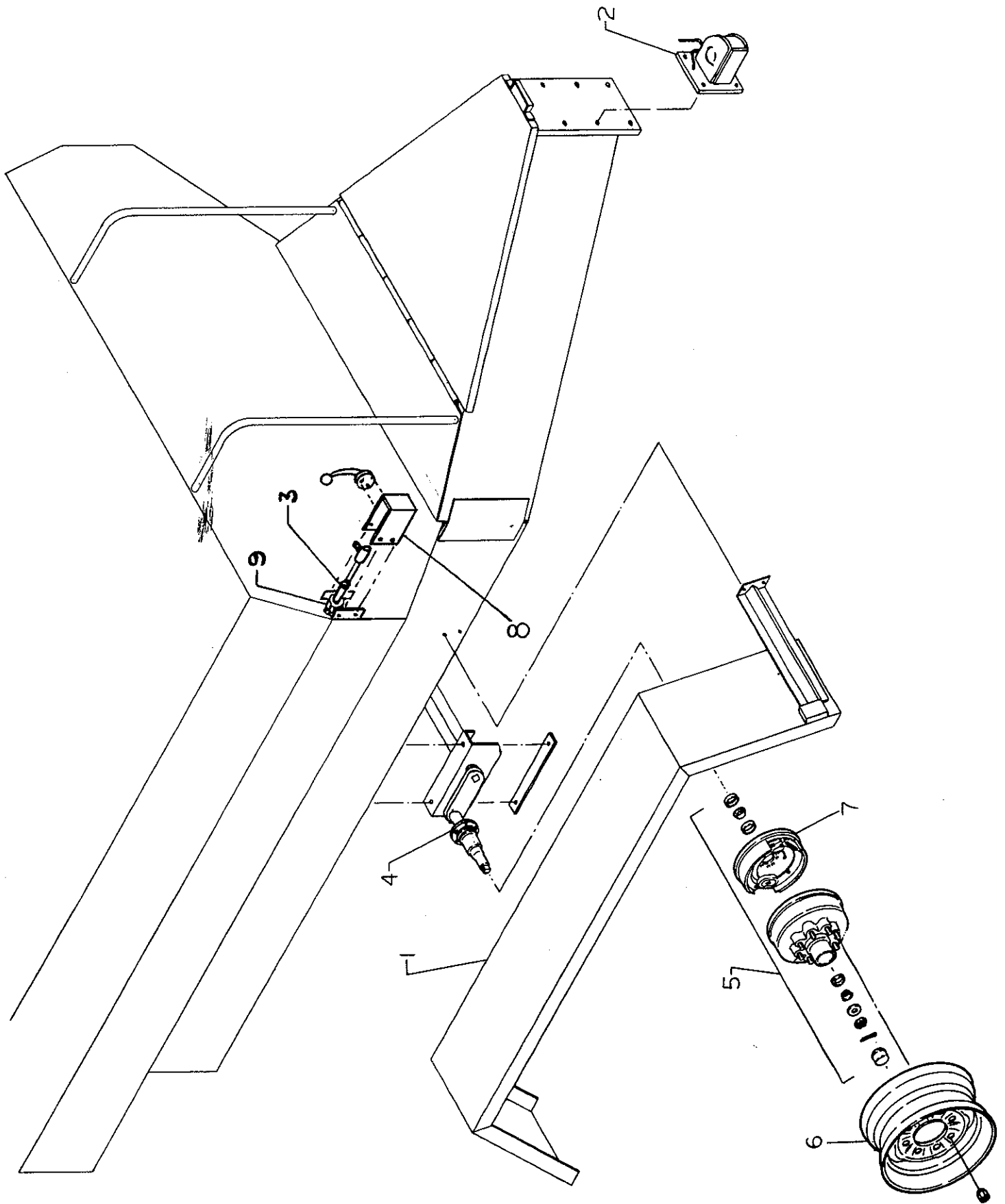
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COVER AND HATCH

Ref No.	T90T	T90S/T120	Description	No. Req'd
9-1	005072		Tank Cover	1
	X0616		Bolt & Nut	34
	190002		Tank Cover Seal	24'
9-2	005075-01		Hatch Lid	1
	X0872		Bolt	2
	Y08L		Locknut	2
	Y08		Nut	2
9-3	005075-02		Hatch Lid	1
	x0872		Bolt & Locknut	2
9-4	005136	005136	T Handle Latch	2
9-5	005092	005092	Bag Cutter	1
9-6	005203-02	005203-02	Bag Cutter Hinge	1
	Y08L	Y08L	Locknut	1
9-7		005102	Hatch Lid	1
9-8		070627	Hatch Lid Hingle	2
		Y10	Nut	4
9-9	005123	005123	Tank Fill Port	1
9-10	005160	005160	Filler Plug	1
9-11		005117	Tank Cover (T120 only)	1
		X0616	Bolt & Nut	38
		190002	Tank Cover Seal	28'
9-11		005202	Tank Cover (T90 skid)	1
		X0616	Bolt & Nut	34
		190002	Tank Cover Seal	24'
	190001	190001	Lanyard Chain	19"
	008097	008097	Decal "Before Entering Tank	1

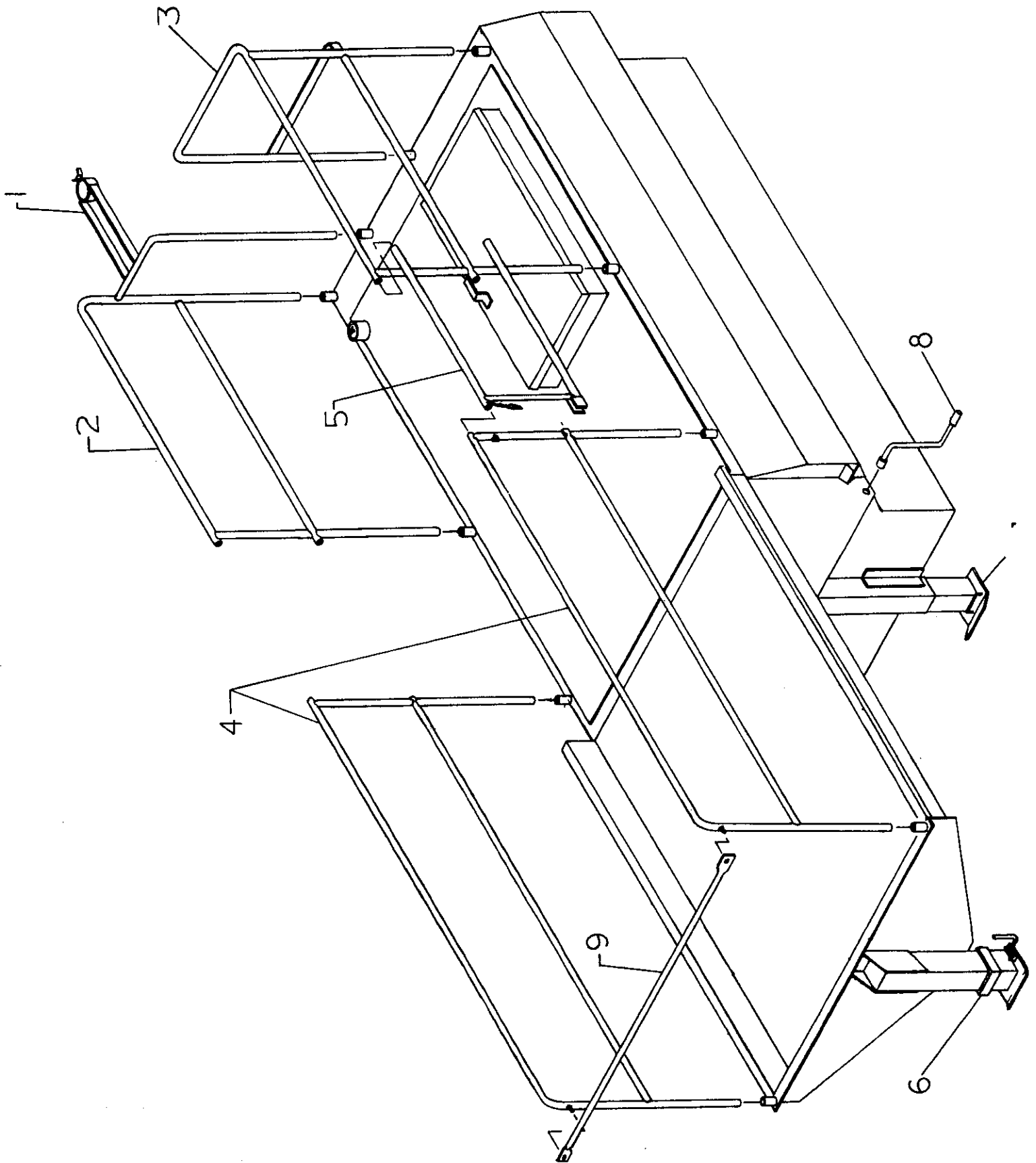
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TRAILER ASSEMBLY

Ref No.	Part No.	Description	No. Req'd
11-1	005274	Right Fender	1
		X0616 Bolt, Nut, Washer (2)	6
	005273	Left Fender	1
		X0616 Bolt and Nut	6
	005139	Side Marker Light	2
11-2	005211	2-5/16" ball Coupler & Ball Assmy	1
	005134	2-5/16" Ball Coupler	1
	005135	2-5/16" Ball	1
	080043	Tow Ring (Optional)	1
11-3	005232	Agitator Remote Control Cable (T90T only)!	1
		005233 Ball Joint	1
		007345 Control Lever	1
11-4	005294	Axle w/Spindle, Hub & Drum, Brake	2
		XF1036H Bolt & Nut-Grade 8	8
	031220-01	Axle Mounting Shim Plate	4
11-5	100232	Hub & Drum Assembly	4
		WL10-1 Grease Seal	1 per
		WL25580 Inner Bearing	1 per
		WL25520 Inner Cup	1 per
		WL14276 Outer Cup	1 per
		WL14125A Outer Bearing	1 per
		WL605 Grease Cap	1 per
		WL6-80 Wheel Nut	8 per
		WL7-122 Stud	8 per
		WL15-57 Washer	1 per
		WL6-1 Nut	1 per
11-6	005057	Wheel	4
11-7	WL23-180	Left Brake Assembly	2
	WL23-181	Right Brake Assembly	2
	€		1
	005060	Tire	4
	004644	Valve Stem	4
	004720	License Bracket	1
	005234	Jack	1
		020834 Pin w/Spring	1
		020835 Mounting Ring	1
	005168	Safety Chain	2
	005169	Clevis Grab Hook	2
	005170	Chain Connector	2
	023310	Decal "Caution Tighten Bolts"	1
11-8	005231	Valve Control Mount	1
11-9	005206-05	Connector Bushing	1
	005206-03	Cable Conduit (T90T only)	1
	005178	O Ring (T90T only)	1

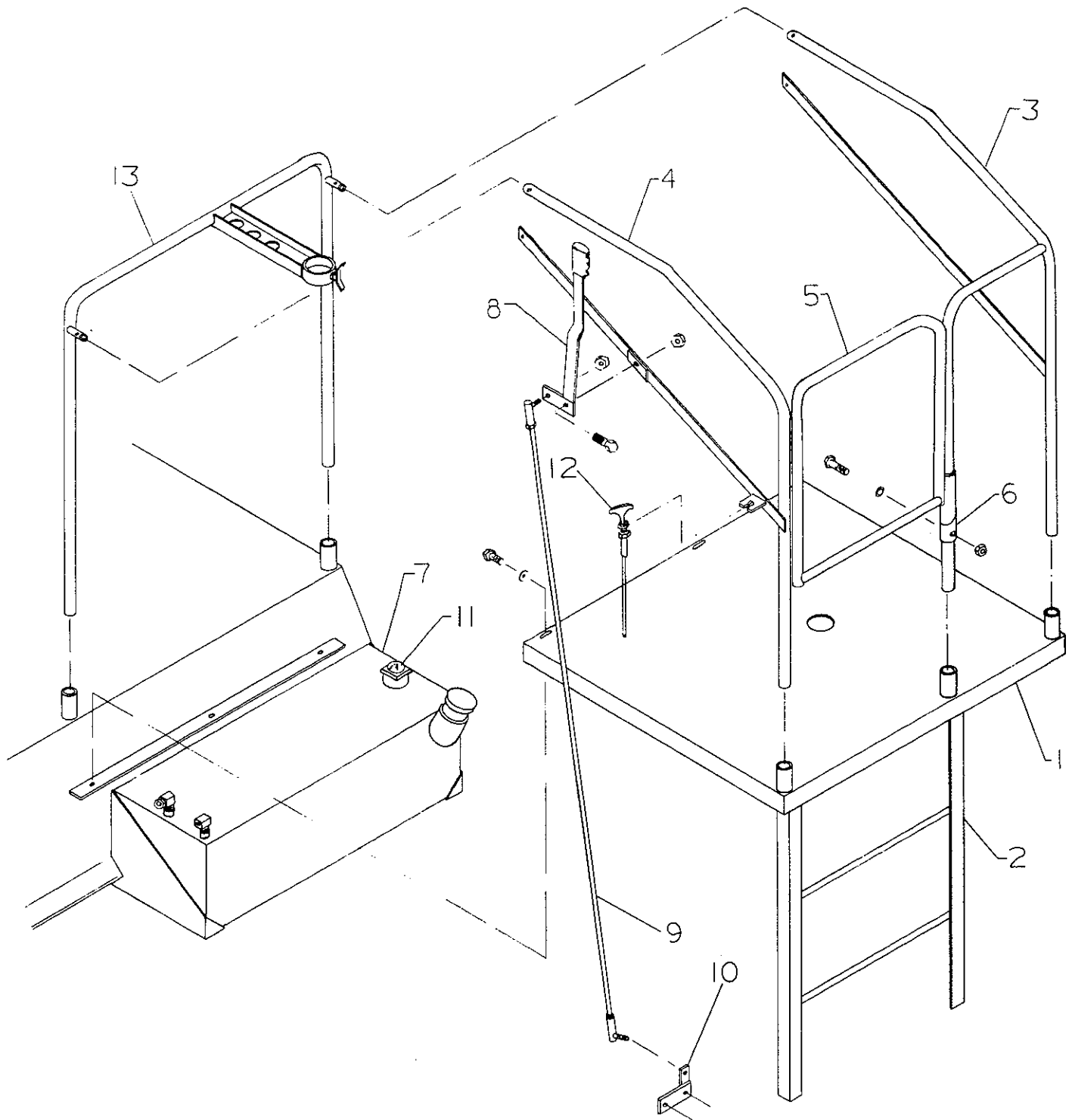
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T-120 GOOSENECK TRAILER

Ref No.	Part No.	Description	No. Req'd
12-1	005116	Right Rear Boom Rail	1
12-2	005192	Right Rear Guard Rail	1
12-3	005193	left Rear Guard Rail	1
12-4	005196	Front Guard Rail	2
12-5 *	005121	Guard Rail Slide Gate	2
12-6	004799	Bal Type Gooseneck Coupler	1
12-7	004798	Trailer Jack	1
12-8	004798A	Jack Handle	1
	005128-09	Jack Handle Extension	1
	005128-10	Jack Handle Shaft	1
12-9	005133	Front Cross Rail	2
		Y06 Nut	4
	011313	Tool Box	1
	005370	Loading Shield (Diesel Only)	/
Note: For axle, brake and fender assembly and parts see pages 10 and 11			

*Units with hose reels takes: Qty 1 005121 Slide Gate
Qty 1 007123 Slide Rail



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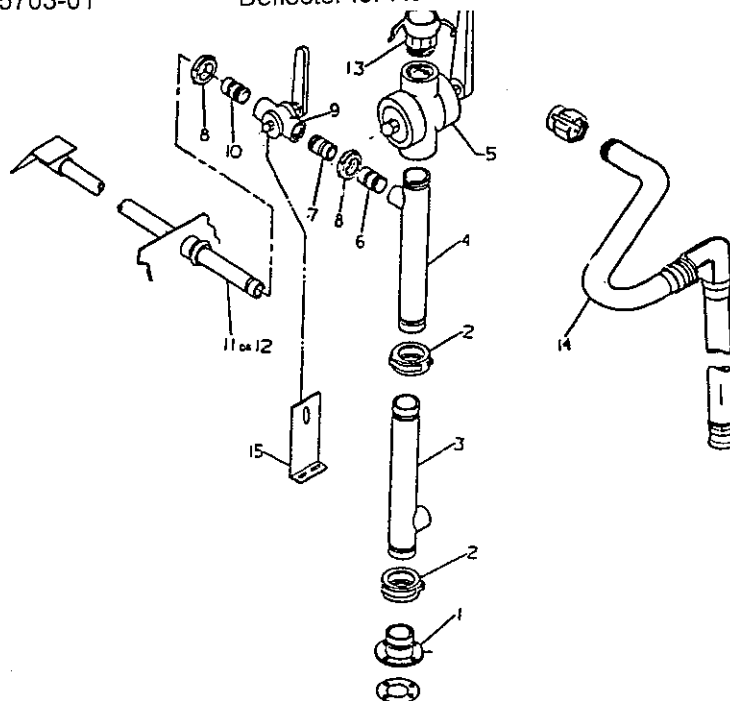
PLATFORM

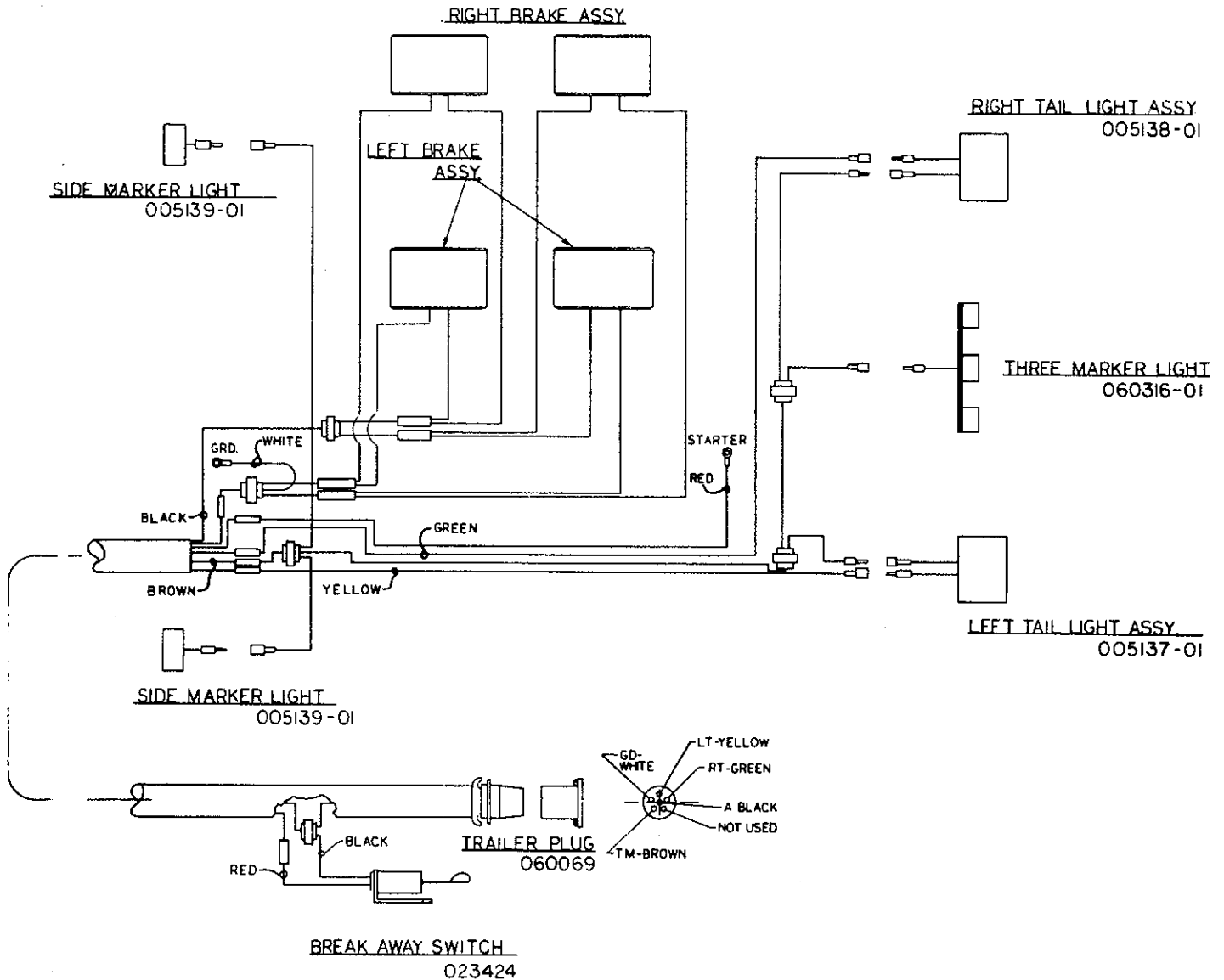
Ref No.	Part No.		Description	No. Req'd
	Gas	Diesel		
14-1	005230	005230	Platform	1
			X0516 Bolt and Washer	3
14-2	005115	005115	Ladder	1
			X0616 Bolt, Nut, Washer	4
14-3	005291	005291	Right Platform Rail	1
14-4	005292	005292	Left Platform Rail	1
14-5	008412	008412	Gate	1
14-6A	8411-04	8411-04	Hinge-Bottom	1
14-6B	8411-03	8411-03	Hinge-Top	1
14-7	005112	005112	Fuel Tank	1
	5205-01	5205-01	Dip Tube-Suction	1
	007907	007907	Fill neck	1
	007914	007914	Cap	1
14-8	5181-01	5181-01	Clutch Control Handle	1
	000427	000427	Handle Grip	1
			X0828 Bolt, Nut, Washer (3)	1
14-9	005182-01	005182-02	Clutch Rod Assembly	1
	006737	006737	Ball Joint	2
			XYF08 Nut, Washer	2
14-10	5181-06	5181-06	Clutch Arm	1
			X0624 Bolt and Nut	2
14-11	031275	031275	Fuel Level Gauge	1
14-12	005175	005176	Throttle Cable	1
	005177	005177	Boot	1
14-13	005120	005120	Cross Rail (T90T only)	1
	002258	002258	Boom Clamp Handle	1
	022357	022357	Decal "Turn Off Engine"	1
	005161	005161	Nozzle Tie Strap	1
	007913	007913	Boom Tie Strap	1

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DISCHARGE BOOM AND PIPING

Ref No.	Part No.	Description	No. Req'd
1	005082-01	Pump Discharge Flange	1
	008469	Gasket, Flange	1
2	006250	Pipe Clamp	2
	006251	Rubber Gasket	2
3	005082-02	Pump Discharge Pipe	1
4	005082-10	Lower Valve Pipe	1
5	005163	Discharge Valve	1
	004961	Lube Screw	1
	005223	Handle	1
	160311	Close Nipple	1
6	005083-07	Recirculation Nozzle	1
7	005083-08	Recirculation Nozzle-Valve	1
8	005156	Pipe Clamp	2
	005183	Rubber Gasket	2
9	005162	Recirculation Valve	1
	004962	Lube Screw	1
	005222	Handle	1
10	005083-09	Recirculation Connector	1
11	005091-01	Recirculation Pipe (T90T Only)	1
or			
12	005091-11	Recirculation Pipe (T90S, T120GN, T120)	1
13	006102	Coupler, Female	1
	006514	Gasket	1
14	005085	Discharge Boom	1
	006102	Coupler, Female	1
	006514	Gasket	1
	006096	Coupling, Male	1
	007288	Swivel Elbow	1
	007296	Spring Adjusting Collar	1
	005058	Spring	1
	005086-09	Boom Handle	1
	005086	Boom Pipe	1
15	005229	Valve Anti-Rotation Bracket	1
	006969	Swivel Repair Kit	2
	005703-01	Deflector for Recirculation Pipe	

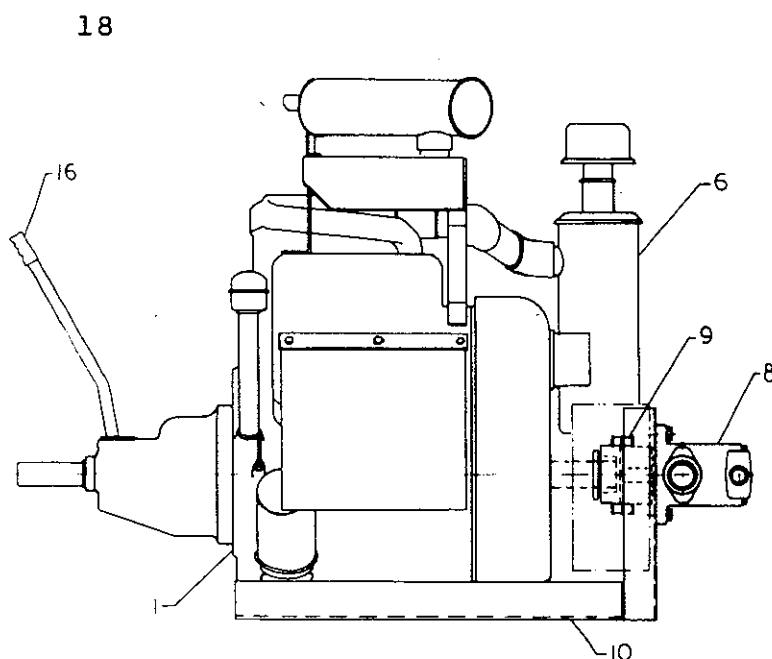
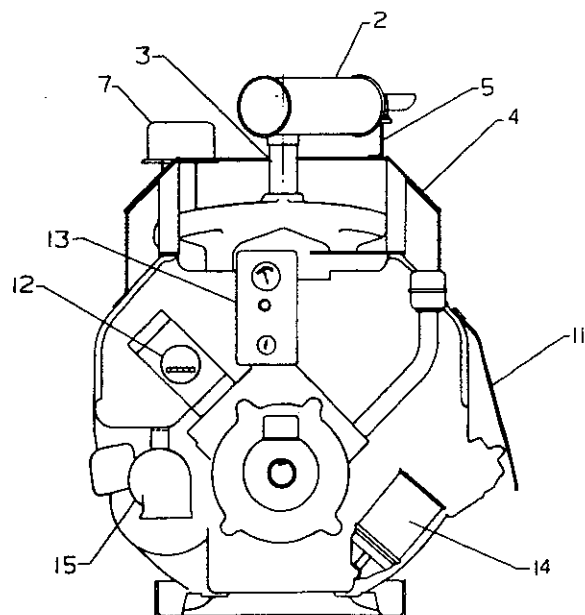




TRAILER WIRING

PART NO.		Description	No. Req'd
T90T	T120T		
005219	005219-10	Trailer Wiring Harness	1
060069	060069	Trailer Plug	1
023424	023424	Breakaway Switch	1
005139-01	005139-01	Side Marker Light	2
005137-01	005137-01	Left Tailight Assembly	1
005138-01	005138-01	Tailight Assembly	1
060316-01	060316-01	Three Marker Light	1
005236	005236	License Light	1

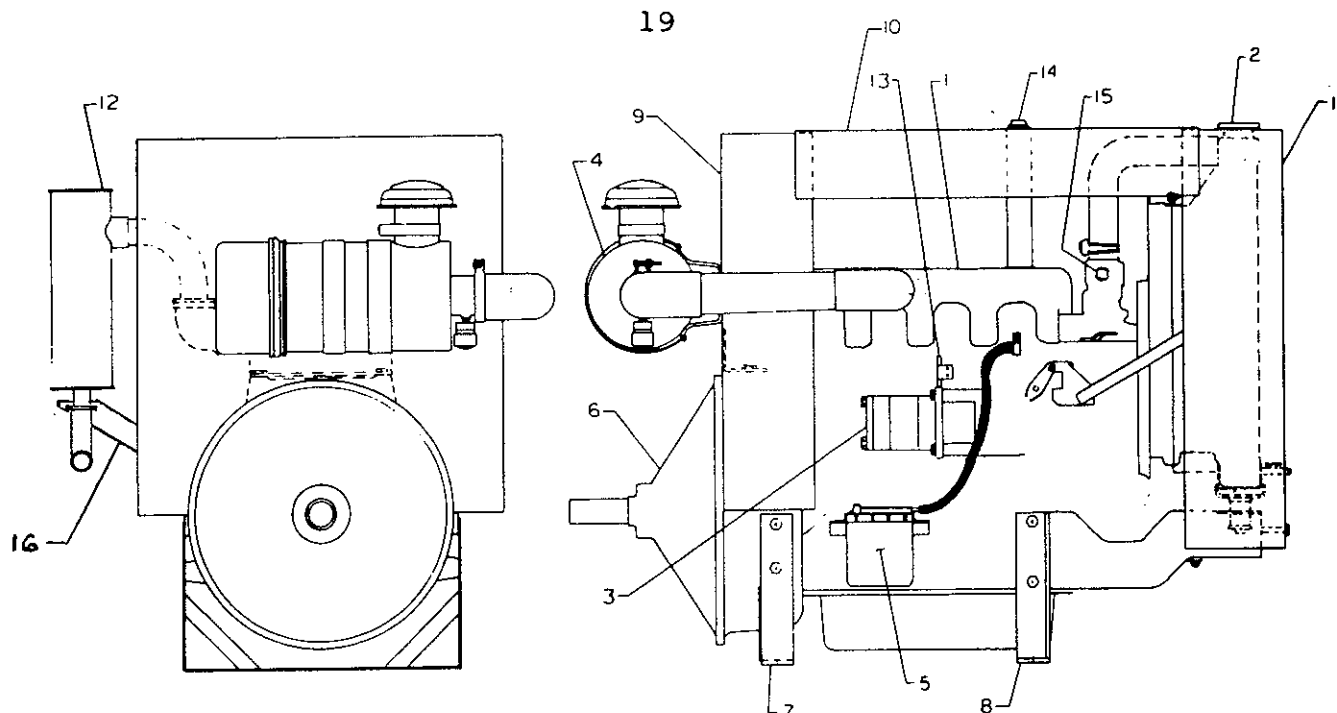
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ENGINE PARTS - GASOLINE

Ref No.	Part No.	Description	No. Req'd
1	005007	Engine Assembly	1
	005166-01	Belt Tensioner	1
	005166-04	Tension Rod	1
		X0840 Bolt & Nut	4
2	031185	Muffler w/Heat Screen	1
	004595-01	Tailspout	1
	004516	Clamp	1
3	004666-03	Exhaust Pipe	1
4	031142	Engine Manifold Cover	1
5	004666-02	Muffler Support	1
6	WEL0159-4S1	No Longer available- Contact Wisconsin	1
7	WEL0115A	No Longer available- Contact Wisconsin	1
8	022085L	Hydraulic Pump	1
9	006466	Chain, Coupling	1
	004807	Coupling Half, Pump	1
	004806	Coupling half, Engine	1
	023062B	Bushing, Engine	1
10	004977	Engine Mount	1
11	004560-02	Distributor Cover	1
	004560-01	Mounting Plate	1
12	007274	Hourmeter	1
	031146	Hourmeter Mount	1
13	WEYE2	No Longer available- Contact Wisconsin	1
	WEYC10C	No Longer available- Contact Wisconsin	1
14	WERV52	No Longer available- Contact Wisconsin	1
15	006499	Horn	1
	006499A	Bracket	1
	031031	Battery cable	1
	010516	Negative Battery cable	1
	002256-12	Battery	1
	080223	Battery Case	1
	080220	Battery Holddown	1
	005199	Heat Shield	1

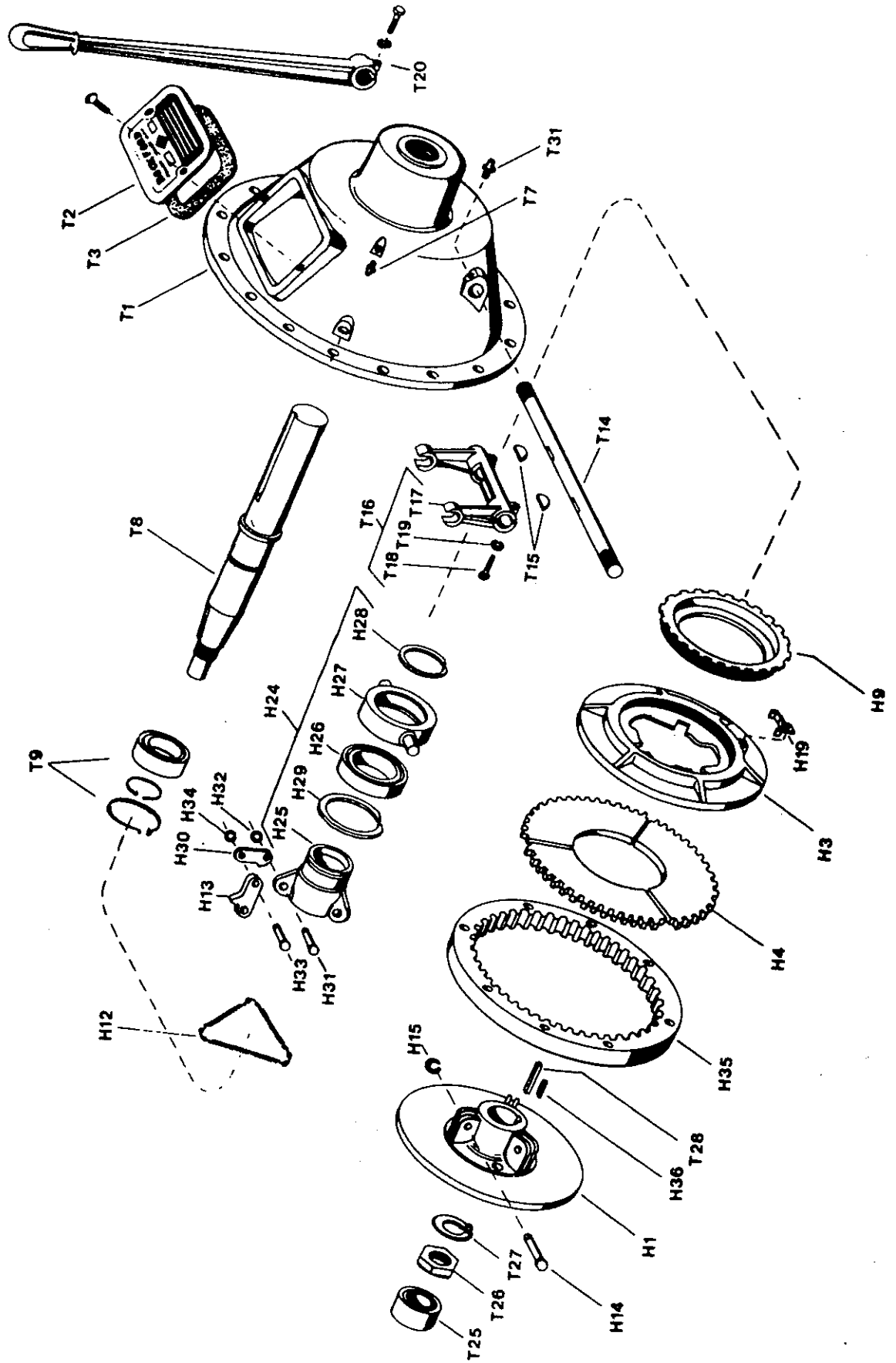
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ENGINE PARTS - DIESEL

Ref No.	Part No.	Description	No. Req'd
1	005003	Engine Assembly - Diesel Includes:	1
2	005093	Radiator Kit	1
3	005208	Hydraulic Pump Kit (see pg 31)	1
4	005096	Air Cleaner Kit	1
		007739 Filter Element	1
		007993 Adapter Elbow	1
5	005095	Fuel Filter Kit	1
		KU70000-43081 Filter Element (spin on)	1
	031312	Suction Fan	1
	KU66711-55131	Ignition Switch	1
	KU66711-55140	Key for ignition switch	
6	031304	Clutch Assembly (see pg 20-21)	1
7	005099	Rear Engine Mount	1
		X0832 Mtg. Hardware	2
8	004979	Front Engine Mount	1
		X0832 Mtg. Hardware	2
9	005098	Rear Engine Shroud	1
10	005097	Top Engine Shroud	1
11	004980	Radiator Shroud	1
12	031185	Muffler w/Heat Screen	1
	031215	Exhaust Elbow	1
	031194	Tailpipe	1
	004516	Clamp	1
13	004984-07	Engine Control Mount	1
14	004984-06	Oil Fill Extension	1
15	080077	Temperature Switch	1
16	031313	Support Bracket, Muffler	1
	021148	Engine Kill Cable	1
		004983 Clamp	1
		007675 Ball Joint	1
	005166-01	Belt Tensioner	2
	005166-04	Tension Rod	2

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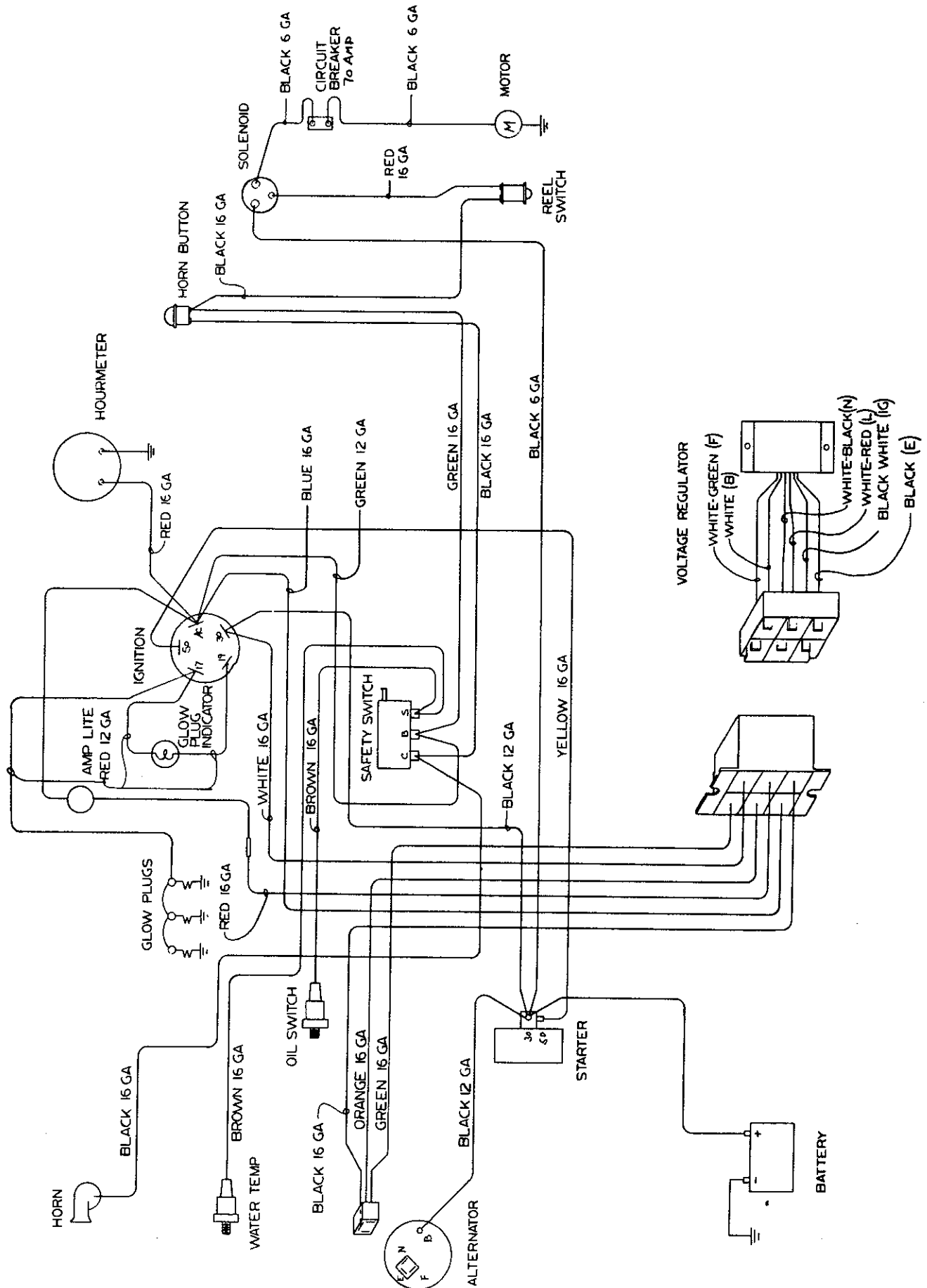
(DIESEL ONLY)

POWER TAKE OFF ASSEMBLY

REF NO.	PART NO.	DESCRIPTION	NO. REQ'D
H1	100207	Body, Clutch	1
H3	100208	Plate, Pressure	1
H4	100209	Facing, Clutch (3 segments)	1
H9	100210	Ring, Adjusting	1
H12	100211	Spring Lever	1
H13	100212	Lever	3
H14	100213	Pin, Pivot Lever	3
H15	100008	Ring, Retaining	3
H19	100214	Lock, Adjusting	1
H24	100327	Release, Sleeve & Bearing Assy.	1
H25	100328	Sleeve, Release	1
H26	100330	Bearing, Release	1
H27	100329	Carrier, Bearing	1
H30	100215	Link, Connecting	6
H31 & 3	100216	Pins, Link	6
H32 & 4	100217	Ring, Retaining	6
H35	100218	Ring, Drive	1
H36	100219	Spring, Retainer	3
H's	100333	Clutch Assembly	1
T1	100221	Horizontal Clutch	1
T2	100222	Pin, Instruction	1
T3	100054	Set, Cover	1
T7	100043	Adjusting, Lubrication	1
T8	100223	Shaft, Drive	1
T9	100060	Bearing	1
T10	100061	Snap Ring, External	1
T11	100062	Snap Ring, Internal	1
T14	100063	Shaft Yoke	1
T15	100042	Key, Woodruff	2
T16	100073	Yoke, Clutch	1
T20	031219	Lever, Shifting	1
T25	005151	Bearing, Pilot	1
T26	100045	Nut, Drive, Shaft	1
T27	100047	Washer, Lock	1
T28	100056	Key, Clutch	1
T31	100224	Lube Fitting, Yoke Shaft	2
	031304	Power Take Off Assembly (4-34193)	

Please do not use this page to obtain clutch part numbers.
See the Clutch Addendum Manual

**WHEN ORDERING PARTS, BE SURE TO STATE
SERIAL NUMBER OF MACHINE**

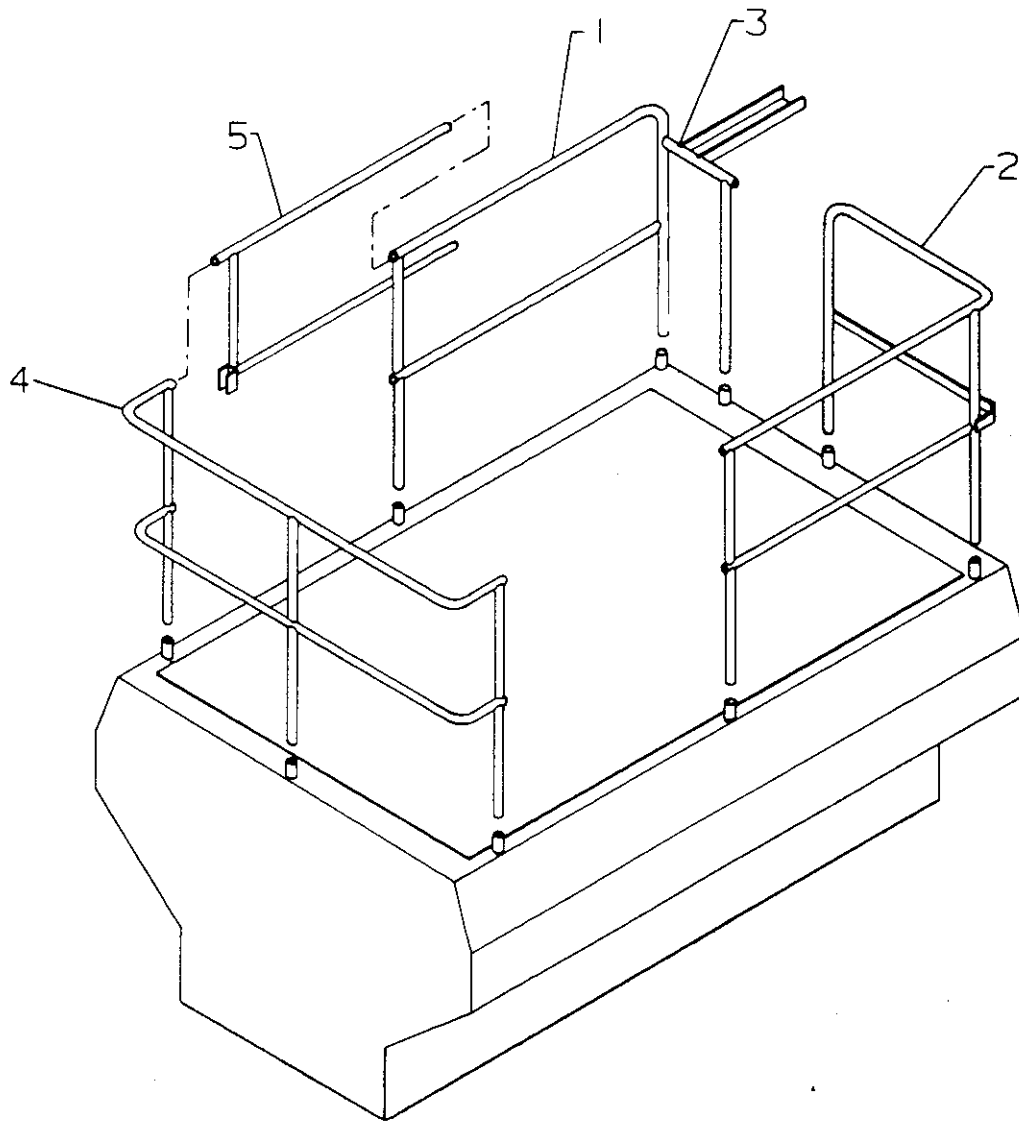


**WHEN ORDERING PARTS, BE SURE TO STATE
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DIESEL WIRING

Part No.	Description	No. Req'd
0020886	Horn Button	1
006499	Horn, Signal	1
002256-12	Battery	1
080220	Battery Holddown	1
031031	Cable, Positive Battery	1
010516	Cable, Negative Battery	1
007274	Hourmeter	1
080132	Safety Switch	1
005301	Temperature Switch	1
006245	AMP Light	1
004989-01	Wiring Harness, Engine	1
004989-02	Wiring Harness, Horn	1
KU70000-65398	Voltage Regulator	1
004933	Ignition	1
004934	Oil Switch	1
004935	Glow Plug	1

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SKID MOUNT PARTS

Ref No.	Part No.		Description	No Req'd
	T90S	T120S		
27-1	005192	005192	Right Guard Rail	1
27-2	005193	005193	Left Guard Rail	1
27-3	005116	005116	Boom Rail	1
27-4	005195-01	005195-05	Front Cross Rail	1
27-5 *	005121	005121	Dual Slide Gate	2
	011313	011313	Tool Box	1
	00-... 005370		Loading Shield (Diesel Only)	
*Units with hose reels take:				
	Qty 1	005121	Slide Gate	
	Qty 1	007123	Slide Rail	

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SPARE PARTS

Part	Description
100253	Filter, Engine Oil (Diesel)
100196	Filter, Engine Oil (Gasoline)
021618	Filter, Hydraulic Oil
007469	Valve Lube Sticks (box)
006515	Gasket, Quick Coupler
005183	Gasket, for 1" Grooved Pipe
006251	Gasket, for 2" Grooved Pipe
006145	Gasket, for 4" Grooved Pipe

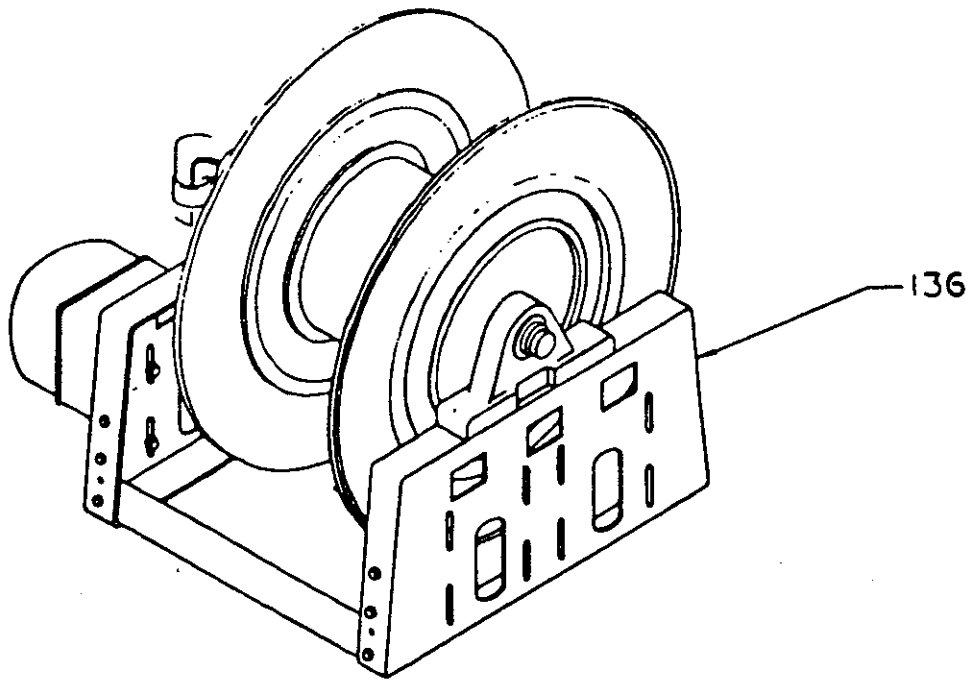
REPAIR KITS

006969	For Discharge Boom Swivel
023120	Seal Kit for 022850 Valve
023257	Seal Kit for 070660 Hydraulic Motor

MISCELLANEOUS PARTS

		No. Req'd
011666	Paint, Finish	1
008156	Paint, Interior Finish	1
023174	Decal, "Finn"	2
011595	Decal, "HydroSeeder"	2

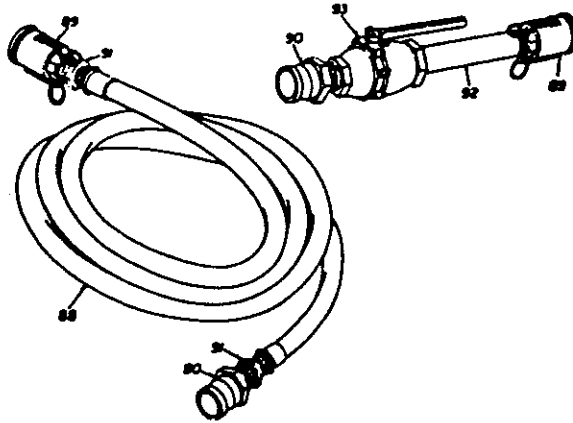
**WHEN ORDERING PARTS, BE SURE TO STATE
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HOSE REEL ASSEMBLY

Ref No.	Part No.	Description	No Req'd
136	008212	Electric Reel	1
		008188 Electric Motor	1
		008199 Small Sprocket	1
		008313 Bearing, Idle Side	1
		008314 Bearing, Drive Side	1
		008200 Chain	1
	008210	Swivel	1
	007710	Valve	1
	004909	Lead In Hose (T90S,T120GN,T120S)	1
	005210	Lead In Hose (T90T only)	1
	005237	Wiring	1
	008420	Circuit Breaker	1

**WHEN ORDERING PARTS, BE SURE TO STATE
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DISCHARGE HOSE EXTENSIONS

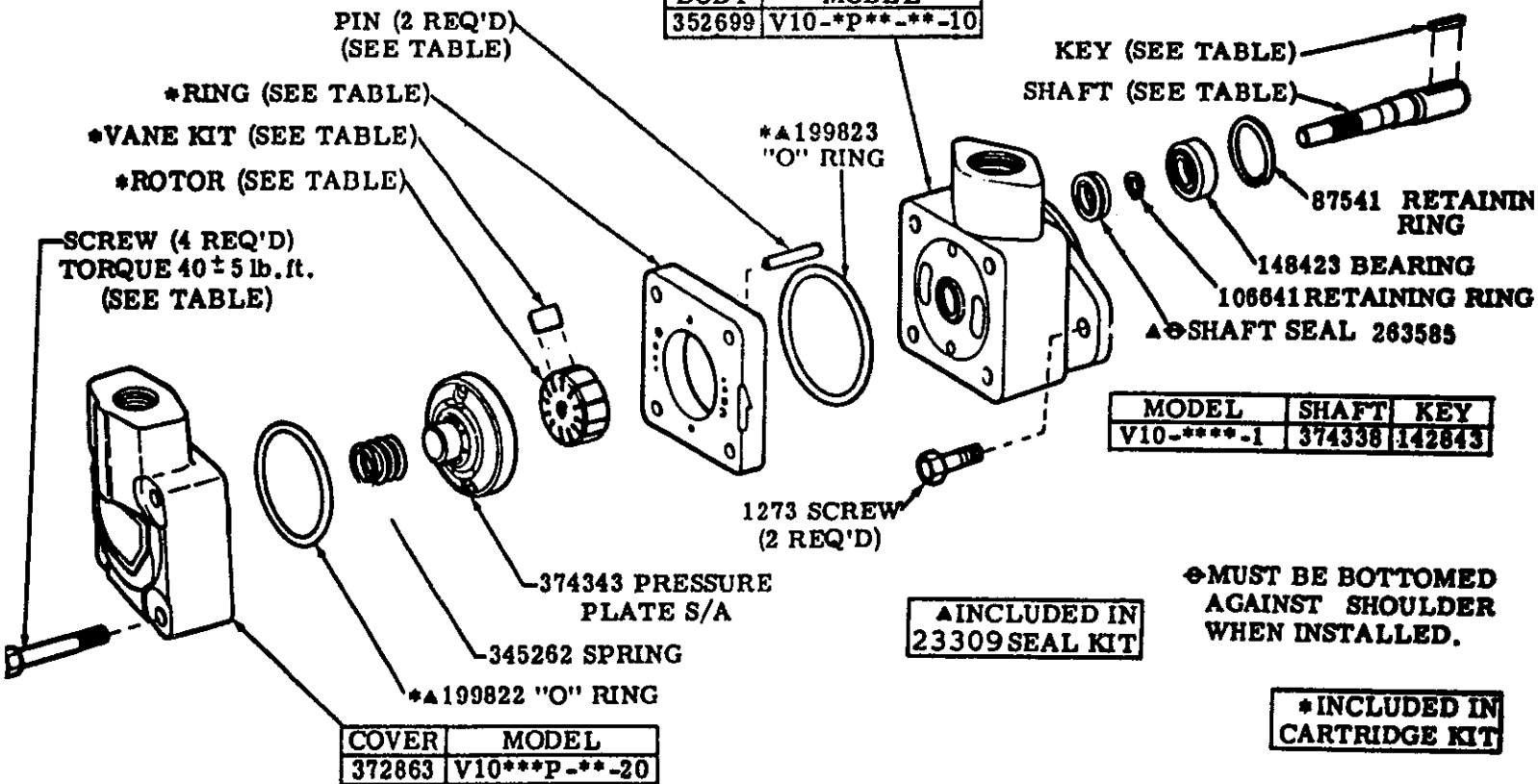
Part No.	Descriptions	No. Req'd
006522	Collapsible Hose Assembly, Discharge Ext.	1
	002273 1-1/2" Hose w/Nipples, 50 ft	1
	006102 1-1/2" Coupler, Female	1
	006514 Gasket	1
	006096 Coupling, Male	1
	160763 Bushing	2
007930	Semi Rigid Hose Assembly, Discharge Ext.	1
	007929 1-1/2" Hose, w/Nipples, 50 ft	1
	006102 Coupler, Female	1
	006514 Gasket	1
	006096 Coupler, Male	1
	160763 Bushing	2
007930-01	Semi Rigid Hose Assembly, Discharge Ext.	1
	007929 1-1/2" Hose, w/Nipples, 50 ft	1
	002158 Coupler Female	1
	006515 Gasket	1
	001207 Coupling, Male	1
007536	Semi Rigid Hose Assembly, Discharge Ext.	1
	003308 1-1/4" Hose w/Nipples, 50 ft.	1
	006102 Coupler, Female	1
	006514 Gasket	1
	006096 Coupling, Male	1
	160762 Bushing	2
003309	Semi Rigid Hose Assembly, Discharge Ext.	1
	003308 1-1/4" Hose, w/Nipples, 50 ft	1
	002158 Coupler, Female	1
	006515 Gasket	1
	001207 Coupling, Male	1
	160756 Bushing	2
007740	Remote Valve Assembly	1
	001207 Coupling, Male	1
	160309 Nipple	1
	003242 Valve	1
	003243 Nipple	1
	160763 Bushing	1
	006102 Coupler, Female	1
	006514 Gasket	1
007711	Valve, Pump Discharge Take Off	1
	007710 Valve	1
	160309 Nipple	1
	002158 Coupler, Female	1
	006514 Gasket	1

**WHEN ORDERING PARTS, BE SURE TO STATE
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WARNING: USE THIS DRAWING FOR PARTS INFORMATION ONLY.

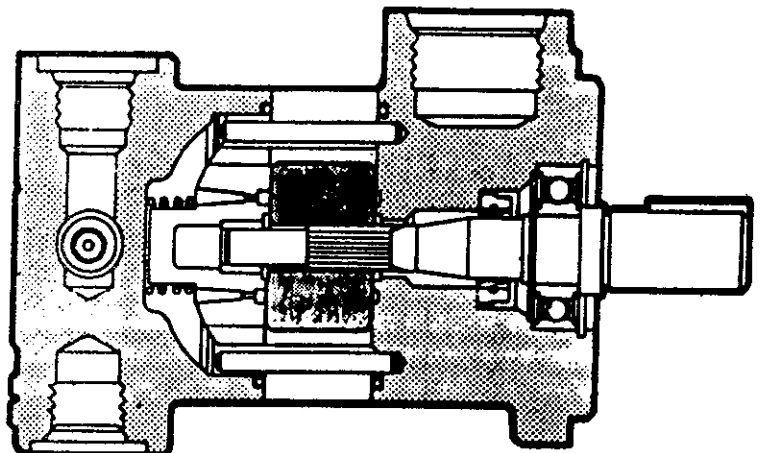
MODEL	*ROTOR	*VANE KIT (12 VANES)	*RING	PIN	SCREW	CART. KIT
V10-**1*-***0	317681	923499	317674	231042	11156	923471
V10-**2*-***0			317675			923470
V10-**3*-***0			317676			923496
V10-**4*-***0	351247	923500	317677	2456	1278	923469
V10-**5*-***0			317678			923468
V10-**6*-***0	357286	923501	355641	351963		923497
V10-**7*-***0			331813			923498

BODY	MODEL
352699	V10-*P**--*-10

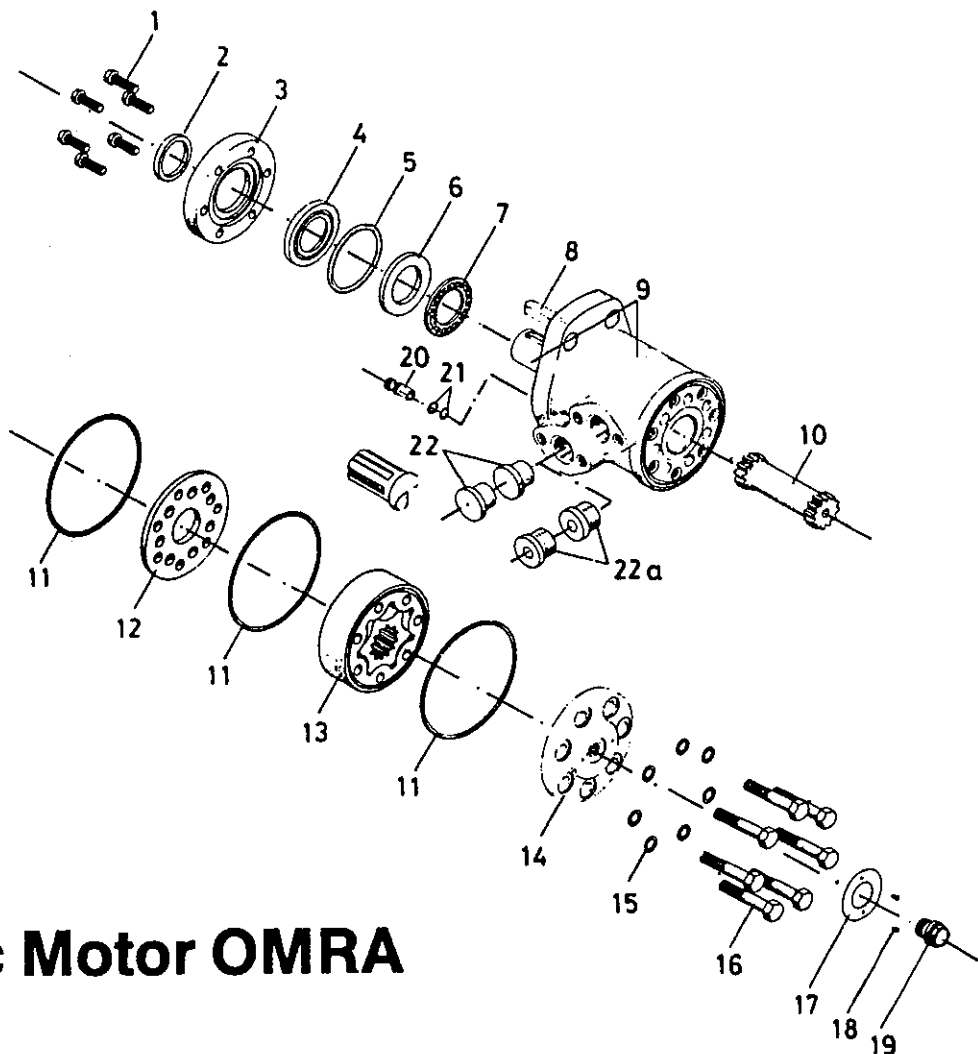


SERVICE PARTS INFORMATION

V10 SERIES -20 DESIGN



SPARE PARTS

Hydraulic Motor OMRA

Ref No.	Part No.	Description	No. Req'd
1	681x1989	Screw	6
* 2	633B3198	Dust Seal Ring	1
3	151-1734	Spigot Flange	1
* 4	633B3273	Shaft Seal	1
* 5	633B1528	O-Ring	1
6	151-1701	Bearing Race	2
7	981x3198	Axial Needle Bearing	1
8	151-4109	Parallel Key	1
9	Not sold separately	Housing and output shaft	1
10	151-1819	Cardan Shaft	1
*11	633B1301	O-Ring, 90x2 mm NBR	3
12	151-1702	Distributor Plate	1
13	151-1191	Gear Wheel Set	1
14	151-1731	End Cover	1
*15	684x2481	Washer	7
16	681x1105	Screw	7
17	151A0309	Name Plate	1
18	68121011	Drive Screw	2
19	631x2013	Drain Plug (incl. o-ring)	1
20	151-1076	Check Valve (incl. item 21)	2
22	633x1021	Seal Plug	2

SDCF Series Valve

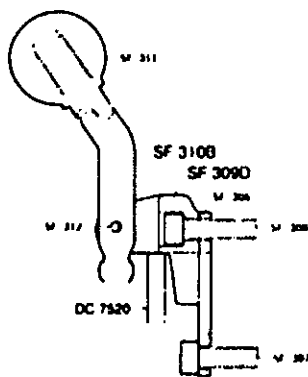


figure 1

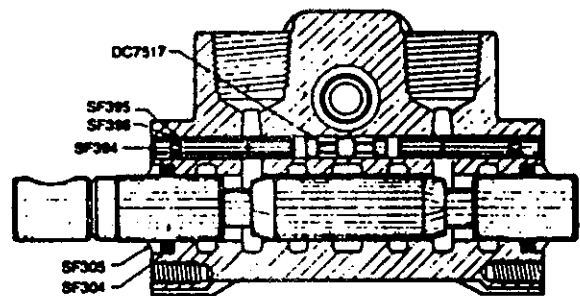


figure 2

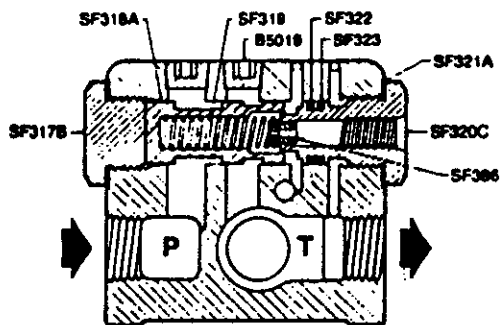
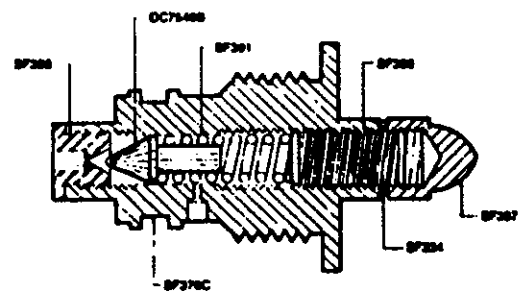


figure 3



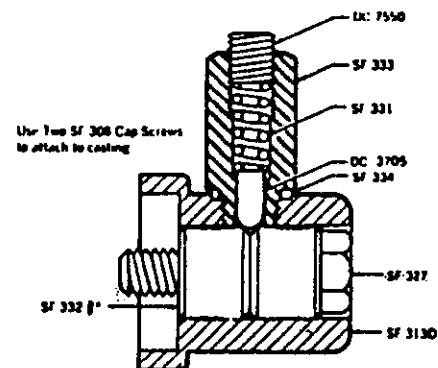
Relief

figure 4

Parts List

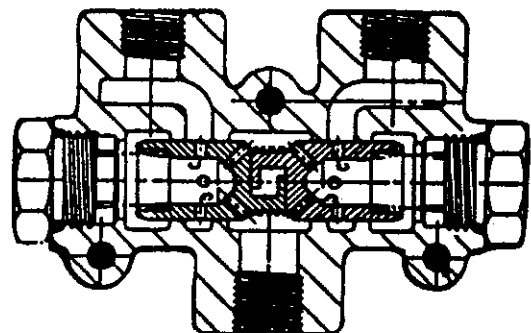
B5019	Pipe Plug 1/4" NPT	SF317B	Plug
DC3705	Detent Plunger	SF318A	Metering Spool
DC7517A	Shuttle Spool	SF319	Metering Spring
DC7520	Roll Pin 3/16 x 1 1/2	SF320C	Cartridge
DC7548B	Poppet	SF321A	Washer
DC7550	Set Screw 5/16-24	SF322	"O" Ring—016
SF304	Seal—210	SF323	Back Up Ring—016
SF305	Wiper	SF327	HHCS 5/16-18 x 1 1/2
SF306	Seal Retainer	SF331	Spring
SF307	Cap Screw 1/4" 20 x 3/8" HAS	SF332-X	Friction Positioning Sleeve
SF308	Cap Screw 1/4" 20 x 3/8" HAS	SF333B	Detent Housing 116
SF309D	Handle Bracket	SF334	Washer
SF310B	Handle	SF370C	Relief Cartridge
SF311	Knob	SF386	Seat
SF312	Roll Pin 1/8" x 1 3/8"	SF387	Acorn Nut
SF312A	Washer	SF388	Set Screw
SF313-D	Detent End Cap	SF391	Spring
		SF394	Shuttle Stop
		SF395	"O" Ring
		SF396	Backup

23120 Seal Kit

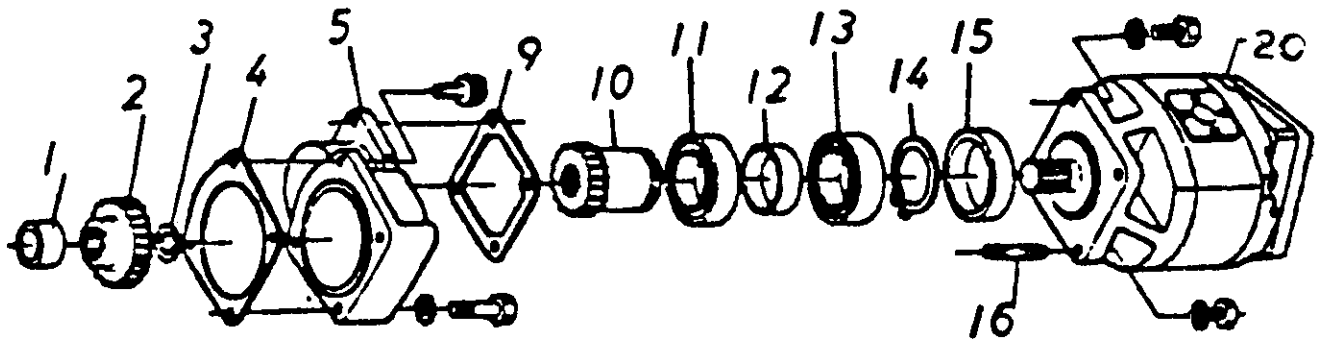


NOTE: Use seal retainer, SF 306 between option and main casting.

SDC-F (Friction Detent Kit)



Flow Divider
T250-300 ONLY

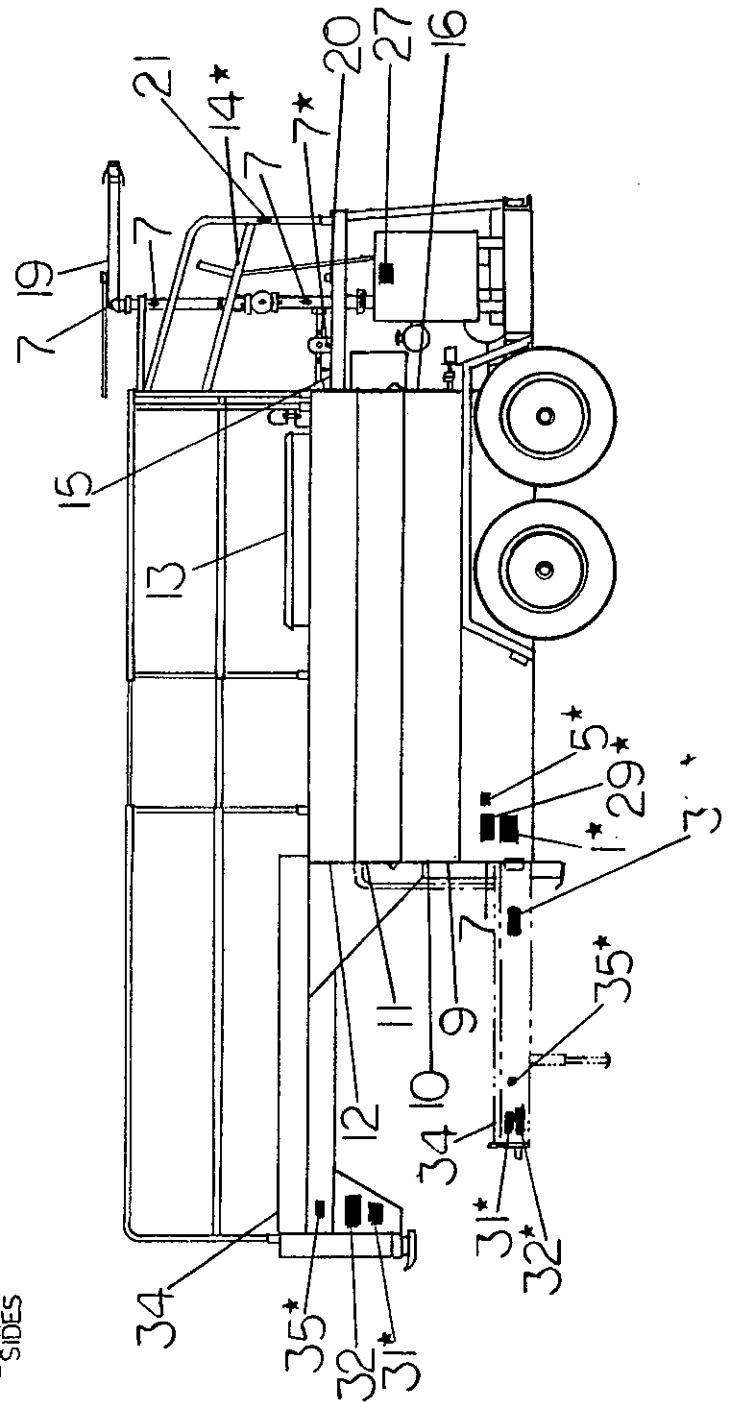
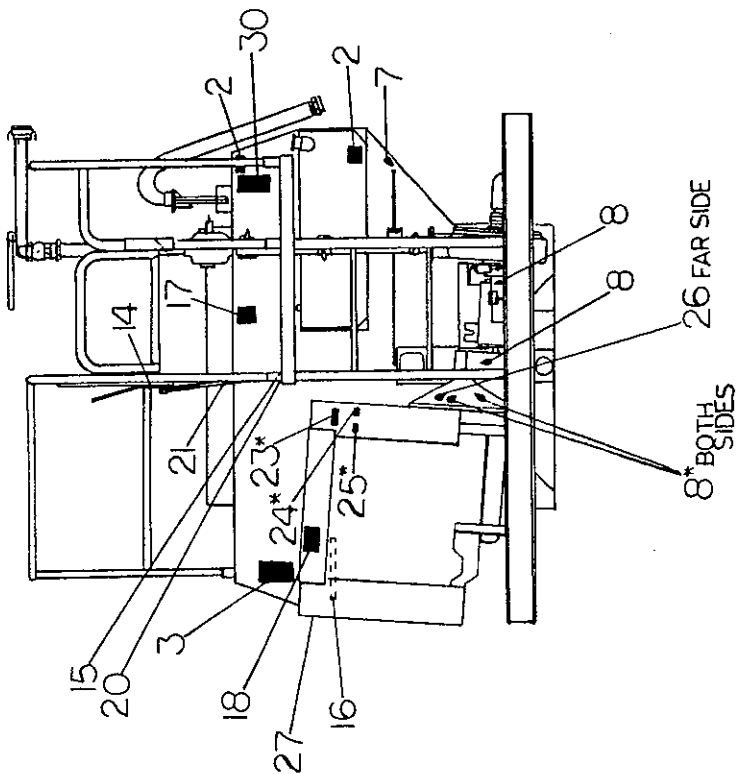
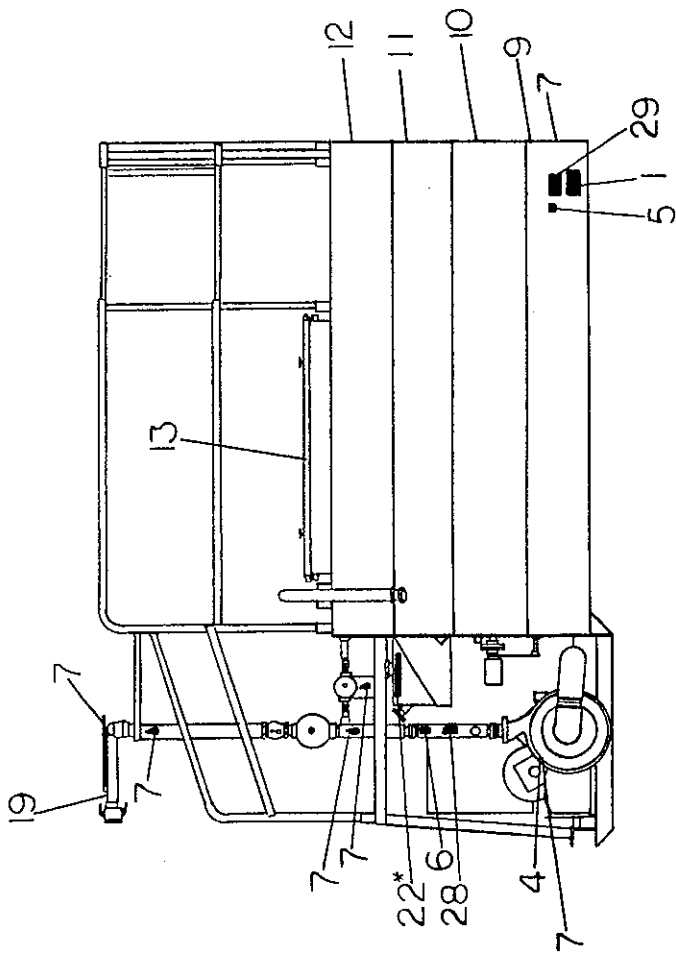


HYDRAULIC PUMP - DIESEL OPTION

Ref No.	Part No.	Description	No. Req'd
	005208	Hydraulic Pump Kit includes:	1
1	100233	Collar	1
2	100234	Gear, 46 teeth	1
3	100235	Snap Ring	1
4	100236	Gasket	1
5	100237	Pump Holder	1
		Bolt	4
		Washer	2
9	100238	Gasket	1
10	100239	Gear, 22 teeth	1
11	100240	Needle Bearing	1
12	100241	Inner Race	1
13	100242	Ball Bearing	1
14	100243	Snap Ring	1
15	100244	Collar	1
16	100245	Stud	2
20	005167	Hydraulic Pump	1
		Bolt	2
		Washer	4
		Nut	2

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DECALS



DECALS

Ref No.	Part No.	Description	No. Req'd
1	011690	Nameplate	1
1A	023174	"FINN" Decal	2
1B	011595	"HydroSeeder" Decal	2
2	005216	Danger Do Not Use Remote Valve	2
3	021665	Hydraulic Instructions	1
4	006869	Pressure Lubricator	1
5	020976	Patent Infringement	1
6	008209	Danger Check Pipe	1
7	007231	Service Daily	7
8	007230	Service Weekly	6
9	005184	250 Gallon	1
10	005186	500 Gallon	1
11	005187	800 Gallon	1
12	005188	1000 Gallon (T-120 Only)	1
13	008097	Danger Before Entering	1
14	004661	Clutch Operation	1
15	008226	Agitator Operation	2
16	023390	Hydraulic Oil Only	1
17	023519	Caution Wear Eye Protection	1
18	022357	Turn Off Engine	1
19	011567	Danger Do Not Aim Stream	1
20	006870-Horn	Horn	1
21	007535	Throttle	1
22	023391	Diesel Fuel Only (Diesel Only)	1
23	005275	Engine Kill (Diesel Only)	1
24	080108-03	Glow Plug (Diesel Only)	1
25	006870-Gen	Gen. (Diesel Only)	1
26	007351	Use Hand Gun Only	1
27	007429	Radiator Protection	1
28	011569	Caution Hose Reel & Remote Only	1
29	011662	U.S. Patent Numbers	1
30	004660	HydroSeeder Operation	1
31	031227	Caution Inspect Hitch (Trailer Only)	1
32	031228	Safety Chain Installation (Trailer Only)	1
33	080107	Caution Always Use Step (T-90 Trailer only)	1
34	021664	Caution Do Not Tow (Trailer Only)	1
35	023423	Warning Breakaway Switch (Trailer Only)	1

Note:

Note: Safety Decals must be purchased as a kit
Part # 005738

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