FINN CORPORATION®
9281 LeSaint Drive • Fairfield, Ohio 45014
Phone (513) 874-2818 • Fax (513) 874-2914
Sales: 1-800-543-7166

Activate Your Warranty By Registering TODAY!!!

T90-II HydroSeeder®

Parts and Operator's Manual

Model **SN** Serial No. _____

NOTES

ACTIVATE YOUR FINN EQUIPMENT WARRANTY

IMPORTANT INFORMATION ON ACTIVATING
YOUR FINN EQUIPMENT WARRANTY!!!

IT IS IMPERATIVE THAT YOU, THE PURCHASER, COMPLETE THE FOLLOWING STEP IN ORDER TO ACTIVATE THE FINN CORPORATION LIMITED WARRANTY.

COMPLETE THE "EQUIPMENT REGISTRATION" FORM ON THE NEXT PAGE AND MAIL TO THE FINN CORPORATION.

IF FINN CORPORATION DOES NOT HAVE YOUR COMPLETED REGISTRATION FORM ON FILE, YOUR WARRANTY CLAIM WILL BE DENIED.

Once your Finn equipment has been registered, your Finn Limited Warranty will be activated per the warranty statement on the other side of this notice.

<<What should you do if you need repairs or parts under Warranty?>>

1. NOTIFY FINN CORPORATION OF THE FAILURE OF MATERIAL OR WORKMANSHIP

1-800-543-7166 Extension (246)
WARRANTY@FINNCORP.COM

2. AFTER YOU OR YOUR SERVICE DEALER NOTIFY FINN, FINN WILL:

- VERIFY THAT WE HAVE YOUR "REGISTRATION" ON FILE
- VERIFY THAT THE WARRANTY PERIOD IS IN EFFECT
- VERIFY THAT THE RELATED PART(s) ARE INCLUDED IN THE SCOPE OF WARRANTY (PENDING FINN'S INSPECTION OF DEFECTIVE PARTS)
- SEND YOU REPLACEMENT PART(S) AND A "WARRANTY INFORMATION PACKET"
- REQUEST YOU FOLLOW ALL INSTRUCTIONS AS NOTED IN THE "PACKET"

  - **Fill out the Parts Tag. (Completely)**
  - **Attach the Parts Tag to the defective part(s).**
  - **Return the part(s) and the completed Warranty Claim Form to Finn Corporation using the return shipping label. (Within 2 weeks)**
  - **Tape the Orange identifier sheet, marked with the W / RMA# on the outside of the box you are shipping the defective part(s) to Finn in.**

Finn Corporation Commercial Limited Warranty

Effective February 20, 2006

OUR WARRANTY TO YOU:

Finn Corporation warrants to you, the original purchaser, for use (or rental to others for use) all new construction machinery, parts and attachments (except those referred to herein) that are 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 to which parts are installed, as if parts were original components of the product.

WHAT FINN WILL DO:

Upon notification of Finn concerning a failure of material or workmanship in accordance with the above stated Warranty, Finn Corporation will:

- Verify claim falls within the valid warranty time frame.
- Verify the product and equipment has been **registered** with Finn in order to be eligible for warranty coverage.
- Upon affirmation of warranty period and registration, Finn will send to you a new or repaired replacement part(s), whichever Finn elects and a "Warranty Claim Information packet" containing instructions for processing the warranty claim.
- Evaluate the part when defective part is returned. Note: Failure to return defective part within **two weeks** will result in an invoice being sent to the customer. In addition, if damage to a part is determined not to be covered under the warranty, the customer will be billed for the replacement part.
- Reconcile costs with customer for parts and shipping, as determined by our inspection of failed parts, and confirmation of warranty coverage, per the terms of this warranty.
- Correction of nonconformities, in the manner provided above, shall constitute fulfillment of all liabilities of Finn Corporation under this warranty.

WHAT YOU MUST DO TO OBTAIN WARRANTY SERVICE:

- As the purchaser covered under the above limited warranty you must **REGISTER** the equipment with Finn as such owner. Should registration not be on file with Finn Corporation, your **warranty will be void.** (See Operators manual for Registration Form)
- Notify Finn Corporation of any failure of material or workmanship as described under this warranty.
  - Web notification: Warranty@Finncorp.com
  - Phone 1-800-543-7166 extension 246
- Complete the required steps in the "Warranty Claim Information packet" (which Finn will send you upon notice of your notification) and return the defective part(s) as directed in the packet to Finn Corporation.

WHAT THE WARRANTY DOES NOT COVER:

1. Allied equipment or trade accessories not manufactured by it, such as but not limited to ignitions, starters, tires, batteries, hose, magnetos, carburetors, engines, labor, or like or unlike equipment or accessories including discharge hoses. (Such being subject to the warranty, if any, provided by their respective manufacture's).
2. Secondhand, used, altered, or rebuilt machines or parts.
3. Defects, malfunctions or failures resulting from accidents, abuse, misuse, improper servicing, or lack of performance of required operational guidelines and maintenance service, as outlined in the Finn Corporation's Operators Manual(s).
4. The warranty shall be null and void to the extent any defect or failure of the products warranted arises out of or is caused by accessories or component parts not manufactured or supplied by Finn Corporation, whether same are supplied by purchaser, dealers, or any other party.

THIS IS THE ONLY EXPRESS WARRANTY ON OUR PRODUCTS:

We neither assume nor authorize anyone to assume for us any other express warranty. The Distributor/Dealer has no authority to make any representation or promise on behalf of Finn Corporation or to modify the terms or limitations of this warranty in any way.
THIS WARRANTY THEREFORE SHALL BE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

LIMITATIONS ON OUR RESPONSIBILITY WITH RESPECT TO PRODUCTS PURCHASED:

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 original 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.

NOTICE:

FINN CORPORATION URGES THE USE OF ONLY FINN CORPORATION SUPPLIED PARTS AND ATTACHMENTS TO ASSURE PROPER PERFORMANCE AND SAFE OPERATION OF FINN CORPORATION EQUIPMENT. INSIST ON PARTS AND ATTACHMENTS MANUFACTURED OR SUPPLIED BY FINN CORPORATION WHEN YOU PURCHASE, REPAIR OR REPLACE YOUR FINN EQUIPMENT AND ATTACHMENTS. BECAUSE FINN CORPORATION CANNOT ASSURE THAT PARTS AND ATTACHMENTS NOT MANUFACTURED OR SUPPLIED BY FINN MEET FINN CORPORATION'S QUALITY STANDARDS, SPECIFICATIONS, OR OPERATING REQUIREMENTS, OUR WARRANTY IS NOT EFFECTIVE TO THE EXTENT ANY FAILURE OF OR DEFECT IN A FINN CORPORATION PRODUCT ARISES FROM OR IS CAUSED BY PARTS, ATTACHMENTS OR COMPONENTS NOT ORIGINATING WITH FINN CORPORATION. USE OF FINN CORPORATION EQUIPMENT WITH PARTS AND ATTACHMENTS NOT MANUFACTURED OR SUPPLIED BY FINN COULD RESULT IN PERSONAL INJURY.

Effective February 20, 2006

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HydroSeeder® is a registered trademark of the Finn Corporation

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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.

The first six pages of this manual are a summary of all the main safety aspects associated with this unit. Be sure to read completely before operation of machine.

This symbol is used throughout the operation and maintenance sections of this manual to call attention to safety procedures.

- Pay Attention -

DANGER: **Immediate hazards which WILL result in severe personal injury or death.**

WARNING: **Hazards or unsafe practices which COULD result in severe personal injury or death.**

CAUTION: **Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.**

IMPORTANT: Indicates that equipment or property damage could result if instructions are not followed.

NOTE: Gives helpful information.

Finn Corporation

CALIFORNIA

Proposition 65 Warning

The engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

CALIFORNIA

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

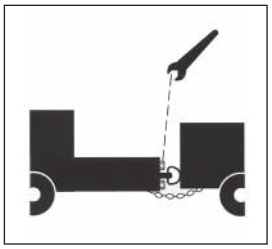
HYDROSEEDER® SAFETY SUMMARY SECTION

It is important that all operators of this machine are familiar with all of the safety aspects mentioned below and have read the entire Operator's Manual before operating the machine. Always keep a copy of this manual with the machine. It is the responsibility of the operator of the machine to fully understand this safety sheet. Remember that YOU are the key to safety. Good safety practices protect not only you but also the people working with and around you. Keep in mind that this safety sheet is written for this type of machine only. Practice all other usual and customary safe working precautions; and above all, remember that safety is up to you.

The FINN HydroSeeder® is designed to mix and apply water, seed, fertilizer, agricultural lime and hydraulic mulch to the prepared seedbed. The resultant slurry from mixing one or more of the above materials may react causing harmful or deadly gasses within the tank. Heat, evaporation or extended emptying period can/will accelerate the formation of these gasses. Please contact your supplier(s) of these slurry components regarding their potential reactivity.

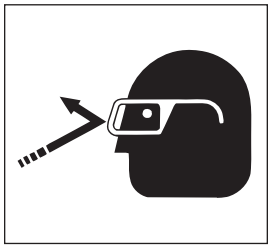
I. PRE-START EQUIPMENT CHECK (equipment check is to be made with the engine off):

1. If you have a chassis mounted unit, check devices securing HydroSeeder® to the truck or trailer frame.

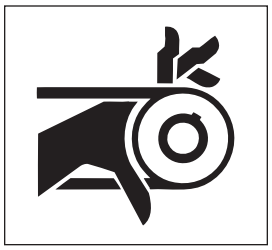


2. If HydroSeeder® is a trailer unit, check hitch and hitch bolts, lights, brakes and all safety components.
3. Make sure loading hatch bag cutter is in place and secure.
4. Check that all guard railing is in place and secure.
5. Verify that all guards are in place.
6. With the ignition switch on, verify that the signal horn is operating correctly.
7. By carefully looking down through the loading hatch, inspect the slurry tank for foreign objects. Never enter the tank without following the procedures described in #3 of the Maintenance section in this sheet.
8. Remove unnecessary objects (or material) from the tank top.
9. Make sure no one is working on or inside the machine. Signal "All Clear" before starting the engine.
10. Inspect all hydraulic hoses for cracks, bulges or damage. If hoses are bad replace immediately.
11. Inspect all discharge hoses for cracks, bulges or damage. If hoses are bad replace immediately.

II. MACHINE OPERATION:



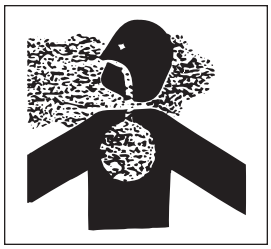
1. Always wear safety goggles when operating the machine. Other safety attire such as safety shoes, ear protection, gloves, hard hats, dust masks, etc. should be worn as required by warning decals on machine, operator's manuals or job site requirements. Remove rings, watches, etc. Avoid loose fitting clothing that may get caught in rotating machinery.



2. Do not operate the machine without all guards in place.
3. Do not load unit while in transit. Load only when parked and unit is as level as possible. Take care not to drop pens, lighters, etc. or pieces of paper or plastic bags into the tank, as these objects might plug the slurry system. Should any object be dropped into the tank, do NOT reach into the tank to retrieve the foreign object. See #3 under Maintenance before allowing any personnel to enter the tank.
4. Make sure area to be sprayed is clear of all persons, animals, etc.
5. The driver of the carrying or towing vehicle is responsible for the safety of the operator(s) of the machine. Make sure the driver is aware and avoids all possible hazards to the operator(s) of the machine, such as low tree limbs, low power lines, etc. Vehicles on which equipment is mounted or towed must be stopped and started gradually. Avoid abrupt starts or stops. Never operate on a slope or a hill that may endanger the driver and/or the operator(s). All personnel should review and be familiar with stop/start signals between the driver and operator(s) before going into operation. Only the operator should be located on the platform during operation.

6. Operator(s) of equipment should never ride on the machine at speeds of greater than 5 MPH (8 kmh).

7. Never operate machine in an enclosed area without venting the engine exhaust of both the equipment and vehicle on which the equipment is mounted. Deadly carbon monoxide fumes can accumulate.



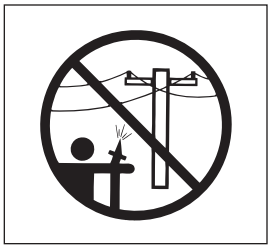
8. Never operate this or any other machinery when fatigued, tired, under the influence of alcohol, illegal drugs or medication. You must be in good physical condition and mentally alert to operate this machine.

9. Never modify the machine. Never remove any part of the machine (except for service and then reinstall before operating).

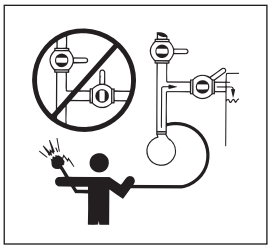
10. Use proper means (steps, ladder) for mounting and dismounting of the machine. Never mount or dismount a moving machine.

III. SLURRY APPLICATION:

1. Do not aim discharge spray toward power-lines, transformers, or other high voltage electrical conductors. Also do not aim discharge spray towards people, animals or anything other than the intended application area.



2. Never engage the clutch when both the recirculation and discharge valves are closed. Operation with both valves closed will result in extreme heat generation that could cause severe bodily injury and damage to the equipment.

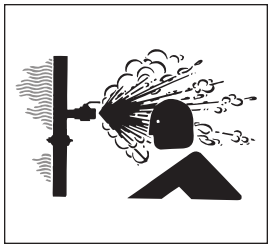


3. Recirculation valve must be open and material flowing back into the tank when using the remote valve. A closed or plugged recirculation line will cause extreme heat in the pump or discharge lines which will result in severe bodily injury and damage to the equipment.

4. During application through a hose, high pressure can be exerted at the end of the hose. Hose holding personnel must establish good footing. The operator should apply gradual pressure to the hose only after hose holding personnel are firmly positioned and have firm control of the hose. Additional personnel to direct hose may be necessary if working on slopes. The proper technique for hose holding personnel is to firmly grasp the hose over the shoulder or under both arms. Never hold the hose so it goes between the legs. If the hose holding personnel finds that it is uncomfortable for him to handle the hose by himself additional hose holders should be positioned at the end of the hose.

5. Plan application so that the furthest area is covered first; working back toward the HydroSeeder®, so that the individuals are not walking back over slippery ground.

6. Before opening any valves or pipe clamps shut machine down and check if material in the pipe is hot. If hot, do NOT open valve or pipe clamps as the hot material may cause severe personal injury. Allow to cool and open with caution.

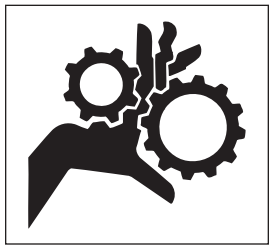


7. Except when loading materials keep loading hatch lid closed to protect operator and prevent splashing of wet material onto the tank top.

8. Wash off spillage of slippery mulch or slurry additive from the tank top and platform before operating equipment.

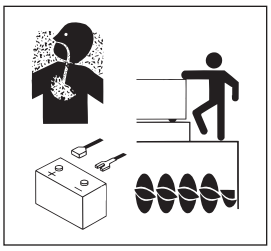
MAINTENANCE:

1. Before servicing the machine, turn off engine and allow all moving parts to stop. To prevent accidental starting disconnect battery cables. Tag the engine operating area to show that the machine is being serviced. Use lockout/tagout procedure (OSHA 29 CFR 1910.147).



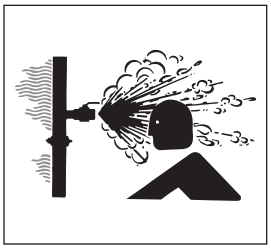
2. Certain hydroseeding amendments, when combined with or without the addition of water or heat or the element of time, may react causing harmful or deadly gasses! Consult your material suppliers regarding reactivity information. The slurry tank must be flushed and drained after each day of operation.

3. Your slurry tank may be considered a confined space by OSHA under 29 CFR 1910.146. Before entering any confined space, your company must develop a procedure for safe entry. Make sure your company's plan meets all the requirements of 29 CFR 1910.146. Including the following:



   a) Drain, flush and ventilate tank interior.
   b) Turn off engine and disconnect battery cables and perform lockout/tagout procedures. (29 CFR 1910.147)
   c) Provide continuous ventilation or proper breathing apparatus.
   d) If tank must be entered, personnel entering the tank must be tethered to a lifeline.
   e) Provide stand-by individual outside of tank able to communicate with person inside and able to haul him out with lifeline if necessary.

4. Before loosening any clamps or opening any valves, determine if material in the line is hot by feeling the pipe. Do NOT allow material to come in contact with personnel. Severe bodily injury could result.



5. On trailer units perform general maintenance such as checking the safety chains, hitch and hitch bolts, tires, brakes. Repair or replace if worn or broken. Never operate machine on improperly inflated or damaged tires. Always use a safety cage or cable restraints when re-inflating a repaired tire.

6. Radiator maintenance: Liquid cooling systems build up pressure as the engine gets hot. Before removing radiator cap, stop the engine and let the system cool. Remove radiator cap only after the coolant is cool.

7. Battery maintenance: Lead-acid batteries contain sulfuric acid, which damage eyes of skin on contact. Always wear a face shield to avoid acid in the eyes. If acid contacts the eyes, flush immediately with clean water and get medical attention. Wear rubber gloves and protective clothing to keep acid off skin. Lead acid batteries produce flammable and explosive gasses. Keep arcs, sparks, flames and lighted tobacco away.

8. Filling of fuel: Never fill the tank with the engine running, while smoking or when near an open flame. Never smoke while handling fuel or working on the fuel system. The fumes in an empty container are explosive. Never cut or weld on fuel lines, tanks or containers. Move at least 10 feet (3 meters) away from fueling point before starting engine. Wipe off any spilled fuel and let dry before starting engine.

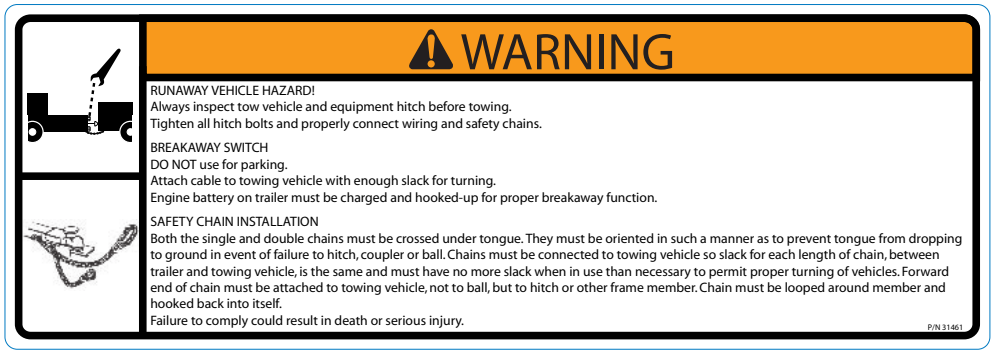
   NOTE: Be careful not to allow fuel, lubricant, hydraulic fluid or cooling fluids to penetrate into the ground or be discharged into the water system. Collect all fluids and dispose of them properly.

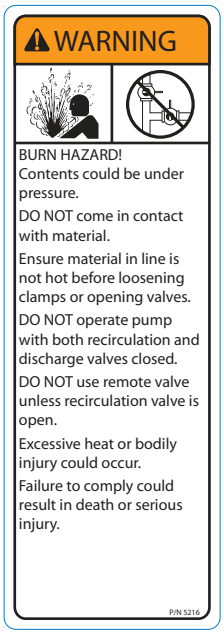
9. It is recommended that only authorized genuine FINN replacement parts be used on the machine.

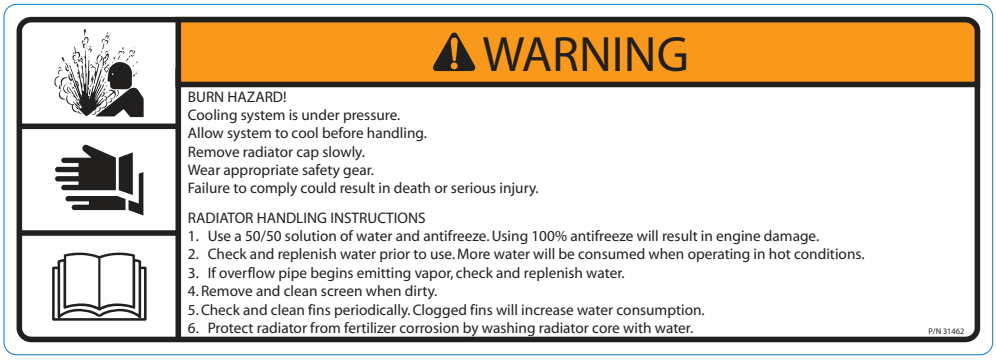
10. Do not use either cold start fluid if engine is equipped with glow plug type preheater or other intake manifold type preheater. It could cause an explosion or fire and severe injury or death.

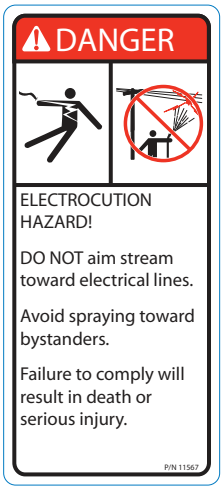
11. Diesel fuel or hydraulic fluid under pressure can penetrate the skin or eyes and cause injury, blindness or death. Pressure may build up in the hydraulic system; use caution when removing the cap.

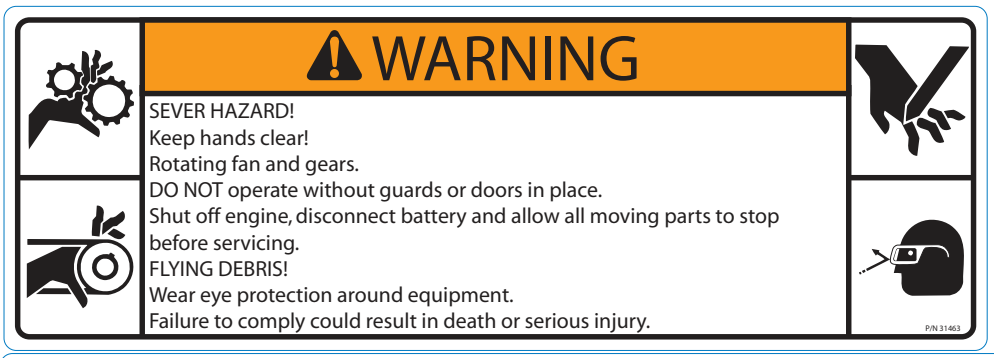
12. Make certain that all decals on the machine are maintained in good legible condition. Replacement decals are available through Finn Corporation by specifying part number shown in the lower right hand corner of the decal. See page 5 for the current safety decals mounted on the unit. See pages 70-71 in the Parts Manual for the location and quantity of all decals on this unit.

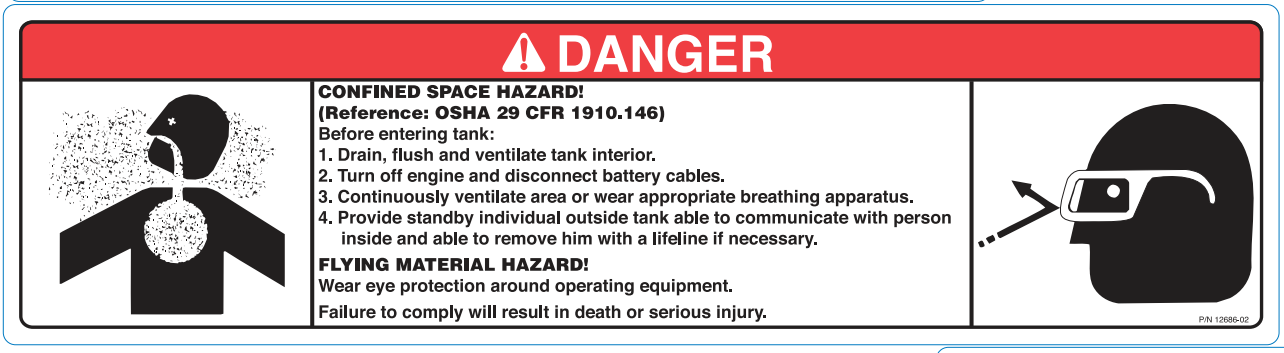












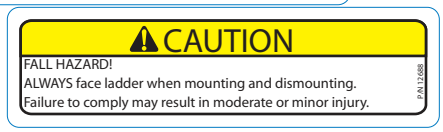


FIGURE 1 - Current Set of Safety Decals

OPERATION AND MAINTENANCE MANUAL FOR THE FINN T90 HYDROSEEDER®

This manual gives you step-by-step instructions for the operation and maintenance of the Finn T90 HydroSeeder®. For best results and to insure longer life of the equipment, please follow the instructions carefully. For your safety read the entire manual before operating this unit.

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 to establish vegetation.

THE FINN HYDROSEEDER® AND HOW IT WORKS:

The Finn T90 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 that is pumped to the discharge assembly and directed onto the seed bed 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:

HYDROSEEDER®		TRUCK REQUIREMENTS	
Type	**Maximum Weight** (Loaded)	**Approx. GVWR***	**Measurements** (cab to axle)
T90S	13,250 lbs. (6,010 kg)	18,000 lbs. (8,165 kg)	84"-100" (213-254 cm)
T90T	14,670 lbs. (6,654 kg)	Tow vehicle must be able to support 1,800 lbs. (816 kg) down or its hitch. 2-5/16” ball ** type 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.*

** *2-5/16” Ball rated 25000 Lbs.*

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 T90 HydroSeeder® to the truck, any one of the following methods of mounting is acceptable:

A. Bolt the HydroSeeder® directly to the truck bed. Installer must insure that the bed as well as the bed to truck and HydroSeeder® to bed connections are adequate for the full load weights that are shown on page 6.

B. Mount the HydroSeeder® to the truck frame.

Note: The T90 HydroSeeder® has mounting legs that are 44" (111.76 cm) across and therefore require an adapter frame or a chassis bed of adequate strength to mount to the truck's 34" (86.36 cm) wide rails.

IMPORTANT: Mounting the HydroSeeder® to the truck must allow for tire clearance as well as frame twist. Place hard wood spacers along the length of truck rails or use Finn spring mounting kit (#011562) or equivalent.

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.

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 boom 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, i.e. 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. The 200 foot (60.96 m)capacity electric rewind reel will wind up and store empty hose. It can be electrically connected to the HydroSeeder® battery.
4. Fill pumps with the capacity of 5,500 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®.
5. Hardened pump parts. Pump casing, impeller, and suction cover treated with special material designed to resist wear.
6. Rear spray bar. The spray bar option is not designed for slurry application but for the dispersion of liquids for dust control, watering, feeding and washing applications. Rear spray bar can be arranged so that operation is remotely controlled from the truck cab.

PRE-START CHECK:

Safety check to insure operator safety:

1. A. Skid Unit - Check condition of all mounting hardware securing HydroSeeder® to truck frame rails.

   B. Trailer Unit - Inspect hitch, safety chains, lights, brakes and breakaway switch.
2. Make sure bag cutter is in place and secure.
3. Inspect that all railings are in place and secure.
4. Insure that all guards are in place.

EQUIPMENT CHECK:

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

1. Verify that the tool kit contains all the prescribed items (see tool kit list in parts section, page 67).
2. Inspect the “slurry-tank” for foreign objects. See numbers 2 and 3 in Maintenance Section (IV) of the Safety Summary Section, page 4.
3. Check fuel level.
4. Check the hydraulic oil level (see hydraulic system page 21 for oil specifications).
5. Check engine oil level. For oil type refer to the engine manual.
6. Check fluid level in radiator and overflow tank.
7. Inspect air cleaner for dust and dirt, clean if necessary.
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. Verify that the suction line shut-off valve is completely open.
11. Engage and disengage clutch to determine if it “snaps” in and out.

12. Install discharge assembly (if stored in location other than standard operating position).
    A. Check and clean nozzle of any obstructions.
    B. Tighten the wing bolt at the opening around the top of discharge assembly and insure that discharge assembly is secure.
13. Check pump discharge and recirculation valve handles for free movement.
14. Lubricate equipment - See Lube Chart on pages 22-23.
    A. Each lubrication point is marked.
    B. Check automatic pressure lubricator at pump. 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 sodium (water soluble) base grease. (FINN part number 000698). DO NOT use lithium base (chassis lube) 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 disk 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, re-service the automatic lubricator.

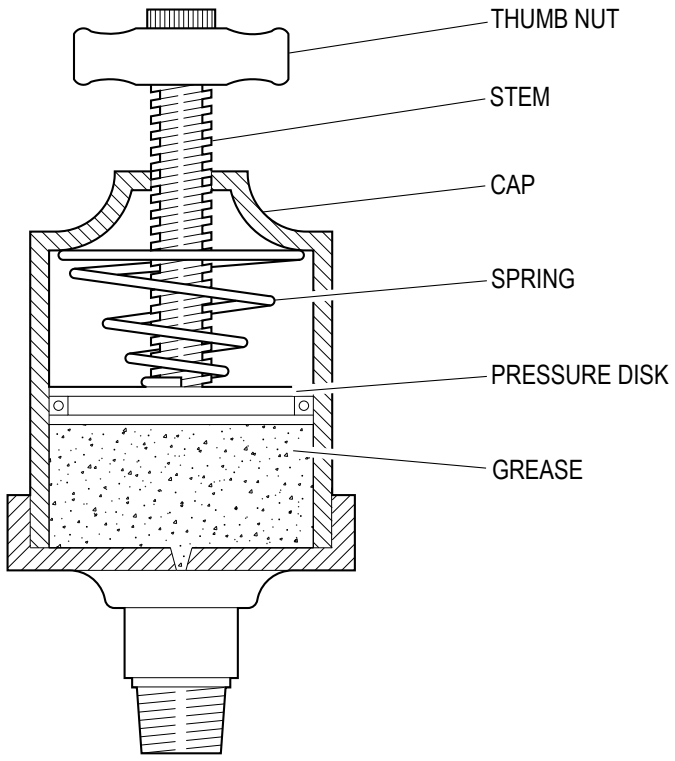


FIGURE 2 - Automatic Pressure Lubricator Components

TWO VALVE OPERATION:

The T90 HydroSeeder® is equipped with two independently operated ball valves to control slurry flow. One is located in the recirculation line below the platform, and the other is located in the discharge line above the platform. The recirculation valve is open when the handle is in line with the valve ports and is closed when the handle is at a right angle to the valve ports. The discharge valve is open when the "v" notch in the foot pedal is in line with the valve ports and is closed when the "v" notch is at a right angle to valve ports.

WARNING: **Never engage the slurry pump clutch when both valve handles are positioned as shown Figure 3. Both valves are closed and will result in extreme heat generation that will cause damage or bodily injury if the slurry pump is running.**

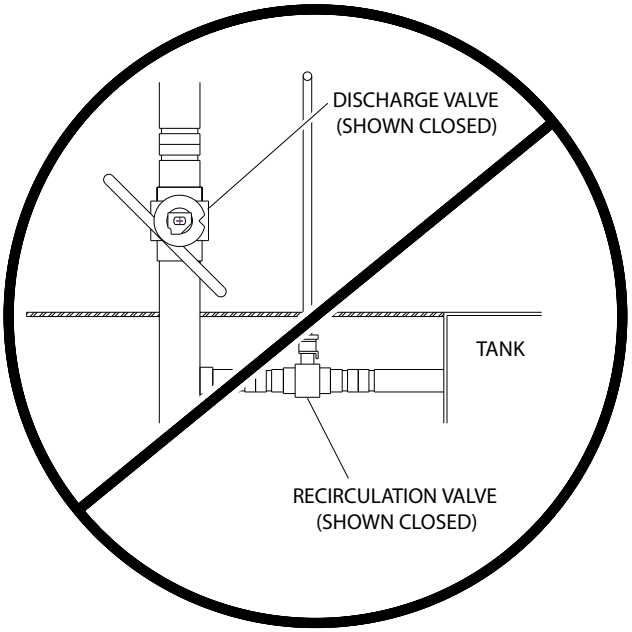


Figure 3 - NEVER Engage Slurry Pump Clutch w/Both Valves Closed

1. DISCHARGE THROUGH BOOM:

Flow is through boom with no flow through closed recirculation valve (Figure 4). Flow through boom is controlled by engaging and disengaging slurry pump clutch. Do not use the discharge valve to control distance. Valve should be either completely open or completely closed. Control the spray volume and spray distance by adjusting the engine RPM.

2. EXTENSION HOSE THROUGH BOOM:

Flow is through boom with no flow through closed recirculation valve (Figure 4). Extension hose is connected to boom and flow is controlled by engaging and disengaging pump clutch, or controlling the speed of the engine.

DANGER: **Do not use remote valve in this application.**

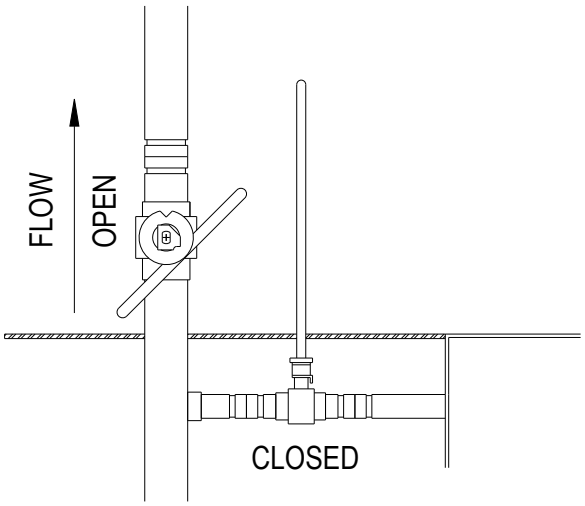


Figure 4- Discharge Through Boom or Extension Hose Through Boom

3. EXTENSION HOSE OR HOSE REEL THROUGH REMOTE PORT:

Flow is through recirculation with no flow through closed discharge valve (Figure 3). 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.

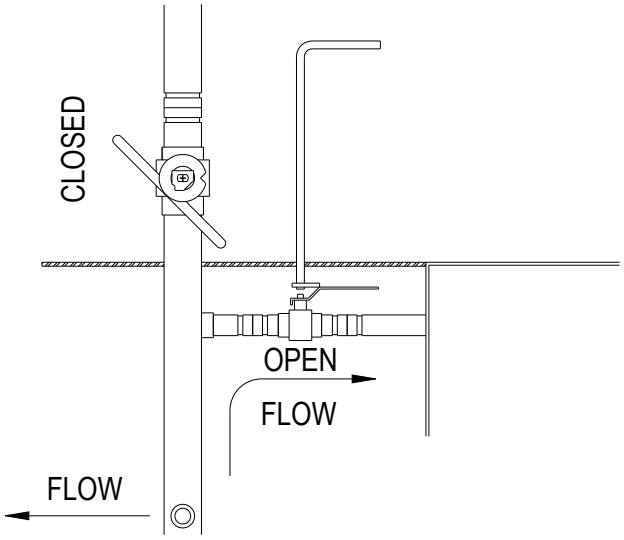


Figure 5 - Discharge Through Extension Hose or Hose Reel Through Remote Port

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.**

STARTING PROCEDURE:

CAUTION: **See safety section of the manual (pages 2-4) before operating the machine.**

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

1 Set throttle about 1/4 open.

2 Turn key counter-clockwise and hold it until the glow plug indicator light goes out.

3 While holding in the safety switch button, turn the key clockwise until the starter engages, and the engine starts.

4 Continue to hold the safety switch in for approximately 10 seconds. Allow engine to warm up for 3 to 5 minutes.

NOTE: This engine has a safety system which will shut the engine off if the engine oil pressure drops below 7 psi or if the water temperature reaches 230˚ Fahrenheit (110˚ Centigrade).

AREA COVERAGE - MATERIAL CAPACITY:

To determine the coverage per load for any HydroSeeder®, three questions must be answered prior to the application. First, is the job to be done "one step" (which is when the seed, fertilizer and mulch are applied proportionally per load) or "two step" (which is when the seed and fertilizer are applied alone and then covered by mulch as a second operation)? Second, at what rates (usually in pounds per 1000 square feet, or pounds per acre) are the seeding materials to be applied? Finally, what are the loading capacities of the HydroSeeder®?

Application rates vary for different geographic locations, but in general, seed is applied at 6-10 pounds per 1000 square feet; fertilizer is applied at a rate of approximately 400 pounds per acre; and fiber mulch is applied at 1500 to 2000 pounds per acre. (Note: There are 43,560 square feet in an acre). Local agronomists, agricultural extension agents, or soil and water conservation officials should be contacted for more specific information on application rates for a given area.

The following tables on page 13 show loading versus coverage rates for the Finn HydroSeeder®. Table A shows rates for "one step" applications. The coverage area is determined by the fiber mulch capacity of the HydroSeeder®, and the rate at which it is applied. Table B shows the area coverage when seeding only, where little or no mulch is applied. The coverage area is determined by the granular solids capacity of the HydroSeeder®, and the rate at which the solids are applied.

TABLE A

USING SEED, FERTILIZER AND MULCH

Unit	Amount of Material in Tank (pounds(kilograms))			Coverage Area
	Seed	Fertilizer	Mulch	(sq. ft.(sq.m.))
T90 II	92 (41)	107 (48.5)	400 (181)	11,600 (1,075)

Above Table is based on 1,500 pounds (680.39 kg) of mulch, 400 pounds (181.44 kg) of fertilizer and 345 pounds (156.49 kg) of seed ((8 pounds (3.6287 kg)/1000 square feet) per acre.

TABLE A EXAMPLE:

$$\frac{\text{400 Pounds (181.44 kg) Mulch per Tank}}{\text{1,500 Pounds (680.39 kg) Mulch per Acre}} = 0.267 \text{ Acre per Load}$$

400 Pounds (181.44 kg) Fertilizer per Acre x 0.267 Acre = 107 (48.534 kg) Pounds Fertilizer per Load
345 Pounds (156.49 kg) Seed per Acre x 0.267 Acre = 92 (41.731 kg) Pounds Fertilizer per Load

TABLE B

SEED AND FERTILIZER ONLY

Unit	Amount of Material in Tank (pounds(kilograms))			Coverage Area	
	Seed	Fertilizer	Total	(sq. ft.(sq.m.))	Acrage (Hectare)
T90 II	784 (356)	900 (408)	1,684 (764)	97,906 (9,095)	2.25 (0.91)

Above Table is based on rates of 8 pounds (3.6287 kg) seed and 9.2 pounds (4.1731 kg) fertilizer per 1000 square feet.

TABLE B EXAMPLE:

$$\frac{\text{1,684 Lbs. (763.85 kg) Tank Capacity (Solids)}}{\text{8 Lbs. (3.6287 kg) Seed + 9.2 Lbs. (4.1731 kg) Fertilizer per 1,000 Sq. Ft.}} = 97{,}906 \text{ Square Feet per Load}$$

$$\frac{\text{8 Lbs. (3.6287 kg) of Seed}}{\text{1,000 Sq. Ft.}} \text{ X 97,906 Square Feet = 784 Lbs. (355.62 kg) Seed per Tank}$$

T90 II		
Gallons (Liters)	in. (cm) from top	in. (cm) from bottom
800 (3028)	10 (25.4)	42 (106.7)
750 (2839)	12.25 (31.1)	39.75 (101.0)
700 (2650)	14.25 (36.2)	37.75 (95.9)
650 (2460)	16.25 (41.3)	35.75 (90.8)
600 (2271)	18.25 (46.4)	33.75 (85.7)
550 (2082)	20.25 (51.4)	31.75 (80.6)
500 (1893)	22.5 (57.2)	29.5 (74.9)
450 (1703)	24.75 (62.9)	27.75 (69.2)
400 (1514)	26.75 (67.9)	25.75 (65.4)
350 (1325)	29 (73.7)	23 (58.4)
300 (1136)	31.25 (79.4)	20.75 (52.7)
250 (946)	33.5 (85.1)	18.5 (47.0)
200 (757)	36 (91.4)	16 (40.6)
150 (568)	39 (99.1)	13 (33.0)
100 (378)	42.25 (107.3)	9.75 (24.8)
50 (189)	46 (116.8)	6 (15.2)

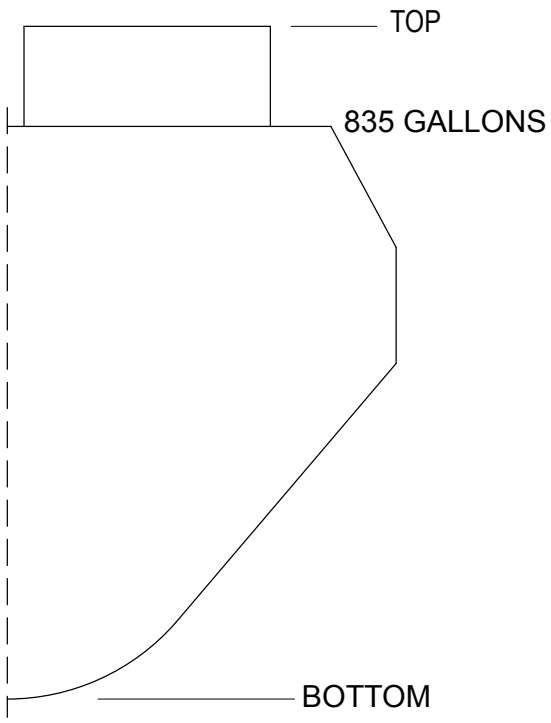


FIGURE 6 - Tank Capacity

LOADING (FOR WOOD FIBER MULCH, IF LIMING SEE PAGE 19):

CAUTION: Take care not to lose pens, lighters, etc. from shirt pockets or drop pieces of paper or plastic bags into the tank, as these might plug the slurry system.

1. With clutch disengaged and agitator control in the neutral position, start engine and allow it to warm up (See starting procedure page 12).
2. Start filling the unit with water. When water reaches the top of the agitator shaft, move agitator control to full reverse position.

   Fill the tank with water from any stream or pond using a fill pump. When filling from a pond or stream be sure to use a suction strainer to filter out contaminants which could damage the pump and unit. Other sources of water:

   A. Any pressure source, eg. fire hydrant. This unit is supplied with a 6" (15.2 cm) air gap fill port but it is necessary to consult with local authorities before using water main in order to abide to all local ordinances.
   B. Water tanker.

3. Piping System Cleanout Procedure (Purging Line):
    A. Remove discharge nozzle and gasket from discharge boom.
    B. Aim discharge boom assembly into an open area away from any persons, obstructions or high voltage power lines.
    C. Open discharge valve and close recirculation valve.
    D. Increase engine speed to approximately 1/2 to 3/4.
    E. Engage clutch with a firm snap. Do NOT slip clutch.
    F. When discharge stream is clear, open recirculation valve and close discharge valve. After recirculation stream is clear disengage clutch.
    G. Replace gasket in discharge boom.
4. Continue filling tank with water.
5. Increase engine speed to full RPM.
6. Start loading dry material, loading the lightest material first. Agitator control should be in full reverse for mixing.
    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.) When using quick swelling seeds load them just prior to application.
    B. Wood Fiber Mulch - Empty the entire bag in or cut bag and drop in the sections of fiber. The amount of mulch to be used should be loaded by the time the water level is at 3/4 full. If agitator stalls or a high pitch squeal comes from the hydraulic system, reverse agitation to forward for a moment to clear the obstruction, then return agitation to reverse.

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

    C. Fertilizer - Stand over hatch opening and drop the bag onto the bagcutter. Grasp both ends of the bag and dump material.
    D. All other additives - Consult with manufacturer for proper loading technique.
7. When all materials are loaded and in suspension, and the tank is full, move the agitator to neutral then full speed forward to insure all material is mixed. It may be necessary to change the agitator direction more than once to insure a thorough mixture.
8. After material is thoroughly mixed, slow agitator in forward direction to 1/2 to 3/4 speed or enough to create movement in all of the corners of the tank. Do not over agitate the slurry. Always discharge the material with the agitator control in forward position.
9. Close the hatch lid on the slurry tank.

NOTE: The slurry should not be recirculated for more than 15 minutes prior to discharge to reduce wear and keep seed from swelling.

NOTE: If foaming occurs, reduce agitator speed.

PRIOR TO APPLICATION:

1. Operator 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 or towing vehicle to signal for start, stop, turn, etc. through the use of the signal horn.
3. Operator 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	Nozzle ID	Distance	Width	Discharge Time
Lg. Long Distance		Up to 180-ft (55 m)	-	5.5 min.
Sm. Long Distance	Brass	Up to 140-ft (42 m)	-	12 min.
Narrow Ribbon	151000	Up to 105-ft (32 m)	15.8-ft (4.8 m)	5.5 min.
Wide Ribbon	501000	Up to 75-ft (23 m)	20.5-ft (6.3 m)	5.5 min.

APPLICATION OF SLURRY:

I. GENERAL APPLICATION TECHNIQUES

DANGER: **Do not spray toward power lines, transformers or other high voltage conductors.**

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

1. Determine which nozzle would best suit the application needs according to the nozzle selection chart above.
2. Application of seed, fertilizer and lime: Elevate discharge nozzle no less than 10˚ above the area to be sprayed, allowing the slurry to gently rain onto the seed bed.
3. Application of wood and paper fiber: Whenever possible aim the stream towards the ground to create a surface with small pock marks which help get seed in contact with ground. Do not allow the stream to blast away the surface of the seed bed.

4. Generally the most remote area of the seed bed should be covered first. Distance is controlled by engine speed and nozzle selection. Do NOT partially close the valve to control the distance.
5. While moving along area to be seeded, the operator should move the nozzle back and forth in a slow, even arc.
6. If application is to be interrupted for a short period of time, leave the valves open and disengage the clutch. Re-engage the clutch to continue application.
7. It may be necessary to slow the agitator as the tank empties to reduce foaming.

II. DISCHARGE THROUGH THE BOOM:

1. 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, disengage the clutch; then re-engage to continue spraying.
2. When the tank is empty, or when discontinuing discharge for an extended period of time, 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. Move the agitator control to the neutral position.

III. 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.

A. PUMP TAKE OFF SYSTEM OR HOSE REEL WITH REMOTE VALVE :

1. Open recirculation valve and close discharge valve and close remote valve at the end of the hose.
2. Engage clutch. When stream is flowing freely through the recirculation line, open the pump take off valve.

CAUTION: **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. Open the pump take off valve and the remote valve slowly and only after the hose operator is firmly positioned and has firm control of hose.**

3. With the engine at 3/4 speed, open the remote valve at the end of the hose to discharge the load.
4. 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.
5. If another load is to be done, see reloading procedure on page 18. 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.**

B. EXTENSION HOSE SYSTEM - WITHOUT REMOTE VALVE:

1. Connect the extension hose into the end of the discharge boom.
2. A person controlling the end of the hose directs a second operator at the machine to control the clutch and adjust the engine speed.

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. Engage the clutch only after the hose operator is firmly positioned and has firm control of hose.**

3. When hose operator is ready, signal the second operator to engage clutch and slowly increase the engine RPM until the desired discharge pressure is reached.
4. 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.
5. If another load is to be done, see reloading procedure below. If finished for the day, follow clean up procedure and flush out the hose.

RELOADING PROCEDURE:

1. Start at step 2 in loading procedure on page 14.
2. After last load of the day refer to the cleaning and maintenance section of the manual on pages 20-21.

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. This unit was designed for the application of agricultural grade lime only.

PROCEDURE:

1. With clutch disengaged and agitator control in neutral position, start engine and allow it to warm up (see starting procedure on page 12)
2. Start filling the unit with water. When water reaches the top of the agitator shaft move agitator control to approximately 1/2 speed reverse.
3. Open both the recirculation and discharge valves.
4. Remove the discharge nozzle and gasket from the discharge boom.
5. Aim the discharge boom assembly into an open area away from any persons, obstructions or high voltage power lines.
6. Move the throttle to approximately 1/2 engine speed.

7. Engage the clutch, and move the throttle to full engine speed. A stream of water should be coming from the end of the recirculation pipe beside the hatch opening, as well as from the boom.
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. 20 lbs. (9.02 kg) of granular solids displaces approximately 1 gal. (3.8 l) of water. When filling the tank with water the volume of granular solids must be accounted for. For example; If using the maximum recommended capacity of 2,500 lbs (1,134 kg), 125 gal. (473.17) (2,500 / 20) would have to be subtracted from the total tank capacity 940 gal.(3,558.27 l) - 125 gal.(473.17 l) = 815 gal.(3,085.09 l) If 1,000 lbs. (453.59 kg) of solids were used, 50 gal. (189.27 l) (1,000 / 20) would have to be subtracted 940 gal. (3,558.27 l) - 50 gal. (189.27 l) = 890 gal. (3,369 l). 11. Fill the tank to the required capacity for the rate of granular solids to be applied.
12. Load the material (see "Loading" page 15, steps 5-8).
13. When ready to apply slurry, install gasket and nozzle into boom.
14. Move agitator control to 3/4 speed, forward.
15. 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.**

16. Apply the slurry (see "Application of Slurry" pages 16-17).
17. If another load is to be applied, start again at step "1". If finished, follow the clean-up procedure.

CLEANING AND MAINTENANCE:

AFTER FIRST 4-8 HOURS OF OPERATION:

1. Check and adjust clutch - see page 27.
2. Re-torque wheel lugs - again after 7 days. (Trailer option only).

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 boom.
   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 momentarily.
   F. Disengage clutch, idle the engine, move valve handle to discharge position, move agitator handle to neutral and turn off the engine.
   G. Always remove the drain plug and allow the tank to drain.
   H. In freezing weather leave main tank drain plug out and remove pump drain plug. Move all slurry valves to open position.
   I. Wash the outside of HydroSeeder®, including the radiator, to remove any corrosive materials.
   J. If using lime - the daily maintenance should be performed after every load.
   K. Cleaning out extension hoses.

2. Lubricating the HydroSeeder® (see lube chart pages 22-23).

   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 9).
   C. Check the engine oil and replenish when necessary. Change oil and filter after first 50 hours then 200 hours thereafter. Consult the engine operator's manual for the correct grade of oil and the engine break-in procedure.

   NOTE: Change engine oil and filter at least once anually even if the 200 hours have not been met.

   D. 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 four grease fittings on the clutch/pump.

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 with the engine off.
5. Check the anti-freeze in the radiator.
6. Inspect the slurry-tank for build up of residue in the suction area and clear if necessary.
7. Check and clean engine radiator. Flush with clear low pressure water and blow dry with compressed air. Do NOT use high pressure water spray.

SEASONAL AND WINTER STORAGE MAINTENANCE:

1. Drain the slurry tank of all water prior to storage and leave the drain plug disconnected.
2. Park unit in suitable location and chock wheels to prevent inadvertent movement.
3. If possible cover machine with tarp or park inside of an enclosure.
4. Store the HydroSeeder® with all slurry valve handles in the open position. To prevent damage from freezing, it is advisable to remove all slurry valves and store in a heated area.
5. Pour one quart of mineral oil or environmentally safe lubricant into the pump housing and spin pump by hand to prevent rust in the pump. Remove drain plug.
6. Chip and steel brush any interior rust spots in the slurry-tank and touch up with paint. See numbers 2 and 3 in Maintenance Section (IV) of the Safety Summary Section page 4.
7. Lubricate all fittings.
8. Check anti-freeze in radiator.
9. Lubricate equipment again just prior to starting operation after storage.
10. Change hydraulic oil and filter. (400 hours)
11. Disconnect battery cables. In cold weather, remove battery and store in safe warm place.
12. Add fuel stabilizer to fuel tank.

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 19 gallons of ISO Grade 46 hydraulic oil. 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 25 micron absolute filter - Finn part #021618. The hydraulic system relief is factory set at 2,100 psi.

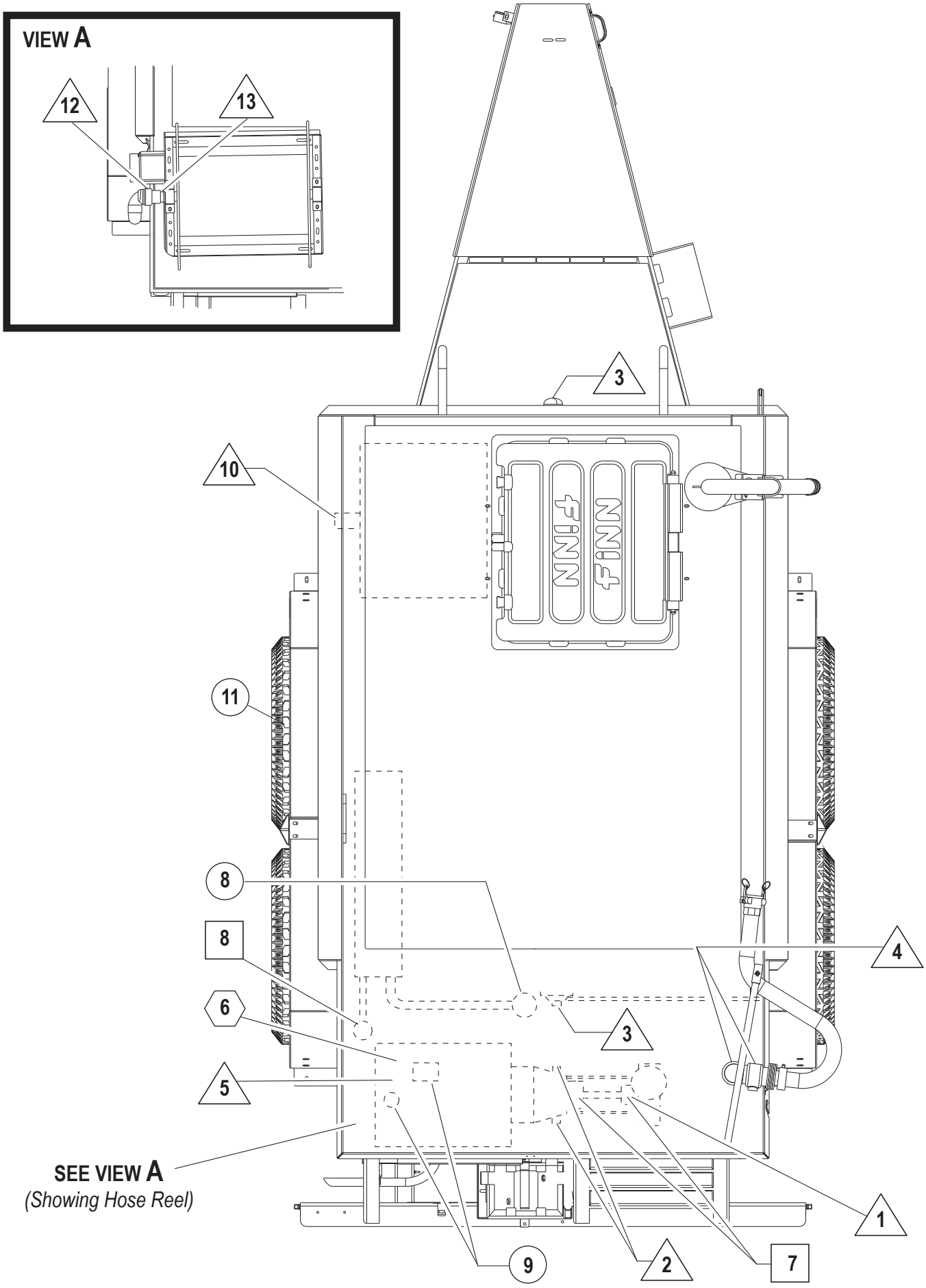


Figure 7 - Lubrication & Adjustment Points

LUBRICATION AND FLUIDS CHART

(Reference Figure 7)

Ref. No.	Location	Lubricant	Frequency	Number
1	Check Grease Level in Pressure Lubricator	SL	Daily	1
2	Check Clutch Lever Bearings	CL	Daily	2
3	Grease Agitator Shaft Bearings	CL	Daily	2
4	Grease Discharge Swivels	CL	Daily	1
5	Check Engine Oil Level	MO	Daily	1
6	Change Engine Oil and Filter	MO	See Engine Manual	1
7	Grease Pump Bearings	CL	Weekly	2
8	Check Hydraulic Fluid Level	HO	Weekly	1
	Check Hydraulic Fluid and Filter	HO	Seasonally	1
9	Change Engine Coolant	AF	Seasonally	1
10	Check Fuel Tank	DF	Daily	1
11	Repack Wheel Bearings	CL	Seasonally	4
12	Check Hose Reel Swivel	CL	Daily	1
13	Hose Reel Hank Crank Shaft	CL	Weekly	1

LUBRICANT OR FLUID USED

SL	Bearing Lube (Soda Base)
CL	Chassis Lubricant
MO	Motor Oil See Engine Manual Recommendations
HO	Hydraulic Oil, ISO Grade 46
AF	50/50 Anti-Freeze and Water Mixture
DF	Diesel Fuel

TIME KEY

Daily (8 hours) △
Weekly (40 hours) □
Seasonally (500 hours) ○
See Engine Manual ⬡

FLUID CAPACITIES

Diesel Fuel - 14 Gallons (53 L)
Engine Oil - 6 Quarts (6 L)
Engine Coolant - 1.5 Gallons (6 L) 50/50 Mix Only
Hydraulic Fluid - 19 Gallons (72 L)

CLUMP MAINTENANCE:

CAUTION: **Clump maintenance should to be done only while engine is not running, and battery cables are disconnected.**

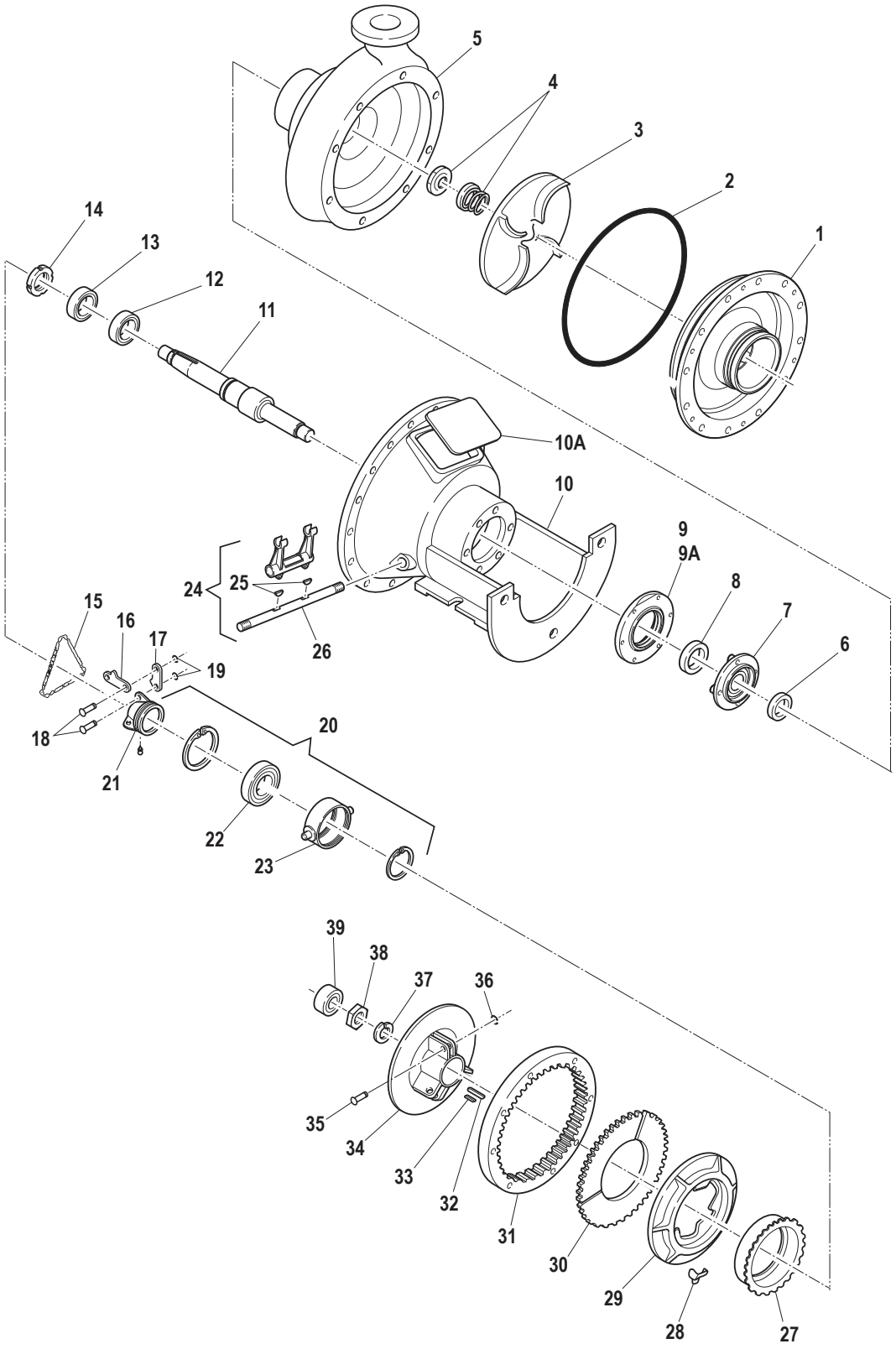


Figure 8 - Clump Assembly Components

CLUTCH/PUMP ASSEMBLY

(Reference Figures 8 and 9)

Ref. No.	Part Number	Description	No. Req'd
1	005146	Suction Cover	1
1B	X0824SS	Suction Cover Bolt	4
1N	Y08SS	Suction Cover Nut	4
2	006437	O-Ring	1
3	005543	Impeller	1
4	006443	Mechanical Seal Assembly	1
5	005144	Pump Casing	1
5B	X0824SS	Suction Cover Bolt	8
5W	W08FSS	Suction Cover Washer	8
6	006444	Grease Retainer Seal	1
7	005446	Flange Bearing	1
7B	X0724SS	Flange Bearing Bolt	4
7LW	W07LSS	Flange Bearing Lock Washer	4
8	005447	Grease Retainer Seal	1
9	005475	Bearing Retainer	1
9A	005544-02	Sealing Gasket	1
9B	X0512SS	Thrust Bearing Retainer Bolt	6
10	005670	Clutch/Pump Frame Housing	1
10A	005570	Nameplate	1
10B	XST0408SS	Nameplate Screw	2
11	005541	Shaft	1
12	005450	Radial Ball Bearing	1
13	005449	Radial Ball Bearing with Seal	1
14	005448	Bearing Lock Nut	1
15	100211	Spring Lever	1
16	100212	Lever	3
17	100215	Connecting Link	6
18	100216	Link Pin	6
19	100217	Retaining Ring	6
20	100327	Release Sleeve and Bearing Assembly	1
21	100328	Release Sleeve	1
22	100330	Release Bearing	1
23	100329	Bearing Carrier	1
24	100073	Clutch Yoke Assembly	1
25	100042	Woodruff Key	2
26	100041	Cross Shaft	1
27	100210	Adjusting Ring	1
28	100214	Adjusting Lock	1
29	100208	Pressure Plate	1
30	100209	Clutch Facing	1
31	100218	Drive Ring	1
32	100056	Clutch Key	1
33	100219	Separator Spring	1
34	100207	Clutch Body	1
35	100213	Pivot Lever Pin	3
36	100008	Retaining Ring	3
37	100047	Lock Washer	1
38	100045	Drive Shaft Nut	1
39	005151	Pilot Bearing	1
40	160234	Pipe Plug	2
41	007705	Grease Fitting	2

PUMP MAINTENANCE SECTION: (Reference Figures 5 and 6)

CAUTION: **Pump maintenance to be done only while engine is not running, and battery cables are disconnected.**

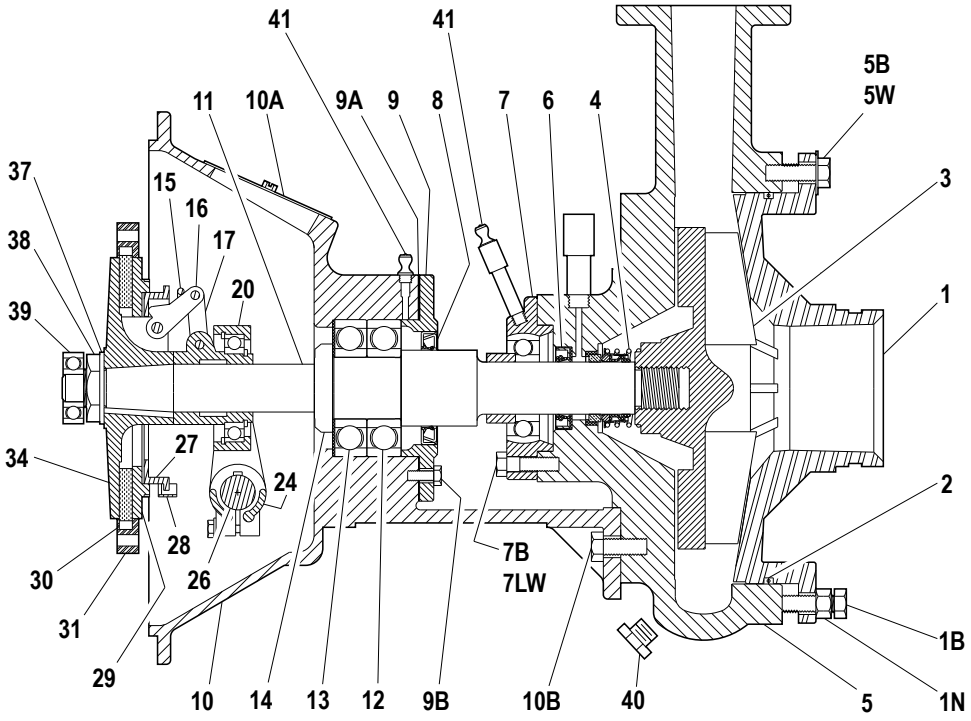


Figure 9 - Cross-Section Through Clump

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 (3) and the suction cover (1). This measurement on a new pump is between .040-.045 of an inch (1.00-1.15 mm).

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

1. Push suction cover (1) into casing (5) until suction cover hits impeller (3). Impeller should be in full contact with suction cover.
2. Tighten cap screws (5B) finger tight. Impeller should rub the suction cover and not turn easily through one revolution.
3. Tighten cap screws (1B) to 15 lb. ft.(165 kg/m). Impeller should turn freely through one revolution.
4. Back off cap screws (5B) 1-1/2 turn.
5. Tighten cap screws (1B) 1-1/2 turn and tighten nuts (1N) to 15 lb.ft.(165 kg/m).
6. Tighten cap screws (5B) to 15 lb. ft. clearance gap should be about .040 inches (1.00 mm). 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.** (2.07 kg/m). Doing so can crack the flange of the suction cover.

C. CLEANING.

1. To clean pump impeller (3), 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 (5B) holding the suction cover (1) in place. Remove suction cover, being careful not to damage the O-Ring gasket (2).
3. Take the impeller wrench, which is stored in the toolbox, and position it so that the hole is aligned with any of the eight tapped holes in the front of the pump casing (5). The 90˚ 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 bolts (5B). 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.

D. INSTALLING NEW SEAL ASSEMBLY (#4) (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. To replace the seal assembly (4), perform the above operations under cleaning and remove pump casing (5) by removing the three bolts (10B) holding the casing to the clutch housing (10).
2. After cleaning all parts including pump shaft, begin the reassembly of the pump. Install seal grease retainer (6) with the cavity portion of the seal facing outward. Rebolt the casing onto the clutch housing using the three cap screw (10B). Using a light oil lubricant (3 in 1), install the ceramic seat with its 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.
3. Install the seal spring on the hub of the impeller. After coating the threads on the pump shaft with an anti-seize compound, install the impeller - seating it securely.
4. Utilizing the rubber O-Ring gasket (2) reinstall suction cover using the eight cover bolts (5B). 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 (2.07 kg/m) on the torque wrench.
5. After reinstalling the suction pipe assembly, lubricate and tighten the victaulic clamps. Service the automatic lubricator.

CLUTCH MAINTENANCE SECTION: (REFERENCE FIGURES 8 AND 9)

CAUTION: Clutch maintenance to be done only while engine is not running, and battery cables are disconnected.

A. ADJUSTMENT - If the clutch does not pull, overheats, or the clutch operating lever jumps out, the clutch must be adjusted. Proceed as follows:

1. Remove the hand hole nameplate (10A) in the housing (10) and rotate the clutch until the adjusting lock collar and lock screw (28) can be reached. Remove or disengage the adjusting lock (28) being careful not to drop it into the housing.
2. Turn the adjusting ring (27) 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 the table below to determine the correct handle pressure.

Clutch Size	Reference Handle Length	Pressure at Lever
7-1/2"	7-5/8"	110 to 130 Lbs

IMPORTANT: 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.

B. LUBRICATION.

1. Lubricant: Use any high grade, Lithium Base #2, short fiber grease having an operating temperature of 200˚ F (93˚ C), recommended for roller bearings may be used.

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

2. Anti-Friction Bearings: Shaft bearings should be lubricated after each 50 hours of operation through fittings (41) with a short fiber, high grade, high temperature, Lithium Base #2 lubricant having an operating temperature of 200˚ F (93˚ C). Use the same lubricant to occasionally lubricate the two fittings at the cross shaft (26).
3. Clutch Lever and Linkage: Levers and linkage should be lubricated with engine oil after every 500 hours of operation.

IMPORTANT: Lubricate sparingly to avoid oil on clutch facings.

C. REMOVAL OF CLUTCH/PUMP FROM ENGINE.

1. Remove the clamps and piping from the suction and discharge side of the pump.
2. Place a jack under the bell housing of the engine to support the rear of the engine after the clutch/pump has been remvoed.
3. Engage the clutch handle, atop the operator's platform, to hold clutch facings in place when removing the clutch from the engine. Unbolt the rod which connects the clutch operating lever to the operator's platform clutch handle
4. Attach a suitable lifting device to the clutch/pump frame housing (10). Remove the hex head cap screws that secure the clutch housing to the engine flywheel housing and the two bolts holding the housing to the HydroSeeder® frame.

IMPORTANT: Caution should be exercised when removing clutch/pump housing from the engine so that the facings and pilot bearing are not damaged.

5. Support the housing assembly on blocks with the output end of the shaft down.
6. Remove the hand hole nameplate (10A) from the housing for improved access to internal parts.

D. CLUTCH FACING PLATES (ITEM 30) REPLACEMENT: A common indication that the facings' friction surface is worn out is that the adjusting ring cannot be turned any tighter. To replace the facing plates remove the clutch/pump from the engine as described above and proceed as follows:

1. Disengage the clutch operating lever and remove the old facing plates (30).
2. Insert the new facing plates (three segments) in between the clutch body (34) and the pressure plate (29), and center the facings as close as possible.
3. Lock the clutch facings between the pressure plates as follows:
    A. Remove the drive ring (31) from the engine flywheel so that it can be used to center the facings.
    B. With the clutch assembly resting on a workbench, turn the clutch adjusting ring COUNTER-CLOCKWISE until the pressure plate (29) almost contacts the clutch facing (30).
    C. Place clutch driving ring over clutch facings with teeth in driving ring in mesh with teeth of clutch facings, and locate driving ring centrally relative to the pressure plate and clutch body.

        NOTE: If driving ring is not properly located relative to the 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.

    D. Engage the clutch by applying pressure on top of release sleeve and collar assembly (20) 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 engaged until the clutch assembly is attached to the engine.

4. Remove clutch driving ring (31) from the clutch facings and attach it to the flywheel with the specified bolts and lock washers.
5. Before re-installing clutch onto engine lubricate the release sleeve (21) through the grease fitting mounted on its side.
6. To re-install the clutch/pump assembly onto the engine, reverse the procedure outline under C. Removal of Clutch/Pump from engine on page 28.
7. When clutch/pump are re-installed check handle engage pressure and adjust if necessary.

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 and a drop in pressure and distance.

Some solutions are:

    A. As the slurry level drops in the tank, slow the agitator.
    B. Add 2 or 3 ounces (4 to 6 cl) of an antifoaming agent 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.
    D. Limit recirculation time as much as possible.

2. Plugging or clogging:

DANGER: Turn off engine and disconnect battery cables 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, shut off the suction line valve
   C. Remove the clamp closest to the pump.

NOTE: If no water comes out, it means 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.
   G. Open suction line valve.

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 plug 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 obstruction.

TROUBLE SHOOTING YOUR HYDROSEEDER®:

Problem	Probable Causes	Suggested Solutions
LEAKS:		
Tank bearing Leaks.	Lack of lubrication - seal worn.	Replace seal and follow lube schedule.
	Bolts not tightened.	Tighten uniformly to 25 ft. lbs. Properly.
Pressure Clamps.	Rubber seal cracked, pinched or torn.	Replace, always grease seal before clamping shut.
Suction.	Rubber seal cracked, pinched or torn.	Replace, always grease seal before clamping shut.
Discharge Swivels.	Not greased often enough.	Rebuild swivels w/repair kit (part #6969, 2 required).
Pump Shaft.	Pressure lubricator not serviced.	Replace pump seal, service pressure lubricator daily.
Pump Suction Cover.	Cover O-Ring bad.	Replace cover O-Ring, use grease when replacing.
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 looses prime - lacks distance - leaves excessive amount in tank (100 gal (378 liters) or more).	Sucking air in suction lines.	Straighten agitator or shim, so it runs true.
	Air entrainment.	See page 27.
	Low engine RPM. (Below 2900 RPM-No load)	Check throttle cable and linkage, See authorized engine dealer.
	Soft water.	Slow the agitator.
	Too much agitation.	Slow the agitator.

TROUBLE SHOOTING YOUR HYDROSEEDER® (CONTINUED):

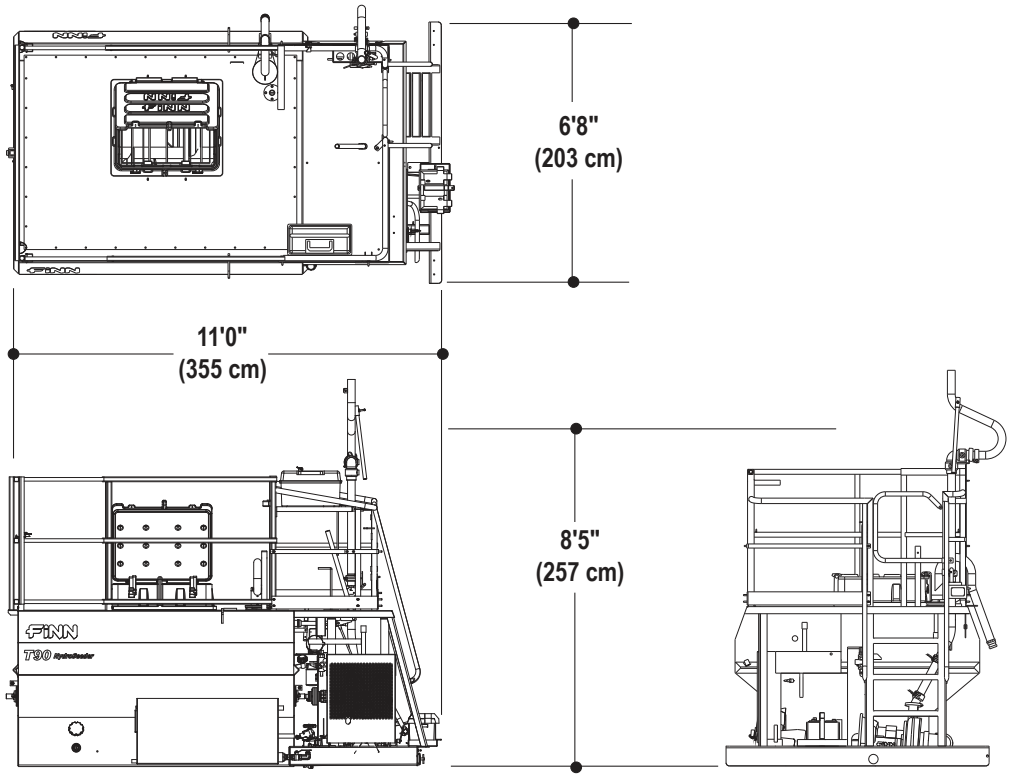
Problem	Probable Causes	Suggested Solutions
CLUTCH CONT'D:		
Pump looses prime - lacks distance - leaves excessive amount in tank (100 gal (378 liters) or more).	Pump worn.	Reset pump tolerance page 22.
	Suction partially plugged.	Clean out machine see page 16.
	Nozzle worn or plugged.	Clean nozzles, replace if necessary.
	Fertilizer.	Change type.
	Clutch slippage.	Readjust clutch page 23.
VALVE:		
Valve stuck:	Frozen.	Thaw out ice, lubricate. Leave in discharge position during storage.
Constant plugging during operation.	Foreign material in slurry.	Drain clean out tank. Check storage for foreign materials.
Constant plugging during loading and discharge.	Loading Hydroseeder before tank is half full of water.	Reinstruct your operator. (See page 11).
	Incorrect loading procedure.	Review loading procedure page 11.
	Improper operation by operation.	Reinstruct your operator. (Review Operators' Manual).
	Clutch slipping.	Readjust clutch see page 23.
	Not moving valve handle far enough.	Valve should be fully open.
	Machine not being flushed out prior to reloading.	See page11.
	Machine not being run at correct RPM during loading.	Reinstruct your operator. (See page 11).
Extension hose plugs after use.	Letting water run out, leaving wood fiber mulch to dry out.	If hose 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.	Out of adjustment.	Readjust clutch, instruction on page 23.
Jumps out of engagement.	Too loose or too tight.	Readjust clutch, instruction on page 23.

TROUBLE SHOOTING YOUR HYDROSEEDER® (CONTINUED):

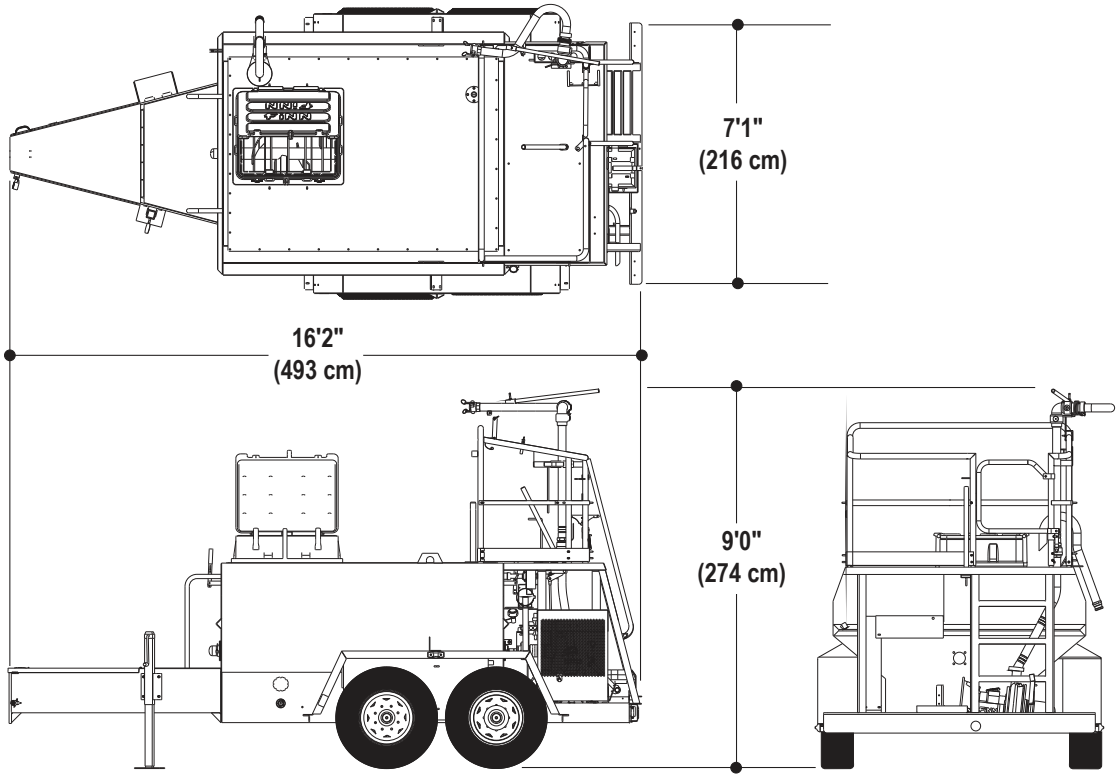
Problem	Probable Causes	Suggested Solutions
PUMP:		
Excessive wear.	Fertilizer with highly abrasive filler.	Change fertilizer. Avoid abrasive fillers.
	Overloading machine with dry material.	Load machine to recommended capacities.
	Too much time allowed between loading and discharging.	After loading and mixing has been completed, set agitator at 1/2 speed in reverse and discharge pump.
	Recirculating all the time.	Close recirculation valve when discharging through the boom.
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, great enough to break the impeller.**

T90 SKID-MOUNT HYDROSEEDER® TECHNICAL SPECIFICATIONS



T90 TRAILER HYDROSEEDER® TECHNICAL SPECIFICATIONS



FINN T90 HYDROSEEDER® TECHNICAL SPECIFICATIONS

POWER		Diesel Kubota V1505, 33.5 hp (25 kw), 4 cylinder water-cooled
ENGINE SAFETY SYSTEM		Low oil pressure, high temperature shutoff
TANK SIZE		940 gallon (3,558 liter) liquid capacity 800 gallon (3,028 liter) working capacity
FUEL TANK CAPACITY		14 gallon (53 liter)
PUMP		Centrifugal 4" x 2" (10 cm x 5 cm) 170 gpm @ 100 psi (646 lpm @ 7 kg/cm2), 3/4" (1.9 cm) solid clearance, external adjustment
PUMP DRIVE		Direct drive with over center clutch, pump drive is independent of agitator operation
AGITATION		Mechanical paddle agitation and liquid recirculation
AGITATOR DRIVE		Reversible, variable speed hydraulic motor drive (0-110 rpm)
DISCHARGE DISTANCE		Up tp 180' (55 m) from end of discharge tower
MAX. MATERIAL CAPACITY		2,500 lbs. (1,134 kg) granular solids 400 lbs. (181 kg) fiber mulch
NOZZLES		(1) narrow fan, (1) wide fan, (2) long distance
EMPTY WEIGHT	T90T	5,240 lbs. (2,458 kg)
	T90S	4,000 lbs. (1,814 kg)
WORKING WEIGHT*	T90T	14,670 lbs. (6,654 kg)
	T90S	13,250 lbs. (6,010 kg)
BRAKES		Electric on both axles with break-away switch
LIGHTS		D.O.T. including marker, identification lights and license plate light
TIRES		9.5" x 16.5" tubeless with highway tread, load range E
TRAILER AXLES		Tandem 7,000 lbs. (3,176 kg) rubber torsion with adjustable fenders
HITCH WEIGHT		Approx. 1,600 lbs. (762 kg)

** Working weights are approximate and do not include options or stored materials.*

NOTES

T90
HydroSeeder®
Parts Manual

Model SN

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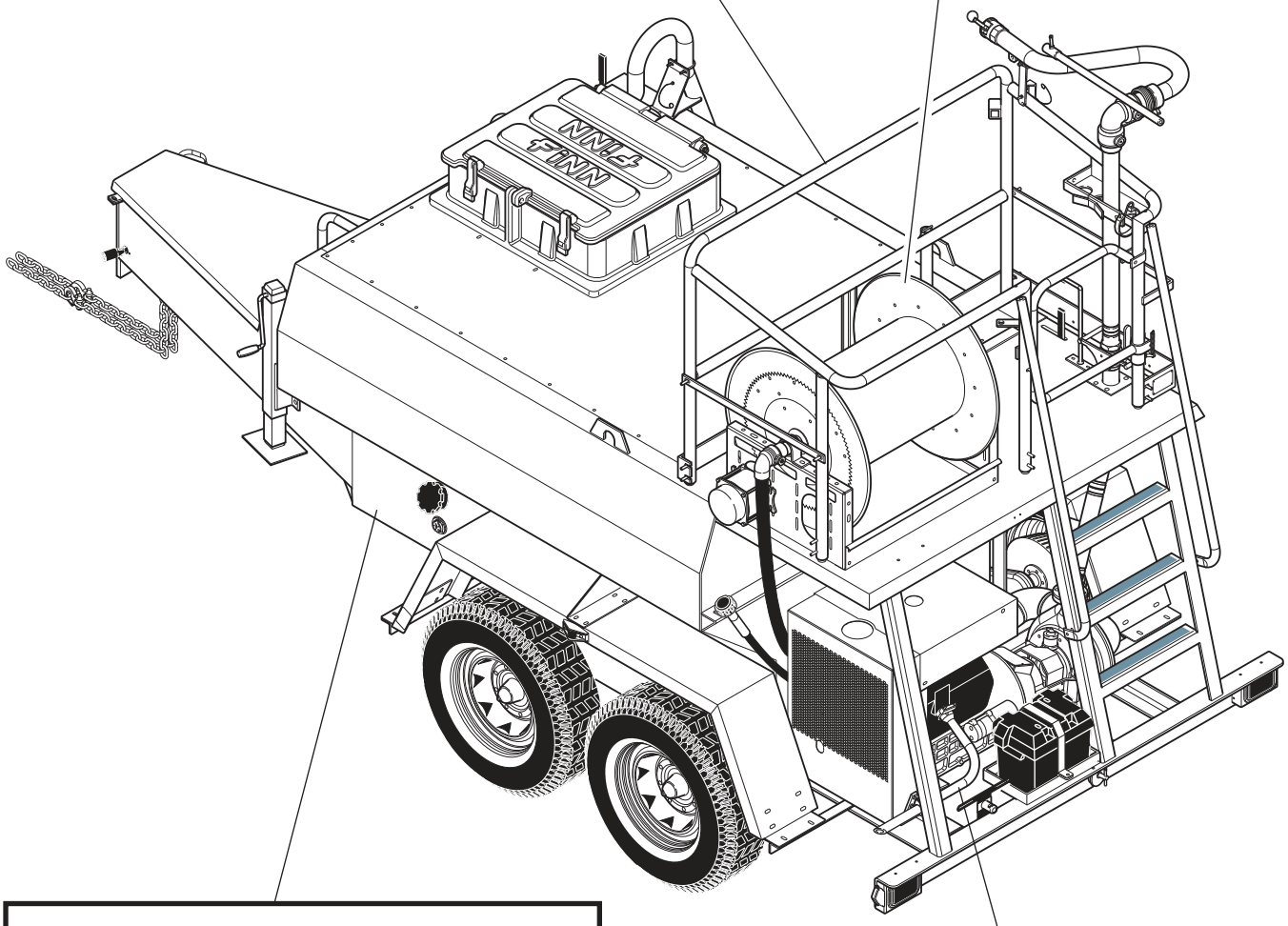

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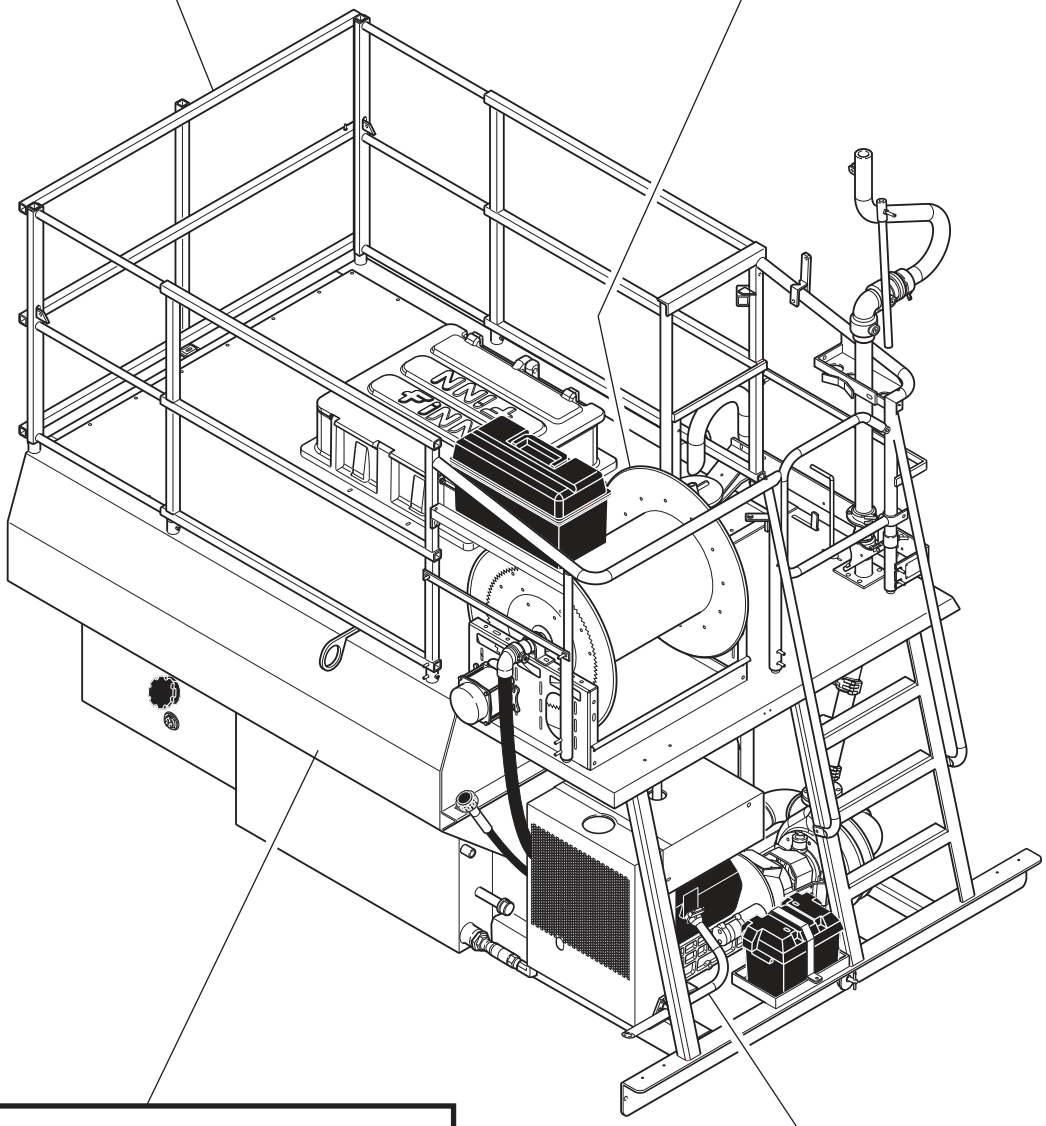

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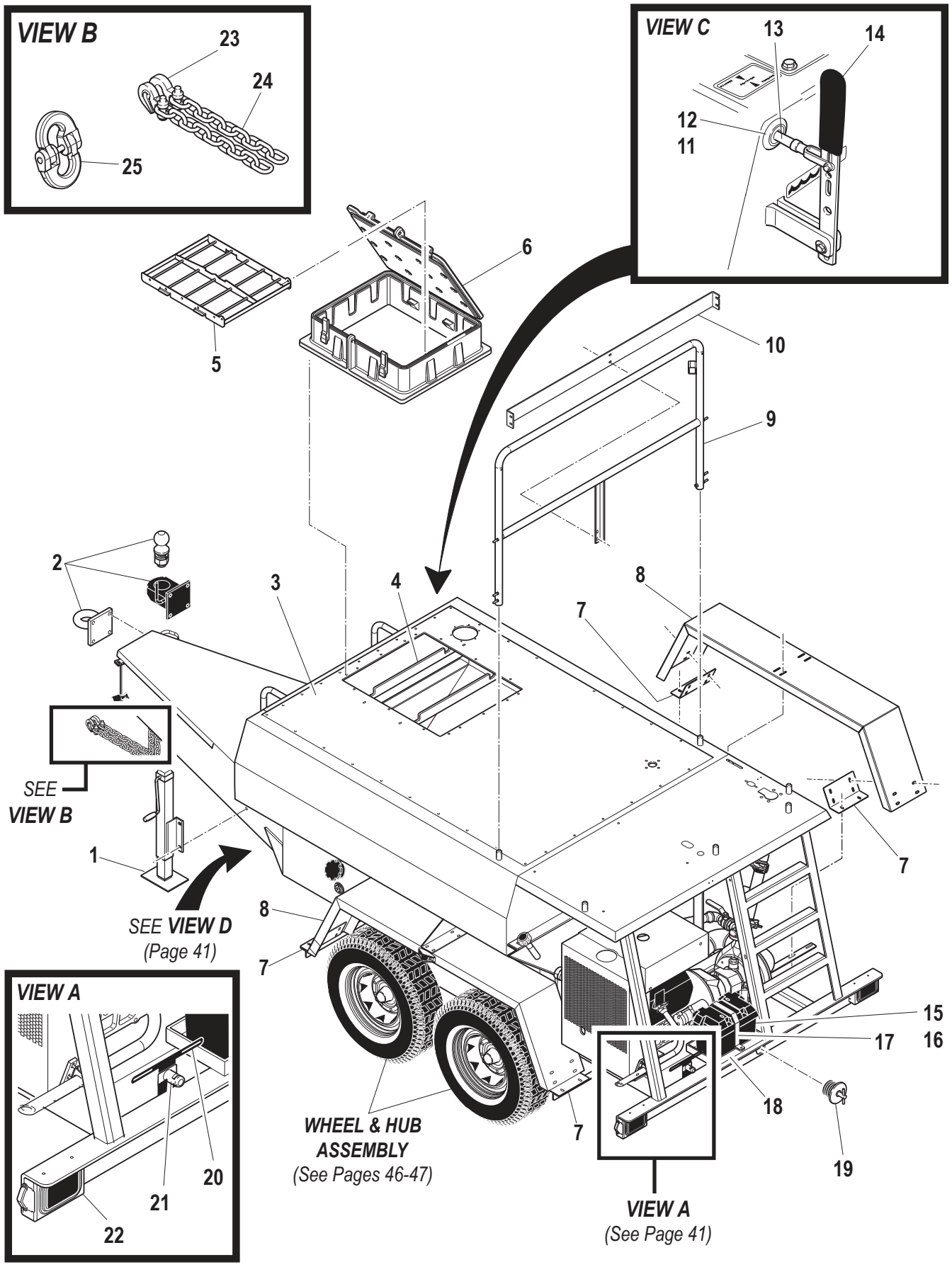
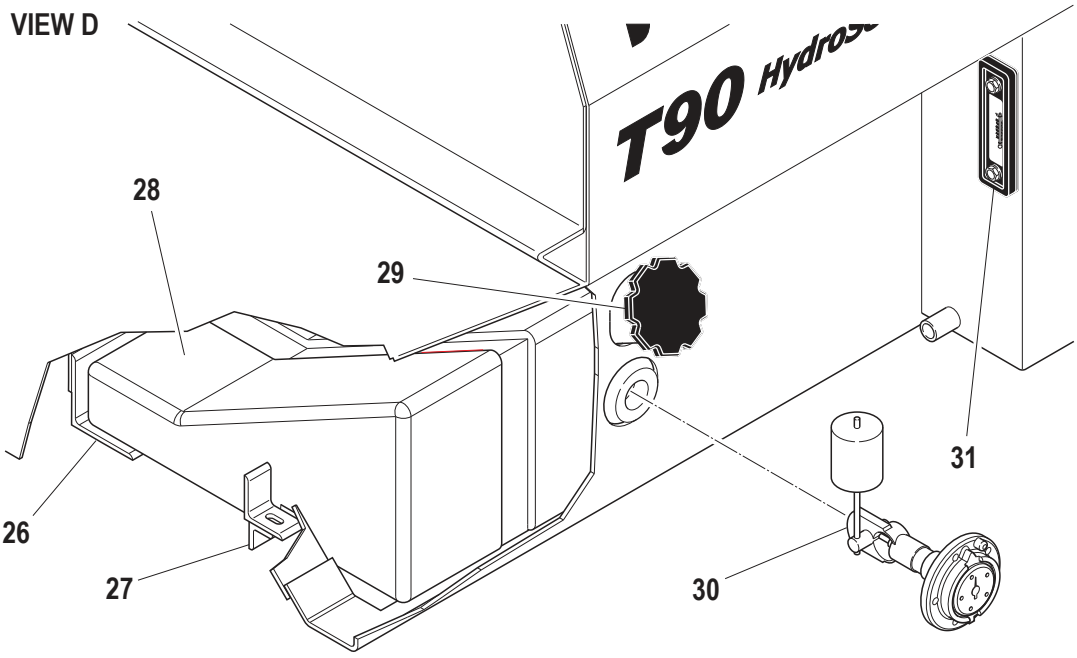


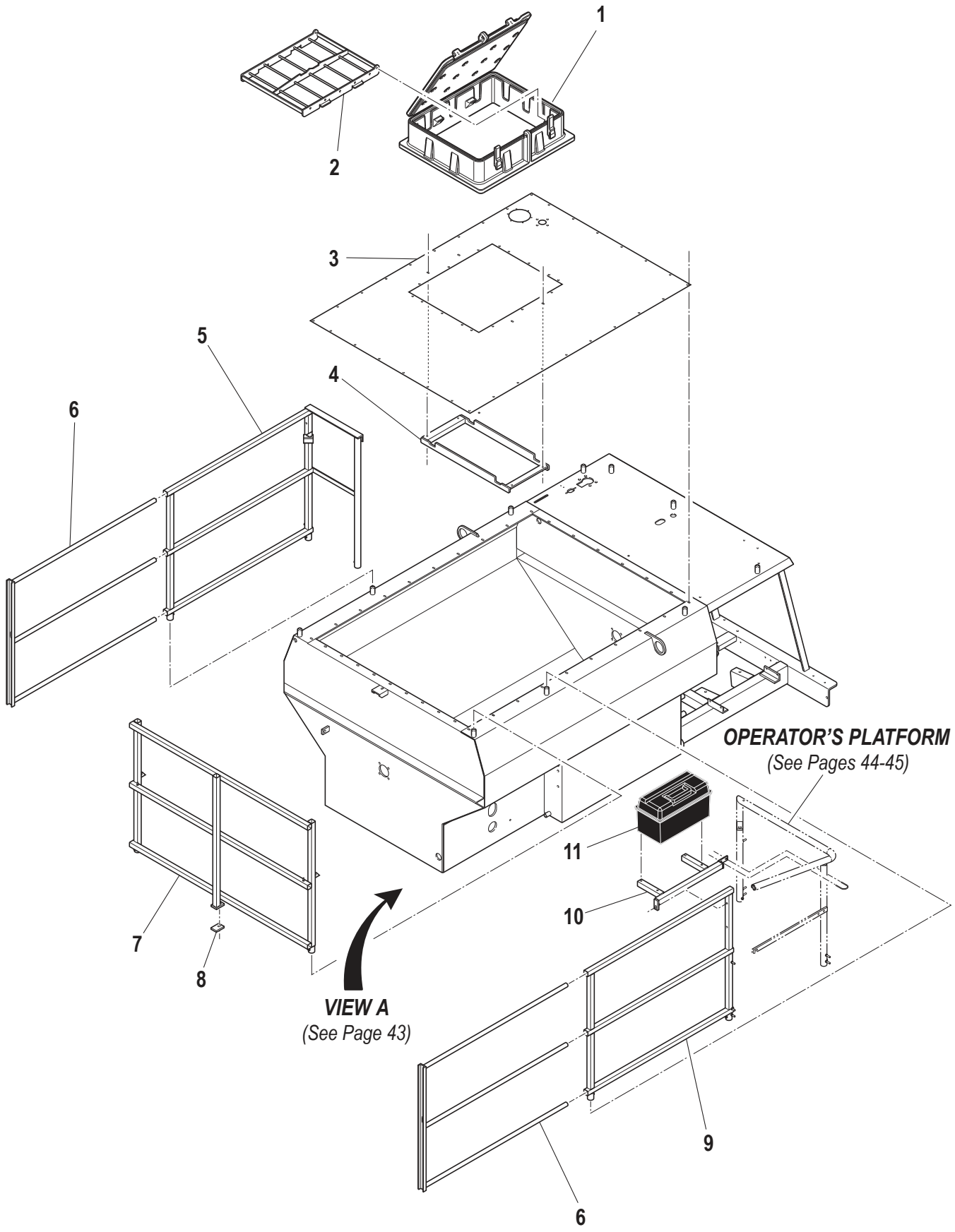
WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE



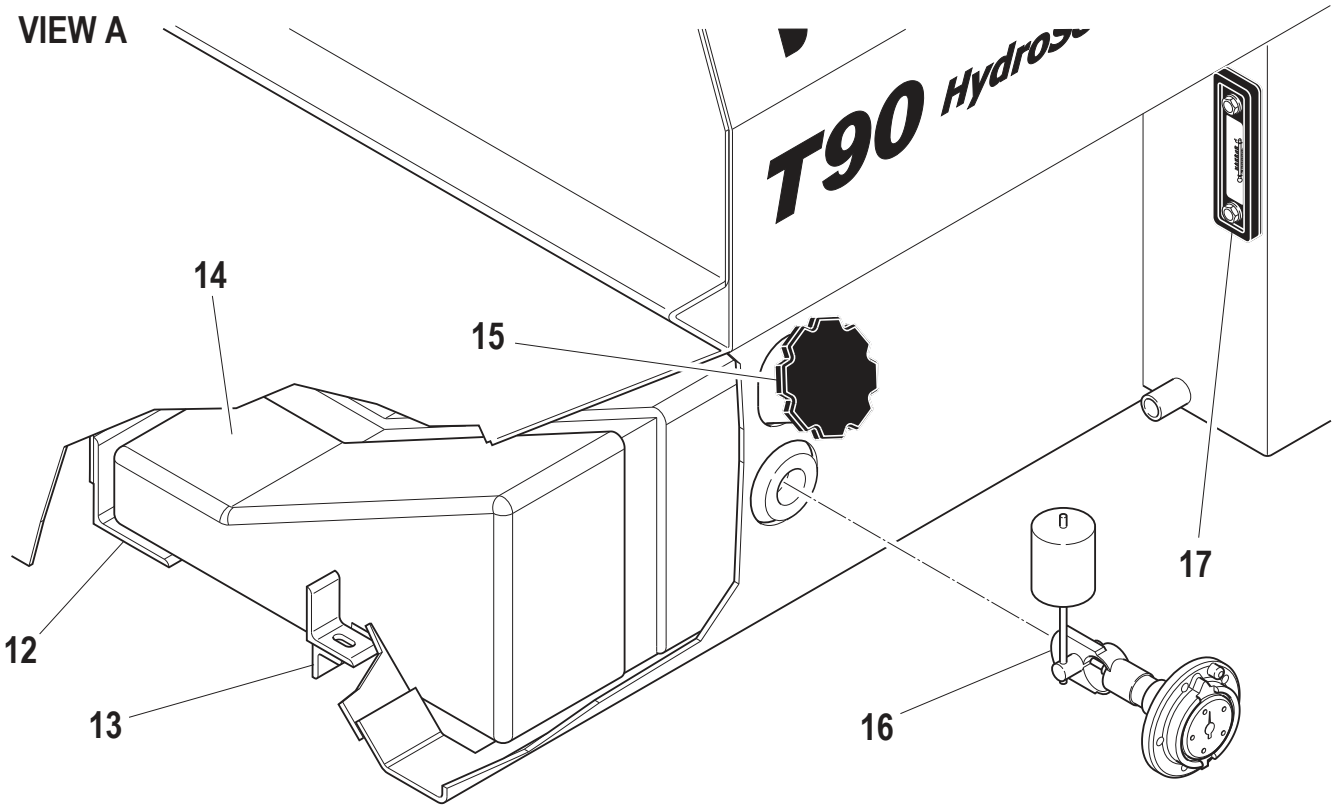
TRAILER

Ref. No.	Part Number	Description	No. Req'd
1	080701	Jack Weldment w/Bracket	1
2	080043	Lunette Eye 2-1/2" Pintle Hitch }	1
	005134	2-5/16" Ball Coupler } *OPTIONAL*	1
	005135	2-5/16" Ball }	1
3	F90-0020	Tank Top	1
4	F120-0006	Hatch Safety Rail	1
5	012834	Bag Cutter - Stainless Steel	1
6	012833	Poly Hatch	1
7	F90-0006	Fender Mounting Bracket	4
8	F90-0011	Fender	2
9	005536	Front Cross Rail Weldment	1
10	005462-01	Platform Cross Toe Rail	1
11	005515-01	Agitator Control Rod Conduit	1
12	005178	O-Ring	1
13	005516-01	Remote Valve Control Rod Weldment	1
14	F60-0020	Agitator Control Handle	1
	022202	Handle Grip, Black	1
15	080223	Battery Case	1
16	002256-12	12V Battery	1
17	F90-0016	Battery Box Hold Down	1
18	F330-0054	Battery Box Holder	1
19	004593	2-1/2" Expansion Plug	1
20	004720	License Plate Bracket	1
21	005436	License Light	1
22	005434	Taillight Assembly	2
	005434A	Taillight Lens	1
23	005169	Clevis Grab Hook	2
24	190007	Binder Chain 1/2 Zinc Plt GR-70	6'
25	005170	Coupling Link	2
26	005500-02	Fuel Tank Support Angle	1
27	005500-12	Fuel Tank Angle - Long	1
28	005724	Poly Fuel Tank	1
29	005726	Diesel Fuel Cap	1
30	005721	Fuel Tank Gauge	1
31	080329	Hydraulic Level Sight Gauge	1

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



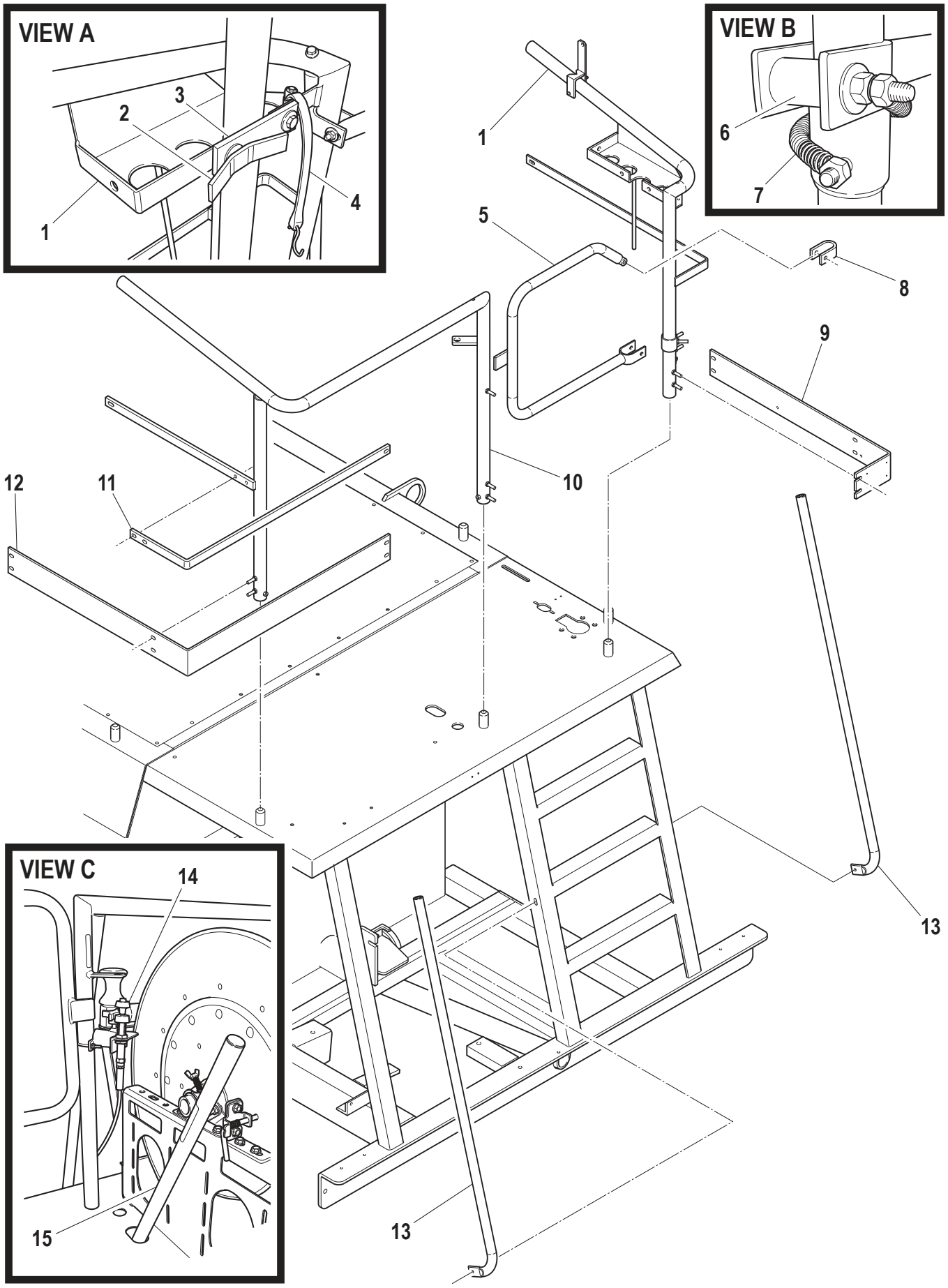
WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE



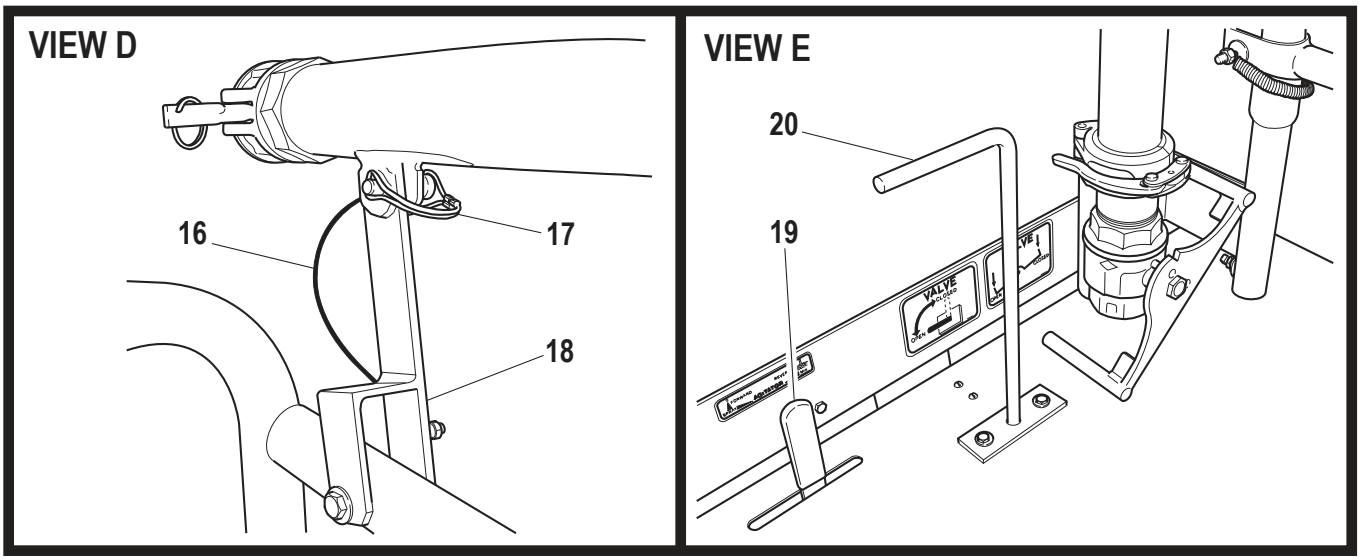
SKID

Ref. No.	Part Number	Description	No. Req'd
1	012833	Poly Hatch Assembly	1
2	012834	Bag Cutter - Stainless Steel	1
3	F90-0021	Tank Top	1
4	F120-0006	Hatch Safety Rail	1
5	005600	Right Rear Rail	1
6	005596	Slide Gate	2
7	005652	Front Cross Rail	1
8	052136-07	Rubber Mount Pad	1
9	005598	Left Rear Rail	1
10	005698	Tool Box Mount Weldment	1
11	052160	Toolbox	1
12	005500-02	Fuel Tank Support Angle	1
13	005500-12	Fuel Tank Angle - Long	1
14	005724	Poly Fuel Tank	1
15	005726	Diesel Fuel Cap	1
16	005721	Fuel Tank Gauge	1
17	080329	Hydraulic Level Sight Gauge	1

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



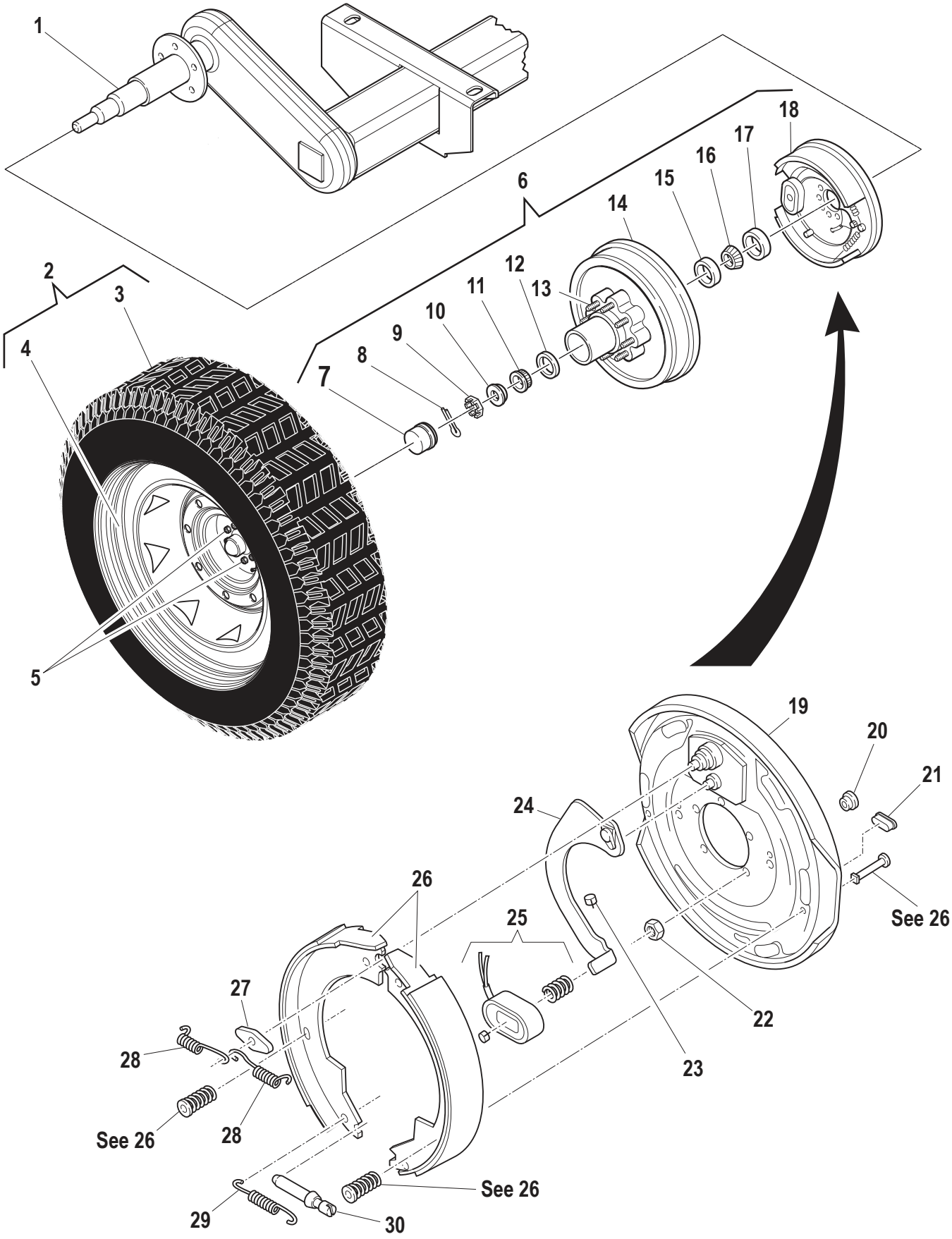
WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE



OPERATOR'S PLATFORM

Ref. No.	Part Number	Description	No. Req'd
1	005538	Right Rear Rail Weldment	1
2	002258	Clamp Handle Weldment	1
3	012487-05	Boom Clamping Strap	1
4	005161	Rubber Strap w/S-Hooks	1
5	005533	Gate Weldment	1
6	005532-03	Spacer	1
7	012052	Gate Spring	1
8	005532-05	Hinge Mounting Strap	1
9	005462-03	Platform Right Toe Rail	1
10	005540	Left Rear Rail Weldment	1
11	005534-01	Left Rear Guard Rail Strap	1
12	005462-02	Platform Left Toe Rail	1
13	005531-01	Hand Rail Weldment	2
14	005675	Throttle Cable (84" Long)	1
	007675	1/4" Ball Joint	1
15	005514-01	Clutch Handle Assembly	1
16	005700	Nylon Lanyard	1
17	031245	Snapper Pin	1
18	005528-02	Boom Holddown Weldment	1
19	F60-0020	Agitator Control Handle	1
	022202	Handle Grip, Black	1

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



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

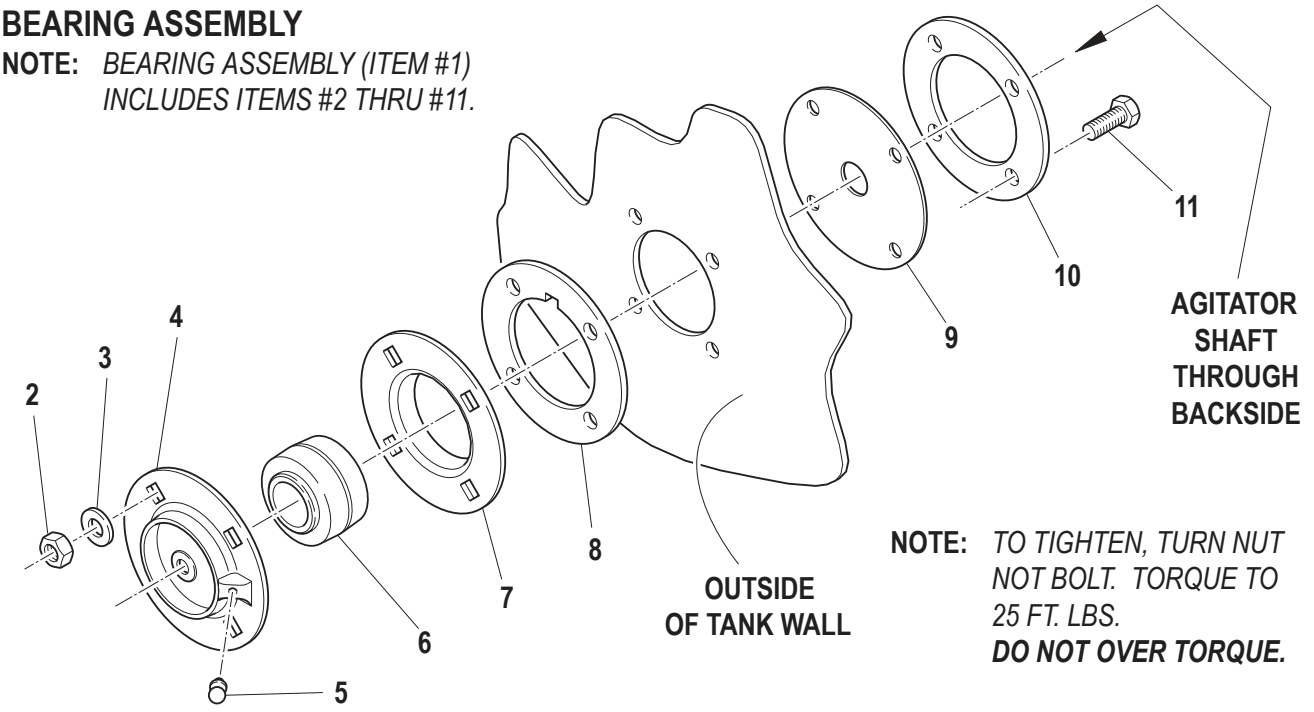
WHEEL AND HUB ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	005637	Axle Assembly *(Includes Hub, Drum & Brakes)*	2
2	005060A	Mounted Tire Assembly	4
3	005060R	Radial Tire	1 per
4	005057	Wheel, 16.5 x 6.75	1 per
5	WL0190016	9/16 Lug Nut	8 per
6	WL8-219-4	Hub and Drum Assembly	4
7	WL605	Grease Cap	1 per
8	WL19-2	Cotter Pin	1 per
9	WL6-1	Spindle Nut	1 per
10	WL5-57	Spindle Washer	1 per
11	WL14125A	Outer Bearing	1 per
12	WL14276	Outer Cup	1 per
13	WL7-132	9/16-18 Press-In Stud	8 per
14	WL8-219-13	Wheel Hub	1 per
15	WL25520	Inner Cup	1 per
16	WL25580	Inner Cone	1 per
17	WL10-1	Grease Seal	1 per
18	WL23-181	Right Hand Brake Assembly	2
	WL23-180	Left Hand Brake Assembly	2
19	WL036-089-10	Backing Plate	1
20	WL046-016-00	Wire Grommet	1
21	WL046-007-00	Adjuster Slot Plug	1
22	WL006-193-00	Nut Washer Assembly	5
23	WL027-005-00	Wire Clip	2
24	WL047-108-00	RH Actuating Lever Arm	1
	WL047-107-00	LH Actuating Lever Arm	1
25	WKL71-125-00	Magnet Kit	1
26	WKL71-127-00	Shoe & Lining Kit	1
27	WL005-067-00	Anchor Post Washer	1
28	WL048-009-00	Retractor Spring	2
29	WL046-018-00	Adjusting Screw Spring	1
30	WL043-004-00	Adjust Assembly	1

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

BEARING ASSEMBLY

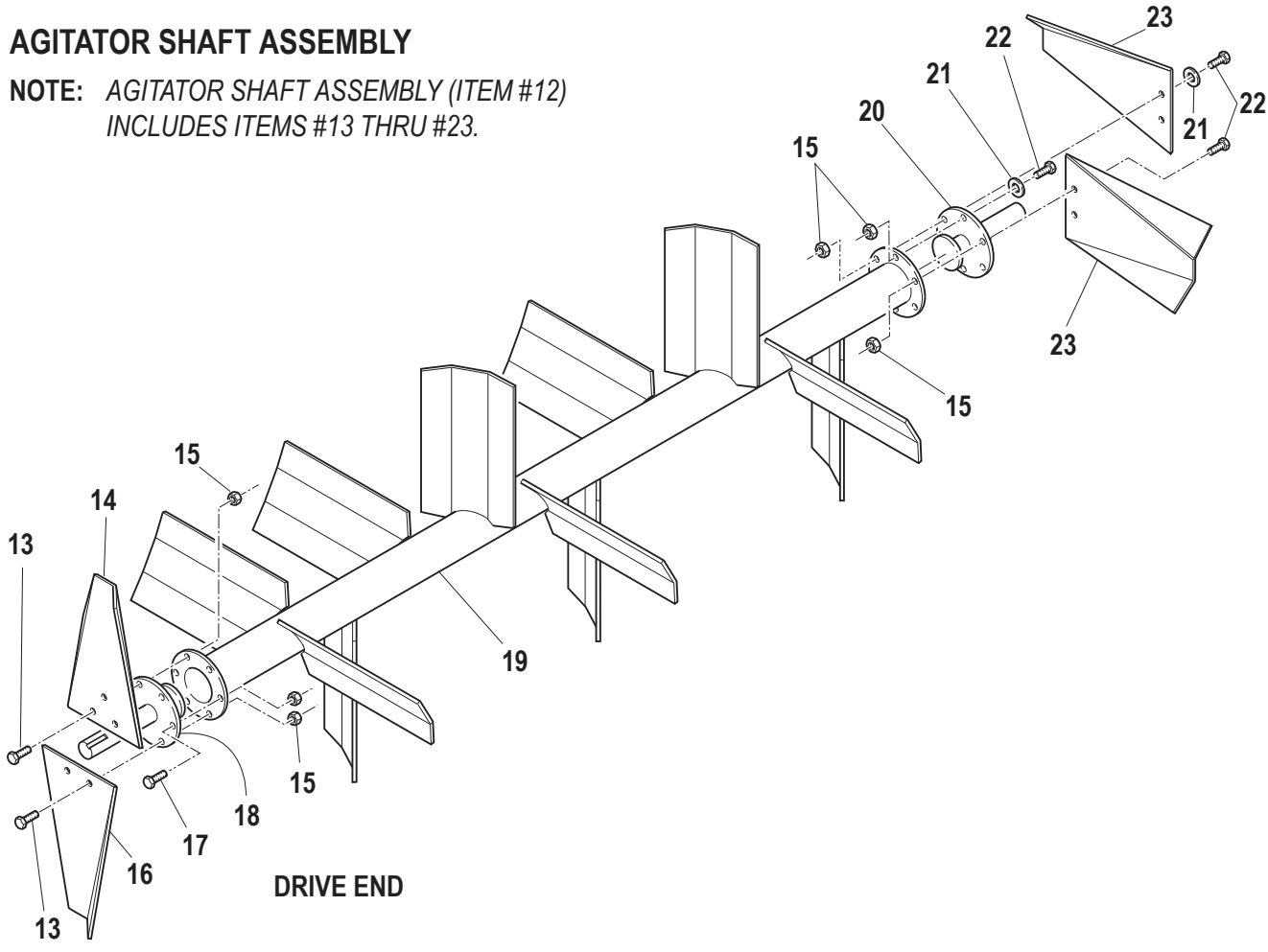
NOTE: *BEARING ASSEMBLY (ITEM #1) INCLUDES ITEMS #2 THRU #11.*



NOTE: *TO TIGHTEN, TURN NUT NOT BOLT. TORQUE TO 25 FT. LBS.*
DO NOT OVER TORQUE.

AGITATOR SHAFT ASSEMBLY

NOTE: *AGITATOR SHAFT ASSEMBLY (ITEM #12) INCLUDES ITEMS #13 THRU #23.*

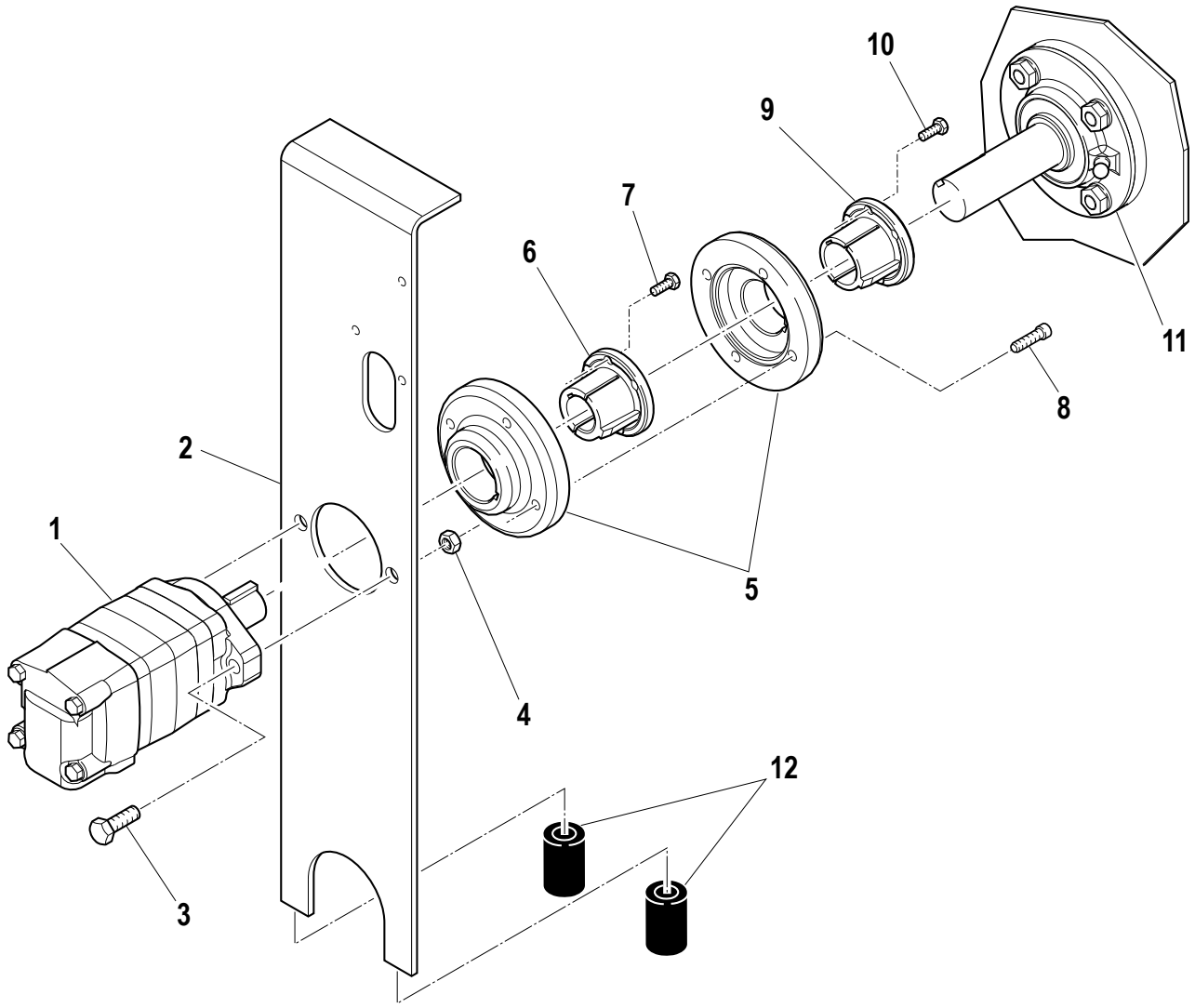


WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE

AGITATOR ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	007420	Bearing & Seal Assembly *(Includes Items 2 Thru 11)*	2
2	0Y08SS	Agitator Nut	4 per
3	012605	Bevel Sealing Washer	4 per
4	007211-02	Flangette w/Lube Coupling	1 per
5	007705	Grease Fitting	1 per
6	003022	Bearing	1 per
7	007212-02	Flangette	1 per
8	006975	Agitator Bearing Gasket	1 per
9	007416	Agitator Rotating Gasket	1 per
10	007417	Clamping Ring	1 per
11	X0828SS	Agitator Bolt	4 per
		NOT SHOWN	
	022407	Grease Line Elbow	1
	008154	Male-To-Female Adapter	1
	012520	Bulk Head Fitting	1
	012521	Grease Line Hose	1
12	REF.	Agitator Shaft Assembly	1
13	0X0824	1/2-13 UNC x 1-1/2" Lg. Hex Hd. Cap Screw	8
14	005027-02	Rear Bolt-On-Paddle w/Hole	1
15	00Y08L	1/2-13 UNC Lock Nut	12
16	005027-01	Rear Bolt-On-Paddle	1
17	0X0820	1/2-13 UNC x 1-1/4" Lg. Hex Hd. Cap Screw	4
18	005081-02	Agitator Stub Shaft, Drive	1
19	005080	Main Agitator Section w/Paddle	1
20	005081-03	Agitator Stub Shaft	1
21	00W08F	1/2" Flat Washer	6
22	0X0820	1/2-13 UNC x 1-1/4" Lg. Hex Hd. Cap Screw	2
23	005027-03	Front Bolt-On-Paddle	2
		NOT SHOWN	
	005399	Stub Shaft Toe Guard	1

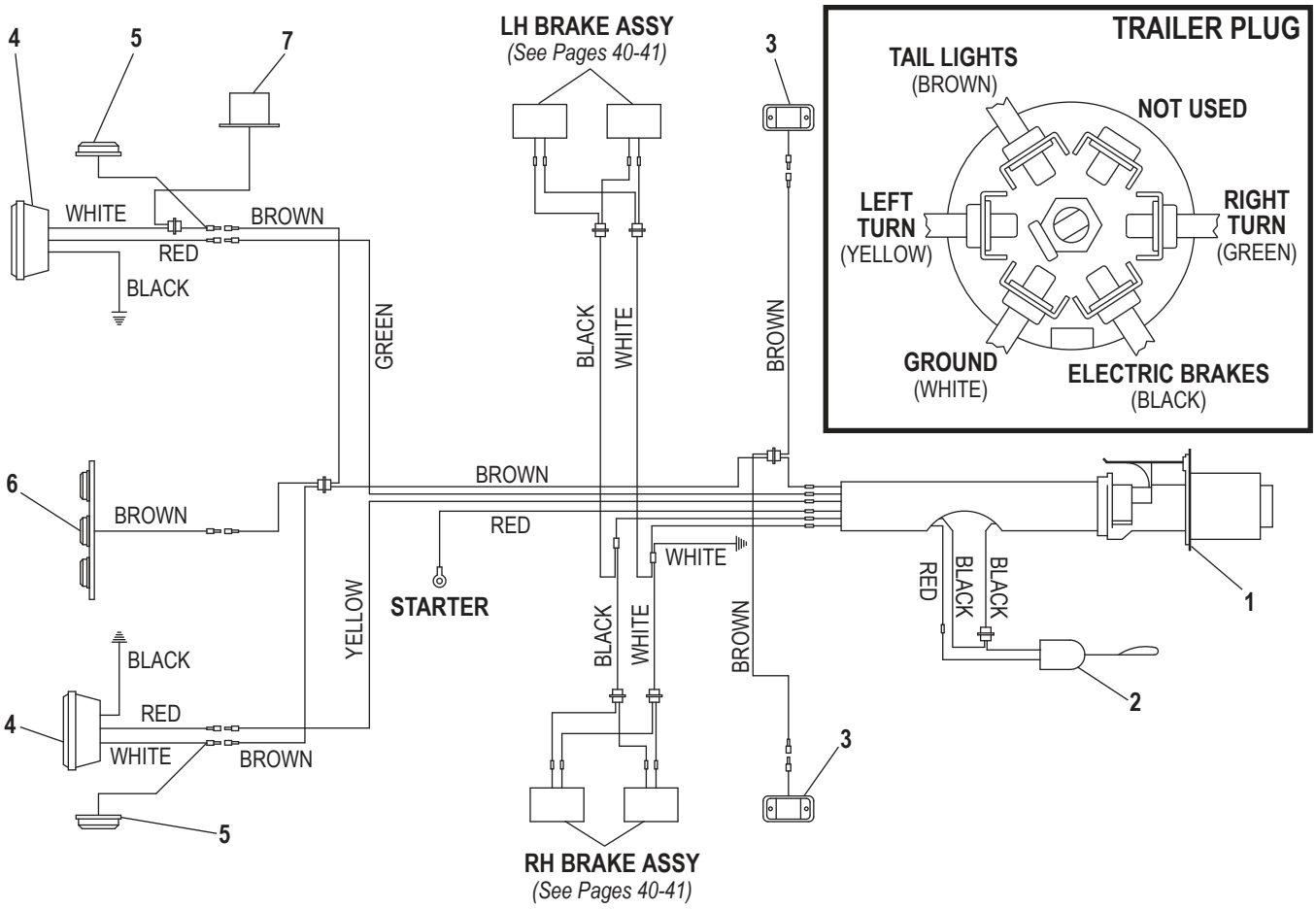
WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE



HYDRAULIC AGITATOR DRIVE

Ref. No.	Part Number	Description	No. Req'd
1	070660	Hydraulic Motor	1
2	005463	Torque Arrestor Plate	1
3	X0824	1/2-13 UNC x 1-1/2" Lg. Hex Hd. Cap Screw	2
4	Y08L	1/2-13 UNC Lock Nut	2
5	023156	Coupling Assembly	1
6	021440	Hydraulic Motor Bushing	1
7	X0516	5/16-20 UNC x 1" Lg. Hex Hd. Cap Screw	3
8	X0625SH	1/2-13 UNC x 1-1/2" Lg. Socket Head Cap Screw	4
9	004635	Agitator Shaft Bushing	1
10	X0516	5/16-20 UNC x 1" Lg. Hex Hd. Cap Screw	3
11	007420	Bearing Assembly *(See Pages 48-49 for Parts)*	2
12	004630	Rubber Bushing	2

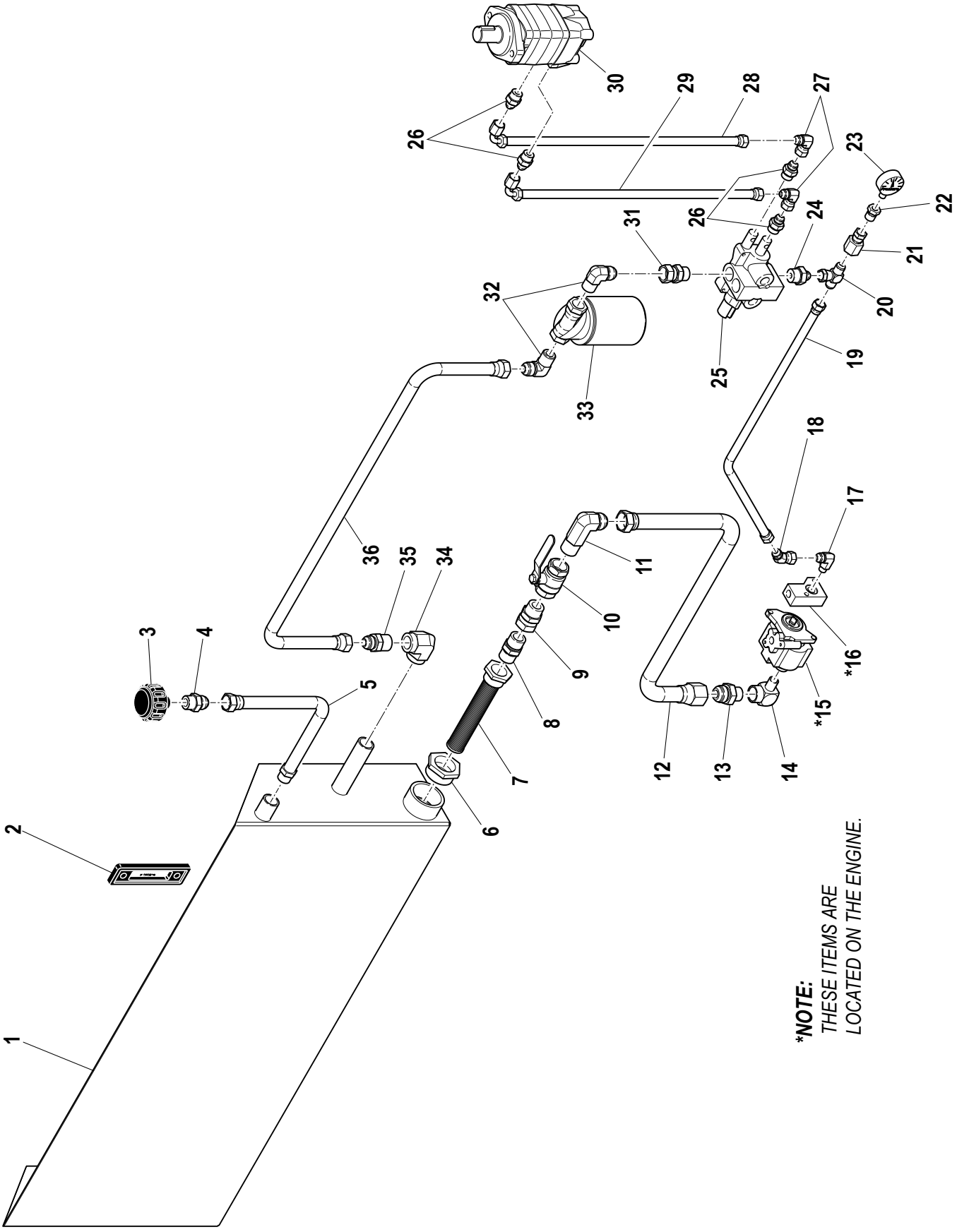
WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE



TRAILER WIRING

Ref. No.	Part Number	Description	No. Req'd
1	075592	7-Blade RV-Style Trailer Plug	1
2	023424	Breakaway Switch	1
	190029	Chain - 2 Tenso Weldless	18"
	005016	1/8" "S" Hook	2
	005017	3/8" Snap Hook	1
3	FW71090	Amber Corner Marker Light	2
4	005434	Taillight Assembly	2
	005434A	Taillight Lens	1
	005467	Taillight Mounting Bracket	2
5	005435	Side Marker Light - Red	2
6	005437	3-Bar Light	1
7	005436	License Light	1
	004720	License Plate Bracket	1
	005585-02	Trailer Wiring Harness	1

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

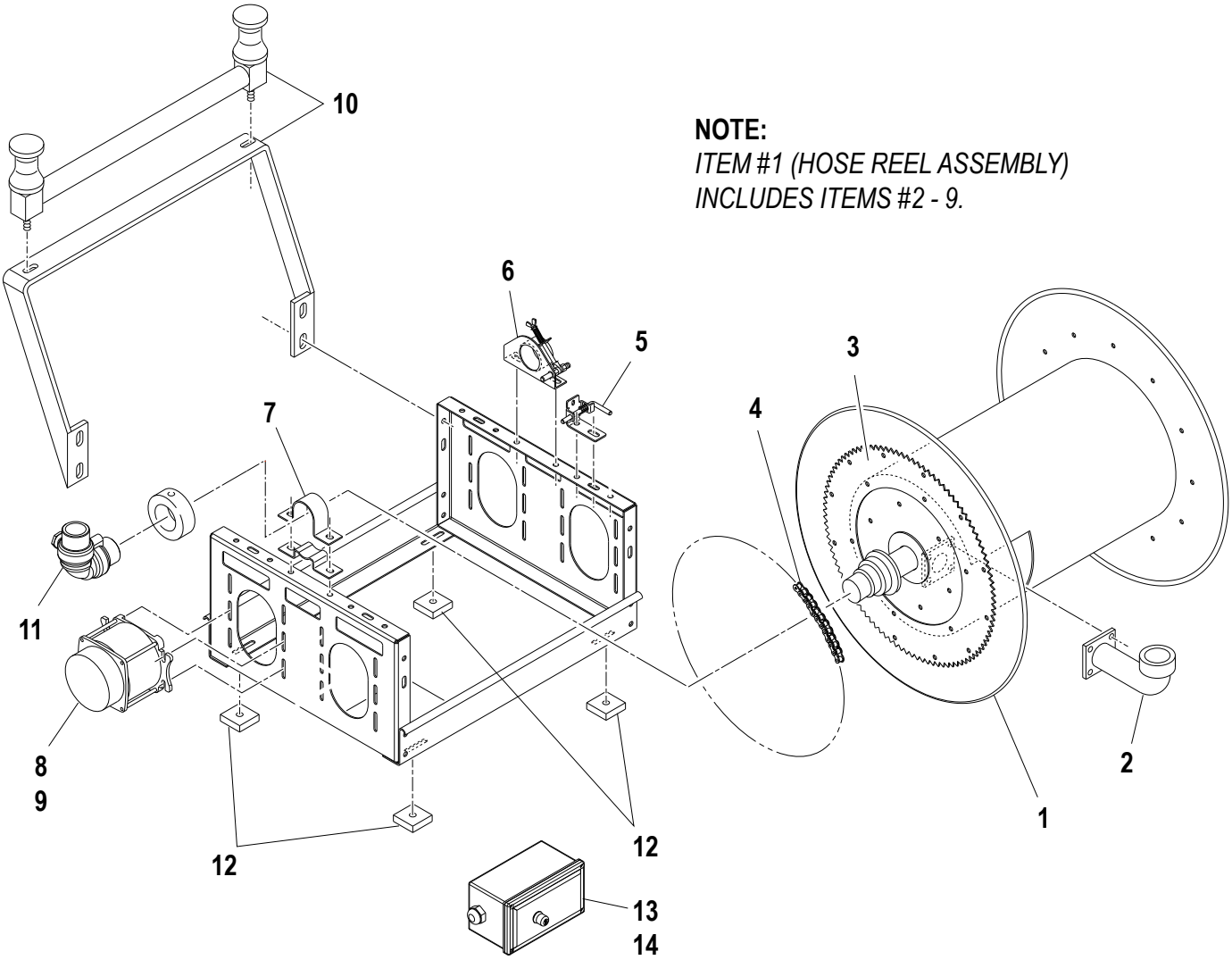


WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE

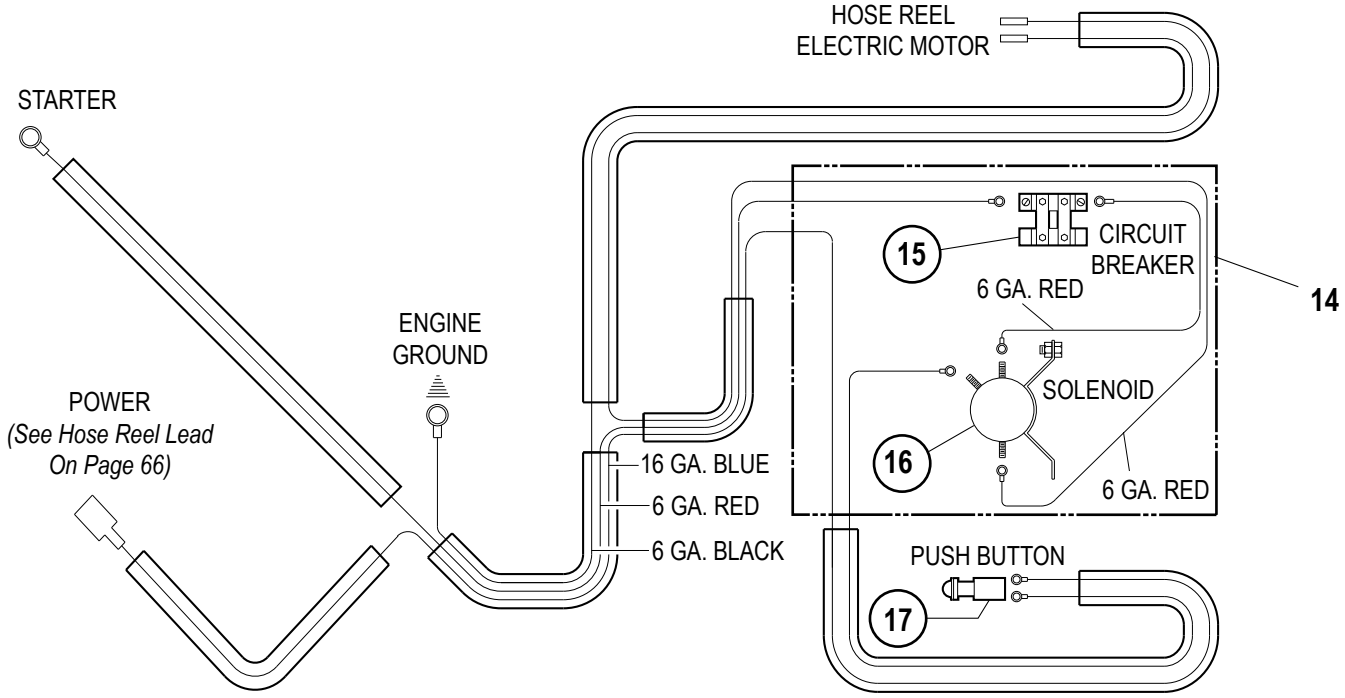
HYDRAULIC SYSTEM

Ref. No.	Part Number	Description	No. Req'd
1	REF ONLY	Hydraulic Reservoir	1
2	080329	Hydraulic Level Sight Gauge	1
3	004900	Filler Breather Cap	1
4	023616	Straight Adapter	1
5	005551	Fill Adapter Hose	1
6	160763	Reducer Bushing	1
7	011466	Suction Strainer	1
8	041162	Pipe Nipple	1
9	021802	Adapter Union	1
10	021559	Ball Valve	1
11	012358	Male 90° Adapter Elbow	1
12	005688	Suction Hose	1
13	FW71713	Straight Male Adapter	1
14	005684	Reducing Pipe Elbow	1
15	KUK3511	Hydraulic Pump	1
16	005719	Hydraulic Block	1
17	055235	Male Pipe Elbow	1
18	FW71504	45° Elbow	1
19	005689	Hydraulic Pump Discharge Hose	1
20	052095	Tee	1
21	008690	Adapter Union	1
22	055229	Hex Reducer Bushing	1
23	012044	Pressure Gauge	1
24	055359	Straight Adapter	1
25	008686	Hydraulic Valve	1
26	012086	Straight Male Adapter	2
27	FW71870	Lenz #3505SW-8	2
28	005554	Short Hydraulic Motor Hose	1
29	005555	Long Hydraulic Motor Hose	1
30	070660	Hydraulic Motor *(See Page 50)*	1
31	005757	Adapter Union	1
32	FW71591	Male 90° Adapter Elbow	2
33	021617	Hydraulic Oil Return Filter	1
	021618	Filter Element	1
34	005639	90° Adapter Elbow	1
35	005640	Straight Male Adapter	1
36	005552	Return Hose	1

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



NOTE:
ITEM #1 (HOSE REEL ASSEMBLY) INCLUDES ITEMS #2 - 9.

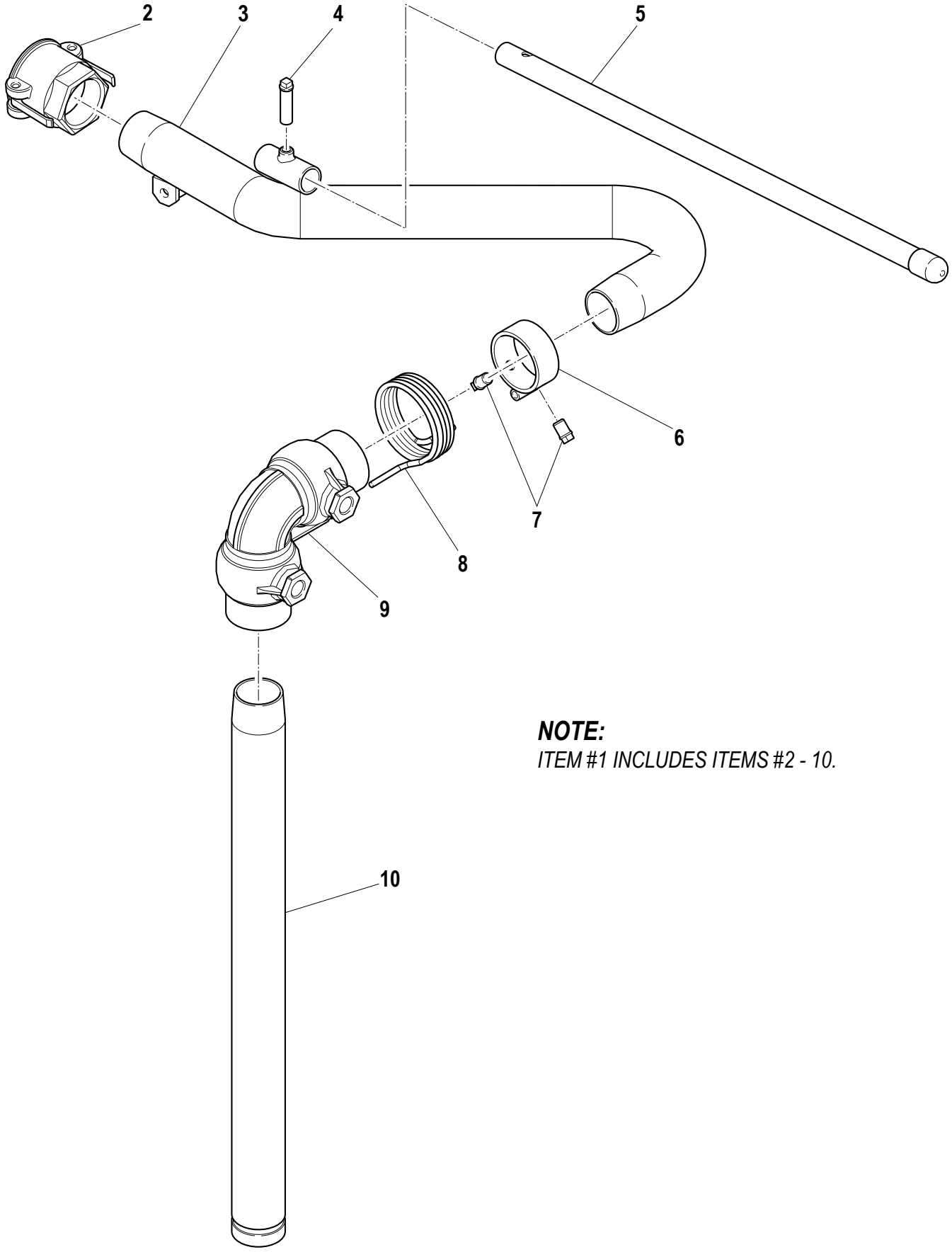


WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE

HOSE REEL ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	008212A	Electric Hose Reel and Swivel Assembly	1
2	080302	Flanged Riser	1
	080302G	Hose Reel Riser Gasket	1
3	008144	Hose Reel Ring Gear	1
4	008200	Hose Reel Chain w/Connecting Link - 69" Lg.	1
5	008433	Pin Lock w/Brackets Assembly	1
6	008314	Idler Side Bearing	1
7	008313	Drive Side Bearing	1
8	008188	Hose Reel Electric Motor	1
9	008199	Chain Sprocket -11 Tooth	1
NOT ILL.	008111	Brake Pad	1
NOT ILL.	008112	Brake Spring	1
NOT ILL.	008109	Brake Wheel	1
10	011894	Hose Roller and Spool Guide	1
	011894-G	Guide Spool	1
11	008210	90º Swivel Elbow	1
	003355-01	Swivel Repair Kit	1
12	031018-01	Hose Reel Bearing Block	4
NOT ILL.	041109	1-1/2" Dia. x 90" Lg. Lead-In Hose	1
NOT ILL.	007710	Pump Take-Off Valve	1
13	005754	Hose Reel Control Box Assy	1
14	005753	Electrical Enclosure	1
15	008420	70 Amp Circuit Breaker	1
	008419	30 Amp Circuit Breaker	1
	011654	40 Amp Circuit Breaker	1
16	008450	Hose Reel Solenoid Kit	1
17	020886	Hose Reel Push Button	1
NOT ILL.	005755	Wiring Harness	1

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



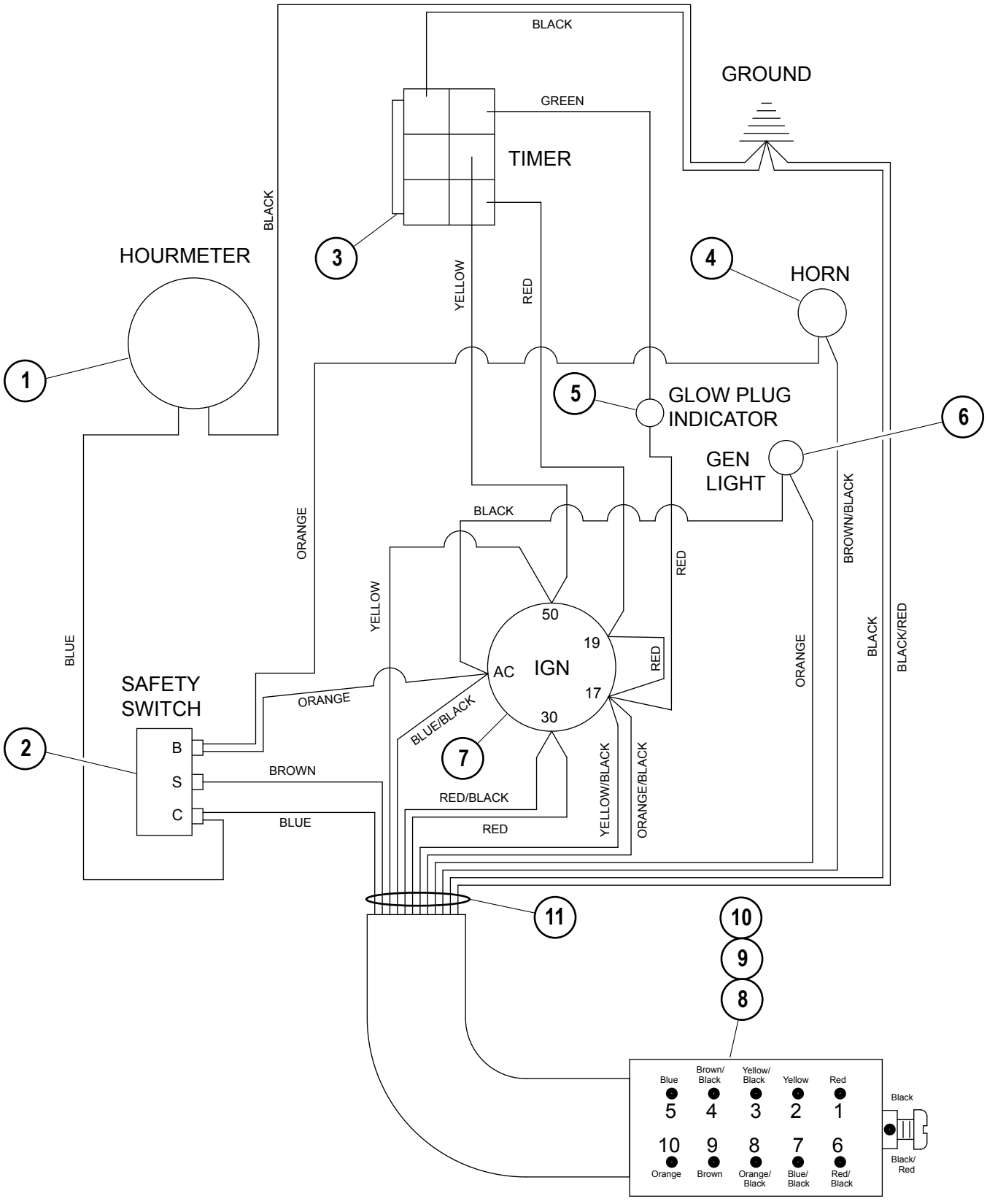
NOTE:
ITEM #1 INCLUDES ITEMS #2 - 10.

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

DISCHARGE BOOM ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	005529	Discharge Boom Assembly Consisting of:	
2	006102	2" Female Coupler	1
	006514	2" Coupler Gasket	1
3	005734	Boom Pipe Weldment	1
4	Z0632SCP	Boom Handle Set Screw	1
5	080559-01	Boom Handle	1
6	005528-03	Boom Collar Weldment	1
7	Z0612SCP	Boom Collar Set Screw	2
8	007286	Discharge Boom Balance Spring	1
9	007288	2" x 90° Swivel Joint	1
	006969	Swivel Repair Kit	2
10	005525-02	Stand Pipe	1

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

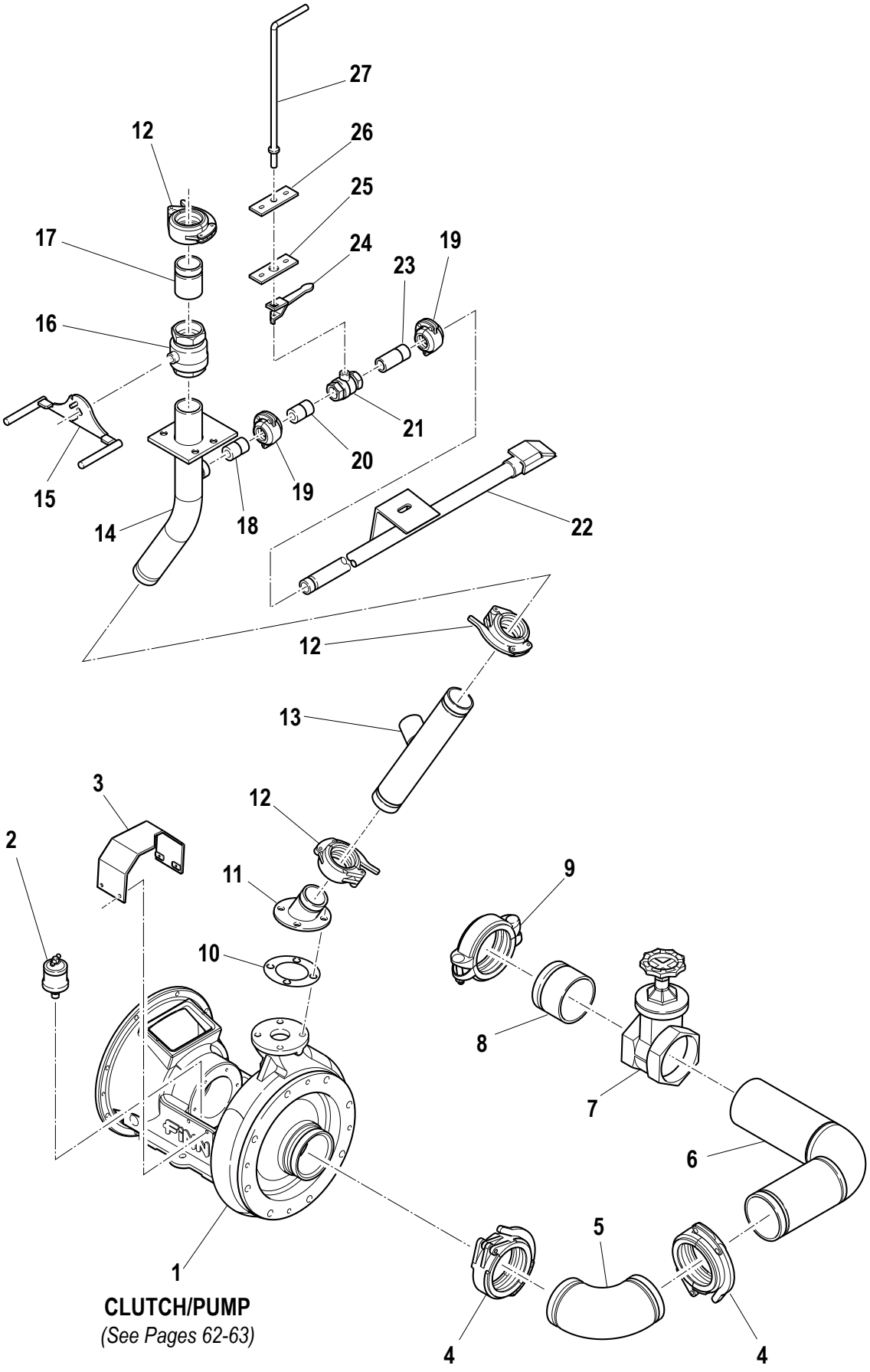


WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE

CONTROL BOX WIRING

Ref. No.	Part Number	Description	No. Req'd
	005604	Control Box Assembly	1
1	007274	Hour Meter	1
2	022119	Safety Switch	1
3	KU15694-65990	Glow Plug Timer	1
4	020886	Horn Button	1
5	KU15403-64490	Glow Plug Indicator Light	1
6	006245	Generator Light	1
7	KU66711-55131	Ignition Key Switch	1
	KU66711-55140	Ignition Key	1
8	023604	Electrical Housing	1
9	023601	Electrical Housing Plug	1
10	080304	Liquid Tight Fitting	3
11	005589	Control Box Wiring Harness	1

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



CLUTCH/PUMP

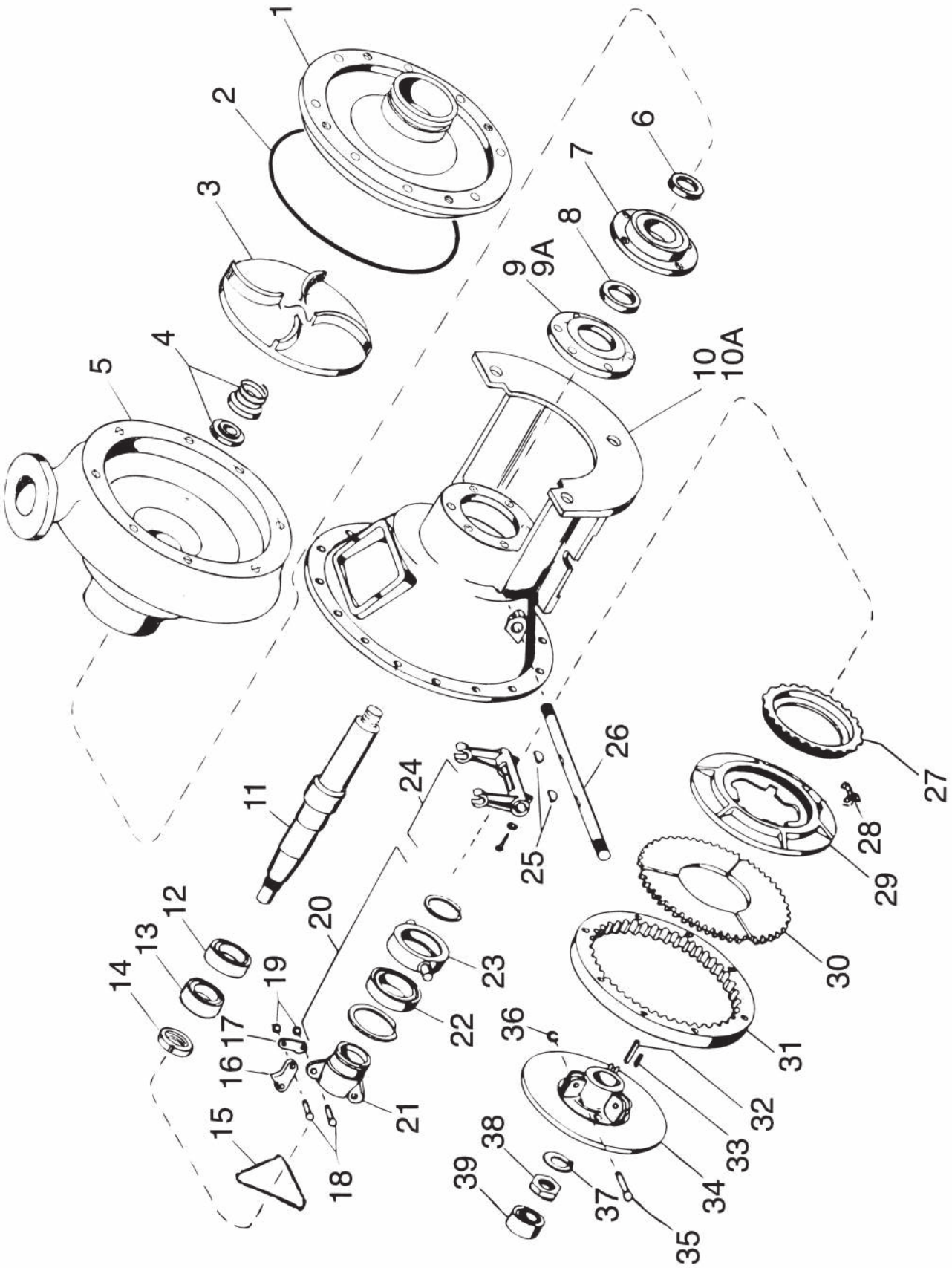
(See Pages 62-63)

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

PIPING

Ref. No.	Part Number	Description	No. Req'd
1	005682	Clutch/Pump Assembly *(See Pages 62-63 for Parts)*	1
2	002383	Pressure Lubricator	1
3	005470	Pump Shaft Guard	1
4	006144	Pipe Clamp	2
	006145	Clamp Gasket	2
5	006359	90° Pipe Elbow	1
6	005524-02	Suction Pipe Elbow Weldment	1
7	008280	Suction Line Shut-Off Valve	1
8	005523-06	Connector Pipe	1
9	006710	Pipe Clamp	1
	006145	Clamp Gasket	1
10	008469	Discharge Flange Gasket	1
11	005526-03	Discharge Flange Pipe	1
12	006250	Pipe Clamp	3
	006251	Clamp Gasket	3
13	005526-02	Lower Discharge Pipe Assembly	1
14	005526-01	Upper Discharge Pipe	1
15	005674	Foot Pedal Weldment	1
16	012287	Discharge Ball Valve	1
17	006483	Boom Connector Pipe	1
18	005083-07	Recirculation Nozzle	1
19	005156	Pipe Clamp	2
	005183	Clamp Gasket	2
20	005083-08	Recirculation Nozzle	1
21	012287	Recirculation Ball Valve	1
22	005706-01	Recirculation Pipe Weldment	1
23	005083-09	Recirculation Nozzle	1
24	005512-02	Recirculation Valve Handle	1
25	005511-03	Lower Valve Handle Pad	1
26	005511-02	Upper Valve Handle Pad	1
27	005512-01	Extension Handle	1

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



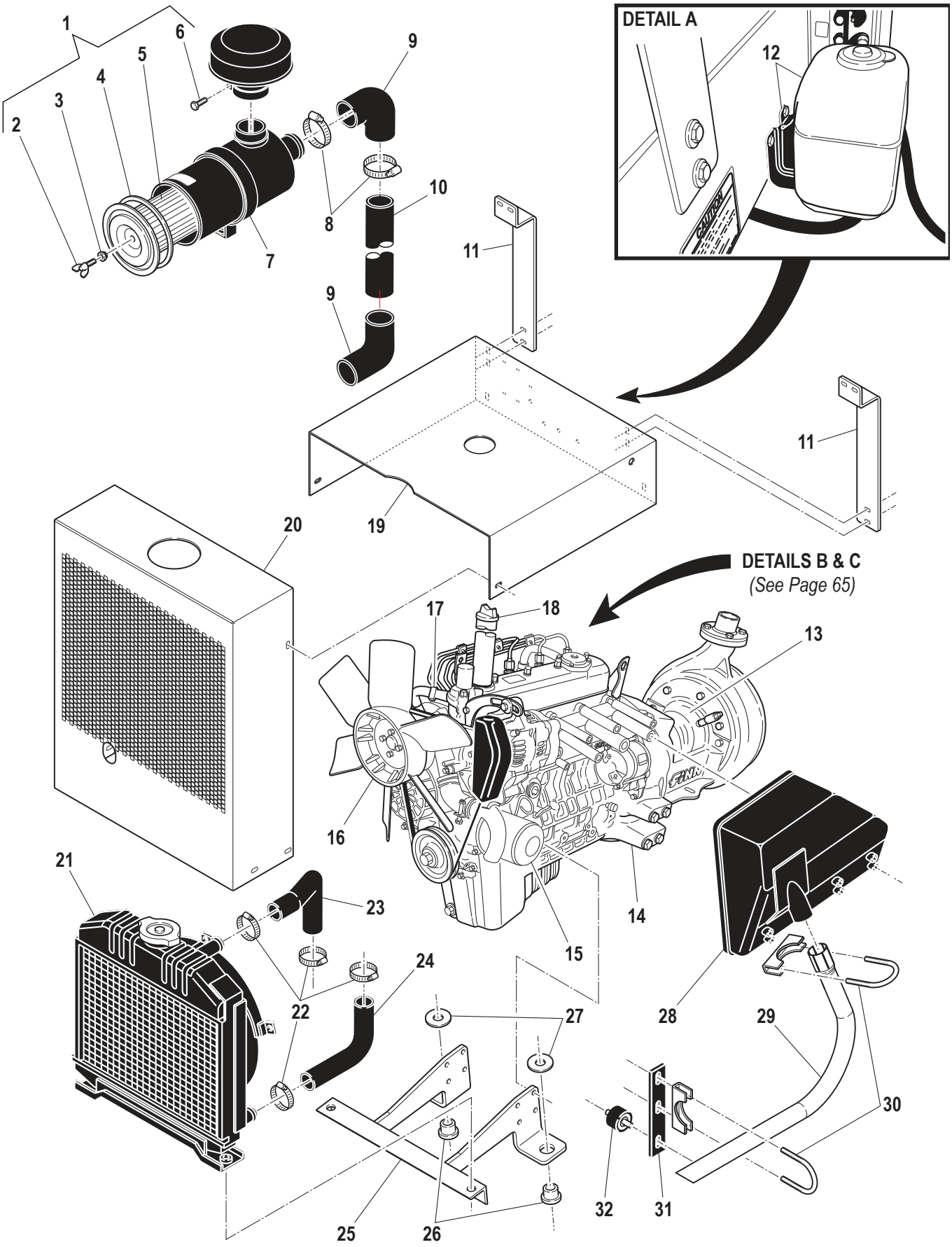
WHEN ORDERING PARTS, BE SURE TO STATE SERIAL NUMBER OF MACHINE

CLUTCH/PUMP ASSEMBLY

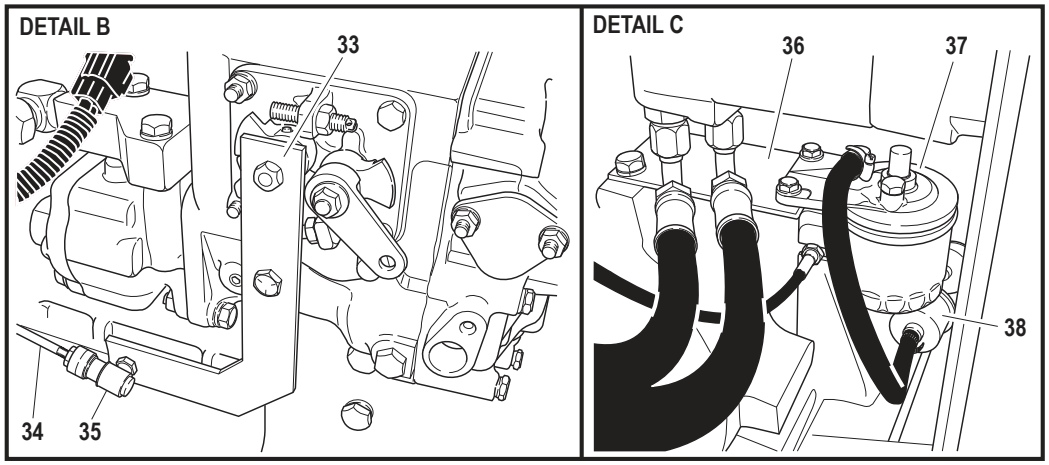
Ref. No.	Part Number	Description	No. Req'd
	005682	Clutch/Pump Assembly Consisting of:	
1	005146	Pump Suction Cover	1
2	005150	O-Ring	1
3	005543	Pump Impeller	1
4	006443	Mechanical Shaft Seal	1
5	005144	Pump Casing	1
6	006444	Grease Retainer Seal	1
7	005446	Flange Pilot Bearing	1
8	005447	Shaft Seal	1
9	005475	Thrust Bearing Retainer	1
9A	005544-02	Bearing Retainer Gasket	1
10	005670	Clutch/Pump Frame Housing	1
10A	005570	Clump Nameplate	1
11	005541	Clump Shaft	1
12	005450	Radial Ball Bearing	1
13	005449	Radial Ball Bearing with Seal	1
14	005448	Bearing Locknut	1
15 *	100211	Lever Spring	1
16 *	100212	Lever	3
17 *	100215	Connecting Link	6
18 *	100216	Link Pin	6
19 *	100217	Retaining Ring	6
20 *	100327	Release Sleeve and Link	1
21 *	100328	Release Sleeve	1
22 *	100330	Ball Bearing	1
23 *	100329	Bearing Carrier	1
24	100073	Clutch Yoke Assembly	1
25	100042	Woodruff Key	2
26	100041	Yoke Shaft	1
27 *	100210	Adjusting Ring	1
28 *	100214	Adjustment Lock	1
29 *	100208	Pressure Plate	1
30 *	100209	Clutch Facing	1
31 *	100218	Drive Ring	1
32 *	100056	Clutch Key	1
33 *	100219	Separator Spring	1
34 *	100207	Clutch Body	1
35 *	100213	Pivot Lever Pin	3
36 *	100008	Retaining Ring	3
37	100047	Lock Washer	1
38	100045	Drive Shaft Nut	1
39	005151	Pilot Bearing	1

**NOTE:*
Clutch Assembly (Part No. 100334) consists of these parts.

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



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



ENGINE & RADIATOR

Ref. No.	Part Number	Description	No. Req'd
1	031354	Air Cleaner Assembly	1
2	KU15741-92620	Wingbolt	1
3	KU15741-94430	Wingbolt Gasket	1
4	KU15741-11170	Air Filter Housing Gasket	1
5	KU15741-11080	Air Filter Element	1
6	KU01123-50835	Bolt	1
7	055548	Mounting Band	2
8	022450	2-1/2" Worm Gear Clamp	4
9	KU16616-11621	Air Cleaner Inlet Pipe	1
10	005681-07	Air Cleaner Extension Pipe	1
11	F90-0012	Sheet Metal Hanger	2
12	KU15501-72400	Coolant Recovery Tank w/Bracket	1
13	005682	Clump Assembly *(See Pages 62-63)*	1
14	031390	Kubota Engine V1505B-86 Engine	1
15	KU16271-32090	Oil Filter	1
16	KU16299-74111	Fan	1
17	055568	Temperature Switch	1
18	005690	Oil Fill Extension Assembly	1
	004987	O-Ring	1
	004988	Conduit Nut	1
19	005680	Engine Top Cover	1
20	005677	Radiator Shroud	1
21	KU16665-72061	Radiator Assembly	1
22	007695	2" Worm Gear Clamp	4
23	031444	Upper Radiator Hose	1
24	031445	Lower Radiator Hose	1
25	005694	Radiator/Engine Mount	1
26	005676	Center Bushing Mount	4
27	055505	Snubbing Washer	4
28	KU37560-88513	Manifold Muffler	1
	KU16271-92010	Muffler Nuts	8
	KU16251-91510	Muffler Studs	4
	KU16251-91520	Muffler Studs	4
	KU37560-12360	Muffler Gasket	1
29	005710	Exhaust Elbow	1
30	031421	Exhaust Clamp	2
31	005574-03	Tailpipe Bracket	1
32	023438	Rubber Shock Mount	1
33	031397-02	Throttle Plate	1
34	005675	84" Lg. Throttle Cable	1
35	007675	1/4" Ball Joint	1
36	005502-01	Filter Support Arm	1
37	031355	Fuel Filter Kit	1
	KU70000-43081	Filter Element	1
38	080105	Pre-Fuel Filter	1

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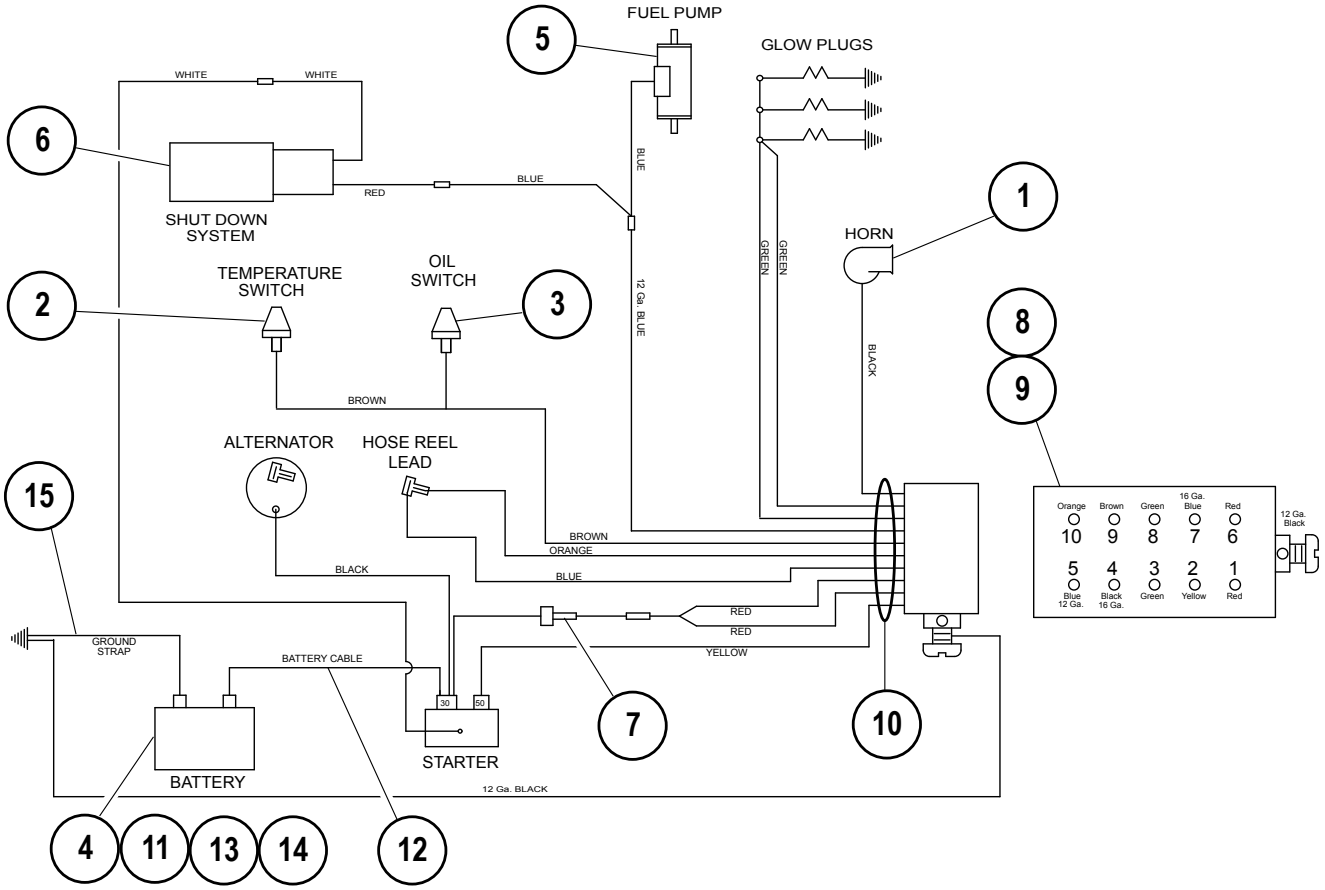

ENGINE WIRING

Ref. No.	Part Number	Description	No. Req'd
1	006499	Horn Assembly	1
2	055568	Temperature Switch	1
3	004934	Oil Switch	1
4	002256-12	12V Battery	1
5	080103	Fuel Pump	1
6	KU17208-60010	Shutdown Solenoid	1
7	170028	Fuse with Holder	1
8	005561	Electrical Housing	1
9	023602	Electrical Housing Plug	1
10	031457	Engine Wiring Harness	1
11	080223	Battery Case	1
12	008171	Battery Cable	1
13	F330-0054	Battery Box Holder	1
14	F90-0016	Battery Box Hold Down	1
15	000241	Ground Strap	1

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

HOSE REEL NOZZLE/REMOTE VALVE/TOOL KIT

Part Number	Description	No. Req'd
	HOSE REEL NOZZLES	
080273	Long Distance Hose Reel Nozzle Assembly	A/R
080131	Long Distance Nozzle	1 per
080260	Adapter	1 per
160749	Reducer Bushing	1 per
080394	Wide Fan Hose Reel Nozzle Assembly	A/R
006605	Wide Fan Nozzle	1 per
080260	Adapter	1 per
160750	Reducer Bushing	1 per
080395	Narrow Fan Hose Reel Nozzle Assembly	A/R
004805	Narrow Fan Nozzle	1 per
080260	Adapter	1 per
160750	Reducer Bushing	1 per
	REMOTE VALVE	
080535	Remote Valve Assembly	A/R
080260	Adapter	1 per
160307	Close Nipple	1 per
012083	Ball Valve	1 per
160520	Nipple	1 per
080261	Coupler	1 per
006515	Gasket	1 per
	TOOL KIT	
000698	Automatic Pressure Lubricator Grease, 1 Lb. Tub	1
005220	Impeller Wrench	1
008187	Long Distance Nozzle	1
006632	Long Distance Nozzle Assembly	1
001042	Long Distance Nozzle	1
006096	Brass Adapter	1
160309	Close Nipple	1
160763	Reducer Bushing	1
006619	Wide Ribbon Nozzle Assembly	1
006493	Wide Ribbon Nozzle	1
006096	Brass Adapter	1
160762	Reducer Bushing	1
005603	Narrow Ribbon Nozzle Assembly	1
012117	Narrow Ribbon Nozzle	1
006096	Brass Adapter	1
160762	Reducer Bushing	1
004593	Drain Plug	1
006102	Brass Coupler	1
006514	Coupler Gasket	1
KU70000-73886	Engine Parts Manual	1

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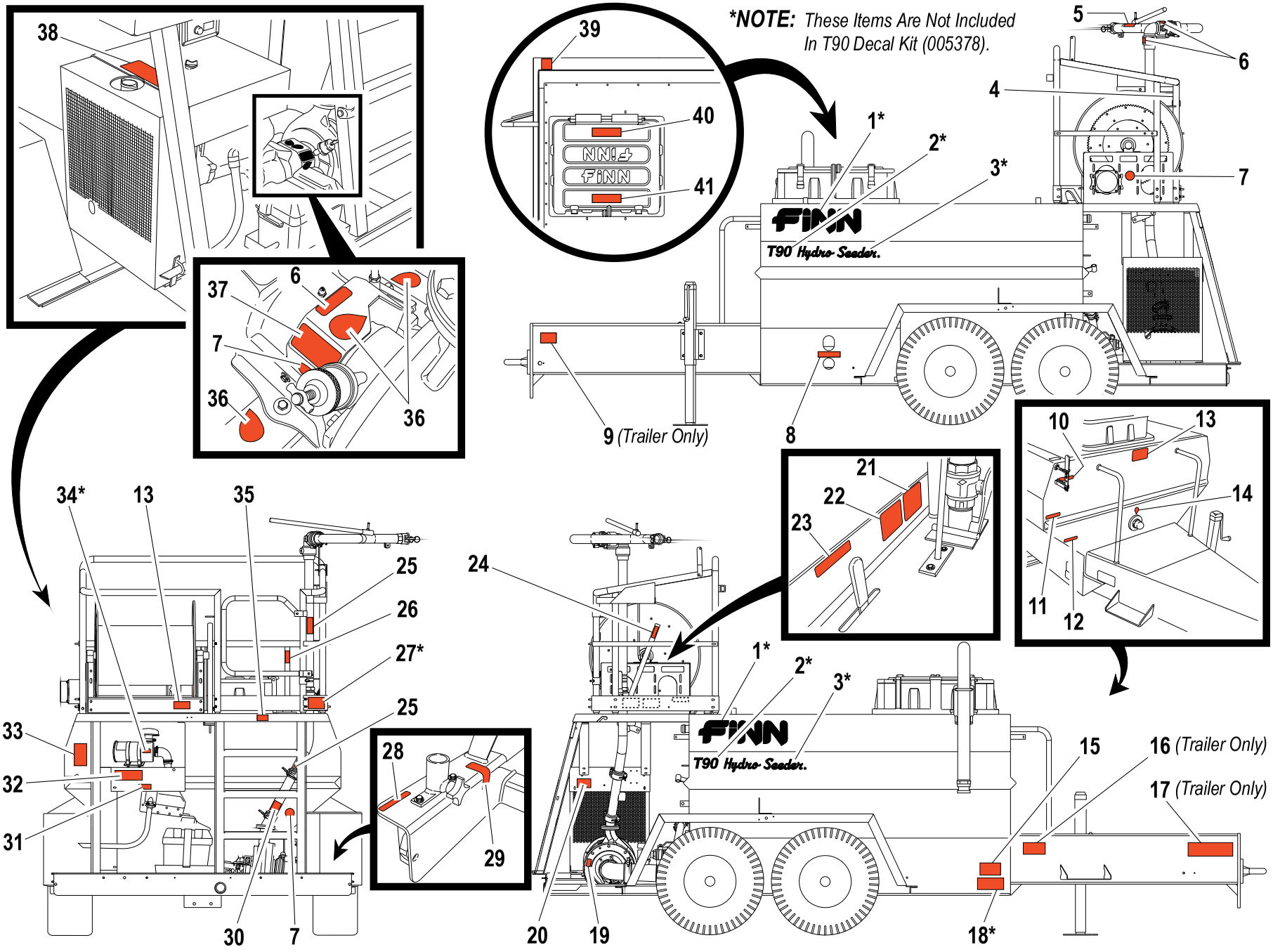

DECALS

Ref. No.	Part Number	Description	No. Req'd
*1	023174	"FINN" Decal - Large	2
*2	012661-05	"T90" Decal	2
*3	011595	"Hydro Seeder" Decal	2
4	022199	"Throttle" Decal	1
5	011567	"Do Not Aim . . ." Decal	1
6	007230-02	"Service Daily" Decal	2
7	007230	"Service Daily" Decal	3
8	023391	"Diesel Fuel Only" Decal	1
*9	005730	T90T GVWR Decal *(Trailer Version Only)*	1
10	005187	"800 Gallon" Decal	1
11	005186	"500 Gallon" Decal	1
12	005184	"250 Gallon" Decal	1
13	020970	"CAUTION! Fall Hazard - Do Not Ride . . ." Decal	2
14	007230-01	"Service Daily" Decal	1
15	011662	"U.S. Patent Nos." Decal	1
16	080107	"CAUTION! Always Use Step" Decal *(Trailer Version Only)*	1
17	031461	"WARNING! Runaway Vehicle Hazard" Decal *(Trailer Version Only)*	1
*18	011690	FINN Name Plate	1
19	012180	"Tighten Suction Cover" Decal	1
20	031297	"Clutch Adjustment" Decal	1
21	005735	"VALVE - Open/Close" Decal	1
22	005736	"VALVE - Open/Closed" (Handle) Decal	1
23	008286-02	"AGITATOR - Forward (Spray) / Reverse (Mix)" Decal	1
24	005737	"CLUTCH - Disengage/Engage" Decal	1
25	005216	"DANGER! Do Not Use Remote . . ." Decal	2
26	012597	"IMPORTANT. This Is A Vent . . ." Decal	1
*27	012260	"IMPORTANT" Metal Plate	1
28	007535	"Throttle" Decal	1
29	004661	"CLUTCH - Engage/Disengage" Decal	1
30	011569	"CAUTION! Hose Reel, Remote . . ." Decal	1
31	012278	"DANGER! Hot . . ." Decal	1
32	031463	"WARNING! Sever Hazard . . ." Decal	1
33	012687	"CAUTION. Hydraulic System Instructions" Decal	1
34	19426-87903	"CAUTION. Do Not Use Ether Or . . ." Decal	1
35	012688	"CAUTION!. Fall Hazard" Decal	1
36	007231	"Service Weekly" Decal	3
37	006869	"Pressure Lubricator" Decal	1
38	031462	"WARNING! Burn Hazard . . ." Decal	1
39	008286-01	"Agitator Operation" Decal	1
40	012686-02	"DANGER! Confined Space Hazard" Decal	1
41	012041-01	"Operating Instructions - HydroSeeder" Decal	1

**** NOTE:***

All of the decals depicted & listed on Pages 68-69 (except those identified with an asterisk) are shown for location purposes only. To order replacements you must order T90 Decal Kit (005738). Replacement decals and plates for those identified with an asterisk are not part of the decal kit and must be ordered separately.

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