



MODEL SA-9

UNIT SERIAL NUMBER _____

MANUAL NUMBER: 90726-F

EFFECTIVE 12/2015



1330 76TH AVE SW
CEDAR RAPIDS, IA 52404-7052
PHONE (319) 363-8281 | FAX (319) 286-3350
www.highwayequipment.com

Copyright 2007 Highway Equipment Company, Inc.

TABLE OF CONTENTS

Warranty.....	4
Preface.....	5
Safety.....	6
Maintenance and Installation Instructions.....	7
Safety Illustrations.....	8
General Description.....	15
Dimensions & Capacities	16
Initial Start-Up	17
General Operating Procedures	18
Automatic Dual Control System	20
Hydraulic System.....	20
Lubrication and Maintenance	22
Hydraulic System.....	22
Bearings	22
Gear Case	22
Fasteners	22
Clean Up.....	23
Lubricant and Hydraulic Oil Specifications	24
Hydraulic System.....	24
Gear Case Lubricant	24
Pressure Gun Lubricant	24
Lubrication Chart.....	25
Troubleshooting	26
Standard Torques National Coarse (NC) Cap Screws	27
Instructions for Ordering Parts.....	28

TABLE OF CONTENTS

Parts List	29
Spreader Trough, Bottom, Cover and Anti-Flow Plates	29
Latch	30
Tailgate Panels	31
Spinner	32
Spinner Klt	34
Berm Chute	35
Direct Drive	36
Worm Gear Drive	37
Gear Case	38
Worm Gear Motor	40
Spinner Motor	41
Hydraulic System	42
Control Valve	44
Pump Kit (Electric Clutch)	46
Hydraulic Pump (Electric Clutch)	47
Hydraulic Pump	48
Mounting Kit - Pump (Transmission PTO)	49
Pedestal Mount Kit	50
Mounting - Quick Disconnect	51
Decals	52

Insert Current Hi-Way Warranty



PREFACE**PLEASE ! ALWAYS THINK SAFETY FIRST !!**

The purpose of this manual is to familiarize the person (or persons) using this unit with the information necessary to properly install, operate, and maintain this system. The safety instructions indicated by the safety alert symbol in the following pages supersede the general safety rules. These instructions cannot replace the following: the fundamental knowledge that must be possessed by the installer or operator, the knowledge of a qualified person, or the clear thinking necessary to install and operate this equipment. Since the life of any machine depends largely upon the care it is given, we suggest that this manual be read thoroughly and referred to frequently. If for any reason you do not understand the instructions, please call your authorized dealer or our Product Sales and Support Department at 1-888-363-8006 or (319)-363-8281.

It has been our experience that by following these installation instructions, and by observing the operation of the spreader, you will have sufficient understanding of the machine enabling you to troubleshoot and correct all normal problems that you may encounter. Again, we urge you to call your authorized dealer or our Product Sales and Support Department if you find the unit is not operating properly, or if you are having trouble with repairs, installation, or removal of this unit.

We urge you to protect your investment by using genuine HECO parts and our authorized dealers for all work other than routine care and adjustments.

Highway Equipment Company reserves the right to make alterations or modifications to this equipment at any time. The manufacturer shall not be obligated to make such changes to machines already in the field.

This Safety Section should be read thoroughly and referred to frequently.

ACCIDENTS HURT !!!**ACCIDENTS COST !!!****ACCIDENTS CAN BE AVOIDED !!!**



TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THAT OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

In this manual and on the safety signs placed on the unit, the words "DANGER," "WARNING," "CAUTION," and "NOTICE" are used to indicate the following:



DANGER

Indicates an imminently hazardous situation that, if not avoided, WILL result in death or serious injury. This signal word is to be limited to the most extreme situations and typically for machine components that, for functional purposes, cannot be guarded.



WARNING

Indicates a potentially hazardous situation that, if not avoided, COULD result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



CAUTION

Indicates a potentially hazardous situation that, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE!

Is used for informational purposes in areas which may involve damage or deterioration to equipment but generally would not involve the potential for personal injury.

NOTE:

Provides additional information to simplify a procedure or clarify a process.

The need for safety cannot be stressed strongly enough in this manual. At Highway Equipment Company, we urge you to make safety your top priority when operating any equipment. We firmly advise that anyone allowed to operate this machine be thoroughly trained and tested, to prove they understand the fundamentals of safe operation.

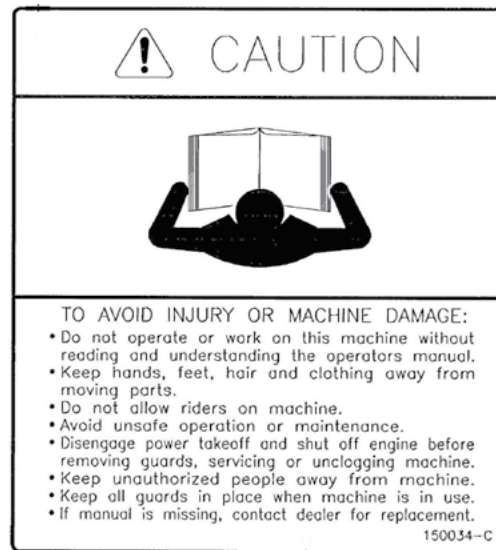
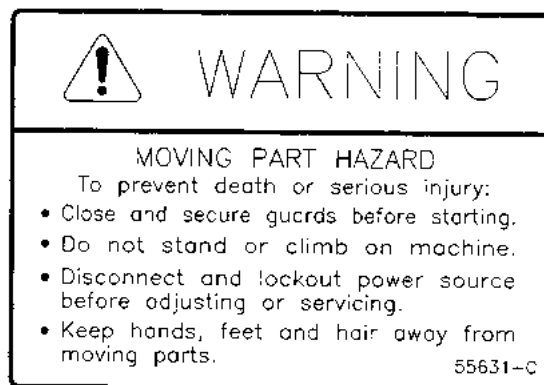
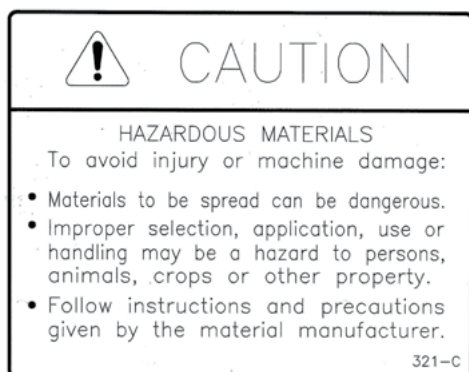
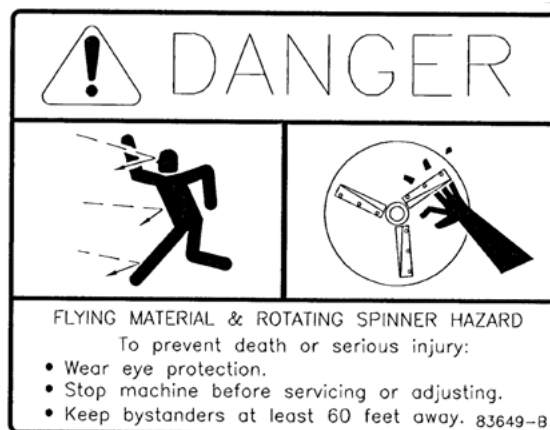
The following guidelines are intended to cover general usage and to assist you in avoiding accidents. There will be times when you will run into situations that are not covered in this section. At those times the best standard to use is common sense. If, at any time, you have a question concerning these guidelines, please call your authorized dealer or our factory at 1-888-363-8006 or (319)-363-8281.

MAINTENANCE INSTRUCTIONS

1. Keep safety decals and signs clean and legible at all times.
2. Replace safety decals and signs that are missing or have become illegible.
3. Replaced parts that displayed a safety sign should also display the current sign.
4. Safety decals or signs are available from your dealer's Parts Department or our Cedar Rapids factory.

INSTALLATION INSTRUCTIONS

1. Clean Surface
Wash the installation surface with a synthetic, free-rinsing detergent. Avoid washing the surface with a soap containing creams or lotion. Allow to dry.
2. Position Safety Decal
Decide on the exact position before application. Application marks may be made on the top or side edge of the substrate with a lead pencil, marking pen, or small pieces of masking tape. NOTE: Do not use chalk line, china marker, or grease pencil. Safety decals will not adhere to these.
3. Remove the Liner
A small bend at the corner or edge will cause the liner to separate from the decal. Pull the liner away in a continuous motion at a 180-degree angle. If the liner is scored, bend at score and remove.
4. Apply Safety Decal
 - a. Tack decal in place with thumb pressure in upper corners.
 - b. Using firm initial squeegee pressure, begin at the center of the decal and work outward in all directions with overlapping strokes. NOTE: Keep squeegee blade even—nicked edges will leave application bubbles.
 - c. Pull up tack points before squeegeeing over them to avoid wrinkles.
5. Remove Pre-mask
If safety decal has a pre-mask cover remove it at this time by pulling it away from the decal at a 180 degree angle. NOTE: It is important that the pre-mask covering is removed before the decal is exposed to sunlight to avoid the pre-mask from permanently adhering to the decal.
6. Remove Air Pockets
Inspect the decal in the flat areas for bubbles. To eliminate the bubbles, puncture the decal at one end of the bubble with a pin (never a razor blade) and press out entrapped air with thumb moving toward the puncture.
7. Re-Squeegee All Edges.



- Before attempting to operate this unit, read and be sure you understand the operation and maintenance manual. Locate all controls and determine the use of each. Know what you are doing!

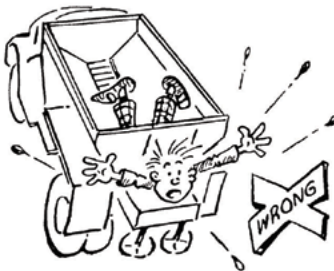


- When leaving the unit unattended for any reason, be sure to:
 - Take power take-off out of gear.
 - Shut off conveyor and spinner drives.
 - Shut off vehicle engine and unit engine (if so equipped).
 - Place transmission of the vehicle in "neutral" or "park".
 - Set parking brake firmly.
 - Lock ignition and take keys with you.
 - Lock vehicle cab.
 - If on steep grade, block wheels.

These actions are recommended to avoid unauthorized use, runaway, vandalism, theft and unexpected operation during start-up.

- Do not read, eat, talk on a mobile phone or take your attention away while operating the unit. Operating is a full-time job.

- Stay out of the trough while auger is operating. If it is necessary to get into the trough for any reason, be sure all power is shut off, vehicle brakes are set, and the engine starting switch is locked and keys removed. All controls should be tagged to prohibit operation and tags should be placed and later removed only by the person who was working in the trough.



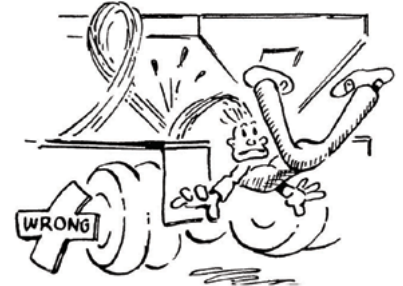
- Guards and covers are provided to help avoid injury. Stop all machinery before removing them. Replace guards and covers before starting spreader operation.

- Stay clear of any moving members, such as shafts, couplings and universal joints. Make adjustments in small steps, shutting down all motions for each adjustment.



- Before starting unit, be sure everyone is clear and out of the way.

- Be careful in getting on and off unit, especially in wet, icy, snowy or muddy conditions. Clean mud, snow or ice from steps and footwear.



- Do not allow anyone to ride on any part of unit for any reason.



- Keep away from spinners while they are turning:
 - Serious injury can occur if spinners touch you.
 - Rocks, scrap metal or other material can be thrown off the spinner violently. Stay out of discharge area.



11. Inspect spinner fins, spinner frame mounting and spinner fin nuts and screws every day. Look for missing fasteners, looseness, wear and cracks. Replace immediately if required. Use only new SAE grade 5 or grade 8 screws and new self-locking nuts.

12. Inspect all bolts, screws, fasteners, keys, chain drives, body mountings and other attachments periodically. Replace any missing or damaged parts with proper specification items. Tighten all bolts, nuts and screws to specified torques according to the torque chart in this manual.



13. Shut off engine before filling fuel and oil tanks. Do not allow overflow. Wipe up all spills. Do not smoke. Stay away from open flame. FIRE HAZARD!



14. Starting fluids and sprays are extremely flammable. Don't smoke. Stay away from flame or heat!



15. All vehicles should be equipped with a serviceable fire extinguisher of 5 BC rating or larger.

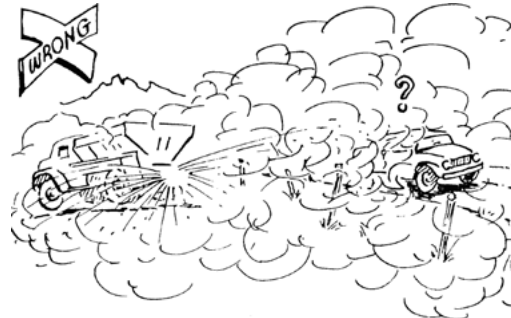
16. Hydraulic system and oil can get hot enough to cause burns. DO NOT work on system that is hot. Wait until oil has cooled. If an accident occurs, seek immediate medical assistance.

17. Wear eye protection while working around or on unit.

18. Read, understand and follow instructions and precautions given by the manufacturer or supplier of materials to be spread. Improper selection, application, use or handling may be hazardous to people, animals, plants, crops or other property.



19. Cover all loads that can spill or blow away. Do



not spread dusty materials where dust may create pollution or a traffic visibility problem.



20. Turn slowly and be careful when traveling on rough surfaces and side slopes, especially with a loaded spreader. Load may shift causing unit to tip.

21. When using a metering device, shut off spinner before placing box on hook or when removing it. Handle box with care to avoid injury.

22. Read and understand the precautionary decals on the spreader. Replace any that become defaced, damaged, lost or painted over. Replacement decals can be ordered from your dealer's parts department or from Highway Equipment Company by calling (319) 363-8281.

1. Maintenance includes all lubrication, inspection, adjustments (other than operational control adjustments such as feedgate openings, conveyor speed, etc.) part replacement, repairs and such upkeep tasks as cleaning and painting.



2. When performing any maintenance work, wear proper protective equipment—always wear eye protection—safety shoes can help save your toes—gloves will help protect your hands against cuts, bruises, abrasions and from minor burns—a hard hat is better than a sore head!

3. Use proper tools for the job required. Use of improper tools (such as a screwdriver instead of a pry bar, a pair of pliers instead of a wrench, a wrench instead of a hammer) not only can damage the equipment being worked on, but can lead to serious injuries. **USE THE PROPER TOOLS.**



4. Before attempting any maintenance work (including lubrication), shut off power completely. **DO NOT WORK ON RUNNING MACHINERY!**
5. When guards and covers are removed for any maintenance, be sure that such guards are reinstalled before unit is put back into operation.
6. Check all screws, bolts and nuts for proper torques before placing equipment back in service. Refer to torque chart in this manual.

7. Some parts and assemblies are quite heavy. Before attempting to unfasten any heavy part or assembly, arrange to support it by means of a hoist, by blocking or by use of an adequate arrangement to prevent it from falling, tipping, swinging or moving in any manner which may damage it or injure someone. Always use lifting device that is properly rated to lift the equipment. Do not lift loaded spreader. **NEVER LIFT EQUIPMENT OVER PEOPLE.**



8. If repairs require use of a torch or electric welder, be sure that all flammable and combustible materials are removed. Fuel or oil reservoirs must be emptied, steam cleaned and filled with water before attempting to cut or weld them. **DO NOT** weld or flame cut on any tank containing oil, gasoline or their fumes or other flammable material, or any container whose contents or previous contents are unknown.



9. Keep a fully charged fire extinguisher readily available at all times. It should be a Type ABC or a Type BC unit.
10. Cleaning solvents should be used with care. Petroleum based solvents are flammable and present a fire hazard. Don't use gasoline. All solvents must be used with adequate ventilation, as their vapors should not be inhaled.

11. When batteries are being charged or discharged, they generate hydrogen and oxygen gases. This combination of gases is highly explosive. DO NOT SMOKE around batteries—STAY AWAY FROM FLAME—don't check batteries by shorting terminals as the spark could cause an explosion. Connect and disconnect battery charger leads only when charger is "off". Be very careful with "jumper" cables.



12. Batteries contain strong sulfuric acid—handle with care. If acid gets on you, flush it off with large amounts of water. If it gets in your eyes, flush it out with plenty of water immediately and get medical help.

13. Hydraulic fluid under high pressure leaking from a pin hole are dangerous as they can penetrate the skin as though injected with a hypodermic needle. Such liquids have a poisonous effect and can cause serious wounds. To avoid hazard, relieve pressure before disconnecting hydraulic lines or performing work on system. Any fluid injected into the skin must be treated within a few hours as gangrene may result. Get medical assistance immediately if such a wound occurs. To check for such leaks, use a piece of cardboard or wood instead of your hand. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to system. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.

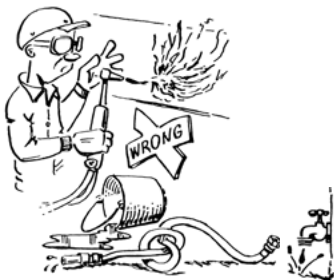


14. The fine spray from a small hydraulic oil leak can be highly explosive—DO NOT SMOKE—STAY AWAY FROM FLAME OR SPARKS.

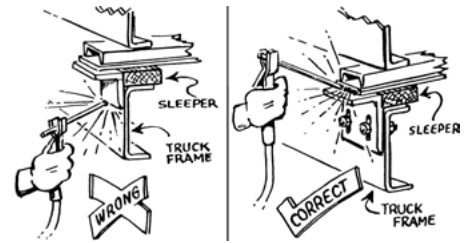
1. Follow mounting instructions in the *Tailgate Installation Instructions* found at **www.highwayequipment.com**. If mounting conditions require deviation from these instructions refer to factory.



2. When making the installation, be sure that the lighting meets Federal Motor Vehicle Safety Standard (FMVSS) No. 108, ASABE S279 and all applicable local and state regulations.
3. When selecting a PTO to drive hydraulic pump, do not use a higher percent speed drive than indicated in the Installation section of this manual. Too high a percent PTO will drive pump at excessive speed, which can ruin the pump, but more importantly, will overheat the hydraulic oil system and increase the possibility of fire.
4. When truck frame must be shortened, cut off only the portion that extends behind rear shackle in accordance with the truck manufacturer's recommendations. If a torch is used to make the cut, all necessary precautions should be taken to prevent fire. Cuts should not be made near fuel tanks and hydraulic oil reservoirs, fuel, brake, electric or hydraulic lines and such lines should be protected from flame, sparks or molten metal. Tires should be removed if there is any chance of their being struck by flame, sparks or molten metal. Have a fire extinguisher handy.



5. Do not weld on vehicle frame as such welding can lead to fatigue cracking and must be avoided. When drilling holes in frame member, drill only through the vertical web portions do not put holes in top or bottom flanges. Refer to truck manufacturer's recommendations.



6. Install controls so that they are located of convenient use. Position them so that they do not interfere with any vehicle control and that they do not interfere with driver or passenger or with access to or exit from the vehicle.
7. Check for vehicle visibility, especially toward the rear. Reposition or add mirrors so that adequate rearward visibility is maintained.
8. Add Caution, Warning, Danger and Instruction decals as required. Peel off any label masking which has not been removed.
9. Install all guards as required.
10. Check installation completely to be sure all fasteners are secure and that nothing has been left undone.



Refer to www.highwayequipment.com for installation instructions. Once on the website, click Customer Support, Other Hi-Way Manuals & Instructions, then Tailgate Spreader Installation Instructions.

The SA-9 unit is an under-tailgate-type spreader designed for spreading abrasives and/or chemicals, primarily for ice and snow control. The SA-9 is also designed to windrow aggregate for road shoulder work.

The SA-9 is a single spinner, single auger spreader. The entire unit mounts to the sides of a dump body level with the floor of the box. A quick-disconnect mounting kit allows for easy installation and removal.

The bottom trough functions as a hopper clean-out. It is held in place by a latch assembly.

The rear cover can be repositioned for use as a hopper cover. This allows normal dumping from the box without filling the hopper with material or removing the spreader.

The SA-9 uses a single nine inch diameter auger with bi-directional flighting. The bi-directional flighting on the unit allows you to move material either to the spinner or to the berm chute. A removable anti-flow cover plate prevents material spillage when the auger isn't operating.

The SA-9 is powered hydraulically. The standard control system is a manual dual hydraulic system, which provides independent variable speed control for both the auger and the spinner.

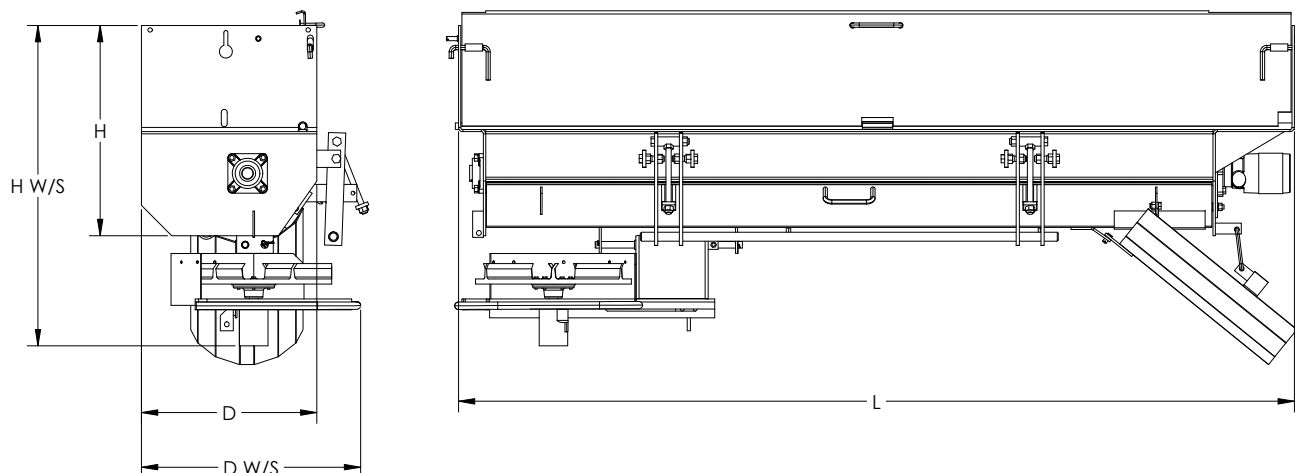
The auger is driven by a hydraulic motor and mounted at the other end in a flange-type ball bearing. A worm gear drive option is available.

A gear-type hydraulic pump provides power to operate the units. Pump drives available are:

1. Through-shaft pump for truck transmission drive.
2. Electric clutch engaged V-belt drive from crankshaft pulley.

This product is intended for commercial use only.

DIMENSIONS & CAPACITIES



	<u>H</u> HEIGHT (inches)	<u>D</u> DEPTH (inches)	<u>L</u> LENGTH (inches)
With Spinner (W/ S)	39 3/16	27 5/16	99 9/16
Without Spinner	26 3/16	24 7/8	99 9/16

Check over the entire unit to be sure all fasteners are in place and properly tightened per *Torque Chart* in this manual. Disengage PTO driving pump. Be sure On-Off control in cab is in the Off position. Do not load the spreader.

1. Check to see that no loose parts or other material is in the spreader or on the spinner disc.
2. Fill the hydraulic tank with oil. Refer to the Lubricant and Hydraulic Oil Specifications section for proper oil.
3. Start engine. Engage PTO or actuate electric clutch switch (if applicable). Let the engine run at approximately 1000 RPM for a few minutes allowing the oil to circulate through pump and back to the reservoir. In cold weather allow greater warm-up time.
4. Place the cab On-Off control in the On position and open the spinner control approximately 1/4. Let the unit run until the air is expelled from the circuit and the spinner is running smoothly. The spinner should rotate counter-clockwise when viewed from the top. Turn the spinner to the Off position.
5. Open auger control approximately 1/4. The auger flighting should move to the center of the spreader. Let the unit run for a few minutes until the auger is running smoothly.
6. Move the spinner and auger control to 1/2 and allow both spinner and auger to run. Shut down system.

**WARNING**

Stand clear of moving machinery. Entanglement of clothes, any part of your body or anything in your hands can cause serious injury or even death.

7. Check all connections in the hydraulic system to make sure that there are no leaks.

**WARNING**

DO NOT check leaks with hands while system is operating as high pressure oil leaks can be dangerous! If skin is pierced with hydraulic fluid at high pressure seek immediate medical attention as fluid injected into the skin could cause gangrene if left untreated. Relieve pressure before disconnecting hydraulic lines or working system. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.

**WARNING**

DO NOT check for leaks adjacent to moving parts while system is operating as there may be danger of entanglement!

8. Check hydraulic oil reservoir and refill to full mark. Fill gear case with oil if applicable. Unit is now ready for road testing.

Before taking the unit out to use, make a walk-around inspection to assure that the spreader is not damaged, that all essential parts are in place, and that all fasteners are tight and all guards are in place. Check all controls to be sure they are operating satisfactorily.

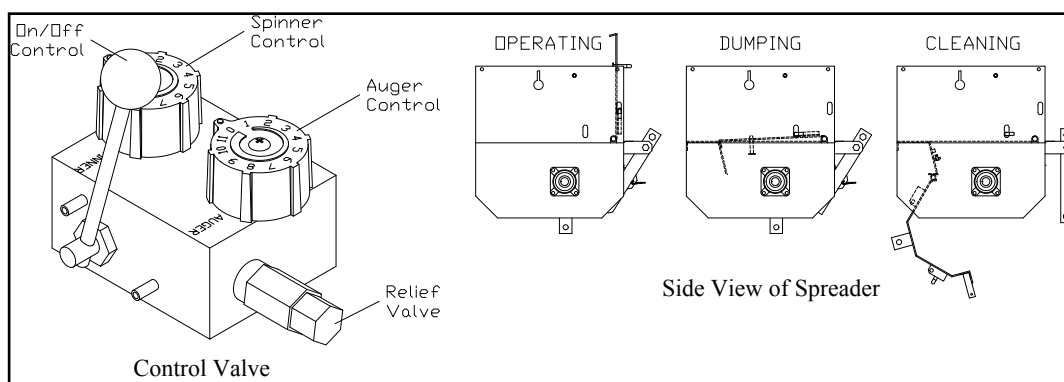


Figure 1 - Operating Controls



CAUTION

Check for clearance before releasing trough for cleaning. It may swing open suddenly. Material in the trough will dump quickly.

Position the rear cover vertically and secure with the pivot rods.

Adjust the dump body's tailgate chains to hold the tailgate in the required position. This adjustment is by trial and error and depends on the flow characteristics of the material being spread. The gate should be open only enough to keep the material freely flowing to the auger. The tailgate should not touch the rear cover.

NOTICE! Make sure trough bottom is secured before filling with material to be spread.

A wide open tailgate on certain materials will tend to stall the auger resulting in uneven delivery of material. With free flowing salt, the tailgate may be chained with only a 3" (7.6cm) or 4" (5.1cm) opening.

If the material to be spread is not already in the dump body, have the unit loaded. With On-Off control in Off position, engage pump drive and allow oil to circulate until it is warm. This may be done while traveling to loading or starting point. The colder the weather, the more important this warm-up becomes.

All spinner adjustments must be made with On-Off control in Off position to stop spinner and auger to avoid injury from spinner and/or discharging material.

Set variable speed spinner control to obtain spread width desired. Spinner speed and position, as well as material granule size, density and moisture content affect spread width, so proper settings are gained by trial and experience.

Spinner speed selected should be the lowest required to obtain the desired spread width with the material being spread. Use of higher spinner speeds will increase wear and tear on parts. It will waste material, and can create excessive damage to vehicle finish through uncontrolled throwing and bounce of materials.

Spread pattern is determined by the mounting position of the spinner assembly. Lateral adjustment of the assembly is made by sliding it along the hinge pin. Lock the assembly in place by tightening set screw.

Slide the spinner to the far left and tighten the set screw. Spread a small amount of material to determine placement of material at various spinner and auger speeds in this position.

Slide the spinner to the far right and tighten the set screw. Make the same checks as above.

NOTE: Close the tailgate before loading and when traveling to the point where spreading is to begin. Open the tailgate just before starting to spread.

If the auger jams while spreading, follow this procedure:

1. Place On-Off control in Off position.
2. Open the bottom panel.
3. Allow any obstructions to fall to the ground.
4. Push the latch handle down to reposition bottom panel. Replace snap pins.

**DANGER**

Never attempt to open the bottom panel with the augers or spinner turning. You will be injured.

**CAUTION**

Check for clearance before releasing trough for cleaning. It may swing open suddenly. Material in the trough will dump quickly.

The rear cover lays down flat on top of the spreader hopper so the dump body may be used without removing the spreader hopper. Follow the procedure below:

1. Place On-Off control in Off position.
2. Unlatch rear cover at each end by rotating pivot rods and pulling out of slots in trough side panels.
3. Pivot the cover until it is flat.
4. Insert the pivot rods through lower slots in trough side panels to retain the cover.

NOTE: Disengage PTO when spreader is not in use for long periods of time or when moving to and from the job after initial warm-up.

APPROXIMATE DELIVERY PER MILE IN CUBIC FEET												
VALVE POSITION	DIRECT DRIVE						GEARCASE DRIVE (OPTION)					
	SPEED IN M.P.H.						SPEED IN M.P.H.					
	15	20	25	30	35	40	15	20	25	30	35	40
1	7.2	5.4	4.3	3.6	3.1	2.7	5.6	4.2	3.4	2.8	2.4	2.1
2	13.6	10.2	8.2	6.8	5.8	5.1	8.2	6.2	4.9	4.1	3.5	3.1
3	20.0	15.0	12.0	10.0	8.6	7.5	10.8	8.1	6.5	5.4	4.6	4.1
4	25.2	18.9	15.1	12.6	10.8	9.5	12.4	9.3	7.4	6.2	5.3	4.7
5	30.4	22.8	18.2	15.1	13.0	11.4	14.0	10.5	8.4	7.0	6.0	5.3
6	35.5	25.4	20.3	16.9	14.5	12.7	15.5	11.6	9.3	7.7	6.6	5.8
7	38.1	27.9	22.3	18.6	16.0	14.0	16.9	12.7	10.2	8.5	7.3	6.4
8	40.6	30.5	24.4	20.3	17.4	15.2	18.4	13.8	11.0	9.2	7.9	6.9
9	46.3	33.3	26.6	22.2	19.0	16.7	21.4	16.8	13.4	11.2	9.6	8.4
10	49.2	36.2	28.9	24.1	20.7	18.1	25.5	19.8	15.8	13.2	11.3	9.9
11	52.0	39.0	31.2	26.0	22.3	19.5	30.4	22.8	18.2	15.2	15.2	11.4

GENERAL OPERATING PROCEDURES CONTINUED

AUTOMATIC DUAL CONTROL SYSTEM

This system uses a ground-speed sensing arrangement to automatically adjust the auger portion of the dual control valve so that auger speed is coordinated with ground speed. The system has three basic speed rates. They are normally calibrated to give light, normal or heavy applications.

As factory settings of the system may not be suitable, the system should be adjusted before use. Calibration instructions are included in the Fluid Controls, Inc. Hydra-Tach Adjustment instructions in the installation manual.

If the tachometer simulator (GTS-1300) mentioned in the manual is not available, the truck can be driven on a smooth roadway at speeds indicated in the adjustment instructions to obtain proper ground speed signals; follow the remainder of the instructions for adjustment.

**WARNING**

Do not jack up or block up rear wheels so that road speeds can be simulated, since vibration from engine, driveline and wheels could jar truck off of jacks or blocks and cause an accident.

HYDRAULIC SYSTEM

When the engine is running and the PTO or electric clutch is engaged, the pump delivers oil to the cab control valve. If the On-Off valve is in the Off position, the oil flows through the valve and returns to the reservoir.

When the On-Off control is moved to the On position, the oil will still flow through the valve and back to the reservoir as long as the spinner and auger control are Off.

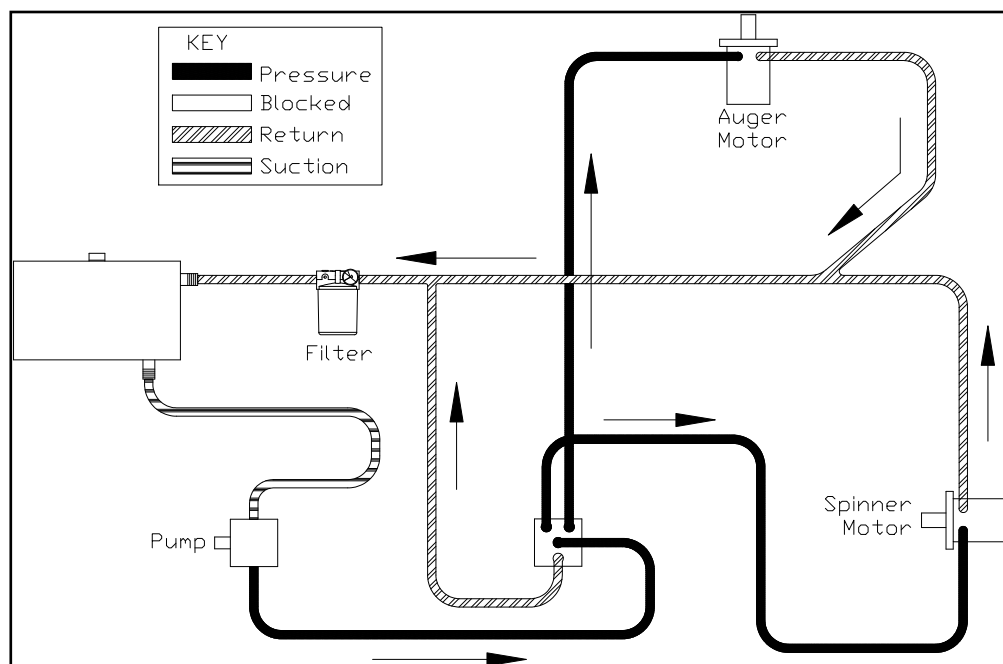


Figure 8 - Hydraulic System Schematic

When the auger or spinner control is rotated, oil under pressure is metered to the spinner or auger motors. The further the control is moved, the more oil is sent to the motors, the faster they turn. Excess oil is returned from the control to the reservoir through a return line. After passing through the motors, that oil is also returned to the reservoir through return lines.

All the hydraulic oil flows through an oil filter before entering the hydraulic reservoir. There is a bypass in the filter. If the filter is clogged, oil will flow through the bypass instead of the filter element. This condition is indicated when the filter indicator gauge is in the "Red" or "Danger" zone. The filter element must be changed.

To reverse auger rotation, switch the pressure and return hoses at the ports on the auger motor.

Pressure Setting

The system relief is located in the cab control valve and is set at 1500 PSI. The pressure can be set as follows:

1. Turn both auger and spinner controls to "Off". Disengage the PTO.
2. Disconnect the pressure line leading to the spinner motor. Install a gauge of at least 2000 PSI capacity in the line. Block the line downstream from the gauge. The easiest way to do this is to install a "Tee" in the line. Block one port on the "Tee" and install a gauge in the other. Make sure the "Tee" is capable of withstanding 2000 PSI.
3. Engage the PTO. Start the engine. Turn the spinner control full "On" and read the pressure. Adjust the relief valve as required.

NOTE: Back off on the adjustment, then turn back in until proper pressure is reached. Tighten the jam nut on the relief valve.

**CAUTION**

Do not jack up or block up rear wheels so that road speeds can be simulated, since vibration from engine, driveline and wheels could jar truck off of jacks or blocks and cause an accident.

4. Turn the control to the Off position. Shut off engine. Disengage PTO. Remove the gauge and reconnect the hydraulic lines.

Checking Pump Flow

Pump output can be checked with a flow meter. Disconnect the pressure line leading from the pump at the cab control valve. Connect this line to the flow meter inlet port. Disconnect the return line from the cab control valve. Connect this line to the flow meter return port. Plug the two open ports on the control valve to prevent oil loss and entry of foreign material.

Open the load valve fully. Engage the PTO or electric clutch. Start the truck engine and operate it at 2500 RPM. Read the flow meter. Slowly close the load valve on the flow meter until pressure reads 1000 PSI. Flow should not fall off more than 3 GPM. If flow loss is greater, the pump is worn and must be replaced.

**CAUTION**

Be very careful not to exceed 1000 PSI—No relief valve protection is available during this test.

HYDRAULIC SYSTEM

The use of proper oil in the hydraulic system is one of the most important factors for satisfactory operation. Utmost cleanliness in handling the oil cannot be stressed enough. Keep the hydraulic oil in original closed containers, clean top of container before opening and pouring, and handle in extremely clean measures and funnels.

Refer to the *Lubricant and Hydraulic Oil Specifications* section of the manual for selection of the proper hydraulic fluid for use in the hydraulic system.

Service Schedule

1. Check the hydraulic oil daily by means of dipstick. Add oil if required. Periodically inspect the hoses and fittings for leaks.

NOTICE!	2. CHANGE THE HYDRAULIC OIL FILTER AFTER THE FIRST WEEK (OR NOT MORE THAN 50 HOURS) OF OPERATION ON A UNIT.
----------------	---

3. After first filter change, replace filter when indicator reaches Danger Zone.
4. The reservoir should be drained through drain plug (not through suction outlet), flushed, and refilled annually, or the oil should be changed if it shows any signs of breaking down under continued high-pressure operation. Discoloration of oil is one sign of breakdown.

BEARINGS

Grease in a bearing acts to prevent excessive wear of parts, protects ball races and balls from corrosion and aids in preventing excessive heat within the bearing. It is very important the grease maintains its proper consistency during operation. It must not be fluid and it must not channel.

Make sure all fittings are thoroughly cleaned before grease is injected. Points to be lubricated by means of a grease gun have standard grease fittings.

Lubricate bearings by pumping grease slowly until it forms a slight bead around the seals. This bead indicates adequate lubrication and also provides additional protection against the entrance of dirt.

GEAR CASE

Drain oil in a new unit after first two weeks (or not more than 100 hours) of operation, and flush gear case thoroughly with light oil. Refer to *Lubricant and Hydraulic Oil Specifications* section for proper grade oil. Refill gear case up to level plug or 3/4 pint of recommended lubricant. (See "Checking Installation" in *Tailgate Spreader Installation Instructions* at www.highwayequipment.com.) After initial change, oil should be changed every 2,000 hours of operation or annually, whichever occurs first.

Check gear case oil level monthly.

FASTENERS

Tighten all screw fasteners to recommended torques after the first week of operation and annually thereafter. If loose fasteners are found at any time, tighten to the recommended torques. Replace any lost or damaged fasteners or other parts immediately upon finding such damage or loss. Check body mounting bolts every week.

CLEAN UP

For maintaining minimum maintenance operation, this equipment should be thoroughly washed every two (2) to three (3) days during the operating season. Hose the unit down under pressure to free all sticky and frozen material.

It is important that the machine be thoroughly cleaned at the end of each operating season. All lubrication and maintenance instructions should be closely followed. For longer life, repaint worn spots to prevent formation of rust.

NOTICE!

The lubricant distributor and/or supplier is to be held responsible for the results obtained from their products. Procure lubricants from distributors and/or suppliers of unquestionable integrity, supplying known and tested products. Do not jeopardize your equipment with inferior lubricants. No specific brands of oil are recommended. Use only products qualified under the following oil viscosity specifications and classification recommended by reputable oil companies.

HYDRAULIC SYSTEM

The following are the recommended procedures for selecting the proper hydraulic fluid for use in the hydraulic system. Select a major brand industrial PREMIUM QUALITY (anti-wear type) hydraulic oil to provide viscosity between 100-200 SSU at operating temperature. Premium hydraulic oils with viscosity indexes of 95 or above will provide the following temperature ranges :

INDUSTRY IDENTIFICATION/ SAE VISCOSITY GRADE	OPERATING TEMPERATURE	VISCOSITY
150 SSU	122° F (50° C)/84° F (28.9° C)	100 SSU/200 SSU
225 SSU	140° F (60° C)/107° F (41.7° C)	100 SSU/200 SSU
300 SSU	150° F (66.6° C)/116° F (46.1° C)	100 SSU/200 SSU
450 SSU	165° F (73.9° C)/130° F (54.5° C)	100 SSU/200 SSU
600 SSU	182° F (83.3° C)/145° F (62.8° C)	100 SSU/200 SSU

If, because of necessity or convenience, it is desirable to use an automotive engine oil, multi-viscosity oils of SC rating (formerly MS quality) which will provide between 100-200 SSU at operating temperature can be used. These will provide proper viscosity over a wide range. For example:

SAE VISCOSITY GRADE	OPERATING TEMPERATURE	VISCOSITY
10W-30	130° F (54.5° C)	100 SSU
	100° F (37.8° C)	200 SSU
10W-40	190° F (87.8° C)	100 SSU
	140° F (60° C)	200 SSU

GEAR CASE LUBRICANT

Gear cases are factory equipped with synthetic oil for best performance at high loads. Lubricate the gear case with multi-purpose gear lubricating oil conforming to MIL-L2105B according to the chart below:

Part	Refill Quantity	40° to 120° F (4.5° to 49° C)	Below 40° F (4.5° C)
Gear Case	.75 pints (.35 liters)	SAE 85W 140	SAE 88W 90

PRESSURE GUN LUBRICANT

Use a ball and roller bearing lithium base lubricant with a minimum melting point of 300° F (148.9° C). This lubricant should have a viscosity that assures easy handling in the pressure gun at prevailing atmospheric temperatures. The lubricant must be waterproof. The grease should conform to NLGI No. 2 consistency.

**WARNING**

Shut off all power and allow all moving parts to come to rest before performing any maintenance operation.

The spreader should be regularly lubricated with the lubricants recommended in this manual in accordance with the following chart:

<u>LOCATION</u>	<u>PLACES</u>	<u>METHOD</u>	<u>FREQUENCY</u>
Transmission PTO			
Slip Joint	1	Grease Gun	Weekly
U-Joint	2	Grease Gun	Monthly
Hydraulics			
Reservoir	1	Oil	Check Daily; Change Annually
Filter	1	Check Daily; Change Element when Indicated (Red)	
Control Valve – Hex Valve Stem (Under hand knob)	2	Hand Grease	Check Annually
Auger			
Bearings	1	Grease Gun	Weekly
Gear Case	1	Fill through vent plug	Check Monthly; Change Annually

NOTE: Unusual conditions, such as excessive dust, temperature extremes or excessive moisture may require more frequent lubrication of specific parts.

* See *Lubricant and Hydraulic Oil Specifications* for types of lubricants and oil to be used.

1. Symptom: Neither auger nor spinner will operate.

Reason	Correction
A. Low reservoir oil level.	Check and fill as required.
B. PTO not engaged.	Engage PTO. Check for broken or disconnected control cable.
C. PTO malfunction.	Check out PTO.
D. Electric clutch malfunction.	Check out electric clutch.
E. Drive belts slipping or broken.	Check out belts. Replace or adjust tension as required.
F. Pump driveshaft.	Check for broken or disconnected pump driveshaft.
G. Pump not rotating.	Check for broken key in pump. Also see C- F above.
H. Worn pump.	Check with flow meter.
I. Relief valve set too low.	Adjust relief valve setting.

2. Symptom: Auger operates but spinner doesn't.

Reason	Correction
A. Spinner jammed.	Turn spinner control Off, then check for jams.
B. Motor not turning spinner.	Check for broken key or failed motor. Repair or replace.
C. Pinched or crushed hoses or lines.	Repair or replace as required.

3. Symptom: Spinner operates but auger doesn't.

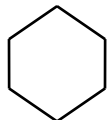
Reason	Correction
A. Auger jammed.	Turn auger control Off, then check for jams.
B. Gear case drive.	Check for broken or missing keys, broken shafts or broken gears. Check the auger drive bolt. Repair or replace as necessary.
C. Frozen bearings.	Turn auger control Off, then check bearings. Replace as required.
D. Motor doesn't turn auger.	Check for broken key or failed motor. Repair or replace.
E. Pinched or crushed hoses or lines.	Repair or replace as required.

4. Symptom: Hydraulic oil overheats.

Reason	Correction
A. Low oil level.	Check oil level. Add as necessary.
B. Check for proper pump/PTO matching.	Install proper sized pump.
C. Incorrect relief valve setting.	Check setting. Adjust to proper setting.
D. Pinched or crushed hoses and lines.	Repair or replace as required.
E. Worn motor in system.	Repair or replace as required.

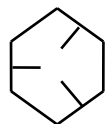
CAP SCREW GRADE IDENTIFICATION - MARKINGS ON HEAD

SAE GRADE 2



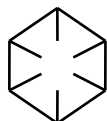
NO MARKINGS

SAE GRADE 5



THREE MARKS - 120 DEGREES APART

SAE GRADE 8



SIX MARKS - 60 DEGREES APART

USE GRADE 2 TORQUES FOR STAINLESS STEEL FASTENERS AND CARRIAGE BOLTS.

CAP SCREW SIZE	TORQUE - FOOT-POUNDS					
	GRADE 2		GRADE 5		GRADE 8	
	DRY	LUBE	DRY	LUBE	DRY	LUBE
1/4"	5	4	8	6	12	9
5/16"	11	8	17	13	25	18
3/8"	20	15	30	23	45	35
7/16"	30	24	50	35	70	55
1/2"	50	35	75	55	110	80
9/16"	65	50	110	80	150	110
5/8"	90	70	150	110	220	170
3/4"	100	120	260	200	380	280
7/8"	140	110	400	300	600	460
1"	220	160	580	440	900	650



Order from the **AUTHORIZED DEALER** in your area.

1. Always give the pertinent model and serial number.
2. Give part name, part number and the quantity required.
3. Give the correct address to where the parts are to be shipped, and the carrier if there is a preference.

Unless claims for shortages or errors are made immediately upon receipt of goods they will not be considered. Any part returns should be directed through the dealer from which they were purchased.

When broken goods are received, a full description of the damage should be made by the carrier agent on the freight bill. If this description is insisted upon, full damage can always be collected from the transportation company.

No responsibility is assumed for delay or damage to merchandise while in transit. Our responsibility ceases upon delivery of shipment to the transportation company from whom a receipt is received showing that shipment was in good condition when delivered to them, therefore, claims (if any) should be filed with the transportation company and not with Highway Equipment Company.

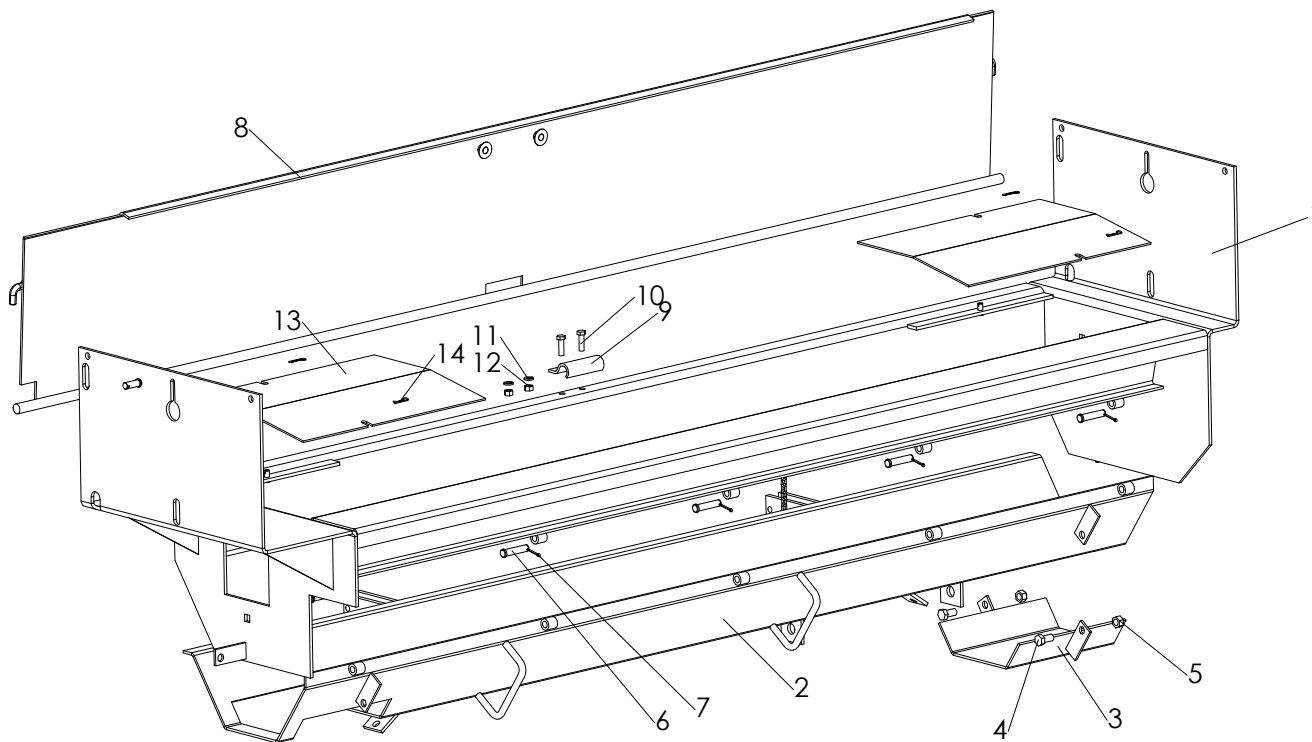
If your claims are not being handled (by the transportation company) to your satisfaction, please call the Parts Manager at Highway Equipment Company (319-363-8281) for assistance.

In the parts list the following symbols and abbreviations stand for:

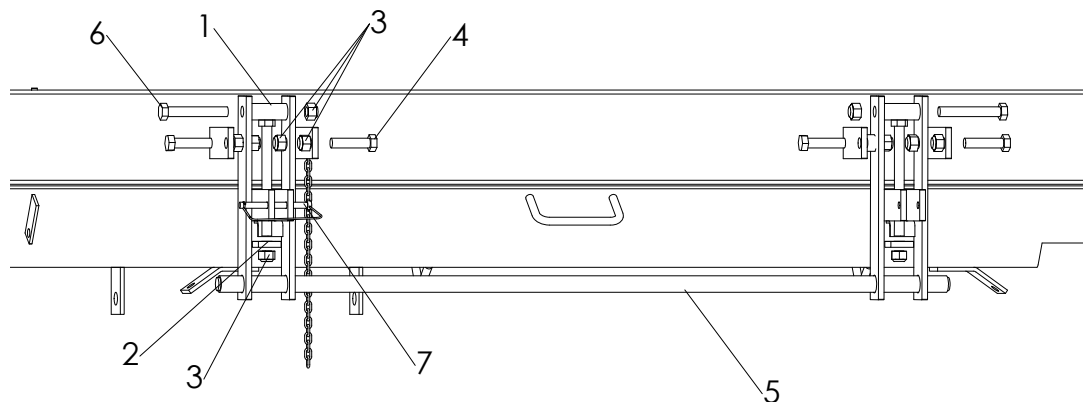
* - Not Shown
AR – As Required
CS – Carbon Steel
SS – Stainless Steel

The parts listed under the different steel types (CS, 409 SS and 304 SS) are for that type of unit and do not necessarily mean the part is made of that type of steel.



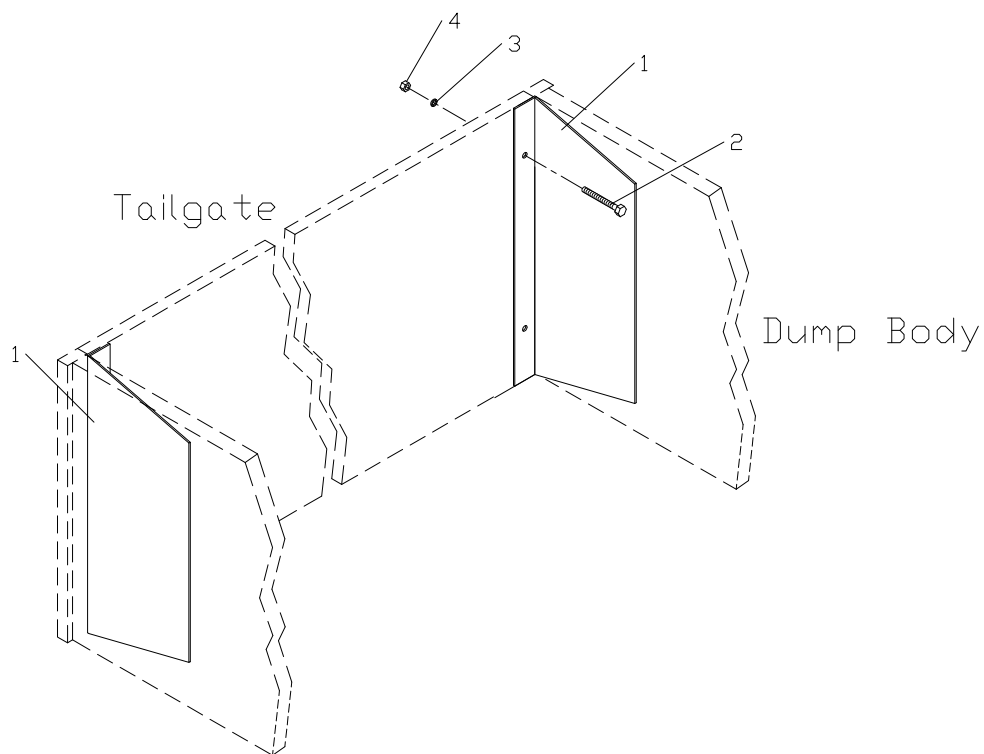


ITEM	PART NO.		DESCRIPTION	QTY
	CS	304 SS		
1	312433	312434	Trough – Frame Wldmt RH Discharge	1
		312435	Trough - Frame Wldmt Center Discharge	1
2	90752	90906	Trough – Bottom Wldmt RH Discharge	1
		90906-X4	Trough - Bottom Wldmt Center Discharge	1
3	90776	90908	Cover – Trough Wldmt	1
4	20127	36401	Cap Screw – 1/2 X 1	2
5	20680	39016	Nut – Lock 1/2	2
6	21024	21024	Pin – Clevis 1/2 X 2 1/4	5
7	20817	20817	Pin – Cotter 1/8 X 1	5
8	90748	90905	Cover Wldmt	1
9	90742	90942	Holder – Pivot Cover	1
10	20068	36399	Cap Screw – 3/8 X 1 1/4	2
11	20712	36420	Washer – Lock 3/8 SS	2
12	20644	36414	Nut – Hex 3/8	2
13	90761	90941	Plate – Anti-flow	2
14	41779	41779	Pin – Hair	4

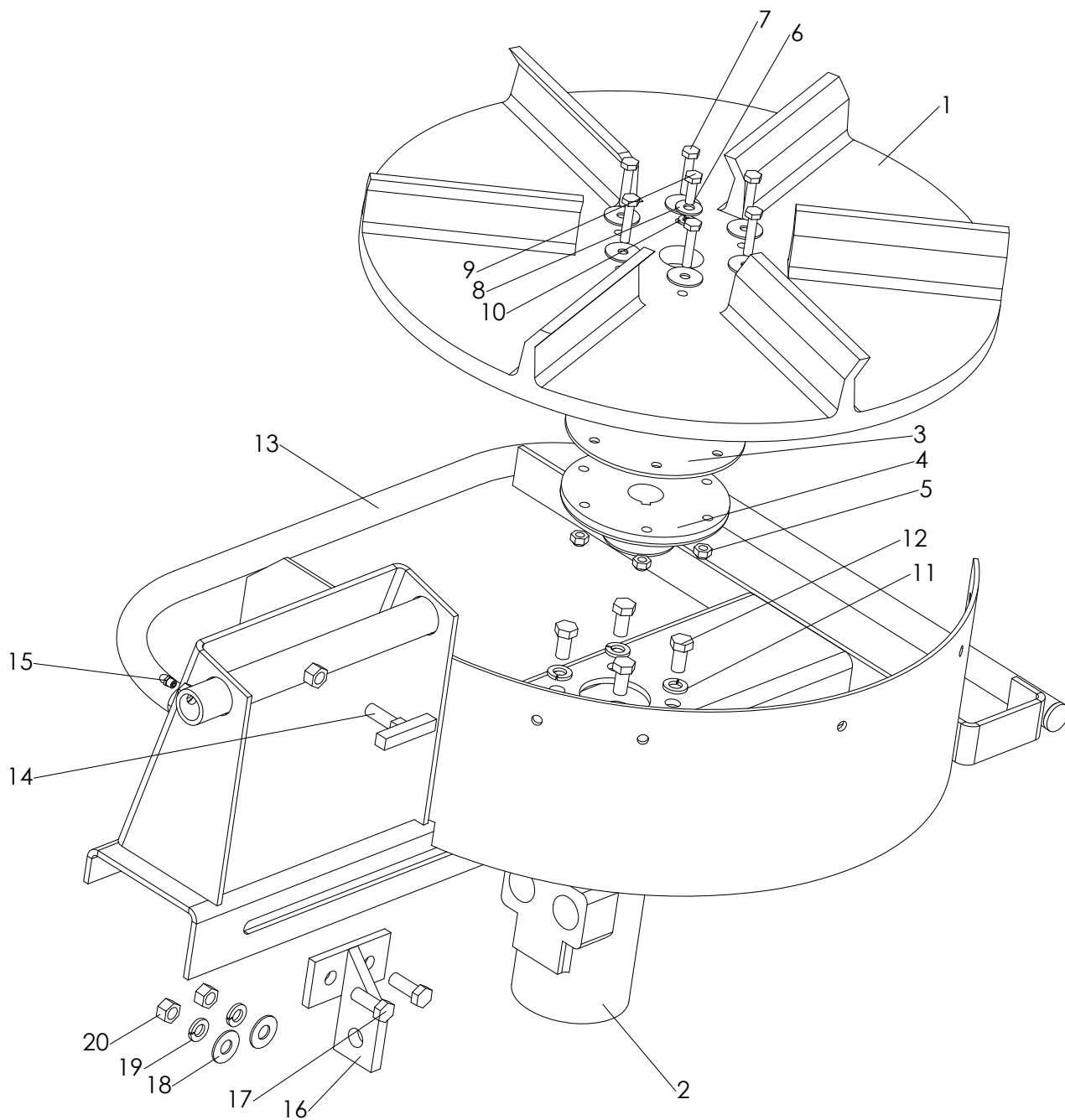


<u>ITEM</u>	<u>PART NO.</u>		<u>DESCRIPTION</u>	<u>QTY</u>
	CS	304 SS		
1	90771	90952	Pipe – Latch WLDMT	2
2	90772	90954	Shaft – Latch	2
3	20682	41762	Nut – Lock 5/8	12
4	90855	90966	Cap Screw – 5/8 X 2 1/2	4
5	90770	90953	Latch – Handle WLDMT	1
6	20185	90967	Cap Screw – 5/8 X 4	2
7	90727	90727	Pin – Snap	1

TAILGATE PANELS



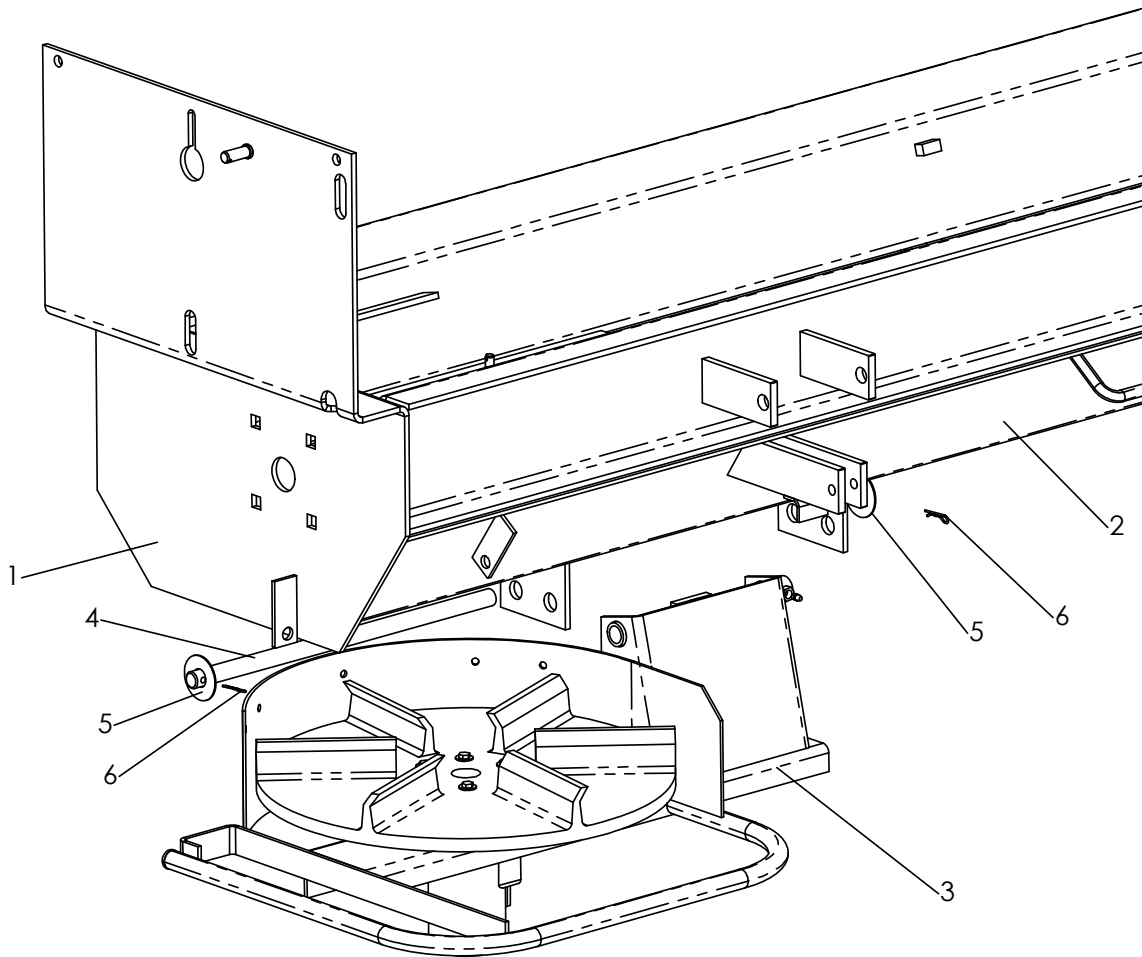
<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	207117	Panel - Corner	2
2	20077	Cap Screw - 3/8 x 3-1/2	4
3	20712	Washer - Lock 3/8	4
4	20644	Nut - Hex 3/8	4



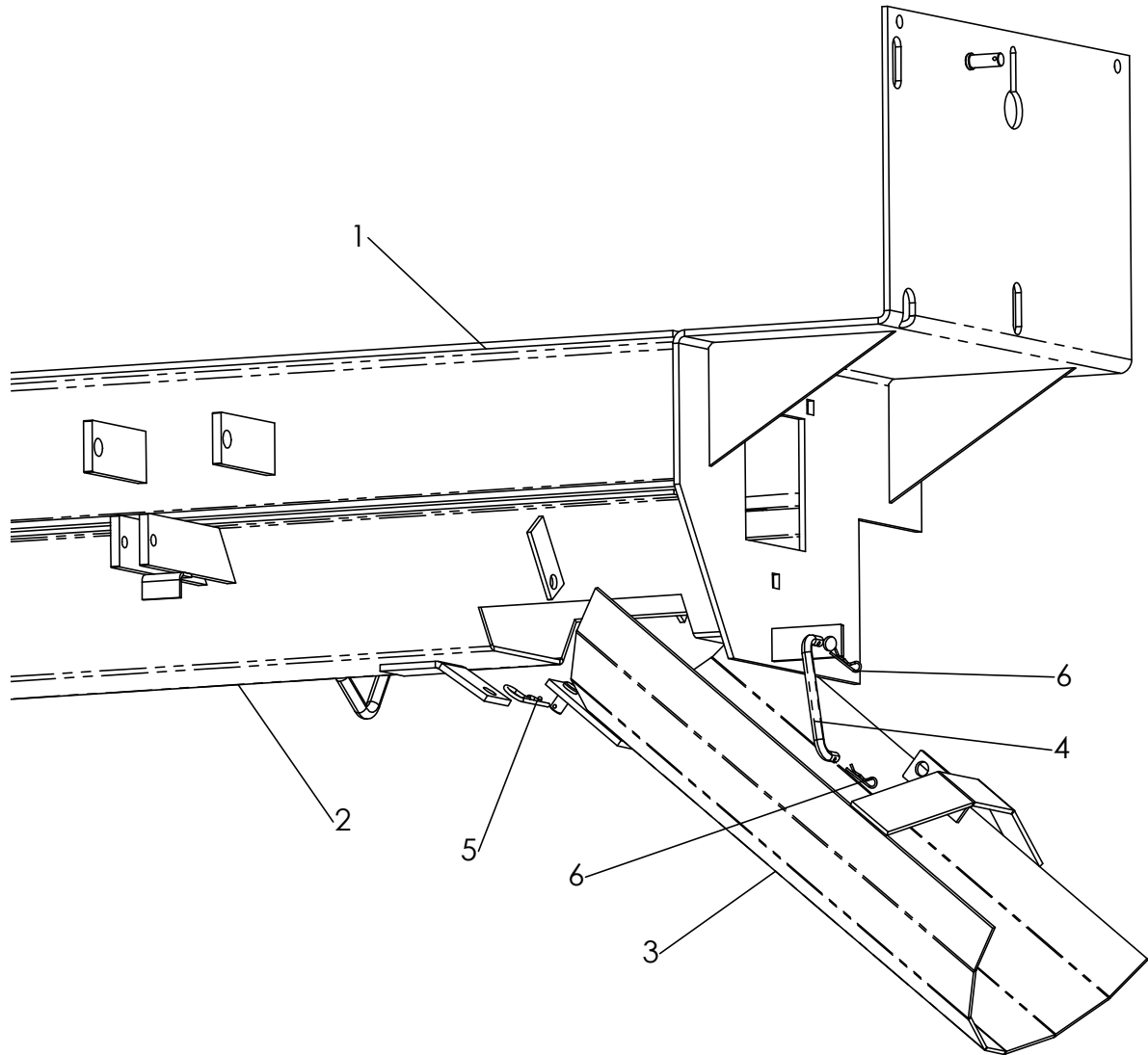
SPINNER CONTINUED

<u>ITEM</u>	<u>PART NO.</u>		<u>DESCRIPTION</u>	<u>QTY</u>
	CS	304 SS		
1	34852	34852	Spinner – Urethane 18"	1
2	37336	37336	Motor – Hydraulic	1
3	39178	90945	Plate – Spinner Mounting	1
4	74122	74122	Hub – Disc Spinner	1
5	42034	42034	Nut – Lock 1/4 SS	6
6	21423	21423-X1	Washer – Flat 1/4	6
7	20007	42448	Cap Screw – 1/4 X 1-1/2	6
8	20691	-----	Washer – Flat 1/4	1
9	20003	36393	Cap Screw – 1/4 X 3/4	1
10	36418	36418	Washer – Lock 1/4 SS	1
11	36420	36420	Washer – Lock 3/8 SS	4
12	36293	36293	Cap Screw – 3/8 X 3/4 SS	4
13	90731	90912	Spinner WLDMT	1
14	71212	90946	T-Bolt WLDMT	1
15	6072	6072	Zerk – Grease	1
16	73440	90960	Link – Leveling WLDMT	1
17	20067	36398	Cap Screw – 3/8 X 1	2
18	20693	36425	Washer – Flat 3/8	2
19	20712	36420	Washer – Lock 3/8	2
20	20644	36414	Nut – Hex 3/8	2
21	*32996	*32996-X1	Panel - Baffle Curved (mounts to back-side of fixed baffle)	1
22	*36395	*36395	Cap Screw - 1/4-20NC x 1 SS	2
23	*32445	*32445	Nut - Wing 1/4-20NC SS	2
24	*36423	*36423	Washer - Flat 1/4 SS	2

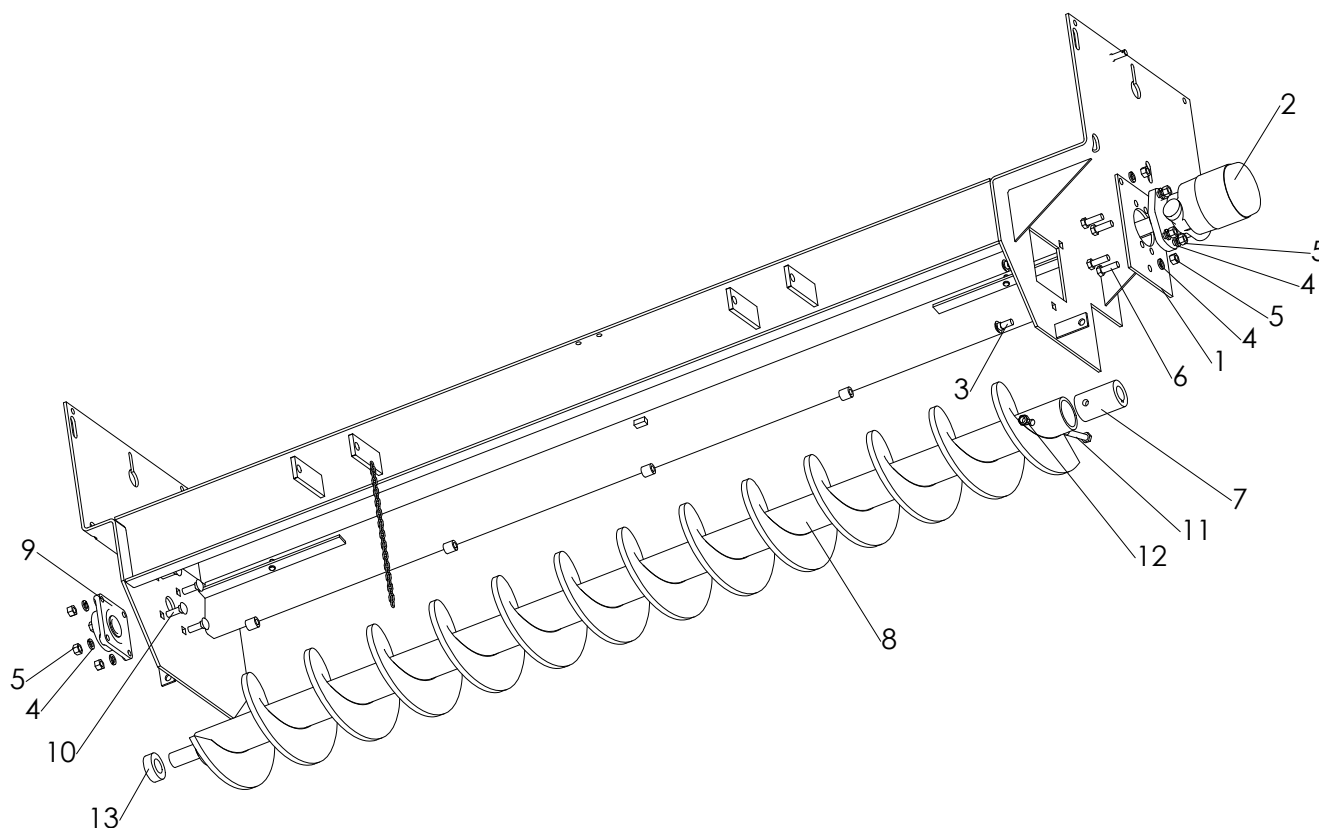
*Not Shown



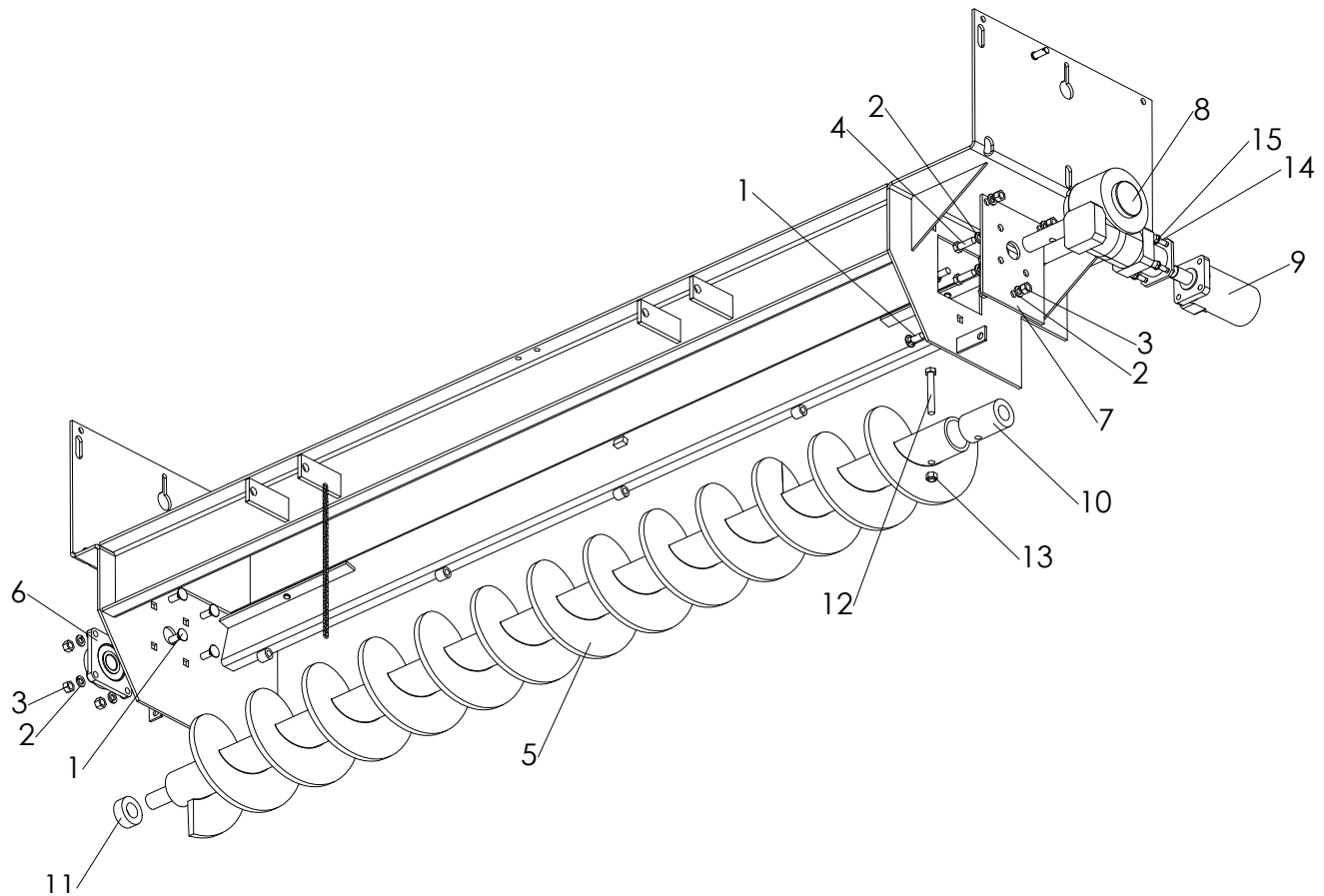
ITEM	PART NO.		DESCRIPTION	QTY
	CS	304 SS		
1	312433	312434	Frame – Trough Wldmt	1
2	90752	90906	Trough – Bottom Wldmt	1
3	90788	90913	Spinner Assembly	1
4	90733	90955	Pin – Hinge	1
5	20698	20698	Washer – Flat .75	2
6	41779	41779	Pin – Hair	2



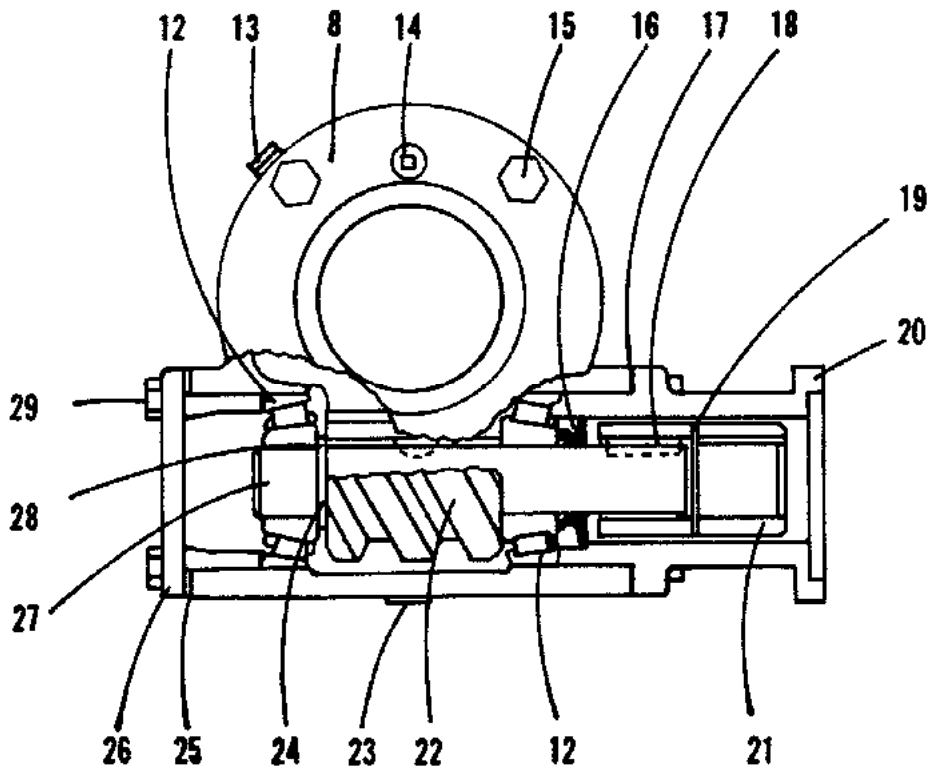
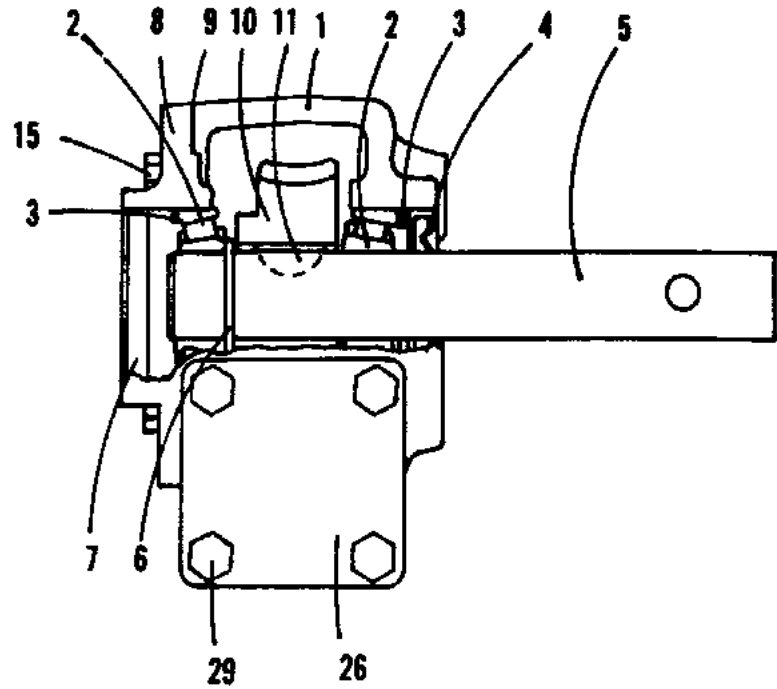
<u>ITEM</u>	<u>PART NO.</u>		<u>DESCRIPTION</u>	<u>QTY</u>
	CS	304 SS		
1	312433	312434	Frame – Trough WLDMT	1
2	90752	90906	Trough – Bottom WLDMT	1
3	90792	90909	Chute – Berm WLDMT	1
4	39672	80990	Rod – Control	1
5	40576	40576	Pin – Hair	1
6	41779	41779	Pin – Hair	2



ITEM	PART NO.		DESCRIPTION	QTY
	CS	304 SS		
1	99070	90944	Plate – Motor	1
2	90729	90729	Motor – Hydraulic	1
	96459	96459	Motor – Hydraulic w/2 pac sensor	
	96460	96460	Motor – Hydraulic w/ weather-pac sensor	
3	20365	36411	Bolt – Carriage 1/2 X 1 1/4	3
4	20714	36422	Washer – Lock 1/2	11
5	20646	36416	Nut – Hex 1/2	11
6	20135	36297	Cap Screw – 1/2 X 3	4
7	90801	90801	Coupling – Auger	1
8	90764	90764	Auger WLDMT	1
9	6693	6693	Bearing	1
10	20366	36411	Bolt – Carriage 1/2 X 1 1/2	4
11	20137	20137	Cap Screw – 1/2 X 3 1/2	1
12	20680	20680	Nut – Lock 1/2	1
13	90725-X1	90725-X1	Spacer	1



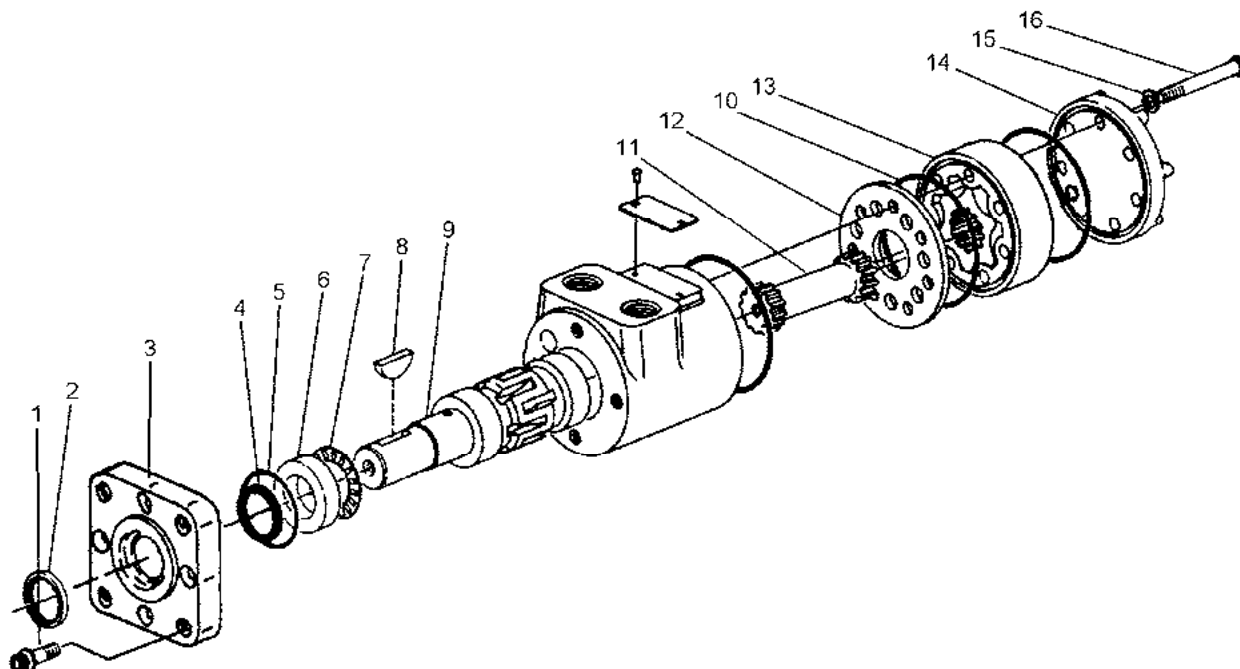
ITEM	PART NO.		DESCRIPTION	QTY
	CS	304 SS		
1	20365	36411	Bolt – Carriage 1/2 X 1 1/4	7
2	20714	36422	Washer – Lock 1/2	11
3	20646	36416	Nut – Hex 1/2	7
4	20129	36539	Cap Screw – 1/2 X 1 1/2	4
5	90764	90764	Auger WLDMT	1
6	6693	6693	Bearing	1
7	90755	90943	Plate – Gear Case	1
8	71825	71825	Gear Case Assembly	1
9	37337	37337	Motor – Hydraulic	1
10	90795	90795	Bushing – Auger	1
11	90725	90725	Spacer	1
12	20137	34581	Cap Screw – 1/2 X 3 1/2	1
13	20680	39016	Nut – Lock 1/2	1
14	20067	36398	Cap Screw – 3/8 X 1	4
15	20712	36420	Washer – Lock 3/8	4



GEAR CASE CONTINUED

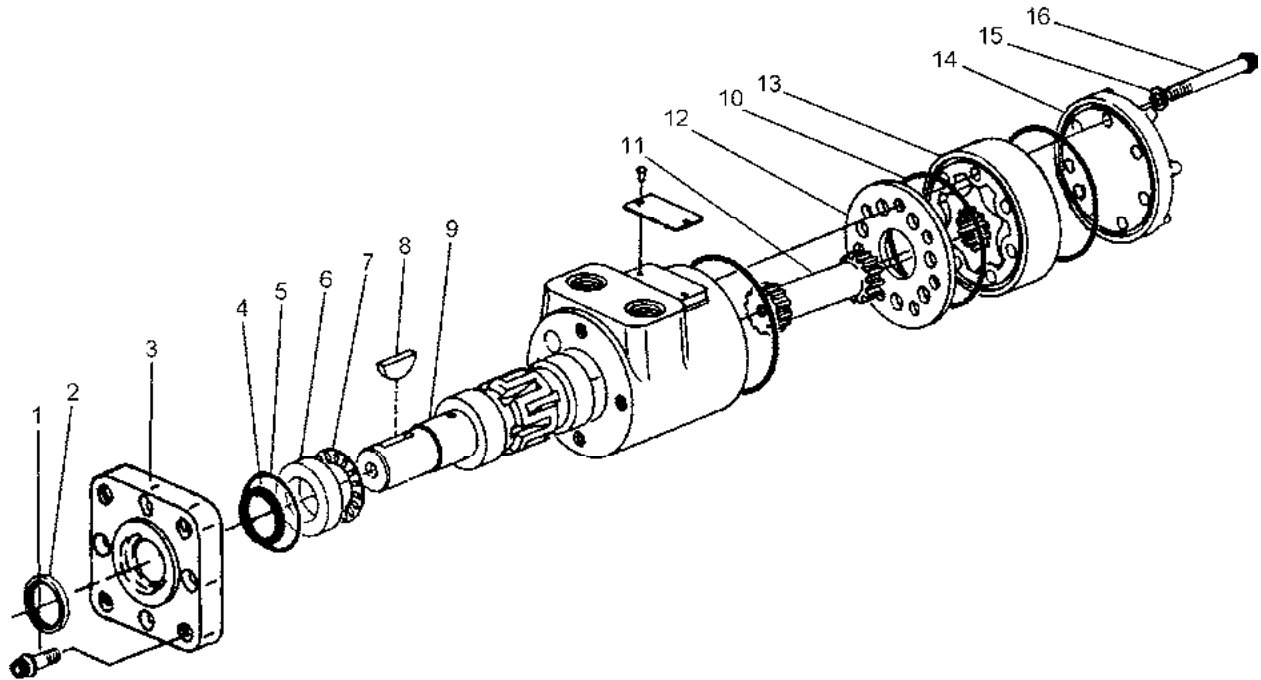
<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
	71825	Gear Case Assy	1
1	58985	Housing	1
2	24230	Bearing - Cone	2
	24225	Bearing - Cup	2
3	22832	Ring - Snap	2
4	22831	Seal - Output	1
5	58987	Shaft - Output	1
6	24231	Ring - Snap	1
7	22839	Cap	1
8	22824	Cover	1
9	22834	Gasket - Cover	1
10	22825	Gear - Worm	1
11	58988	Key - Woodruff	1
12	22840	Bearing - Cone	2
	24225	Bearing - Cup	2
13	8621	Plug - Vent	1
14	6031	Plug - Level	1
15	20065	Cap Screw - 3/8 x 3/4	4
16	71458	Seal - Input	1
17	58989	Gasket	1
18	34995	Key	1
19	58986	Pin - Roll	1
20	83585	Mount - Motor	1
21	71105	Coupling	1
22	22826	Worm	1
23	6293	Plug - Drain	1
24	6089	Ring - Snap	1
25	58989	Gasket	1
26	71454	End	1
27	71456	Shaft - Input	1
28	24234	Key - Woodruff	1
29	20066	Cap Screw - 3/8 x 7/8	8
30	22835	Shim	AR

AR - As Required



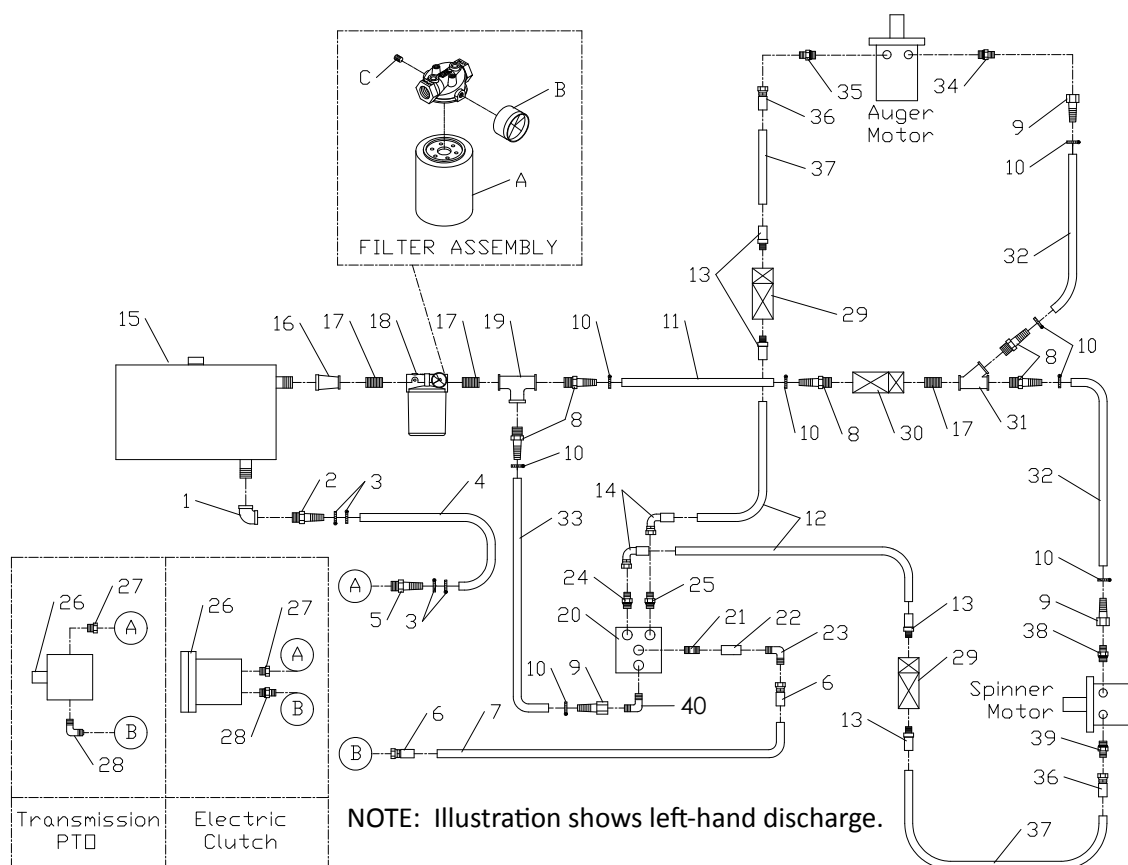
ITEM	PART NO.	DESCRIPTION	QTY
	70927	Motor - Hydraulic	
1	30665	Cap Screw - 5/16 x 7/8	4
2	37382	Seal	1
3	37383	Flange - Mounting	1
4	37378	Seal	1
5	37379	Seal - O-Ring	1
6	37385	Bearing - Spacer	1
7	37401	Bearing - Thrust Needle	1
8	3065	Key - Woodruff	1
9	37386	Shaft - Output	1
10	37380	Seal - O-Ring	3
11	16945	Drive	1
12	37388	Plate - Spacer	1
13	37391	Gerotor	1
14	37400	Cap - End	1
15	37381	Washer - Seal	7
16	16933	Cap Screw	7
17	* 22068	Seal - O-Ring	1
	37352	Kit - Seal, Includes Items 2,4,5,10,15,17	

* - Not Shown



<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
	37336	Motor – Hydraulic	
1	30665	Cap Screw - 5/16 x 7/8	4
2	37382	Seal	1
3	37384	Flange – Mounting	1
4	37378	Seal	1
5	37379	Seal – O-Ring	1
6	37385	Race – Bearing	1
7	37401	Bearing – Thrust Needle	1
8	3065	Key – Woodruff	1
9	37387	Shaft – Output	1
10	37380	Seal – O-Ring	3
11	16945	Drive	1
12	37388	Plate – Spacer	1
13	37389	Gerotor	1
14	37400	Cap – End	1
15	37381	Washer – Seal	7
16	16931	Cap Screw	7
17	* 22068	Seal – O-Ring	1
	37352	Kit – Seal, Includes Items 2,4,5,9,14	

* - Not Shown



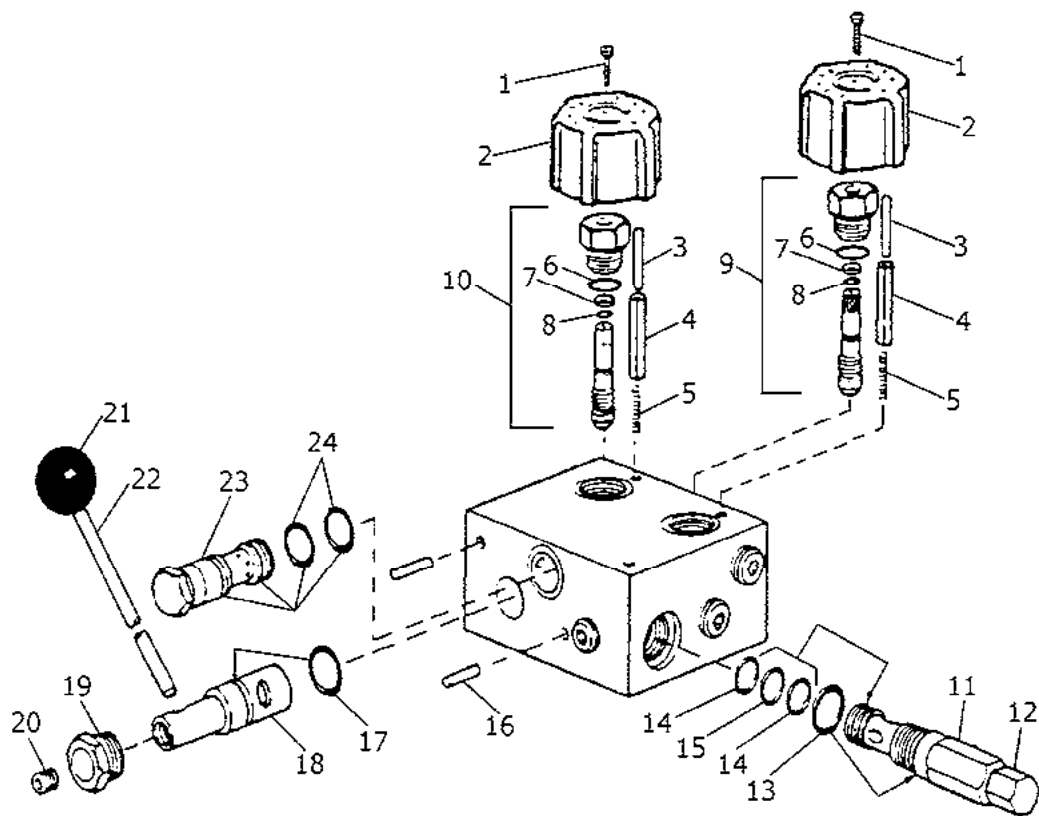
ITEM	PART NO.	DESCRIPTION	QTY
1	6011	Elbow - Pipe 90°	1
2	16582	End - Hose	1
3	6335	Clamp - Hose	4
4	23184-72	Hose - Suction (Trans. PTO)	1
	23184-144	Hose - Suction (Electric Clutch)	1
5	16572	End - Hose (Trans. PTO)	1
	16582	End - Hose (Electric Clutch)	1
6	56508	End - Hose	2
7	56459-72	Hose - Hydraulic (Trans. PTO)	1
	56459-120	Hose - Hydraulic (Electric Clutch)	1
8	22425	End - Hose	3
9	11424	End - Hose	3
10	22381	Clamp - Hose	5
11	16529-144	Hose - Return	1
12	56453-144	Hose - Hydraulic	2
13	31599	End - Hose	2
14	56485	End - Hose 90°	2

ITEM	PART NO.	DESCRIPTION	QTY
15	39796	Reservoir - Hydraulic Wldmt	1
	* 20069	Cap Screw - 3/8 X 1-1/2	4
	* 20693	Washer - Flat 3/8	4
	* 20712	Washer - Lock 3/8	4
	* 20644	Nut - Hex 3/8	4
16	8809	Coupling - Pipe	1
17	6026	Nipple - Pipe	3
18	30743	Filter - Oil	1
A	39934	Filter	1
B	43534	Indicator - Sleeve	1
C	21835	Plug	1
19	6020	Tee - Pip	1
20	310650	Valve - Control	1
21	16362	Nipple - Close	1
22	16276	Coupling	1
23	29764	Adapter - 90°	2
24	29767	Adapter	1
25	29808	Adapter	1
26	34569	Pump - Hyd. Assy (Electric Clutch)	1
	24516	Pump - Hyd. Assy (Trans. PTO)	1
27	22018	Adapter (Electric Clutch)	1
	22016	Adapter (Trans. PTO)	1
28	29835	Adapter (Electric Clutch)	1
	29764	Adapter 90° (Trans. PTO)	1
29	* 16322	Coupling - Pipe Standard	3
	22332	Disconnect - Quick 1/2" (OPT.)	3
30	* 6003	Coupling - Pipe Standard	1
	71185	Disconnect - Quick 3/4" (OPT.)	1
31	29809	Adapter - T	1
32	29752	Adapter	2
33	90814	Hose - .75 X 60 100R2 Assy	2
34	29753	Adapter - Straight	2
35	90813	Hose - .5 X 60 100R1 Assy	1
36	29784	Adapter - Reducing	1
37	6025	Nipple - Close	1
38	22020	Adapter	1
39	29771	Adapter - Reducing	1
40	90815	Hose - .5 X 48 100R1 Assy	1

* - Not Shown

Please Give Part No., Description
& Unit Serial No.

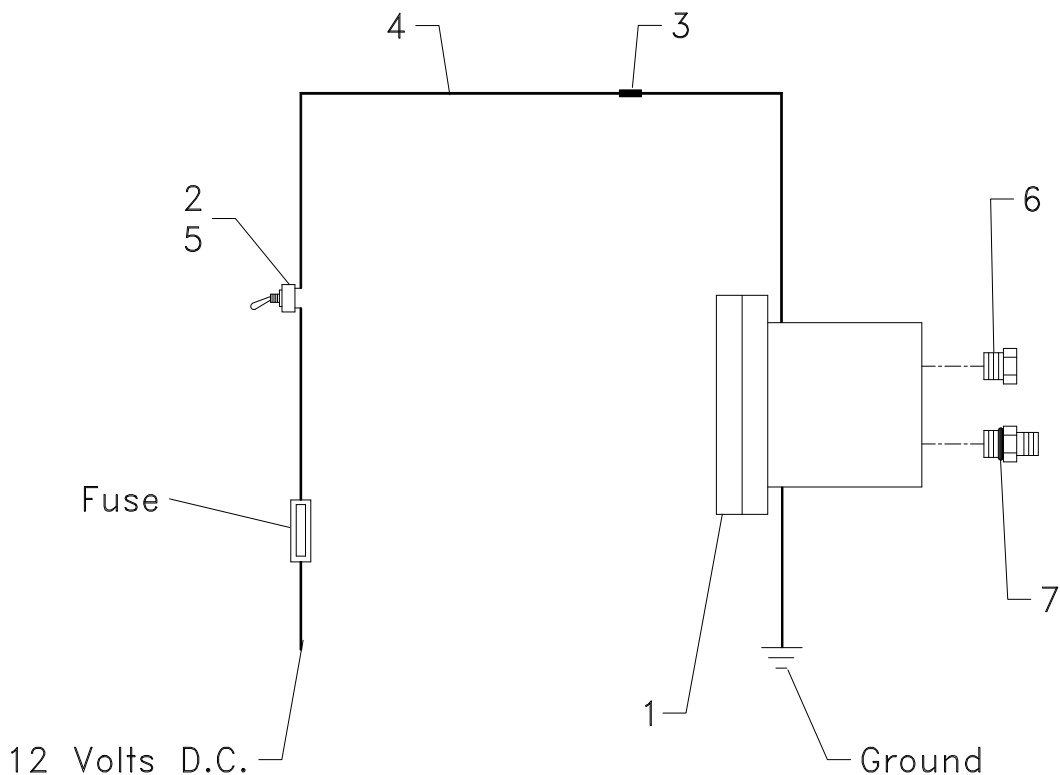




CONTROL VALVE CONTINUED

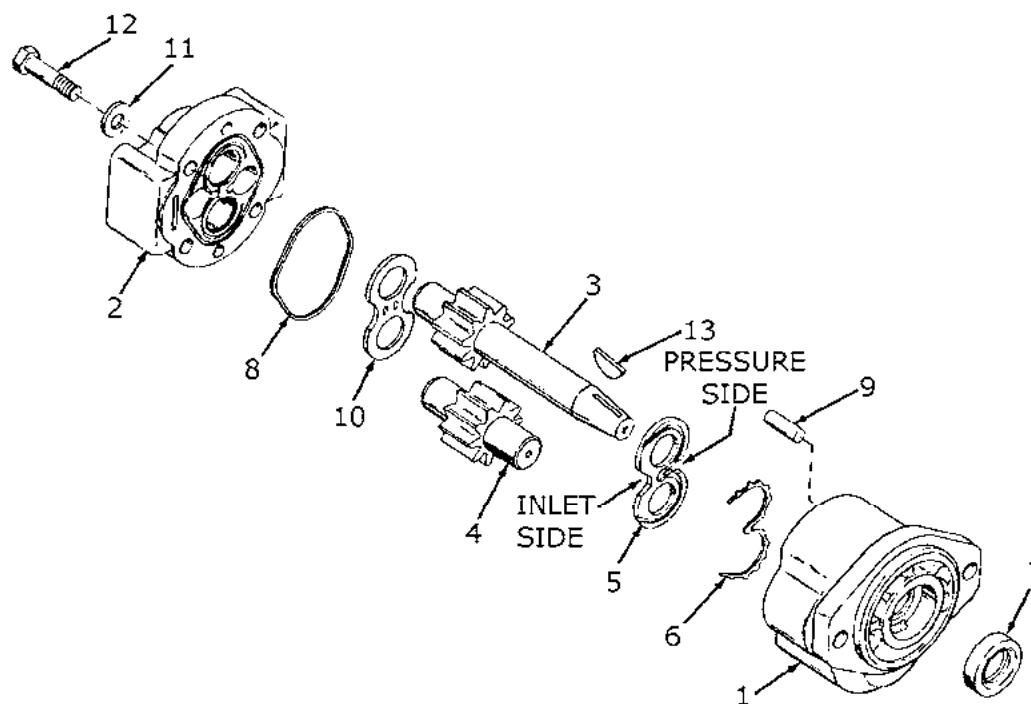
<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
	34144	Valve – Control (10 - 15 GPM)	
	34142	On/Off Valve Assembly, Includes Items 17-22	
1	72590	Screw	2
2	72591	Knob – Hand	2
3	72592	Pin – Dowel	2
4	72593	Pin – Roll	2
5	72594	Spring	2
6	NSS	O-Ring – Viton	2
7	NSS	Back-up – Teflon	2
8	NSS	O-Ring – Viton	2
9	72599	Auger Adjust Assembly	1
10	72589	Spinner Adjust Assembly	1
11	16964	Cartridge – Relief	1
12	NSS	Gasket	1
13	NSS	O-Ring – Viton	1
14	NSS	Back-up – Teflon	2
15	NSS	O-Ring – Viton	1
16	20918	Pin – Roll	2
17	NSS	O-Ring – Dump Stem	1
18	NSS	Stem	1
19	NSS	Plug	1
20	20748	Screw – Set	1
21	34148	Knob – Hand	1
22	34147	Lever	1
23	16960	Bypass Assembly	1
24	NSS	O-Ring – Viton	2
	72597	Kit – Seal, Inc. Items 6-8, 12-15, 17, 24	

NSS - Not Sold Separately

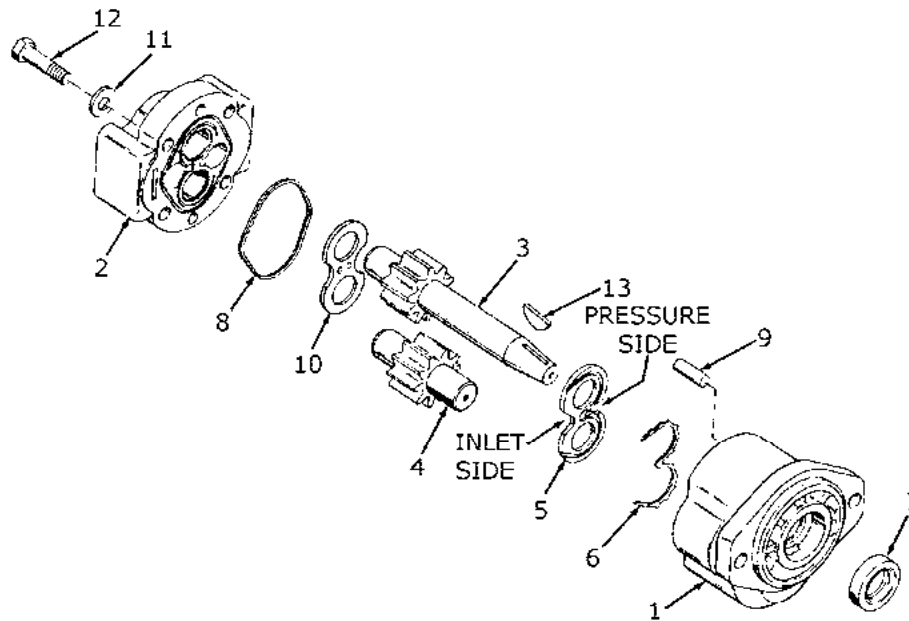


ITEM	PART NO.	DESCRIPTION	QTY
	71196	Kit – Pump w/ Electric Clutch	
1	34569	Pump – Hydraulic with Elec. Clutch Assy	1
	34577	Pump – Hydraulic	1
	34570	Clutch – Electric	1
	34571	Bracket – Mounting	1
2	21679	Terminal – Spade	1
3	6549	Connector – Butt	1
4	21580-120	Wire – Black, 14 Ga.	1
5	21681	Switch – Toggle	1
6	22018	Adapter	1
7	29835	Adapter	1

HYDRAULIC PUMP (ELECTRIC CLUTCH)

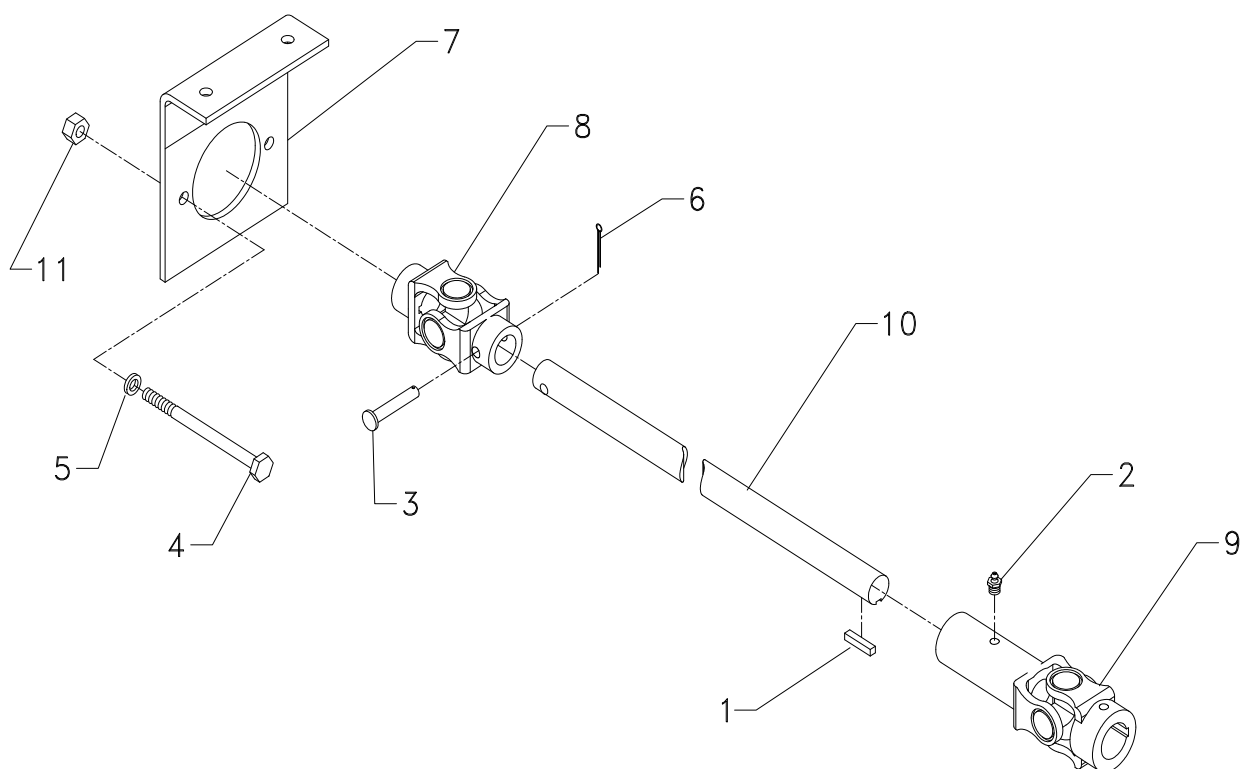


<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
	34577	Pump Assembly	
1	34546	Body – Pump Assembly	1
2	34549	Cover Assembly	1
3	34564	Gear – Drive	1
4	34566	Gear – Driven	1
5	34554	Plate – Wear	1
6	34555	Seal – Pressure Loading	1
7	34556	Seal – Shaft	1
8	34557	Ring – Square Cut	1
9	34558	Pin – Dowel	1
10	34559	Plate – Thrust	1
11	34560	Washer	4
12	34561	CapScrew	4
13	34562	Key – Woodruff	1
	34563	Kit – Seal, Includes Items 6 - 8	

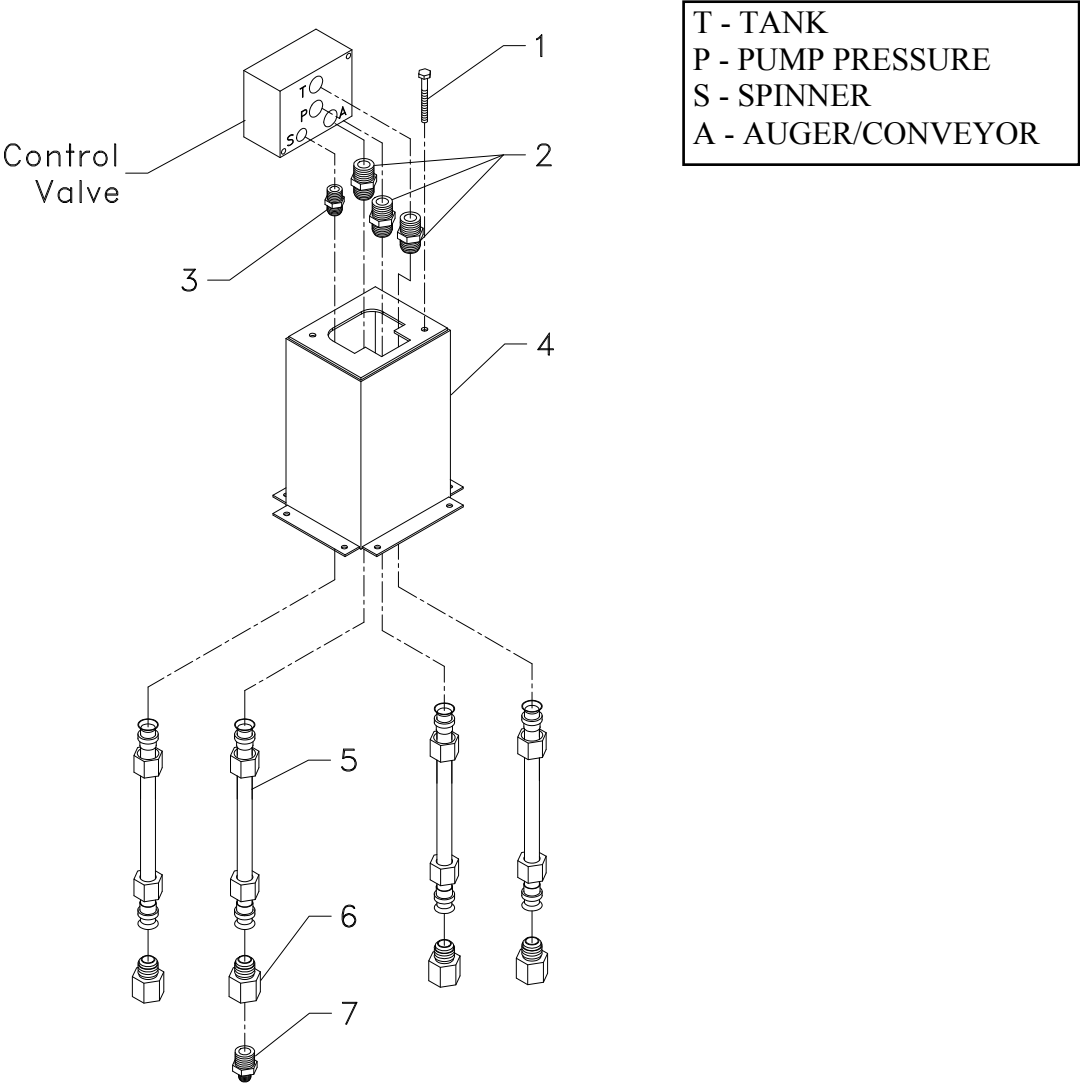


ITEM	PART NO.	DESCRIPTION	QTY
	24516	Pump – Hydraulic Assembly	
1	5676	Housing – Gear	1
2	5680	Pin – Dowel	2
3	58621	Plate – End	1
4	58622	Gear – Idler	1
5	5665	Plate – Wear	2
6	5678	Seal – Ring	2
7	5666	Washer – Backup	2
8	5677	Seal – Preload	2
9	58623	Plate – End	1
10	5682	Shaft – Drive	1
11	6137	Key – Square	1
12	58624	Flange	2
13	5685	O-Ring	2
14	5683	Bolt – Socket Head	6
15	58625	Washer	6
16	58626	Bolt – Socket Head	4
	3904	Kit – Seal, Includes Items 5-8, 11, 13	

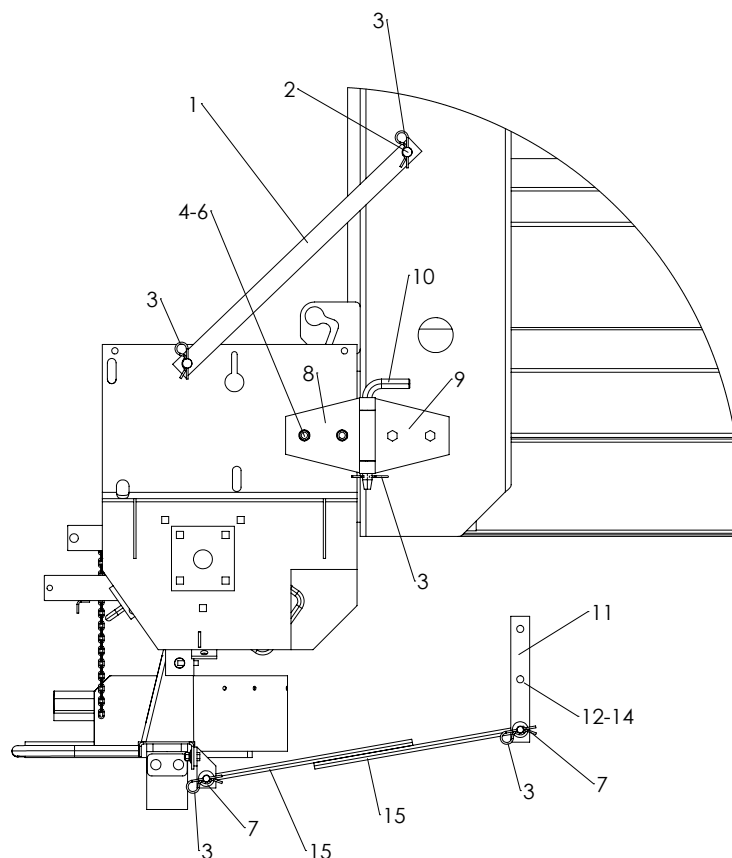
MOUNTING KIT - PUMP (TRANSMISSION PTO)



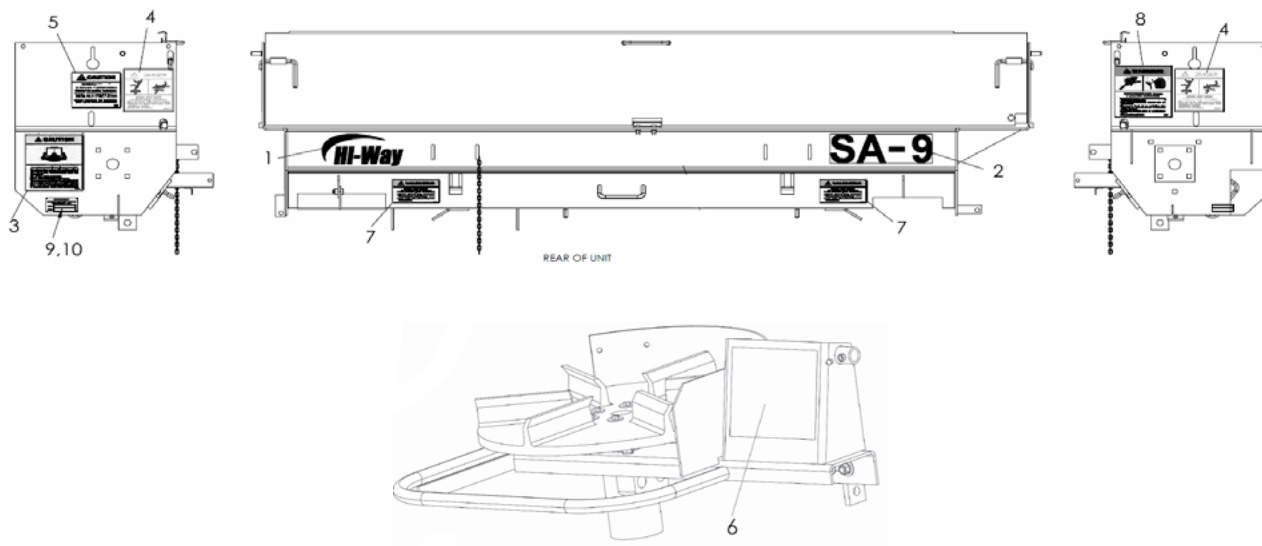
<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	2211	Key – Square	1
2	6069	Zerk – Grease	1
3	6123	Pin – Shear	1
4	20085	Cap Screw - 3/8 x 5 1/2	2
5	20712	Washer – Lock 3/8	2
6	20817	Pin – Cotter	1
7	22337	Bracket – Mounting WLDMT	1
8	22465	U-Joint	1
9	56745	U-Joint	1
10	17932	Shaft – Drive	1
11	20644	Nut – Hex 3/8	2



ITEM	PART NO.	DESCRIPTION	QTY
1	20013	Cap Screw - 1/4 x 3	2
2	29752	Adapter	3
3	29784	Adapter	1
4	36803	Mount – Valve WLDMT	1
5	36800	Tube – Hydraulic	4
6	29799	Adapter – Bushing	4
7	29808	Adapter	1



ITEM	PART NO.		DESCRIPTION	QTY
	CS	304 SS		
1	96762	96844	Brace - Mounting	2
2	96780	96825	Boss	2
3	40576	40576	Pin - Hair	6
4	20129	36539	Cap Screw – 1/2 X 1 1/2	8
5	20714	36422	Washer - Lock 1/2	8
6	20646	36416	Nut - Hex 1/2	8
7	20695	36426	Washer - Flat 1/2	8
8	23244	23244-X1	Mount - Spreader Half Wldmt	2
9	23236	23236-X1	Mount - Truck Half Wldmt	2
10	23248	23248-X1	Rod - Lock Pin	2
11	204120	90963	Bar - Stabilizer	1
12	20067	36398	Cap Screw – 3/8 X 1	2
13	20712	36420	Washer - Lock 3/8	2
14	20644	36414	Nut - Hex 3/8	2
15	204121	90964	Rod - Link, Stabilizer	2



<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	39870	Decal - Hi-Way	1
2	90805	Decal - SA-9	1
3	150034	Decal - Caution, Operation & Maintenance	1
4	55997	Decal - Danger, Moving Part Hazard	2
5	321	Decal - Caution, Hazardous Material	1
6	83649	Decal - Danger, Flying Material	1
7	55631	Decal - Warning, Moving Part Hazard	2
8	39138	Decal - Warning, High Pressure Fluid	1
9	37285	Serial Plate - HECO	1
10	6276	Screw - Drive #4 x 1/4	4