MODEL E3020

UNIT SERIAL NUMBER _____

MANUAL NUMBER: 72400-K
EFFECTIVE 11/2022

1330 76TH AVE SW
CEDAR RAPIDS, IA 52404-7052
PHONE (800) 363-1771 | FAX (319) 286-3350
www.newleader.com

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SAFETY

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 require 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.

It has been our experience that by following the instructions in this manual, 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 NLM parts and our authorized dealers for all work other than routine care and adjustments.

New Leader Manufacturing 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 !!!

Important Safety Information

⚠WARNING

Before using this equipment, read, understand and follow all instructions in the Operator's Manual provided with this equipment. If the user and/or assistants cannot read or understand the warnings and instructions, the employer of the user and/or assistants must provide adequate and necessary training to ensure proper operation and compliance with all safety procedures pertaining to this equipment. If Operator's Manual has been lost, visit www.newleader.com or call your authorized dealer or our Product Sales & Support Department at (800) 363-1771 for replacements. Serious injury or death can result from the failure to read, understand, and follow instructions provided in this manual.

Figure 1.1 - The need for safety cannot be stressed strongly enough in this manual. At New Leader Manufacturing, we urge you to make safety your top priority when operating any equipment. We firmly advise that anyone allowed to operate this machine carefully read, learn and understand all messages and information in this manual and on machine's safety decals before operating machine, as well as familiarize themselves with the location and function of all machine controls.

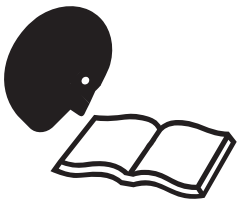


Figure 1.1

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 Product Sales & Support Department at (800) 363-1771.

Safety Alert Symbols

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	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	NOTICE is used to address practices not related to physical injury.
NOTE:	Provides additional information to simplify a procedure or clarify a process.

PREPARE FOR EMERGENCIES

Figure 1.2 - Be prepared if a fire starts. Keep a fully charged fire extinguisher and first aid kit in accessible place on the vehicle at all times.

Fire extinguisher must be Type ABC or Type BC.

Keep emergency numbers for doctors, ambulance service, hospital and fire department available at all times.

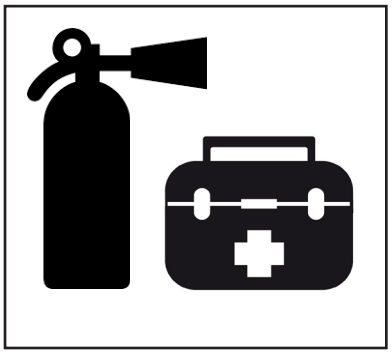


Figure 1.2

INSPECT HARDWARE BEFORE USE

Figure 1.3 - Inspect all bolts, screws, fasteners, keys, chain drives, body mounts and other attachments periodically. Immediately replace any missing or damaged parts with NLM specified parts.

Inspect spinner fins, spinner frame mounting and spinner fin hardware daily. Look for missing or loose fasteners, wear and cracks. Replace immediately with NLM specified parts.

Tighten all bolts, nuts and screws to specified torques. Refer to "Standard Torques" in Maintenance section of this manual.

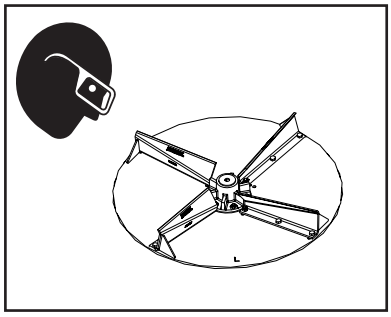


Figure 1.3

HANDLE FLAMMABLE MATERIALS SAFELY

Figure 1.4 - Handle fuel and hydraulic oil with care. They are highly flammable.

Exposure to toxic fluids or fumes may occur during the normal operation of this system. Before attempting to fill, use, or service this system, read Safety Data Sheets (SDS) to know the specific hazards of the fluids you are using. Always use proper Personal Protective Equipment when attempting to fill, use, or service this system.

Always stop engine before refueling machine or filling hydraulic reservoir.

Never smoke while adding fuel or oil to machine. Add fluids in a safe place away from open flame and sparks.

Do not allow overflow. Clean up spilled fuel and oil immediately.

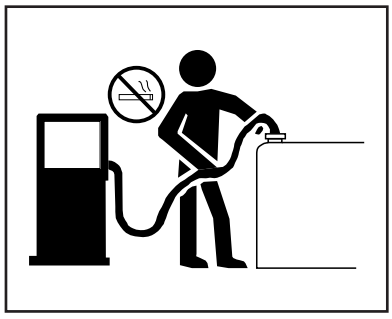


Figure 1.4

Always have a multipurpose dry chemical fire extinguisher filled and available during machine operation and when adding fuel. Know how to use it.

HANDLE HAZARDOUS MATERIALS SAFELY

Figure 1.5 - Materials to spread can be dangerous.

Figure 1.5

Improper selection, application, use or handling may be a hazard to persons, animals, plants, crops or other property.

A Safety Data Sheet (SDS) provides specific details on chemical products: physical and health hazards, safety procedures and emergency response techniques.

Check all SDS's before starting any job using a hazardous material. Follow all instructions and precautions given by the material manufacturer.

WORK IN WELL-VENTILATED AREAS

⚠WARNING

Never run machine engine inside a building unless adequate ventilation is provided to safely and properly remove exhaust fumes. Failure to comply with this requirement could result in death or serious injury.

Figure 1.6 - Always work in a properly ventilated area.

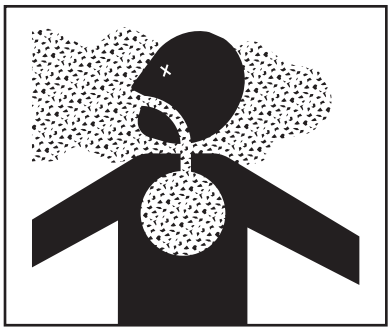


Figure 1.6

Engine exhaust fumes can cause sickness or death. If it is necessary to run an engine in an enclosed area, use proper equipment to safely remove exhaust fumes from the working area.

Open building doors and get fresh air into the working area whenever possible.

PROTECT AGAINST NOISE

Figure 1.7 - Long periods of exposure to high decibels or loud noise can cause hearing impairment or loss.

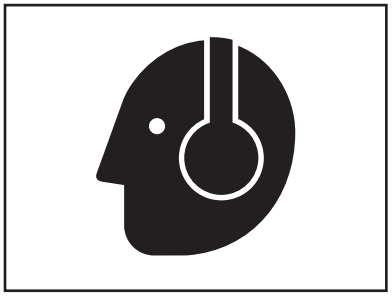


Figure 1.7

Wear proper hearing protection such as earmuffs or earplugs during periods of exposure to high decibels or loud noise.

AVOID MOVING PART HAZARDS

Figure 1.8 - Entanglement in rotating drive lines or moving parts will cause serious injury or death.

Stay clear of all moving parts, such as shafts, couplings and universal joints.

Make sure all personnel are clear of machine before starting.

Figure 1.8

Figure 1.9 - Do not operate machine without all guards and shields closed and secured.

Disconnect and lock out power source before removing guards.

Disconnect and lock out power source before adjusting or servicing.

Keep hands, feet, hair and clothing away from moving parts.

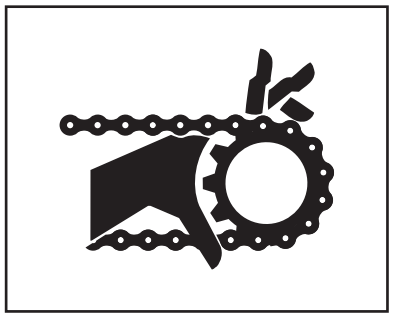


Figure 1.9

Figure 1.10 - Keep away from spinners while they are turning.

Rocks, scrap metal and other material can be thrown from the spinners violently. Stay away from discharge area.

Stop machine before servicing or adjusting. Wear eye protection.

Make sure discharge area is clear before spreading.

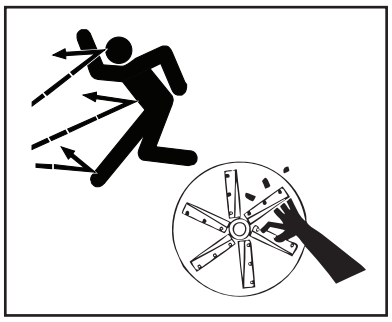


Figure 1.10

Figure 1.11 - Stay out of spreader.

If necessary to enter the spreader, return to shop, empty body, turn off all power, engage brakes, shut down engine and remove keys before entering.

Tag all controls to prohibit operation. Tags should be placed, and removed, by the person working in the body.

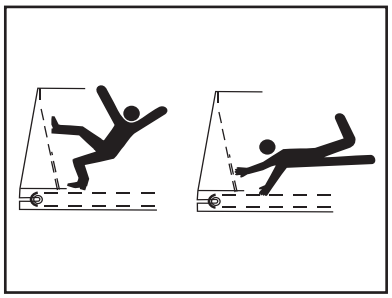


Figure 1.11

DO NOT CLIMB OR STAND ON MACHINE

Figure 1.12 - Never allow any personnel to ride in or on the machine.

Use inspection ladder or portable ladder to view the unit. Use caution when getting on and off the ladder, especially in wet, icy, snowy or muddy conditions. Clean mud, snow and ice from steps and footwear.

Always maintain three-point contact with steps, ladders and handholds. Face the machine when mounting and dismounting inspection ladder. Do not jump off machine.

Figure 1.12

OPERATE MACHINE SAFELY

Always walk around and visually inspect machine before using. Check the immediate vicinity of machine for people and obstructions. Ensure adequate visibility.

Avoid distractions such as reading, eating or operating personal electronics while operating machine. Never operate the machine under the influence of alcohol, drugs or while otherwise impaired.

Always come to a complete stop before reversing. Be sure that all personnel are clear of machine path. Turn around and look directly for best visibility. Ensure all rear view mirrors are properly installed and adjusted. Use a signal person when backing if view is obstructed or when in close quarters.

Always disengage hydraulics before shutting down engine. DO NOT start engine with hydraulics engaged.

TRAVELING & TRANSPORTING ON PUBLIC ROADS

Always walk around and visually inspect the machine before traveling on public roads. Check for damage and/or faulty components that can fail and create a hazard or unsafe condition. Make sure all machine systems operate properly, including but not limited to: headlights, tail and brake lights, hazard warning lights, turn indicators, parking brake, horn and rear view mirrors. Repair or replace any component that is not in proper working order.

Never drive machine at a speed that causes it to bounce or cause loss of control.

Obey all traffic safety laws and regulations. Operate the machine with hazard warning lights on, unless prohibited by law. It is the operator's responsibility to activate and use road lights properly while traveling on public roads.

Cover all loads that may spill or blow away. Environmental damage may result. Do not spread dusty materials where dust may create pollution, visibility issues or interfere with traffic on public roads.

When transporting equipment or machine on a trailer, ensure it is properly secured. Be sure that SMV signs on equipment or machine are covered while in transport on a trailer.

Be aware of overhead structures and power lines. Make sure machine can safely pass under. Refer to "Dimensions & Capacities" pages in the Operations section of this manual.

NAVIGATING ROUGH & UNEVEN TERRAIN

Figure 2.1 - Turn slowly and be careful when traveling on rough surfaces and side slopes. Avoid holes, ditches and obstructions that may cause machine to roll over, especially with a loaded spreader.

Never drive near the edge of a gully or steep embankment.

Load may shift, causing vehicle to tip.

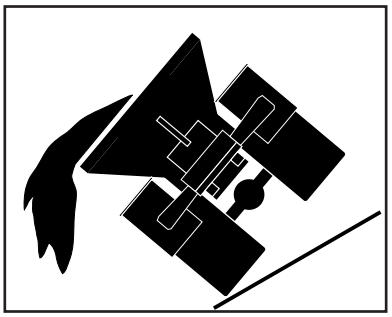


Figure 2.1

READ AND UNDERSTAND MAINTENANCE PROCEDURES

Figure 3.1 - Read the maintenance and safety instructions and understand them before performing any maintenance procedure.

Never perform any maintenance procedure or repair if the instructions and safety procedures are not fully understood. Only trained and qualified personnel should perform any maintenance procedure or repair.

Never modify any equipment or add attachments not approved by New Leader Manufacturing.

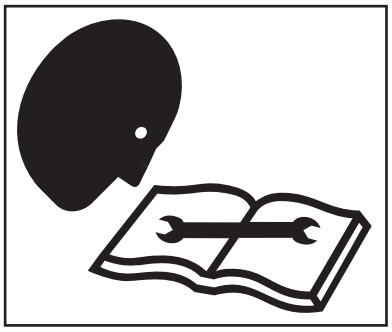


Figure 3.1

DO NOT SERVICE OR ADJUST MACHINE WHILE IN MOTION

Figure 3.2 - Never lubricate, service or adjust the machine or any of its components while they are moving.

Never wear loose clothing or jewelry when working near machine tools or moving parts.

Remove rings and other jewelry to prevent electrical shorts and other personal injury when in contact with machine tools or moving parts.

Close and secure all guards removed for service. Check all screws, bolts, nuts and fasteners for proper torques before operating machine.

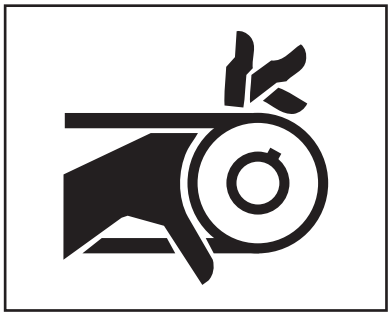


Figure 3.2

WEAR PROPER PROTECTIVE EQUIPMENT

Figure 3.3 - Wear close-fitting clothing and proper safety equipment for the job.

Always wear eye protection when working on or around the machine.

Wear a suitable hearing protection device such as earmuffs or earplugs to protect against high decibels or loud noises.

Prolonged exposure to high decibels or loud noise can cause hearing impairment or loss of hearing.

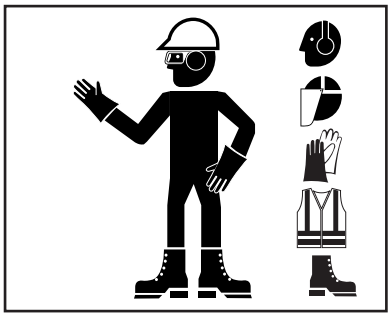


Figure 3.3

Wear protective gloves to protect hands from cuts, abrasions and minor burns.

HANDLE FLAMMABLE SOLVENTS SAFELY

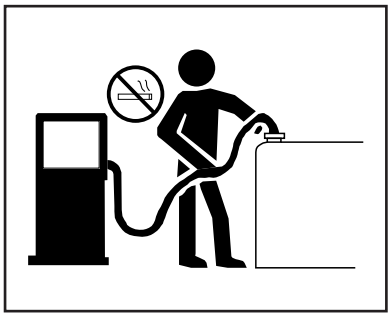


Figure 3.4

Figure 3.4 - Never use diesel fuel, kerosene, gasoline or any flammable solvents for cleaning.

Exposure to toxic fluids or fumes may occur during the normal operation of this system. Before attempting to fill, use, or service this system, read Safety Data Sheets (SDS) to know the specific hazards of the fluids you are using. Always use proper Personal Protective Equipment when attempting to fill, use, or service this system.

Perform work using flammable fluids and solvents in a safe place away from open flame and sparks. Do not smoke.

Do not weld, grind or flame cut on any tank containing oil, fuel, fumes or any other flammable material, or any container that contents or previous contents are unknown. Move all flammable materials and containers away from work area.

Clean up spilled fuel and oil immediately.

Always have a multipurpose dry chemical fire extinguisher filled and available. Know how to use it.

USE PROPER LIFTING EQUIPMENT

Figure 3.5

Figure 3.5 - Use only lifting devices that meet or exceed OSHA standard 1910.184 or ASME B30.20-2013.

Never lift equipment over people.

Never lift a loaded unit. Never lift unit with any loose objects or persons in the body. Loads may shift or fall if improperly supported, causing death, serious injury or machine damage.

Before unfastening heavy parts or assemblies, support with adequate hoist or other device to prevent falling, tipping, swinging or any other movement that may cause injury or damage.

USE PROPER TOOLS FOR THE JOB

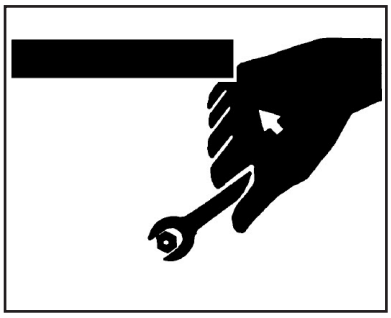


Figure 3.6

Figure 3.6 - Use of improper tools (such as a screwdriver instead of a pry bar, pliers instead of a wrench, a wrench instead of a hammer) can cause serious injuries or machine damage.

Use power tools only to loosen threaded parts and fasteners. Using power tools to tighten may cause over-tightening and component damage.

Use only service parts meeting New Leader specifications.

HIGH PRESSURE FLUID HAZARDS

Figure 3.7 - Escaping fluid under pressure can penetrate the skin causing serious injury.

Always stop machine, allow to cool and relieve pressure before servicing hydraulic system. Never open hydraulic lines under pressure. Make sure all connections are tight and all hoses are in good condition before pressurizing system.

Always use a piece of cardboard or wood to search for leaks instead of hand. Wear impervious gloves and eye protection when servicing system.

Seek medical attention immediately if fluid penetrates your skin. Gangrene may result if wound is left untreated.

Figure 3.7

AVOID HEATING NEAR HIGH PRESSURE FLUID LINES

Figure 3.8 - Flammable spray can be generated by heating near pressurized fluid lines, resulting in burns to yourself and bystanders.

Do not heat by welding, soldering or using a torch near pressurized fluid lines or other flammable materials.

Pressure lines can suddenly burst when heat goes beyond the immediate flame area.

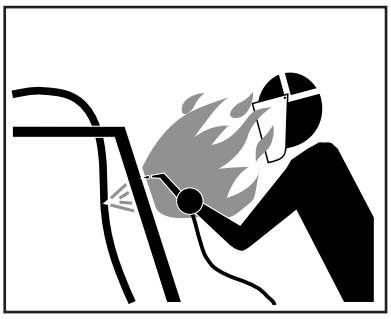


Figure 3.8

AVOID TOXIC FUMES & DUST

Figure 3.9 - Hazardous fumes can be generated when paint is heated from welding, soldering or using a torch.

Remove paint before heating:

- Remove a minimum of 4 in (100 mm) from area to be affected by heating. If paint cannot be removed, wear an approved respirator while heating or welding.
- Avoid breathing dust from sanding or grinding on paint.
- If a solvent or paint stripper is used, wash stripper away with soap and water before heating or welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse for at least 15 minutes before heating or welding.

Do not use chlorinated solvents in areas where welding will take place.

Perform all work in a well-ventilated area that will carry all toxic fumes and dust away.

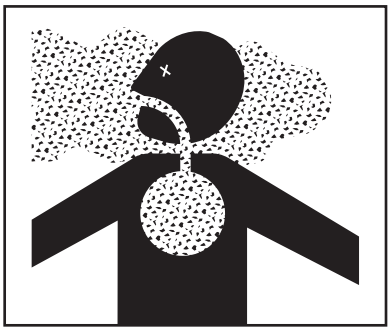


Figure 3.9

CLEAN MACHINE OF HAZARDOUS CHEMICALS

⚠CAUTION

During application of hazardous chemicals, residue can build up on the inside or outside of the vehicle. Clean vehicle according to use instructions of hazardous chemical. Failure to comply with this requirement may result in minor or moderate injury.

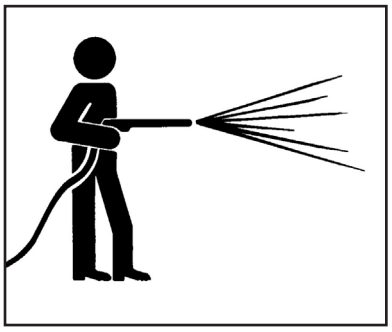


Figure 3.10

Figure 3.10 - When exposed to hazardous chemicals, clean exterior and interior of vehicle daily to keep free of the accumulation of visible dirt and contamination.

1. Clean operator's station to maintain unobstructed visibility of all windows and mirrors, and safe operation of all controls.

NOTICE

Directing pressurized water at electronic/ electrical components, bearings and hydraulic seals or other sensitive parts and components may cause product malfunctions. Reduce pressure and spray at 45 to 90 degree angles.

2. Wash entire exterior of vehicle.
3. Dispose of any wash water with hazardous concentrations of active or non-active ingredients according to published regulations or directives.

HANDLE BATTERIES SAFELY

⚠WARNING

Sulfuric acid in battery electrolyte is poisonous. It can burn skin, eat holes in clothing, and cause blindness if it contacts eyes. Keep sparks and flame away from batteries. Wear proper safety equipment. Failure to comply with this requirement could result in death or serious injury.

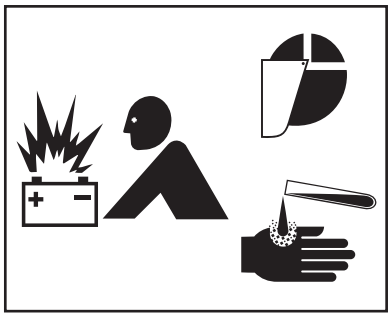


Figure 3.11

Figure 3.11 - Lead acid batteries generate flammable and explosive gases. Keep sparks and flame away from batteries. Do not smoke.

If acid contacts eyes, skin or clothing, flush with water immediately. Seek immediate medical attention if acid contacts eyes.

PROPER TIRE MAINTENANCE

Figure 3.12 - Never weld on a wheel or rim that has a tire on it.

Never attempt to mount or remove a tire unless using the proper equipment, tire safety cage, instructions, training, and you are qualified to perform the work safely. Failure to follow the correct procedures when mounting a tire on a wheel or rim can cause an explosion and serious injury.

Tire service procedures must be performed by trained and qualified personnel.

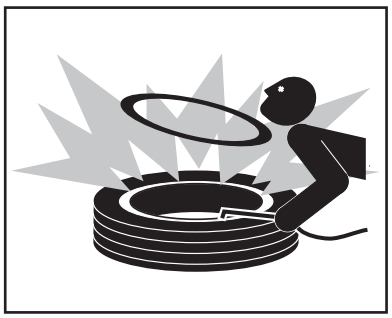


Figure 3.12

PARK VEHICLE SAFELY

Figure 4.1 - When leaving the vehicle unattended for any reason, be sure to:

- Shut down PTO.
- Shut off vehicle's engine, and unit's engine if applicable.
- Place vehicle transmission in "Neutral" or "Park".
- Set parking brake firmly.
- Remove ignition key and take it with you.
- Block wheels.

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

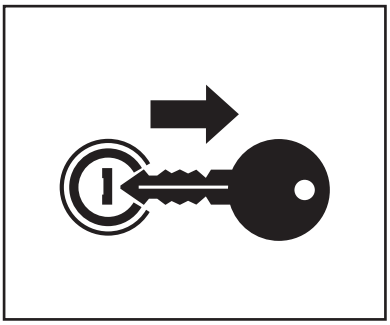


Figure 4.1

SUPPORT MACHINE PROPERLY

Figure 4.2 - When machine is removed from vehicle, always store on adequate supports on a firm level surface. Improper supporting or storage of spreader may cause machine to fall, resulting in serious injury or death.

Never use lifting device to free machine from a chassis, storage stands or frozen ground, or to lift the chassis in any way. Shock loading is prohibited and sudden accelerations must be avoided. Lifting in such a manner could result in injury or machine damage.

Figure 4.2

DISPOSE OF WASTE PROPERLY

Figure 4.3 - Improper disposal of waste can threaten the environment and ecology. Potentially harmful waste used with equipment include items such as fuel, oil, filters and batteries.

Use leakproof containers when draining fluids. Do not use food or beverage containers that may mislead someone into drinking from them. Do not pour waste onto the ground, down a drain, or into any water source.

Comply with all OSHA, local, City, State, Province, Country and jurisdiction regulations, ordinances and standards, related to your particular work area and environment. Inquire on proper disposal methods from your local environmental or recycling center, or from your local dealer.

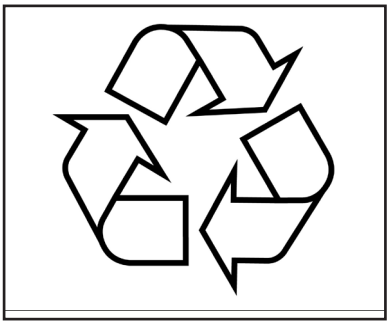


Figure 4.3

Safety Decal Maintenance

Keep safety decals and signs clean and legible at all times.

Replace safety decals and signs that are missing or have become illegible.

Replaced parts that displayed a safety sign should also display the current sign.

Safety decals or signs are available from your dealer's Parts Department or from New Leader Manufacturing by calling (800) 363-1771.

Safety Decal Installation

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.

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.

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.

Apply Safety Decal

Tack decal in place with thumb pressure in upper corners. 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. Pull up tack points before squeegeeing over them to avoid wrinkles.

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.

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.

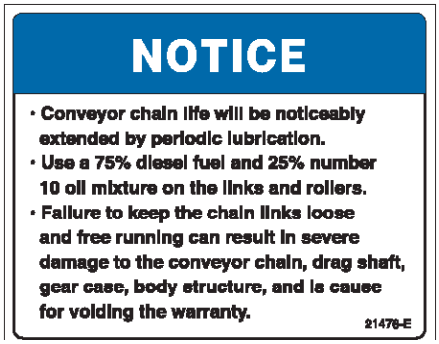
Re-Squeegee All Edges

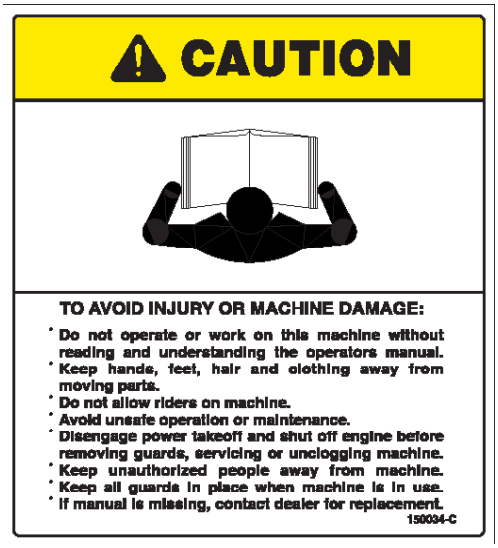

WARNING
To prevent death or serious injury: •Do not place objects on fenders.
•Keep off fenders. They are not intended to carry loads.
38208-D

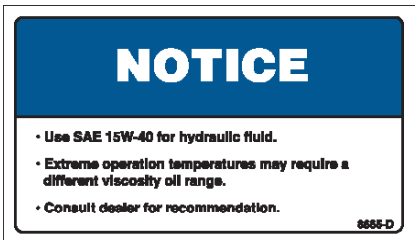

DANGER
MOVING PART HAZARD
To prevent death or serious injury:
• Stay out of box while conveyor is moving.
• Disconnect and lockout power source before adjusting or servicing.
• Do not ride on spreader.
364-C


WARNING
HIGH PRESSURE FLUID HAZARD
To prevent death or serious injury
• Do not check leaks with hands while system is operating as high pressure oil leaks can be dangerous!
• Relieve pressure before disconnecting hydraulic lines or working on 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 searching for leaks. Use wood or cardboard instead of hands.
• Do not use hydraulic lines for hand holds or steps.
• Components may be hot.
• Get immediate medical attention if skin is pierced with fluid as gangrene may result.
39138-D


CAUTION
HAZARDOUS MATERIALS
To avoid injury or machine damage:
• Materials to be spread can be dangerous.
• Improper selection, application, use or handling may be a hazard to persons, animals, crops or other property.
• Follow instructions and precautions given by the material manufacturer.
321-C


NOTICE
• Conveyor chain life will be noticeably extended by periodic lubrication.
• Use a 75% diesel fuel and 25% number 10 oil mixture on the links and rollers.
• Failure to keep the chain links loose and free running can result in severe damage to the conveyor chain, drag shaft, gear case, body structure, and is cause for voiding the warranty.
21478-E


CAUTION
TO AVOID INJURY OR MACHINE DAMAGE:
• Do not operate or work on this machine without reading and understanding the operators manual.
• Keep hands, feet, hair and clothing away from moving parts.
• Do not allow riders on machine.
• Avoid unsafe operation or maintenance.
• Disengage power takeoff and shut off engine before removing guards, servicing or unclogging machine.
• Keep unauthorized people away from machine.
• Keep all guards in place when machine is in use.
• If manual is missing, contact dealer for replacement.
150034-C


NOTICE
• Use SAE 15W-40 for hydraulic fluid.
• Extreme operation temperatures may require a different viscosity oil range.
• Consult dealer for recommendation.
8655-D


NOTICE
Keep valve open
while pump is running.
8664-D


WARNING
FALLING HAZARD
To prevent death, serious injury or machine damage:
• Do not stand or climb on guard.
55630-D


WARNING
MOVING PART HAZARD
To prevent death or serious injury:
• Close and secure guards before starting.
• Do not stand or climb on machine.
• Disconnect and lockout power source before adjusting or servicing.
• Keep hands, feet and hair away from moving parts.
55631-C


DANGER
FLYING MATERIAL & ROTATING SPINNER HAZARD
To prevent death or serious injury:
• Wear eye protection.
• Stop machine before servicing or adjusting.
• Keep bystanders at least 60 feet away.
388-C

INSTALLATION

In mounting the E3020 spreader on a truck, the following major questions are to be considered:

1. Is the CA (Cab to Axle) dimension of the truck correct for the length of the spreader?

To answer this question, see the Dimension and Capacity Chart. This will assist in matching spreader to truck.

2. Is the truck's GAWR (Gross Axle Weight Rating) and the GVWR (Gross Vehicle Weight Rating) adequate to carry the fully loaded spreader?

To answer this question, refer to your NLM dealer. He knows where to find the GAWR and GVWR for most trucks, and how to calculate the weight distribution on each axle and total loaded vehicle weight.

3. How will the hydraulic pump be driven?

The answer to this question will depend upon the availability of means to drive a pump that exists on the particular truck chosen for the mounting. Your dealer should be able to help here also. The following explains the procedure for determining the correct PTO-Pump match if the pump is to be ordered from NLM.

Transmission PTO-Pump Selection

Determine the maximum engine speed of the truck to be used. On the PTO-Pump Match Graph on the following page locate the maximum speed on the engine RPM scale. Draw a line up from this point until it reaches the 2000 RPM horizontal line of the PTO-Pump RPM scale. The maximum PTO percentage to be used will be at the point where the maximum engine RPM line crosses the 2000 RPM line. Determine a PTO percentage at or below the maximum PTO percentage which fits your particular transmission application.

Draw a line over from the point where the chosen PTO percentage line crosses the maximum engine RPM line. The correct pump to use will be one that intersects this line in the GPM range required. For the E3020 hydraulic system, this range is 35 to 40 GPM.

For example, if the maximum engine RPM of the truck to be used is 3000 RPM, a vertical line from this point would intersect the 2000 PTO-Pump RPM scale at the 67% PTO hash mark. If the nearest available PTO at or below 67% for the transmission is 54%, drawing in the line for the 54% PTO and drawing a line over from where this line intersects the maximum engine RPM line crosses the 22397 pump curve in the desired GPM range. This would be the correct pump to use for the particular engine speed-PTO percentage used in this example.

Please note that unless otherwise specified, the E3020 spreader will be shipped with Pump Number 22397 when the standard Transmission PTO-Pump option is ordered.

If the PTO-Pump matching will not fit into the speed and delivery volumes required for the spreader, refer to your NLM dealer.

Please note that unless otherwise specified, the E3020 spreader will be shipped with Pump Number 36847 when the Crankshaft PTO-Pump option is ordered.

If PTO-Pump matching will not fit into the speed and delivery volumes required for the spreader, refer to your Hi-Way dealer.

Recommended sequence of installation is as follows:
1. Mounting of pump and pump drive.
2. Installation of cab controls.
3. Mounting of spreader.
4. Installation of hydraulic hose and electrical wiring.
5. Filling hydraulic tank and lubrication.
6. Checking for leaks and functioning.

Hydraulic Pump Installation

Transmission PTO Drive

A mounting bracket for the hydraulic pump is shipped with the spreader. It may be necessary to modify this bracket to fit your truck, since many variable factors, such as PTO make and model, muffler position, transmission make and model, etc., all affect the mounting position. DO NOT WELD THE BRACKET TO THE TRUCK FRAME, to do so may void the truck manufacturer's warranty.

Position the mounting bracket so that the pump drive shaft will be as straight as possible. In no case may the angle at any universal joint exceed 15 degrees. The pump shaft and the PTO shaft should be parallel. (Figure 1)

Crankshaft PTO Drive

As a crankshaft PTO drive normally requires repositioning of both truck radiator and front bumper, it is recommended that the truck be procured by specifying that it be adapted for front crankshaft PTO installation. A crankshaft adapter to fit either a "Spicer" type or "Mechanics" type universal joint companion flange should be specified.

If the vehicle is not already adapted for front crankshaft PTO installation, the following steps must be followed:

A crankshaft adapter described above must be supplied. The radiator must be raised or modified to allow the PTO driveline to pass beneath it. The radiator fan must also clear all parts of the PTO driveline. The fan shroud, if any, must be modified to suit the new radiator position. It is recommended that your local truck dealer or radiator specialist be consulted for guidance.

The front bumper must be moved forward far enough to clear all PTO components. A mounting channel is to be fabricated locally to provide a mounting surface on which the PTO must be positioned parallel to the engine crankshaft centerline. The universal joint timing is to be as shown in Figure 1.

Pump drive control cable is to be located at a convenient point in the truck cab, usually on the instrument panel, and run to the pump drive engaging lever on the PTO. Avoid sharp bends in the cable, moving parts and hot manifold and exhaust pipe. Secure cable sheath near each end and at frequent intermediate points with cable clips.

Hydraulic Pump Drive Shaft

The pump drive shaft included may be too long for some installations. It may be cut and redrilled as necessary. When redrilling the shaft, be sure that universal joints are properly "timed."

Install the slip joint at the end of the pump drive shaft. Failure to install the slip joint will result in bearing failure in pump, PTO or both.

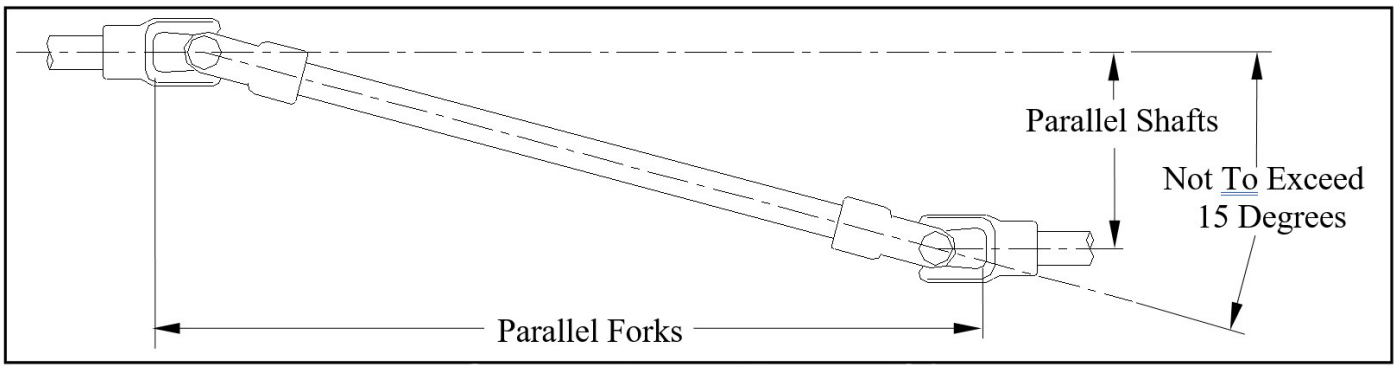


Figure 1 - Timing of Universal Joints

Cab Control Valve Installation

When selecting a location for the cab control, there are a number of things to consider:

1. Select a suitable location for the operator to adjust the control and to turn it ON and OFF.
2. Check for clearance with the seat in all positions.
3. Check the transmission gear shift in all gears for clearance with the valve and with the valve lever in the ON and OFF position.
4. If there are any other controls, such as parking brake, plow and wiring controls, check for clearance.
5. Under the cab, check for interference with transmission, etc.
6. Check to see that control valve installation does not interfere with entering or leaving the cab.
7. For the "Electric Dual Control System," the control valve is mounted on the right rear stake of the spreader. The control box is mounted wherever it is convenient to locate it inside the cab.
8. "Manual Dual Control System" valve arrangement may be mounted on the right rear stake, a pedestal (Optional Item) or directly to the floor of the truck cab.
9. "Automatic Dual Control System" mounting is similar to the "Manual Dual Control System" but requires additional vertical height.

⚠CAUTION All holes in the truck cab walls, floor and firewall for control wires, hoses and cables are to be grommetted, plugged and sealed to prevent entrance of engine fumes, dust, dirt, water, and noise.

Mounting Of Spreader Body

Chassis Mounting

Truck Frame Length:

In many cases, the truck frame must be shortened. The length from the rear of the cab to the rear end of the frame should be approximately as shown on the Dimensions and Capacity Chart under "C" (General Descriptions).

Wood Filler Strips

Hardwood filler strips (not supplied with spreader), one by three inches, must be installed the length of the frame behind the truck cab. Cut the filler strip to length and place on top of the truck frame rails. With a heavy hammer strike directly above each rivet head to mark the position of the rivet, if frame has rivets in top flange. Remove the filler strips and counterbore for the rivet heads. Replace the filler strips and hold them in place by bending anchor clips as shown in Figure 2. If the truck frame has fishplates on the top flange, it will be necessary to provide a level top surface by adding steel shim bars or strips of the same thickness as the fishplates and as wide as the frame channel top flange. These shim bars or strips must be drilled out to clear any rivet or bolt heads. DO NOT WELD these bars or strips to the truck frame. To do so may void truck warranty. Place the wood filler strips on top of them and secure both steel shims and wood filler strips by means of bending the anchor clips around them and the frame top flanges as shown in Figure 2. Each steel shim bar or strip and each separate wood filler strip should have three (3) anchor clips. Locate anchor clips between spreader body cross sills. Secure each anchor clip by driving 1/4" sheet metal screw through clip into wood filler strip as shown in Figure 2.

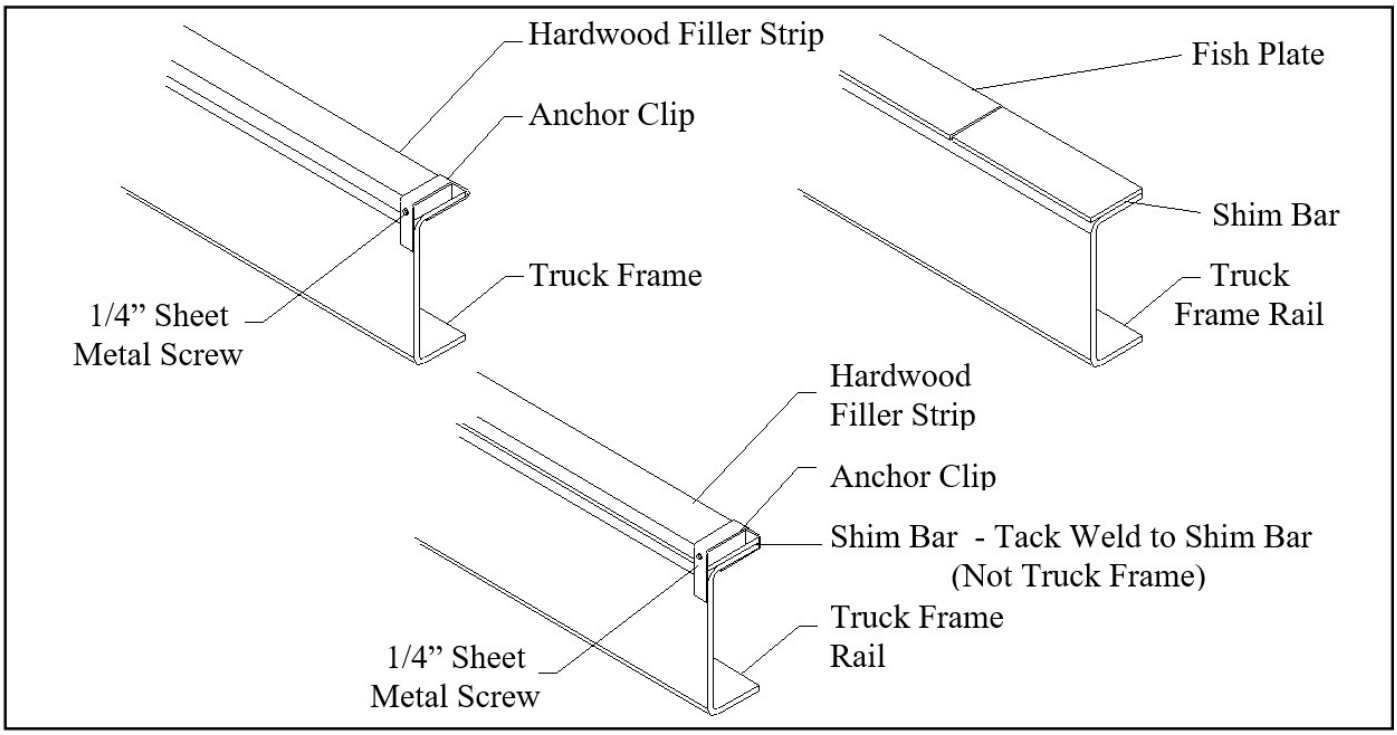


Figure 2 - Wood Filler Strips & Anchor Clips

Positioning Body

Using a suitable lifting device with a 6000 pound minimum lifting capacity, lift the empty spreader body onto the truck frame. Position body centrally with respect to the truck frame rails and approximately 4" to the rear of the cab. Check the position of the spreader at the rear to insure that the rear mounting angle can be installed on truck frame and centered on rear cross tube.

⚠CAUTION Never lift equipment over people. Use only lifting devices rated for 6000 pounds or more. Loads may shift or fall if improperly supported, causing injury.

Installing Front Mounting Angles

Assemble the two front mounting angle springs and hardware. Use a 3/8" shim between the cross tube mounting plate and truck frame mounting angle. Position assembly under the second cross tube from the front and against the truck frame, make sure that the springs do not contact the cross tube. Mark the position of the holes in the mounting angle onto the truck frame. Drill two (2) 9/16" holes through the truck frame and install the mounting assembly using the 1/2" hardware supplied. Weld the mounting plate to the bottom of the cross tube on three sides and remove 3/8" shim. (Figure 4) Tighten the spring assembly until the compressed spring height is 3 5/8". There should be a 3/8" space between the cross tube mounting plate and the truck frame mounting angle. (Figure 3) Repeat this procedure on the other side of the truck frame, on the same cross tube.

NOTE: On some vehicles it may be necessary to mount the front mounting angle springs on the first cross tube due to obstructions such as spring shackles etc.

IMPORTANT! DO NOT PUT HOLES INTO TOP OR BOTTOM FRAME FLANGES. To do so may void truck manufacturer's warranty. When drilling holes in frame member, drill only through vertical web portions.

Installing Center Mounting Angles (10 Foot through 11 Foot Bodies)

Position the center mounting angles at a convenient cross tube near the center of the body with the slotted faces against the truck frame. Weld on three sides the mounting angle to the bottom of the cross tube. (Figure 4) Do not install hardware, these mounting angles are for side-to-side support only. (Figure 3)

Installing Center Mounting Angles (12 Foot to 16 Foot Bodies)

Position the center mounting angles at a convenient cross tube near the center of the body with the slotted faces against the truck frame and mark the location of the slots on the truck frame. Drill two 9/16" diameter holes through the truck frame approximately 3/4" from the bottom of the slot. (Figure 3) Weld the mounting angle to the bottom of the cross tube on three sides. (Figure 4) Install hardware and torque according to torque chart.

NOTE: The position of the center mounting angles will vary from truck to truck due to obstructions such as spring shackles, etc.

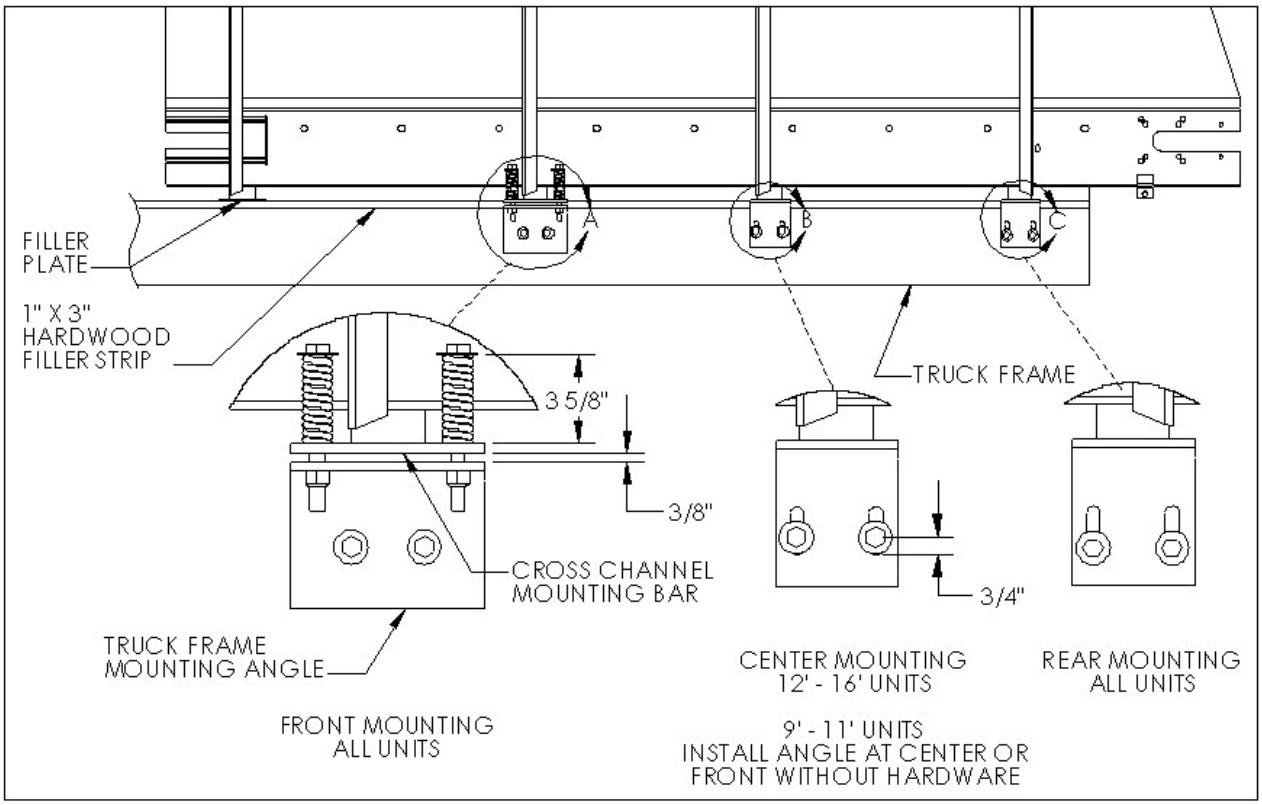


Figure 3 - Mounting Angle Installation

Installing Rear Mounting Angles

Position the rear mounting angles with the slotted faces against the side of the truck frame and centered on the rear cross sill. Mark the location of the slots on the truck frame. Drill two (2) 9/16" diameter holes through the truck frame at the bottom end of the slots. (Figure 3) Weld on three sides the mounting angle to the bottom of the cross tube. (Figure 4) Install hardware and torque according to torque chart.

⚠CAUTION When drilling holes, make sure that the drill will not puncture the gas tank or harm any other obstruction!

NOTICE DO NOT WELD ON VEHICLE FRAME! Such welding can lead to fatigue cracking and must be avoided. DO NOT drill through frame flanges.

NOTICE If at anytime an arc welder is used on the vehicle or anything connected to the vehicle, be sure to connect the welders ground directly to one of the two items being welded.

Securing Spreader Body to Frame

Install the mounting angles and tighten the mounting bolts according to the torque chart. Position angles as shown in Figure 3. Weld the mounting angles to the spreader cross tubes by welding on the front, outer and rear sides. (Figure 4) Be sure welds between mounting bars or mounting angles and spreader cross tubes are sound full fillet welds. Center mounting angles so good fillet welds can be made on three sides, an edge bead weld is not a satisfactory weld for this service. Use dry E6013 or E7018 rod for mild steel spreaders. On stainless steel spreaders, use type 308 welding rod.

Check for vehicle visibility, especially toward the rear. Reposition or add mirrors so adequate rearward visibility is maintained. Check installation completely to be sure all fasteners are secure and that nothing has been left undone.

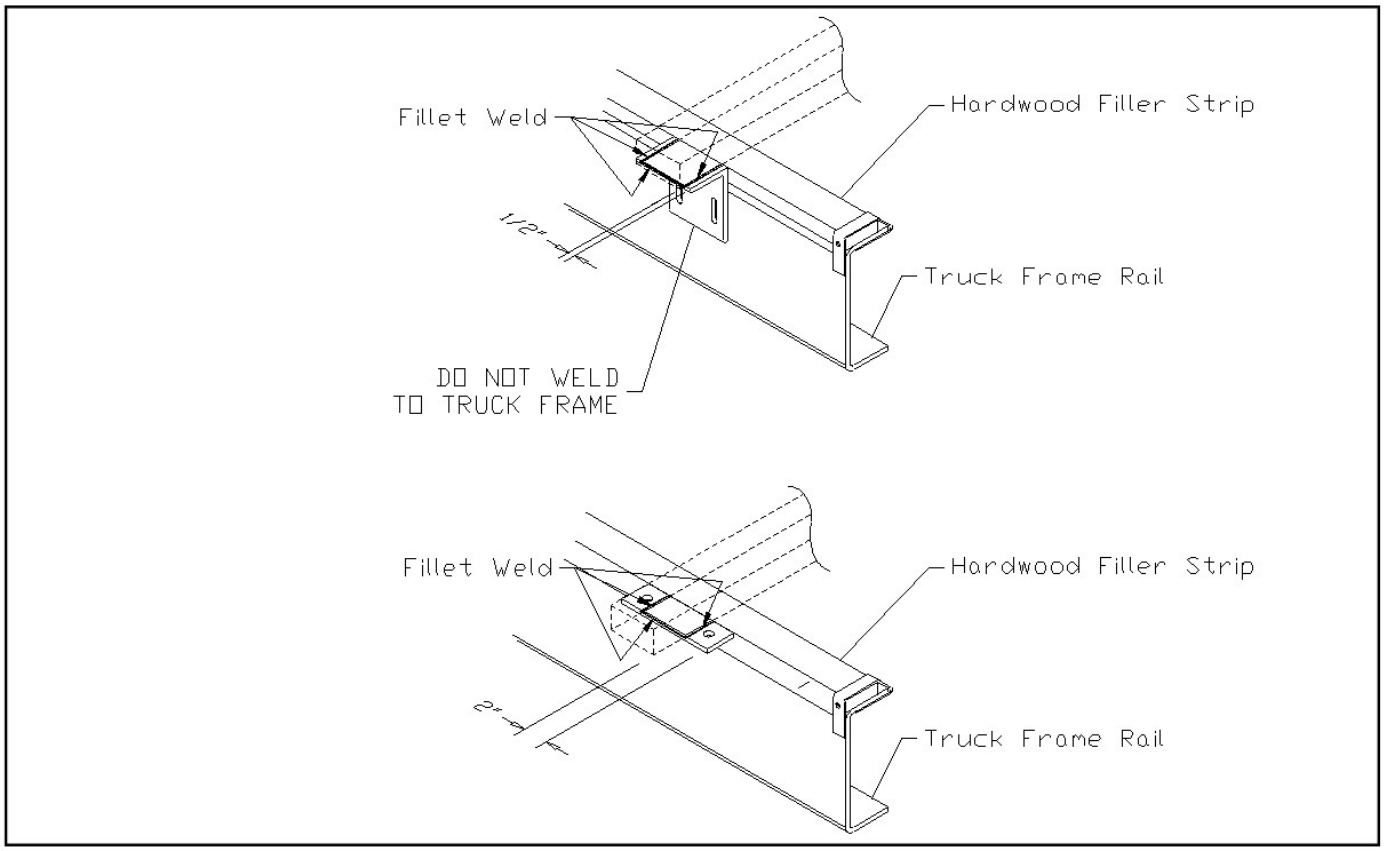


Figure 4 - Welding Instructions

Spinner Assembly Installation

Swing-Away Spinner

Slide the chute assembly into place above the sills. Attach with 3/8" stainless steel hardware. Install the righthand and lefthand hinge. Using any suitable jack or hoist, lift the spinner assembly into place. Install the four mounting pins. Connect the two hose assemblies with the quick-disconnect fittings.

Quick-Detachable Spinner

Using any suitable jack or hoist, lift the assembly into position. Engage the pins on the spinner hopper into the lugs on the rear of the spreader. Swing the hopper into position. Engage the load binders on each side of the hopper. Adjust the load binders as required until they hold the assembly securely in place. Connect the two hose assemblies with the quick-disconnect fittings.

Standard (Bolt-in) Spinner

Using any suitable jack or hoist, lift the assembly into position. Attach with 3/8" stainless steel hardware. Connect the two hose assemblies with the quick-disconnect fittings.

⚠WARNING Don't get under the spinner assembly when it is supported by a hoist or on jacks. Watch out for "pinch" points between the spinner assembly and the spreader or truck frame. They can cause injury to the fingers or hands.

Hydraulic Reservoir And Filter

For all arrangements of pump drive, the hydraulic reservoir is to be mounted on the truck frame side, as close to the truck cab as practical and where filler neck is accessible, so that the suction line is as short as the installation will permit. Drill four 7/16" diameter holes through the frame channel vertical web for the mounting bolts to match the holes in the tank mounting brackets. Bolt reservoir in place. Connect filter as shown in parts list under "Hydraulics" using thread sealer as instructed below.

IMPORTANT! Keep holes away from frame top and bottom flanges.

Hydraulic Hose Installation

Determine the pressure port of the pump. Install the pressure hose into this port as shown in Figure 5. Connect the suction hose to the opposite port and to the tank outlet on the reservoir. If necessary, use plastic tie straps to support hoses so that they will not catch on field obstructions or contact the muffler or moving parts.

Use thread sealer on all fittings, except "O" ring and JIC adapters, "O" ring valves and motors, etc. When using thread sealer, do not put it on the first three threads of the fitting. Too much sealer on the fitting or on the first three threads will force it into the oil stream where it could damage the system.

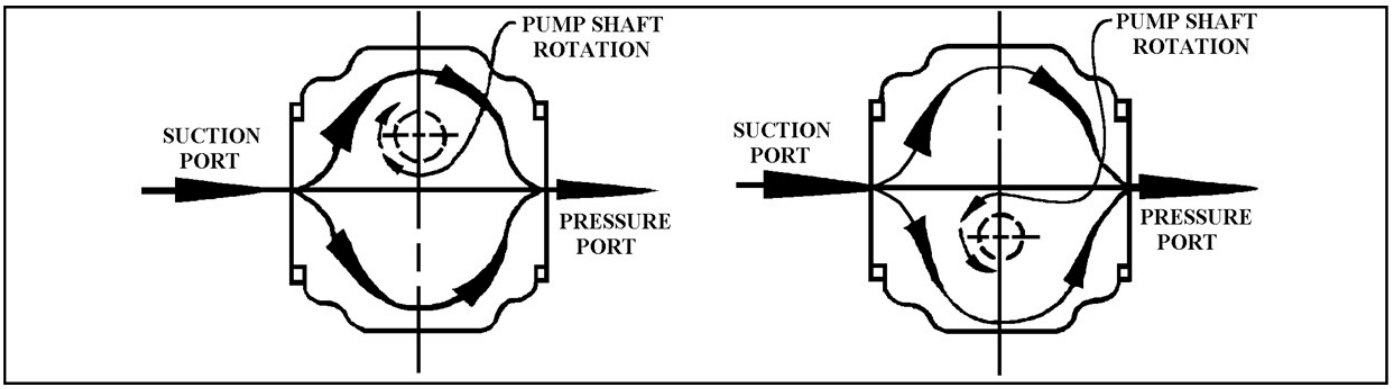


Figure 5 – Hydraulic Pump

⚠CAUTION If a threaded connection is tightened too tightly, the fitting or housing into which the fitting is placed could be distorted and an unstoppable leak could occur.

Assemble the system as shown in the "Hydraulics System" parts list. Place the hose clamps as needed to keep hoses away from hot or moving parts. Do not let hoses hang so low as to be snagged. Do not stretch hoses tight.

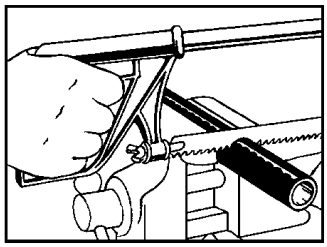
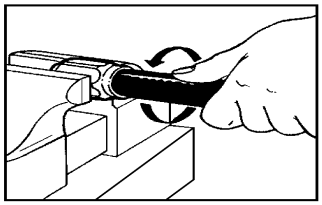
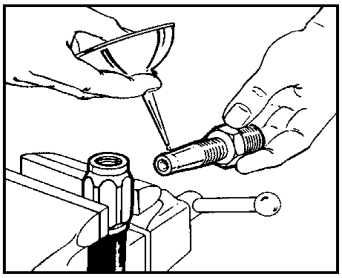
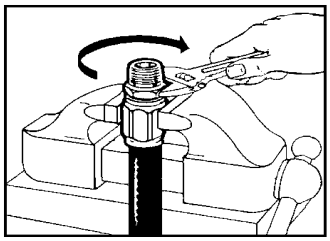
The hydraulic hoses supplied are as follows:

Pressure Line - Two wire braid hose, one end fitting crimped on, other end fitting to be field installed after cutting hose to length. See assembly instructions on the following pages.

Suction Line - Single spiral wire reinforced to be cut to length. Fittings to be assembled with double hose clamps.

All Return Lines - Double cotton braid to be cut to length as necessary. Fittings to be assembled with single hose clamps.

Reusable Non-Skive Type Ends

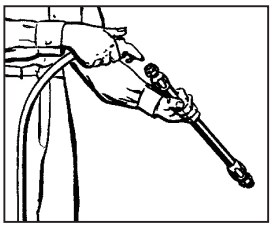
	**Step 1** Cut hose to length required using a fine tooth hacksaw or cut-off machine. Clean hose bore.
	**Step 2** Liberally lubricate hose cover with hose assembly lube. Place socket in vise and turn hose into socket counterclockwise until it bottoms. When assembling long lengths of hose, it may be preferred to put hose in the vise just tight enough to prevent from turning, and screw socket onto the hose counterclockwise until it bottoms.
	**Step 3** Liberally lubricate nipple threads and inside of hose. Use heavy weight oil.
	**Step 4** Screw nipple clockwise into socket and hose. Leave 1/32" (.08cm) to 1/16" (.16cm) clearance between nipple hex and socket. Disassemble in reverse order. Used with permission of the Aeroquip Company

⚠WARNING Do not use one manufacturer's hose with another manufacturer's fittings! Such use will void any warranty and may cause premature burst or leak of hydraulic fluids! Such bursting or leaking may cause severe injury and/or fire!

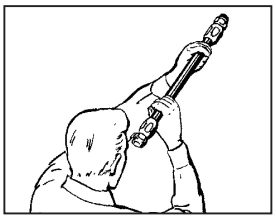
Hydraulic Hose Maintenance

Hose assemblies in operation should be inspected frequently for leakage, kinking, abrasion, corrosion or other signs of wear or damage. Worn or damaged hose assemblies should be replaced immediately.

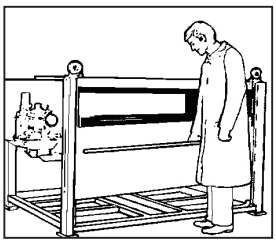
⚠WARNING Testing should be conducted in approved test stands with adequate guards to protect the operator.



Clean
Clean assembly by blowing out with clean compressed air. Assemblies may be rinsed out with mineral spirits if the tube stock is compatible with oil, otherwise hot water at 150°F (65.55° C) maximum may be used.



Inspect
Examine hose assembly internally for cut or bulged tube, obstructions, and cleanliness. For segment style fittings, be sure that the hose butts up against the nipple shoulder; band and retaining ring are properly set and tight, and segments are properly spaced. Check for proper gap between nut and socket or hex and socket. Nuts should swivel freely. Check the layline of the hose to be sure the assembly is not twisted. Cap the ends of the hose with plastic covers to keep clean.



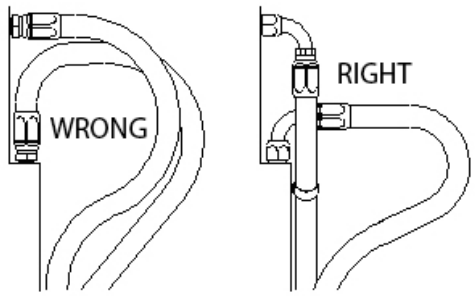
Test
The hose assembly should be hydrostatically tested at twice the recommended working pressure of the hose.
Test pressure should be held for not more than one minute and not less than 30 seconds. When test pressure is reached, visually inspect hose assembly for: 1. Any leaks or signs of weakness. 2. Any movement of the hose fitting in relation to the hose. Any of these defects are cause for rejection.

Storage and Handling

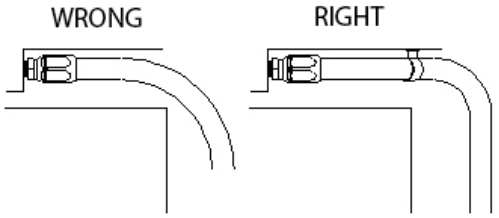
Hose should be stored in a dark, dry atmosphere away from electrical equipment, and the temperature should not exceed 90° F (32° C).

Installation Instructions Cont.

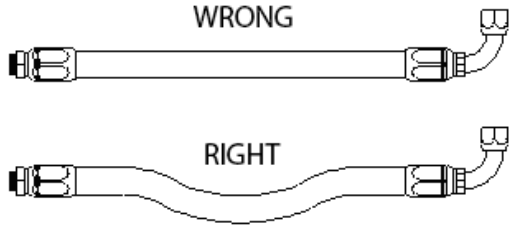
Hydraulic Hose Installation Guide



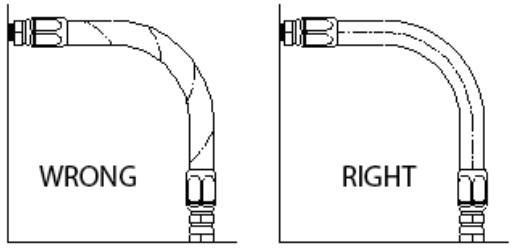
1. Use elbows and adapters in the installation to relieve strain on the assembly, and to provide easier and neater installations that are accessible for inspection and maintenance. Remember that metal end fittings cannot be considered as part of the flexible portion of the assembly.



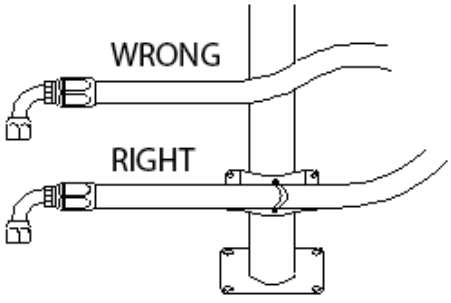
2. Install hose runs to avoid rubbing or abrasion. Clamps are often needed to support long runs of hose or to keep hose away from moving parts. It is important that the clamps be of the correct size. A clamp that is too large will allow the hose to move in the clamp causing abrasion at this point.



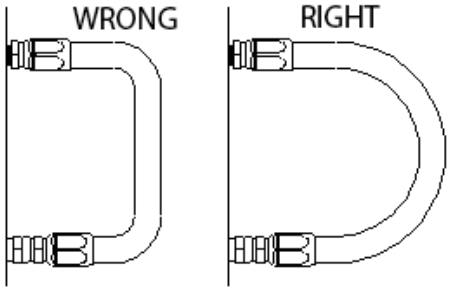
3. In straight hose installations allow enough slack in the hose line to provide for changes in length that will occur when pressure is applied. This change in length can be from +2% to -4%.



4. Do not twist hose during installation. This can be determined by the printed layline on the hose. Pressure applied to a twisted hose can cause hose failure or loosening of the connections.



5. Keep hose away from hot parts. High ambient temperature will shorten hose life. If you cannot route it away from the heat source, insulate it.



6. Keep the bend radii of the hose as large as possible to avoid hose collapsing and restriction of flow. Follow catalog specs on minimum bend radii.

(Used with the permission of The Weatherhead Company.)

Electrical Connections

Connect all electrical control circuits. The supply conductor should be connected to the accessory terminal of the truck ignition switch through the fifteen amp. circuit breaker provided in the control panel. All wiring should be approved automotive insulated wire, should be supported adequately with insulating ties or straps, should be located where it will not interfere with any control access, does not contact any moving parts or sharp edge and is kept away from any hydraulic line or any heated part.

Filling The Hydraulic System

NOTICE DO NOT attempt to run pump without first filling hydraulic oil reservoir and opening suction line gate valve, or pump may be ruined.

Fill reservoir with hydraulic oil as specified in the Lubricant Specifications section of this manual. Be sure oil is clean, free from dirt, water and other contaminants.

Lubricate all points requiring lubrication per Lubrication Chart in this manual.

Checking Installation

See Initial Start-Up procedure.

OPERATIONS & MAINTENANCE

General Description

The E3020 is a hydraulic, rear dump, truck chassis mounted spreader. The unit can be used for dumping crushed rock, hot mix, etc. directly into a paved hopper. It can also be used for spreading materials with the spinner—sand and chips in seal coating, ag lime, dried sludge, litter, manure, gypsum for agriculture, and sand, salt, cinders, calcium chloride, etc. for ice control.

The unit is powered hydraulically. The standard control system is the manual dual hydraulic system, providing independent variable speed control for both the conveyor and the spinner. An automatic dual-type (Hydra-Tach) is available as an option.

Also available as an option is a series/parallel hydraulic system. This system provides a high and low speed for the conveyor. The control valve is located at the front of the spreader. With the lever in the forward position the conveyor is in the low (parallel) range. This speed is normally used when spreading, salt, sand, etc. for ice control. Moving the lever rearward shifts the conveyor into high speed (series) which is normally used for pit dumping material or spreading at high application rates.

A gear-type hydraulic pump provides hydraulic pressure for the unit. Pump drives available are:
1. Truck Transmission PTO Drive.
2. Engine Crankshaft PTO Drive.

To use the unit for pit dumping, windrowing, or charging a paver hopper, the spinner assembly can be removed. With the optional swinging assembly, it can be swung to the right or left and out of the way. A lever located on the left-hand side of the spreader releases the optional swinging endgate.

NOTE: When the spinner is not mounted, the cab control knob should be turned off and the pressure line to the spinner motor must be connected directly into the return line by means of the quick disconnect fittings provided.

The conveyor runs the full length of the hopper bottom to deliver material through an adjustable metering gate at the rear of the hopper body. Three types of spinner hopper are available: the standard bolted-on unit, a quick-detachable unit and a swing-away unit.

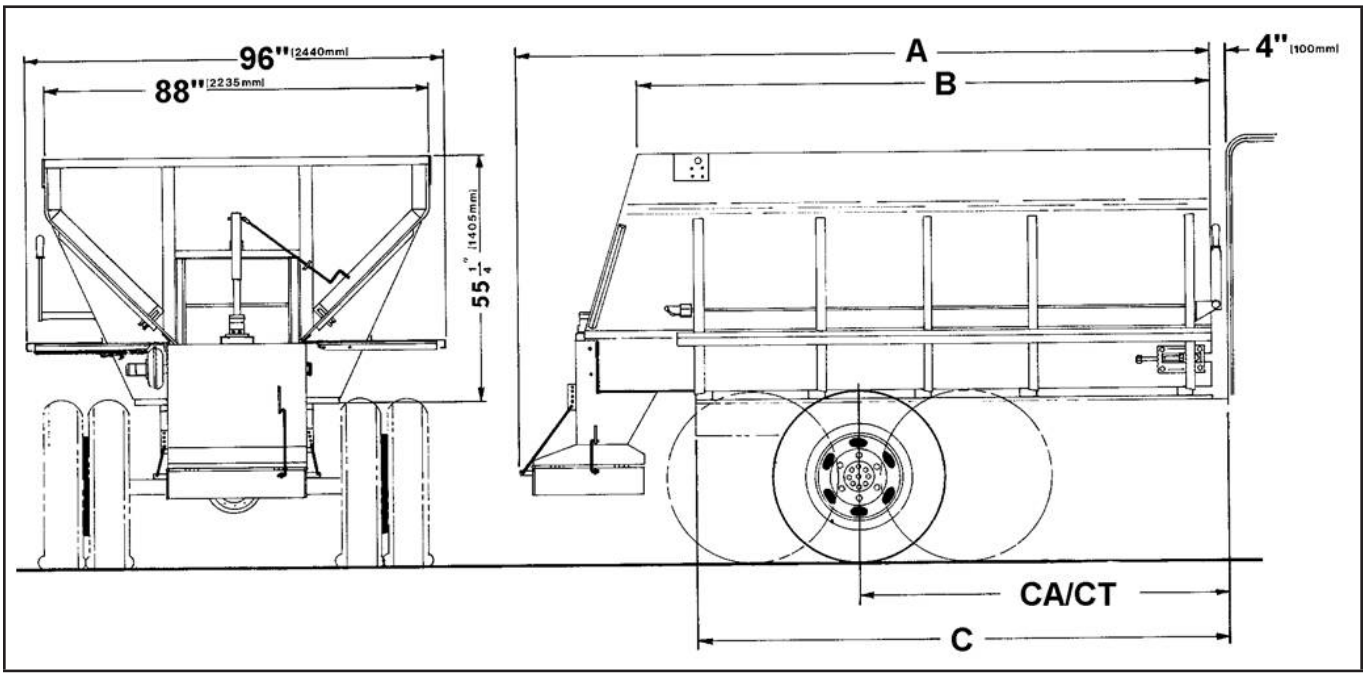
A single 24" spinner, driven by a hydraulic motor is used to spread material. Adjustable baffles and internal deflectors provide complete control of material spread.

The standard conveyor consists of a Number 2 type, having parallel strands of pintle chain joined by cross bars every other link. Optional conveyors are:
1. Number 4 Type – Belt-over-chain Conveyor.
2. Number 4 Type – Hi-Temp Belt-over-chain Conveyor.
3. Number 4 Type – Hi-Temp Abrasion Resistant Belt-over-chain Conveyor.

The cab control valve has an On/Off control for spot spreading or shut-down, and has a built in relief valve for system protection. A conveyor shut-down solenoid valve and control switch kit is available as an option.

This product is intended for commercial use only.

Dimensions & Capacities



GENERAL SPECIFICATIONS				
Spreader Length	Overall A	Inside B	Frame C	Cab to Axle C.A.
10′	148″ (3759 mm)	120″ (3048 mm)	111″ (2819 mm)	84″ (2134 mm)
11′	160″ (4064 mm)	132″ (3353 mm)	123″ (3124 mm)	84″ (2134 mm)
12′	172″ (4368 mm)	144″ (3657 mm)	135″ (3429 mm)	102″ (2591 mm)
13′	184″ (4674 mm)	156″ (3962 mm)	147″ (3734 mm)	102 – 108″ (2591 – 2743 mm)
14′	196″ (4978 mm)	168″ (4267 mm)	159″ (4038 mm)	120″ (3048 mm)
15′	208″ (5283 mm)	180″ (4572 mm)	180″ (4572 mm)	130″ (3302 mm)
16′	220″ (5588 mm)	192″ (4877 mm)	183″ (4648 mm)	138″ (3505 mm)

STRUCK CAPACITIES – Cu. Yds. (m3) Cu. Ft.				
Spreader Length	Standard	W/6″ Lower Sides	W/6″ Higher Sides	Approx. Spreader Weight
10′	7.0 (5.4) 188	5.5 (4.2) 148	5.5 (4.2) 148	2865 lbs (1300 kg)
11′	7.7 (5.9) 208	6.1 (4.7) 164	9.3 (7.1) 252	3152 lbs (1430 kg)
12′	8.5 (6.5) 228	6.7 (5.1) 180	10.2 (7.8) 276	3432 lbs (1557 kg)
13′	9.2 (7.0) 248	7.3 (5.6) 196	11.1 (8.5) 300	3725 lbs (1690 kg)
14′	9.9 (7.6) 268	7.9 (6.0) 212	12.0 (9.2) 324	4011 lbs (1819 kg)
15′	10.7 (8.2) 288	8.4 (6.4) 228	12.9 (9.9) 348	4298 lbs (1950 kg)
16′	11.4 (8.7) 308	9.0 (6.9) 244	13.8 (10.6) 372	4584 lbs (2079 kg)

Check over 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.

NOTE: DO NOT LOAD SPREADER WITH MATERIAL.

1. Check to see that no loose parts are in the body, on the conveyor or on the spinner. Be sure to remove any loose pieces.
2. Open the feedgate until it is completely clear of the conveyor.
3. Fill the hydraulic reservoir with oil. Refer to the Lubricant Specifications section of this manual for proper oil. Open the gate valve under the reservoir fully (rotate counterclockwise to open).
4. If crankshaft PTO transmission has been installed, make sure transmission has proper amount of lubricant.
5. Engage PTO. Start the truck engine and set throttle so engine runs at about 1000 RPM. Allow pump to run and circulate oil for several minutes. In cold weather, increase warm-up time.
6. Place the cab On-Off control in the On position and move the spinner control knob to position #3. Let the unit run until air is expelled from the circuit and the spinner is running smoothly. Turn the spinner control knob to the Off position.
7. Open conveyor control knob to position #3. Allow conveyor to run until it is operating smoothly and all air is purged from the system.
8. Move the spinner and conveyor control knobs to position #5 and allow both the spinner and conveyor to run. Shut down the system.
9. Check over entire unit to be sure all fasteners are in place and properly tightened per Torque Chart in this manual.

⚠DANGER Stay clear of moving machinery.

10. 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!

11. Check hydraulic oil reservoir and refill as necessary. Unit is now ready for road testing.

Initial Start-Up

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

If material to be spread is not already in spreader, load the unit. 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 speed, flow deflector and baffle adjustments must be made with On-Off control in Off position to stop spinner and conveyor to avoid injury from spinner and/or discharging material.

Set variable-speed spinner control to obtain spread width desired. As spread width is affected by spinner speed, spinner height, flow deflector settings, baffle positions as well as material granular size, density and moisture content, 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 high spinner speeds and attempting to control spread width by means of the external baffles will increase wear and tear on parts, will degrade materials being spread by causing unnecessary particle break-up and will waste material. High spinner speeds can also create excessive damage to vehicle finishes through uncontrolled throw and bounce of materials.

To increase spread to one side, the exterior baffle on that side should be raised and the interior flow deflector on that side should be raised (swung inward) to direct material to the side of the spinner away from the direction of spread increase. The interior flow deflector on the opposite side should be lowered (swung downward) to allow material to fall on the side of the spinner away from the direction of desired spread.

An optional On-Off solenoid (dump) valve and control switch is available for the conveyor. Two switches are used, one in the truck cab and the other at the rear of the spreader.

An optional high/low conveyor speed control is also available. It mounts at the front of the spreader. Push in on the handle for low speed, pull out for high speed.

A lever located on the front of the spreader releases the optional swinging endgate. Make sure the endgate is closed and latched before loading the spreader.

Refer to the theoretical Spread Rate Charts for various settings of the conveyor.

NOTE: Close the feedgate before loading the spreader and when traveling to the location where spreading is to be done. Open feedgate before starting to spread.

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.

Automatic Dual Control System

This system utilizes a ground-speed sensing arrangement to automatically adjust the conveyor control portion of a dual pressure compensated valve so that conveyor speed is coordinated with ground speed. This system has three basic spread rate ranges which, when properly adjusted, should achieve the following deliveries which should be fairly constant for road speeds of 10 miles per hour and above:

Spread Rate Range	Theoretical Delivery Cu. Ft./Mile/Inch of Gate
1	2.3
2	6.0
3	8.3

(NOTE: If other delivery rates are desired, they can be obtained by adjusting metering gate opening accordingly.)

As factory settings of the automatic dual control system may not be suitable, the system should be adjusted before initial use. Readjustment should be done if there is any question that delivery rates are not desired. Calibration procedure is listed in Fluid Control, Inc. "Hydra-Tach Adjustment" instructions included in the installation bulletin.

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

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

Recommended settings for adjusting Automatic Dual Control System are:

	Valve Setting			
Spread Rate Range	10MPH	15MPH	30MPH	40MPH
1	1			3
2		3		9
3		4	9	

Calibration Procedure

The material delivery charts in this manual are based upon theoretical volumes calculated from expected engine, pump, hydraulic valve and hydraulic motor operating characteristics, together with ideal material flow to conveyor and from conveyor to spinner. The attainment of the listed material volumes is not guaranteed.

It is recommended that the spreader be calibrated periodically (a yearly calibration is recommended) so that actual deliveries can be determined under a representative set of operating conditions. The following procedure is suggested:

Select a smooth, level test course about 1/4 mile long. Place a marker about 200 yards from the starting point and a second marker just 100 feet down course from the first marker.

Set feedgate opening of spreader at one inch by measuring vertically from conveyor bottom with a #2 conveyor, or from belt surface at center of belt with #4 conveyor to bottom edge of feedgate belt. Fill spreader body about half full of material for which calibration is to be run (full load may be used if desired).

Place unit at start of test-course. Without moving truck, run conveyor and spinner until uniform discharge from spinner occurs. Shut off conveyor and spinner. Close spinner valve so that spinner does not turn. Brush off any material remaining on the spinner. Lower all external baffles so that they hang straight down and lock in that position.

Weigh empty calibration box and record weight. Hang empty box below spinner by suspending from spinner hopper.

With conveyor control OFF, start truck, bring up to speed in gear for which calibration is desired. Turn conveyor ON when first marker is passed and turn conveyor OFF when second marker is passed. Bring truck to a halt. Lower calibration box and carefully brush all material on spinner into box.

Weigh box with material. Subtract weight of empty box. Material weight represents amount of material discharged per 100 feet of travel per inch of gate opening.

Repeat above for two more runs and average results of all three runs. The average weight of material discharged per 100 feet of travel per inch of gate opening multiplied by 52.8 will give the weight of material used in test that would be delivered per mile of travel.

If volume is desired instead of weight, divide weight discharged by the weight of one cubic foot of the material used in the calibration above. Result will be volume discharge in cubic feet.

WEIGHTS OF VARIOUS MATERIALS

	APPROX. WEIGHT (lbs.)			APPROX. WEIGHT (lbs.)	
MATERIAL	Per Cu. Ft	Per Cu. Ft	MATERIAL	Per Cu. Ft	Per Cu. Ft
Ashes	40	1080	Salt	80	2160
Cinders	30	810	Sand	100	2700
Limestone, Crushed	100	2700	Urea	60	1620

Hydraulic System

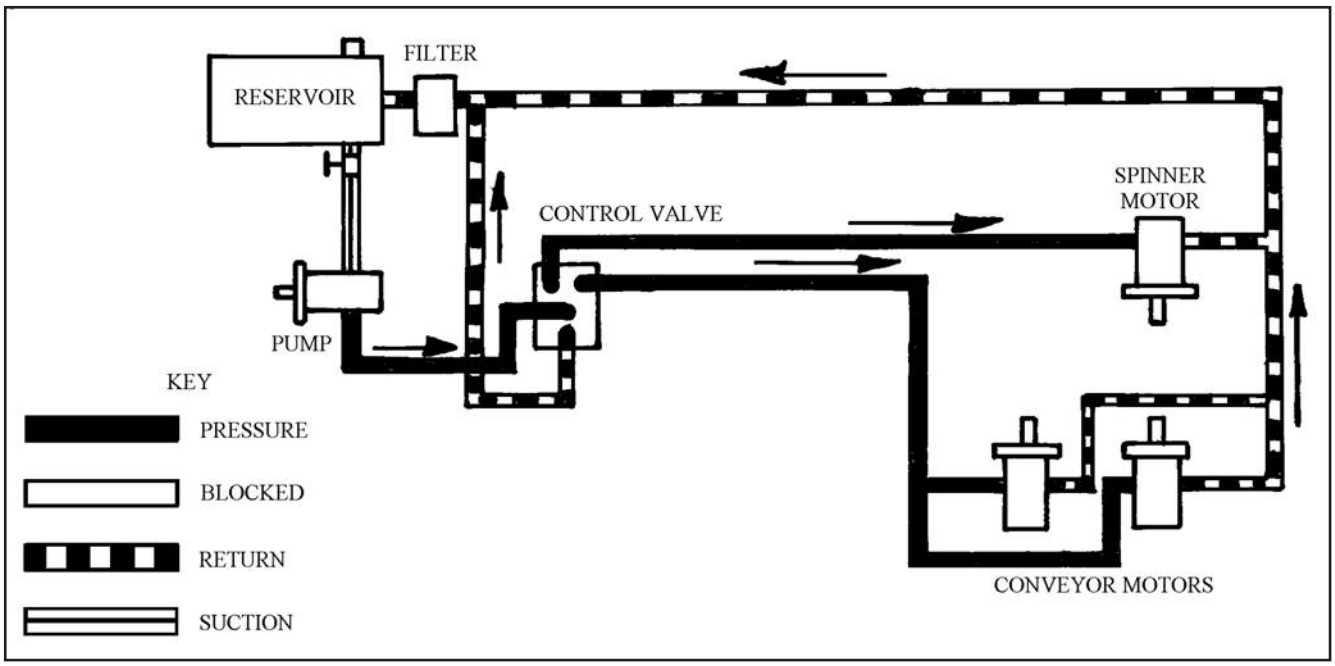


Figure 1 - Standard Parallel System

When the engine is running and the PTO 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 (Figure 1).

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 conveyor controls are off.

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

The conveyor motors are in parallel. The oil flow from the conveyor is split and half is sent to each motor.

All of the return 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 "Danger" zone. The filter must be changed.

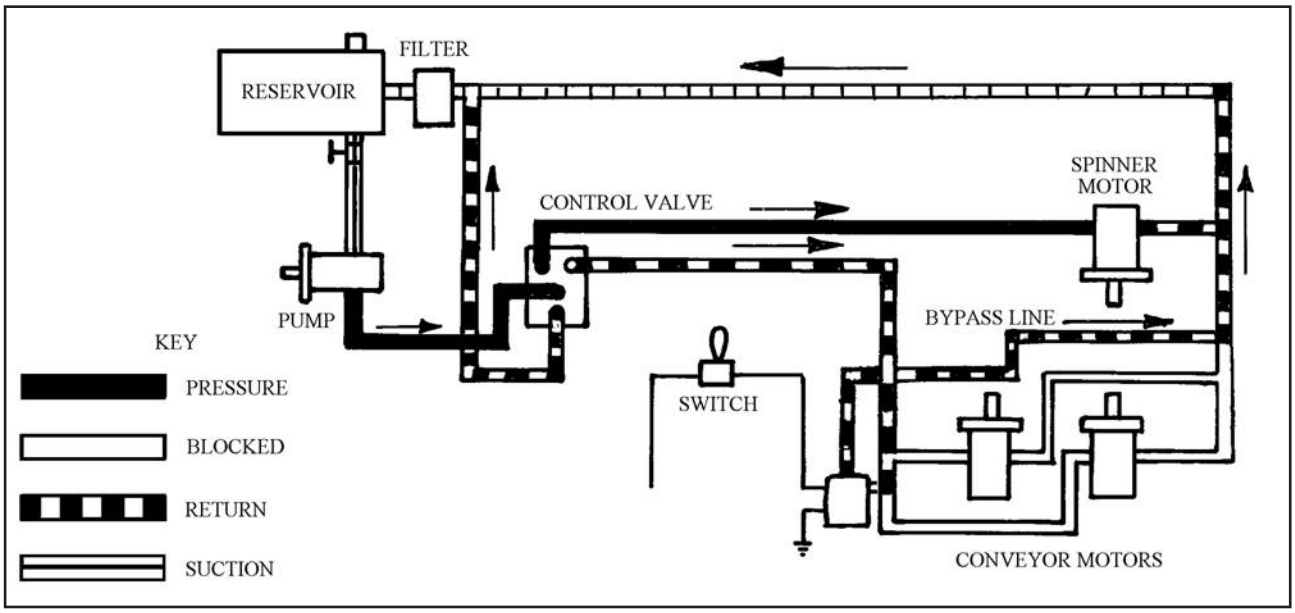


Figure 2 - Dump Valve Operation

When the optional conveyor stop switch is operated, it operates the dump valve. The dump valve is a normally open solenoid valve. When the valve is open, oil flows through it and back to the reservoir instead of turning the conveyor motors.

When the switch is actuated to energize the solenoid, the valve closes the return or bypass line, thereby directing the oil through the conveyor motors, causing them to run.

When the switch is actuated to de-energize the solenoid, the valve opens, and the conveyor motors stop, as shown in Figure 2.

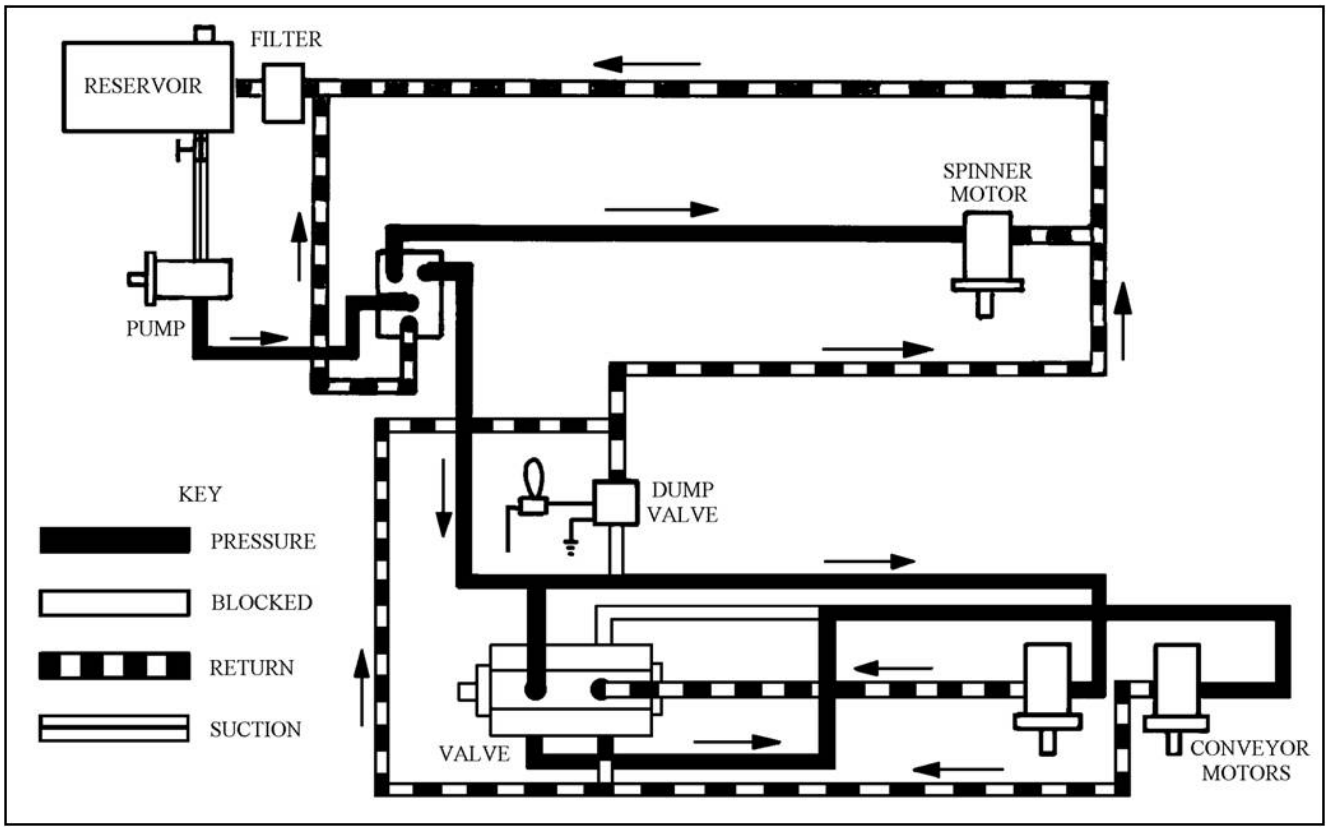


Figure 3 - Series/Parallel System - Parallel Operation

An extra control valve and plumbing is added to the standard system to allow either series or parallel operation of the conveyor motors. When shifted into the parallel mode, the hydraulic system operates as explained earlier under "Standard Parallel System".

Figure 3 is shown with dump valve in On position with conveyor motors running.

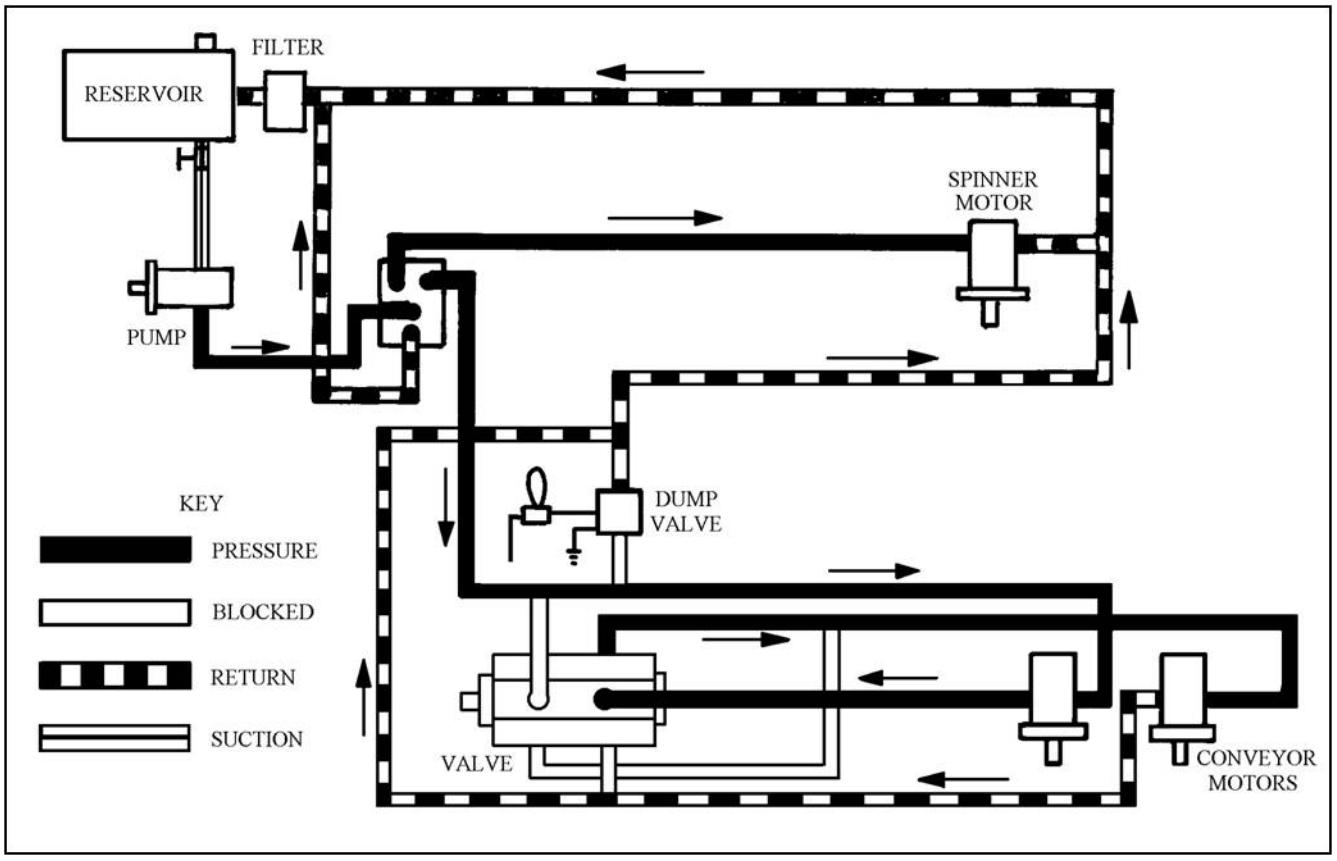


Figure 4 - Series/Parallel System - Series Operation

When shifted into series operation, oil flows from the control valve to one motor and through it. The discharge oil from the first motor flows back to the control valve and is then directed to the second motor. Oil leaving the second motor is routed back to the reservoir. (Figure 4)

The spinner circuit is the same with the standard system or the series/parallel system.

Pressure Setting

The system relief valve is set at 2000 PSI. The relief valve is located in the cab control valve. Set the pressure as follows:

1. Turn both spinner and conveyor controls to Off. Disengage the PTO.
2. Disconnect the pressure line leading to the spinner motor. Install a gauge of at least 3000 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 the gauge in the other. Make sure the "tee" is capable of withstanding 2500 PSI.
3. Engage the PTO. 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 Don't run the pump over relief for long periods of time. This will cause oil to overheat and may cause component damage.

4. Turn control to Off position. Disengage the 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. Operate the truck engine at 2500 RPM and 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.

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 this manual for selection of the proper hydraulic fluid 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 Change the hydraulic oil filter after the first week (or not more than 50 hours) of operation on a new unit.

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

Conveyor Gear Case

The oil in a new unit should be drained at the end of the first two weeks (or not more than 100 hours) of operation and the case should be thoroughly flushed with light oil. Refer to the Lubricant Specifications section for the proper grade oil. Refill gear case with one (1) pint (.47 liters) of recommended lubricant. After the initial change, the oil should be changed every 2,000 hours of operation or annually, whichever occurs first. Check the level of the gear case monthly and fill as necessary.

Conveyor Chain

Hose down the machine and remove any material build-up on the sprockets or beneath the chain. If material is allowed to build-up, the chain may ride up and damage the body.

NOTE: If material builds up under the chain, the chain will ride on the material instead of the bottom panel. The more material allowed to build, the closer the chain will come to the chain shields. If the chain should catch a chain shield, it could permanently distort the chain, the chain shields or the spreader body. In the same manner, if material is allowed to build up on the sprockets, the chain will have a larger diameter to follow. The more material allowed to build, the closer the chain will run to the chain shields, until damage occurs. Do not remove material while conveyor or spinner is running.

The conveyor chain should be lubricated at least once every week using a mixture of 75% diesel fuel and 25% SAE 10 oil in a pressurized hand spray can.

⚠CAUTION When conveyor is running, stay out of spreader body—stay clear of all moving parts. Entanglement of clothes, any part of your body, or anything you have in your hands can cause serious injury. Do not use a bar, rod or hammer on conveyor while it is moving—if it gets caught it could be very dangerous.

With the spinner shut down and the conveyor running slowly, spray the mixture of oil between the links of the chain by spraying through openings at the rear ends of the sill, or from the front outside body when access clearance is adequate. Do this at least once a week and after each time the machine is washed down. Allow to dry before lubricating.

If a chain oiler is used, the oiler reservoir should be filled daily with a mixture of 75% diesel fuel and 25% SAE 10 oil. Before each filling of spreader with material to be spread, open petcock and run conveyor until full length of chain has been oiled, then shut petcock.
An automatic chain oiler is available. A pressure switch in the conveyor hydraulic lines actuates a control valve on the automatic oiler. This valve opens to let oil flow onto the chains. Check the reservoir daily. Fill, if required, with a mixture of 75% diesel fuel and 25% SAE 10 oil. Adjust the two petcocks so that oil drips slowly onto each chain.

Proper chain tension is also a factor in chain and sprocket life. The proper chain tension is illustrated below. Be sure the chain is tensioned equally on both sides. This adjustment is made on each side of the unit at the idler bearings.

Conveyor chains that are too tight will tend to stretch. This will cause excess sprocket wear and eventually cause breakage. Excess slack presents the possibility of the chain catching on sub-frame parts. Bent or distorted chain bars will cause damage to the body as well. Straighten or replace bent or distorted chain bars immediately.

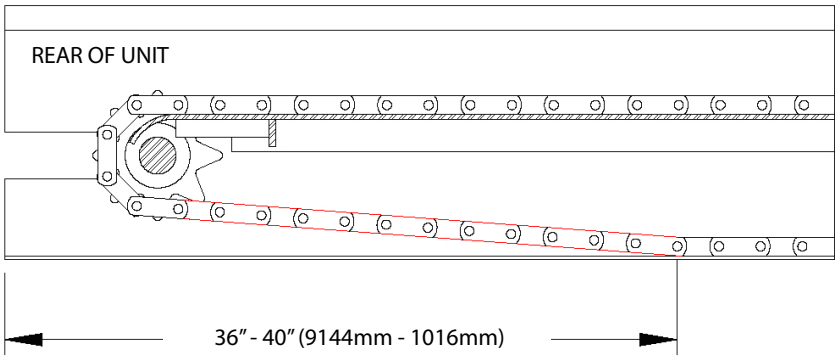


Figure 5 - Chain Tension

Lubrication Of 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 bearings. It is very important the grease maintains its proper consistency during operation. It must not be fluid and it must not channel.

Bearings should be lubricated by pumping grease in slowly until a slight bead forms around the seals. This bead indicates adequate lubrication and also provides additional protection against the entrance of dirt. Be sure that all fittings are thoroughly cleaned before grease is injected. Points to be lubricated by means of a grease gun have standard grease fittings.

Clean Up

To maintain a minimum maintenance operation, this equipment should be thoroughly washed every two or three days when operating. 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 listed in this section should be closely followed. For longer body life, repaint worn spots to prevent formation of rust.

Fasteners

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

Conveyor Belt Maintenance

The standard belt for the #4 chain has a nylon fabric that is impervious to moisture, weathering, or normal chemical action except oil. The optional high-temperature belting is highly recommended where an asphalt mix is going to be run through the spreader. Inspect the belt fasteners occasionally for wear or "raveling" of the belt grip area.

High-Temperature Belting

In order to achieve maximum life out of the high-temperature belting, the following recommendations should be followed:

1. Keep the belt free from build-up of asphalt or other material.
2. Spray the belt often with oil to assure flexibility of the rubber.
3. Hot asphalt mix should be kept below 300° F.
4. Do not let hot asphalt mix remain on the belt any longer than necessary. Keep belt running as much as possible to allow a cooling cycle on the belt.

In normal use, a properly cared for belt will first experience cracking of the belt cover. This is normal for a belt of this type in an asphalt environment and does not indicate a failing belt. Eventually, the belt cover will begin to harden and chunks of the cover begin falling off, exposing the carcass. When this happens, it is time for belt replacement.

NOTICE

The lubricant distributor and/or supplier are to be held responsible for the results obtained from their products. Procure lubricants from distributors and/or suppliers of unquestioned 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 classifications and recommended by reputable oil companies.

Hydraulic System

The hydraulic reservoir has a capacity of 20 gallons. 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 VISCOSITY GRADE	OPERATING TEMPERATURE	VISCOSITY
150 SSU	84° F - 122° F	200 SSU - 100 SSU
225 SSU	107° F - 140° F	200 SSU - 100 SSU
300 SSU	116° F - 150° F	200 SSU - 100 SSU
450 SSU	130° F - 165° F	200 SSU - 100 SSU
600 SSU	145° F - 182° F	200 SSU - 100 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 provide between 100 and 200 SSU at operating temperature can be used. These will provide proper viscosity over a wide range:

SAE VISCOSITY GRADE	OPERATING TEMPERATURE	VISCOSITY
10W-30	100 F - 130° F	200 SSU - 100 SSU
10W-40	140 F - 190° F	200 SSU - 100 SSU

The above recommendations cover the normal system operating temperatures. For system temperatures above or below those shown in the charts above, contact the Product Support Department at Highway Equipment Company. For additional information contact your Highway Equipment Company dealer.

Pressure Gun Lubricant

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

Gear Box Lubricant

Lubricate these assemblies with a non-corrosive type SAE 90 E.P. (Extreme Pressure) gear oil conforming to MIL-L 2105B multi-purpose gear lubricating oil requirements (API Service GL 4) with ambient temperatures from 40° to 100° F. Ambient temperatures below 40° F require an SAE 80 E.P. lubricant; above 100° F use SAE 140 E.P. grade oil.

Chain Oiler Lubricant

Use a mixture of 75% No. 1 or No. 2 diesel fuel or kerosene mixed with 25% SAE 10 engine oil.

Crankshaft Pto Gear Box Lubricant

Use SAE 50 petroleum base oil.

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

Lubricant & Hydraulic Oil Specifications

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

LOCATION	PLACES	METHOD	FREQUENCY
Pump Drive			
Trans. PTO - Slip Yoke	1	Grease Gun	Weekly
Trans. PTO - Universal Joint	2	Grease Gun	Monthly
Crankshaft PTO - Sliding Spline	1	Grease Gun	Weekly
Crankshaft PTO - Universal Joint	2	Grease Gun	Monthly
Crankshaft PTO - Pipe Plug on Cast Mounting Plate	1	Oil	Annually
Hydraulic System			
Reservoir	1	Check Daily; Change Annually	
Filter	1	Check Daily; Change when indicator is red	
Dual Control Valve - Hex Valve Stem (Under Hand Knob)	2	Hand Grease	Annually
Auto. Dual Control - Hex Valve Stem	2	Hand Grease	Annually
Auto. Dual Control - Control Gears	2	Hand Grease	Annually
Auto. Dual control - Speedometer "T" Drive Adapater	1	Hand Grease	Annually
Conveyor			
Dragshaft Bearings	2	Grease Gun	Weekly
Idler Shaft Sprockets	2	Grease Gun	Daily
Take-up Screws	2	Hand Grease	Monthly
Chain	2 Strands	Spray Oil	Weekly
Chain Oiler (If so equipped)	1	Oil	Daily
Gear Case - Breather Plug	1	Gear Oil	Check Monthly; Change Annually
Feedgate			
Jack Assembly - Gears	1	Hand Grease	Annually
Jack Assembly - Tube	1	Grease Gun	Monthly
Tube	1	Grease Gun	Monthly
Spinner Assembly			
Driveshaft - Universal Joints	2	Grease Gun	Weekly
Driveshaft - Bearings	2	Grease Gun	Weekly

Lubrication Chart

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.

Speed Rate Charts

THEORETICAL DELIVERY IN
CUBIC FEET/MILE/INCH OF GATE OPENING

SERIES/PARALLEL CONVEYOR MOTOR DRIVE SYSTEM

VALVE POSITION IN CAB	MPH 15		MPH 20		MPH 25		MPH 30		MPH 35		MPH 30	
	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI
1	4.8	9.6	3.6	7.2	2.9	5.8	2.4	4.8	2.1	4.2	1.8	3.6
2	9.6	19.2	7.2	14.4	5.8	11.6	4.8	9.6	4.1	8.2	3.6	7.2
3	14.4	28.8	10.8	21.6	8.6	17.2	7.2	14.4	6.2	12.4	5.4	10.8
4	18.9	37.8	14.2	28.4	11.3	22.6	9.4	18.8	8.1	16.2	7.1	14.2
5	22.9	45.8	17.2	24.4	13.7	27.4	11.4	22.8	9.8	19.6	8.6	17.2
6	26.4	52.8	19.8	39.6	15.8	31.6	13.2	26.4	11.3	22.6	9.9	19.8
7	29.7	*	22.3	*	17.8	*	14.8	*	12.7	*	11.1	*
8	32.5	*	24.4	*	19.5	*	16.2	*	13.9	*	12.2	*
9	35.6	*	26.7	*	21.3	*	17.8	*	15.2	*	13.3	*
10	37.4	*	28.1	*	22.5	*	18.7	*	16.1	*	14.0	*
11	38.7	*	29.0	*	23.2	*	19.3	*	16.6	*	14.5	*

STANDARD PARALLEL CONVEYOR MOTOR DRIVE SYSTEM

VALVE POSITION IN CAB	MPH 15	MPH 20	MPH 25	MPH 30	MPH 35	MPH 30
1	4.8	3.7	2.8	2.4	2.1	1.8
2	9.6	7.2	5.8	4.8	4.1	3.6
3	14.4	10.8	8.6	7.2	6.2	5.4
4	18.9	14.7	11.3	9.4	8.1	7.1
5	22.9	17.2	13.7	11.4	9.8	8.6
6	26.4	19.8	15.8	13.2	11.3	9.9
7	29.7	22.3	17.8	14.8	12.7	11.1
8	32.5	24.4	19.5	16.2	13.9	12.2
9	35.6	26.7	21.3	17.8	15.2	13.3
10	37.4	28.1	22.5	18.7	16.1	14.0
11	38.7	29.0	23.2	19.3	16.6	14.5

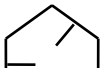
Troubleshooting

Reason:	Correction:
Symptom : Neither conveyor or spinner system will operate.	
1. Low reservoir oil level.	Check and fill as required.
2. PTO not engaged	Engage PTO. Check for broken or disconnected control cable.
3. PTO malfunction	Check out PTO.
4. Pump drive shaft.	Check for broken or disconnected pump drive shaft.
5. Reservoir shut off valve.	Make sure valve is fully open.
6. Pump not rotating.	Check for broken key in pump. (Also, check out PTO and check for broken or disconnected pump drive shaft.)
7. Worn pump.	Check with flow meter.
8. Relief valve set too low.	Adjust relief valve setting.
Symptom : conveyor system operates but spinner does not.	
1. Jammed spinner.	Turn spinner control Off., then check for jams.
2. Frozen shaft bearings.	Turn spinner control Off, then check bearings. Replace as required.
3. Spinner not turning.	Check for broken key or failed motor. Repair or replace.
4. Spinner drive shaft.	Check for broken or missing keys or pins, and/or broken u-joints. Repair or replace.
5. Pinched or crushed hoses or lines.	Repair or replace as required.
Symptom : Spinner Operates but conveyor does not.	
1. Jammed or broken conveyor.	Turn conveyor Off, then check for jams or breakage.
2. Broken conveyor or drive shaft.	Check for broken or missing keys and/or broken shaft. Repair or replace as required.
3. Gear case.	Check for broken or missing keys, broken shafts or broken gears. Repair or replace as required.
4. Dump valve stuck open, or faulty dump valve switch.	Check out valve and/or switch. Repair or replace as required.
5. Frozen dragshaft bearings.	Turn conveyor Off, then check bearings. Replace as required.
6. Pinched or crushed hoses or lines.	Repair or replace as required.
Symptom : Hydraulic oil overheats	
1. Low oil level.	Check oil level, add as necessary.
2. Check for proper pump/PTO matching.	Install proper sized pump.
3. Incorrect relief valve setting.	Check setting. Adjust to proper setting.
4. Pinched or crushed hoses or lines.	Repair or replace as required.
5. Worn motor in system.	Repair or replace as required.

Standard Torques National Course (Nc) Cap Screws

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

PARTS

Instructions for Ordering Parts

ORDER FROM THE AUTHORIZED DEALER IN YOUR AREA.

Always give the pertinent model and serial number.

Give part name, part number and the quantity required.

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 New Leader Manufacturing.

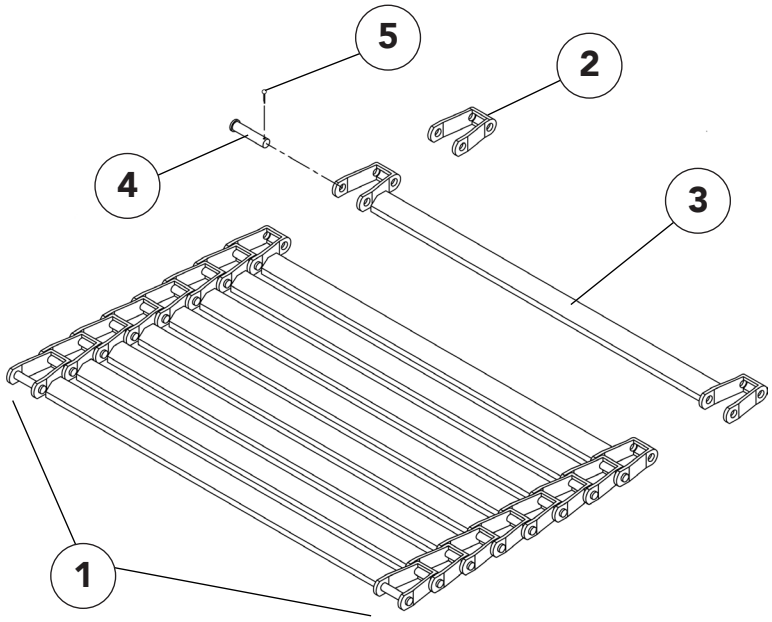
If your claims are not being handled (by the transportation company) to your satisfaction, please call our Product Sales & Support Department at New Leader Manufacturing at 888-363-8006 for assistance.

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

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

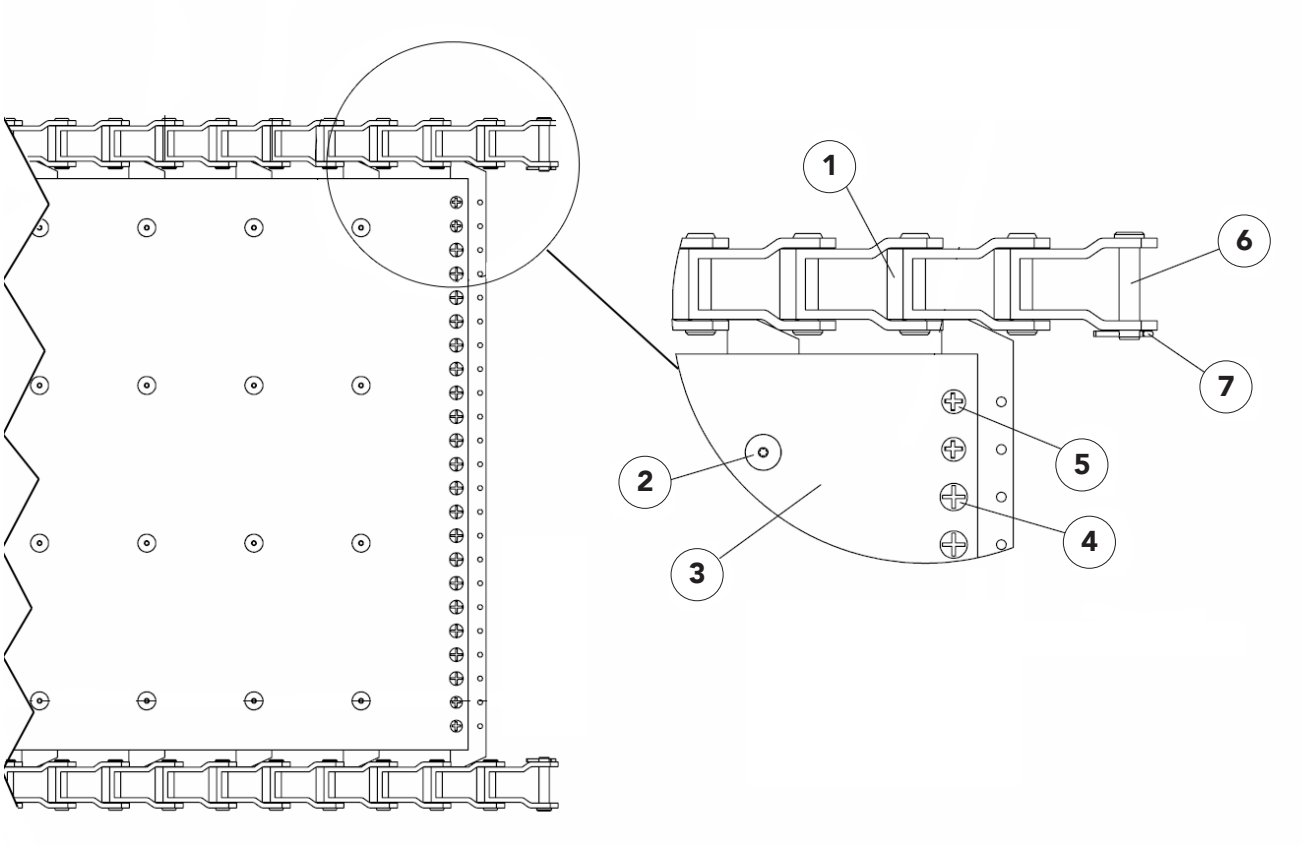
The parts listed under the different steel types (CS, 409 SS and 304 SS) are for that type of unit and do not necessarily mean the part is made of that type of steel.

Conveyor - #2 & #3 Pintle Chain



ITEM	PART NO.	DESCRIPTION	QTY
1		Chain- #2 Pintle Assy	
	99166	Chain- #2 Pintle Assy, 10' Unit	
	99167	Chain- #2 Pintle Assy, 11' Unit	
	99168	Chain- #2 Pintle Assy, 12' Unit	
	99169	Chain- #2 Pintle Assy, 13' Unit	
	99170	Chain- #2 Pintle Assy, 14' Unit	
	99171	Chain- #2 Pintle Assy, 15' Unit	
	99172	Chain- #2 Pintle Assy, 16' Unit	
		Chain- #3 Pintle Assy	
	99173	Chain- #3 Pintle Assy, 10' Unit	1
	99174	Chain- #3 Pintle Assy, 11' Unit	1
	99175	Chain- #3 Pintle Assy, 12' Unit	1
	99177	Chain- #3 Pintle Assy, 13' Unit	1
	99178	Chain- #3 Pintle Assy, 14' Unit	1
	99179	Chain- #3 Pintle Assy, 15' Unit	1
	99180	Chain- #3 Pintle Assy, 16' Unit	1
2	36699	Link- Pintle Chain	AR
3	--	Cross Bar Wldmt	AR
4	36697	Pin- Clevis	AR
5	20817	Pin- Cotter	AR
AR-	As Required		

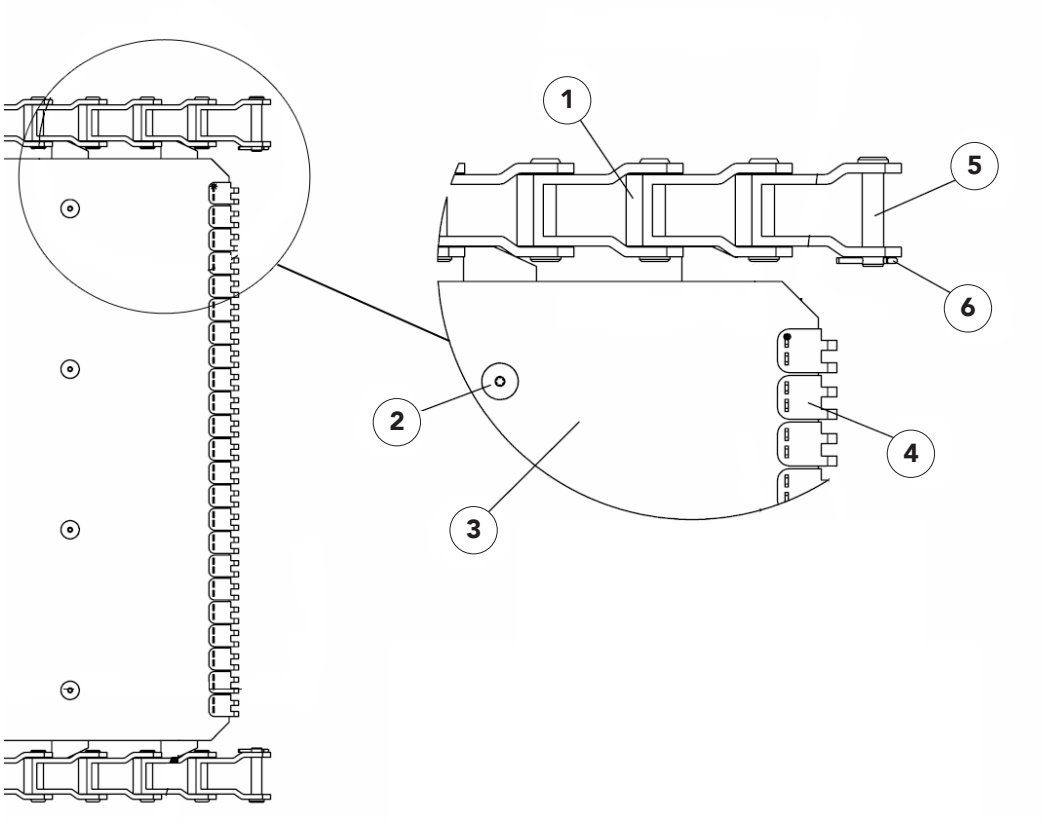
Conveyor - #4 Belt-Over-Pintle-Chain



ITEM	PART NO.	DESCRIPTION	QTY
1	308665	#4 Belt-Over-Chain Assy- 10’ Unit	1
	308666	#4 Belt-Over-Chain Assy- 11’ Unit	1
	308667	#4 Belt-Over-Chain Assy- 12’ Unit	1
	308668	#4 Belt-Over-Chain Assy- 13’ Unit	1
	308669	#4 Belt-Over-Chain Assy- 14’ Unit	1
	308670	#4 Belt-Over-Chain Assy- 15’ Unit	1
	308671	#4 Belt-Over-Chain Assy- 16’ Unit	1
2	305646	Screw- #4 BOC Flat Head	AR
3	18027	Belt	AR
4	20624	Screw- Truss Head	AR
5	20617	Screw- Flat Head	AR
6	36697	Pin- Clevis	AR
7	20817	Pin- Cotter	AR

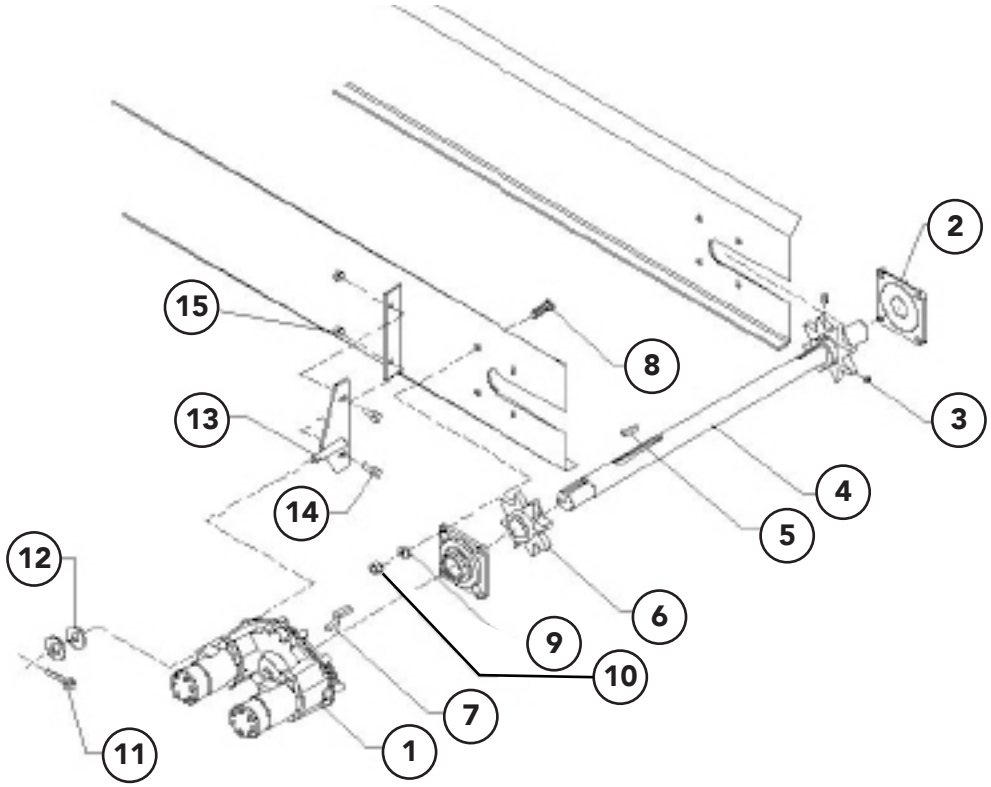
AR- As Required

Conveyor - #4 Belt-Over-Chain With High-Temperature Belting



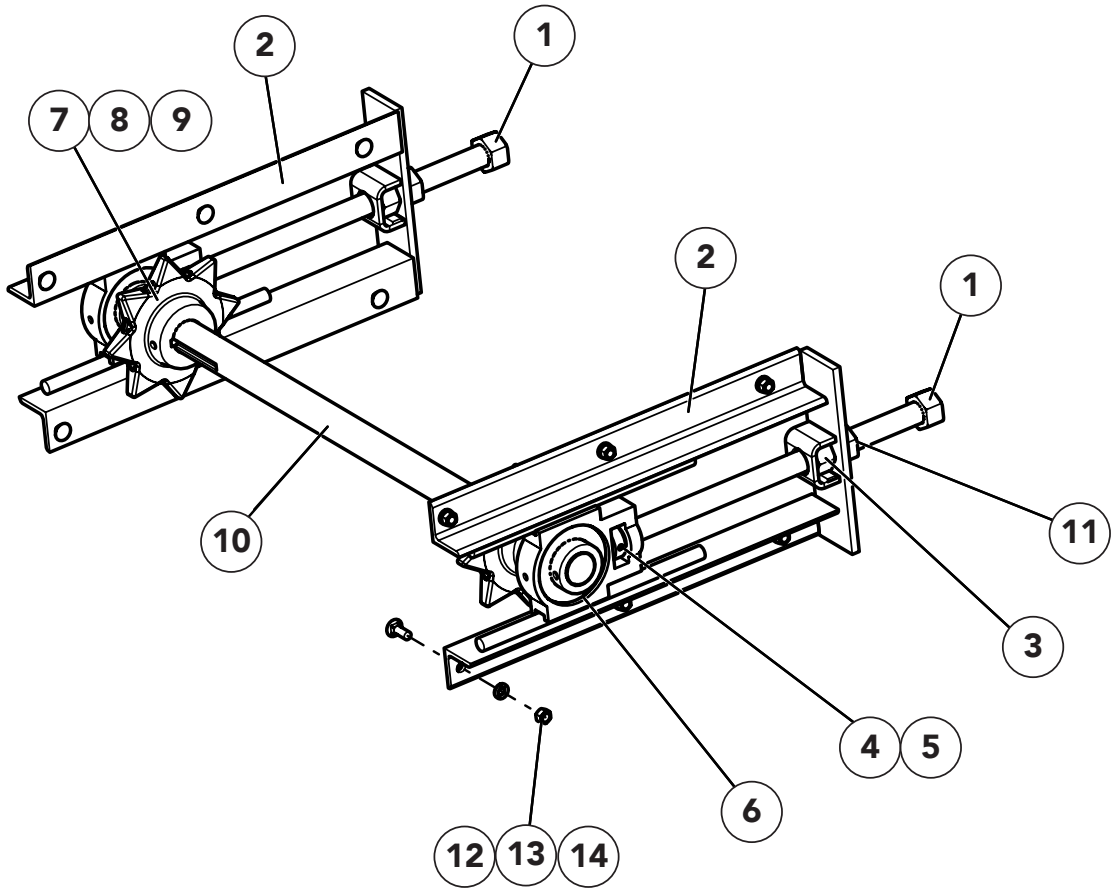
ITEM	PART NO.	DESCRIPTION	QTY
1	308672	#4 Belt-Over-Chain Assy- 10’ Unit	1
	308673	#4 Belt-Over-Chain Assy- 11’ Unit	1
	308674	#4 Belt-Over-Chain Assy- 12’ Unit	1
	308675	#4 Belt-Over-Chain Assy- 13’ Unit	1
	308676	#4 Belt-Over-Chain Assy- 14’ Unit	1
	308677	#4 Belt-Over-Chain Assy- 15’ Unit	1
	308678	#4 Belt-Over-Chain Assy- 16’ Unit	1
2	305646	Screw- #4 BOC Flat Head	AR
3	55794	Belt	AR
4	73317	Lacing- 23” wide	AR
5	36697	Pin- Clevis	AR
6	20817	Pin- Cotter	AR
AR- As Required			

Conveyor Drive



ITEM	PART NO.	DESCRIPTION	QTY
1	57303	Gear Case	1
2	6465	Bearing	2
3	20748	Screw- Set 3/8	4
4	38600	Shaft- Drive	1
5	6131	Key- Square, 3/8 x 1 1/2	2
6	27275	Sprocket	2
7	37010	Key- Square, 1/2 x 1 1/2	2
8	36399	Cap Screw- 3/8-16NC x 1-1/4 SS	8
9	36420	Washer- Lock 3/8 SS	8
10	36414	Nut- Hex 3/8-16 NC SS	8
11	20833	Pin- Cotter 1/4 x 1 1/2	1
12	2716	Washer- Flat 3/4	2
13	82550	Torque Arm- L.H. Wldmt	1
14	20128	Cap Screw- 1/2-13 x 1-1/4	2
15	20680	Nut- Lock 1/2	2
16	*82882	Guide- Bearing Wldmt	4
*- Not Shown			

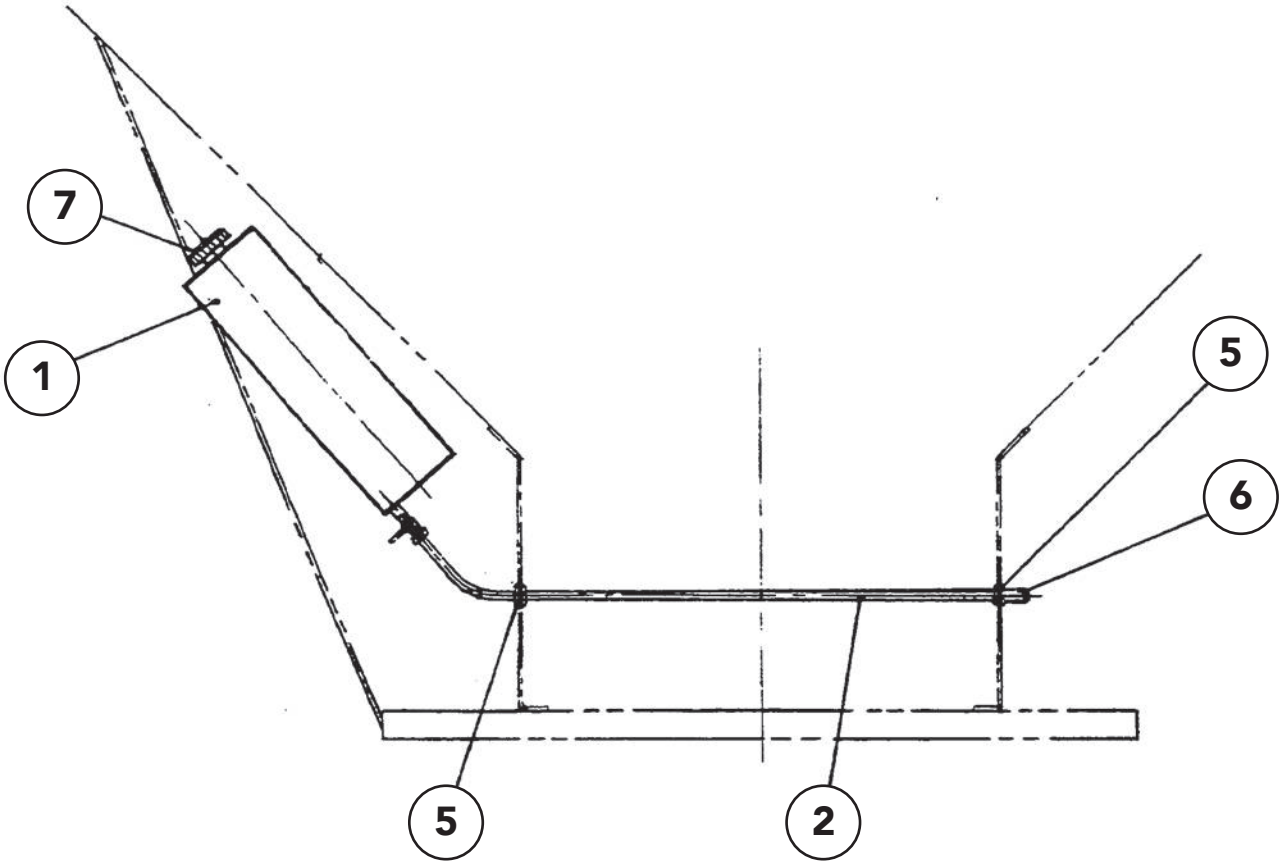
Conveyor Idler



ITEM	PART NO.	DESCRIPTION	QTY
	90709	Shaft- Idler Assy, Includes Items 7- 10	
1	36508	Screw – Adjusting SS	2
2	7895	Take-up – Wldmt	2
3	39110	Nut – Wldmt SS	2
4	30725	Collar – Set	2
5	20925	Pin – Roll 1/4 X 1-1/2	2
6	22511	Bearing – 1.5 Take-up	2
7	1899	Sprocket	2
8	20743	Screw – Set	4
9	2135	Key – Square	2
10	82799	Shaft – Idler	1
11	36509	Nut – Hex 1-8NC SS	2
12	20318	Bolt – Carriage 3/8 x 1	12
13	20712	Washer – Lock 3/8	12
14	20644	Nut – Hex 3/8	12
15	*20319	Bolt - Carriage 3/8 x 1-1/4	4

*- Not Shown

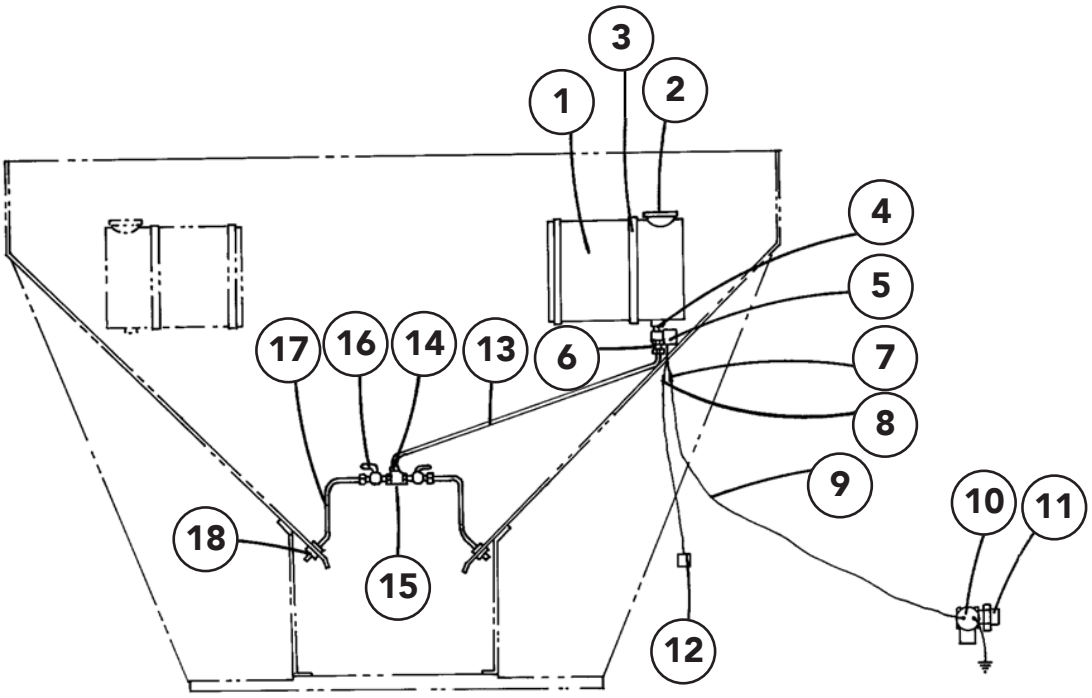
Conveyor Chain Oiler



ITEM	PART NO.	DESCRIPTION	QTY
1	1571	Oiler Tank Assy includes Item 7	1
2	1582	Tube- Oiler 24” Bottom	1
3	20004*	Cap Screw- 1/4 x 7/8	4
4	20710*	Washer- Lock 1/4	4
5	21983	Grommet- Rubber	2
6	21984	Sleeve- Plug	1
7	21980	Cap- Tank	1

*- not shown

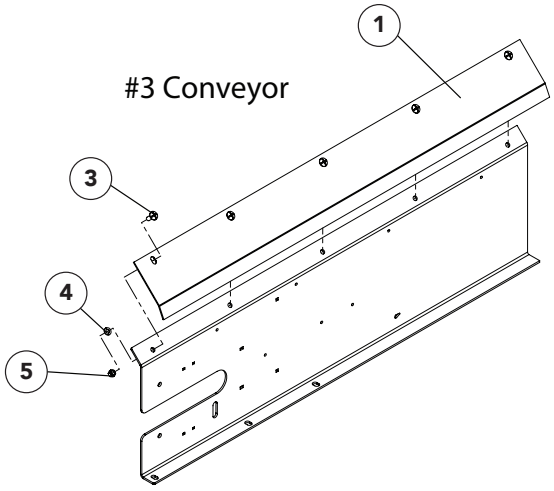
Automatic Conveyor Chain Oiler

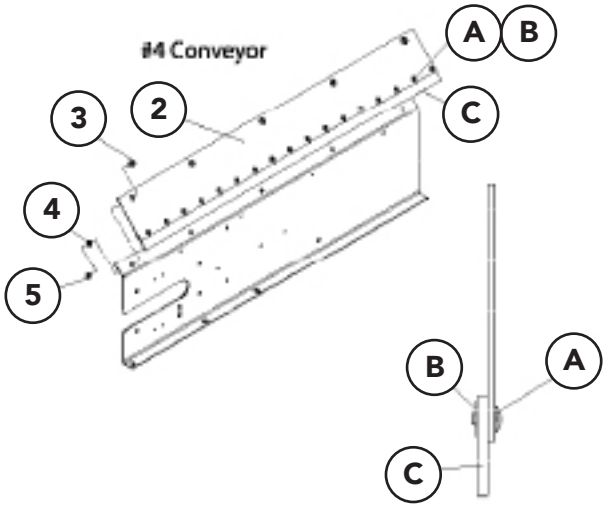


Automatic Conveyor Chain Oiler

ITEM	PART NO.	DESCRIPTION	QTY
1	3156	Tank- Oiler	1
2	21980	Cap- Tank	1
3	3838	Bracket	2
	20005	Cap Screw- 1/4 x 1	2
	20710	Washer- Lock 1/4	2
	20642	Nut- Hex 1/4	2
4	6023	Nipple- Close	1
5	21836	Valve- Shut Off	1
6	22417	Connector- Male	1
7	6549	Connector	1
8	12374	Connector- Tap	1
9	21580-288	Wire- 14 Ga	1
10	37037	Switch- Pressure	1
	6065	Bushing- Pipe	1
11	31142	Adapter- 90deg Elbow	1
12	39293	Plug- Connector	1
	31572	Connector- Ring	1
13	6081-38	Tube- Copper	1
14	22417	Connector- Male	2
15	24895	Tee Wldmt	1
	20644	Nut- Hex	1
16	21982	Valve- Shut Off	2
17	6081-15	Tube- Copper	2
18	21983	Grommet- Rubber	1

Chain Shields





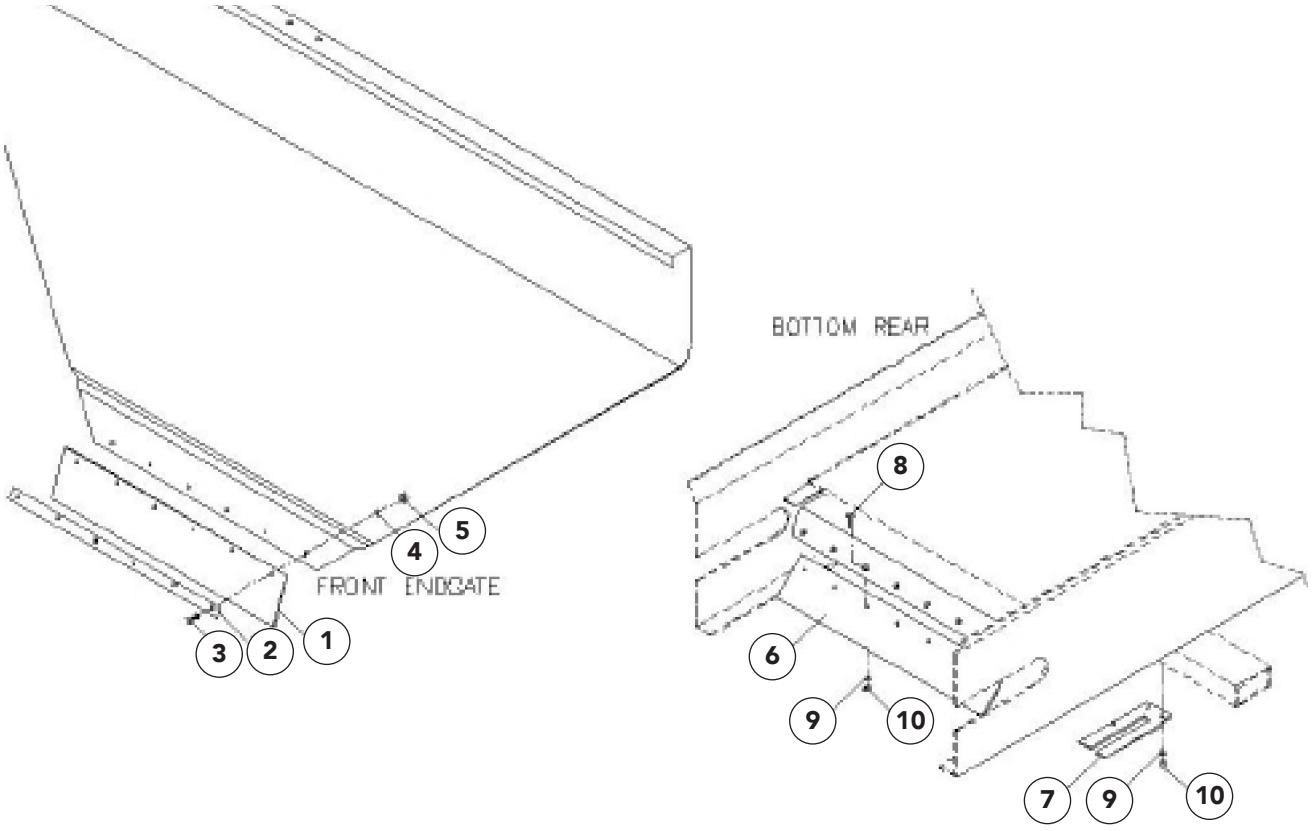
ITEM	PART NO.	DESCRIPTION	QTY
1		Chain Shield Wldmt- #3 Chain For:	
	72169	10’ Unit	2
	72170	11’ Unit	2
	72171	12’ Unit	2
	72172	13’ Unit	2
	72173	14’ Unit	2
	72174	15’ Unit	2
	72175	16’ Unit	2
2		Chain Shield Assy- #4 BOC For:	
	72189	10’ Unit	2
	72190	11’ Unit	2
	72191	12’ Unit	2
	72192	13’ Unit	2
	72193	14’ Unit	2
	72194	15’ Unit	2
	72195	16’ Unit	2
		Chain Shield Assy- Hi-Temp #4 BOC For:	
	72216	10’ Unit	2
	72217	11’ Unit	2
	72218	12’ Unit	2
	72219	13’ Unit	2
	72220	14’ Unit	2
	72221	15’ Unit	2
	72222	16’ Unit	2

Chain Shields Continued

ITEM	PART NO.	DESCRIPTION	QTY
A		Shield- Chain Wldmt For:	
	72196	10’ Unit	1
	72197	11’ Unit	1
	72198	12’ Unit	1
	72199	13’ Unit	1
	72200	14’ Unit	1
	72201	15’ Unit	1
	72202	16’ Unit	1
B	20624	Screw- Truss Head 1/4-20NC x 1/2	AR
	88931	Nut- Tee 1/4 x 1/4	AR
C	7687	Sealer- Belt #4 BOC (Specify Length)	AR
	38349	Sealer- Belt Hi-Temp #4 BOC (Specify Length)	AR
3	20318	Bolt- Carriage 3/8 x 1	AR
4	20712	Washer- Lock 3/8	AR
5	20644	Nut- Hex 3/8	AR

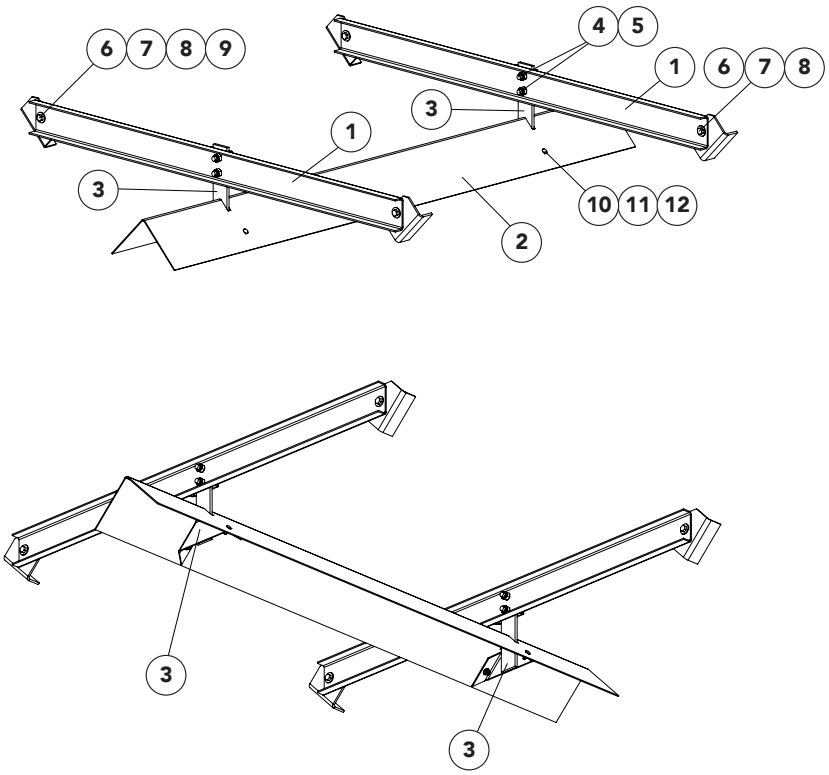
AR- As Required

Belt Wipers & Retainers



ITEM	PART NO.	DESCRIPTION	QTY
1	14743	Wiper- Belt Front	1
2	14742	Retainer- Belt Front	1
3	20583	Screw- Machine 1/4 x 3/4	6
4	20710	Washer- Lock 1/4	6
5	20642	Nut- Hex 1/4	6
6	27243	Wiper- Belt Rear	1
7	33207	Sealer- Belt	2
8	36405	Screw- Machine 1/4 x 3/4	7
9	36423	Washer- Flat 1/4	13
10	36412	Nut- Hex 1/4	13

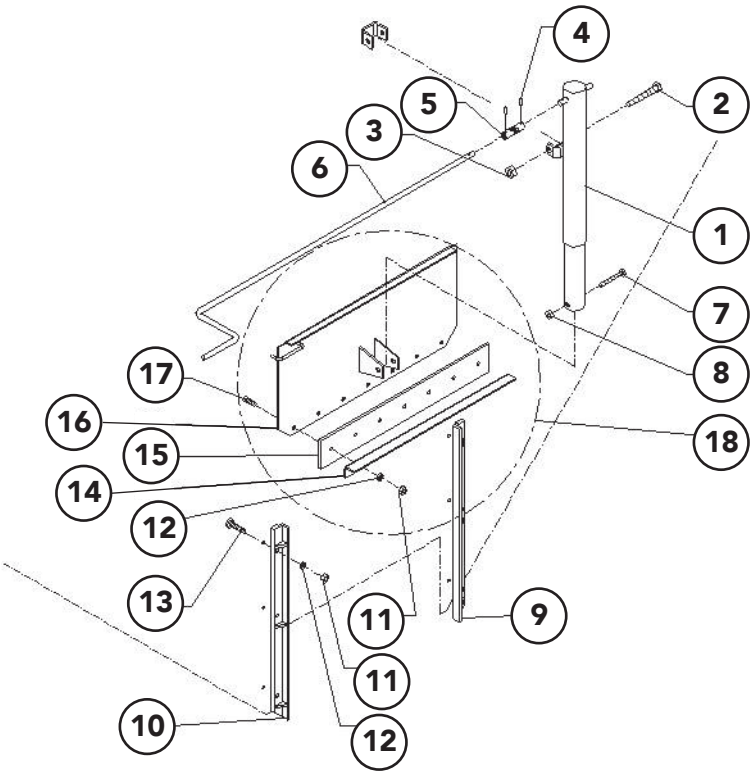
Inverted "V"



ITEM	PART NO.	DESCRIPTION	QTY
1	81261	Channel "V" hanger Wldmt	AR
2	82613	"V"- Inverted 5' (10' Units)	1
	82614	"V"- Inverted 7' (11'-12' Units)	1
	82615	"V"- Inverted 9' (13'-14' Units)	1
	82616	"V"- Inverted 11' (15'-16' Units)	1
3	82625	Bar- Adjusting Wldmt	AR
4	20176	Cap Screw- 5/8 x 1 3/4	AR
5	20682	Nut- Hex 5/8 Locking	AR
6	20128	Cap Screw- 1/2 x 1 1/4	AR
7	20695	Washer- Flat 1/2	AR
8	20714	Washer- Lock 1/2	AR
9	20646	Nut- Hex 1/2	AR
10	20692	Washer- Flat 5/16	AR
11	20677	Nut- Lock 5/16	AR
12	20291	Bolt- Carriage 5/16 x 1	AR

AR- As Required *- Not Shown

Feedgate & Jack



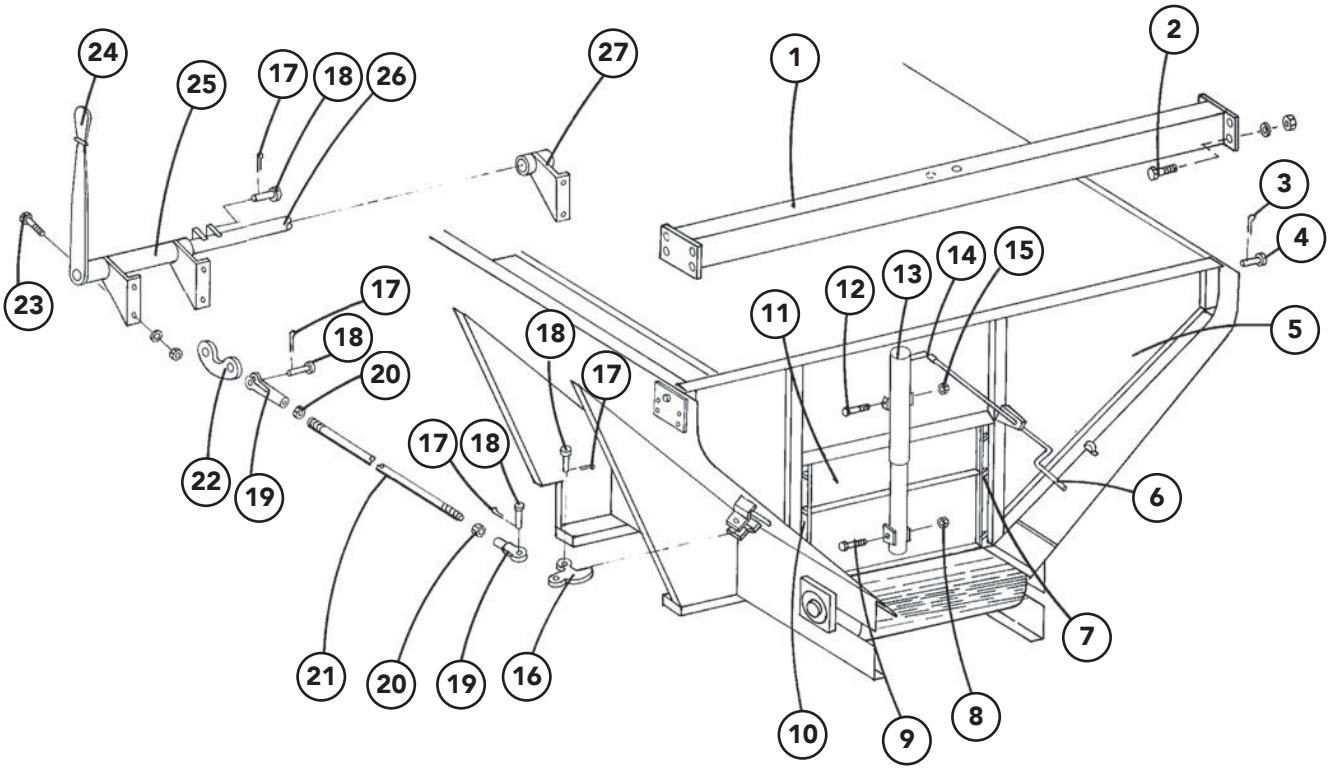
ITEM	PART NO.	DESCRIPTION	QTY
1	40704	Jack, Coated	1
2	20138	Cap Screw- 1/2 x 3 3/4	1
3	20680	Nut- Hex 1/2	1
4	20918	Pin- Roll	2
5	85002	U-Joint	1
6	14382	Handle	1
	36725	Handle (Use w/ Swinging Rear Endgate)	1
7	20074	Cap Screw- 3/8 x 2 3/4	1
8	20678	Nut- Lock 3/8	1
9	2885	Slide- Feedgate RH	2
10	2884	Slide- Feedgate LH	2
11	20642	Nut- Hex 1/4	13
12	20710	Washer- Lock 1/4	13
13	20006	Cap Screw- 1/4 x 1 1/4	6
14	27297	Belt- Retainer	1

Feedgate & Jack Continued

ITEM	PART NO.	DESCRIPTION	QTY
15	27296	Belt- Sealer	1
16	14262	Feedgate Wldmt	1
	42835	Feedgate Wldmt	1
		(Use with Swinging Rear Endgate)	
17	20621	Screw- Machine 1/4 x 1	7
18	14261	Feedgate Assy includes items 11,12,14-17	

AR- As Required *- Not Shown

Swinging Rear Endgate

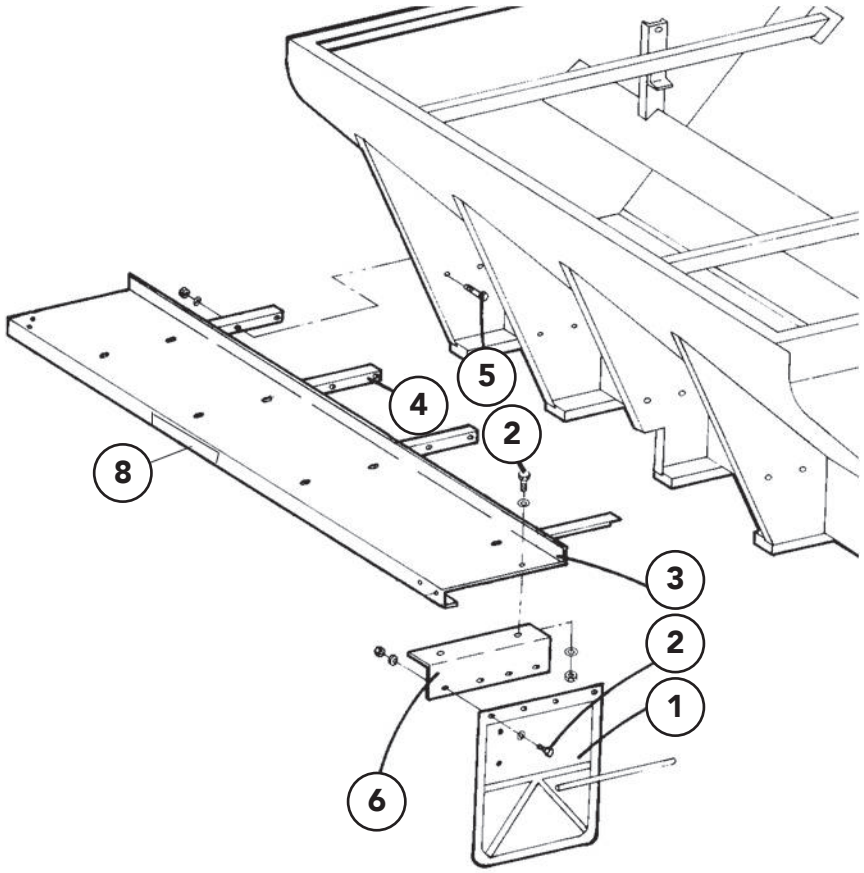


ITEM	PART NO.	DESCRIPTION	QTY
1	72247	Tube- Support	1
2	20067	Cap Screw- 3/8 x 1	8
	20712	Washer- Lock 3/8	8
	20644	Nut- Hex 3/8	8
3	20828	Pin- Cotter	2
4	36719	Pin- Clevis	2
5	72240	Endgate- Rear Swinging	1
	72241	Endgate- Rear 6” Higher Swinging	1
6	36725	Handle- Jack	1
7	2885	Slide- Feedgate RH	1
	20005	Cap Screw- 1/4 x 1	3
	20710	Washer- Lock 1/4	3
	20642	Nut- Hex 1/4	3
8	20678	Nut- Lock 3/8	1
9	20074	Cap Screw- 3/8 x 2 3/4	1
10	2884	Slide- Feedgate LH	1
	20005	Cap Screw- 1/4 x 1	3
	20710	Washer- Lock 1/4	3

Swinging Rear Endgate Continued

ITEM	PART NO.	DESCRIPTION	QTY
	20642	Nut- hex 1/4	3
11	14261	Feedgate Assy	1
	14262	Feedgate Assy	1
	27297	Retainer	1
	27296	Belt- Sealer	1
	20621	Screw- Machine 1/4	7
	20710	Washer- Lock 1/4	7
	20642	Nut- Hex 1/4	7
12	20135	Cap Screw- 1/2 x 3	1
13	40735	Jack Assy	1
14	20986	Pin- Roll	1
15	20680	Nut- Lock 1/2	2
16	36736	Hook- Endgate	2
17	20821	Pin- Cotter	8
18	21027	Pin- Clevis	8
19	9342	Yoke- Female	4
20	21084	Nut- Jam 1/2	4
21	56072	Rod- Control 10’ Unit	2
	56073	Rod- Control 11’ Unit	2
	56074	Rod- Control 12’ Unit	2
	56075	Rod- Control 13’ Unit	2
	56076	Rod- Control 14’ Unit	2
	56077	Rod- Control 15’ Unit	2
	56078	Rod- Control 16’ Unit	2
22	36819	Link- Over-center	2
23	20067	Cap Screw- 3/8 x 1	6
	20712	Washer- Lock 3/8	6
	20644	Nut- Hex 3/8	6
24	36899	Handle	1
25	56080	Pivot- Long	1
26	36727	Shaft- Lever	1
27	56079	Pivot- Short	1

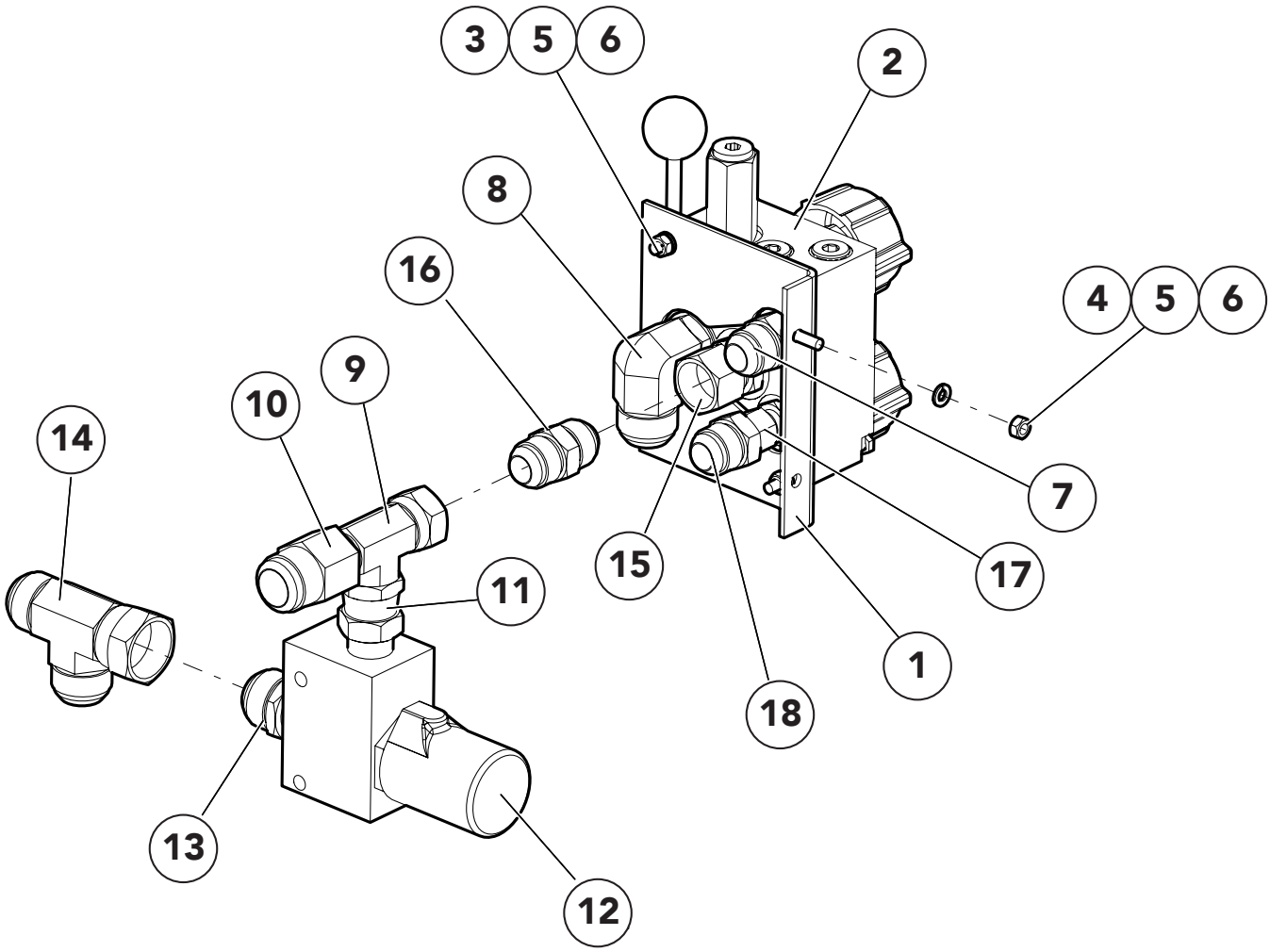
Fenders & Mudflaps



Fenders & Mudflaps Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	21770	Mudflap	2
2	20067	Cap Screw- 3/8 x 1	8
	20693	Washer- Flat 3/8	8
	20712	Washer- Lock 3/8	8
	20644	Nut- Hex 3/8	8
3	73044	Fender- RH 10’ Unit	1
	73059	Fender- LH 10’ Unit	1
	73045	Fender- RH 11’ Unit	1
	73060	Fender- LH 11’ Unit	1
	73046	Fender- RH 12’ Unit	1
	73061	Fender- LH 12’ Unit	1
	73047	Fender- RH 13’ Unit	1
	73062	Fender- LH 13’ Unit	1
	73048	Fender- RH 14’ Unit	1
	73063	Fender- LH 14’ Unit	1
	73049	Fender- RH 15’ Unit	1
	73064	Fender- LH 15’ Unit	1
	73050	Fender- RH 16’ Unit	1
	73065	Fender- LH 16’ Unit	1
4	85855	Angle- Mounting	AR
5	20318	Bolt- Carriage 3/8 x 1	AR
	20693	Washer- Flat 3/8	AR
	20712	Washer- Lock 3/8	AR
	20644	Nut- Hex 3/8	AR
6	55854	Bracket- Mudflap RH	1
	55855	Bracket- Mudflap LH	1
7	*36844	Rod- Mudflap	2
8	39200	Decal- Warning Slipping Hazard	2

Valve - Manual Dual Rear Mount

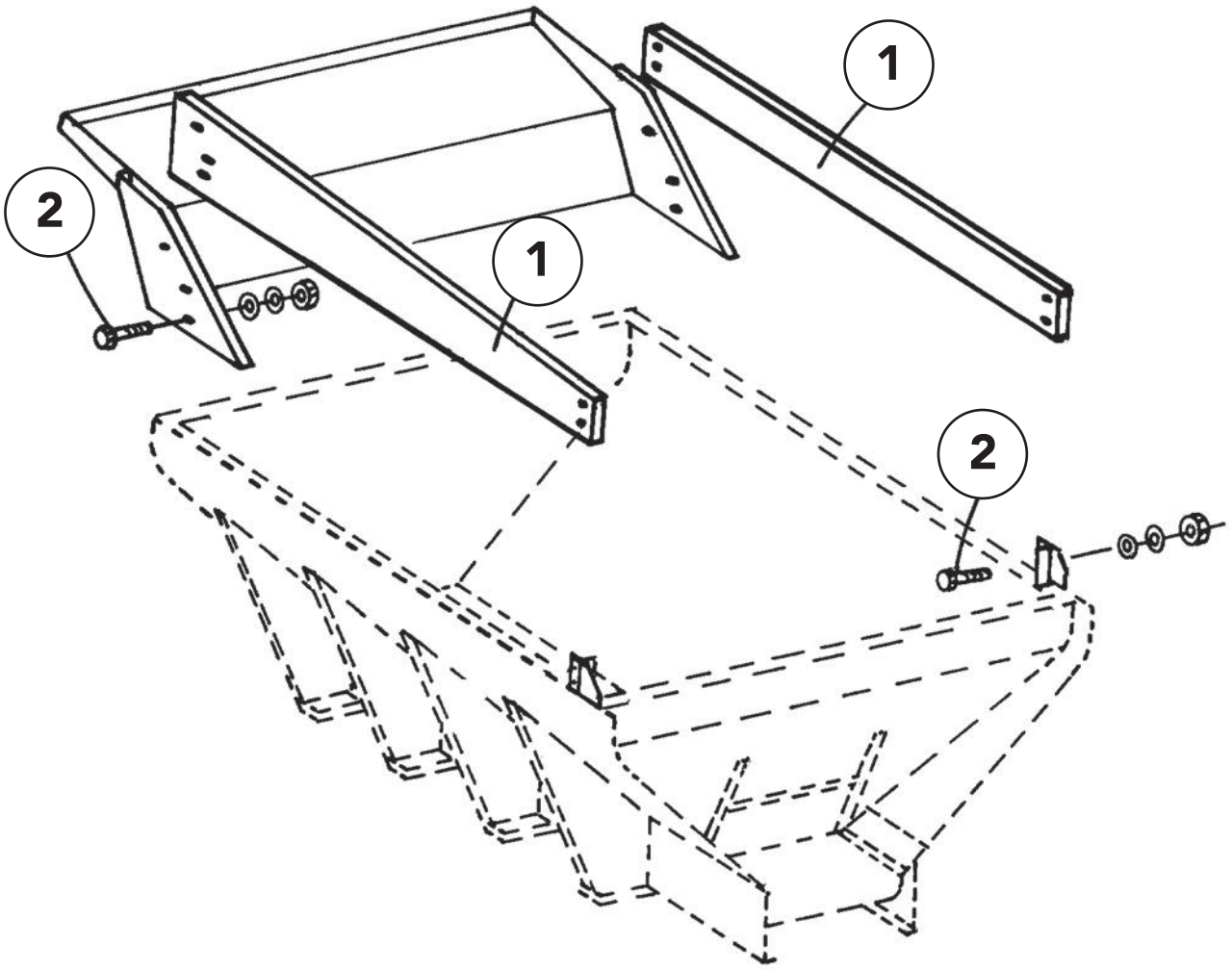


Valve - Manual Dual Rear Mount Cont.

ITEM	PART NO.	DESCRIPTION	QTY
	310655	Valve- Assy Manual Dual at Rear w/ Dump Valve	1
1	88049	Bracket- Valve	1
2	310650	Valve- Control 1500PSI 10S / 15C	1
3	20013	Cap Screw- 1/4-20NC x 3	2
4	20003	Cap Screw- 1/4-20NC x 3/4	2
5	20710	Washer- Lock 1/4	4
6	20642	Nut- Hex 1/4-20NC	4
7	29753	Fitting- 12-10 070120	1
8	29838	Fitting- 16-12 070220	1
9	29781	Fitting- 12-12-12 070432	1
10	34712	Adapter- Bushing	1
11	34826	Fitting- 12-12 S1040-36 Non-Standard	1
12	302654	Valve- Solenoid 2-Way	1
13	29757	Fitting- 16-12 070102	1
14	29850	Fitting- 16-16-16 070432	1
15	29788	Fitting- 12-12 S1040-30 Non-Standard	1
16	29817	Fitting- 12-12 070101	1
17	34866	Fitting- 8-8 S1040-30 Non-Standard	1
18	306377	Fitting- 12-8 070101	1
19	*31572	Terminal- Ring	1
20	*21583	Wire- Brown 14 AWG x 36”	3
21	*6488	Connector- Wire Male	3
22	*12373	Plug- Receptacle	1

*- Not Shown

Valve Side Boards

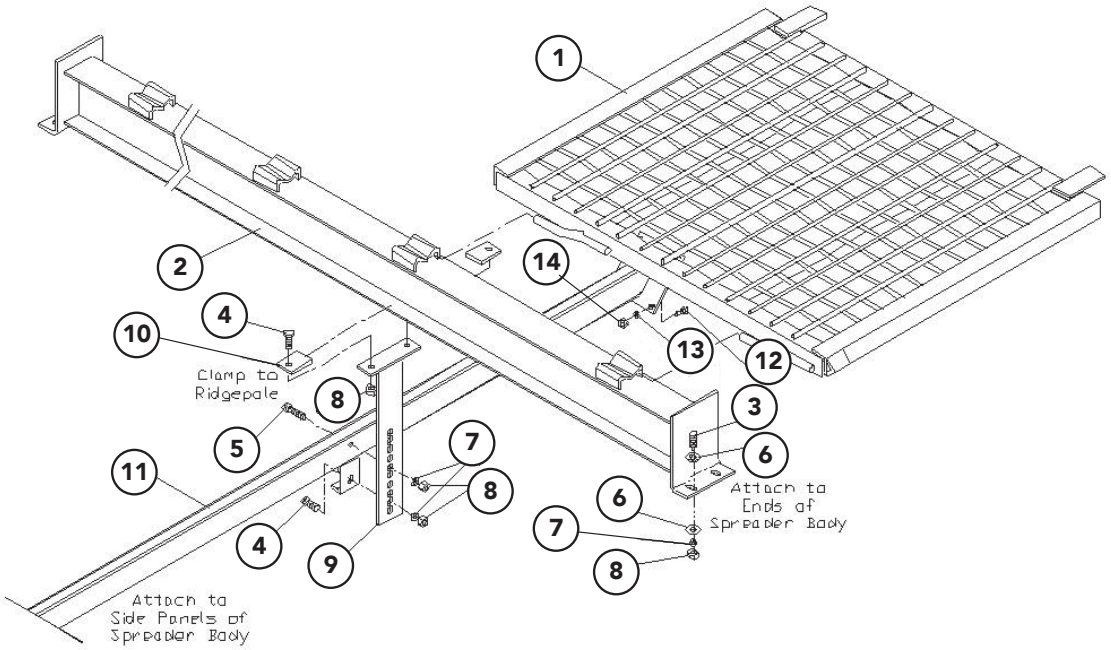


Valve Side Boards Continued

ITEM	PART NO.	DESCRIPTION	QTY
1		Side Board Kit- Tapered 6” x 12”	
	72500	Side Board- RH 10’ Unit	1
	72513	Side Board- LH 10’ Unit	1
	72501	Side Board- RH 11’ Unit	1
	72514	Side Board- LH 101 Unit	1
	72502	Side Board- RH 12’ Unit	1
	72515	Side Board- LH 13’ Unit	1
	72503	Side Board- RH 13’ Unit	1
	72516	Side Board- LH 13’ Unit	1
	72504	Side Board- RH 14’ Unit	1
	72517	Side Board- LH 14’ Unit	1
	72505	Side Board- RH 15’ Unit	1
	72518	Side Board- LH 15’ Unit	1
	72506	Side Board- RH 16’ Unit	1
	72519	Side Board- LH 16’ Unit	1
		Side Board Kit- 6” Steel	
	72482	Side Board- 6” 10’ Unit	2
	72483	Side Board- 6” 11’ Unit	2
	72484	Side Board- 6” 12’ Unit	2
	72485	Side Board- 6” 13’ Unit	2
	72486	Side Board- 6” 14’ Unit	2
	72487	Side Board- 6” 15’ Unit	2
	72488	Side Baord- 6” 16’ Unit	2
2	20128	Cap Screw- 1/2 x 1 1/4	AR
	20695	Washer- Flat 1/2	AR
	20714	Washer- Lock 1/2	AR
	20646	Nut- Hex 1/2	AR

AR- As Required

Screens - Standard Height & 6” Higher Sides



ITEM	PART NO.	DESCRIPTION	QTY
1	72382	Screen Wldmt- 4’ (Standard)	AR
	72320	Screen Wldmt- 4’ (Swinging)	AR
	72321	Screen Wldmt- 5’ (Standard)	AR
	72383	Screen Wldmt- 6’ (Standard)	AR
	72322	Screen Wldmt- 6’ (Swinging)	AR
2		Ridgepole Wldmt- Standard Rear Endgate	
	44189	10’ Unit	1
	44190	11’ Unit	1
	44191	12’ Unit	1
	44192	13’ Unit	1
	44193	14’ Unit	1
	44194	15’ Unit	1
	44195	16’ Unit	1
		Ridgepole Wldmt- Swinging Rear Endgate	
	72391	10’ Unit	1
	72392	11’ Unit	1
	72393	12’ Unit	1
	72394	13’ Unit	1
	72395	14’ Unit	1
	72396	15’ Unit	1
	72397	16’ Unit	1
3	20128	Cap Screw- 1/2 x 1 1/4	4
4	20129	Cap Screw- 1/2 x 1 1/2	2

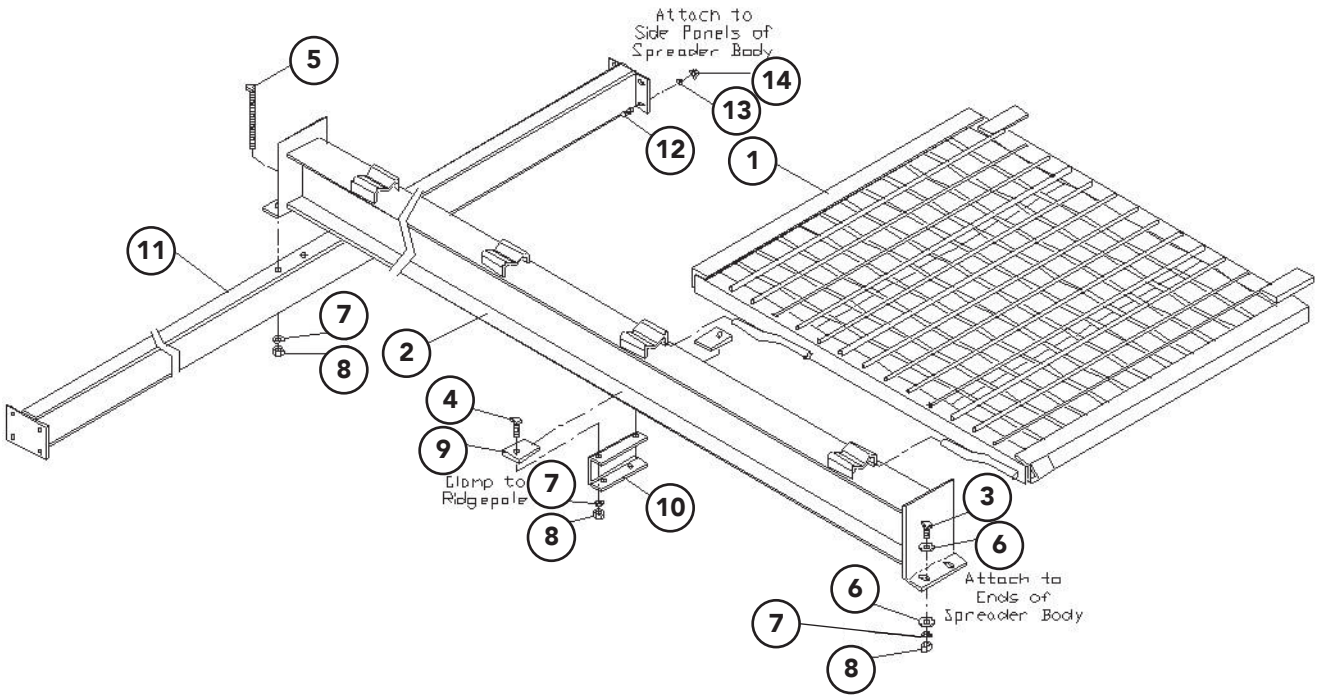
Screens - Standard Height & 6” Higher Sides Continued

ITEM	PART NO.	DESCRIPTION	QTY
5	20132	Cap Screw- 1/2 x 2 1/2	2
6	20695	Washer- Flat 1/2	8
7	20714	Washer- Lock 1/2	4
8	20646	Nut- Hex 1/2	8
9	44235	Support- Ridgepole Wldmt (12’-16’ Units)	1
10	44238	Bracket- Support (12’-16’ Units)	2
11	37240	Hanger- Support Wldmt	1
12	20068	Cap Screw- 3/8 x 1	8
13	20712	Washer- Lock 3/8	8
14	20644	Nut- Hex 3/8	8

AR- As Required

E3020 Length	STANDARD REAR ENDGATE	SWINGING REAR ENDGATE
10’ Unit	2 – 4’ & 2 – 5’	4 – 5’
11’ Unit	4 – 5’	2 – 5’ & 2 – 6’
12’ Unit	2 – 5’ & 2 – 6’	4 – 6’
13’ Unit	6 – 4’	4 – 4’ & 2 – 5’
14’ Unit	4 – 4’ & 2 – 5’	2 – 4’ & 4 – 5’
15’ Unit	4 – 4’ & 2 – 6’	6 – 5’
16’ Unit	2 – 4’, 2 – 5’ & 2 – 6’	4 – 5’ & 2 – 6’

Screens - 6” Lower Sides



ITEM	PART NO.	DESCRIPTION	QTY
1	72382	Screen Wldmt- 4’ (Standard)	AR
	72320	Screen Wldmt- 4’ (Swinging)	AR
	72321	Screen Wldmt- 5’ (Standard)	AR
	72383	Screen Wldmt- 6’ (Standard)	AR
	72322	Screen Wldmt- 6’ (Swinging)	AR
2		Ridgepole Wldmt- Standard Rear Endgate	
	44189	10’ Unit	1
	44190	11’ Unit	1
	44191	12’ Unit	1
	44192	13’ Unit	1
	44193	14’ Unit	1
	44194	15’ Unit	1
	44195	16’ Unit	1
		Ridgepole Wldmt- Swinging Rear Endgate	
	72304	10’ Unit	1
	72305	11’ Unit	1
	72306	12’ Unit	1
	72307	13’ Unit	1
	72308	14’ Unit	1
	72309	15’ Unit	1

Screens - 6” Lower Sides Continued

ITEM	PART NO.	DESCRIPTION	QTY
	72310	16’ Unit	1
3	20128	Cap Screw- 1/2 x 1 1/4	4
4	20129	Cap Screw- 1/2 x 1 1/2	2
5	20145	Cap Screw- 1/2 x 5 1/2	2
6	20695	Washer- Flat 1/2	12
7	20714	Washer- Lock 1/2	4
8	20646	Nut- Hex 1/2	8
9	44238	Bracket- Support (12’-16’ Units)	1
10	72331	Spacer- Support Standard (12’-16’ Units)	1
	72332*	Spacer- Support 6” Higher Sides (12’-16’ Units)	1
11	72247	Support Tube Wldmt (12’-16’ Units)	1
12	20068	Cap Screw- 3/8 x 1	8
13	20712	Washer- Lock 3/8	8
14	20644	Nut- Hex 3/8	8

*- not shown AR- As Required

E3020 Length	STANDARD REAR ENDGATE	SWINGING REAR ENDGATE
10’ Unit	2 – 4’ & 2 – 5’	4 – 5’
11’ Unit	4 – 5’	2 – 5’ & 2 – 6’
12’ Unit	2 – 5’ & 2 – 6’	4 – 6’
13’ Unit	6 – 4’	4 – 4’ & 2 – 5’
14’ Unit	4 – 4’ & 2 – 5’	2 – 4’ & 4 – 5’
15’ Unit	4 – 4’ & 2 – 6’	6 – 5’
16’ Unit	2 – 4’, 2 – 5’ & 2 – 6’	4 – 5’ & 2 – 6’

Spinner Hopper - Standard Or Quick Disconnect

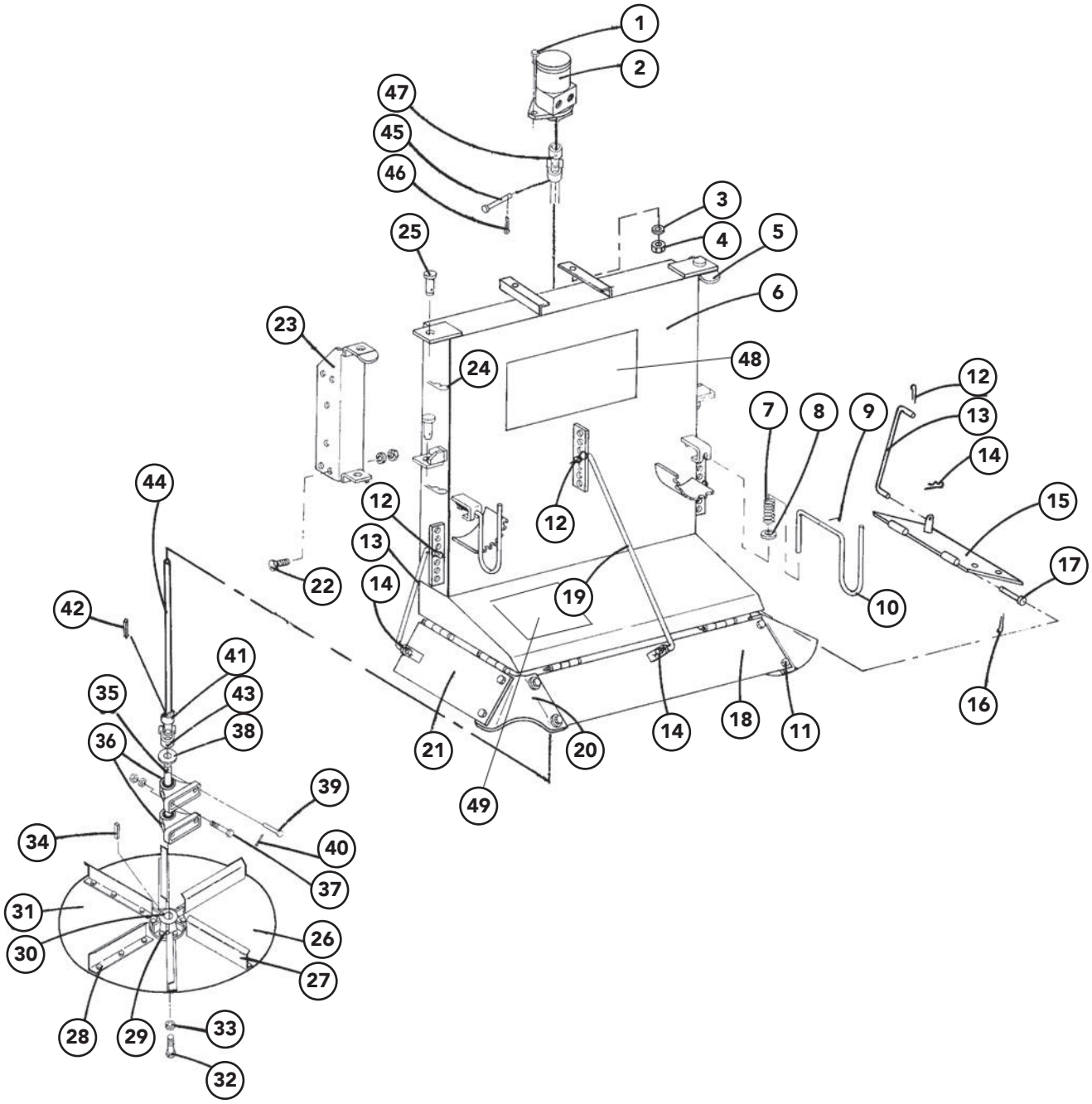
Spinner Hopper - Standard Or Quick Disconnect Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	20068	Cap Screw – 3/8 x 1 1/4	2
2	37345	Motor- Hydraulic	1
3	22464	U-Joint	1
4	72289	Shaft – Drive	1
5	20693	Washer – Flat, 3/8	2
6	20644	Nut – Hex, 3/8	2
7	39665	Pin – Chute, Baffle	2
8	20986	Pin – Roll	2
9	72281	Baffle – Chute Wldmt	1
10	72269	Hopper – Spinner Wldmt	1
11	72291	Support – Front Baffle Wldmt	1
12	39672	Rod – Control	1
13	40576	Pin – Hair	2
14	72285	Baffle – Optional Fourth	1
15	17770	Pin – Clevis	1
16	20810	Pin – Cotter	1
17	20035	Cap Screw – 5/16 x 7/8	4
18	20810	Pin – Cotter	6
19	17770	Pin – Clevis	6
20	20821	Pin – Cotter	1
21	17640	Rod- Control	2
22	20692	Washer – Flat, 5/16	4
23	20643	Nut – Hex, 5/16	4
24	40576	Pin – Hair	3
25	20821	Pin – Cotter	3
26	72287	Baffle – Side	2
27	72283	Shaft – Spinner	1
28	36751	Spinner Assy	1
29	36752	Fin	6
30	20677	Nut – Lock, 5/16	18
	20035	Cap Screw – 5/16 x 7/8	18
31	20004	Cap Screw – 1/4 x 7/8	6
	20676	Nut – Hex, 1/4	6
32	14353	Hub	1
33	36753	Disc – Spinner	1

Spinner Hopper - Standard Or Quick Disconnect Continued

ITEM	PART NO.	DESCRIPTION	QTY
34	20128	Cap Screw – 1/2 x 1 1/4	1
35	20714	Washer – Lock, 1/2	1
36	21445	Key	1
37	20176	Cap Screw – 5/8 x 1 3/4	4
	20716	Washer – Lock, 5/8	4
	20648	Nut – Hex, 5/8	4
38	6122	Pin – Clevis	2
	20817	Pin – Cotter	2
39	72284	Bearing – Pillow Block	2
40	72294	Seal – Bearing Cover	2
41	45989	U-Joint	1
42	72285	Baffle – End	1
43	36796	Rod- Control	1
44	20678	Nut – Lock, 3/8	4
45	20693	Washer – Flat, 3/8	4
46	3126	Spring	4
47	1517	Plate – Adjusting	2
48	6124	Pin – Clevis	1
49	20817	Pin – Cotter	1
50	20748	Screw – Set	1
51	2212	Key	1
		The following items are available with the quick-disconnect spinner hopper:	
52	72068	Support – Upper, R.H.	1
	72069	Support – Upper, L.H.	1
53	20068	Cap Screw – 3/8 x 1 1/4	4
	20693	Washer – Flat, 3/8	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8	4
54	40576	Pin – Hair	2
55	72070	Binder – Load	2
56	368	Decal- Flying Material	1
57	55630	Decal- Warning Falling Hazard	1
	72579	Includes Items 11-17,20,22,23	
		Kit – Service, 3-Section Baffle,	
		Includes Items 18,19,21,24-26,42,43	

Optional Swing-Away Spinner Hopper



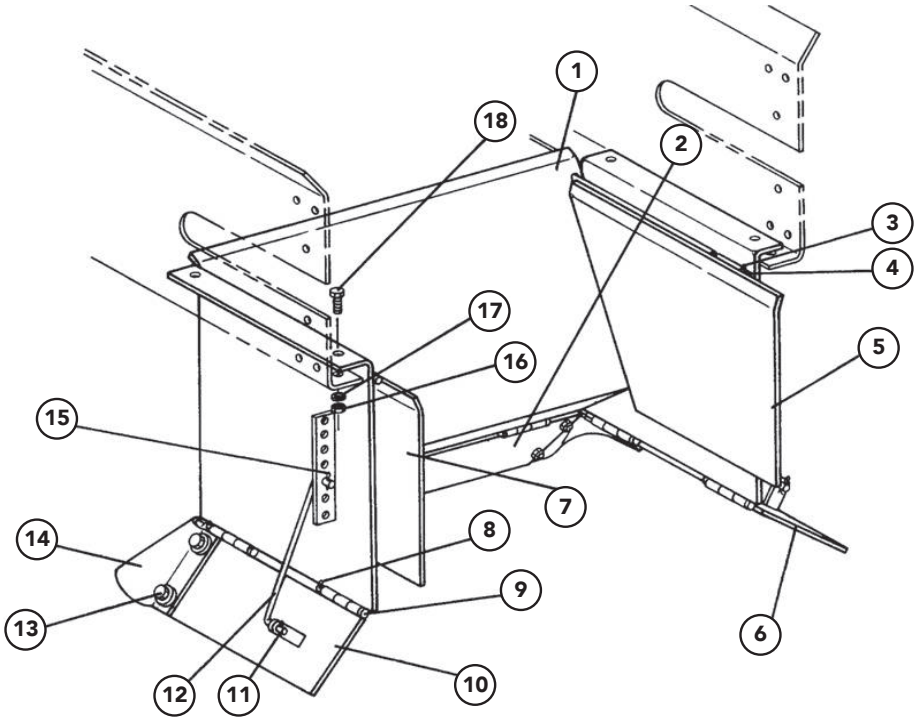
Optional Swing-Away Spinner Hopper Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	20068	Cap – Screw, 3/8 x 1 1/4	2
2	37345	Motor – Hydraulic	1
3	20693	Washer – Flat, 3/8	2
4	20644	Nut – Hex, 3/8	2
5	72259	Hinge – R.H.	1
	36867	Pin – Clevis	2
	40576	Pin – Hair	2
6	72253	Frame – Spinner Wldmt	1
7	3126	Spring	2
8	20694	Washer – Flat, 7/16	2
9	20907	Pin – Roll	2
10	36722	Handle – Baffle Control	2
11	20004	Cap Screw – 1/4 x 7/8	8
	21423	Washer – Flat, 1/4	8
	20676	Nut – Lock, 1/4	8
12	40576	Pin – Hair	3
13	17640	Rod – Control	2
14	20821	Pin – Cotter	3
15	36791	Baffle – R.H.	1
16	20810	Pin – Cotter	6
17	17770	Pin – Shear	6
18	72257	Baffle – End	1
19	36796	Rod – Control	1
20	36794	Deflector – Belt	2
21	36793	Baffle – L.H.	1
22	20068	Cap Screw – 3/8 x 1 1/4	12
	20712	Washer – Lock, 3/8	12
	20644	Nut – Hex, 3/8	12
23	72260	Hinge – L.H.	1
24	40576	Pin – Hair	2
25	36867	Pin – Clevis	2
26	36751	Spinner Assy	1
27	36752	Fin	6
28	20035	Cap Screw – 5/16 x 7/8	18
	20677	Nut – Lock, 5/16	18

Optional Swing-Away Spinner Hopper Continued

ITEM	PART NO.	DESCRIPTION	QTY
29	20004	Cap Screw – 1/4 x 7/8	6
	20676	Nut – Lock, 1/4	6
30	14353	Hub	1
31	36918	Disc – Spinner	1
32	20128	Cap Screw – 1/2 x 1 1/4	1
33	20714	Washer – Lock, 1/2	1
34	21445	Key	1
35	72283	Shaft – Spinner	1
36	72284	Bearing – Pillow Block	2
37	20176	Cap Screw – 5/8 x 1 3/4	4
	20716	Washer – Lock, 5/8	4
	20648	Nut – Hex, 5/8	4
38	72294	Seal – Bearing Cover	2
39	6124	Pin – Clevis	1
40	20817	Pin – Cotter	1
41	45989	U-Joint	1
42	2212	Key	1
43	20748	Screw – Set	1
44	72339	Shaft – Drive	1
45	6122	Pin – Shear	2
46	20817	Pin – Cotter	2
47	22464	U-Joint	1
48	368	Decal- Flying Material	1
49	55630	Decal- Warning Falling Hazard	1
	72580	Kit – Service, Hopper Half of 6-Section Baffle, Includes Items 11-21	

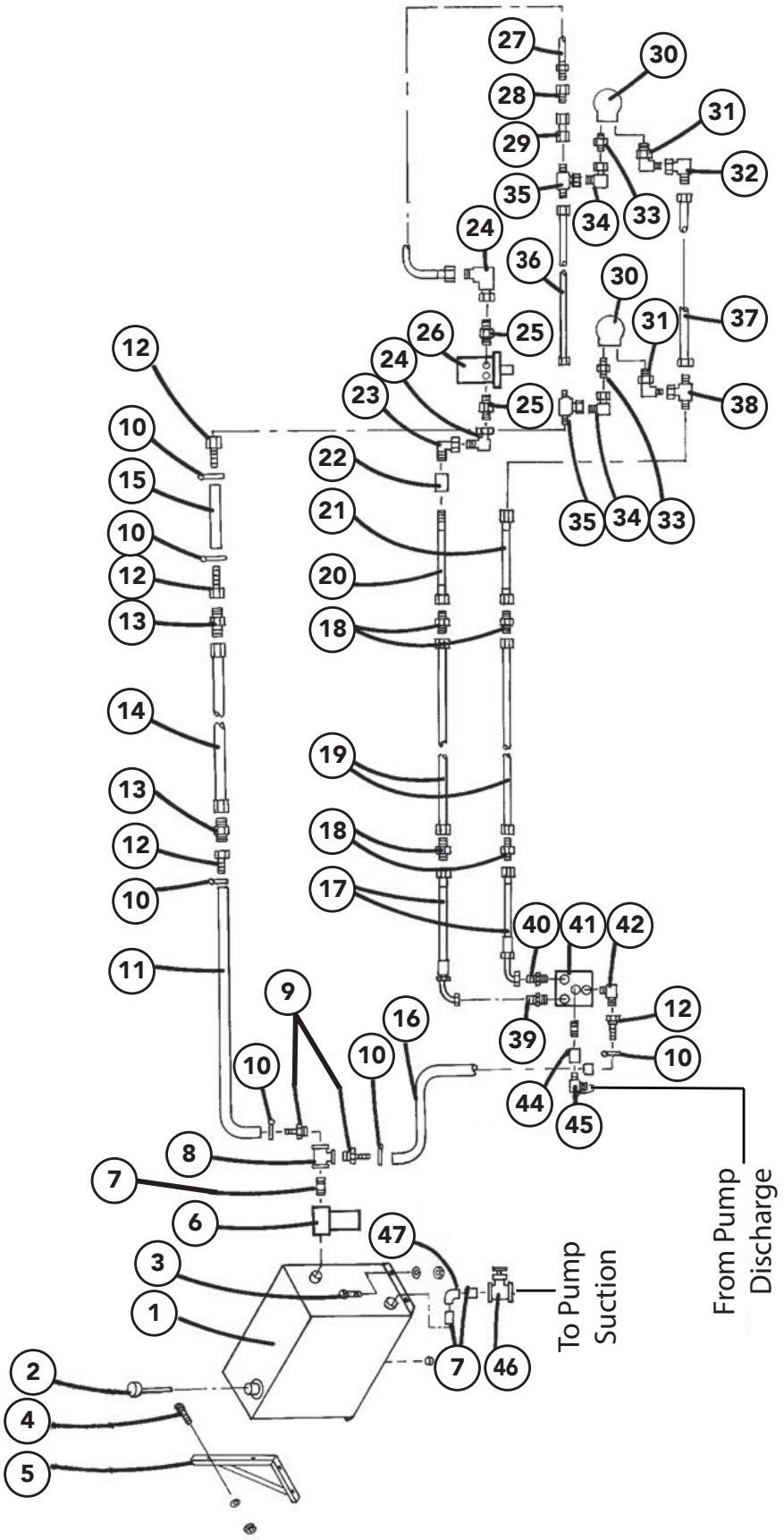
Chute



Chute Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	72264	Chute Wldmt	1
2	72257	Baffle – End	1
3	20817	Pin – Cotter	4
4	36783	Rod – Hinge	2
5	36784	Baffle – Inside, R.H.	1
6	36791	Baffle – Front Side, R.H.	1
7	36787	Baffle – Inside, L.H.	1
8	20810	Pin – Cotter	6
9	17770	Pin – Shear	6
10	36793	Baffle – Rear Side, L.H.	1
11	40576	Pin – Hair	3
12	17640	Rod – Control	3
13	20004	Cap Screw – 1/4 x 7/8	8
	21423	Washer – Flat, 1/4	8
	20676	Nut – Lock, 1/4	8
14	36794	Belting – Deflector	2
15	20821	Pin – Cotter	3
16	36414	Nut – Hex, 3/8 SS	4
17	20712	Washer – Lock, 3/8	4
18	36399	Cap Screw – 3/8 x 1 1/4 SS	4

Parallel Hydraulic System
Transmission Pto - Tubing Option



Parallel Hydraulic System
Transmission Pto - Tubing Option Continued

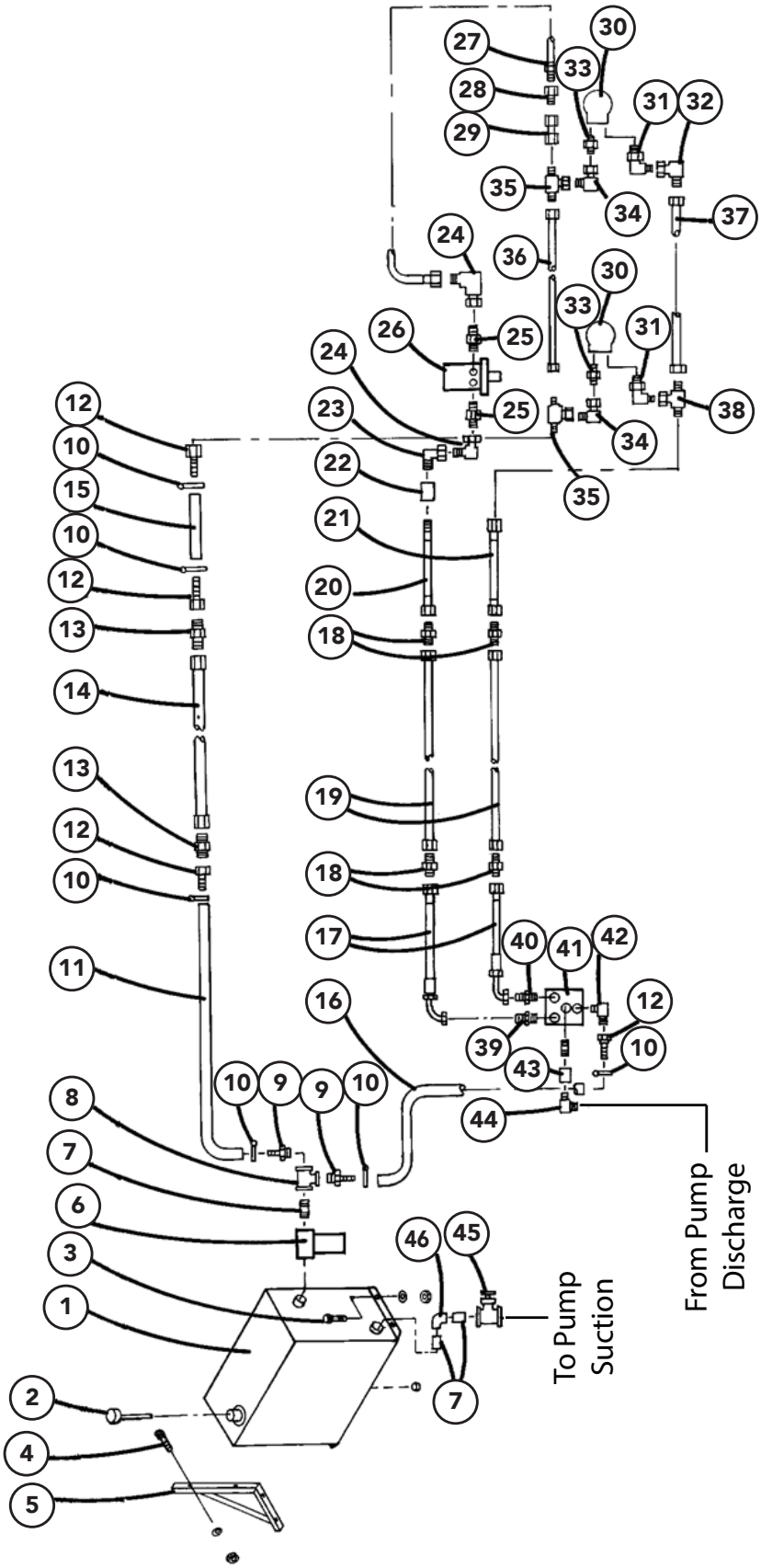
ITEM	PART NO.	DESCRIPTION	QTY
1	14820	Reservoir – Hydraulic	1
	6033	Plug – Drain	1
2	21850	Cap – Filler	1
3	20068	Cap Screw – 3/8-16 x 1 1/4	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8-16	4
4	20069	Cap Screw, 3/8-16 x 1 1/2	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8	4
5	33652	Mount – R.H.	1
	33653	Mount – L.H.	1
6	39845	Filter – Oil	1
7	6028	Nipple – Close	3
8	6318	Tee – Pipe	1
9	22426	Nipple – Hose, Male	2
10	6335	Clamp – Hose	2
11	16521-48	Hose – 1”	1
12	36802	Nipple – Hose, Female	2
13	34719	Adapter – Union	2
14	72356	Tubing – 10’ Unit	1
	72357	Tubing – 11’ Unit	1
	72358	Tubing – 12’ Unit	1
	72359	Tubing – 13’ Unit	1
	72360	Tubing – 14’ Unit	1
	72361	Tubing – 15’ Unit	1
	72362	Tubing – 16’ Unit	1
15	16521-36	Hose – Return	1
16	16521-60	Hose – Return	1
17	58952	Hose – Pressure	1
18	29817	Adapter	4
19	72349	Tubing – 10’ Unit	1
	72350	Tubing – 11’ Unit	1
	72351	Tubing – 12’ Unit	1
	72352	Tubing – 13’ Unit	1
	72353	Tubing – 14’ Unit	1
	72354	Tubing – 15’ Unit	1
	72355	Tubing – 16’ Unit	1
20	58951	Hose – Pressure	1
21	29717	Hose – Pressure	1

Parallel Hydraulic System
Transmission Pto - Tubing Option Continued

ITEM	PART NO.	DESCRIPTION	QTY
22	16276	Coupling – Pipe	1
23	29827	Adapter – Elbow, 90°	1
24	34709	Adapter – Elbow, 90°	2
25	29753	Adapter – Connector	2
26	37345	Motor – Hydraulic, Spinner	1
27	56138	Hose – Return	1
28	22208	Bushing – Pipe	1
29	34716	Adapter – Coupling	1
30	55970	Motor – Hydraulic, Conveyor	2
31	29773	Adapter – Elbow, 90°	2
32	34709	Adapter – Elbow, 90°	2
33	29778	Adapter	2
34	29807	Adapter – Elbow, 90°	2
35	29836	Tee	2
36	80888	Tube Assy	1
37	80886	Tube Assy	1
38	29809	Adapter – Tee	1
39	29752	Adapter	1
40	29784	Adapter	1
41	34145	Valve	1
42	29779	Adapter – Elbow, 90°	1
43	*16362	Nipple – Close	1
44	16276	Coupling – Pipe, Female	1
45	29779	Adapter – Elbow, 90°	1
46	22155	Valve – Gate	1
47	6011	Elbow – Pipe, 90°	1
OPTIONAL QUICK-DISCONNECT REMOVABLE SPINNER			
	* 39905	Quick Disconnect – 3/4 Male	2
	39906	Quick Disconnect – 3/4 Female	2
	* 34748	Adapter – Elbow, 90°	1

*- not shown

Parallel Hydraulic System - Crankshaft Pto - Tubing Option



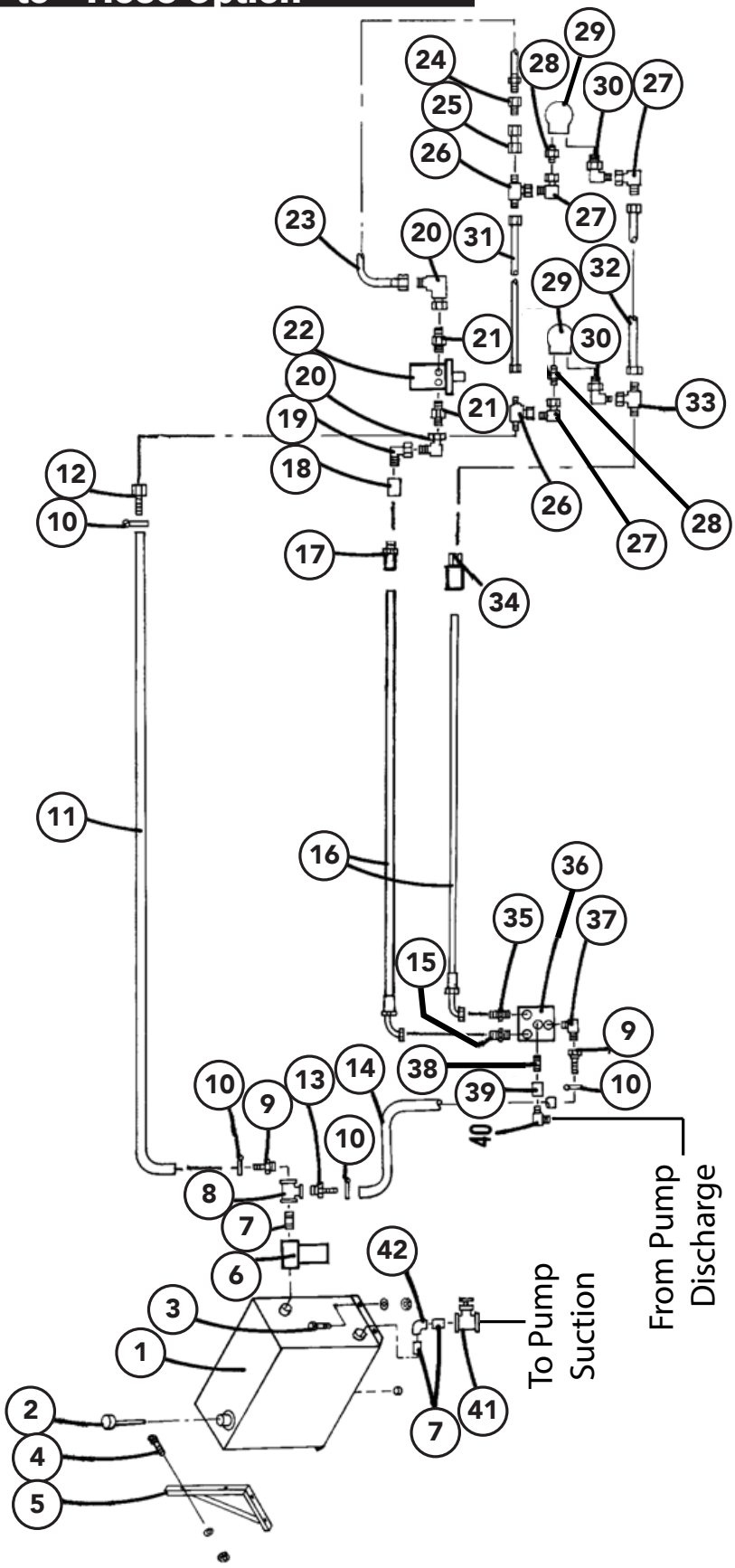
Parallel Hydraulic System - Crankshaft Pto - Tubing Option Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	14820	Reservoir – Hydraulic	1
	6033	Plug – Drain	1
2	21850	Cap – Filler	1
3	20068	Cap Screw – 3/8-16 x 1 1/4	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8-16	4
4	20069	Cap Screw, 3/8-16 x 1 1/2	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8	4
5	33652	Mount – R.H.	1
	33653	Mount – L.H.	1
6	39845	Filter – Oil	1
7	6028	Nipple – Close	3
8	6318	Tee – Pipe	1
9	22426	Nipple – Hose, Male	2
10	6335	Clamp – Hose	6
11	16521-48	Hose – 1”	1
12	36802	Nipple – Hose, Female	2
13	34719	Adapter – Union	2
14	72356	Tubing – 10’ Unit	1
	72357	Tubing – 11’ Unit	1
	72358	Tubing – 12’ Unit	1
	72359	Tubing – 13’ Unit	1
	72360	Tubing – 14’ Unit	1
	72361	Tubing – 15’ Unit	1
	72362	Tubing – 16’ Unit	1
15	16521-36	Hose – Return	1
16	16521-60	Hose – Return	1
17	58952	Hose – Pressure	1
18	29817	Adapter	4
19	72349	Tubing – 10’ Unit	1
	72350	Tubing – 11’ Unit	1
	72351	Tubing – 12’ Unit	1
	72352	Tubing – 13’ Unit	1
	72353	Tubing – 14’ Unit	1
	72354	Tubing – 15’ Unit	1
	72355	Tubing – 16’ Unit	1
20	58951	Hose – Pressure	1
21	29717	Hose – Pressure	1

Parallel Hydraulic System - Crankshaft Pto - Tubing Option Continued

ITEM	PART NO.	DESCRIPTION	QTY
22	16276	Coupling – Pipe	1
23	29827	Adapter – Elbow, 90°	1
24	34709	Adapter – Elbow, 90°	2
25	29753	Adapter – Connector	2
26	37345	Motor – Hydraulic, Spinner	1
27	56138	Hose – Return	1
28	22208	Bushing – Pipe	1
29	34716	Adapter – Coupling	1
30	55970	Motor – Hydraulic, Conveyor	1
31	29773	Adapter – Elbow, 90°	2
32	34709	Adapter – Elbow, 90°	2
33	29778	Adapter	2
34	29807	Adapter – Elbow, 90°	2
35	29836	Tee	2
36	80888	Tube Assy	1
37	80886	Tube Assy	1
38	29809	Adapter – Tee	1
39	29752	Adapter	1
40	29784	Adapter	1
41	34145	Valve	1
42	29779	Adapter – Elbow, 90°	1
43	16276	Coupling – Pipe, Female	1
44	29779	Adapter – Elbow, 90°	1
45	22155	Valve – Gate	1
46	6011	Elbow – Pipe, 90°	1
OPTIONAL QUICK-DISCONNECT REMOVABLE SPINNER			
	* 39905	Quick Disconnect – 3/4 Male	2
	39906	Quick Disconnect – 3/4 Female	2
	* 34748	Adapter – Elbow, 90°	1
*- not shown			

Parallel Hydraulic System
Transmission Pto - Hose Option



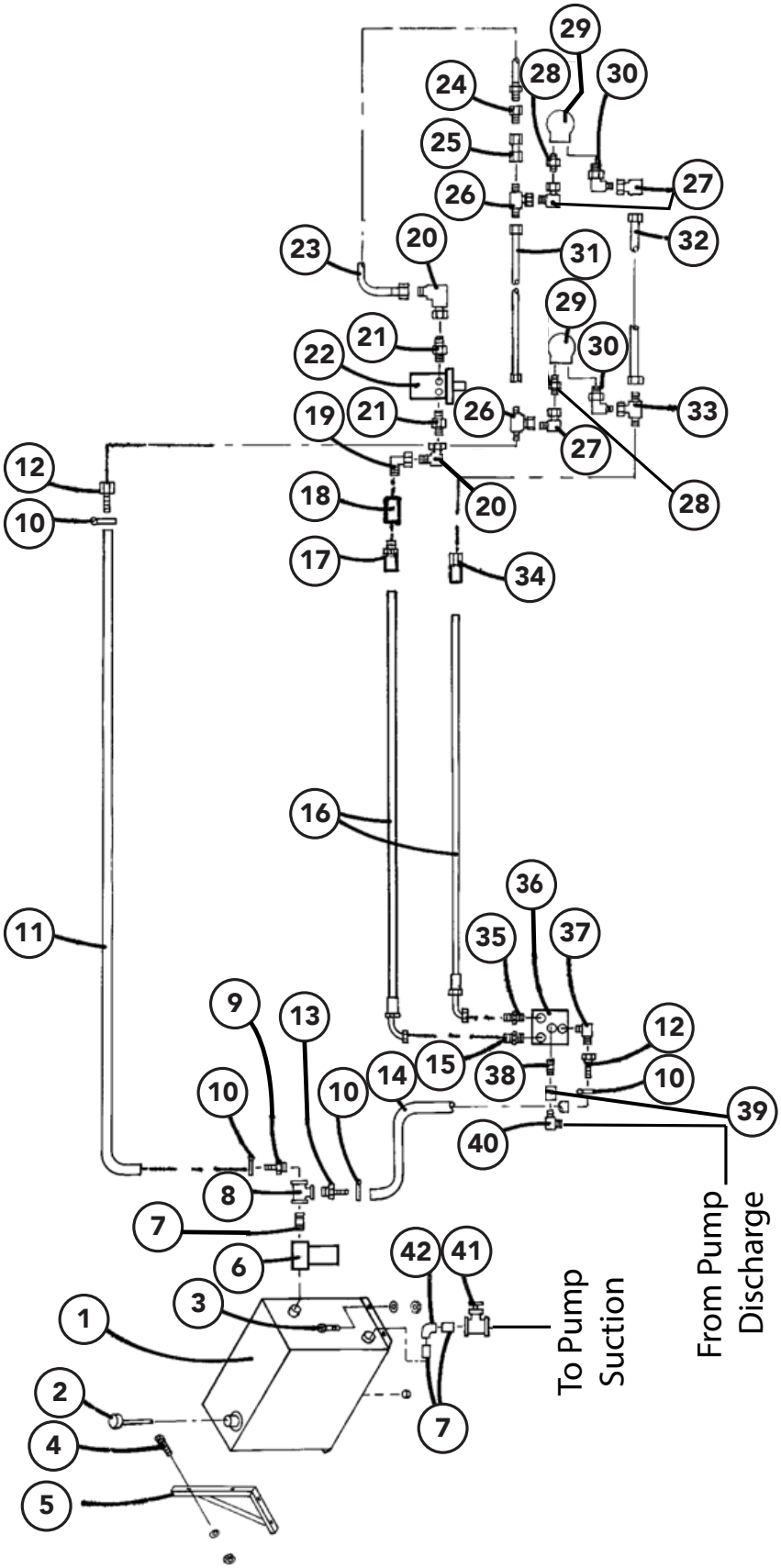
Parallel Hydraulic System
Transmission Pto - Hose Option Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	14820	Reservoir – Hydraulic	1
	6033	Plug – Drain	1
2	21850	Cap – Filler	1
3	20068	Cap Screw – 3/8-16 x 1 1/4	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8-16	4
4	20069	Cap Screw, 3/8-16 x 1 1/2	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8	4
5	33652	Mount – R.H.	1
	33653	Mount – L.H.	1
6	39845	Filter – Oil	1
7	6028	Nipple – Close	3
8	6318	Tee – Pipe	1
9	22426	Nipple – Hose, Male	1
10	6335	Clamp – Hose	4
11	16521-204	Hose – 1”	1
12	36802	Nipple – Hose, Female	1
13	22426	Nipple – Hose, Male	1
14	16521-60	Hose – Return	1
15	29752	Adapter	1
16	29722	Hose – Pressure	2
17	56503	Nipple – Hose, Male	1
18	16276	Coupling – Pipe	1
19	29827	Adapter – Elbow, 90°	1
20	34709	Adapter – Elbow, 90°	2
21	29753	Adapter – Connector	2
22	37345	Motor – Hydraulic, Spinner	1
23	56138	Hose – Return	1
24	22208	Bushing – Pipe	1
25	34716	Adapter – Coupling	1
26	29836	Tee	2
27	29807	Adapter – Elbow, 90°	2
28	29778	Adapter	2
29	55970	Motor – Hydraulic, Conveyor	1
30	29773	Adapter – Elbow, 90°	2
31	80888	Tube Assy	1
32	80886	Tube Assy	1

Parallel Hydraulic System
Transmission Pto - Hose Option Continued

ITEM	PART NO.	DESCRIPTION	QTY
33	29809	Adapter – Tee	1
34	56508	Nipple – Hose, Female	1
35	29784	Adapter	1
36	34145	Valve	1
37	29779	Adapter – Elbow, 90°	1
38	16362	Nipple – Close	1
39	16276	Coupling – Pipe, Female	1
40	29779	Adapter – Elbow, 90°	1
41	22155	Valve – Gate	1
42	6011	Elbow – Pipe, 90°	1
OPTIONAL QUICK-DISCONNECT FOR REMOVABLE SPINNER			
	* 39905	Quick Disconnect – 3/4 Male	2
	39906	Quick Disconnect – 3/4 Female	2
	* 34748	Adapter – Elbow, 90°	1
*- not shown			

Parallel Hydraulic System
Crankshaft Pto - Hose Option



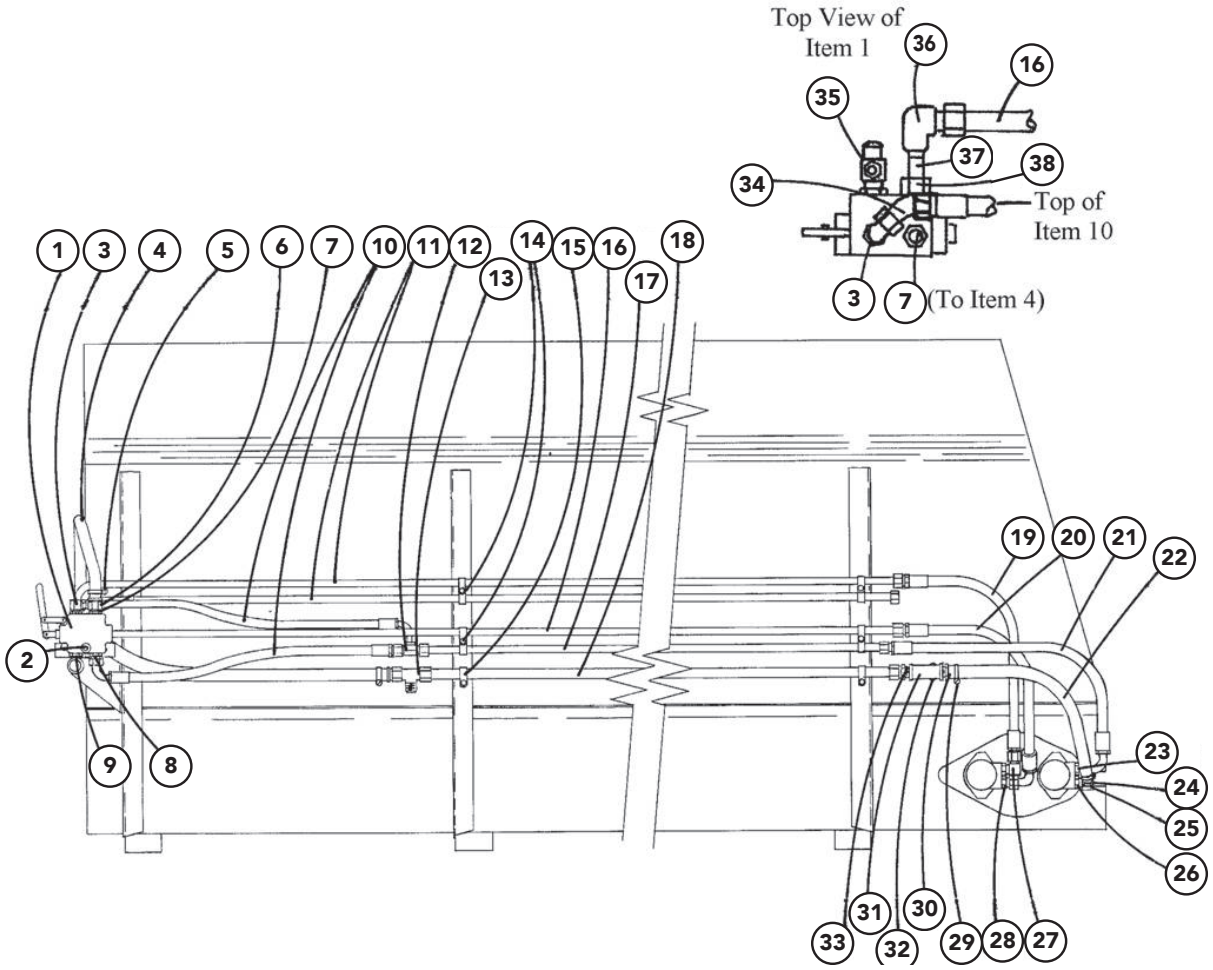
Parallel Hydraulic System
Crankshaft Pto - Hose Option Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	14820	Reservoir – Hydraulic	1
	6033	Plug – Drain	1
2	21850	Cap – Filler	1
3	20068	Cap Screw – 3/8-16 x 1 1/4	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8-16	4
4	20069	Cap Screw, 3/8-16 x 1 1/2	4
	20712	Washer – Lock, 3/8	4
	20644	Nut – Hex, 3/8	4
5	33652	Mount – R.H.	1
	33653	Mount – L.H.	1
6	39845	Filter – Oil	1
7	6028	Nipple – Close	3
8	6318	Tee – Pipe	1
9	22426	Nipple – Hose, Male	1
10	6335	Clamp – Hose	4
11	16521-204	Hose – 1”	1
12	36802	Nipple – Hose, Female	1
13	22426	Nipple – Hose, Male	1
14	16521-60	Hose – Return	1
15	29752	Adapter	1
16	29722	Hose – Pressure	2
17	56503	Nipple – Hose, Male	1
18	16276	Coupling – Pipe	1
19	29827	Adapter – Elbow, 90°	1
20	34709	Adapter – Elbow, 90°	2
21	29753	Adapter – Connector	2
22	37345	Motor – Hydraulic, Spinner	1
23	56138	Hose – Return	1
24	22208	Bushing – Pipe	1
25	34716	Adapter – Coupling	1
26	29836	Tee	2
27	29807	Adapter – Elbow, 90°	2
28	29778	Adapter	2
29	55970	Motor – Hydraulic, Conveyor	1
30	29773	Adapter – Elbow, 90°	2
31	80888	Tube Assy	1
32	80886	Tube Assy	1

Parallel Hydraulic System
Crankshaft Pto - Hose Option Continued

ITEM	PART NO.	DESCRIPTION	QTY
33	29809	Adapter – Tee	1
34	56508	Nipple – Hose, Female	1
35	29784	Adapter	1
36	34145	Valve	1
37	29779	Adapter – Elbow, 90°	1
38	16362	Nipple – Close	1
39	16276	Coupling – Pipe, Female	1
40	29632	Adapter – Elbow, 90°	1
41	22155	Valve – Gate	1
42	6011	Elbow- Pipe, 90°	
OPTIONAL QUICK-DISCONNECT FOR REMOVABLE SPINNER			
	* 39905	Quick Disconnect – 3/4 Male	2
	39906	Quick Disconnect – 3/4 Female	2
	* 34748	Adapter – Elbow, 90°	1
*- Not shown			

Series/Parallel Hydraulic System



ITEM	PART NO.	DESCRIPTION	QTY
1	36831	Valve – Selector	1
2	20074	Cap Screw – 3/8-16 x 2 3/4	1
	20693	Washer – Flat, 3/8	1
	20712	Washer – Lock, 3/8	1
	20644	Nut – Hex, 3/8-16	1
3	29847	Adapter – Elbow, 90°	1
4	16521-69	Hose – Return	1
5	6335	Clamp – Hose	2
6	36802	Fitting – Hose End	2
7	29775	Adapter	1
8	29789	Adapter	1
9	29790	Adapter – Plug	1
10	29749	Hose	2
11	72431	Tube – 10’ Unit	2

Series/Parallel Hydraulic System Continued

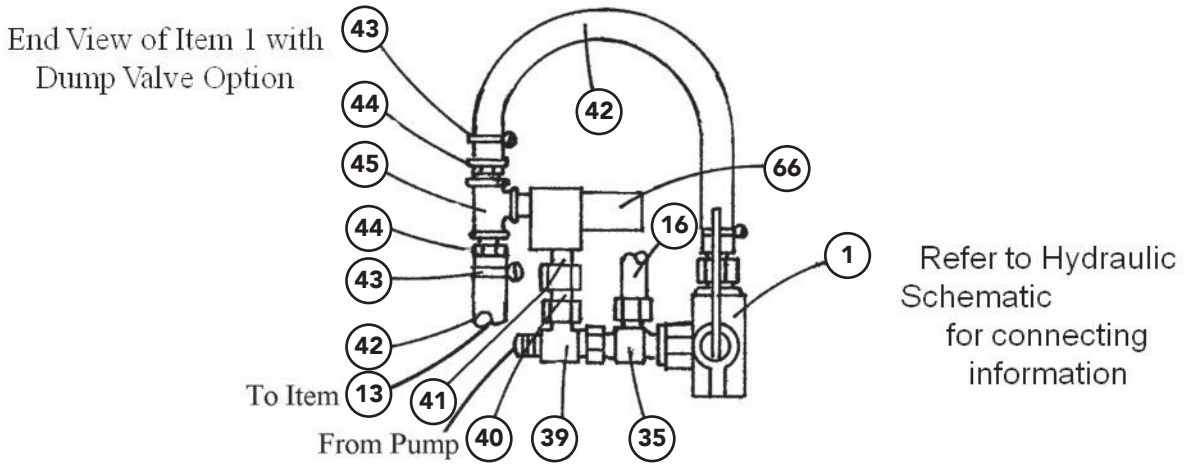
ITEM	PART NO.	DESCRIPTION	QTY
	72432	Tube – 11’ Unit	2
	72433	Tube – 12’ Unit	2
	72434	Tube – 13’ Unit	2
	72435	Tube – 14’ Unit	2
	72436	Tube – 15’ Unit	2
	72437	Tube – 16’ Unit	2
12	29792	Adapter – Tee	1
13	34711	Adapter – Tee	1
14	21993	Clamp – Conduit	AR
	20908	Screw – Self Tapping	AR
15	21994	Clamp – Conduit	AR
	20908	Screw – Self Tapping	AR
16	72438	Tube – 10’ Unit	1
	72439	Tube – 11’ Unit	1
	72440	Tube – 12’ Unit	1
	72441	Tube – 13’ Unit	1
	72442	Tube – 14’ Unit	1
	72443	Tube – 15’ Unit	1
	72444	Tube – 16’ Unit	1
17	72424	Tube – 10’ Unit	1
	72425	Tube – 11’ Unit	1
	72426	Tube – 12’ Unit	1
	72427	Tube – 13’ Unit	1
	72428	Tube – 14’ Unit	1
	72429	Tube – 15’ Unit	1
	72430	Tube – 16’ Unit	1
18	72417	Tube – 10’ Unit	1
	72418	Tube – 11’ Unit	1
	72419	Tube – 12’ Unit	1
	72420	Tube – 13’ Unit	1
	72421	Tube – 14’ Unit	1
	72422	Tube – 15’ Unit	1
	72423	Tube – 16’ Unit	1
19	58955	Hose Assy	1
20	58954	Hose Assy	1
21	58953	Hose Assy	1
22	16529-22	Hose – Return	1

AR- As Required

Series/Parallel Hydraulic System Continued

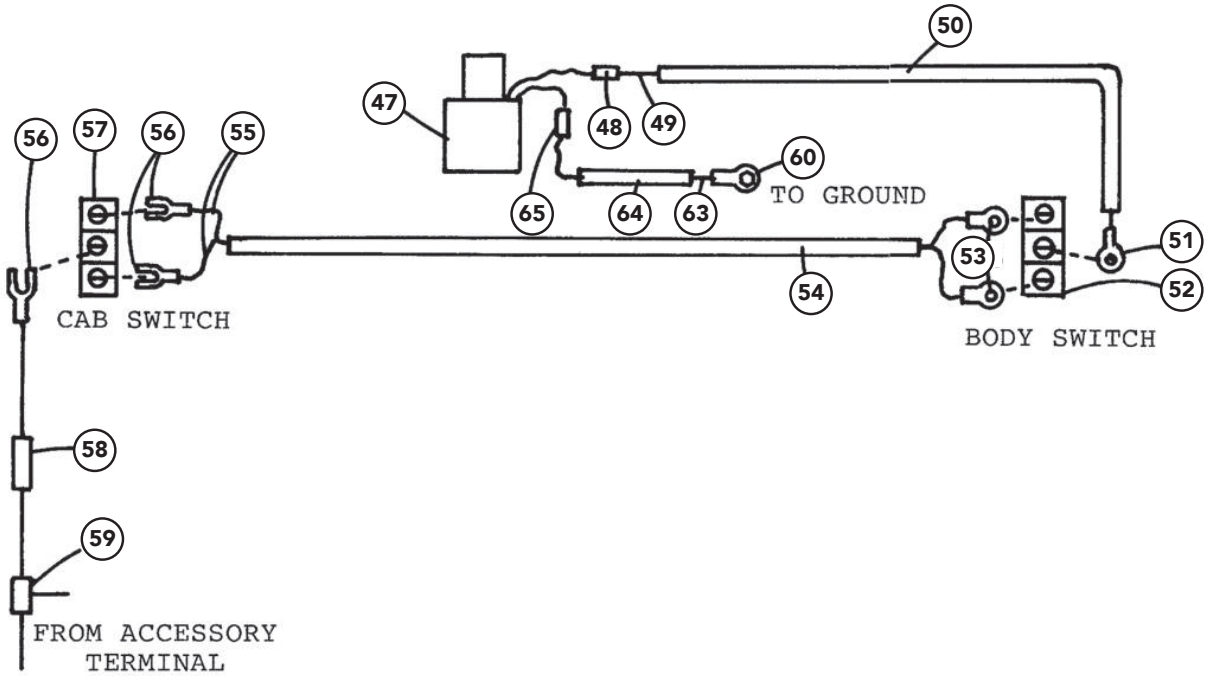
ITEM	PART NO.	DESCRIPTION	QTY
23	29753	Adapter	1
24	22381	Clamp – Hose	1
25	11424	Fitting – Hose End	1
26	29773	Adapter – Elbow, 90°	1
27	29773	Adapter – Elbow, 90°	1
28	29753	Adapter	1
29	22381	Clamp – Hose	1
30	22425	Fitting – Hose End	1
31	22221	"Y" Branch Pipe	1
32	22208	Bushing – Pipe	1
33	29751	Adapter	1
34	29782	Adapter – Elbow, 45°	1
35	29791	Adapter – Tee	1
36	29758	Adapter – Elbow, 90°	1
37	34773	Nipple – Pipe	1
38	22021	Adapter – Bushing	1

DUMP VALVE OPTION



ITEM	PART NO.	DESCRIPTION	QTY
39	24781	Adapter – Tee	1
40	29787	Adapter	1
41	16362	Nipple – Close	1
42	16521-69	Hose (makes 2 hoses)	1
43	6335	Clamp – Hose	2
44	22426	Fitting – Hose	2
45	6067	Pipe – Tee, Reducing	1

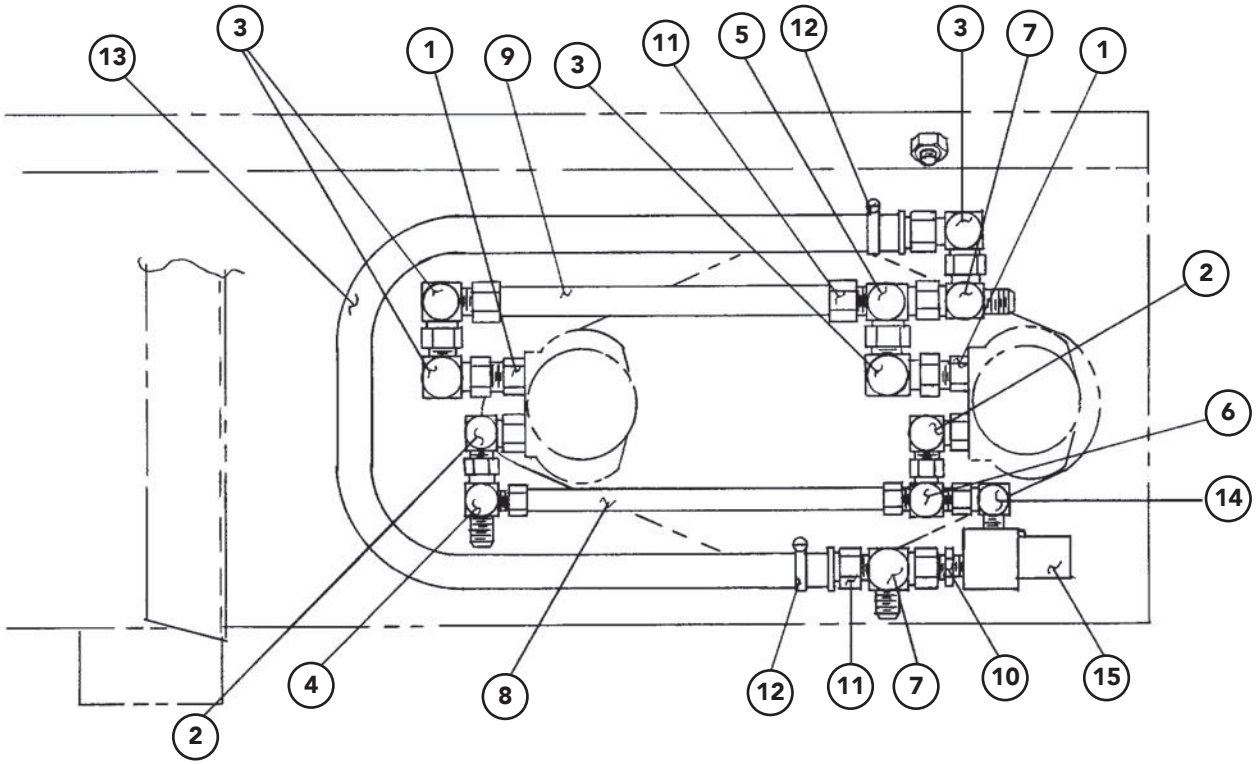
Series/Parallel Hydraulic System Continued

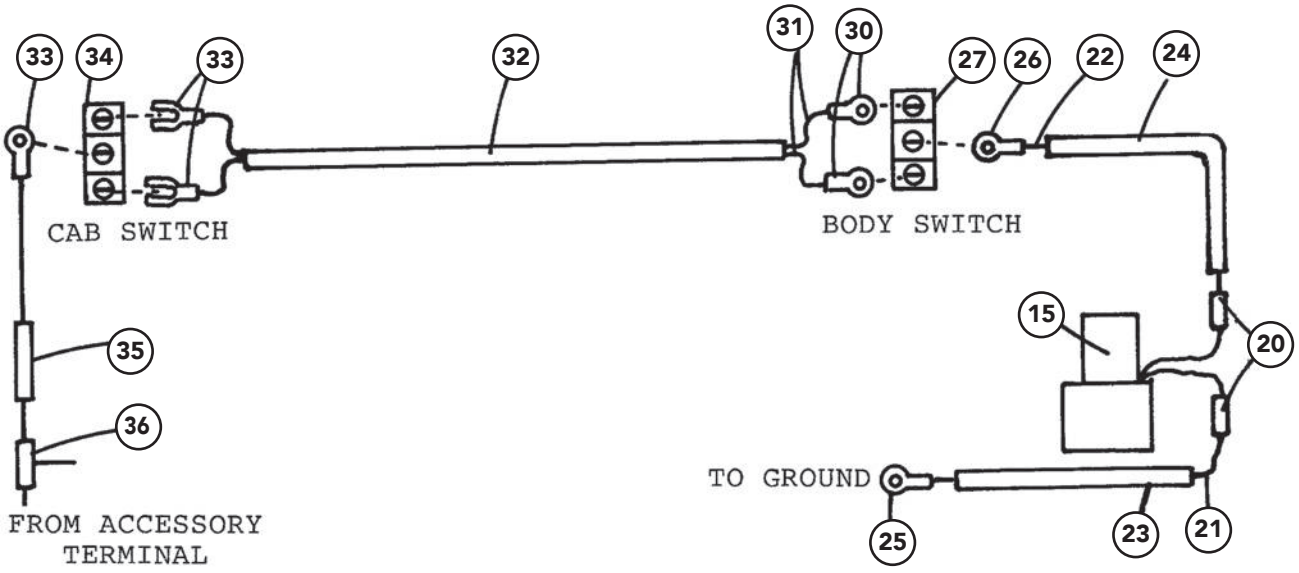


ITEM	PART NO.	DESCRIPTION	QTY
46	*6026	Nipple – Close	1
48	6649	Terminal – Butt Connector	1
49	21582-200	Wiring – Red, 14 Ga.	AR
50	36864-200	Tubing	AR
51	6536	Terminal – Ring	1
52	21479	Switch – Toggle	1
53	21663	Terminal – Ring	2
54	36864-200	Tubing	AR
55	21582-200	Wiring – Red, 14 Ga.	AR
56	6485	Terminal	3
57	58895	Switch – Toggle	1
58	39952	Fuse – In-line	1
59	12374	Connector – Tap	1
60	31572	Terminal – Ring	1
61	* 22377	Clamp – Insulated	1
62	* 20908	Screw – Self Drilling	1
63	21582-10	Wire – Red, 14 Ga.	AR
64	36864-20	Tubing	AR
65	6649	Terminal – Butt Connector	1
66	302564	valve-solenoid	1

*- Not Shown AR- As Required

Parallel Hydraulic System With Optional Dump Valve

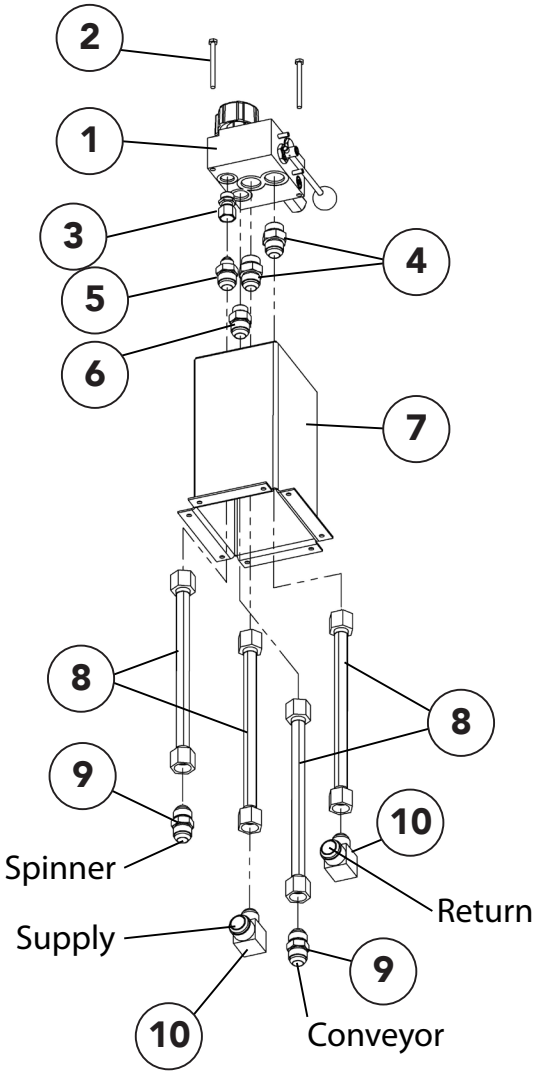




Parallel Hydraulic System With Optional Dump Valve Continued

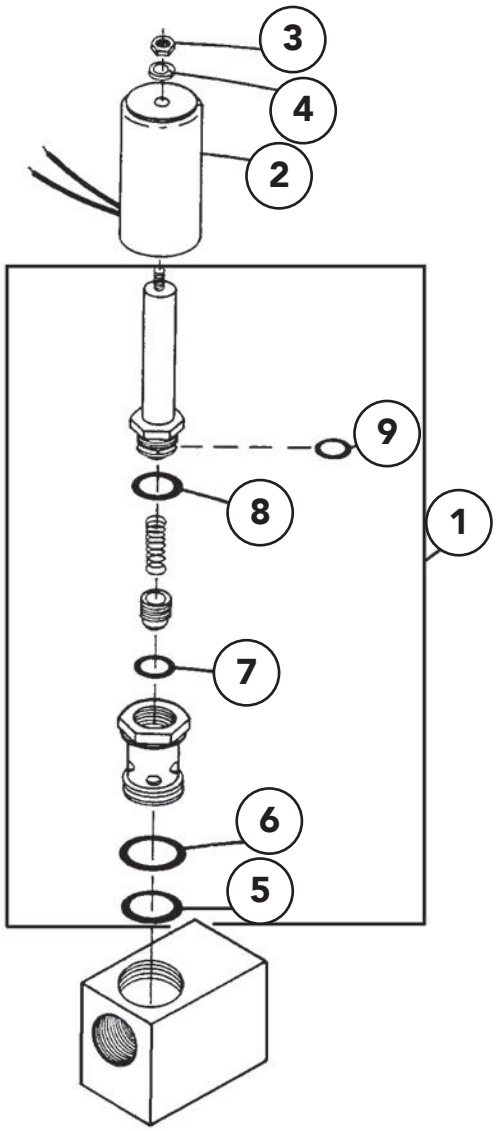
ITEM	PART NO.	DESCRIPTION	QTY
1	29778	Adapter	2
2	29773	Adapter – Elbow, 90°	2
3	29807	Adapter – Elbow, 90°	4
4	29781	Adapter – Tee	1
5	29836	Adapter – Tee	1
6	29809	Adapter – Tee	1
7	29850	Adapter – Tee	2
8	80886	Tubing Assy	1
9	80888	Tubing Assy	1
10	29757	Adapter	1
11	36802	Nipple – Hose End	2
12	6335	Clamp – Hose	2
13	16521-23	Hose – Return	1
14	29827	Adapter – Elbow, 90°	1
15	33712	Valve – Dump, Electric	1
20	6649	Terminal – Butt Connector	2
21	21582-10	Wire – Red	1
22	21582-26	Wire – Red	1
23	36864-20	Tubing	1
24	36864-36	Tubing	AR
25	31572	Terminal – Ring	1
26	6536	Terminal – Ring	1
27	58895	Switch – Toggle	1
28	* 22377	Clamp – Insulated	1
29	* 20908	Screw – Self Drilling	1
30	21479	Switch – Toggle	1
31	21582-200	Wiring – Red, 14 Ga.	AR
32	36864-200	Tubing	AR
33	6485	Terminal – Spade	3
34	21479	Switch – Toggle	1
35	39952	Fuse – In-line	1
36	12374	Connector – Tap	1

Control Valve Mount Assembly



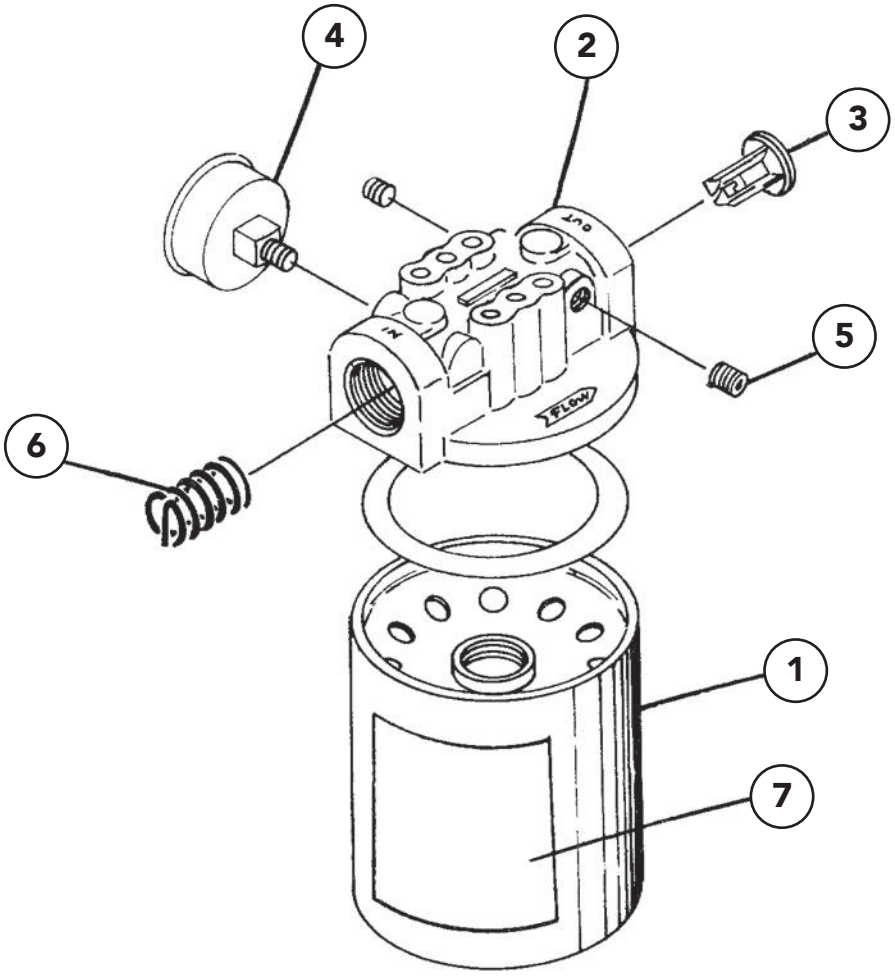
ITEM	PART NO.	DESCRIPTION	QTY
1	308645	Valve- Control	1
2	20013	Cap Screw- 1/4 x 3	2
3	34846	Adapter- Straight Non Standard	1
4	29789	Adapter- Straight 12-12	2
5	306377	Adapter- Straight 12-8	1
6	29753	Adapter- Straight 12-10 Special	6
7	36803	Mount- Valve Weldment	1
8	36800	Tube- Assy 12”	4
9	29817	Adapter- Straight 12-12	2
10	29786	Adapter – Elbow, 90°	2

Dump Valve - Solenoid



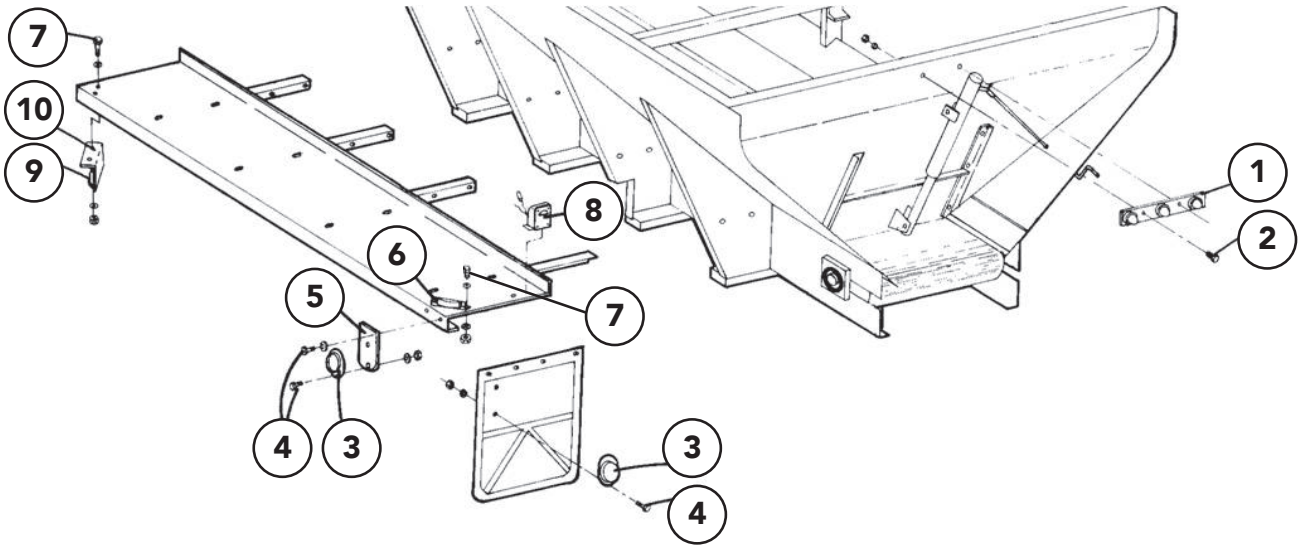
ITEM	PART NO.	DESCRIPTION	QTY
	33712	Dump Valve – Solenoid	
1	NSS	Cartridge Assy	1
2	1922	Coil	1
3	NSS	Nut – Hex	1
4	NSS	Washer – Lock	1
5	29892	O-Ring	1
6	29893	O-Ring	1
7	29891	O-Ring	1
8	30648	O-Ring	1
9	29891	O-Ring	1
	33714	O-Ring Kit, Includes Items 5-9	

Hydraulic Filter With Indicator



ITEM	PART NO.	DESCRIPTION	QTY
	39845	Filter – Hydraulic with Indicator	
1	43530	Filter – Element Kit	1
2	NSS	Head Casting	1
3	43533	Relief Valve Poppet	1
4	43534	Indicator	1
5	6029	Pipe – Plug	1
6	43492	Spring – Relief Valve	1
7	39379	Decal	1
NSS- Not Serviced Separately			

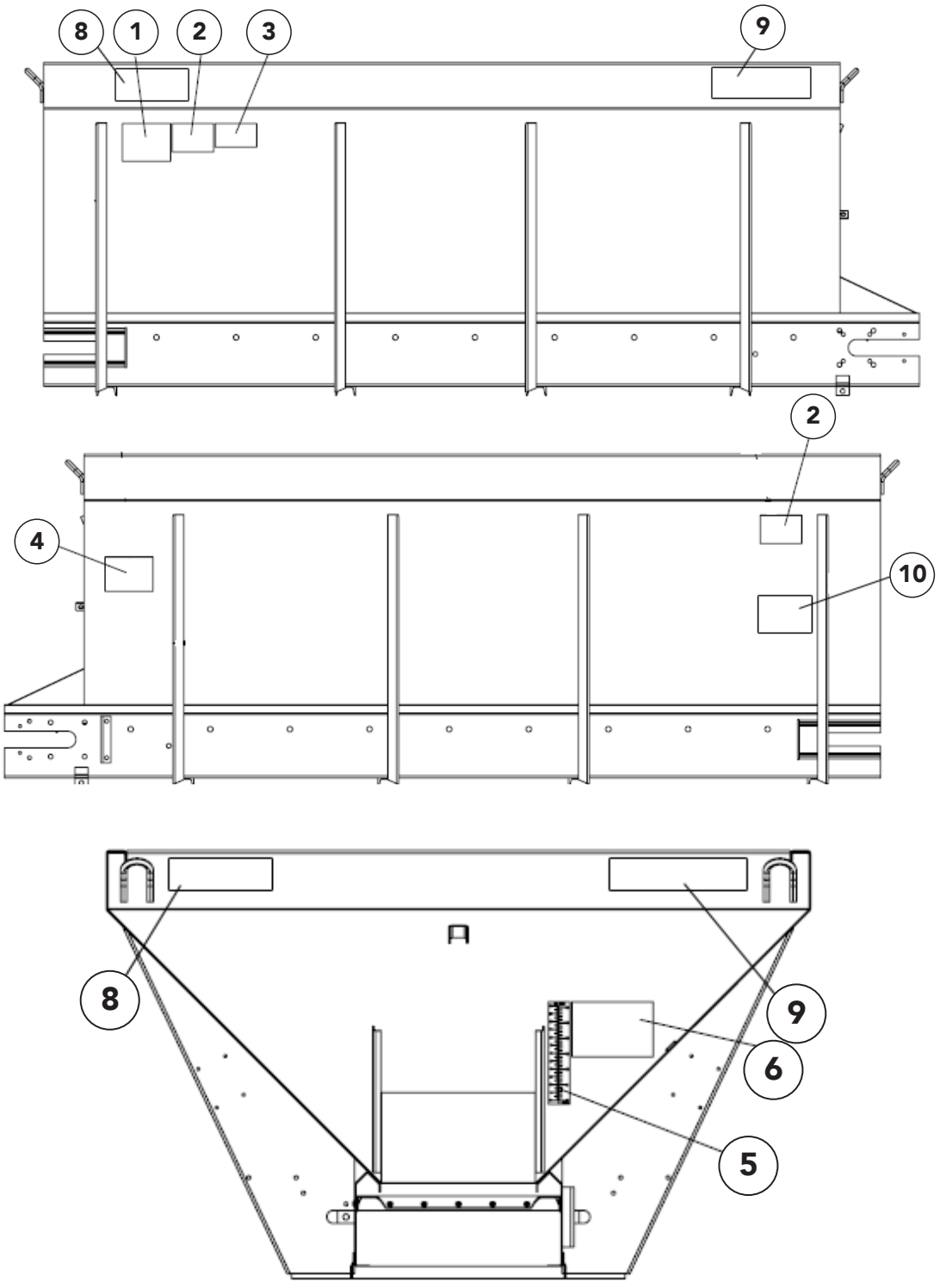
Lights



ITEM	PART NO.	DESCRIPTION	QTY
1	6114	Lamp – Cluster, Red	1
2	20572	Screw – Machine, 3/16 x 3/4	12
	20709	Washer – Lock, 3/16	12
	20641	Nut – Hex, 3/16	12
3	6107	Reflector – Red	4
4	20003	Cap Screw – 1/4 x 3/4	AR
	20691	Washer – Flat, 1/4	AR
	20642	Nut – Hex, 1/4	AR
5	3824	Mount – Belt, Reflector	AR
6	6110	Light – Clearance, Red, Includes 4 of Item 2	2
	3775	Bracket – Clearance Light	2
7	20003	Cap Screw – 1/4 x 3/4	AR
	20691	Washer – Flat, 1/4	AR
	20710	Washer – Lock 1/4	AR
	20642	Nut – Hex, 1/4	AR
8	21629	Lamp – Turn Signal	2
	6549	Connector – Butt	4
	21581-120	Wire – Light, 14 Ga. Blue	1
	21607	Bracket – Mounting	2
9	6108	Light – Clearance, Amber, Includes 4 of Item 2	2
10	38611	Bracket – Mounting	2
	* 6198	Clip – Wire	21
	* 21986	Grommet – Rubber, 3/16	10

*- Not Shown AR- As Required

Decals



Decals Continued

ITEM	PART NO.	DESCRIPTION	QTY
1	150034	Decal- Caution Operation & Maint	1
2	364	Decal- Danger Moving Part	2
3	321	Decal- Caution Hazardous Material	1
4	39138	Decal- Warning High Pressure Fluid	1
5	23769	Decal- Ruler	1
6	368	Decal- Flying Material	1
7	*39200	Decal- Warning Slipping Hazard (Fenders)	2
8	39870	Decal- HiWay Large	3
9	72081-X1	Decal- Decor 3020	3
10	21476	Decal- Important Conveyor Chain Life	1
11	*368	Flying- Material (Spinner)	1
12	*55630	Decal- Warning Falling Hazard (Spinner)	1
13	*8664	Decal- Keep Valve Open (Hydraulic Tank)	1
14	*39378	Decal- Change Filter Element (Hydraulic Tank)	1
15	*8665	Decal- Hydraulic Oil Only (Hydraulic Tank)	1

*- Not Shown See ***Spinner*** and ***Fenders & Mudflaps*** parts lists for more decals

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