TARCO®

"HIGHLANDER"

SPREADER FOR
ICE & SNOW CONTROL

OPERATION AND MAINTENANCE INSTRUCTIONS

IMPORTANT SAFETY INFORMATION

All Operators must review manual
and be trained prior to operating machine

LOUGHBERRY MFG. CORP.
249 EXCELSIOR AVENUE
SARATOGA SPRINGS, NY 12866
PHONE: (518) 584-4400
FAX: (518) 584-6630

OPERATION AND MAINTENANCE
&
PARTS MANUAL
SAFETY FIRST

Before operating your TARCO® spreader, be sure to carefully read the entire section on operation and maintenance in this book. Be sure to follow all safety precautions in this book and these listed below.

- Keep all shields and guards in place when operating this equipment.
- Adjust and lubricate machine only when the power source is off and locked out.
- When any mechanism becomes clogged, shut off the power source and lock it out before attempting to clear the blockage.
- Keep hands, feet, and clothing away from all moving parts.
- Always use a funnel for filling fuel tank and do not fill the tank to overflowing. Always be sure the engine is off when re-fueling.
- When any mechanism, the conveyor chain, spinner assembly, top screen or other moving part becomes jammed or clogged, lock out the power source before attempting to clear blockage. Do not climb on the machine to clear it. Only access the machine from a proper safety platform equipped with proper fall protection equipment. Failure to do this could result in serious injury or death to you or others.
- Observe and obey all warning and safety decals displayed on the machine.
- Failure to observe and obey the safety warnings in this manual and displayed on this machine could result in serious injury or death.

RECORD the TYPE, MODEL, and SERIAL NUMBER of your machine here for parts ordering information.

PURCHASED FROM: _____

DATE: _____

TYPE: _____

MODEL: _____

SERIAL NUMBER: _____

LOUGHBERRY MFG. CORP.
249 Excelsior Avenue • Saratoga Springs, New York 12866 • (518) 584-4400

Limited Warranty

Loughberry Mfg. Corp. warrants all products manufactured by it to be free from defects in material and manufactured at the time of shipment and for twelve (12) months from date of delivery to customer.

The obligation under this warranty is expressly limited to the replacement or repair at our Saratoga Springs factory, or at a facility designated by us, of such parts as shall appear to us, upon inspection at such facility, to have been defective in material and workmanship.

All warranties VOID in the case of negligence, faulty installation, abuse, abnormal usage, misuse, accidents, or failure to maintain the product according to the manufacturer's specifications.

This warranty shall not apply to any product that has been subjected to misuse, misapplication, neglect (including but not limited to improper maintenance), accident, improper installation, modification (including buy not limited to use of unauthorized parts or attachments), adjustment, or repair. Engines, motors, and any accessories furnished with LOUGHBERRY MFG. CORP. products, but which are not manufactured by LOUGHBERRY MFG. CORP. are not warranted by LOUGHBERRY MFG. CORP. but are sold only with the express warranty, if any, of the manufacturers thereof. THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED (INCLUDING THOSE OF MERCHANTABILITY AND FITNESS OF ANY PRODUCT FOR A PARTICULAR PURPOSE), AND OF ANY OTHER OBLIGATION OF LIABILITY ON THE PART OF LOUGHBERRY MFG. CORP..

Limitation of Liability

It is expressly understood that LOUGHBERRY MFG. CORP.'S liability for its products, whether due to breach of warranty, negligence, strict liability, or otherwise, is limited to the furnishing of such replacement parts, and LOUGHBERRY MFG. CORP. will not be liable for any other injury, loss, damage, or expense, whether direct or consequential, including but not limited to loss of use, income, profit, or production, or increased cost of operation, or spoilage of or damage to material, arising in connection with the sale, installation, use, or inability to use, or the repair or replacement of , LOUGHBERRY MFG. CORP. products.

OPERATION AND MAINTENANCE
&
PARTS MANUAL
SAFETY FIRST

Before operating your TARCO® spreader, be sure to carefully read the entire section on operation and maintenance in this book. Be sure to follow all safety precautions in this book and these listed below.

DANGER

- Inspect and keep all shields and guards in place when operating this equipment.
- Adjust and lubricate machine only when the power source is off and locked out.
- When any mechanism becomes clogged, shut off the power source and lock it out before attempting to clear the blockage.
- Keep hands, feet, and clothing away from all moving parts.
- Always use a funnel for filling fuel tank and do not fill the tank to overflowing. Always be sure the engine is off when re-fueling.
- When any mechanism, the conveyor chain, spinner assembly, top screen or other moving part becomes jammed or clogged lock out the power source before attempting to clear blockage. Do not climb on the machine to clear it. Only access the machine from a proper safety platform equipped with proper fall protection equipment. Failure to do this could result in serious injury or death to you or others.
- The conveyor and spinner drive assemblies transmit great amounts of power and accordingly, are hazardous when in operation. All maintenance, inspections, or operator adjustments must be made with the power off. Proper LOCK OUT/TAG OUT procedures must be followed. All safety guards and shields must be reinstalled prior to use. Failure to do so may result in serious injury or death.

WARNING

- Observe and obey all warning and safety decals displayed on the machine. Replace missing or damaged decals.
- Failure to observe and obey the safety warnings in this manual and displayed on this machine could result in serious injury or death.
- Persons who install, mount, operate, or service this equipment must be properly trained. Do not let anyone operate this equipment without proper training.
- Use care when mounting and dismounting the sander from the truck.
- Keep the sander and components in proper working condition.
- Keep the sander and surrounding area clear of personnel and property while in operation.
- When traveling, especially loaded, the sander may have a high center of gravity and caution should be exercised, especially when turning or driving on banked surfaces.
- Completely disengage all power to the sander, turn off the ignition, and remove the key before leaving the truck.
- UNAUTHORIZED modifications to the sander and components may impair the function and safety of the machine

SAFETY & WARNING DECALS

The decals shown below are installed on the spreader. If these decals are missing, become destroyed, or cannot be read – please contact the factory and new decals will be sent to you. The decals will be sent at no charge.

! DANGER
Do Not Climb or Work on Top of this Machine.
Do Not Work or Climb on the Top Screens.

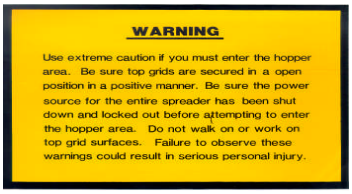
Part #7500-97

Part #7500-36

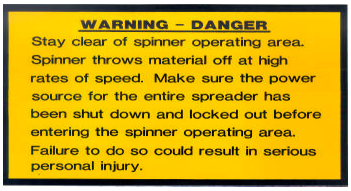
!
Do Not operate this machine before reading the Operation & Maintenance Manual for this machine

Part #7500-98

Part #7500-87



Part #7500-44



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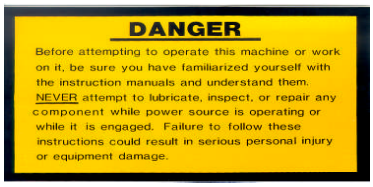
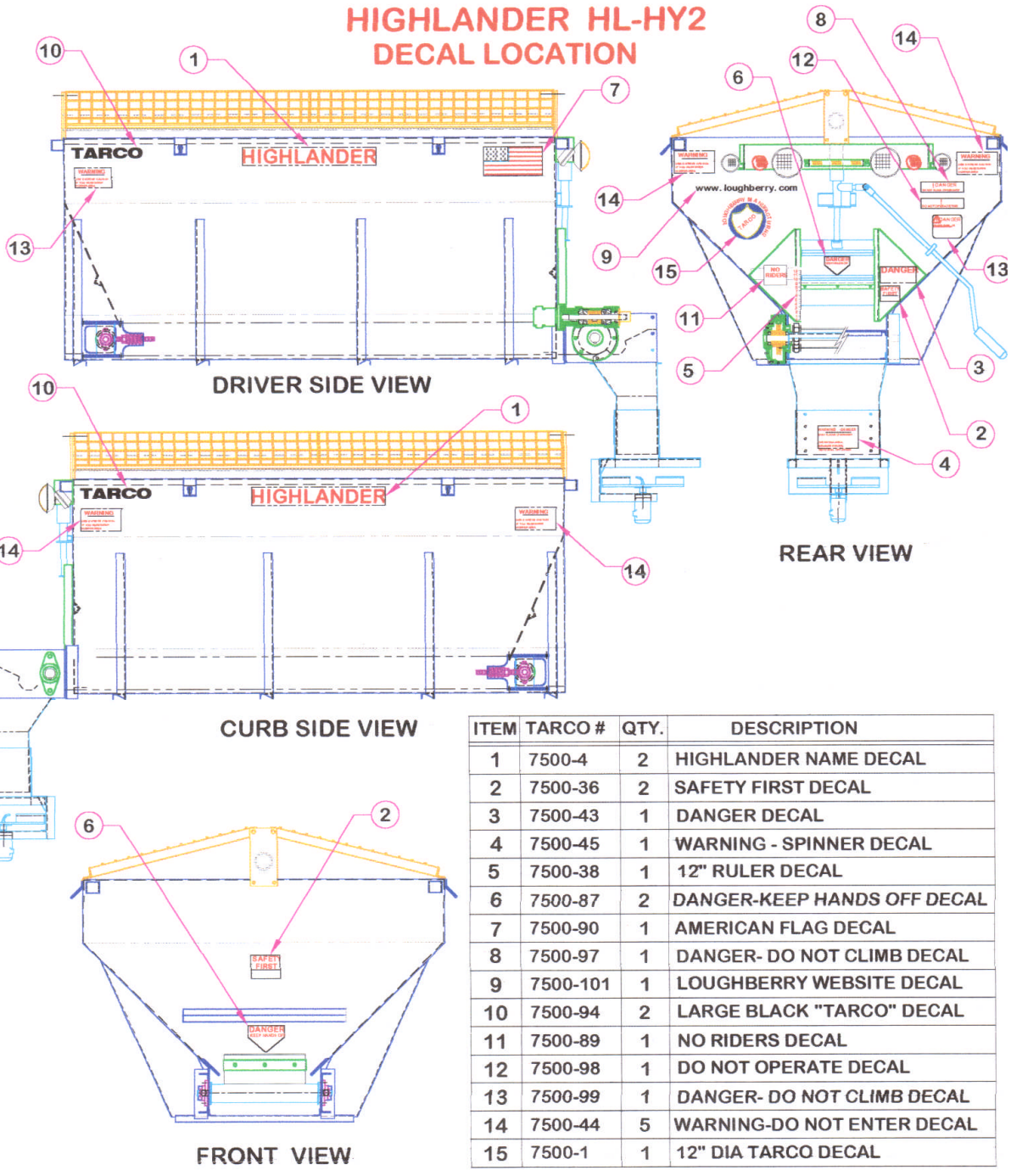


Part #7500-43

HIGHLANDER HL-HY2
DECAL LOCATION



ITEM	TARCO #	QTY.	DESCRIPTION
1	7500-4	2	HIGHLANDER NAME DECAL
2	7500-36	2	SAFETY FIRST DECAL
3	7500-43	1	DANGER DECAL
4	7500-45	1	WARNING - SPINNER DECAL
5	7500-38	1	12" RULER DECAL
6	7500-87	2	DANGER-KEEP HANDS OFF DECAL
7	7500-90	1	AMERICAN FLAG DECAL
8	7500-97	1	DANGER- DO NOT CLIMB DECAL
9	7500-101	1	LOUGHBERRY WEBSITE DECAL
10	7500-94	2	LARGE BLACK "TARCO" DECAL
11	7500-89	1	NO RIDERS DECAL
12	7500-98	1	DO NOT OPERATE DECAL
13	7500-99	1	DANGER- DO NOT CLIMB DECAL
14	7500-44	5	WARNING-DO NOT ENTER DECAL
15	7500-1	1	12" DIA TARCO DECAL

"ALWAYS GIVE PART NAME, NUMBER AND MACHINE SERIAL NUMBER WHEN ORDERING"

REV. A 08/10/05

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SARATOGA POWER-PAK MAINTENANCE INSTRUCTIONS

A Word About Safety

The material spreader described in this manual is normally being operated in winter conditions with bad weather and snow & ice conditions. Due to these adverse operating conditions it is important that you the operator use good safety practices at all times to protect yourself and co-workers and others when using this machine.

It is not practical or possible to warn you about all the hazards associated with the operation and maintenance of this machine. You must use your own good judgement supplemented with the information found on the safety decals, instructions in this manual, your employer's safety programs, safety codes, local, state/provincial, and federal laws, rules and regulations.

When performing maintenance on this machine, trouble shooting the operations of the machine, loading or unloading the machine with material or operating the machine observe & obey all safety decals on the machine and warnings listed in the manual. Failure to do this could result in serious injury or death to you or others.

Remember at all times that as the operator you are responsible for the safe operation of this equipment and responsible for the safety of others. Good safety practices not only protect you but also protect the people around you.

SECTION ONE

OPERATION & MAINTENANCE

INTRODUCTION

Your TARCO® HIGHLANDER spreader has been designed to handle a wide range of your material spreading needs. Some of the materials commonly used in HIGHLANDER® spreaders include:

- Sand and salt for snow & ice control
- Stone chips and gravel for road maintenance
- Absorbent chips for oil spill control
- Lime powder for field preparation

In addition to the above, almost any spreadable material may be used. Spreader lengths and built in extension sizes also vary to cover a wide range of capacity requirements. The standard machine lengths and extension sizes available are shown in Table 1.

Table 1: Capacities of TARCO® HIGHLANDER® for any standard length or extension size.

HOPPER LENGTH	LEVEL CAPACITY (YDS)	WIDTH	HEIGHT	O.A. LENGTH (APPROX)	LEVEL CAPACITY W/HOPPER EXT					
					2”	4”	6”	8”	10”	12”
8’	5.0	80”	52”	10’	5.2	5.5	5.9	6.2	6.5	6.9
9’	5.5	80”	52”	11’	5.9	6.2	6.6	7.0	7.4	7.7
10’	6.1	80”	52”	12’	6.5	6.9	7.3	7.7	8.2	8.5
11’	6.8	80”	52”	13’	7.3	7.7	8.0	8.6	9.1	9.4
12’	7.3	80”	52”	14’	7.9	8.4	8.7	9.4	9.9	10.2
13’	8.0	80”	52”	15’	8.5	9.1	9.6	10.1	10.7	11.2
14’	8.7	80”	52”	16’	9.3	9.9	10.4	11.0	11.6	12.2
15’	9.3	80”	52”	17’	9.9	10.5	11.2	11.8	12.4	13.0
16’	10.0	80”	52”	18’	10.5	11.2	11.9	12.5	13.2	13.9

Once the capacity requirements have been determined, the drive system may be selected from one of eight standard drive systems. These different drive systems include hydraulic, gas hydraulic, and gas mechanical, which are further described in the section on Highlander Model Codes.

There is also a long list of optional equipment for HIGHLANDERS® ranging from special lighting, top screens, hold down devices, catwalks, discharge chute variations, and many, many more. These readily available options are listed in the Highlander Options section. In addition TARCO® is able to supply other options on request not covered in the option section, consult your local TARCO® distributor or Loughberry Mfg. Corp. directly.

The following pages in Section One will guide you from mounting the spreader through off season storage and maintenance of the spreader. We suggest that you read this entire section before using your spreader as it contains many helpful hints. In Section Two there is a complete parts breakdown identifying all the spare or replacement parts that you might need. There are also instructions on how to order parts.

As always you should obey all of the safety rules outlined on Page One and throughout this book. A great effort has been made to make the spreader as safe as possible and still perform its task, but only properly trained personnel should operate or perform maintenance on this machine.

REGISTRATION OF SPREADER AND WARRANTY INFORMATION

Before beginning to mount your spreader, unpack all loose parts that might be inside the hopper and check for damage. Report any damage at once to the shipping company and your local TARCO® distributor. You should also immediately register your spreader with LOUGHBERRY MFG. CORP. by filling out a warranty certificate and registration card and returning them to the LOUGHBERRY MFG. CORP. The warranty period becomes effective upon date of delivery of your machine unless other arrangements have been made with your TARCO® distributor or LOUGHBERRY MFG. CORP. The information required to register your spreader may be found on the serial number tag secured to your machine and will look like this.

LOUGHBERRY MFG. CORP.
SARATOGA SPRINGS, NY
SERIAL NUMBER **PHONE: 518-584-4400**

_____-_____-_____-_____-_____-_____-_____

TARCO® HIGHLANDER MODEL CODES

Every TARCO® HIGHLANDER has an associated model code, which identifies the machine drive type and length. A typical model code is as follows:

Model HL-HY2-10

Where the first group identifies the HIGHLANDER spreader group. ALL HIGHLANDERS have a "HL" in the first group. The second group identifies the drive type. The third group identifies the hopper lengths.

The various drive types (second group) are as follows:

HL-HY2…….Two motor hydraulic drive, one motor powers the conveyor, through a 50:1 or 25:1 gearbox, the other motor powers the spinner.

HL-HY2P……SARATOGA POWER PAK℈ drive, the patented SARATOGA POWER PAK℈ powers the conveyor, and a hydraulic motor powers the spinner.

HL-HY3……..Three motor hydraulic drive, two motors coupled together power the conveyor through chain and sprockets, one motor powers the spinner.

HL-G-HY2…….Gas or diesel engine close coupled to a hydraulic pump to power the HY2 spreader type.

These four options are readily available to power your TARCO® HIGHLANDER SPREADER. Each drive type has specific advantages to help meet your specialized needs. Consult your local TARCO® distributor for finding the proper drive option to meet your needs.

℈Patented

For your convenience record this information on the warranty card half, which you keep and be sure to give all this information when ordering parts or seeking service information.

If your spreader has a hydraulic pump, hydraulic motor, gasoline or diesel engine as the power source the LOUGHBERRY MFG. CORP. makes no warranty whatsoever in respect to the engine, ignition, starter, alternator, battery, carburetor or other power accessories or their components as these items are in warranty by their respective manufacturers.

POSTAGE REQUIRED

LOUGHBERRY MFG. CORP.
249 EXCELSIOR AVENUE
SARATOGA SPRINGS, NY 12866

COMPLETE AND RETURN IMMEDIATELY UPON RECEIPT OF MACHINE

REGISTRATION CARD

(PLEASE PRINT IN INK)

MACHINE SERIAL#_____ **(SEE METAL PLATE)**

WHAT IS MACHINE USED FOR:_____

IF EQUIPPED WITH ENGINE OR MOTOR GIVE:
NAME:_____ **MODEL:**_____
TYPE:_____ **SERIAL#**_____

DEALER PURCHASED FROM:_____

OWNER'S NAME:_____

ADDRESS:_____

SAVE THIS CARD

FOR YOUR RECORDS FILL IN:

MACHINE MODEL NO:_____

MACHINE SERIAL NO:_____

TYPE OF MACHINE:_____

PURCHASED FROM:_____

DATE PURCHASED:_____

BE SURE TO ALWAYS GIVE MACHINE NAME, MODEL, AND SERIAL NUMBER WHEN ORDERING PARTS

*****KEEP THIS PORTION FOR YOUR RECORDS*****

Limited Warranty

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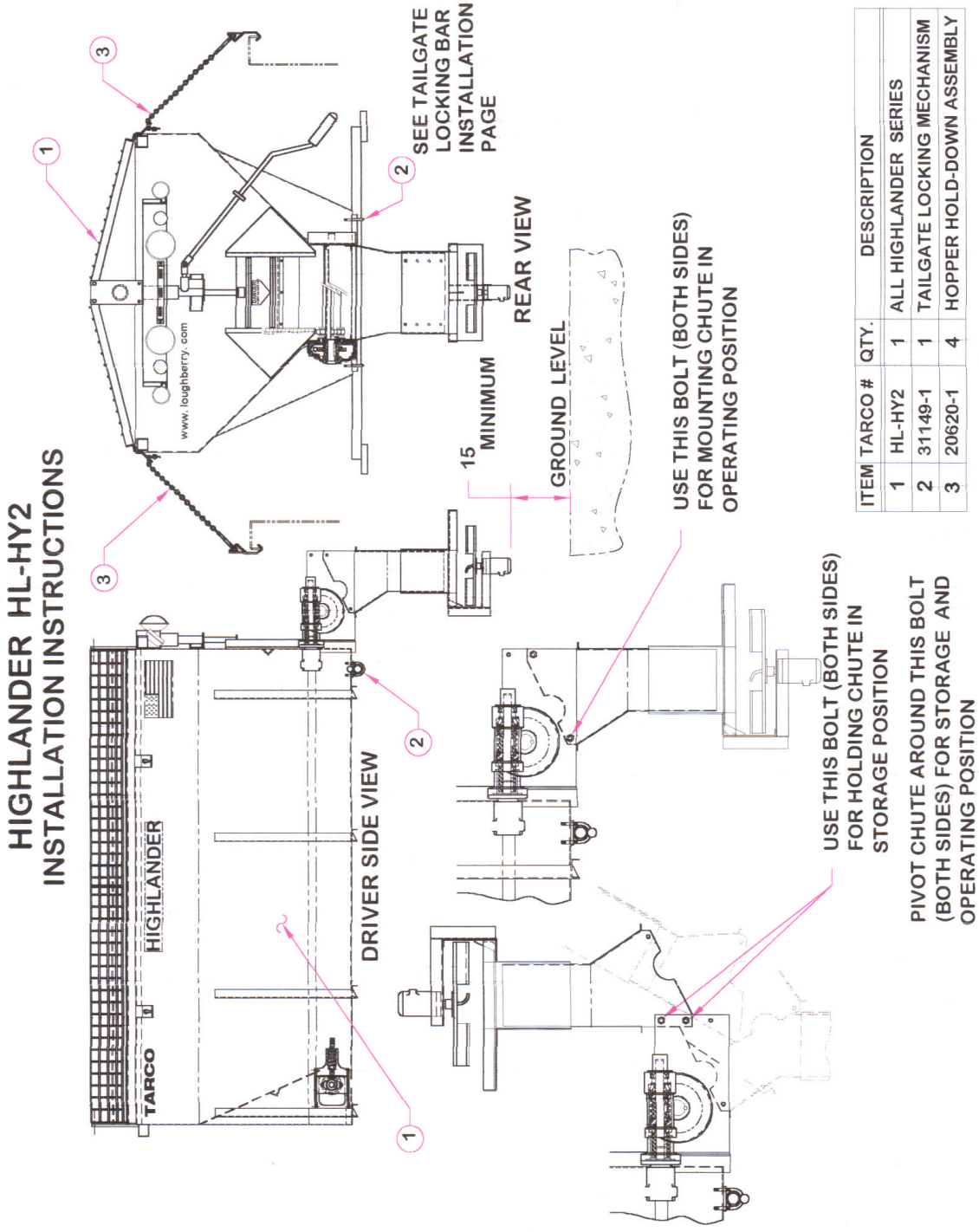
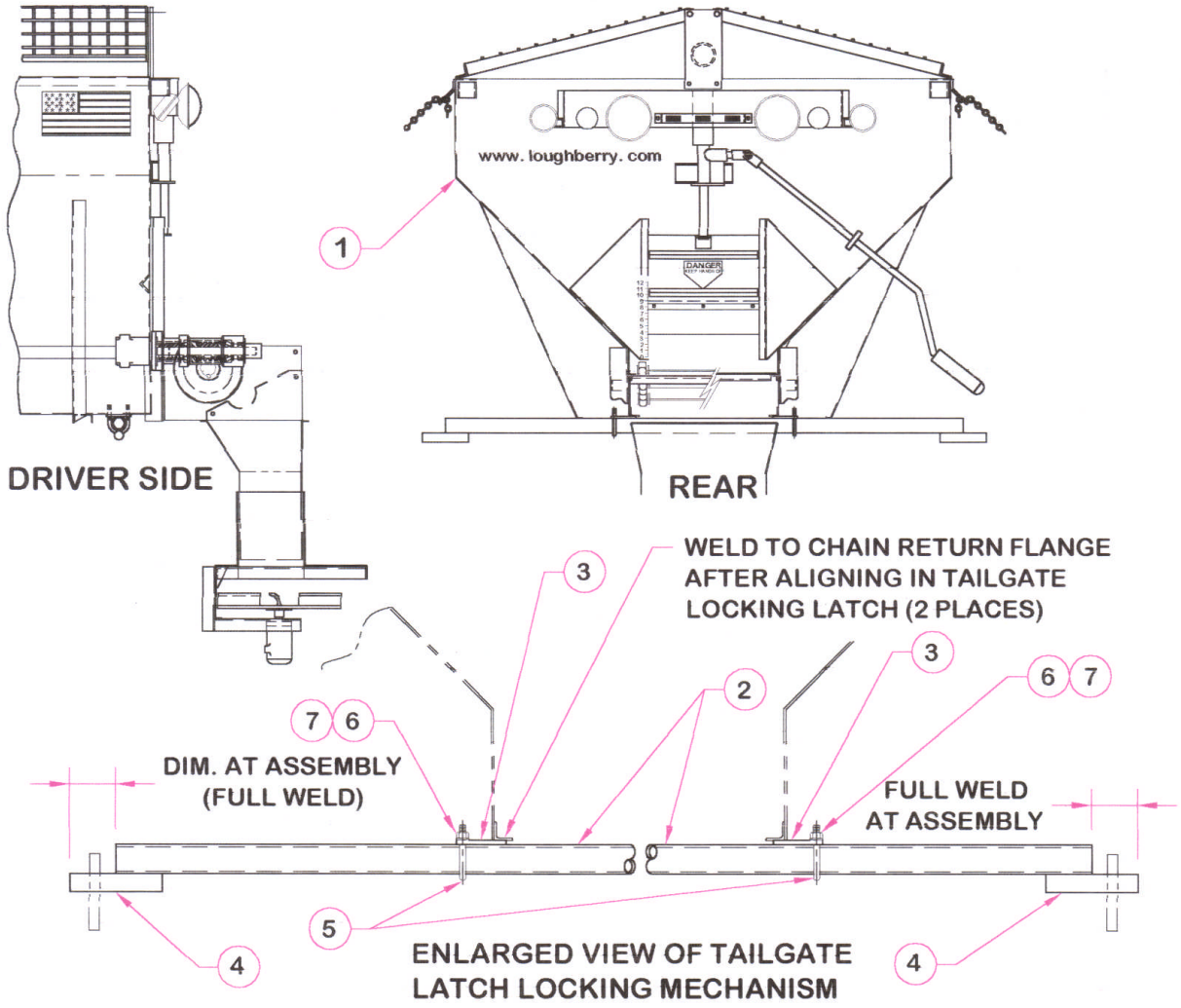


ITEM	TARCO #	QTY.	DESCRIPTION
1	HL-HY2	1	ALL HIGHLANDER SERIES
2	31149-1	1	TAILGATE LOCKING MECHANISM
3	20620-1	4	HOPPER HOLD-DOWN ASSEMBLY

HIGHLANDER HL-HY2
TAILGATE LOCKING BAR
INSTALLATION INSTRUCTIONS



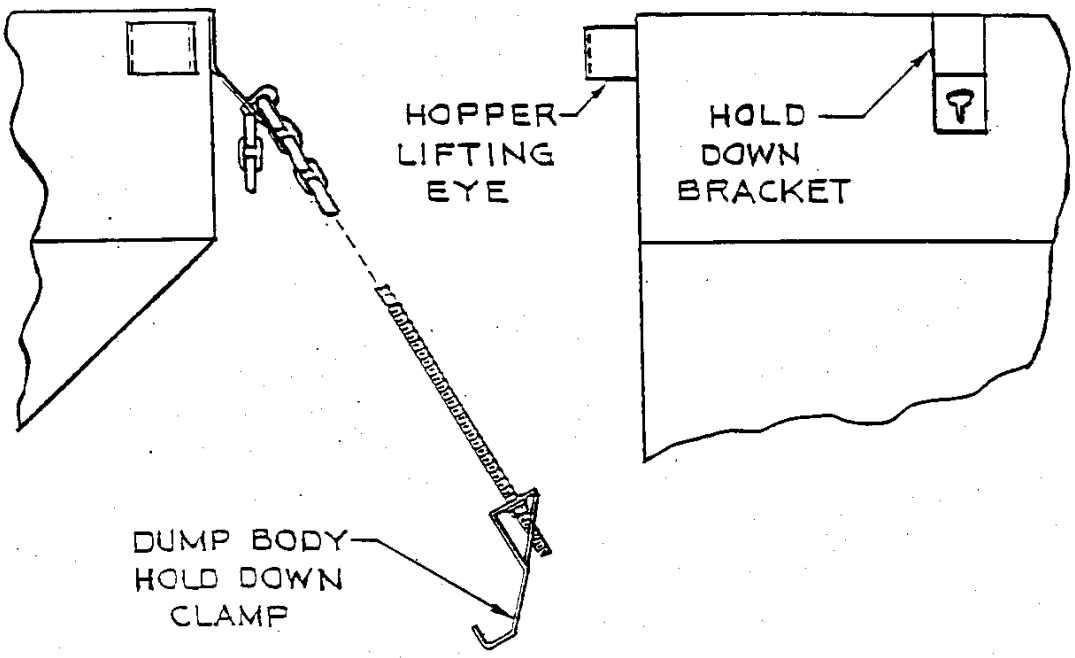
ITEM	TARCO #	QTY.	DESCRIPTION
1	HL-HY2	1	ALL HIGHLANDER SERIES
2	31149-2	1	2" SCH. 40 PIPE X 83 7/8 LG.
3	31149-6	2	3/8 X 4 X 4 SQ. PLATE
4	31149-11	2	1 1/2 DIA X 7 LG. RND. STK.
5	31149-5	2	1/2 DIA X 2 X 4 "U"- BOLT
6	31149-11	2	1 1/2 DIA X 7 LG. RND. STK.
7	31149-7	2	LCKWSHR FOR 1/2 DIA "U"- BOLT

MOUNTING THE SPREADER

Dump Body Mounting: (All Models)

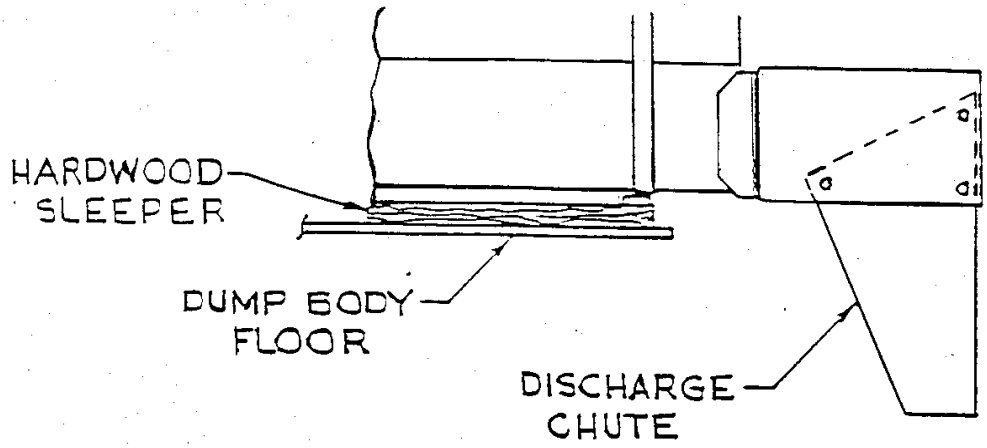
To mount the spreader in the dump body of a truck begin by unpacking any loose parts that may have been shipped inside the hopper. Then lift the spreader by the four (4) lifting eyes provided in each corner.

Figure 1 - Illustration of hopper hold down bracket.



Next guide the spreader into the dump body being careful not to damage any of the guards or engine enclosure. The spreader is in place when it is equally spaced from each side of the dump body and the last cross channel is resting on the truck bed. It is recommended that you place two 1" or 2" thick hardwood sleepers between the hopper and the truck bed. These sleepers will reduce the tendency of the hopper to slide inside the dump body and also allow you to flush out the space under the hopper after each use. (**Note**: sometimes it is required to remove the dump body spill apron to allow the discharge chute to be installed. This is required because the last cross channel on the hopper must be on the dump body floor.) This also allows for the spreader to move as far forward as possible to keep the load from being overhung.

Figure 2 -Illustration of hopper in dump body.



When clearance has been made for the discharge chute, the hopper must be secured to the dump body. (The discharge chute will be installed later as outlined in the next section.)

To secure the hopper use the dump body hold down clamps as shown in figure 1. Other additional hold down devices may also be purchased as options. These include a tailgate locking bar, upper tailgate locking assembly, and front stabilizer braces. Each of these options are detailed in the option section. When all hold down devices are in place and secure you are ready to install the discharge chute and spinner assemblies.

Chassis Mount (All Models)

To mount the spreader on a truck chassis begin by unpacking any loose parts and mounting instructions that may have been shipped inside the hopper. When the following instructions are performed in order; the installation should go along smoothly.

1. Place 2" x 3" hardwood sleepers furnished by the customer on top of the truck frame rails. Be sure to drill or chisel clearance for any rivets, which might be protruding. Sometimes it is required to use a steel sub frame to gain additional height for tire clearance.

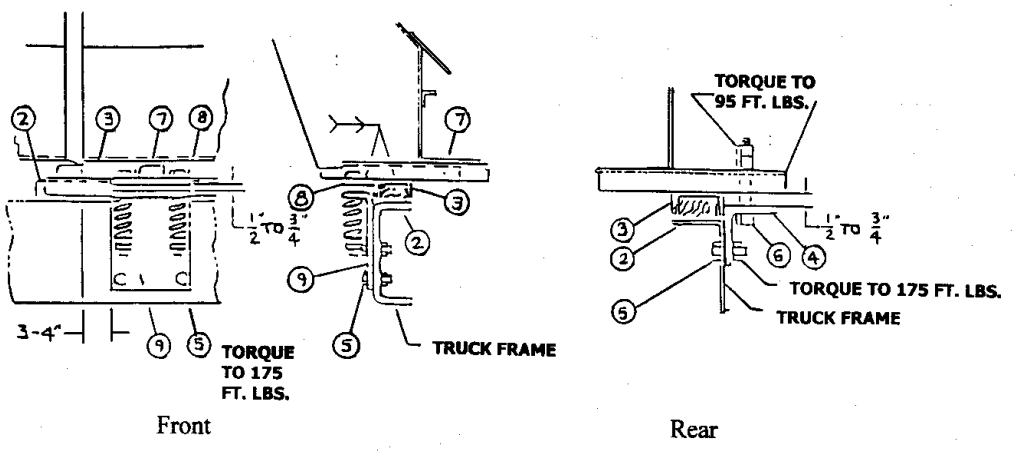


Figure 3: Illustration of Chassis Mounting Hardware (Optional)

2. Place the hopper on the hardwood sleepers as far forward as practical leaving about 3" from the truck cab to the nearest part of the spreader.

3. Locate the rear chassis mounting angles (item #4) ½" to ¾" below the hopper cross channels on each side of the spreader.

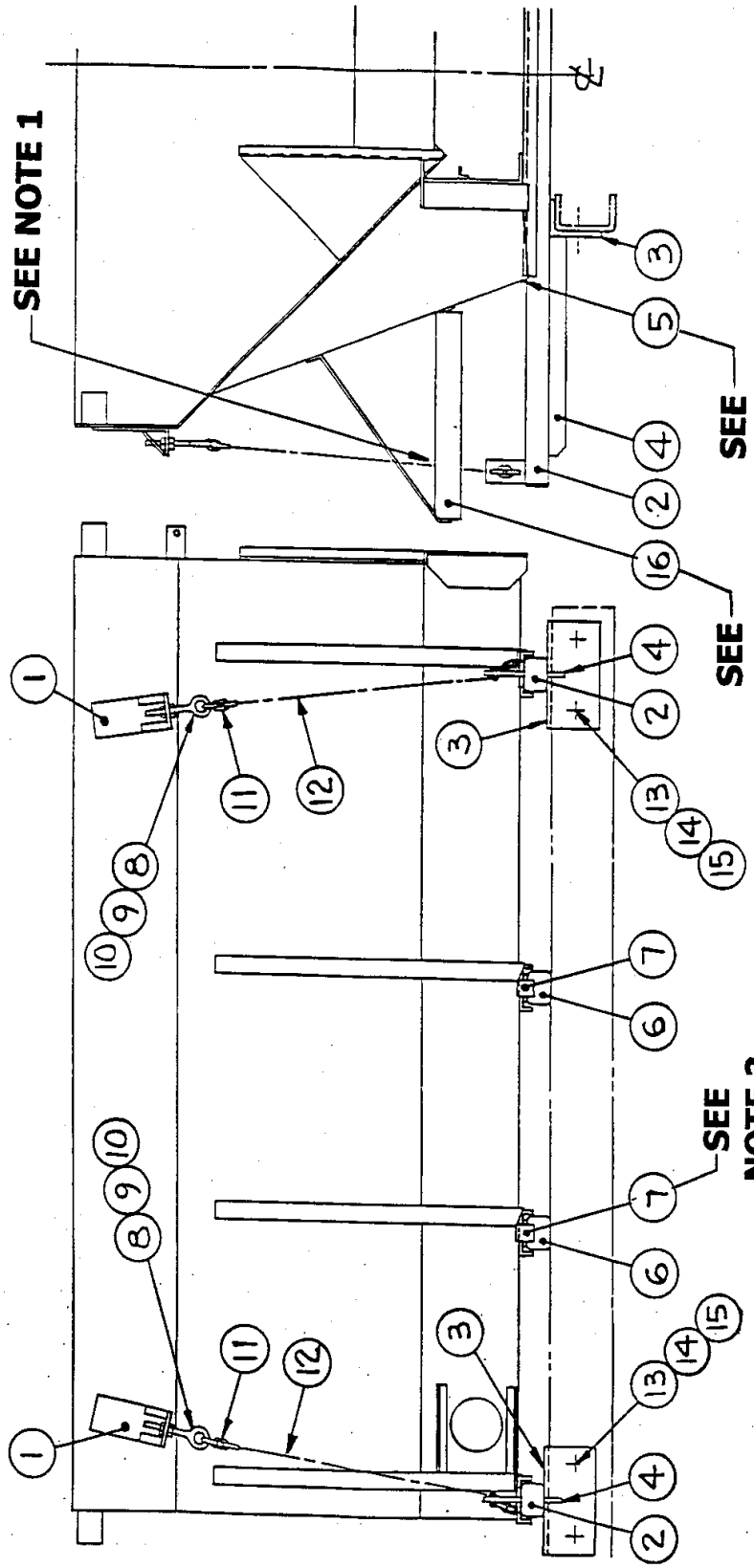
4. Locate the front chassis mtg. angles (item #9), approximately 3-4 inches behind the second gusset from the front of the hopper. Weld the upper plate (item #8) and support channel (item #7) to the hopper longitudinal channel. When locating the lower mounting angle (item #9) be sure to leave a gap of ½ to ¾" prior to drilling and bolting in place. This will be required on both sides of the hopper/chassis.

5. Drill 11/16" dia holes as required in the truck frame using the chassis mounting angle (item #9) as a drilling guide. Note: truck manufacturers warn that the upper edge of the holes must be at least 1-5/8" below the inside surface of the upper flange and 1" away from any other hole. Do not weld to truck frames at any time.

6. Fasten each mounting angle to the truck frame by 5/8" dia. grade 5 bolts (item #5). Torque to 175 ft-lbs.

7. Fasten the hopper to the mounting angles by ¾" dia. grade 5 bolts (item #6). Torque to 95 ft-lbs. Recheck all bolts periodically to be sure that none have loosened.

Once the hopper has been secured to the chassis you are ready to install the spinner disc and discharge chute assembly. The procedure for this is outlined in the next section.



13926
HIGHLANDER/HL=HY2 HOPPER TO CHASSIS MOUNTING PROCEEDURE (MHQ STYLE).

SEE SHEET 2 FOR MOUNTING PROCEEDURE.
SEE SHEET 3 FOR GENERAL NOTES.
SEE SHEET 4 FOR BILL OF MATERIALS.

13926
MOUNTING PROCEEDURE

A. INSTALL LONG TUBES (ITEM 2) IN FIRST AND LAST HOPPER CROSS CHANNEL. CENTER TUBES AND SECURE
USING CHAINS AND TAKE-UP.

B. POSITION MOUNTING ANGLES (ITEM 3) ON FRAME IN APPROXIMATE LOCATION AND THEN SET HOPPER WITH
LONG TUBES ON TOP OF ANGLES.

C. ESTABLISH FINAL LOCATION OF HOPPER ON FRAME. TRANSFER MOUNTING HOLES FROM ANGLES (ITEM 3)
TO FRAME AND THEN REMOVE HOPPER. DRILL (8) 11/16" DIA. HOLES IN FRAME.

D. FASTEN ANGLES TO FRAME USING (8) 5/8" – 11 X 2" LG. GR.5 HEX HD. BOLTS, SPLIT LOCKS AND NUTS.

E. LOWER HOPPER BACK INTO POSITION. AT THIS TIME INSTALL SHORT TUBES (ITEM 6) IN THE REMAINING CROSS CHANNELS. THESE TUBES ARE FLOATING AND WILL **NOT** BE WELDED.

F. FULL WELD LONG TUBES TO MOUNTING ANGLES AND SKIP WELD SUPPORT BARS (ITEM 4) IN PLACE.
(ALSO SEE NOTE 2)

13926
GENERAL NOTES

1. IF OPTIONAL CATWALK (TEM 16) IS USED, A 2" DIA. HOLE MUST BE BURNED OUT OF CATWALKS IN (4)
PLACES FOR HOLD DOWN CHAIN (ITEM 12) TO PASS THRU.

2. ½" SQUARE BARS X 3" LG. (ITEM 5) MUST BE WELDED TO LONG TUBES IN (4) PLACES AT THE END OF CROSS CHANNELS TO ELIMINATE SIDE TO SIDE MOVEMENT.

3. ¼" THK. X 3" X 3" TABS (ITEM 7) MUST BE WELDED TO ENDS OF SHORT TUBES (ITEM 6) TO ELIMINATE SIDE
TO SIDE MOVEMENT.

4. ON 12 FT. AND UP HOPPERS A THIRD HOLD DOWN IS USED, LOCATED NEAR CENTER OF HOPPER. QUANTITIES IN BILL OF MATERIALS REFLECTS THIS.

5. CATWALKS (ITEM 16) ARE OPTIONAL. THE DRAWING NO. FOR THE CATWALKS IS 31154 AND ARE AVAIABLE IN HRS AND SS.

13926
BILL OF MATERIALS

ITEM	DRAWING NO.	QTY		DESCRIPTION
1	SK-1509 –1HR - 4 SS	4	8 FT. THRU 11 FT.	HOPPER HOLD DOWN BRACKET
		6	12 FT. AND UP	
2	25223-1	2	8 FT. THRU 11 FT.	HOPPER HOLD DOWN TUBE (LONG)
		3	12 FT. AND UP	
3	SK-1783-1	4	8 FT. THRU 11 FT.	HOPPER HOLD DOWN MOUNTING ANGLE
		6	12 FT. AND UP	
4	SK-1783-2	4	8 FT. THRU 11 FT.	SUPPORT BAR – MOUNTING ANGLES
		6	12 FT. AND UP	
5	½” SQUARE HR BAR X 3” LG.	4	8 FT. THRU 11 FT.	STOP TO ELIMINATE HOPPER SIDE MOVEMENT
		6	12 FT. AND UP	
6	25224-1	1	8 FT.	HOPPER HOLD DOWN TUBE (SHORT)
		2	9 AND 10 FT.	
		3	11 FT.	
		2	12 FT.	
		3	13 AND 14 FT.	
		4	15 AND 16 FT.	
		5	17 AND 18 FT.	
7	¼” THK. HR 3” X 3”	2 PER SHORT TUBE		STOPS TO ELIMINATE HOPPER SIDE MOVEMENT
8	60033-32	4	8 FT. THRU 11 FT.	EYE BOLT
		6	12 FT. AND UP	
9		4	8 FT. THRU 11 FT.	3 / 4 “ FLAT WASHER
		6	12 FT. AND UP	
10		4	8 FT. THRU 11 FT.	3 / 4” – 10 NYLOCK NUT
		6	12 FT. AND UP	
11	60020-17	4	8 FT. THRU 11 FT.	DOUBLE CLEVIS
		6	12 FT. AND UP	
12	9009-9	4	8 FT. THRU 11 FT.	CHAIN 5 / 16” GR 70 X 34” LG
		6	12 FT. AND UP	
13		8	8 FT. THRU 11 FT.	5/8”-11 X 2” LG. GR5 HEX HD. BOLT
		12	12 FT. AND UP	
14		8	8 FT. THRU 11 FT.	5/8” SPLIT LOCK
		12	12 FT. AND UP	
15		8	8 FT. THRU 11 FT.	5/8” – 11 HEX NUT
		12	12 FT. AND UP	

INSTALLING SPINNER AND DISCHARGE CHUTE ASSEMBLY

After the spreader has been installed in the dump body or on the truck chassis; the discharge chute, spinner assembly and deflector frame assembly need to be installed.

Procedure for Hydraulic Machines with Funnel Style Chutes

When shipped from the factory, the spinner, deflector frame and discharge chutes are shipped loose. The following procedure will allow you to install these items properly on the machine.

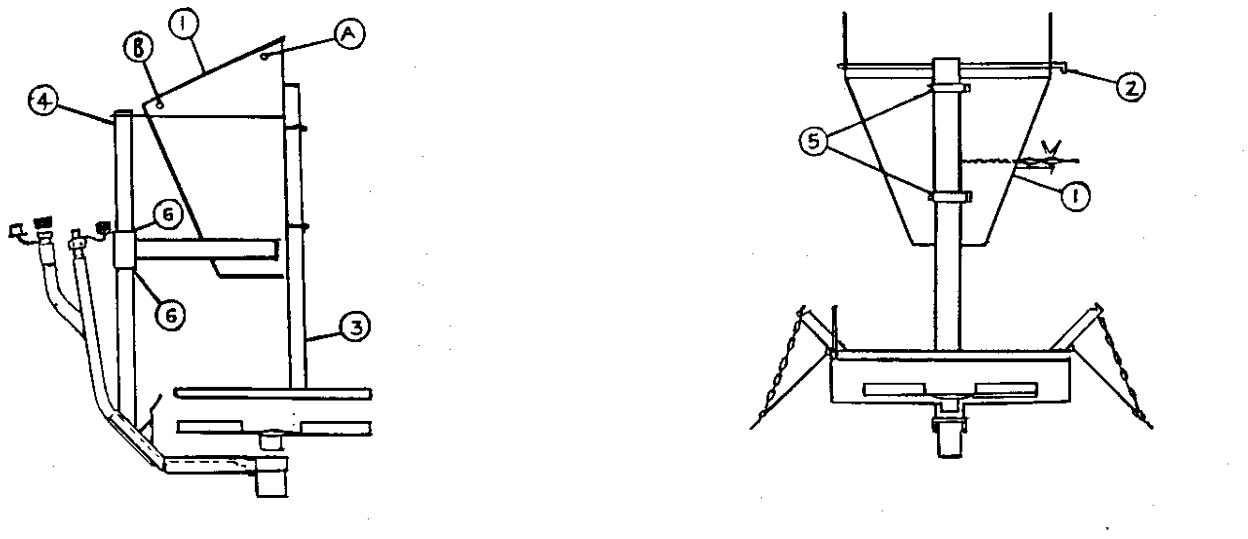
1. Remove the spinner motor support pipe (item #4) from the discharge chute (item #1) by loosening the Two "U" bolt clamps (item #6) and sliding the pipe out of it's holder.

2. Remove the deflector frame (item #3) from the discharge chute by loosening the four nuts (item #5) and sliding the rectangular tubing out of it's holder.

3. Set the discharge chute between the tailpieces at the rear end of the hopper and secure it by installing two ½" dia. bolts in the holes marked "A" and the locking rod (item #2) in the holes marked "B" in figure 4.

4. With the discharge chute in place, pivot it up slightly about the bolts in holes "A" (remove long locking rod for now) and slide the spinner support pipe into it's holder. Slide the pipe up until the bottom of the spinner motor is 15" to 20" above level ground. Since the pipe is supplied extra long from the factory, it may need to be shortened. Once the amount of extra pipe has been figured, remove the pipe and cut to the required length. **Note**: be sure the pipe is extended at least 1" through the hole in the top of the chute (see fig. 4 Note 1) and don't cut the pipe off too short the first time. Secure the spinner support pipe with the pipe clamps (item #6).

Figure 4 - Illustration of hydraulic spinner and discharge chute assembly.



5. Place the rectangular tubing of the deflector frame (item #3) in it's holder and adjust it until the pivot point of the flaps is about 9" above the spinner disc hold in place by tightening the nuts (item #5).

With these 5 steps, the discharge chute, spinner and deflector frame are properly installed. Now simply plug in the quick couplers on the hydraulic lines and you are ready to read the next section on applying power to the spreader.

Procedure for Hydraulic Machines with Enclosed Chute

Procedures for hydraulic machines with rectangular enclosed style chutes, bottom mount hydraulic motors.

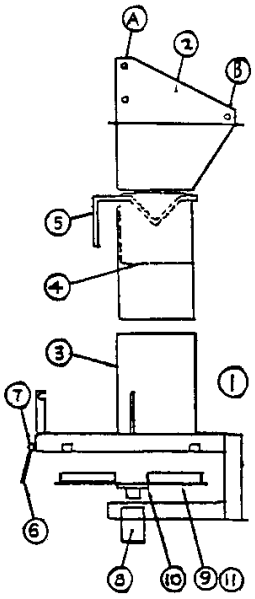
When shipped from the factory, the upper and lower chute assembly is shipped unassembled. The following procedure will allow you to install the chute properly on the machine.

1. Set the upper discharge chute between the tailpieces and secure it with (2) ½" bolts that are double nutted (holes "A"). This will be the chute pivot point. Install (2) ½" bolts (holes "B") to secure the assembly. See illustration #4A.

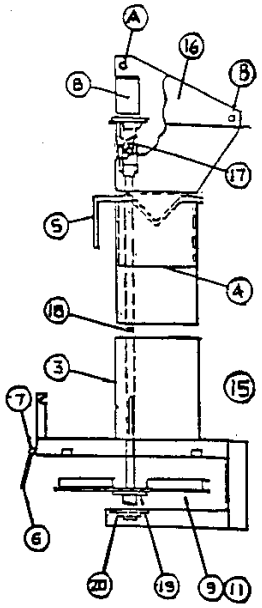
2. Slide the lower chute assembly into the upper chute until you have maintained a minimum clearance of 15" from the ground to the bottom of the hydraulic motor. Secure with the (4) ½" bolts.

Figure 4A Illustration

Bottom Mounted Motor



Top Mounted Motor



Procedure for Hydraulic Machines with Top Mount Hydraulic Motor

1. Set the upper discharge chute between the tailpieces and secure it with (2) ½" bolts that are double nutted (holes "A"). This will be the chute pivot point. Install (2) ½" bolts (holes "B") to secure the assembly. See figure #4A.

2. Slide the lower chute assembly into the upper chute until you have maintained a minimum clearance of 15" from the ground to the bottom of the bearing support arm. Install the spinner shaft universal assembly to the hydraulic motor, install the spinner shaft, and spinner disc (the spinner hub and spinner shaft must be drilled out to accept a 5/16" bolt). Secure the upper and lower chute assembly with (4) ½" bolts.

Any excess spinner shaft length may now be cut off below the lower bearing. Be sure all set screws and mounting bolts are tight.

Now that these items/procedures are complete you can plug in the quick couplers on the hydraulic lines and proceed to the next section.

CHUTE AND SPINNER ASSEMBLY PARTS LIST

BOTTOM MOUNTED MOTOR

ITEM	PART NUMBER	DESCRIPTION
1	31795-1	Assembly Complete – Bottom Motor
2	31796-1	Upper Half Chute Assembly
3	31797-1	Lower Half Chute Assembly
4	23894-1	Diverter Plate
5	23895-1	Diverter Handle
6	23846-1	Deflector Plate
7	11649-1	Deflector Pin
8	60005-2	Hydraulic Motor
9	20774-1B	Poly Spinner Disc
10	11882-1	Spinner Hub
11	20774-1	Steel Spinner Disc
TOP MOUNTED MOTOR		
15	31795-15	Assembly Complete – Top Motor
16	31796-10	Upper Half Chute Assembly
17	60011-11	1" x 1" Universal Joint
18	13459-1	Spinner Shaft
19	11145-1	Spinner Hub
20	21670-1	Bearing

APPLYING POWER TO THE SPREADER

(**NOTE**: Before applying power to the spreader be sure all persons are clear of all moving parts and all safety rules are followed.)

Now that the spreader has been properly mounted and the spinner disc properly installed and adjusted, the next step is to apply power to the spreader. (**NOTE**: All fluid levels on spreader engine, gearbox and hydraulic system have been set at the factory. However, it is a good idea to double check all fluid levels before starting to operate the spreader.) The procedure for applying power to each of the spreader types is as follows:

Hydraulic Drive (HL-HY2P)

This type of spreader has the patented SARATOGA POWER PAK9 conveyor drive system and a hydraulic spinner motor. The POWER PAK requires approximately 25 GPM of hydraulic oil at 1500 PSI.

The high pressure hydraulic fluid from the truck mounted pump is piped into the fluid control valve which is used to control the spreader. When the fluid control valve is located inside the truck cab it must always be mounted on a steel pedestal. (**NOTE**: The pedestal housing is an important safety device which helps prevent high pressure, high temperature hydraulic oil from entering the truck's cab in the event of a hose break.)

The fluid control valve has an "ON-OFF" handle for shutting off the flow of oil to the spreader and two pressure compensated flow control knobs (see the General Hydraulic Information section for explanation of terms) to control the amount of oil going to the conveyor and spinner. By adjusting the two knobs the spinner speed (knob marked "S") and the conveyor speed (knob marked "A") may be set. Once the desired setting is reached, the "ON-OFF" lever is used to start and stop the spreader. Be sure to always have the lever up against one of the "stops" on the valve and never anywhere in between.

The fluid control valve also contains an internal pressure relief set at 1500 PSI by the factory. When the valve lever is in the "OFF" position, the hydraulic oil is dumped back to the tank. Therefore all that is needed to start up the spreader is to engage the trucks hydraulic system, start the trucks engine and move the fluid control valve lever to the "ON" position.

9Patented

Hydraulic Drive (HL-HY2)

This type of spreader has a single gear type hydraulic motor to run the conveyor and a hydraulic spinner motor. The HL-HY2 spreader type requires approximately 25 GPM of hydraulic oil at 1500 PSI for normal operation.

The high-pressure hydraulic fluid from the truck-mounted pump is piped into the fluid control valve that is used to control the spreader. When the fluid control valve is located inside the truck cab it must always be mounted on a steel pedestal. (**NOTE**: The pedestal housing is an important safety device which helps prevent high pressure, high temperature hydraulic oil from entering the truck's cab in the event of a hose break.)

The fluid control valve has an "ON-OFF" handle for shutting off the flow of oil to the spreader and two pressure compensated flow control knobs (see General Hydraulic Information section for explanation of terms) to control the amount of oil going to the conveyor and spinner. By adjusting the two knobs the spinner speed (knob marked "S") and the conveyor speed (knob marked "A") may be set. Once the desired setting is reached, the "ON-OFF" lever is used to start and stop the spreader. Be sure to always have the lever up against one of the "stops" on the valve and never anywhere in between.

The fluid control valve also contains an internal pressure relief set at 1500 PSI by the factory. When the valve lever is in the "OFF" position, the hydraulic oil is dumped back to the tank. Therefore all that is needed to start up the spreader is to engage the truck's hydraulic system, start the truck's engine and move the fluid control valve lever to the "ON" position.

Hydraulic Drive (HL-HY3)

This type of spreader utilizes two orbital type hydraulic motors to drive the conveyor through a chain and sprocket speed reduction and a hydraulic spinner motor.

The high-pressure hydraulic fluid from the truck-mounted pump is piped into the fluid control valve that is used to control the spreader. When the fluid control valve is located inside the truck cab it must always be mounted on a steel pedestal. (**NOTE**: the pedestal housing is an important safety device which helps prevent high pressure, high temperature hydraulic oil from entering the truck's cab in the event of a hose break.)

The fluid control valve has an "ON-OFF" handle for shutting off the flow of oil to the spreader and two pressure compensated flow control knobs (see General Hydraulic Information section for explanation of terms) to control the amount of oil going to the conveyor and spinner. By adjusting the two knobs the spinner speed (knob marked "S") and the conveyor speed (knob marked "A") may be set. Once the desired setting is reached, the "ON-OFF" lever is used to start and stop the spreader. Be sure to always have the lever up against one of the "stops" on the valve and never anywhere in between.

The fluid control valve also contains an internal pressure relief set at 1500 PSI by the factory. When the valve lever is in the "OFF" position, the hydraulic oil is dumped back to the tank. Therefore all that is needed to start up the spreader is to engage the truck's hydraulic system, start the truck's engine and move the fluid control valve lever to the "ON" position.

GAS POWERED HYDRAULIC (HL-G-HY2)

(NOTE: Before starting any gas engine powered spreader refer to the engine manufactures manual for proper starting and warm up procedure.)

This type of spreader has the high-pressure hydraulic fluid supplied from an 20 H.P. minimum gas engine (others available as an option) close coupled to a hydraulic gear pump mounted at the rear of the spreader. The fluid control valve for the spreader is usually located at the discharge end of the spreader (when optional cab mounting of the fluid control valve, a steel pedestal must be used for safety reasons) and an electric solenoid valve turns on and off the oil flow at the spreader rear, from an electrical switch in the cab. (See figure 6).

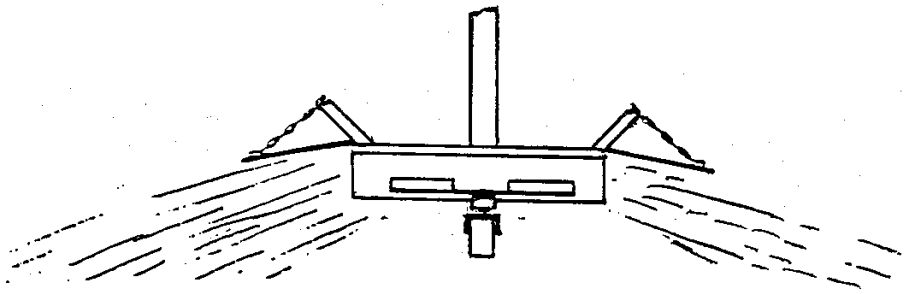
The high-pressure oil then flows from the fluid control valve to the gear type hydraulic motor that powers the conveyor and the hydraulic spinner motor.

To start this type of machine put the run-stop switch in the cab mounted control box to the on position and press the engine starter switch. Once the engine has warmed up, the switch for the electric solenoid valve may be activated and spreading will begin. The fluid control valve will allow for independent speed control on the conveyor and spinner (this is explained in the General Hydraulic Information section).

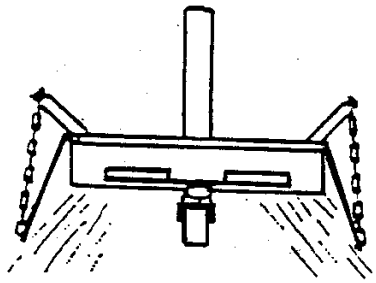
Once the desired setting is obtained, the electric solenoid valve is used to start and stop the spreader operation. Since the engine throttle is connected to the governor control and it is all automatic, all you need to do is start the engine, there are no throttle settings. The engine should run between 2800 and 3000 RPM with the conveyor running empty. The automatic governor will boost engine power to compensate for the increased load from sand or salt. To shut down the spreader simply throw the electric solenoid switch to stop spreading and push the stop button to shut down the engine.

CONTROLLING THE SPREAD PATTERN WITH A FUNNEL STYLE DISCHARGE CHUTE

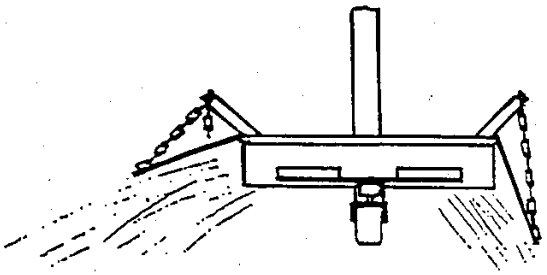
Proper adjustment of the deflector flaps is important for accurate spread control. Every Highlander spreader is supplied with three deflector flaps for spread control. By adjusting the angle of the flaps and the height of the flaps above the spinner disc almost any spread pattern may be obtained. When all flaps are raised a wide spread pattern will result.



When all flaps are lowered a narrow spread pattern will result.



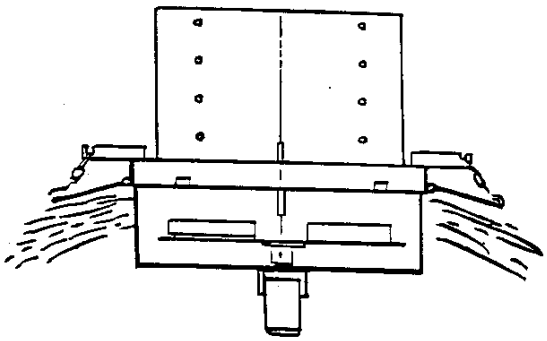
When one flap is raised and one flap is lowered a directional spread will result.



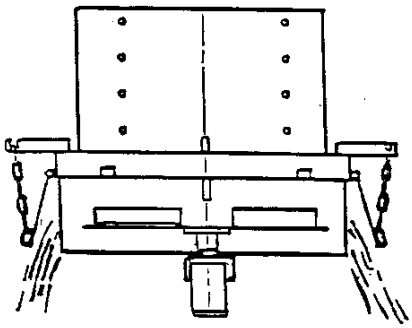
Another feature on a hydraulically driven spinner is that the spinner disc may be moved in an arc under the discharge chute-an oblong spread will be the result on the left or right sides. Along with the deflector flaps, the flowgate height and spinner speed may also be adjusted to help control the spread. It should not take very long to get all the adjustments set for your particular spreading needs. The following section will help you select from the various spinner speeds, flowgate openings and truck speeds to achieve the desired number of pounds of material spread per mile.

CONTROLLING THE SPREAD PATTERN WITH A RECTANGULAR ENCLOSED STYLE CHUTE

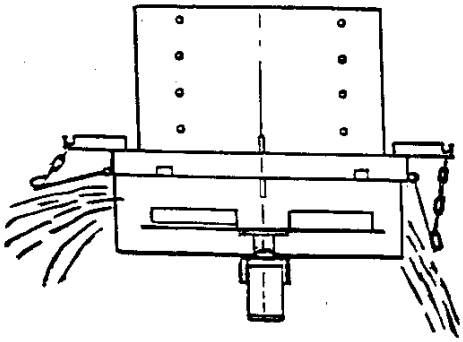
Proper adjustment of the deflector flaps is important for accurate spread control. Every Highlander spreader is supplied with three deflector flaps for spread control. By adjusting the angle of the flaps and the height of the flaps above the spinner disc almost any spread pattern may be obtained. When all flaps are raised a wide spread pattern will result.



When all flaps are lowered a narrow spread pattern will result.



When one flap is raised and one flap is lowered a directional spread will result.



Another important feature is the internal diverter plates. They are located in the upper half of the enclosed chute. The diverter plates can be adjusted to “fine tune” the spread pattern.

APPLICATION RATE TABLES

The following four tables will serve as a guide to tell you how much material is being spread for the various conditions of gate opening, truck speed, hydraulic valve position or engine throttle setting. These figures are approximate and are good within 10%. All figures are for Sand, deduct 5% for Salt. If any further performance information is required contact your local Tarco distributor for the information.

TABLE 2

HIGHLANDER® HL-HY2 PERFORMANCE CHART

POUNDS PER MINUTE (50:1 GEARBOX)

Valve Position	**GPM**	**RPM Drive Shaft**	**Gate Opening (In Inches From Wear Plate)**							
			1	2	3	4	5	6	8	10
1	.2	2	31	61	92	122	153	183	244	305
2	4	4	61	122	183	244	305	366	488	610
3	7	7	107	214	320	427	534	641	855	1068
4	11	12	164	327	491	655	818	982	1309	1637
5	13	14	198	397	595	794	992	1190	1587	1984
6	15	16	229	458	687	916	1145	1373	1831	2289
7	18	20	275	549	824	1099	1373	1648	2197	2747
8	20	22	305	610	916	1221	1526	1831	2442	3052
9	22	24	336	671	1007	1343	1679	2014	2686	3357
10	24	26	366	732	1099	1465	1831	2197	2930	3662
11	26	28	379	793	1190	1587	1984	2381	3174	3968

TABLE 3
HIGHLANDER® HL-HY2P PERFORMANCE CHART
POUNDS PER MINUTE (SARATOGA POWER PAK)

Valve Position	**GPM**	**RPM Drive Shaft**	**Gate Opening (In Inches From Wear Plate)**							
			1	2	3	4	5	6	8	10
1	.2	1	12	23	35	47	58	70	93	117
2	4	6	93	187	280	373	467	560	748	934
3	7	11	165	329	494	660	824	989	1319	1649
4	11	18	258	517	775	1033	1292	1550	2067	2584
5	13	21	307	613	920	1226	1533	1840	2453	3066
6	15	24	353	707	1059	1413	1766	2120	2826	3533
7	18	29	423	846	1270	1693	2117	2540	3387	4234
8	20	32	470	940	1410	1880	2350	2820	3760	4700
9	22	35	516	1034	1550	2067	2584	3101	4134	5168
10	24	39	563	1127	1690	2254	2817	3381	4508	5635
11	26	42	611	1223	1835	2446	3058	3760	4893	6117

TABLE 4
HIGHLANDER® HL-HY3 PERFORMANCE CHART
(POUNDS PER MINUTE)

Valve Position	**GPM**	**RPM Drive Shaft**	**Gate Opening (In Inches From Wear Plate)**							
			1	2	3	4	5	6	8	10
1	.2	0	0	0	0	0	0	0	0	0
2	4	3	44	88	132	176	220	264	352	440
3	7	6	88	176	264	352	440	528	704	880
4	11	10	146	292	438	585	730	876	1170	1460
5	13	13	190	380	570	761	950	1140	1522	1900
6	15	16	234	468	702	937	1170	1404	1874	2340
7	18	18	264	548	792	1056	1320	1584	2172	2640
8	20	20	292	584	876	1170	1460	1752	2340	2920
9	22	22	308	636	924	1282	1680	2016	2692	3360
10	24	24	350	700	1000	1400	1750	2100	2800	3500
11	26	26	380	760	1140	1522	1900	2280	3044	3800

MAINTENANCE INTRODUCTION

The following sections will guide you in the proper maintenance procedures for your Highlander® spreader. It is important that all applicable maintenance procedures be followed to get the maximum amount of use from the spreader. This section should be read thoroughly as it gives plenty of useful information and some important tips to prolong the spreader life. At the end of this section there are some off season storage tips to help protect the spreader during the off season.

CAUTION: Before any adjustments or lubrication work is performed on the spreader be sure to follow all safety rules.

- Keep all shields and guards in place when operating this equipment.
- Adjust and lubricate machine only when the power source is off and locked out.
- When any mechanism becomes clogged, shut off the power source and lock it out before attempting to clear the blockage.
- Keep hands, feet and clothing away from all moving parts.
- Always use a funnel for filling fuel tanks and be sure the engine is off. Do not fill the tank to overflowing.
- Periodically check all hoses and fittings for wear and tightness. Rupturing hoses may produce a high-pressure stream of hot hydraulic oil.

LUBRICATION

The lubrication of your Highlander® Spreader is an important part of obtaining a prolonged service life. While all bearings and gearboxes have been lubricated at the factory, further periodic lubrications will be required. The following items will require periodic maintenance.

1. Engine Crankcase - Important: See engine manufactures instruction book for details. Keep the engine crankcase filled at all times to the full mark on the dipstick.

2. Air Cleaner – Important: Refer to the engine manual for details. When using the spreader in an extremely dusty environment the frequency of air filter changes should be increased.

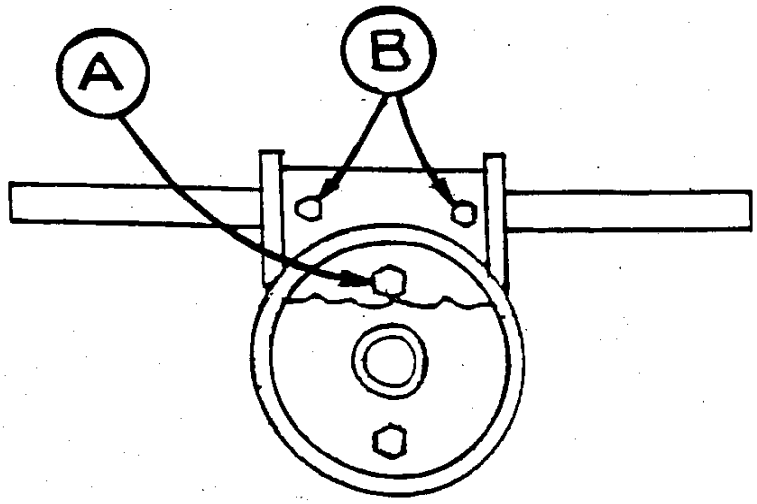
3. Bearings – All the bearings on your spreader are sealed, heavy duty and self-aligning. For the first year of operation it should not be required to grease any of the bearings as this has been done by their manufacturer. The bearings used were designed to operate at elevated speeds and under continuous duty. Since bearings on your spreader operate as low as 20 RPM more harm will be done to the bearing by over greasing than by under greasing. When lubrication is required, use a hand-operated grease gun and a light bearing grease. It is a good idea to

keep the bearing race and any shafts protruding through the bearings heavily coated with grease or light tar. This will retard corrosion on the shaft and allow for easier shaft removal should it become necessary.

4. Right Angle Worm Gear Reducer – The worm gear speed reducer (used on the HL-HY2) has been properly filled at the factory and should be checked periodically during the usage season. If the oil level is low, refill with a high quality SAE-90 gear lube to the inspection plug "A". The two grease fittings at "B" should be lightly greased once or twice each season. It is recommended that at the end of each season you completely drain the gearbox to remove all oil and any accumulated water. Then fill the gearbox to the top with gear lube for the off season storage. Before the next spreading season the gearbox should be drained back down to the inspection plug "A".

(See figure 10)

Figure 10 – Illustration of 50:1 gearbox
Lubrication points.



GENERAL HYDRAULIC INFORMATION

If your Highlander Spreader is powered through hydraulic motors, there are a few items of importance that need particular attention. By following the guidelines and the maintenance procedures detailed here, years of service will be given by your spreader.

To provide the hydraulic power to the spreader the hydraulic pump must be mounted either on the truck (models HL-HY2, HL-HY2P, HL-HY3) or on the spreaders engine (models HL-G-HY2). Important: Regardless of where the hydraulic power is supplied from, when the hydraulic valve which controls the flow of oil to the spreader is mounted inside the trucks cab, it must be mounted on a totally enclosed steel pedestal. In the event of a hose breaking where it attaches to the cab valve, the pedestal will help prevent high pressure, high temperature hydraulic oil from entering the truck's cab.

When the hydraulic power is to be supplied through the truck's hydraulic system, the pump may be mounted in any of three positions.

These positions are:

(a) front crankshaft mounted, speed reduced and clutched
(b) engine mounted, belt driven, constant running or clutched
(c) transmission PTO mounted, clutched

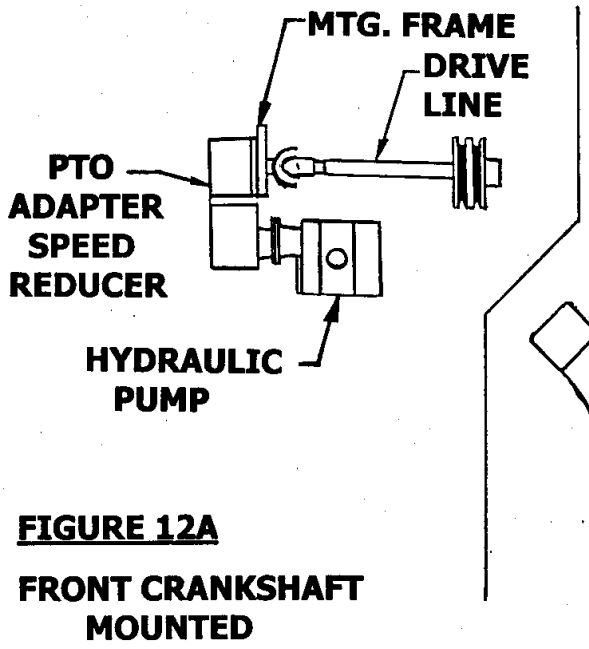


FIGURE 12A

FRONT CRANKSHAFT MOUNTED

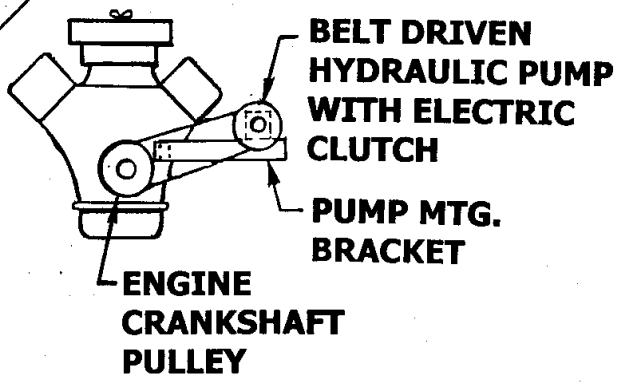
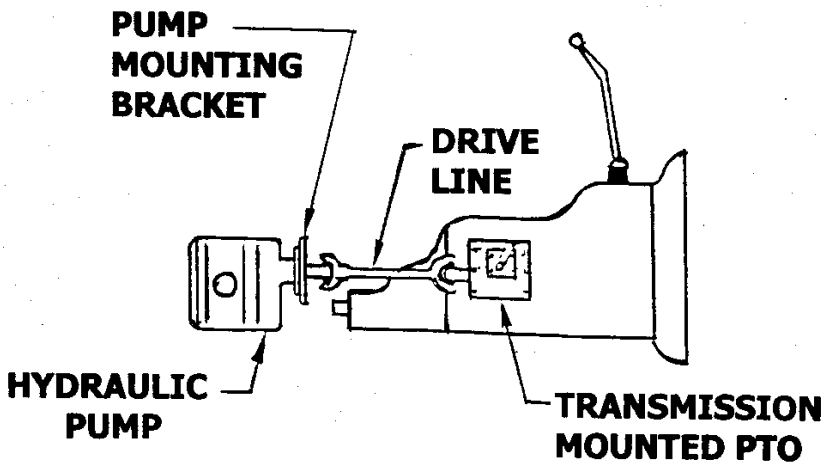


FIGURE 12B

ENGINE MOUNTED BELT DRIVEN

Figure 12C-Transmission Mounted PTO
(Direct or Driveline)

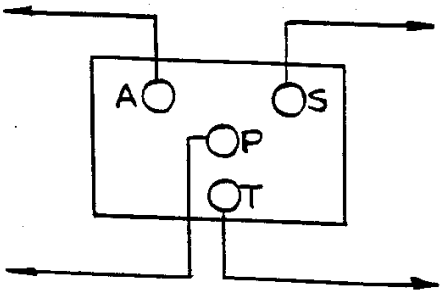


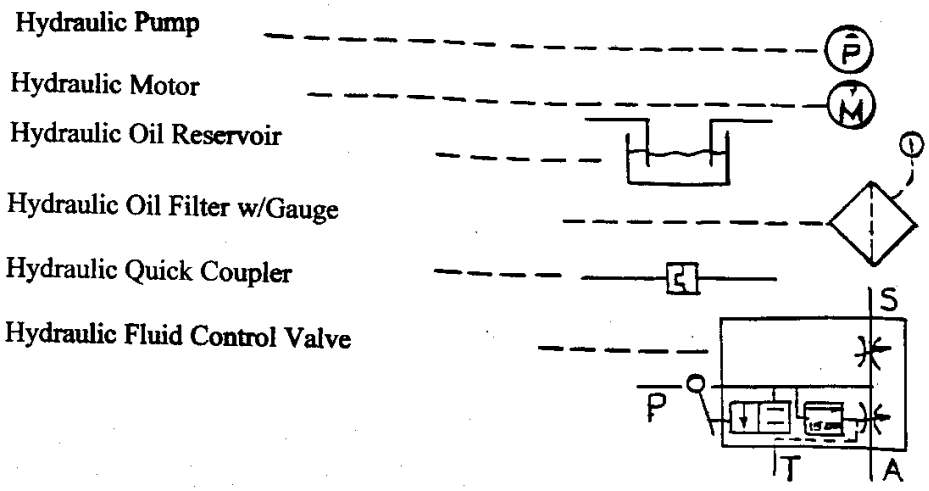
The type of hydraulic fluid used in the spreader circuit is another very important part of the spreader operation. The fluid used should have good antifoam and corrosion protection ingredients. Additionally the fluid should have a viscosity rating at 100 SSU at 100 degrees Fahrenheit. This viscosity rating is required to provide an adequate flow of oil to the pump in cold weather conditions.

The size of the oil reservoir is another important part of the hydraulic system. For wintertime spreader operation, the Loughberry Mfg. Corp. recommends the reservoir size to be equal to the output of the pump in one minute. This means that a 20 GPM pump should have a 20-gallon reservoir size. If the spreader is to be used in a warm environment, then the reservoir size should be increased to two or three times the pumps output in one minute. These sizes will ensure the hydraulic oil will not build up too much heat and cause damage to the hydraulic system and accelerated oil break down. All spreaders of the engine-hydraulic type (HL-G-HY2) have a 15 or optional 20-gallon reservoir installed by the factory. When the spreader is of the straight hydraulic type (HL-HY2, HL-HY2P, HL-HY3) and to be run off the truck's existing hydraulic system, the reservoir size on the truck should be checked and enlarged if required.

Where the return lines run into the hydraulic reservoir, they should all be run through a hydraulic filter. The filter should be of high quality and have a maximum mesh size of 25 microns. This filter will help keep rust, dirt and other contaminants from damaging the pumps, motors, valves and cylinders. If your spreader is a gas-hydraulic type then a filter has been installed by Loughberry Mfg. Corp. If the spreader is to be run off the trucks hydraulic system then be sure a filter is installed in the return line. It is recommended that the filter be changed after 100 hours of operation or once each season.

The control of the oil flow to the spreader is through a pressure compensated, priority flow control valve. This valve directs the first amount of oil flow to the spinner circuit and all excess flow to the conveyor drive. This means that if the pump is supplying 25 gpm and the spinner is only using 4 gpm, then the remaining 21 gpm will go to the conveyor drive motor. If the conveyor motor does not require the full 21 gpm, then the excess flow will be dumped back to the tank. This valve also ensures that the same oil pressure is supplied to the spinner and conveyor circuits. The built in relief cartridge on the valve is factory set at 1500 PSI to protect the system from over-pressurizing. This type of valve also provides for independent spinner and conveyor motor speed with 11 detented flow positions to choose from on each circuit. Once the desired valve setting is obtained then the "On-Off" lever on the valve should be used to start and stop the spreader. At no time should the handle be left in between the two stops on the valve. It should be totally on or off at all times. On the bottom of the valve there are four NPT ports, one marked "A" for auger or conveyor power, "S" for spinner power, "P" for pump input pressure and "T" for tank return, this valve is represented in the hydraulic schematics below and on the next page.





HYDRAULIC SCHEMATIC ILLUSTRATIONS

Figure 13A – Hydraulic Schematic
HL-HY2

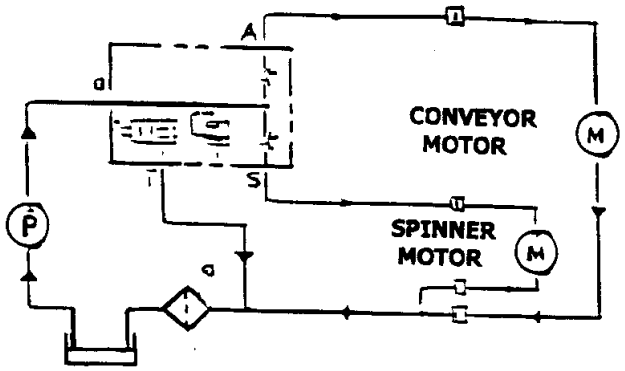


Figure 13C – Hydraulic Schematic
HL-HY3

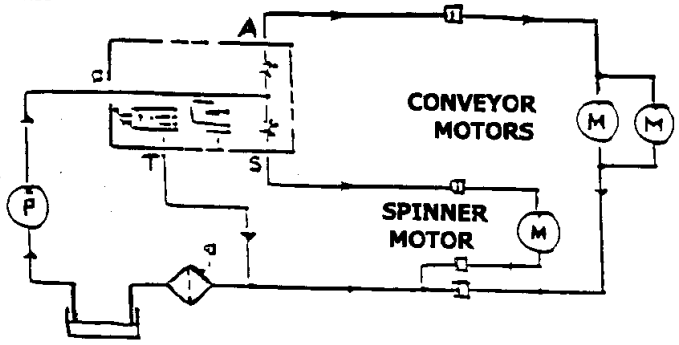
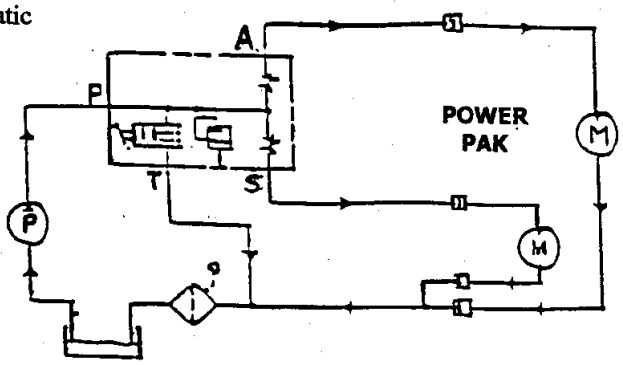


Figure 13D – Hydraulic Schematic
HL-HY2P



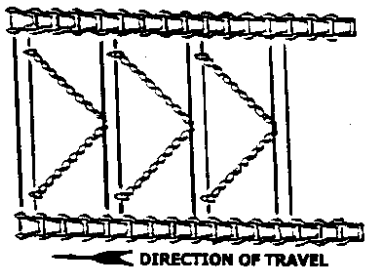
GENERAL CONVEYOR CHAIN INFORMATION

The conveyor chain in your Highlander is a very important part of the spreader. It is ruggedly constructed and with proper maintenance, will deliver years of service. An important part of good conveyor chain life is to install the optional top screens. Top screens will help prevent large chunks of frozen sand, salt, and foreign material from blocking and damaging the conveyor system.

The standard chain has an all riveted construction with ¼" x 1-1/2" flight bars welded to every other link. The chain has one connecting link where a chain pin is held in place by a stainless steel cotter pin. If this pin is to be replaced, be sure to use a stainless steel cotter to prevent later chain separation due to a rusted away cotter. All Highlander chains have 23-1/2" over all chain width.

There are other optional conveyor chains to choose from. One option has the standard chain with 3/8" x 1-1/2" flight bars welded to every other link. Another option is the CHEVRON϶ chain. This CHEVRON϶ shape is ideally suited for uniformly spreading straight de-icing chemicals or abrasives as the Chevron provides a smooth flow of these materials to the spinner.

Figure 14 – Illustration showing Chevron✪ chain construction.



Located in the parts section is all the required ordering information on conveyor chain, repair flites, repair links, repair pins and replacement conveyor chain sprockets. All these items are available from stock for fast delivery. (NOTE – The Chevron϶ and non Chevron chains are interchangeable on all Highlander Spreaders. The Loughberry Mfg. Corp. will also manufacture upon special request conveyor chains for non Highlander machines. Contact your local TARCO® distributor or Loughberry Mfg. Corp. for more details.

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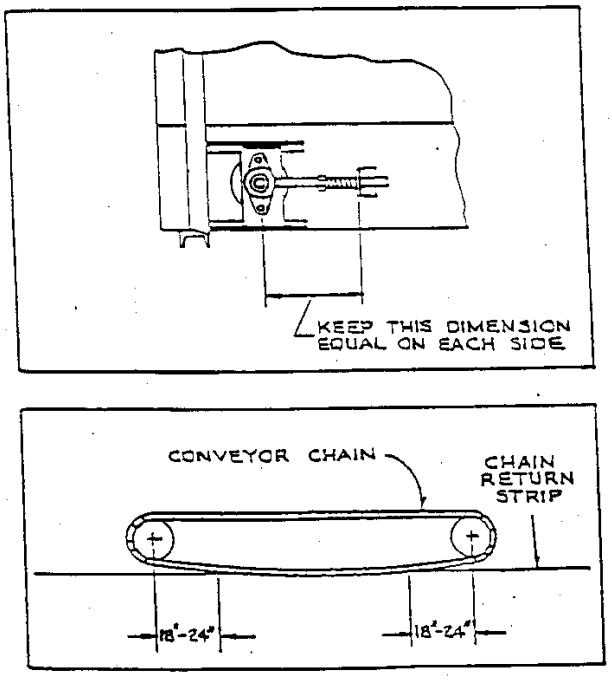
The importance of proper chain tension can not be overstressed. When the chain goes out of adjustment, excessive and rapid chain wear will result. The take-up assemblies on each side of

the chain idler (opposite the discharge end) should be adjusted evenly. The adjustment should be checked by measuring from the center of the idler roll to the edge of the take up angle as shown in figure 11. This will ensure the idler roll of being square with the drive shaft at the discharge end.

IMPORTANT – You should check and adjust the chain tension after the first 2 or 3 loads of material and once each week after that. This tension check is important for good chain life. Be sure to inspect the entire conveyor chain for damage and check the idler bearings for good shaft tightness.

The other thing to check when adjusting the chain is the slack under the conveyor wearplate. The chain should be adjusted such that 18" to 24" of the chain is above the chain return path as measured from the shaft center. When the chain has this amount of slack in it the least amount of wear will result. Quite often the chains are adjusted too tightly resulting in not enough chain give and an increased torque. Another recommended conveyor maintenance procedure is to thoroughly flush the hopper and under the chain return section after each use. This flushes out all the sand and salt which would accumulate there during normal operation. (Note: Be sure to keep all hands and feet clear of the moving chain at all times and always follow all safety rules.) As an option an automatic drip type oiling system can be easily installed on any spreader. This option will further increase the chain life.

Figure 14A – Illustration of proper chain tension.



GENERAL ENGINE INFORMATION

If your Highlander® spreader is equipped with it's own engine, be sure to carefully read the engine manufacturers instruction manual supplied with the spreader. (Note: The Loughberry Mfg. Corp. makes no warranty whatever in respect to gasoline or diesel engine, ignition, starters, alternators, batteries, carburators, or other power accessories connected with the engine as these are in warranty by their respective manufactures.) Before starting the engine be sure the crankcase, gear case, and air filter are full to proper level. Also be sure to keep all cooling fins and circulation holes clean at all times on the engine and it's enclosure. Engine overheating can cause many problems such as sticky valves, loss of power, and eventual engine damage. The engine has been test run at the factory but has not been "Broken In". For the proper break in procedure refer to the engine manual. The engine is also equipped with a 12 volt DC starting system and the electrical schematics may be found in another section of this book. By following these few simple maintenance procedures, your TARCO® spreader will provide you with years of satisfactory performance.

SARATOGA POWER PAK϶ MAINTENANCE INSTRUCTIONS

The Saratoga Power Pak϶ is a unique way to power your Highlander Spreader. It consists of two double acting cylinders timed to give you a smooth flow of power over a wide speed range. When combined with the hydraulic valve, the drive shaft rotating speed can vary from ½ to 40 RPM where conventional machines the range is from 6 to 25 RPM. This wider RPM range allows you more flexibility in your spreading operation.

In addition to ordering your Highlander Spreader with the Saratoga Power Pak϶ on it from the start, you may order the complete drive unit to bolt onto any Highlander spreader. You may even retrofit many other spreader makes with a Saratoga Power Pak϶ drive unit, consult your local TARCO® distributor or the factory for details.

There are only a couple of maintenance items on a Saratoga Power Pak϶, which would not be found on conventional drives. The sliding parts in the valve actuator should be kept free from rust, dirt, paint, and grime and should be lightly oiled on a weekly basis. The cylinder end bearings should be given a small amount of molybdenum disulfide grease on a weekly basis and the shaft bearings need a small amount of general purpose grease on a yearly basis.

϶Patented

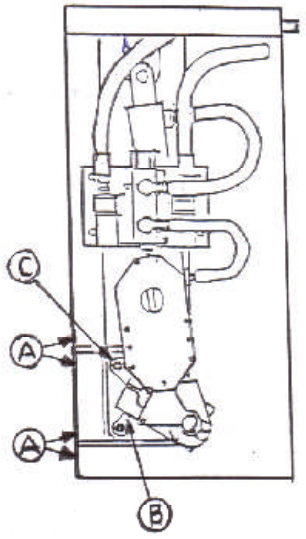
Also, be sure the bearing mounting bolts, crank arm bolts and Saratoga Power Pak9 mounting bolts are tightened according to the specified torques in the following illustration.

Figure 15 – Illustration showing bolt torque Specifications for Power Pak.

(A) Eight (8) mounting bolts ½-13 UNC 70 ft.-lbs

(B) Two (2) crank arm bolts 5/8-18 UNF 180 ft.-lbs

(C) Eight (8) bearing mounting Bolts 5/8-18 UNF 180 ft.-lbs



VALVE TIMING PROCEDURE

(1) Check the bearing and valve mounting bolts for proper torque, refer to figure 15 above.

(2) Make sure that all sliding surfaces in the valve actuator are free from paint, grime and are sliding smoothly.

(3) Check the distance from the center of the cylinder pivot pin to the valve body casting. This dimension should be five inches plus or minus one-sixteenth inch (5” ± 1/16”) (See Figure 16A). If the valve has moved, readjust to the proper dimension and re-tighten.

(4) Measure the distance of the valve spool travel (See Figure 16B). When the cylinder is pushing, the measurement should be one half to nine sixteenths (1/2” to 9/16”). When the cylinder is pulling (See Figure 15C) the measurement should be zero to one sixteenth (0” to 1/16”). If any measurement falls outside of this range, see step five.

(5) Remove the valve bumper cap and inspect the components for wear damage and cracks (See Figure 16D). The elastic washer in the cap should be one quarter of an inch thick (1/4”). Both washers should be intact and without cracks. The hex head cap screw should be installed with locktite (or equivalent) and torqued to twelve foot pounds (12 ft.-lb). If any of these parts are damaged, order the appropriate replacement parts from the parts section in this book.

(6) After checking the above items make sure that the timing is adjusted so that the valve spools shift at top dead center, plus or minus five degrees. (± 5 degrees)

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TO CHECK AND RESET TIMING

Watch from the side as the crank approaches the vertical position and note the position of the crank when the valve spool shifts. If the valve does not shift when the crank is vertical (± 5 degrees) adjust the valve actuator as follows:

- Loosen the locknut on the push-pull and turn the rod until there is a one quarter inch of threads exposed (1/4" See Figure 16E).

- Run the machine observing where the crank is when the valve shifts. **CAUTION** – be sure all hands and clothing are well away from the moving parts during this observation. Only make adjustments to the timing when the power source is shut down and locked out.

- If the crank is Before Top Dead Center (BTDC) when the valve spool shifts, tighten the push-pull rod in one half turn increments (180 degree increments) and return the machine until the crank arm is vertical (± 5 degrees) when the valve shifts (See Figure 16F).

- If the crank is After Top Dead Center (ATDC) when the valve spool shifts, loosen the push-pull in half turn increments (180 degree increments) and re-run the machine until the crank arm is vertical (± 5 degrees) when the valve shifts (See Figure 16G).

- When the proper adjustment is reached, retighten the locknut on the push-pull rod (See Figure 16E).

NOTES ON ADJUSTING TIMING

1. Make adjustments only when the spool and rod are inline to avoid damage to the valve and actuator (See Figure 16H).

2. Adjust the quiet side first. Often the side, which is out of adjustment, is opposite the one, which is making the noise.

3. If possible, test for pressure before and after you work on your machine by "Tee-ing" in a pressure gauge in the Saratoga Power Pak® main high pressure feed line. When the hopper is empty, the operating pressure at 10 GPM (16 GPM Drive Shaft Speed) should be less than 100 PSI. This is the only way of measuring performance and improvements.

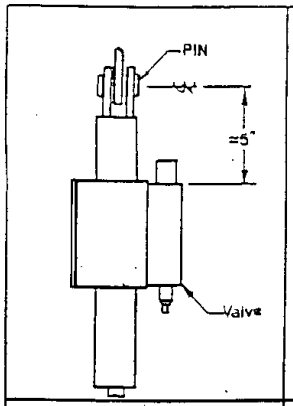


FIGURE 16A

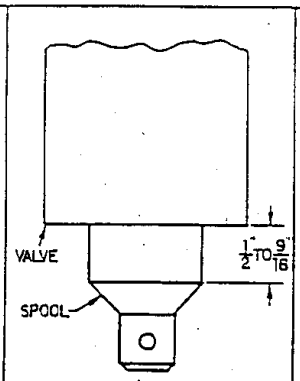


FIG. 16B

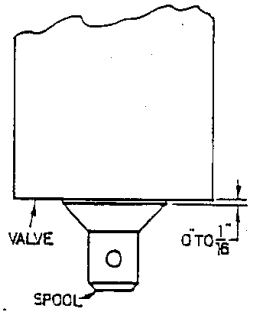


FIG. 16C

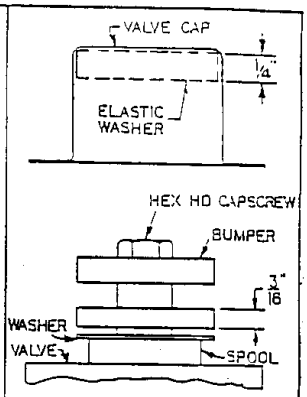
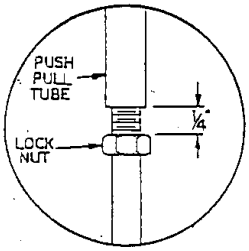
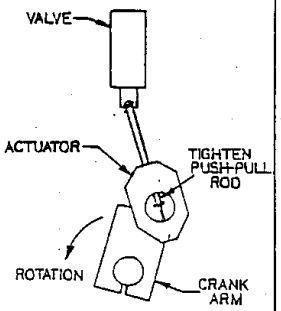


FIG. 16D



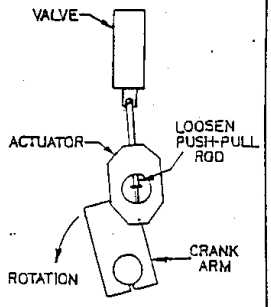
ACCESS HOLE IN VALVE ACTUATOR

FIGURE 16E



BEFORE TDC

FIG. 16F



AFTER TDC

FIG. 16G

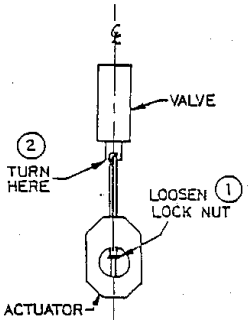


FIG. 16H

OFF SEASON STORAGE

At the end of each spreading season good preventative maintenance procedures will help prolong the life of your spreader. On all engine driven models the crankcase, oil bath air cleaner, and clutch reduction assembly should be drained completely and refilled with fresh lubricants according to the lubrication section of this manual and engine manual. Also remove each spark plug and pour two tablespoons of motor oil into each cylinder to help retard corrosion. All drive chains should be thoroughly lubricated and exposed shafts smeared with grease to help prevent corrosion. As at the end of each use, the entire hopper should be thoroughly flushed with water and a liberal amount of motor oil applied to the conveyor chain. This will prevent the conveyor chain from freezing due to corrosion. To store the Highlander, the optional Hoist-It-Legs are available from your TARCO® distributor as outlined in the option section of this book. There is also a steel-four wheel dolly available as an option to set the Highlander on during the off season.

HIGHLANDER OPTIONS

In addition to the many standard features on the TARCO® Highlander Spreaders, there are also many options available. The following pages will list most all of the regularly available options for any Highlander Spreader. Loughberry Mfg. Corp. will, upon request, design and build other options for your Highlander Spreader, contact your local TARCO® distributor for details. The following optional items are illustrated in the parts section refer to the index for proper page number. Always give the serial and model number of your Highlander to speed your order.

CATWALKS:

Constructed of heavy-duty 11 gauge diamond tread steel 24” inches wide. They bolt directly to the hopper gussets. When ordering specify hopper length, number of gussets and whether or not there is an engine on the spreader. Includes the required mounting brackets.

RUBBER MUD FLAPS:

This mud flap has a heavy-duty construction and “LOUGHBERRY MFG. CORP. ” printed in raised letters. It mounts under the catwalks and behind the rear wheels (may be mounted in front of the rear wheels also).
The flaps are 24” wide x 36” long.

HOPPER LADDER:
This all steel welded ladder mounts on the left or right side of the spreader. The ladder is supplied with the required mounting hardware.

WARNING BUMPER:
The bumper is constructed of 5" channel iron and mounts directly to the truck frame. When installed it helps prevent accidental damage to the spinner assembly and discharge chute. Supplied with mounting hardware. If your spreader is equipped with hoist-it-legs, the bumper may be mounted in the rear sockets. Please specify this when ordering.

INVERTED VEE:
This device will reduce the pressure on the conveyor chain when the hopper is fully loaded. It is recommended when spreading heavy sand or stone chips to have this option installed. The inverted vee is manufactured with heavy gauge steel and comes complete with all mounting hardware. Specify hopper length when ordering.

STAINLESS STEEL LIGHT BAR ASSEMBLY:
This assembly consists of a stainless mounting bracket with top stainless steel shielding. This assembly bolts to the machine. The lighting consists of; one three light cluster, two 7" flashing lights (specify red or amber), stop-directional tail lights, two spotlights. Assembly is pre wired with a 7-pin male/female connector.

STAINLESS STEEL LIGHT BAR (MASS DOT STYLE):
This assembly is a smaller version of our standard light bar, similar construction with different lighting. The lighting consists of; one three light cluster, two 7" flashing lights (specify red or amber) and one spinner spotlight. Assembly is pre wired with a 4-pin male/female connector.

ELECTRIC THROTTLE:
This electric throttle is designed to give you greater flexibility in controlling gas engine HL-G-HY2 powered spreaders.

DUMP BODY HOLD DOWNS:
This assembly uses a chain and screw clamp arrangement to help hold the hopper in the dump body. The chain end goes through the keyhole bracket welded to the hopper side and the screw end catches onto the ledge on the dump body side.

TAILGATE LOCK:
This heavy-duty device bolts to the rear of the hopper and engages the tailgate-locking device on a dump body. It helps hold the hopper from moving forward or backward inside the dump body.

UPPER TAILGATE LOCKING ASSEMBLY:
This device bolts to the hopper side at the rear and catches into the upper tailgate pinhole on the dump body. Made of heavy duty, ½" thick steel, it helps secure the hopper inside the dump body. Comes in a set of two and includes 2 dump body hold-downs for front of hopper.

DUMP BODY STABILIZER PIPE:
The stabilizer pipe assembly has two sockets which weld to the front hopper cross channel. Then two pieces of pipe extend out of the sockets to hold the hopper in the middle of the dump body. Easily adjustable and removable.

AUTOMATIC CONVEYOR CHAIN OILER:
A drip type automatic chain oiler is available to keep a steady supply of lubricating oil on the conveyor chain. Easily installed on the spreader, it will help prolong the chains life.

CAB SHIELD:
When the hopper is chassis mounted, the cab shield helps protect the cab from sand and salt while loading the hopper. Heavy-duty construction and removable.

RUBBER SPILL APRONS:
Constructed of heavy weight rubber belting, they attach to each side and the front of the hopper to prevent material from spilling down the side of the hopper and into the dump body.

TOP SCREENS:
Top screens have heavy-duty construction with 2-1/2" openings. They attach to a central top screen pipe, which is bolted to the hopper ends and gives the screens a 3-5/8" pitch from center. Each top screen section pivots about the top screen pipe for access to the hopper interior. Be sure to specify the hopper length when ordering.

EXTENDED TO REAR TAKE-UPS:
This option allows the take-ups to be adjusted from the discharge end of the spreader when mounted inside a dump body.

SHORT HYDRAULIC DISCHARGE CHUTE:
Is available in an enclosed or funnel version chute assembly. It is used when the spreader is chassis mounted on a truck with a low frame height. Interchangeable with standard funnel chute.

REAR TWIN HYDRAULIC CHUTE:
When twin spinners are desired at the rear of the truck, this chute and special spinner assembly is used. This set-up goes in place of the standard single spinner and mounts in the same holes.

FRONT MOUNTED – SINGLE SPINNER HYDRAULIC CHUTE:
When the spreader is front mounted on a truck chassis this chute and special spinner assembly is used. It allows for spreading of material in front of the rear drive wheels. Uses the same mounting holes as the standard chute.

FRONT MOUNTED – TWIN SPINNER HYDRAULIC CHUTE:
When the spreader is front mounted with twin spinners this option is used. It allows for spreading of material in front of the rear drive wheels. Uses the same mounting holes as the standard chute.

SECTION TWO

PARTS INFORMATION

The second section of this book deals with identifying the necessary replacement parts for your Highlander Spreader. By following through the upcoming pages a logical presentation of the component parts will be presented starting with the basic hopper and progressing through the drive options, spinner options and so on until all replacement parts have been identified.

BE SURE THAT WHEN ORDERING ANY REPLACEMENT PARTS TO ALWAYS GIVE THE MACHINE MODEL AND SERIAL NUMBER.

IMPORTANT MAINTENANCE INFORMATION REGARDING ELECTRICAL CONNECTIONS ON TARCO® MATERIAL SPREADERS

For optimum performance and corrosion resistance, a light to medium application of dielectric grease, at the beginning and end of each season of operation, should be applied to all electrical disconnects.

SECTION TWO

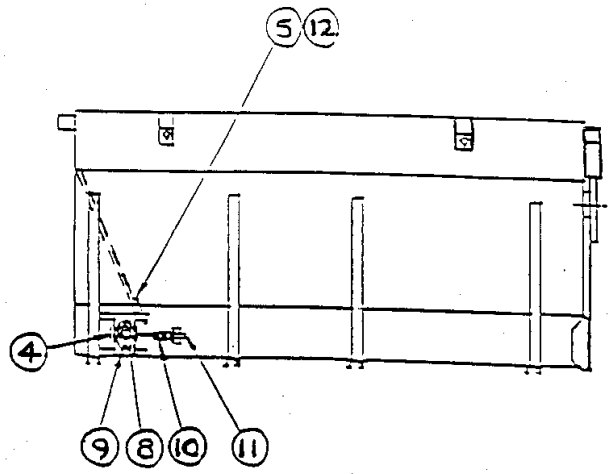
PARTS

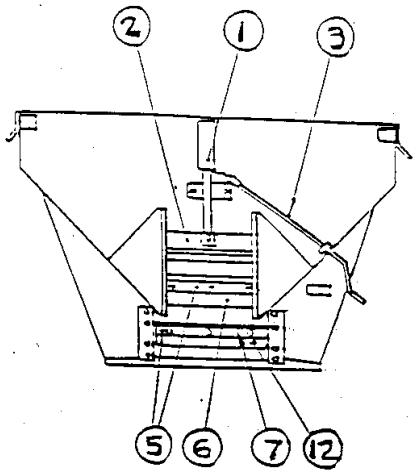
HYDRAULIC UNITS

HIGHLANDER MODELS:

HL-HY2
HL-HY2P
HL-HY3
HL-G-HY2
HL-2C

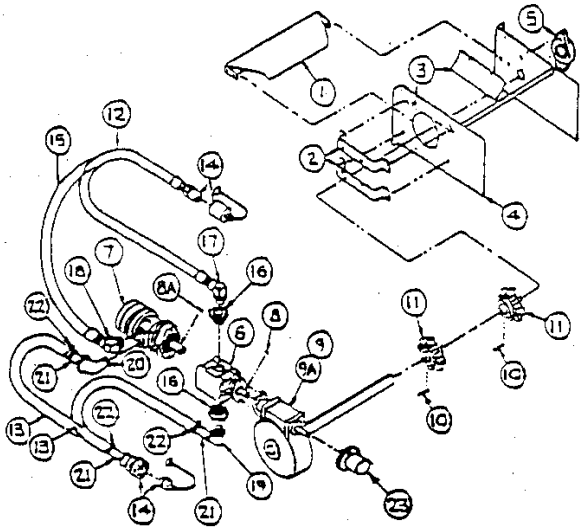
BASIC HIGHLANDER HOPPER PARTS LIST





ITEM	TARCO PART# REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	31091-24	23840-1	Flowgate Jack (includes rack & gear housing)
2	31091-2	23839-1	Flowgate
3	31091-17	13418-2	Flowgate Crank Rod
4	23907-1	23907-1	Idler Drum
5	22607-2	13417-1	Keeper Plate
6	22607-3	22607-3	Rubber Flowgate Wiper
7	31223-1	23841-1	Wearplate-Specify Hopper Length
8	23908-1	13405-2	Bearing Mounting Plate
9	21670-2	21670-2	Bearing
10	21275-4	21275-4	Take-Up Spring
11	13505-1	13505-1	Take-Up Adjusting Rod
12	22607-5	22607-5	Rubber Hopper Seal

HL-HY2 TAILPIECE ASSEMBLY

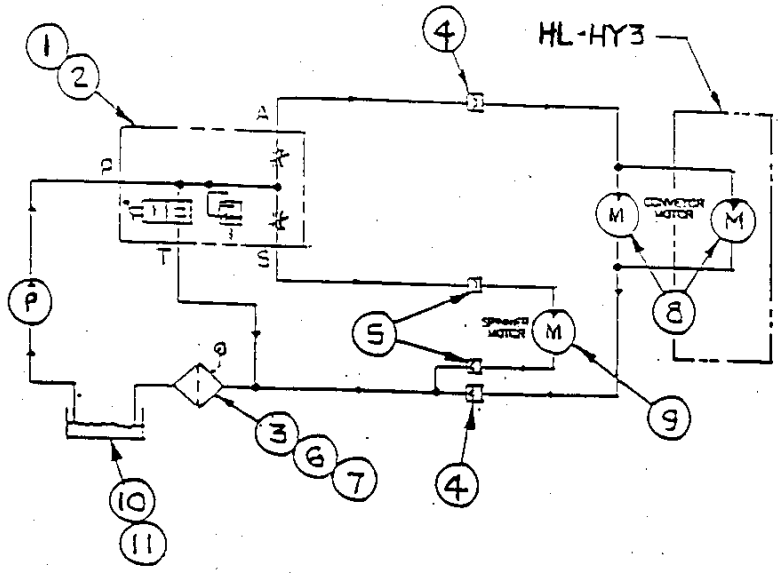


ITEM	TARCO PART# REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	22695-1	22695-3	Wearplate Extension
2	22895-1	22895-2	Gearbox Mounting Brackets (1 Pair)
3	22615-1	22615-3	Chain Shield Extension
4	31206-1	23842-7	Endplate Assembly
5	21670-6	21670-6	Bearing
6	11556-4	11556-4	Conveyor Motor (Commercial) Std.
7	60005-26	60005-26	Conveyor Motor (White) Optional
8	SPECIAL	SPECIAL	Key (comes with Motor)(Commercial)
8A	60019-2	60019-2	Key: ¼" Square x 1" (White)
9	12228-37	12228-37	Gearbox (50:1)
9A	12228-1	12228-1	Gearbox (25:1)
10	60019-8	60019-8	Key: 3/8" Square x 2"
11	11924-1	11924-1	Drive Sprocket
12	22928-1	22928-1	High Pressure Hydraulic Feed Line with Ends
13	22949-1B	22949-1B	Low Pressure Return Line-Hose Only
14	21886-23	21886-23	¾" Quick Disconnect Set-Includes Male End, Female End, Male Cap & Female Cap
15	22928-3	22928-3	High Pressure Hyd. Feed Line w/ends
16	8013-26	8013-26	Bushing 1-1/4" Male to ¾" Female
17	9050-435	9050-435	90 Deg HP Elbow – ¾" NPT
18	9050-533	9050-533	90 Deg Swivel Elbow – ½" NPT
19	8009-24	8009-24	90 Deg Street Elbow – ¾" NPT
20	8009-26	8009-26	90 Deg Street Elbow – ½" NPT
21	9018-3	9018-3	¾" NPT Male to 1" Dia Hose Nipple
22	20716-18	20716-18	Hose Clamp – 1" Diameter
23	12531-1	12531-1	Shaft Cover

HYDRAULIC SCHEMATIC

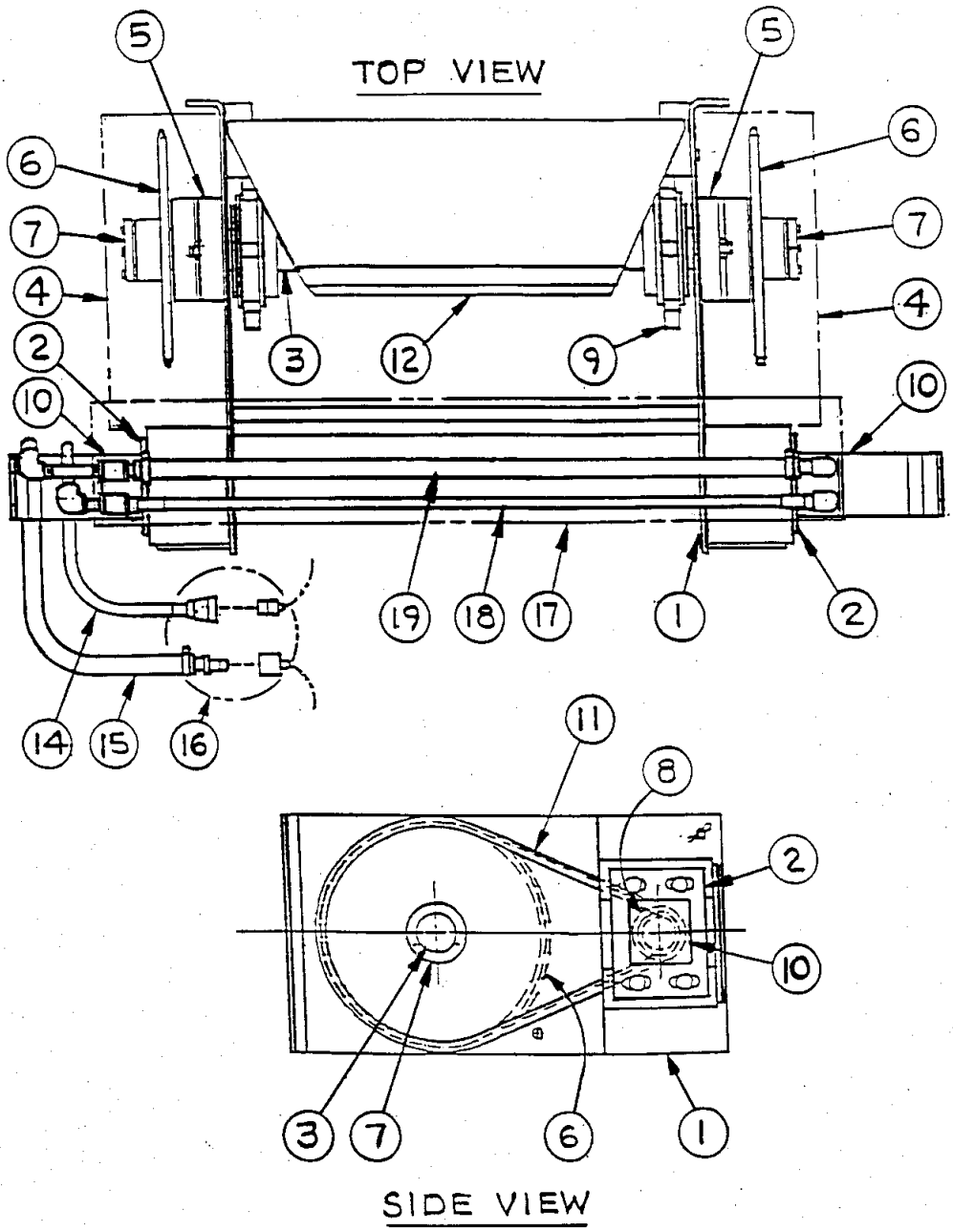
HL-HY2 & HL-HY3 (VALVE IN CAB)

NOTE: All items on this page are optional except Item 8 & 9, they are supplied on the machine.



ITEM	PART NUMBER	DESCRIPTION
1	31089-2	Spreader Fluid Control Valve
2	22596-1	Valve Pedestal (Not Shown)
3	11433-8	Hydraulic Fluid Filter
4	21886-23	¾" Quick Disconnect Ass'y (includes male end, female end, male cap, female plug)
5	21886-24	½" Quick Disconnect Ass'y (includes male end, female end, male cap, female plug)
6	11433-9	Filter Element Only (spin on type)
7	11433-3	Gauge For Filter Only
8	11556-4	Conveyor Motor
9	60005-2	Spinner Motor
10	22826-1	Oil Tank (20 gal rectangular for mounting to truck frame)
11	22826-7	Tank Mounting Brackets

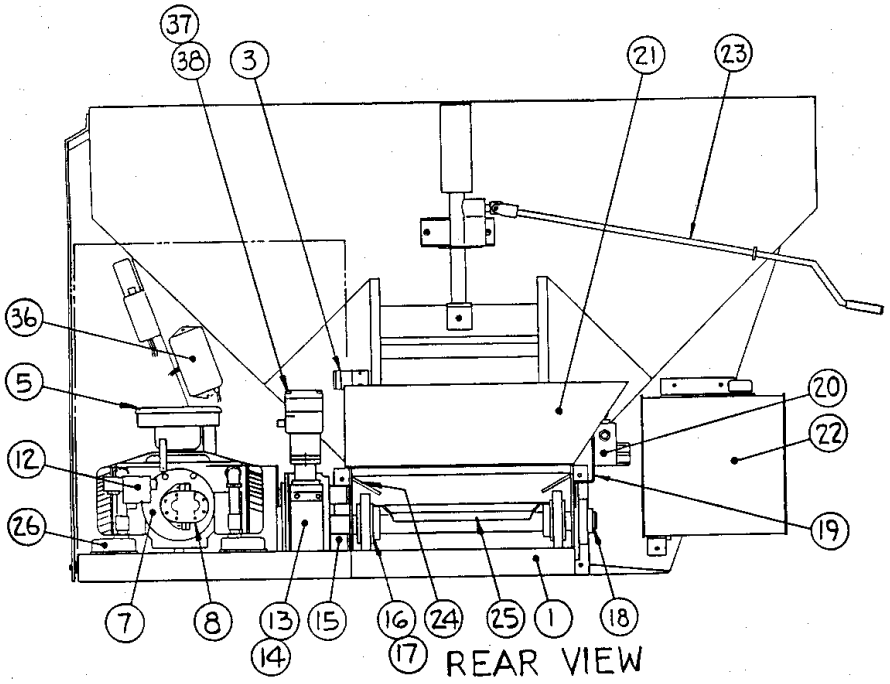
HY-3 POWER UNIT ILLUSTRATION
(START SER. NO 40188)

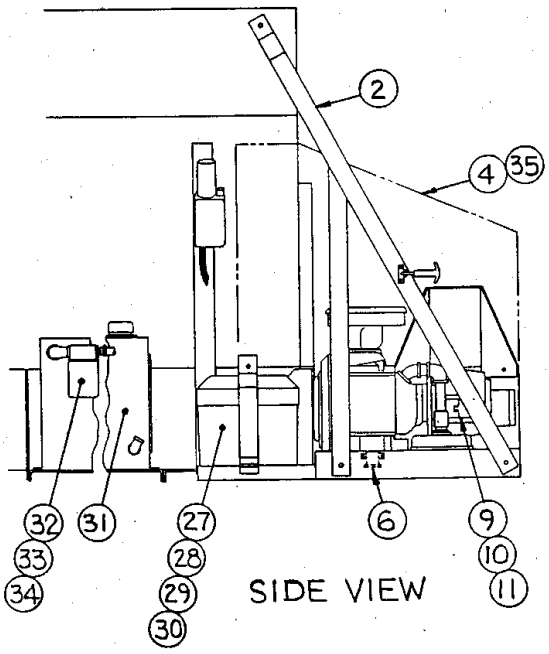


HL-HY3 POWER UNIT PARTS LIST

ITEM	TARCO PART # REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	40604-21	40604-121	Drive Frame Welded Ass'y
2	23361-1	23361-2	Motor Mounting Plate
3	22609-1	22609-1	Drive Shaft (2" dia. X 35" lg.)
4	23386-1	23386-6	Chain Guard (left or Right)
5	21670-6	21670-6	2" Flange Bearing – 2 Bolt
6	21676-126	21676-126	47 Tooth Sprocket - #60
7	21679-29	21679-29	Taper Lock Bushing –2" dia.
8	9026-102	9026-102	10 Toot Sprocket - #60
9	11924-1	11924-1	Conveyor Sprocket – 8 Tooth
10	11434-2	11434-2	Hydraulic Motor
11	9027-7	9027-7	#60 Drive Chain – 60 Links (45" lg.)
12	22695-1	22695-3	Wear Plate Extension
13	22615-2	22615-3	Chain Shield Extension (Not Shown)
14	23403-8, 9	23403-8, 9	High Pressure Feed Line
15	23403-15, 20, 21	23403-15, 20, 21	Low Pressure Return Line
16	21886-23	21886-23	¾" Quick Disconnect Ass'y (includes male end, female end, male cap, female plug)
17	23401-1	23401-4	Crossover Hose Guard
18	23403-6, 7	23403-6, 7	High Pressure Crossover Line
19	23403-14, 15, 16	23403-14, 15, 16	Low Pressure Crossover Line

HL-G-HY2 POWER UNIT ASSEMBLY



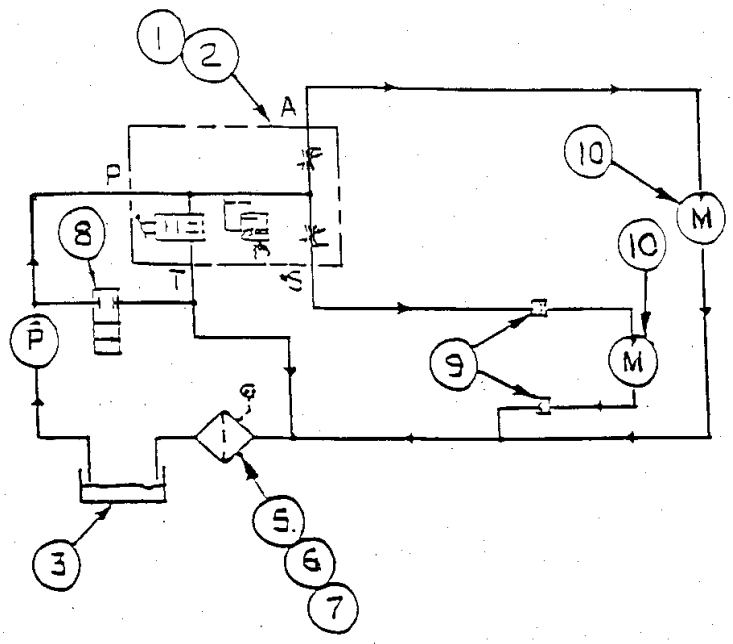


HL-G-HY2 POWER UNIT ASSEMBLY

ITEM	TARCO PART # REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	40683-1A	40683-41A	Power Unit Frame – Welded Assembly (Specify Engine When Ordering)
2	13255-1	13255-2	Side Brace
3	23660-1	23660-4	Cover Aligning Bracket
4	23661-1	23661-1B	Driver Side cover
5	60027-4	60027-4	Briggs & Stratton 18 HP Engine
6	60013-45	60013-45	Starting Solenoid
7	22835-1	22835-1	Pump Mounting Bracket
8	60004-23	60004-23	Pump – Webster
9	9068-12	9068-12	Engine Coupling Half
10	9068-9	9068-9	Coupling Insert
11	9068-11	9068-11	Pump Coupling Half
12	60006-60	60006-60	Solenoid Dump Valve
13	12228-37	12228-37	Gearbox 50:1
14	12228-1	12228-1	Gearbox 25:1
15	22895-1	22895-2	Gearbox Mounting Brackets (1 Pair)
16	11924-1	11924-1	Drive Sprocket
17	60019-8	60019-8	Key 3/8” square x 2” Long
18	21670-6	21670-6	Bearing
19	13256-1A	13256-2A	Valve Mounting Bracket
20	31089-2	31089-2	Spreader Control Valve
21	23653-1	23653-5	Hose Guard
22	25150-1A	25150-1A	Fuel Tank
23	13265-1	13418-2	Flowgate Crank Handle
24	22615-2	22615-3	Chain Shield Extension
25	22695-1	22695-3	Wear Plate Extension
26	13443-1	13443-1	Muffler Modification Assembly
27	60032-1	60032-1	Battery
28	60032-5	60032-5	Battery Case
29	60032-2	60032-2	Cable – Pos. (12” Lg.) RED
30	13651-1	13651-1	Cable – Neg. (18” Lg.) **BLACK**
31	23659-1	23659-1	Hydraulic Oil Tank – 15 Gallon
32	11433-1	11433-1	Hydraulic Oil Filter
33	11433-9	11433-9	Filter Element Only
34	11433-3	11433-3	Gauge Only
35	13590-1	13590-1	Throttle Actuator (NOT SHOWN)
36	60013-44	60013-44	Electric Junction Box – Signal Stat
37	60005-26	60005-26	Hydraulic Motor – (WHITE)
38	11556-4	11556-4	Hydraulic Motor – (COMMERCIAL)

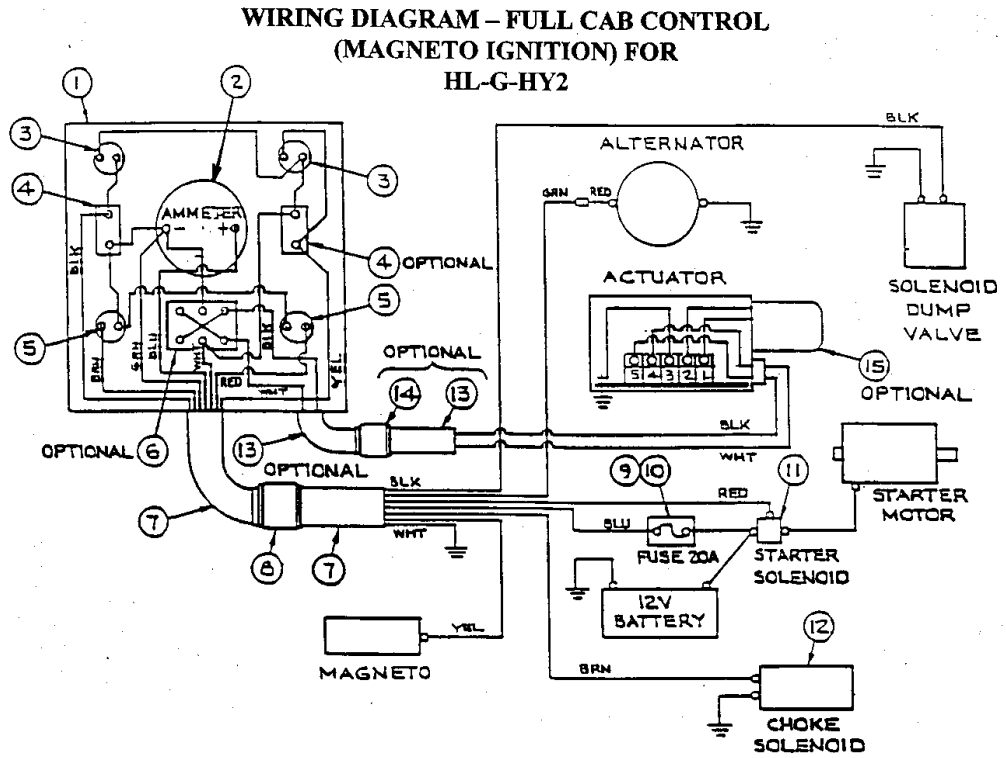
HYDRAULIC SCHEMATIC

HL-G-HY2 (VALVE ON HOPPER AT REAR)



ITEM	PART NUMBER	DESCRIPTION
1	31089-2	Spreader Control Valve
2	13256-1A	Valve Mounting Bracket
3	23659-1	Hydraulic Oil Tank – 15 Gallon
4	60004-23	Hydraulic Pump
5	11433-1	Hydraulic Oil Filter
6	11433-9	Filter Element Only
7	11433-3	Gauge Only
8	60006-60	Solenoid Dump Valve
9	21886-24	½" Quick Disconnect Assembly (Includes: Male End, Female End, Male Cap, & Female Cap)
10	60005-2	Spinner Motor

18 & 23 H.P. BRIGGS & STRATTON ENGINE

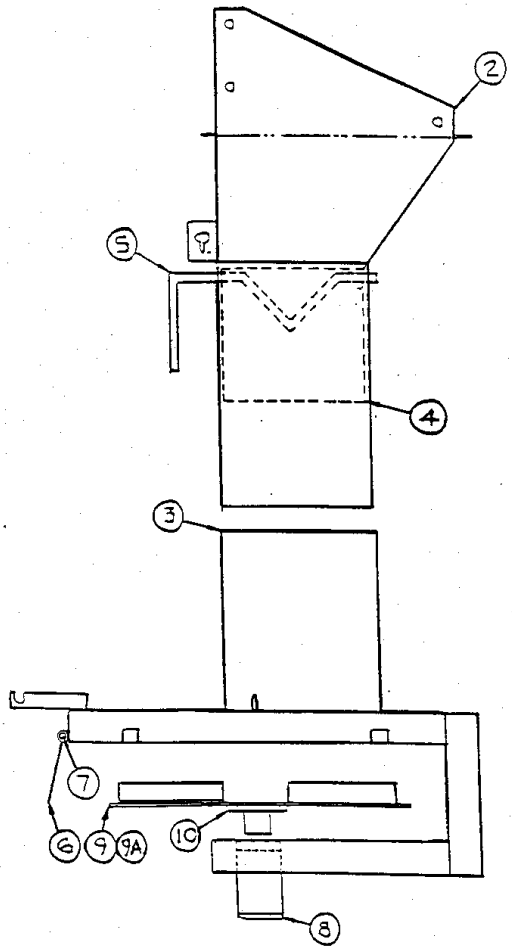


ITEM	TARCO PART #	DESCRIPTION
1	22976-1B	Assembled Cab Control Box & Harness (Less Solenoid Item 11 & Options – Order Separately)
2	60013-72	Ammeter 15 AMP
3	9056-35	L.E.D. Light 12V Red
4	9012-11	Toggle Switch – Optional
5	9012-1	Momentary Switch (Start & Choke)
6	60013-62	Switch (DPDT-6 Pole) – Optional
7	9013-4	7 Conductor Cable (order by the foot)
8	9014-3M/F	7 Prong Connector
9	60013-54	Fuse Holder
10	9090-2	20 AMP Fuse
11	9012-8	Starter Solenoid
12	11828-2,3	Choke Solenoid
13	9013-3	2 Conductor Cable (order by the foot) – Optional
14	9014-1M/F	2 Prong Connector – Optional
15	13590-1	Actuator – Optional
16	9014-4	Rubber Boot for Item #8

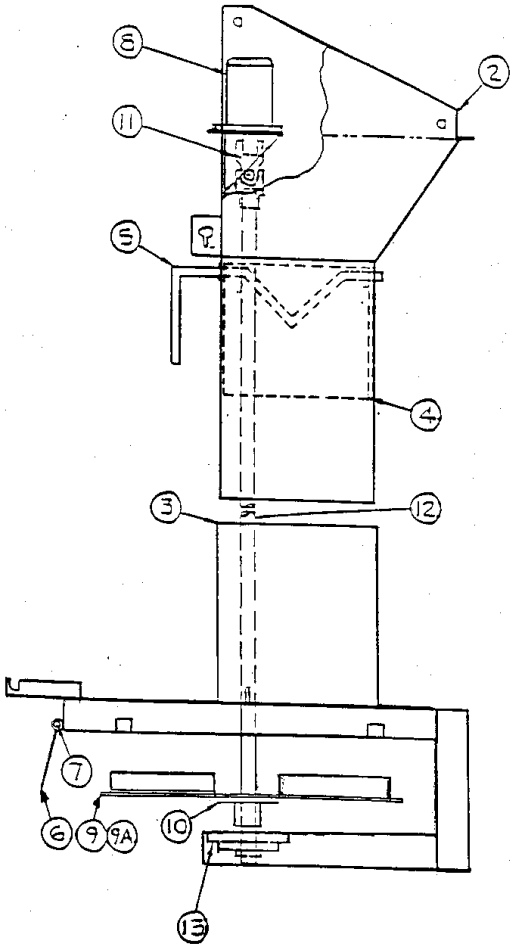
*Denotes Magneto

RECTANGULAR DISCHARGE CHUTE & SPINNER ASSEMBLY

(BOTTOM & TOP MOUNT SPINNER MOTOR)



BOTTOM MOUNT



TOP MOUNT

RECTANGULAR DISCHARGE CHUTE & SPINNER ASSEMBLY PARTS LISTING (BOTTOM MOUNT SPINNER MOTOR)

ITEM	TARCO PART # REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	31795-21	31795-1	Assembly Complete (Less: Hydraulic Motor & Hoses)
2	31796-20	31796-1	Upper Half Chute Assembly
3	31797-20	31797-1	Lower Half Chute Assembly
4	23894-1	23894-2	Diverter Plate
5	23895-1A	23895-1	Diverter Handle
6	23846-5	23846-1	Deflector Plate
7	11649-1	11649-1	Deflector Pin & Cotter
8	60005-2	60005-2	Hydraulic Spinner Motor
9	20774-1B	20774-1B	Poly Spinner Disc with Vanes
9A	20774-1	20774-1	Spinner Disc with Vanes (Steel)
10	11882-1	11882-1	Spinner Hub
11	31053-7	31053-7	High Pressure Supply Line with Ends (Not Shown)
12	22949-2B	22949-2B	Low Pressure Return Line – No Ends (Not Shown)

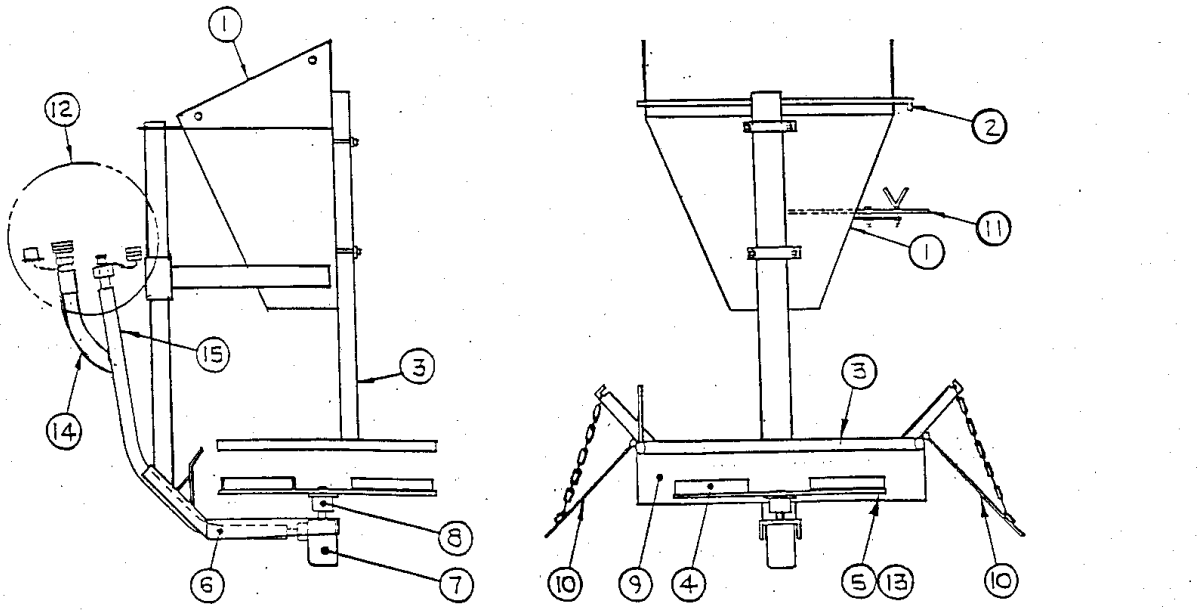
RECTANGULAR DISCHARGE CHUTE & SPINNER ASSEMBLY PARTS LISTING (TOP MOUNT SPINNER MOTOR)

ITEM	TARCO PART # REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	31795-27	31795-15	Assembly Complete (Less: Hydraulic Motor & Hoses)
2	31796-29	31796-10	Upper Half Chute Assembly
3	31797-20	31797-1	Lower Half Chute Assembly
4	23894-1	23894-2	Diverter Plate
5	23895-1A	23895-1	Diverter Handle
6	23846-5	23846-1	Deflector Plate
7	11649-1	11649-1	Deflector Pin & Cotter
8	60005-2	60005-2	Hydraulic Spinner Motor
9	20774-1B	20774-1B	Poly Spinner Disc with Vanes
9A	20774-1	20774-1	Spinner Disc with Vanes (Steel)
10	11145-1	11145-1	Spinner Hub
11	9023-1	9023-1	1” x 1” Universal Joint
12	13459-1	13459-1	Shaft
13	21670-1	21670-1	Bearing
14	31053-7	31053-7	High Pressure Supply Line with Ends (Not Shown)
15	22949-2B	22949-2B	Low Pressure return Line – No Ends (Not Shown)

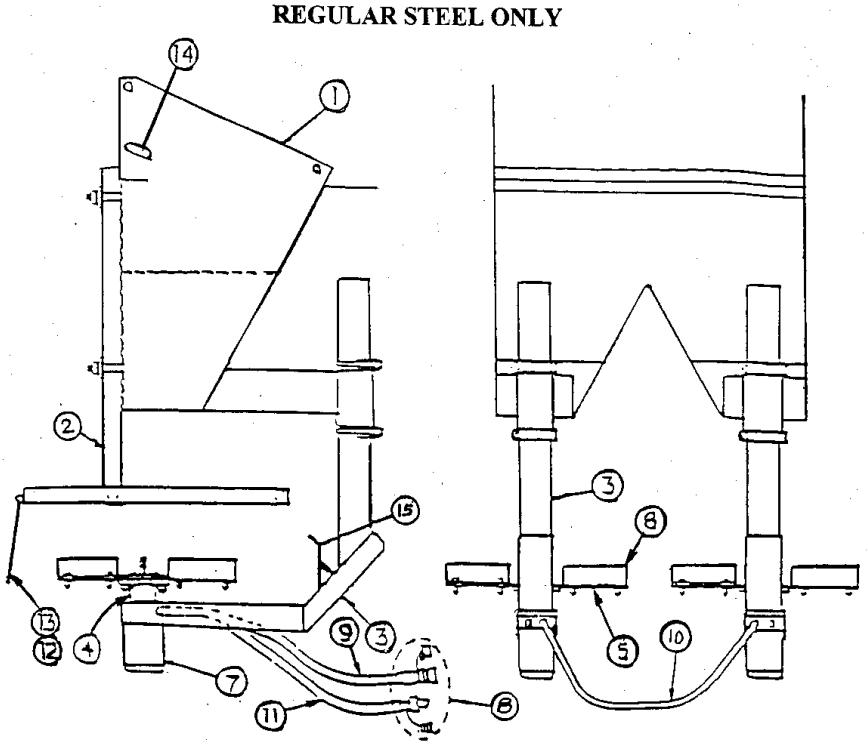
FUNNEL STYLE
CHUTE AND SPINNER ASSEMBLY
FITS ALL HYDRAULIC MACHINES

REGULAR STEEL ONLY

ITEM	PART NUMBER	DESCRIPTION
1	31811-1	Discharge Chute
2	31049-2	Chute Lock Pin
3	31051-1	Deflector Frame
4	11180-1	Spinner Vane Only
5	20774-1	Spinner Disc With Vanes
6	23844-1	Spinner Support
7	60005-2	Spinner Motor
8	11882-1	Spinner Hub
9	31052-1	Front Deflector
10	10998-1	Deflector – Side or Rear
11	31050-9	Spinner Adjusting Collar Assembly
12	21886-24	Quick Disconnect Assembly (1/2") (Includes: Male End, Female End, Male Cap and Female Plug)
13	20774-3	Spinner Disc Only
14	31053-7	High Pressure Supply Line (With Ends)
15	22949-2B	Low Pressure Return Line (Hose Only)

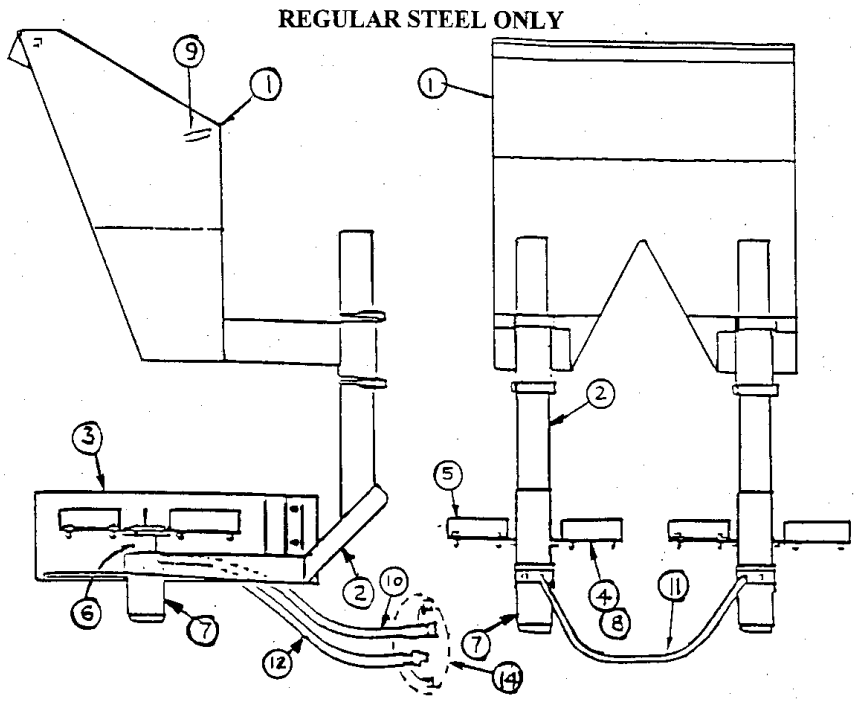


TWIN SPINNER REAR MOUNT HIGHLANDER



ITEM	PART NUMBER	DESCRIPTION
1	40456-20	Discharge Chute
2	31051-1D	Deflector Frame
3	23844-1	Spinner support Assembly
4	11882-1	Spinner Hub
5	21209-1	Spinner Disc with Vanes
6	12066-1	Vane
7	60005-2	Spinner Motor
8	21886-24	Quick Disconnect Assembly (1/2") (Includes: Male End, Female End, Male Cap and Female Plug)
9	31053-7	High Pressure Hydraulic Supply Line with Ends
10	22928-5	High Pressure Hydraulic Line Between Spinner Motors with ends
11	22949-2	Low Pressure Hydraulic Return Line (Hose Only)
12	10998-1	Side Deflector
13	10998-1A	Rear Deflector
14	13414-1	Locking Rod
15	31052-1A	Front Deflector

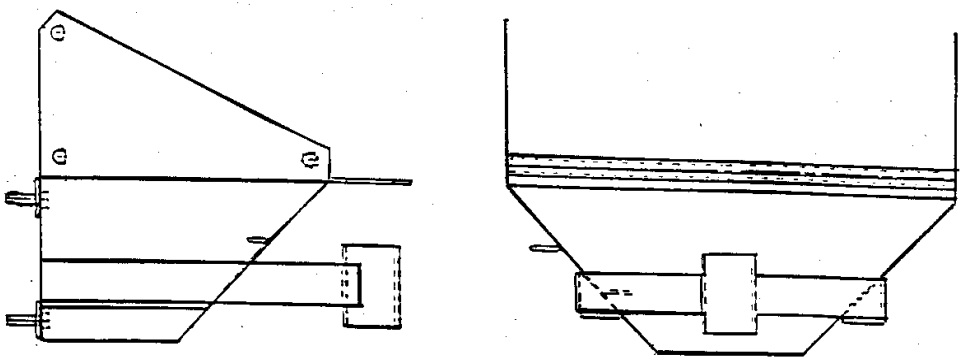
TWIN-SPINNER REVERSE MOUNT HIGHLANDER



ITEM	PART NUMBER	DESCRIPTION
1	40495-20	Discharge Chute
2	40345-22,23,25	Spinner Support
3	31406-7 & 8	Center Deflector
4	21209-1	Spinner Disc with Vanes
5	12066-1	Spinner Vane Only
6	11882-1	Spinner Hub
7	60005-2	Spinner Motor
8	21209-2	Spinner Disc Only
9	31049-2	Locking Rod
10	31053-7	High Pressure Hydraulic Supply Line with Ends
11	22928-5	High Pressure Hydraulic Line Between Spinner Motors w/ends
12	22949-2	Low Pressure Hydraulic Return Line (Hose Only)
13	11117-1	Side Deflector Complete (Only)
14	21886-24	½" Quick Disconnect Assembly (Includes: Male End, Female End, Male Cap and Female Plug)

SHORT DISCHARGE CHUTE

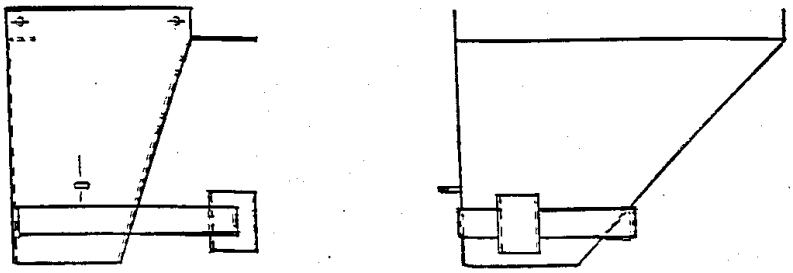
HL-HY2, HL-HY3 AND HL-HY2P



ITEM	PART NUMBER	DESCRIPTION
1	31250-1	Short Discharge Chute (HL-HY2, HL-HY3, HL-HY2P)

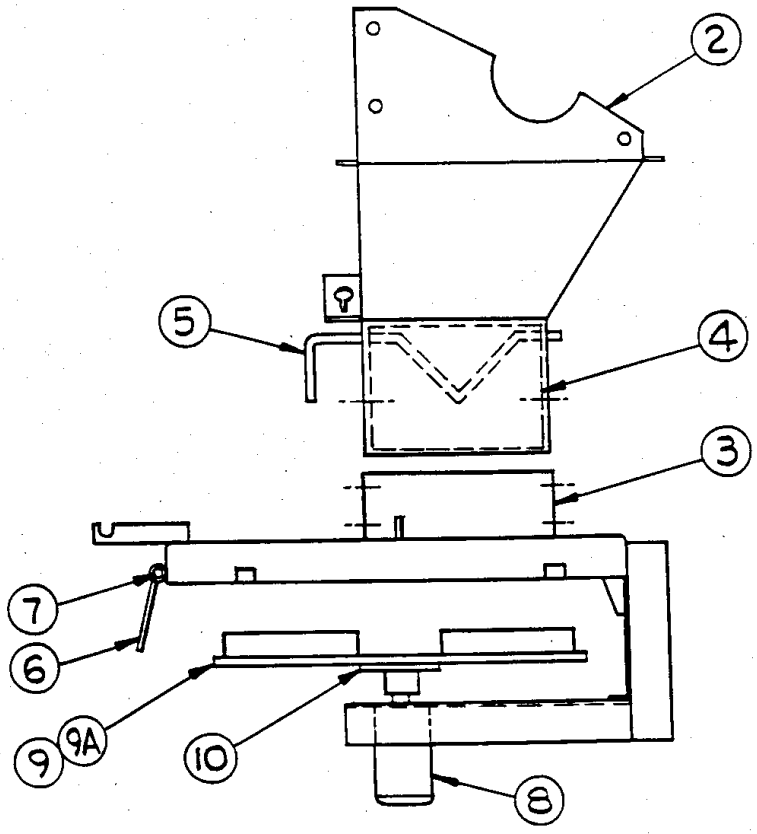
OFFSET DISCHARGE CHUTE

HL-HY, HL-HY2P AND HL-HY3



ITEM	PART NUMBER	DESCRIPTION
1	31215-1	45 Degree Offset Discharge Chute (HL-HY, HL-HY2P, HL-HY3)

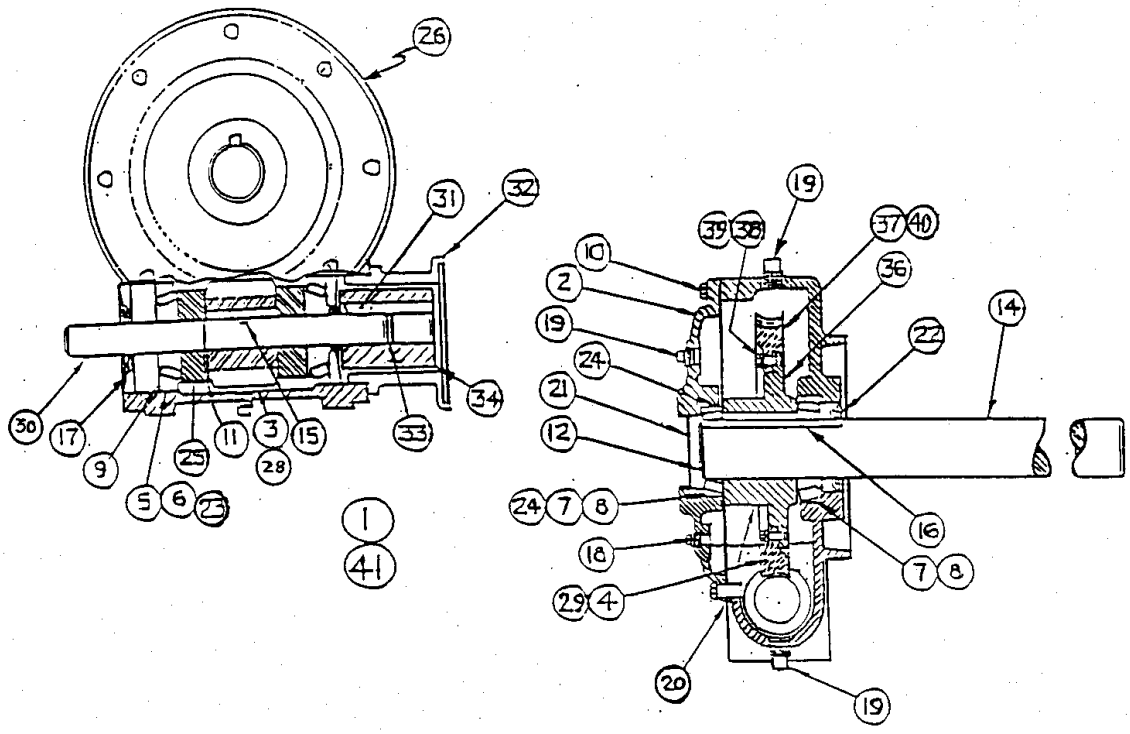
RECTANGULAR DISCHARGE SHORT CHUTE & SPINNER ASSEMBLY



ITEM	TARCO PART # REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	C31795-21	C31795-1	Assembly complete (less: Hydraulic Motor & hoses)
2	B31796-20	B31796-1	Upper Half Chute Assembly
3	B31797-20	B31797-1	Lower Half Chute Assembly
4	B23894-1	B23894-2	Diverter Plate
5	C23895-1	B23895-1	Diverter Handle
6	23846-5	23846-1	Deflector Plate
7	11649-1	11649-1	Deflector Pin & Cotter
8	60005-2	60005-2	Hydraulic Spinner Motor
9	20774-1B	20774-1B	Poly Spinner Disc with Vanes
9A	20774-1	20774-1	Spinner Disc with Vanes (Steel)
10	11882-1	11882-1	Spinner Hub
11	31053-7	31053-7	High Pressure Supply Line with Ends (Not Shown)
12	22949-2B	22949-2B	Low Pressure Return Line – No Ends (Not Shown)

WORM REDUCTION GEAR BOX

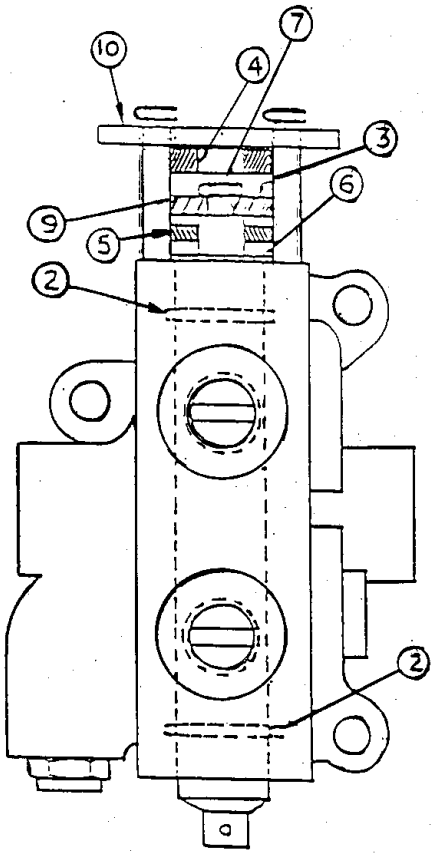
CAST IRON CASE



HL-HY2 WORM REDUCTION GEAR BOX

ITEM	PARTS NUMBER	DESCRIPTION
1	12228-37	Assembly (Hydraulic) (50:1 Reduction)
2	12228-2	Cover
3	12228-3	Worm 50:1
4	12228-4	Worm Gear 50:1 (Includes Parts 36, 37, 38 & 39)
5	12228-5	Bearing – Cone
6	12228-6	Bearing – Cup
7	12228-7	Bearing – cone
8	12228-8	Bearing – Cup
9	12228-9	Snap ring
10	12228-10	Cap Screw 3/8 NC x 1” Long
11	12228-11	Snap Ring
12	12228-12	Snap Ring
13	NOT USED	
14	12228-14	Shaft – Output
15	12228-15	Woodruff Key
16	12228-16	Key
17	12228-17	Seal
18	12228-18	Plug 1/8” – 27 NPT
19	12228-19	Plug 3/8” – 18 NPT
20	12228-20	Gasket
21	12228-23	Cap
22	12228-24	Seal
23	12228-25	Shim Kit One @ (.005, .010 & .020)
24	12228-26	Shim Kit One @ (.005, .010 & .020)
25	12228-27	Spacer
26	12228-29	Housing (Hydraulic)
27	NOT USED	
28	12228-30	Worm 25:1 (Optional)
29	12228-31	Worm Gear 25:1 (Optional – Includes Parts 36, 38, 39,40)
30	12228-32	Shaft – Input
31	12228-33	“A” (807) Woodruff – Soft
32	12228-34	Hydraulic Adapter
33	12228-35	Snap ring
34	12228-36	Coupling
36	12228-38	Hub
37	12228-39	Ring Gear 50:1 (Brass)
38	12228-40	Capscrew
39	12228-41	Lockwasher
40	12228-42	Ring Gear 25:1 (Brass)
41	12228-1	Assembly (Hydraulic) (25:1 Reduction)

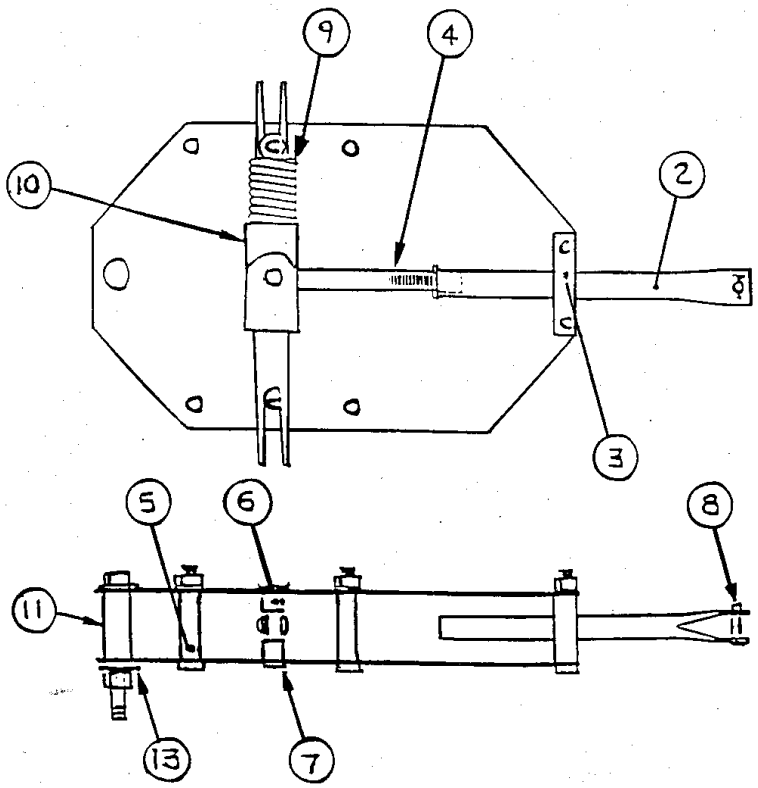
SARATOGA POWER PAK9 VALVE PARTS LIST



ITEM	PARTS NUMBER	DESCRIPTION
1	31047-11	Bumper Kit (Consists of Parts 3, 4, 5, 6 & 7)
2	31047-15	"O" Ring Seals
3	31047-5	Bumper (Only)
4	31047-7	¼" Pad (Rubber)
5	31047-9	3/16" Pad (Rubber)
6	31047-6	Washer
7	31047-8	¼-20 x ¾ Hex Head Bolt
8	31047-14	Pad Set (Parts 4 & 5)
9	31047-16	Cap
10	31047-17	Cap Reinforcement

9Patented

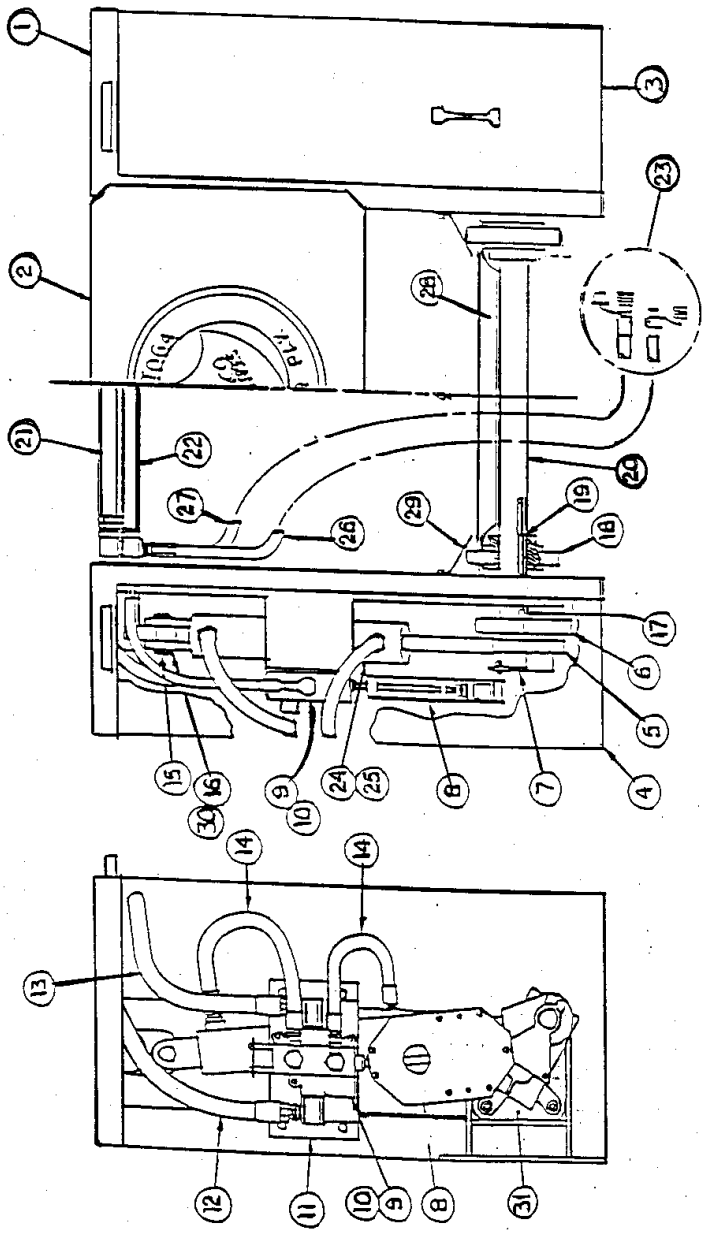
SARATOGA POWER PAK℈ ACTUATOR PARTS



ITEM	PART NUMBER	DESCRIPTION
1	31307-1	Actuator Assembly
2	31307-10	Connecting Tube Assembly (Includes: Pin & Cotter)
3	31307-7	Rod Guide
4	31307-5	Push – Pull Link
5	31307-11	Spacer
6	31307-12	Sleeve Bearing
7	31307-14	Clevis Pin
8	31307-15	Clevis Pin
9	31055-10	Spring
10	31307-30	Toggle Swivel Assembly (Includes: Item 4)
11	31307-8	Spacer
12	31307-31	Retrofit Parts for Item 10 (not shown)
13	31307-13	Bushing

℈Patented

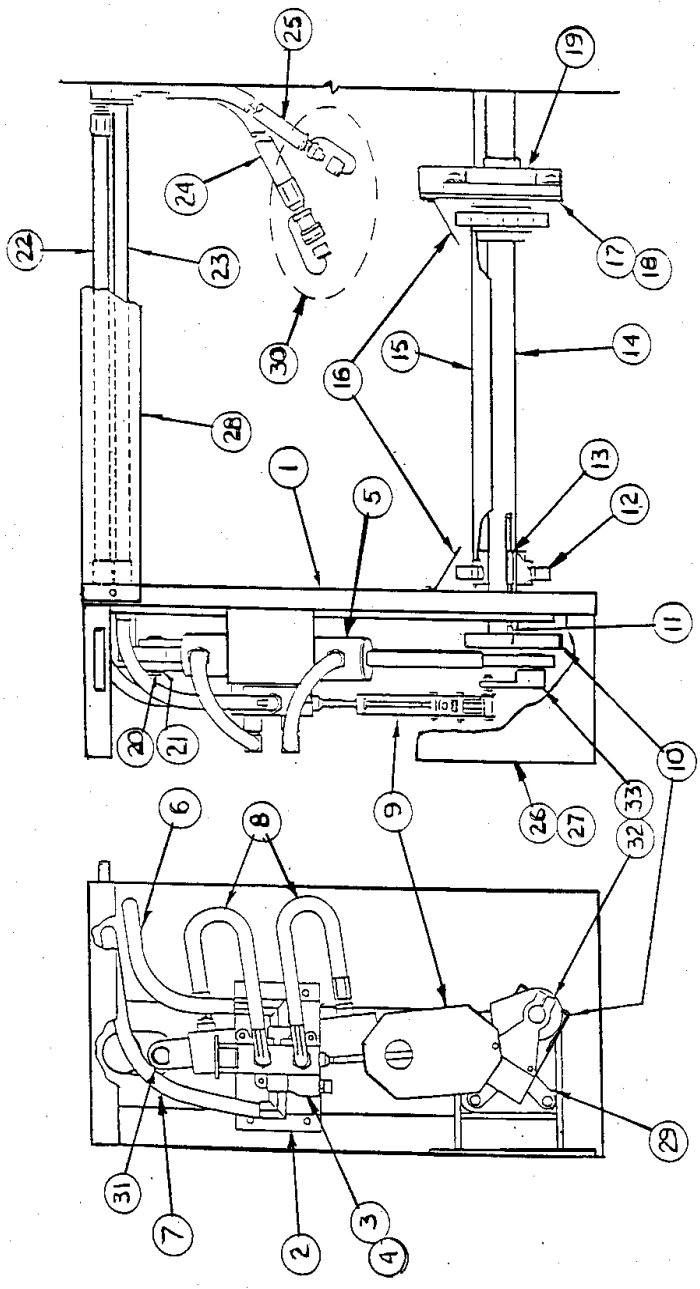
POWER PAK PARTS BREAKDOWN



POWER PAK PARTS BREAKDOWN

ITEM	PART NUMBER	DESCRIPTION
1	40344-1	Drive Frame
2	22514-1	Decal Plate
3	31041-1	Right Cylinder Cover
4	31041-2	Left Cylinder Cover
5	40354-12	Spherical Bearing 1-1/4”
6	310454	Crank Arm
7	22647-1	Timing Arm
8	31307-1	Valve Actuator Assembly
9	31047-13	Valve (Left)
10	31047-12	Valve (Right)
11	31334-1	Valve Mounting Bracket
12	31053-4	Hose Assembly (Long)
13	31053-3	Hose Assembly (Short)
14	31053-8	Valve to Cylinder Hose Assembly
15	22823-3	Cylinder Pin
16	22823-6	Snap Ring
17	40356-12	Key – Crank Arm to Crank Shaft
18	11924-1	Sprocket
19	40356-11	Key – Sprocket to Crank Shaft
20	31045-1	Crank Shaft
21	31053-19	High Pressure Cross Over
22	31053-20	Low Pressure Cross Over
23	21886-23	Quick Disconnect Assembly ¾” (Includes Male End, Female End, Male Cap & Female Plug)
24	40354-1	Hydraulic Cylinder
25	40354-30	Seal Kit for Cylinder
26	31053-6	Low Pressure Return Line
27	31053-5	High Pressure Feed Line
28	22695-1	Wear Plate Extension
29	22615-1	Chain Shield Extension
30	22823-2	Upper Cylinder Bearing
31	21793-3	Four Bolt – 2” Flange Bearing

HIGHLANDER HL-2C SARATOGA POWER PAK * DRIVE PARTS

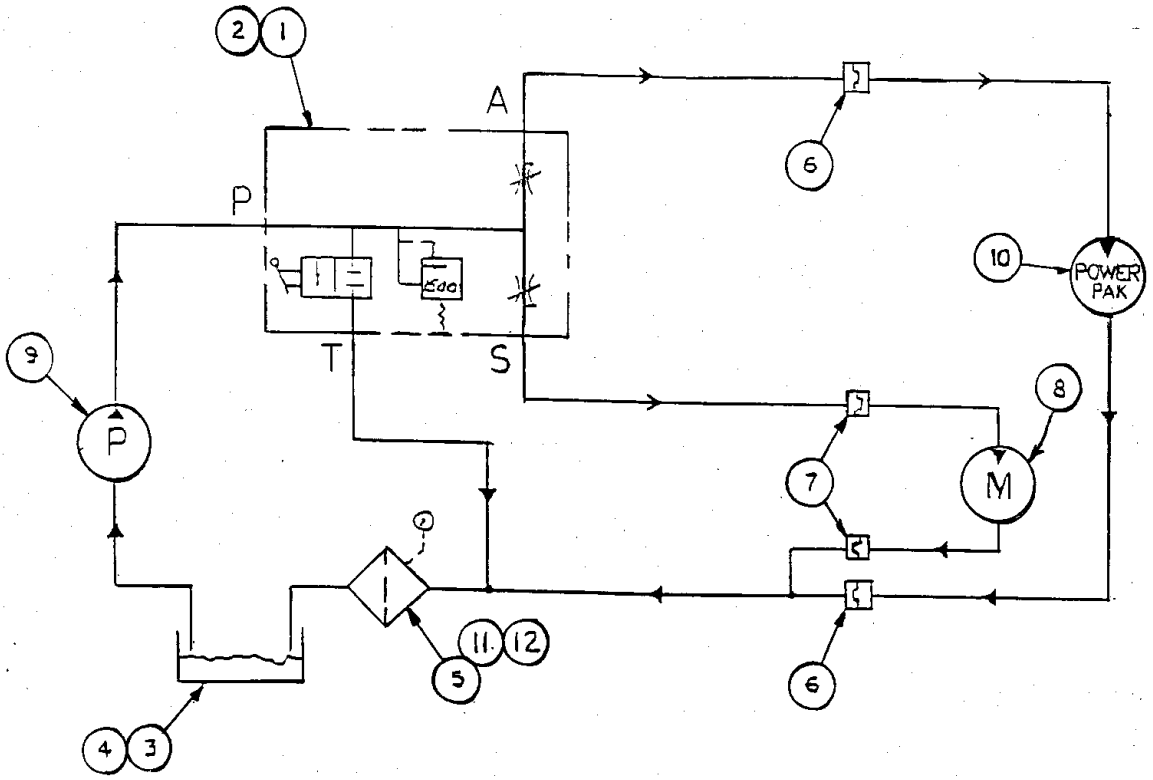


*Patented

HIGHLANDER HL-2C SARATOGA POWER PAK * DRIVE PARTS LIST

ITEM	TARCO PART #	DESCRIPTION
1	40507-1	Drive Frame Weldment
2	31334-1	Valve Mounting Bracket
3	31047-13	Left Valve
4	31047-12	Right Valve
5	40354-1	Hydraulic Cylinder
6	31053-3	H.P. Hydraulic Line (Short Supply)
7	31053-4	H.P. Hydraulic Line (Long Supply)
8	31053-8	H.P. Hydraulic Line (Valve to cylinder)
9	31307-1	Actuator Assembly
10	31045-4	Crank Arm
11	12374-9	Key for Crank Arm (1/2x1-1/4)
12	11924-1	Conveyor Sprocket
13	12374-2	Key for Sprocket (3/8x2-3/8)
14	22946-1	Crank Shaft
15	22695-1	Wearplate Extension
16	22615-1	Chain Shield Extension
17	22947-1	Midship Bearing Mounting Plate (Left)
18	22947-2	Midship Bearing Mounting Plate (Right-not shown
19	21670-6	2”-2 Bolt Flange Bearing
20	22823-3	Upper Cylinder Pin
21	22823-6	Cylinder Pin Snap Ring
22	22950-1	H.P. Hydraulic Manifold Assembly
23	22950-2	L.P. Hydraulic Manifold Assembly
24	31053-5	H.P. Hydraulic Supply Line
25	31053-6	L.P. Hydraulic Return Line
26	31041-2	Side Cover (Left)
27	31041-1	Side Cover (Right-not shown)
28	22937-1	Hydraulic Piping Cover
29	21793-3	2”-4 Bolt Flange Bearing
30	21886-23	¾” Quick Disconnect Assembly-Includes Male Half, Female Half, Male Cap, Female Plug)
31	22823-2	Upper Cylinder Bearing
32	22647-1	Timing Arm
33	12374-10	Key for Timing Arm

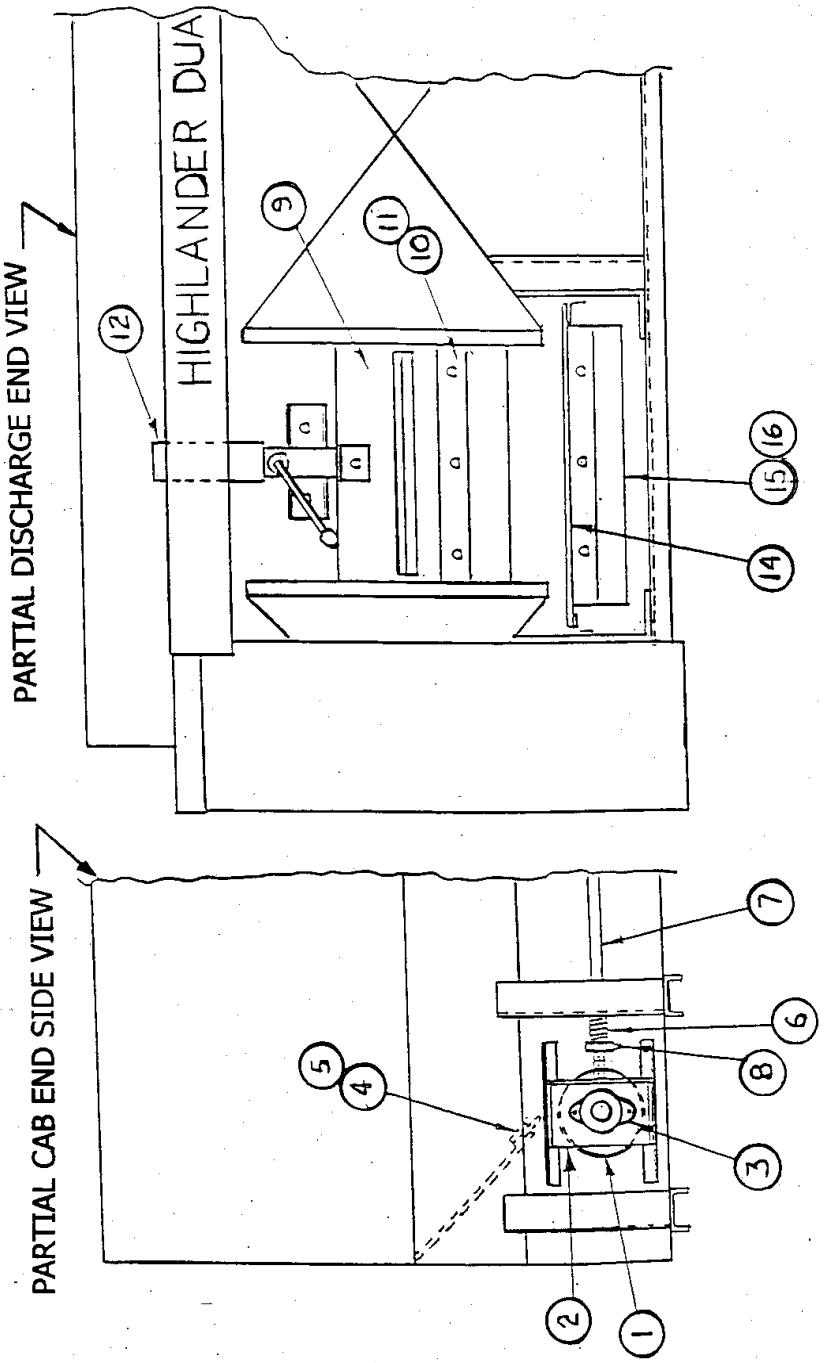
HIGHLANDER HL-2C HYDRAULIC SCHEMATIC



ITEM	PART NUMBER	DESCRIPTION
1	31089-2	Control Valve for Spreader
2	22596-1	Valve Pedestal (not shown)
3	22826-1	Oil Tank (20 gal rec. for mounting to truck frame)
4	22826-7	Oil Tank Mounting Brackets
5	11433-8	Hydraulic Oil Filter
6	21886-23	¾" Quick Disconnect Assembly (Includes Male End, Female End, Male Cup, Female Plug)
7	21886-24	½" Quick Disconnect Assembly (Includes Male End, Female End, Male Cup, Female Plug)
8	12367-1	Spinner Motor
9		Hydraulic Pump
10		Saratoga Power Pak* (See Power Pak Pages)
11	11433-9	Filter Element Only
12	11433-3	Gauge Only

*PATENTED PARTS

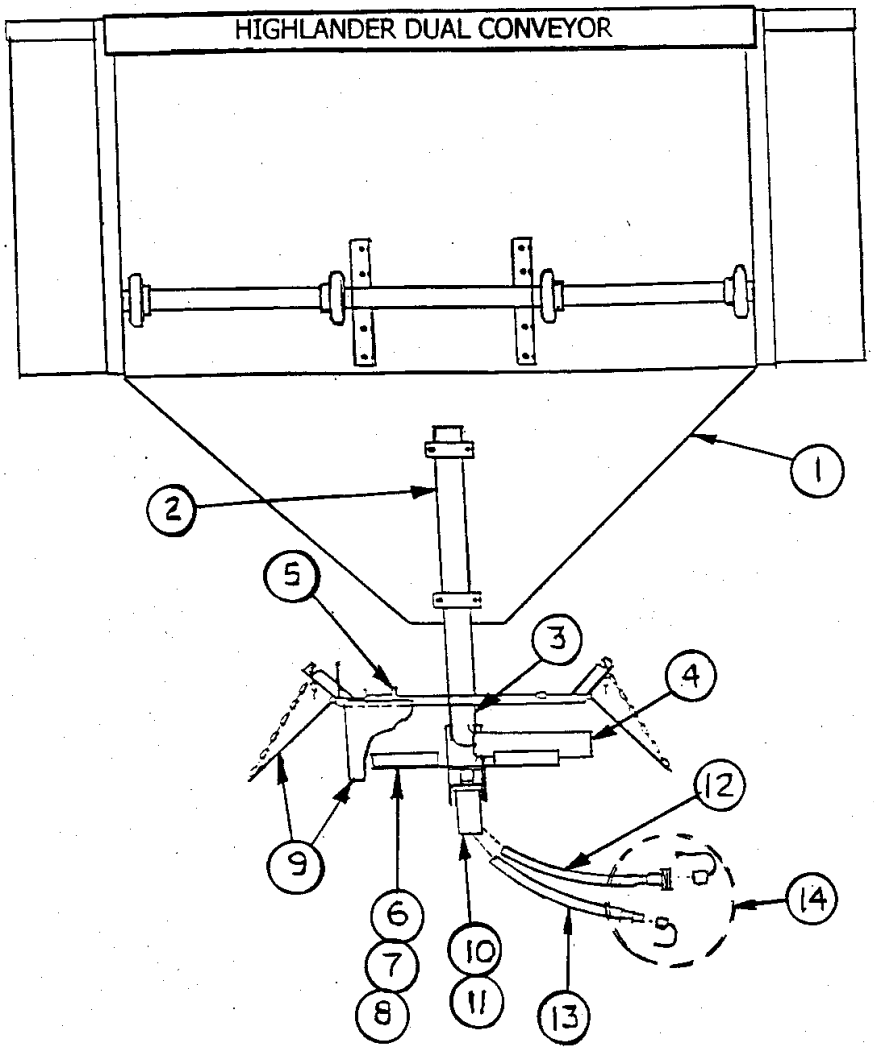
BASIC HIGHLANDER HL-2C HOPPER PARTS



BASIC HIGHLANDER HL-2C HOPPER PARTS LIST

ITEM	PART NUMBER	DESCRIPTION
1	23907-1	Idler Roller
2	23908-1	Idler Bearing Mounting Plate
3	21670-2	Idler Bearing
4	22607-6	Cab End Hopper Seal (Rubber)
5	22607-2	Cab End Seal Keeper (Steel)
6	21275-4	Idler Spring
7	31029-10E	Idler Adjustment Rod
8	31029-2E	Idler Adjusting Nut
9	22935-4A	Flowgate
10	22607-3	Flowgate Seal (Rubber)
11	22607-2	Flowgate Seal Keeper (Steel)
12	22959-1A	Flowgate Jack
13		
14	31223-1	Wearplate (Specify Machine Length)
15	22607-5	Chain Return Wiper (Rubber)
16	22607-2	Chain Return Wiper (Steel)

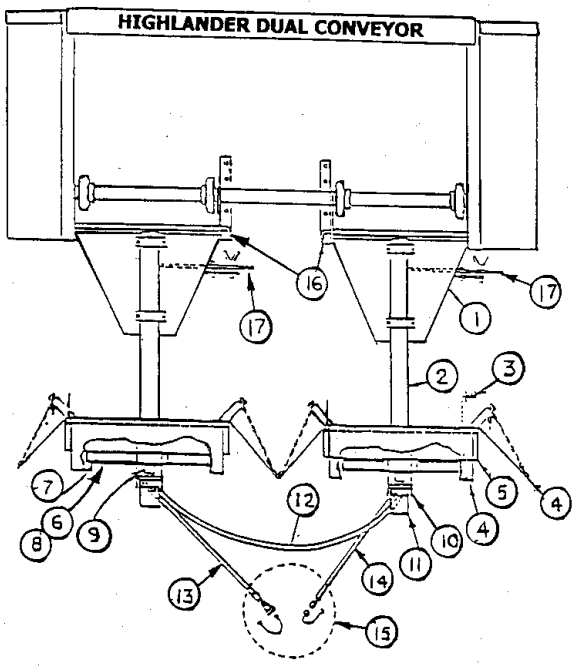
HL-2C SINGLE SPINNER ASSEMBLY



HL-2C SINGLE SPINNER PARTS LIST

ITEM	PART NUMBER	DESCRIPTION
1	31438-1	Discharge Chute
2	31051-1F	Deflector Frame
3	23844-1	Spinner Motor Support Tubing
4	31052-1	Front Deflector
5	11649-1	Deflector Pin
6	40415-20	Spinner Disc with Vanes
7	40415-6	Spinner Disc Only
8	11180-1	Spinner Vane Only
9	10998-1B	Deflector (Side or Rear)
10	12367-1	Spinner Motor
11	11882-1	Spinner Hub
12	22928-4	High Pressure Hydraulic Feed Line (Hose with fittings)
13	22949-2B	Low Pressure Hydraulic Return Line (Hose only)
14	21886-24	½" Quick Disconnect Assembly (Includes Male Half, Female Half, Male Cap, Female Plug)

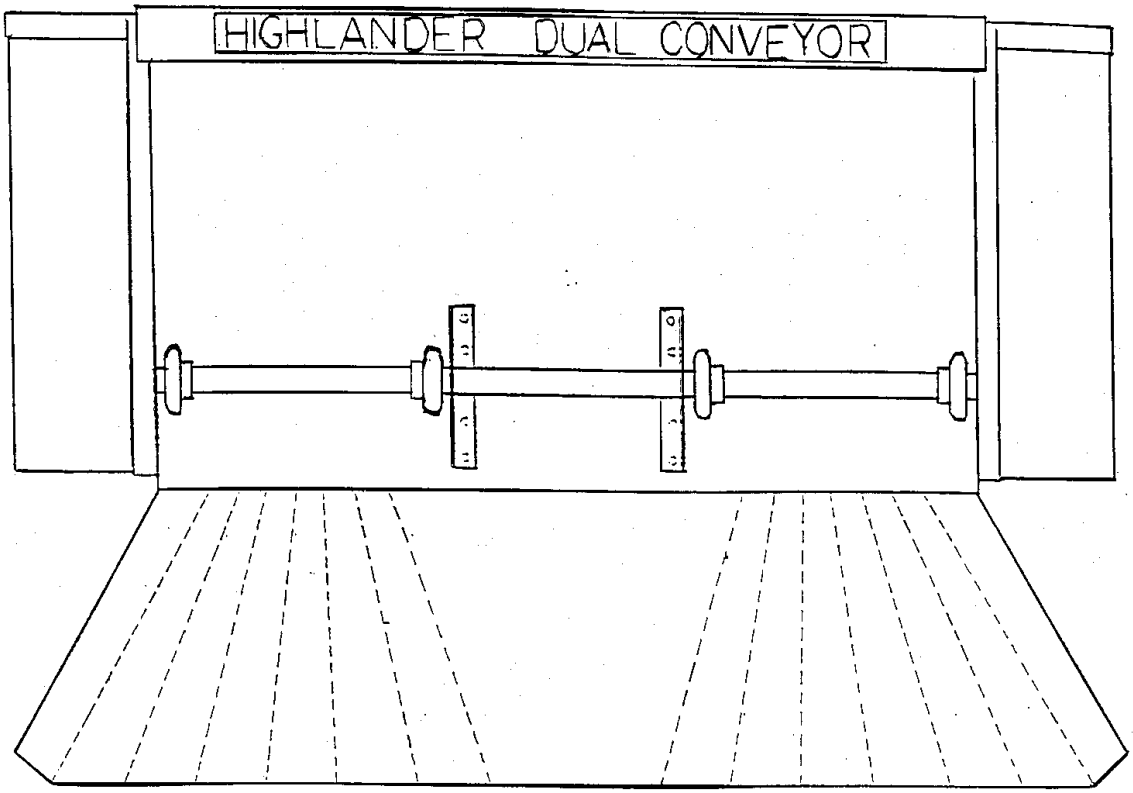
HIGHLANDER HL-2C DUAL SPINNER PARTS LIST



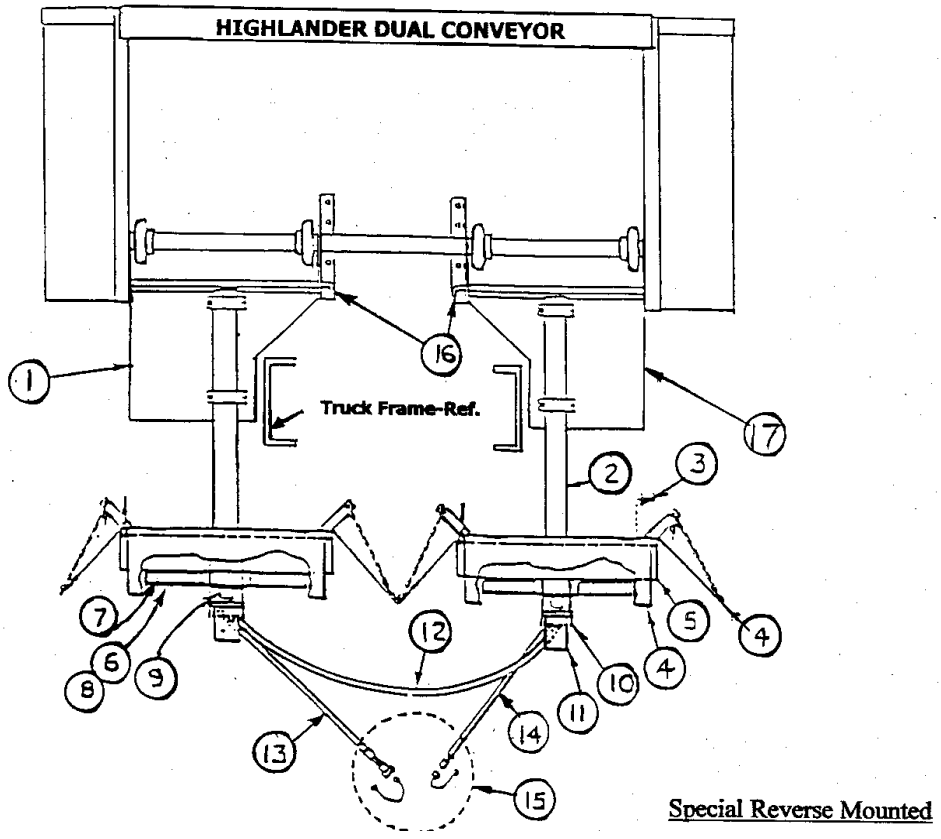
ITEM	PART NUMBER	DESCRIPTION
1	40345-2	Discharge Chute
2	31051-1	Deflector Frame
3	11649-1	Deflector Pin
4	10998-1	Deflector (Side & Rear)
5	31052-1	Deflector (Front)
6	20774-1	Spinner Disc with Vanes
7	11180-1	Spinner Vane Only
8	20774-3	Spinner Disc Only
9	11882-1	Spinner Hub
10	40345-26	Spinner Motor Support Tube
11	11434-1	Spinner Motor
12	22928-4	H.P. Hydraulic Line Between Spinner Motors
13	22928-4	H.P. Hydraulic Feed Line
14	22949-2B	L.P. Hydraulic Return Line
15	21886-24	½" Quick Disconnect Assembly (includes male end, female end, male cup, female plug)
16	31049-2	Chute Locking Rod
17	31050-9	Spinner Adjusting Collar

DROP SPREAD CHUTE

PART NO. 40457



HIGHLANDER HL-2C DUAL SPINNER PART LIST REVERSE MOUNTED



ITEM	PART NUMBER	DESCRIPTION
1	31748-1	Discharge Chute Passenger Side
2	31051-1	Deflector Frame
3	11649-1	Deflector Pin
4	10998-1	Deflector (Side & Rear)
5	31052-1	Deflector (Front)
6	20774-1	Spinner Disc with Vanes
7	11180-1	Spinner Vane Only
8	20774-3	Spinner Disc Only
9	11882-1	Spinner Hub
10	23844-1	Spinner Motor Support Tube
11	60005-2	Spinner Motor
12	22928-4	H.P. Hydraulic Line Between Spinner Motors
13	22928-4	H.P. Hydraulic Feed Line
14	22949-2B	L.P. Hydraulic Return Line
15	21886-24	½" Quick Disconnect Assy (includes male end, female end, male cup, female plug)
16	31049-2	Chute Locking Rod
17	31748-20	Discharge Chute Driver's Side

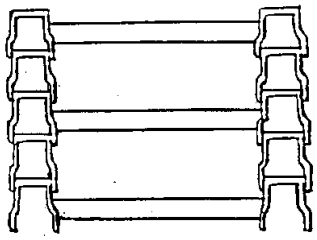
COMMON COMPONENTS

AND

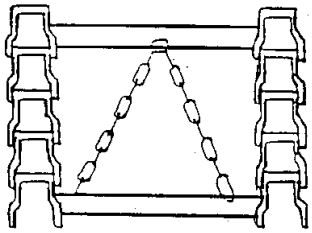
OPTIONAL EQUIPMENT

CONVEYOR CHAINS

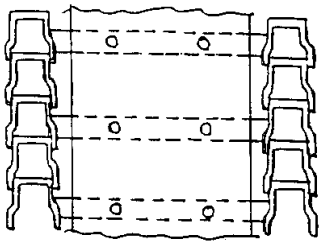
STD. & HEAVY CHAIN



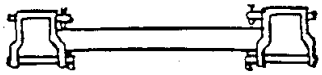
CHEVRON CHAIN



BELT OVER CHAIN



REPAIR FLITE



REPAIR LINK

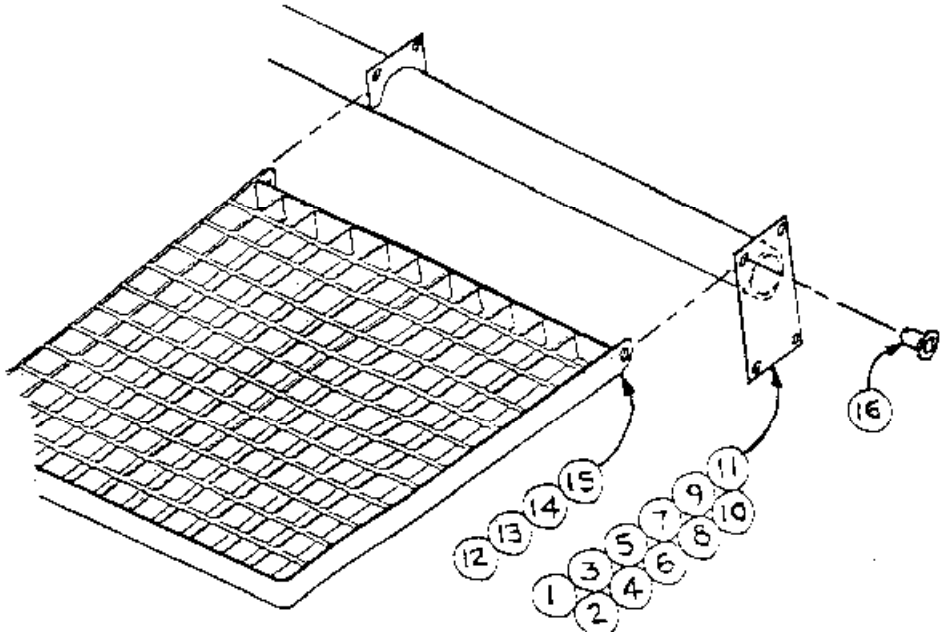
REPAIR PIN

HIGHLANDER MACHINE LENGTH	CHAIN LENGTH		STANDARD CHAIN ¼" X 1-1/2" BAR	HEAVY CHAIN 3/8 X1-1/2" BAR	CHEVRON9 CHAIN	BELT OVER CHAIN
	LINKS	FT-IN				
8'	91	17'-3/4"	31204-8	A31037-8	A31192-8	31343-8
9'	102	19'-1-1/2"	31204-9	A31037-9	A31192-9	31343-9
10'	112	21'-0"	31204-10	A31037-10	A31192-10	31343-10
11'	123	23'-3/4"	31204-11	A31037-11	A31192-11	31343-11
12'	134	25'-1/2"	31204-12	A31037-12	A31192-12	31343-12
13'	144	27'-0"	31204-13	A31037-13	A31192-13	31343-13
14'	155	29'-3/4"	31204-14	A31037-14	A31192-14	31343-14
15'	166	31'-1-1/2"	31204-15	A31037-16	A31192-15	31343-22
16'	176	33'-0"	31204-16	A31037-17	A31192-16	31343-23
Repair Flite with Pin and Stainless Steel Cotter			31204-4	A313037-4	A31192-4	
Repair Link with Pin and Stainless Steel Cotter			31204-6	31204-6	31204-6	
Repair Pin with Stainless Steel Cotter			12391-1	12391-1	12391-1	

9Patented

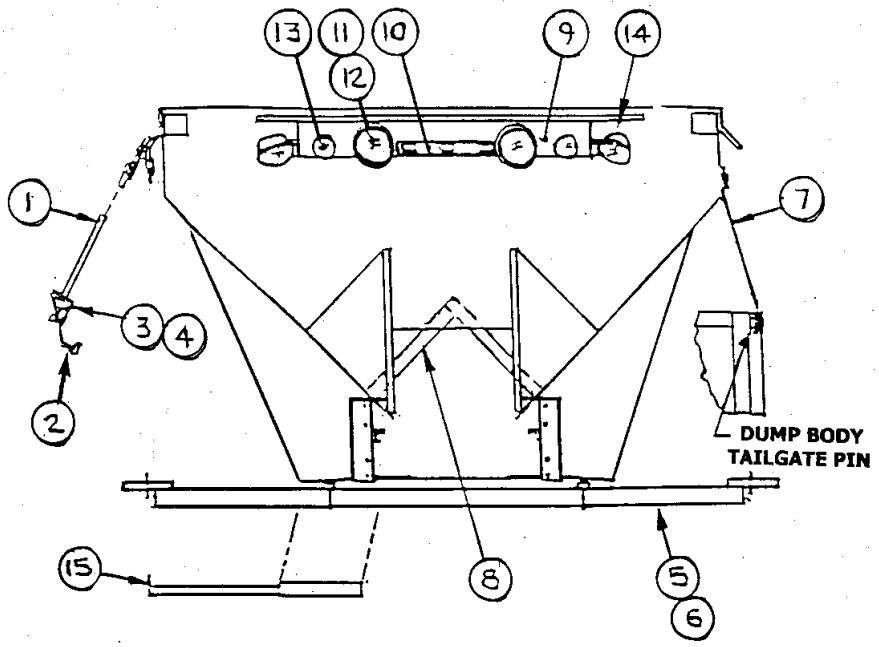
TOP SCREENS

MACHINE LENGTH	QUANTITY OF SCREENS REQUIRED
8 FT.	4 – 47'S
9 FT.	2-47'S + 2-59'S
10 FT.	4 – 59'S
11 FT.	4-47'S + 2-34.5'S
12 FT.	6 – 47'S
13 FT.	4-59'S + 2-34.5'S
14 FT.	2-47'S + 4-59'S
15 FT.	6 – 59'S
16 FT.	4-59'S + 2-71'S
18 FT.	6 – 71'S



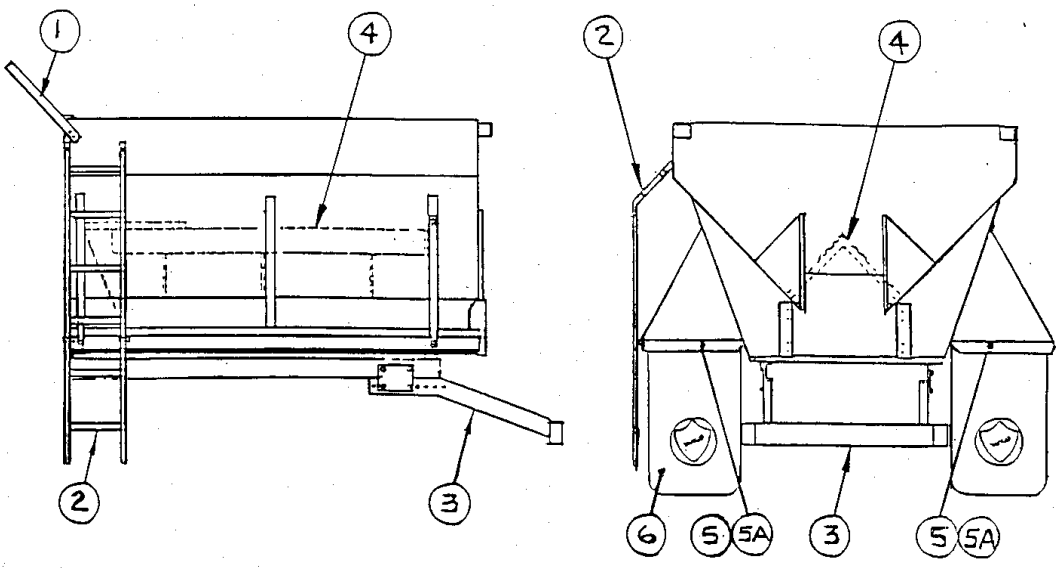
ITEM	TARCO PART #	DESCRIPTION
1	23949-1	8 Ft Top Screen Pipe
2	23949-1A	9 Ft Top Screen Pipe
3	23949-1B	10 Ft Top Screen Pipe (for 47" & 71" screens)
4	23949-1K	10 Ft Top Screen Pipe (for 59" screens)
5	23949-1C	11 Ft Top Screen Pipe
6	23949-1D	12 Ft Top Screen Pipe
7	23949-1E	13 Ft Top Screen Pipe
8	23949-1F	14 Ft Top Screen Pipe
9	23949-1G	15 Ft Top Screen Pipe
10	23949-1H	16 Ft Top Screen Pipe
11	23949-1J	18 Ft Top Screen Pipe
12	22518-1	34-1/2" Heavy Duty Top Screen
13	22025-1	47" Heavy Duty Top Screen
14	21932-1	59" Heavy Duty Top Screen
15	22510-1	71" Heavy Duty Top Screen
16	11404-1	Hinge Pin (with cotter)

DUMP BODY MOUNTED HOPPER AND LIGHTING OPTIONS



ITEM	PART NUMBER	DESCRIPTION
1	20620-2	Take-up Rod and Chain
2	20620-3	Dump Body Clamp
3	20620-14	5/8” Flatwasher
4	20620-16	5/8”-11 Nylock Nut
5	31149-1	Tailgate Locking Device (Pipe Style)
6	31149-13	Tailgate Locking Device (Angle Style)
7	22640-1	Hopper Body to Tailgate Hold Down
8	31227-1	Inverted Vee (specify machine length)
9	31907-1	Rear Light Bar Assembly
10	12007-2	Three Light Cluster
11	11760-1	Flasher Light (specify red or amber lens)
12	10311-11	Flasher Unit
13	21845-5	Stop, Tail and Directional Lights
14	11819-1	Spot Light
15	10759-1	Hopper Body Stabilizer

CHASSIS MOUNTED OPTIONS



ITEM	TARCO PART # REGULAR STEEL	TARCO PART # STAINLESS STEEL	DESCRIPTION
1	23375-1	23375-5	45 Deg. Cab Shield(available through special order)
2	31207-1		Access Ladder
3	30816-5		Warning Bumper
4	31227-1	31227-1A	Inverted Vee(specify machine length)
5	31154-8 to 16	31154-25 to33	Catwalks(specify mach lgth & no. of gussets)
5A	31154-8A Thru 16A		Aluminum Catwalks(specify mach lgth & no. of gussets)
6	30259-7		Rubber Mud Flaps