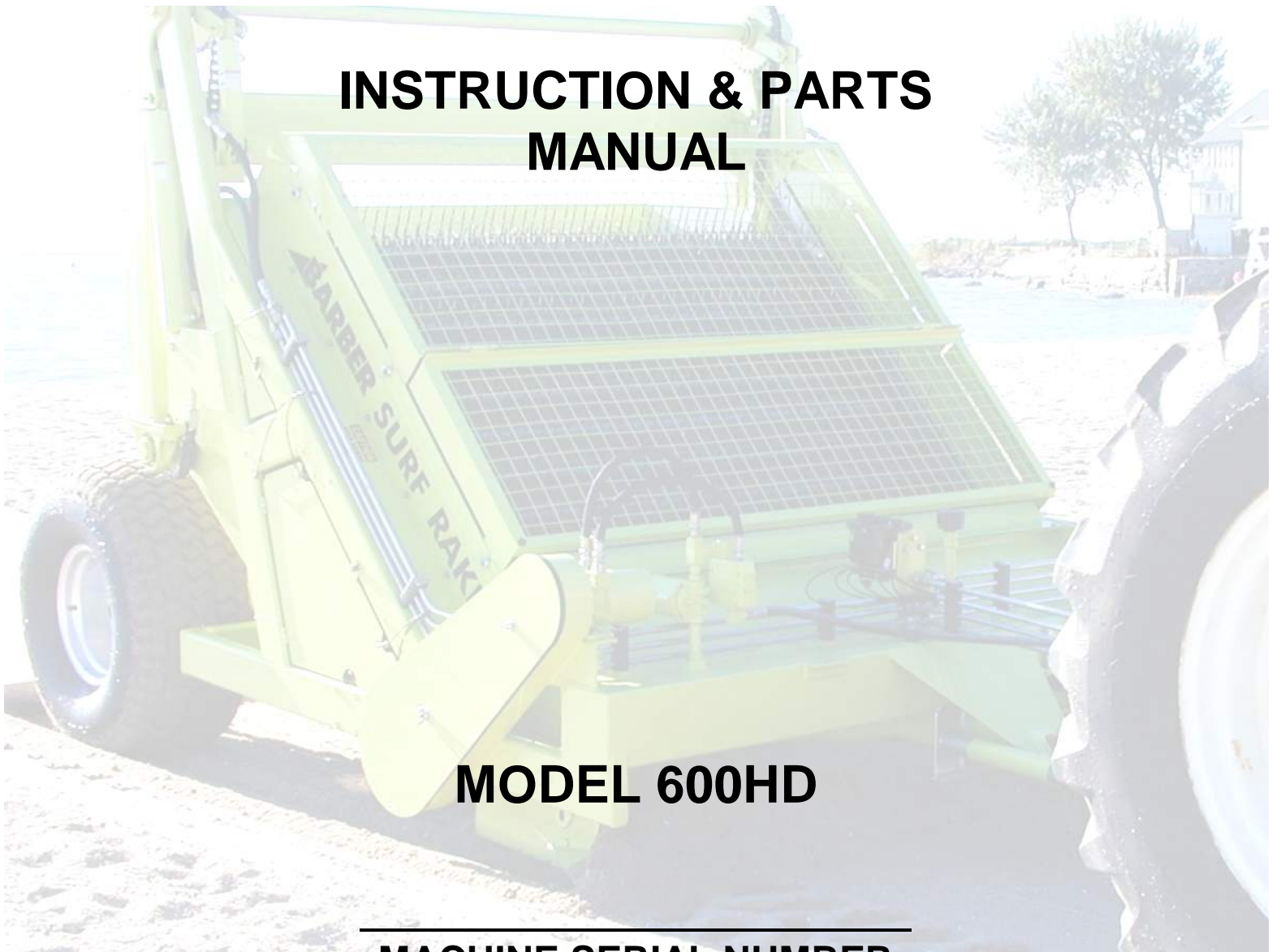




SURF RAKE®

INSTRUCTION & PARTS MANUAL



MODEL 600HD

MACHINE SERIAL NUMBER

CATALOG 600HDS617800221

**IMPORTANT SAFETY INFORMATION
FOR SURF RAKE® OWNERS, OPERATOR EMPLOYERS
AND OPERATORS**

1. Do not allow individuals to operate the Surf Rake® without first receiving personalized training and ensuring that they have read this manual.
2. Before each operation of the Surf Rake®, make a careful visual inspection of the machine. Do not operate if you observe damaged or missing parts, missing guards, excessive wear or unusual noise or vibration during startup.
3. Never allow a bystander to approach the operating Surf Rake®, whether or not it is moving forward. Stop the Surf Rake®, unless that individual is qualified and is present for the specific purpose of assisting in the operation, maintenance or repair of the Surf Rake®.
4. Never allow a bystander to approach the operating Surf Rake® and stand under or near the hopper while it is being raised or lowered.
5. Do not attempt to clear large obstacles from the path of the Surf Rake® by pushing them with the tractor or the Surf Rake®. Stop the Surf Rake®, turn it off and manually remove obstacles. Seek assistance if you cannot do so alone.
6. Never attempt to clear a jam by placing hands or any part of the body into or near the machinery which has not been completely shut down. A jammed conveyor component can immediately jump into motion and cause serious injury to hands or other body parts in immediate contact with the components if the system is under hydraulic pressure.
7. Stand clear of the Surf Rake® when it is being set down on its foot stands or jack stand, to prevent injury.
8. Follow OSHA regulations regarding hydraulic fluid, fire safety, guarding and if applicable, lock-out/tag-out procedures.
9. Before conducting any repair or maintenance on the Surf Rake®, ensure that the hydraulic pump is OFF, not just in neutral, and examine the machine carefully to assure that:
 - (a) No hydraulic hoses remain pressurized.
 - (b) No parts of the machine are suspended without being mechanically blocked or supported.
 - (c) All sources of power have been locked in the OFF position and tagged.
10. Never allow one person to operate the controls of the Surf Rake® while another has any part of their body in or near a pinch point or machinery element from which a guard has been removed.
11. Stand clear of hydraulic hoses and fittings while the Surf Rake® is in operation. A sudden fitting or hose failure can inflict serious injury.
12. Do not operate the Surf Rake® on a steep incline, extremely irregular surface or unstable surface. The tractor and/or the Surf Rake® can capsize and cause serious injury or death to the operator or nearby persons.
13. Never modify any part of the Surf Rake® without prior approval, in writing, from the manufacturer.
14. Never replace any components of the Surf Rake® with one which is not manufactured by H. Barber & Sons, Inc., or listed in this manual as a proper replacement part.

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When Ordering Parts, state the:

1. **Model and serial number of your Surf Rake®.**
2. **Part number, description and page number.**
3. **Shipping and billing address.**
4. **Method by which shipment is to be made.**
5. **Full name of consignee.**
6. **Catalog number of this parts book (found in bottom left hand corner)**

BARBER SURF RAKE® MODEL 600HD

SECTION 1 - SURF RAKE® COMPONENTS

This instruction manual describes the different systems and components that make up the Surf Rake®. This manual includes a maintenance, lubrication and parts ordering section. It is important that anyone operating the Surf Rake® should read and understand this manual prior to operating the machine. All safety procedures must be observed. Step-by-step instructions are also included to facilitate installation. The following section describes the different systems and features of the Surf Rake®.

MECHANICAL COMPONENTS

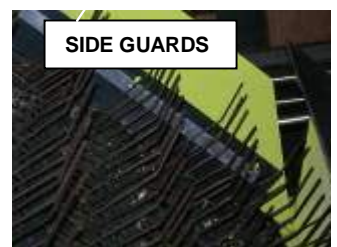
CONVEYOR The conveyor belt rakes the material off of the beach, separates the debris from the sand, elevates the debris up the conveyor and deposits the debris into the hopper. The speed of the conveyor is adjustable. Proper belt tension is essential for long life of the conveyor belt chains and the conveyor belt drive components which include rollers, sprockets and bearings. If the conveyor is loose, it will cause the Surf Rake® to pick up less material and will hasten the wear of the Surf Rake's® drive and conveyor components.

MOLDBOARD The moldboard is located behind the reservoir and in front of the conveyor. It allows debris in the path of the Surf Rake® to pass under it and into the adjacent area between the moldboard and conveyor belt, where the conveyor separates the sand and lifts the debris using the back/hidden side of the moldboard. The proper height adjustment of the moldboard is important for picking up the maximum amount of debris per pass.

DRIVE MECHANISM The conveyor belt is supported by sets of sprockets and rollers on each side of the frame. The bottom front shaft is the driving shaft or main shaft. The pair of sprockets on the main shaft and the pair on the top shaft keep the conveyor belt tracking straight by guiding the chains located on each side of the conveyor belt. For the conveyor belt to track correctly, the tension must be the same on each side of the conveyor belt. The top shaft moves upward to achieve correct tracking tension. Take up bolts located under the top shaft on each side of the frame are tightened to raise the top shaft. It is very important to evenly adjust both sides of the conveyor belt to the same tension by tightening these take up bolts. There are four 3 ½" diameter and two 3 ¼" metal roller assemblies that support the weight of the conveyor and the debris that is being lifted up to the hopper.

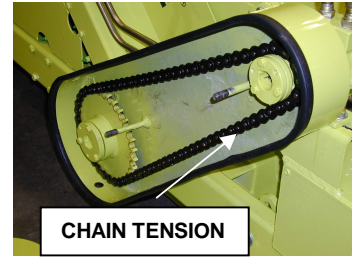
There are four 8" diameter idler roller assemblies that create a smooth path of support for the conveyor to rotate on.

SIDE GUARDS/STONE GUARDS The side guards and stone guard flaps are located on each side of the conveyor belt. Together they guide debris up to the top of the conveyor belt and into the bucket. They keep debris away from the conveyor belt chain and drive sprockets. The side guards are fastened to the side frame with three bolts. The stone guard flaps are fastened to the side guards with bolts which are loosened to adjust the flaps down toward the belt as the flaps wear. There should be no gap between the stone flap and the belt. This should be adjusted every season or replaced when worn. This protects the conveyor belt from jams.



TOP SHIELD The top shield acts as a guide that prevents light weight objects from being blown out of the side of the moving Surf Rake®. The top shield is also a safety device that prevents incidental contact with the moving conveyor belt assembly. It is fastened to the side guard with four bolts and is taken off to adjust the stone guard flaps.

CHAIN CASE The conveyor belt is driven by the hydraulic motor which transfers power to the drive chain and the drive sprockets located inside the chain case. Drive chain should be adjusted so that there is approximately 1/4" (6.35mm) slack but no more than 1" (25.4mm) slack midpoint between the sprockets. Adjustment is made by loosening the two bolts that fasten the motor mount to the front tank motor bracket and tightening the adjusting bolt, which will move the motor and attached front sprocket assembly forward. Replace chain when adequate adjustment can no longer be achieved. Note: Chain tension should be 1/4" minimum (6.35 mm) and 1" maximum (25.4 mm).



BUCKET The bucket catches the debris the conveyor belt picks up. When full, the bucket is raised and then tripped, pivoting on the lift arm and bucket bearings. There is a bucket stop on the left side, which stops the bucket at its dumping position and prevents the bucket from spinning and over turning. There is a block on either side of the bucket which nests into the angled guides on each side of the bucket on the frame. When the bucket is in its correct position, the blocks should be to the bottom of the guides and slightly off the frame.

BUCKET LIFTING MECHANISM The lift arms attach the bucket to the frame. They are elevated hydraulically by the two larger lifting cylinders. They lift the bucket back/away from the frame for emptying the collected debris. The lift arms are supported by a sleeve bearing located at the top of the side frame on each side of the Surf Rake®. The grease port on top of the side frames should be greased weekly to prevent the sleeve bearings from freezing up.

BUCKET TRIPPING MECHANISM After the bucket is raised, it is tripped to empty the collected debris. It is tripped by the smaller pair of dumping cylinders, dumping sprockets and turnbuckle assemblies. After the bucket is tripped and emptied of debris, it must be un-tripped before it is lowered.

BUCKET GUIDES The guides are located on the frame on either side of the bucket and should be used to position the bucket correctly by tightening or loosening the dump chains. If the bucket chain assemblies are loose when they are down, the turnbuckles should be tightened until the chain assemblies are both taut and lifting the bucket blocks slightly off of the frame. This adjustment should be done when the bucket is empty. If the bucket blocks are not nested near the bottom of the guides, the dump chains are too tight. The turnbuckles must be loosened until the chain assemblies are both taut and lifting the bucket blocks slightly off of the frame.

HUB ASSEMBLY, WHEEL AND TIRE The two hub assemblies are attached to the frame by the spindle. The hub rides on two races and bearings that can be adjusted as they wear with the adjusting castle nut and pin. There is a refillable grease reservoir on each hub that maintains pressure to the bearings.

Torque the lugs on the wheel and tire assemblies to 95 ft/lbs. The tires are inflated to 18 PSI. It is important that both tires be the same pressure.



AUTOMATIC FINISHER (OPTION) The grooming finisher is attached to the rear of the Surf Rake® to smooth the clean sand and eliminate tire marks left by the tractor and beach cleaner.

HYDRAULIC COMPONENTS (CONVEYOR)

The conveyor hydraulic system is separate from the bucket or finisher hydraulic systems. It is a closed system made of the following components:

A reservoir of hydraulic fluid on the front of the Surf Rake®

A hydraulic pump, attached to and powered by the tractor PTO, which circulates the hydraulic fluid

The flow control, which regulates the flow of the hydraulic fluid through the motor

The conveyor belt motor that turns the chain case drive chain and sprockets and turns the conveyor

The hydraulic fluid is then filtered and returns back to the Surf Rake® reservoir.

HYDRAULIC RESERVOIR The reservoir tank is located across the front of the frame. It supplies hydraulic fluid to the hydraulic pump and conveyor belt drive motor. It has a magnetic drain on the bottom for changing the hydraulic fluid. There is a sight gage for inspecting hydraulic fluid level on the side of the tank.

BREATHER CAP The breather cap on top of the reservoir is pressurized to keep out contaminants and keep fumes from entering the atmosphere. It has a 10 micron rating and has a 5 PSI relief valve setting.

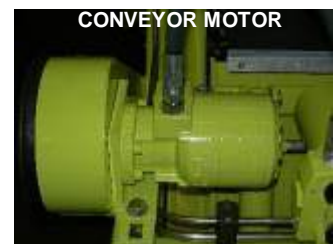
HYDRAULIC PUMP The hydraulic pump should be placed over the PTO spline shaft at the rear of the tractor. Slide the pump as far forward as possible. The pump bracket can be mounted directly to the top link of the three point hitch. Adjust arms to keep the pump upright and as close as possible to the tractor. If this bracket cannot be attached, use the bracket with mounting chain. To secure the pump, secure the chain to a rigid surface of the tractor, preferably to the pin of the upper three-point hitch arm bracket, so that the torque arm of the pump is positioned up. The PTO spline will turn clockwise and the resulting torque will tend to turn the pump clockwise also. Minimize the length of the safety chain. There is a removable link that attaches the hook to the chain. This link may be repositioned along the chain to minimize the chain length and maintain the upright orientation of the pump. It may be necessary to reduce the chain length to achieve proper orientation of the pump. It may also be necessary to reposition the pump arm to fit up with the tractor. Be careful not to crimp or twist the hoses. If the 1"(2.54cm) suction hose is twisted, the hose clamp on the pump end of the hose can be loosened, the hose turned to the desired position, and the clamp re-tightened.

FLOW CONTROL The flow control is located between the pump and conveyor belt motor. It raises or lowers the speed of the conveyor belt motor by regulating the flow of hydraulic fluid circulated by the pump. The control arm is on the side. When the control arm is in the up position, hydraulic fluid is completely restricted, preventing the motor and conveyor belt from turning. As the control arm is turned down, the valve inside is opened up and the motor and conveyor belt increase speed. There is a built-in, preset, pressure relief valve that protects the conveyor belt assembly. If an oversized object stops the rotation of the conveyor belt, the valve will open, relieving pressure from the conveyor motor and bypass the hydraulic fluid back to the reservoir.



HYDRAULIC FILTER The hydraulic fluid is filtered and returned to the reservoir tank through the canister filter.

HYDRAULIC CONVEYOR BELT MOTOR The hydraulic motor drives the conveyor belt and is located next to the chain case. The intake hose comes from the flow control and the outlet hose returns to the reservoir. The motor does not run in reverse. There is a take up bolt and lock down nut at the base of the motor that moves the motor to adjust and tighten the chain case drive chain when the chain wears.



HYDRAULIC COMPONENTS (BUCKET AND FINISHER)

The tractor's remote valve hydraulic system is used to control both the bucket hydraulics and the hydraulic moldboard if equipped.

Each tractor remote valve spool has a pair (2) of quick disconnects that are next to each other, positioned either vertically or horizontally depending on brand of tractor, and independently operated from adjacent spools. One spool (2 quick disconnect outlets) is needed for the hose for the bucket raising and lowering operation and tripping and returning operations. Only one quick connect is utilized. No other hose or implement can be plugged into the unused quick connect. If a hydraulic moldboard option is added, an additional spool or second remote is required to raise and lower the moldboard. These are the only double acting cylinders on the Surf Rake® and use both the upper and lower quick disconnects of a spool. It is not possible to share two of these operations on the same spool or set of remote valves. When connecting to each spool use the upper remote and leave the lower remote empty.

BUCKET LIFTING CYLINDERS The two large cylinders raise the lift arms and bucket to its dumping position.

BUCKET TRIPPING CYLINDERS After the hopper is raised and positioned, two small cylinders are used to trip the hopper and remove the debris. The dump chains, sprockets and small cylinders trip the bucket after it is raised. The turnbuckles are the mechanism used to adjust the position of the bucket. It is very important that the turnbuckles be adjusted evenly to distribute or share the lifting load of the bucket. When the bucket is being raised or when the bucket is down in the cleaning position, the dump chains should be taut on both sides.

AUTOMATIC FINISHER (OPTION) The automatic finisher is integrated into the conveyor belt hydraulics. When the PTO on the tractor is engaged, the conveyor belt is activated and the finisher is lowered. A spring mechanism is used to raise the finisher when the PTO is disengaged.

FINISHER CYLINDER (OPTION) The finisher's single acting cylinder is operated hydraulically through a hose connected to one of the tractor's quick disconnecting remote valves. The finisher cylinder lowers the finisher onto the beach to create a smooth pathway behind the Surf Rake®. The finisher cylinder raises the finisher for transporting to and from either a debris dump site or dumpster and for transporting the Surf Rake® to a storage site.

HYDRAULIC MOLDBOARD (OPTION) The hydraulic moldboard is moved up and down by two double acting cylinders. This option requires a separate set of remote valves on the tractor. The two hoses connect to one rear remote valve.

ELECTRONIC COMPONENTS (OPTIONS)

Electrical diagrams for all component options are located at the end of this manual.

POWER CABLE The towing tractor supplies the Surf Rake® and all its electronic components with power through a seven conductor cable. The cable runs from the tractor to the junction box on the Surf Rake®. Wiring diagrams are located at the back of this manual – refer to the table of contents. **See Picture.**



POWER CABLE

LIGHTING (OPTION) The lighting circuit is comprised of a two piece molded electrical harness that connects the brake lights, tail lights, turn signal lights to the towing vehicle's lighting system. The Electrical Plug is a 7-pin configuration. Wiring diagrams are in Section 6-18.

HYDRAULIC MULTIPLIER (OPTION) When the tractor needs an additional valve(s) to operate the bucket or the finisher, a hydraulic multiplier can be used. Connect the multiplier's solenoid body to the tractor's quick disconnect remote outlet. Attach the multiplier's push button handle onto the tractor remote's handle and plug into the tractor's electrical power source. This electronic solenoid activated valve spits an existing line from the tractor, allowing you to choose which cylinders you want to activate by pressing the button on the handle. A one to two line multiplier and a one to three line multiplier are available. **See Picture.**



HYDRAULIC MULTIPLIER

BARBER SURF RAKE® MODEL 600HD

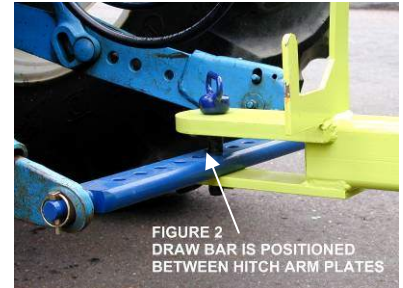
SECTION 2 - ATTACHING TO TOWING VEHICLE

ATTACH

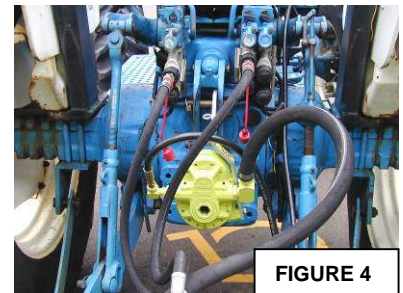
DRAWBAR Install the supplied draw bar onto the tractor's lower 3-point hitch arms, securing it on each end with the supplied hitch bar snap pins.

FRONT HITCH To attach, back the tractor up to the Surf Rake® and centrally locate the draw bar between the upper and lower plates of the hitch. Drop hitch pin through and insert cotter pin into bottom of hitch pin. **See Figure 2.**

DRAFT CONTROL Set the draft control on the tractor so the bottom edge of the moldboard may be lowered at least 4 inches (10.16 cm) below ground level. The three-point hitch lift arms on the tractor may need to be adjusted so that you have the necessary range of movement. It is recommended that sway bars be used on the arms of the three-point hitch. **The draw bar must be 4-5 inches from the ground at its lowest point.**



HYDRAULIC PUMP The tractor PTO guard must first be removed in order to correctly install the pump. The hydraulic pump should be placed over the PTO spline at the rear of the tractor. Slide the pump as far forward on the PTO spline shaft as possible. The pump bracket is attached to the pump. Attach the bracket to the top pin of the three point assembly. Keep the pump as close to the tractor as possible. If the arm cannot be attached, use the attaching chain. The pump chain is located in the spare parts box. Secure the chain to a rigid surface of the tractor, preferably to the pin of the upper three-point hitch arm bracket, so that the torque arm of the pump is positioned up. The PTO spline will turn clockwise and the resulting torque will tend to turn the pump clockwise also. **MINIMIZE THE LENGTH OF THE SAFETY CHAIN.** There is a removable link that attaches the hook to the chain. This link may be repositioned along the chain to minimize the chain length and maintain the upright orientation of the pump. It may be necessary to reduce the chain length to achieve proper orientation of the pump. Be careful not to crimp or twist the hoses. If the 1"(2.54cm) suction hose is twisted, the clamp on the pump end of the hose can be loosened, the hose turned to the desired position, and the clamp re-tightened. The supplied bracket is adjustable for a variety of tractors.



There is one hose at the front of the Surf Rake® that operates the bucket. **See Figure 4.** If equipped, can add an additional hose for the hydraulic moldboard.

HYDRAULICS FOR BUCKET RAISE Remove the protective covers (545HD-13) from the bucket hose. Attach the hose, which is equipped with quick disconnect couplers into your tractor's quick disconnect outlets. This hose must be connected to separate spools for independent operation. **DO NOT ACTIVATE TRIP UNTIL THE BUCKET HAS BEEN RAISED.**



HYDRAULIC MULTIPLIER Depending on which options are purchased for the SURF RAKE®, the towing tractor may require more than one hydraulic (spool) valve. If more than one valve is required, a "hydraulic multiplier" can be installed to split one valve into two or three circuits. **See Figure 5.**

JACK POSITIONING Lift the machine up with the three-point hitch, remove the jack stand pin and turn the jack stand back, not forward, into its neutral position (or remove jack stand if desired). Replace jack stand

pin. Fold the jack stand arm up to keep it away from the working area as shown in Figure 6. The Surf Rake® is now ready for operation. **See Figure 6.**



TRACTOR ENGINE While in operation, the tractor engine should be kept at an RPM that will result in a **540-RPM PTO** speed. This should be displayed on the tractor's tachometer. The speed of the tractor and the PTO speed will later be adjusted to suit individual beaches.

FLOW CONTROL The flow control valve lever should be adjusted once the PTO on the tractor is engaged. The pump will deliver oil to the flow control valve. The lever on the valve regulates the conveyor belt speed. Adjust the belt speed as described in the operation section in this manual (Belt speed of **14 RPM** is a good initial setting). The valve is also equipped with an overflow relief, factory set to **2000 PSI (13,788 kPa)**, which serves as a safety device should the belt mechanism jam. **See Figure 7.**



BARBER SURF RAKE® MODEL 600HD

SECTION 3 – OPERATING THE SURF RAKE®

OPERATION



Do not allow individuals to operate the Surf Rake® without first receiving personalized training and ensuring that they have read this manual.



Before each operation of the Surf Rake®, make a careful visual inspection of the machine. Do not operate if you observe damaged or missing parts, missing guards, excessive wear or unusual noise or vibration during startup.



Stand clear of hydraulic hoses and fittings while the Surf Rake® is in operation. A sudden fitting or hose failure can inflict serious injury.



To prevent the tractor and/or Surf Rake® from capsizing and causing serious injury or death, do not operate the Surf Rake® on a steep incline or unstable surface.



Do not allow a bystander to approach the Surf Rake® unless that individual is qualified and is present to assist in the operation or repair of the machine. Never allow one person to operate the controls of the Surf Rake® while another has any part of their body in or near a pinch point.



Under no circumstances should a bystander stand under or near the hopper while it is being raised or lowered.



To prevent injury, do not attempt to clear large obstacles by pushing them with the tractor or Surf Rake®.



Never attempt to clear a jam by placing hands or any part of the body into or near the machinery that has not been completely shut down. A jammed conveyor component can immediately jump into motion and cause serious injury to hands or other body parts in immediate contact with the components if the system is under hydraulic pressure.

START UP Pull the Surf Rake® into position on the beach area to be cleaned. Put the tractor in gear. Engage the PTO and adjust the engine to a **540-RPM PTO** setting. With the tractor moving and the belt turning, lower the Surf Rake® into the sand. The Surf Rake® can be towed along the beach at speeds from one to fifteen miles per hour (1.6km/hr to 24 km/hr). Speed is dependent on the contour of the beach and the volume of debris to be removed. On a very uneven beach or on a beach that is heavily littered, travel-cleaning speeds of three to four miles per hour should be maintained. On a level beach that is lightly littered, higher speeds can be attained. The operator must be alert for large objects or obstructions on the beach. If a significant obstruction is encountered, the Surf Rake® must be raised clear of the obstruction. If it is not possible to safely raise the Surf Rake® clear of the obstruction, stop the machine, turn it off, and manually remove the obstacle. Seek assistance if you cannot do so alone.



FIGURE 8
MATERIAL CARRIED
IN FRONT OF MOLDBOARD



UNDER NO CIRCUMSTANCES SHOULD THE SURF RAKE® REMOVE MORE THAN A NEGLIGIBLE AMOUNT OF SAND.

If it is picking up too much sand, refer to the operating hints section of this manual. The machine should be raised and lowered while cleaning to follow the general contour of the beach. To achieve a consistently clean beach, some material should be carried in front of the moldboard deflector unit. This allows the tines to penetrate evenly for the full width of the machine, thus leveling the beach while utilizing the Surf Rake® to its maximum potential.

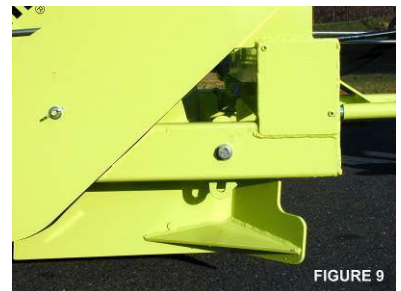


FIGURE 9

MOLDBOARD ADJUSTMENT Proper adjustment of the moldboard is critical to achieving the maximum potential from your Surf Rake®. The distance from the bottom of the Surf Rake® frame to the bottom edge of the moldboard is set at the factory at 7 1/4"(18.42cm). This adjustment can be varied to change the cleaning depth and accommodate particular beach conditions. The moldboard is adjusted by two turnbuckles as shown in **Figure 10** (one side). Caution must be taken so that both sides of the moldboard are adjusted evenly and it should be noted that even a 1/4"(.635cm) adjustment makes a significant difference in the performance of the machine. **Do Not Raise The Moldboard Too High.** This will result in the Surf Rake® unnecessarily removing sand and will greatly accelerate tine and conveyor wear. If there are any questions regarding this adjustment, please call the factory for a more in-depth explanation.



FIGURE 10

OPERATING HINTS

The following general rules should be followed to attain maximum efficiency from your Surf Rake®.

If your Surf Rake® is picking up too much sand:	If your Surf Rake® is not removing enough debris:
1. Lower moldboard	1. Raise moldboard
2. Reduce conveyor belt speed	2. Increase conveyor belt speed
3. Increase tractor speed	3. Decrease your tractor speed

As beach conditions vary, the adjustments listed below should also be varied. Some general conditions and the proper settings for the condition are also listed below:

<u>WET SAND</u>	<u>DRY SAND</u>
Moldboard - lower	Moldboard - raise
Belt Speed RPM's - decrease	Belt Speed RPM's - increase
Tractor speed - not critical	Tractor speed - not critical

<u>FIRM BEACH</u>	<u>SOFT BEACH</u>
Moldboard - lower	Moldboard - raise
Belt Speed RPM's - decrease	Belt Speed RPM's - increase
Tractor speed - not critical	Tractor speed - not critical

<u>BIG MATERIAL</u>	<u>SMALL MATERIAL</u>
Moldboard - not critical	Moldboard - raise
Belt Speed RPM's - decrease	Belt Speed RPM's - increase
Tractor speed - slow	Tractor speed - not critical

<u>CLAY OR SOIL IN SAND</u>	<u>PURE SAND</u>
Moldboard - lower	Moldboard - raise
Belt Speed RPM's - decrease	Belt Speed RPM's - increase
Tractor speed - not critical	Tractor speed - not critical

<u>HEAVY SEAWEED</u>	<u>BOTTLES</u>
Moldboard - raise	Moldboard - not critical
Belt Speed RPM's - decrease	Belt Speed RPM's - decrease
Tractor speed - slower	Tractor speed - not critical

Once the proper settings have been found, ***a negligible amount of sand should be removed with the unwanted debris.*** After this setting has been attained, no further adjustment of the moldboard should be required. The daily variations can be satisfactorily dealt with by adjusting the conveyor RPM or tractor speed.

These rules are to be used as a general guideline. Each beach is unique and requires its own group of settings. With experience, the best settings can be found quickly allowing the Surf Rake® to be used to its maximum potential.

BARBER SURF RAKE® MODEL 600HD

SECTION 4 – MAINTENANCE



To prevent injury, before conducting any repair or maintenance on the Surf Rake®, ensure that the hydraulic pump is OFF, not just in neutral, and examine the machine carefully to assure that:

No hydraulic hoses remain pressurized



No parts of the machine are suspended without being mechanically blocked or supported.

All sources of power have been locked in the “off” position and tagged.



Follow OSHA regulations regarding hydraulic fluid, fire safety, guarding and, if applicable, lock-out/tag-out procedures.

Always ensure that the parking brake on the tractor is set before working on the Surf Rake® to prevent injury.



Never modify any part of the Surf Rake® without prior approval, in writing, from H. Barber & Sons, Inc. Do not replace any component of the Surf Rake® with one that is not manufactured by Barber or listed in this manual as a proper replacement part.

LUBRICATION

GREASE FITTINGS Lubricate all grease fittings every 40 hours of operation. (See Maintenance and Lubrication Chart - Section 5)

BUCKET CHAINS should be sprayed with penetrating oil twice a year. Cover the chains with oil or grease before storing for the off-season.

CHAIN CASE ROLLER CHAIN should be oiled after every 200 hours of use.

TURNBUCKLES should be cleaned and re-greased at the end of the season. In severe rusting areas this should be done more frequently.

PINS Cylinder and moldboard pins should be spot lubricated with oil every 4 weeks.

CYLINDERS Cylinder tops should be wiped clean and spot lubricated with penetrating oil every 100 hours and at the end of the season.

CONVEYOR CHAIN It is recommended that the Conveyor Chain be run dry. Lubricants will cause sand to adhere and speed up wear. A dry graphite lubricant may also be used. Occasionally, especially after a period of disuse, light penetrating oil may be applied. Prior to winter storage, heavier oil may be applied to avoid rusting.

BARBER SURF RAKE® MAINTENANCE ADJUSTMENTS

DAILY ADJUSTMENT CHECK There are four basic component checks for proper adjustment to ensure that your Surf Rake® is operating to the efficiency for which it was designed. The four adjustments work together and should be checked each time the machine is used.

1. TIRE PRESSURE It is important for the proper operation of the Surf Rake® to have the two rear tires inflated to the same pressure.

TO ADJUST TIRE PRESSURE: Inflate tires to 18 PSI.

When the tires are not inflated the same, the tire with the lower pressure will in turn lower that side of the Surf Rake® and cause the tines on that side to be lower. The result is the conveyor belt will clean unevenly, possibly picking up sand on the lower side or not cleaning deep enough on the higher side.

2. BUCKET / LIFT ARM CHAIN ASSEMBLIES It is important for the proper operation of the Surf Rake® to have the bucket/lift arm chains on each side of the Surf Rake® under the same tension, and not left loose, so they will share the load when lifting and tripping the hopper.

TO ADJUST BUCKET CHAINS: When the bucket is sitting on the frame, the chain/turnbuckle assemblies should be tight. Tighten up loose chain/turnbuckle assemblies so that both sides have the same tension and the bucket support blocks are just off or barely touching the frame.

When one chain assembly is loose while raising the bucket, all the weight and pressure of lifting the bucket is shifted to the tighter chain assembly. This causes the tighter chain assembly to stretch more than it would if both chain assemblies were the same tension. This causes premature wear to the links and the chains and can cause sudden failure to one or both of the chain assemblies. If both chains become loose, the bucket will not fully return to the forward/bottom position and will bottom out farther back on the frame than it should. This will allow a gap between the bucket and the path of the debris being thrown by the conveyor that allows the debris to drop down in front of the bucket.

3. CONVEYOR BELT TENSION It is important for the proper operation of the Surf Rake® to have both sides of the conveyor belt with the same tension.

TO ADJUST THE CONVEYOR BELT: Open the side guard doors on both sides of the Surf Rake®. Pull the conveyor belt back and forth midway between the upper 8" idler roller wheel and lower 8" idler roller wheel to check for amount of play. If there is more than 1 ½" of play, tighten the adjusting bolt. This will raise the upper shaft and tighten the conveyor assembly. Repeat this procedure on the other side of the conveyor assembly. Take some time and go back and forth to each side of the machine, checking that both sides are the same tension. Once both sides are the same tension, retighten the jam nuts on the take up bolts and refasten the doors/guards.

When the conveyor belt assembly is loose on one side, the belt will naturally sag on that side and cause the tines to drag on that side. The result is premature wear to the tines, an uneven cleaning and possibly picking up sand.

4. MOLDBOARD HEIGHT It is important for the proper operation of the Surf Rake® to have both sides of the moldboard adjusted identically to the same height. The moldboard is initially set evenly. For most applications, this factory setting works well. If the factory setting is changed, be advised that a small amount of adjustment has dramatic results. Do not move more than ¼" at a time without testing the new setting in the sand for a period of time. Use the guides at the sides of the moldboard to align both sides identically.

TO ADJUST: Loosen the turnbuckle locking arms on the sides to be moved. Use the guides at each side of the moldboard to level the moldboard to the desired height. Be sure that the guides are set at the same mark or location on each side. Retighten the turnbuckle locking arm/s.

The moldboard levels the beach so the tines can penetrate and clean the sand to a constant depth. If the moldboard is too high on one side, the tines will be forced too deep into the sand. This will result in sand being removed along with the debris. **At no time should the Barber Surf Rake® pick up sand.**

HYDRAULIC MOLDBOARD (Option) The hydraulic moldboard can be powered up or down from the tractor. When the moldboard is lowered, the life of the conveyor system is maximized. By varying the height of the moldboard, the depth of cleaning is varied.

CONVEYOR BELT DRIVE COMPONENTS – INSPECTION AND ADJUSTMENT

MAIN SHAFT

MAIN SHAFT SPROCKETS Make a visual inspection of the sprockets for wear. If the sprocket tooth is worn down half of its original width, it should be replaced. There is no adjustment to be made on the sprockets.

MAIN SHAFT BEARINGS Try and lift the main shaft either with a pry bar or by hand. If there is play or movement, an adjustment can be made to tighten the bearing.

TO ADJUST THE MAIN SHAFT BEARINGS: Unscrew machine screw on side of main shaft bearing and remove retaining ring stop. Turn retaining ring clockwise until there is little or no play. Reinsert the stop and screw. Do not over-tighten. The drive chain and drive sprocket must be removed to adjust the bearing on the chain case side. If adjusting does not remove the play from the bearing, it must be replaced.

TO REMOVE THE MAIN SHAFT BEARINGS:

Remove the top shield, side guards, and conveyor belt assemblies.

Remove the chain case cover.

Loosen the motor jam nut and take up bolt.

Loosen the motor mount bolts and slide back the motor to loosen the drive chain.

Remove drive chain.

Remove large drive sprocket.

Loosen the set screws on the cast iron conveyor belt sprocket that is farthest away from the chain case - the left side.

Clean the paint off of the inner/left side of the main shaft and move the left side cast iron conveyor belt sprocket toward the center of the main shaft.

Remove the left/outer-retaining ring, which holds the cartridge bearing in its sleeve.

Pull the main shaft away from the chain case so that the left bearing slides out of its sleeve and can be taken off of the shaft.

Remove the right inner retaining ring and push the cartridge bearing out of its sleeve.

If the cartridge bearing is locked into place, a bearing puller can be purchased to help remove the bearing.

TOP SHAFT

TOP SHAFT SPROCKETS Make a visual inspection of the sprockets for wear. If the sprocket tooth is worn down half of its original thickness, the top shaft should be replaced. There is no adjustment to be made on the sprockets.

TOP SHAFT BEARINGS The top shaft bearings are take-up bearings. Clean off any debris or excess grease and visually inspect for wear or damage. Use a pry bar to check for wear pushing on the bar to inspect for movement. If there is no movement, clean and grease. If the bearings or sprockets are visibly damaged or have movement, they must be replaced.

TO REMOVE THE TOP SHAFT: Raise the bucket and secure it with the safety support (545JJCA).

Remove the top shield. Loosen up the six 1/2" wing nuts (518AA) that secure the top shield to the side shields. The top shield is hinged. Flip up the lower section of the top shield so it rests on the upper section of the top shield. Remove the top shield assembly by lifting it off the side shields.

REMOVE SIDE SHIELDS The side shields are slotted so that they can be lifted off the frame once the bolts that attach them to the frame are loosened (four bolts) or removed (two bolts). There are three 3/8" bolts on each side, which secure each guard. The top set of bolts has no hidden nuts and loosens with either a 9/16" socket or box wrench. They can be completely removed from the frame.

The middle set of bolts has nuts, which are accessible and hidden on the inside of the frame. They should be partially loosened with a 9/16" socket and box end wrench. Loosen three or four turns but do not remove from the frame.

One of the bottom bolts/nuts is accessible behind the chain case and must be loosened three or four turns with an open end wrench. The other bottom bolt can be loosened three or four turns with a 9/16" socket and box end wrench.

Raise the bottom end of the side guard first, and then lift the guard off of the bolts.

Remove the two 1/2" wing nuts that secure the chain case cover to the chain case. Remove the chain case cover. Position the connecting link midway between the large and small drive sprockets. Remove the connecting link and the drive chain.

The tractor can be unoccupied from the SURF RAKE® at this point.

There is an overlap at the ends of the conveyor belt rubber belting. The overlap is under one of the rows of springs. The belt must be disconnected at this overlapped row. To find the overlap, look inside the belt while turning it. The channel on the inside of the belt will partially hide the ends of the rubber belting, but the end of the belting will be visible. When it is found, the overlapped row should be positioned one row up from the rear bottom sprockets.

Loosen the jam nuts on the take up bolts (1 1/8" open ended wrench), which are located behind the small/upper side door shields on both sides of the machine.

The top shaft is a sliding/take up shaft. It is used for tensioning and loosening the conveyor belt. By loosening the take up bolts, the top shaft will lower and the conveyor belt will loosen. Loosen the take up bolts until the conveyor belt stops lowering (1 1/8" socket with one 12" and one 6" extension). Loosen both sides completely.

The conveyor belt must be clamped to prevent it from rolling off/down when all fasteners and chains from the overlapped row are removed. Clamp each side using a c-clamp type vice grip or similar clamps. Position the clamps through the chain and fasten the clamps to the arms that hold the skid shoes. Remove the row of tines that covers the overlap by removing the 5/16" nuts that secure the channels-backing strips-retaining bars (use a 1/2" socket with 6" extension & 9/16" box wrench).

Remove the cotter pin and connecting pin from the chains. If the chains are worn out and being replaced, they can be torched apart.

There are 28 rows on the belt. Count 14 rows or half way from where the belt is split. A lifting chain should be hooked at or near this midpoint location on each side of the conveyor belt. This will allow the lowest height necessary to lift the conveyor belt off of the machine.

When the lifting chain is fastened/hooked to the conveyor belt chain and enough tension is on the lifting chain to prevent the conveyor belt from moving, remove the clamps that prevent the conveyor belt from rolling off/down.

Lift the conveyor belt up/off of the machine being careful of the cylinders at the top of the machine and of the hydraulics at the front of the machine.

The conveyor belt can also be pulled off from the rear of the machine.

Once the belt is off, the top shaft lifts up the guides and off the frame. It is easiest to have two people lift it off. It must be lifted off straight and even.

It is important to make a note of the bearing location on the top shaft to ensure correct placement of the new bearings. Measure the distance from the edges of the bearings to the ends of the shaft and to the edge of the sprockets. The better centered the sprockets are the smoother the belt will run. The bearings can only go on one way. The collars must face the outside.

It is possible to rotate the top shaft to allow the unused side of the sprocket teeth to be in contact with the conveyor belt chain, prolonging the life of the top shaft.

Loosen the set screws on the bearings and pull the bearings off the top shaft. It usually takes a bearing puller to remove the bearings. Mark a centering hole on the shaft to keep the bearing puller straight. Clean, file or sand any imperfections that will prevent the bearing replacement.

Put the new bearings on the top shaft. Do not tighten the bearings onto the shaft yet. Do not grease the bearings yet. Replace the top shaft assembly into the take-up guides of the frame. This is a short two-man step. Each person should be on the ends of the shaft. The first person should position one bearing into the take-up guides and just start it down the guides. The second person should use a large screwdriver to help position the second bearing into the take-up guides. When both sides are in the guides, let the top shaft assembly drop all the way down the guides. A rubber hammer will help to get the shaft down the guides. Center the shaft/sprockets so they are even on both sides. Tighten down the set screws when the top shaft is centered.

Grease the bearings until grease is visible at the seals. Wipe off any excess grease. Any excess grease will immediately have sand adhering to it creating a situation where abrasion will occur.

Replace the belt using the belt removal sequence in reverse.

3 ½" and 3 ¼" ROLLERS AND 8" IDLER ROLLERS INSPECTION AND ADJUSTMENT

There are four 3 ½" steel rollers, two 3 ¼" rollers and four 8" poly rollers that support and guide the conveyor belt on the 600HD. The 3 ½" and 3 ¼" rollers are used to support the conveyor chains. Two of the 8" poly rollers support and guide the conveyor belt over the front of the bucket. The other two 8" poly rollers turn the belt at the bottom of the machine, directing the belt toward the front main shaft and providing a plane of four rows of tines that clean the sand. The internal components are the same for all rollers. Look for any wear on the outside diameter/working surface of the roller. On the metal rollers there will be grooves from the contact with the conveyor chains. If there are flats on the metal roller it must be replaced. To check for wear, loosen the conveyor belt by backing off the adjusting bolts located on each side under the top shaft take-up bearings. Take the weight off of the roller you are inspecting. Check for any wobbling or play. If there is play, the bearings are worn but can be adjusted.

TO ADJUST THE IDLER ROLLERS: Shims are used to compensate for wear. Remove the bearing from the machine. Remove the external retaining ring and cover from the roller. Clean the grease away from the pin and retaining ring. Remove the retaining ring off of the pin. Add shim(s) as necessary, replace retaining ring and recheck for play. Repeat until the roller is tight on the pin. The rollers ride on tapered roller bearings. The bearings will wear out prematurely if not adjusted for wear.

CHAIN CASE SPROCKETS AND CHAIN The drive chain sprockets and chain will wear with use and need to be adjusted periodically. Remove chain case cover and check chain tightness. There should be ½" play in the chain, midway between the sprockets. Check the condition of the teeth of the sprockets. If they are worn down to half their original thickness, they should be replaced. The chain should be replaced if the sprockets are replaced.

TO ADJUST THE CHAIN CASE DRIVE CHAIN: Loosen the take-up bolt and nut away from the motor base plate. Slightly loosen the two motor mount bolts to allow the motor to slide. Tighten the take-up bolt until there is ½" play in the drive chain. Re-tighten the motor mount bolts and the take-up nut. Re-check the chain for correct tension. Only use dry film lubricant on the chain. Do not use grease or oil that will attract sand and shorten the life of the components.

HYDRAULIC COMPONENTS

BUCKET MANIFOLD The bucket manifold, a sequence valve, runs the two functions of the bucket. It both raises and trips the bucket. It is centrally located on the upper cross tube.

CYLINDERS The large and small cylinders are of similar design. They are single acting cylinders. Hydraulic pressure from the towing vehicle raises the cylinders and the weight of the bucket and gravity lowers them. Check for hydraulic leaks. There are seal kits to repair leaking cylinders. A WD-40 type penetrator can be used to prevent the seals from drying out when the machine sits for the off-season. It can also lubricate the rods when first operating a machine after it has sat for a period of time. Clean the breathers to improve airflow in and out of the cylinders.

TO REPLACE THE CYLINDER SEALS: Power wash or clean the cylinder before removing it from the machine. Remove hose from the cylinder. Remove breather from the cylinder. Place the base of the cylinder in a vice and position the cylinder horizontally. Use a bar through the piston rod hole to pull out the piston and piston rod assembly.

Small Cylinder – Have someone compress the retaining ring at the top of the cylinder while you pull the gland and rod assembly out of the cylinder. If the retaining ring is rusted, it is advisable to use penetrating oil and clean up the ring and adjoining area. The retaining ring ends must touch in order to disassemble. Pull out as straight as possible.

Large Cylinder - Unscrew the top with a spanner wrench. Remove the rod/piston assembly. Never try to slide the gland over the end of the piston rod. To clean gland, remove nut on bottom of piston rod and disassemble from that side.

Before removing seals, wipers and O-rings, take note of their orientation in the piston and gland. When replacing felt wipers, make sure they have been saturated in oil. Coat all surfaces in oil before reassembly.

WHEELS SPINDLES AND AXLES To check for play in the spindle/hubs elevate the wheels off of the ground and check for play or looseness on the spindles. It is easier to determine if adjustment is necessary when the tire/wheel is off the hub. If there is excessive play, the bearing and races should be inspected for damage.

TO ADJUST WHEEL HUBS: Remove the buddy hub/grease reservoir from the end of the hub. Clean away the grease. Remove the cotter pin. Tighten the castle nut assembly until the play is gone. Reinsert the cotter pin and grease reservoir. There is a blue collar on the grease reservoir that extends out when grease is added. Add grease to the reservoir until the blue collar extends out. Check for tightness of the wheel cone nuts. They should be tightened to 95 ft/lbs. Tires should be inflated to 18 PSI.

TINE REPLACEMENT Replace tines as they break. Your machine can clean effectively with 20 or 30 tines missing; however, it is advisable to replace them soon after they break. When a tine is broken, the work it would normally do picking up material is transferred to the adjacent tines. This will overwork them and, in turn, shorten their life. Never operate your machine with more than 50 broken tines. Tines will shorten as they are used and should be replaced when they wear to within ½” of the bends.

The most convenient location for removing and replacing tines on the conveyor belts is at the back of the machine with the bucket raised and secured with the safety support. Never work on the machine without the safety support in place.

Position the belt. Rotate the conveyor belt slowly and stop it when the row on which you are going to replace the tines is at the top, back of the machine and parallel to the ground.

REMOVAL AND REPLACEMENT OF 504FH TINES (SIFTING BELT)

TOOLS RECOMMENDED: Safety support is REQUIRED! 3/8" ratchet, 6" socket extension and 1/2" socket (6 point) or a 1/2" combination wrench.

The tines are secured on the retaining bar by a spacer washer and a locknut. Loosen off the retaining washer and nut and remove the old tine. Reapply a small amount of anti-seize to the threaded stud before reassembling. Start the washer and nut back onto the threaded stud, leaving enough room to allow the tine to be positioned underneath.

Tines should be parallel to each other and to the conveyor. Be sure the tines are positioned next to the retaining bolt and well secured under the retaining washer and nut. Tighten the retaining nut 18 to 20 ft-lbs.

REMOVAL AND REPLACEMENT OF 504F-1 TINES (SOLID BELT)

TOOLS RECOMMENDED: Safety support is REQUIRED! Impact gun or ratchet, 6" socket extension and 9/16" socket (6 point), large flat blade screwdriver, 9/16" combination wrench, drive torque wrench.

The tines are secured under the retaining bars (516A/516B) and kept in position by a series of divots on the retaining bars. Loosen conveyor bolts (SIX REVOLUTIONS MAXIMUM). Bolts on both sides of any tine must be loosened in order to remove and replace the tine. The center bolts are secured by wing nuts that will fall to the inside of the belt if the bolts are loosened more than 6 turns. Marking the side of the 9/16" socket with a bright colored line will allow you to count the revolutions while loosening a bolt. If a tine is to be replaced next to the belt chain, the end bolts that secure the chain to the retaining bar must be loosened from the side location of the machine.

Once the bolts are loosened, place the screwdriver between the retaining bar and the backing strip and next to the tine that you are removing. Pry the retaining bar away from the belt and remove the tine. Place the new tine under the retaining bar and resting on the backing strip, make sure that it is positioned correctly around the divot. Torque center bolts to 22 ft.-lbs. (30 Meter-Newtons). If a torque wrench is not available, tighten the bolts so that the retaining bars are tight against the spacer washers on which they sit. If the retaining bars bend when tightening, back off until the retaining bar is straight. Torque end bolts to 40ft.-lbs. (54 Meter-Newtons).

REMOVAL AND REPLACEMENT OF CHANNEL STUDS 560B05095S (SIFTING BELT).

TOOLS RECOMMENDED: Channel Stud Replacement Tool 504CM02, 5/8" socket or ratcheting wrench, hammer, punch, oil. The Bucket Safety Support is REQUIRED when working at the rear of the conveyor with the bucket elevated!

When the top of a channel stud has broken off from use, the stud must be replaced. The base of the stud must be removed from the channel using a punch and hammer from the topside of the conveyor belt. The washer can be reused. The replacement stud should be pushed through from the inside of the conveyor belt. The stud's splines can be aligned/turned into the grooves in the channel that were made from the broken stud. Place the washer onto the stud and then thread the lightly oiled Channel Stud Replacement Tool onto the stud by hand, as far as it will go. Tighten the tool until the head of the stud is flush with the channel. The tool is threaded on both ends and each end will tighten between 10 -15 studs. **DO NOT** use power tools to install studs.

Please visit the **SURF RAKE Maintenance Video Section** of our website, by clicking the following link:

<http://www.hbarber.com/customer-service/Maintenance/surf-rake-maintenance.html>

Barber SURF RAKE[®] Model 600HD

Maintenance & Lubrication Schedule

Every 8 Hours or Every Day:

- Wash Machine After Use

Every 40 Hours or Every Week: Lubricate the following:

Chart Ref. #	Barber Part #	Description (Quantity)
1	549AS08	8" Roller Assemblies (4)
17	503JJ	Main Shaft Bearings (2)
3	503VV	Upper Shaft Bearings (2)
22	549AS10A	3 ½" Roller Assembly Bearings (4)
27	549AS20	3 ¼" Roller Assembly Bearings (2)
2	527GF-4	Wheel Bearings (2)
18	545JJF	Large Cylinder Fittings (4)
19	545JJH	Small Cylinder Fittings (4)
15	A523HD	Dump Sprocket Fittings (4)
14	508RG	Top Lift Arm Sleeve Bearing Fitting (2)
	508RA	Caster Arm Sleeve Bearings (2) (Optional Equipment)

Every 40 Hours or Every Week Inspect and/or Adjust:

Chart Ref. #	Barber Part #	Description (Quantity)
24	504F-1 or 504FH	Replace Damaged Tines / Clear Obstructions on tines
20	A504	Inspect Conveyor Belt Tension (Both Sides)
21	540G	Adjust Conveyor Belt Tension If Needed (Both Sides)
6	527KC-1	Inspect and Adjust Tire Pressure 18 PSI (2)
23	525ZP	Inspect and Adjust Bucket Chain Assemblies if Necessary

Every 200 Hours or Every 2 Months:

Chart Ref. #	Barber Part #	Description (Quantity)
	504G	Check / Torque End Bolts on Conveyor to 40psi (56)
4	522JT1	Spot Lubricate Moldboard Turnbuckle Pins (4)
13	545MM	Clean Breather / Filter on Hydraulic Tank
11	545C	Change Hydraulic Filter
9	503MMC	Inspect and Adjust, if necessary, Main Shaft Drive Chain
10	645	Check Hydraulic Tank Fluid Level
26	542DA	Push flap down so it touches chain

Every 500 Hours or Once a Year:

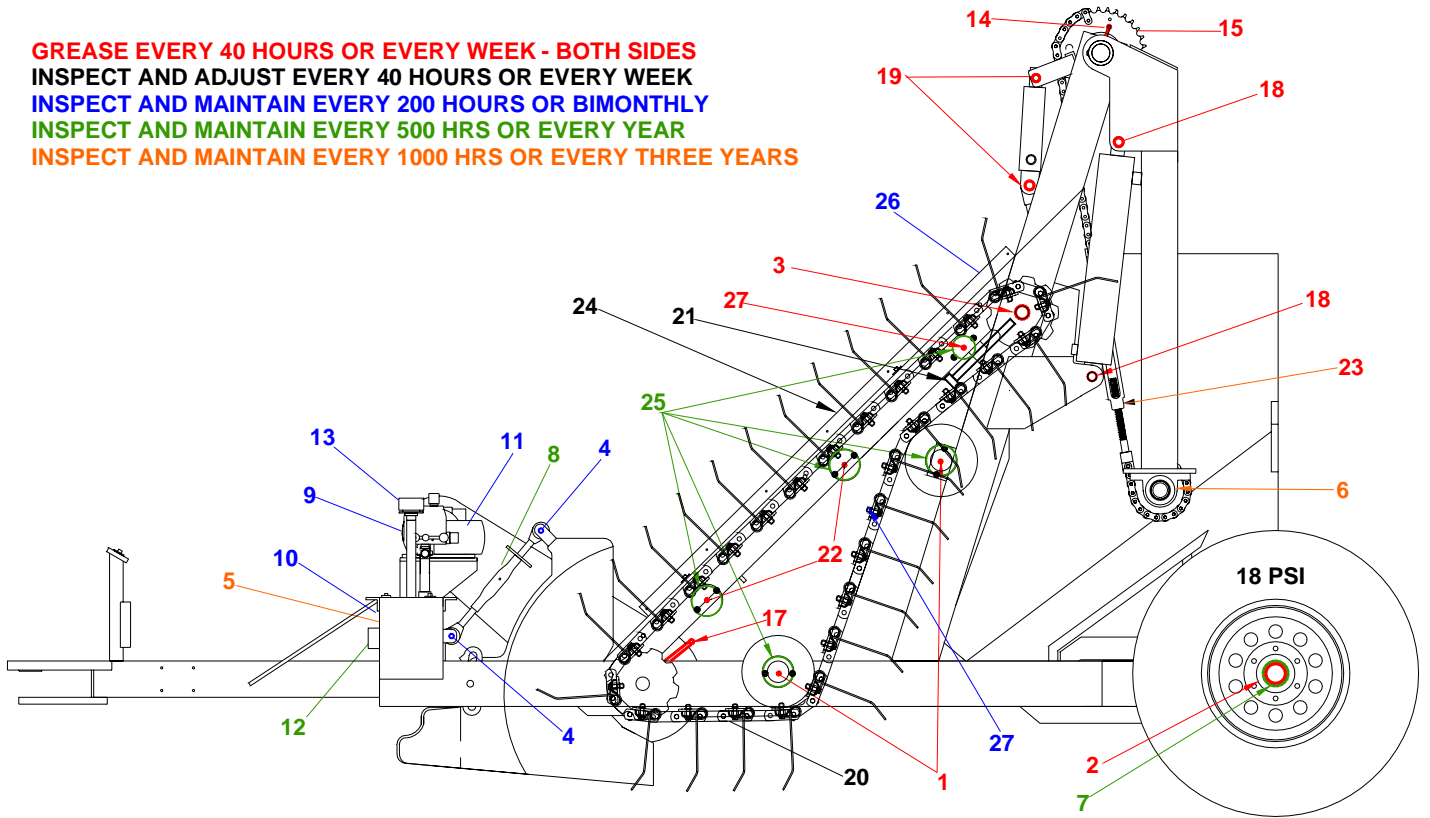
Chart Ref. #	Barber Part #	Description (Quantity)
7	527GF-4	Adjust / Repack / Replace (if needed) Wheel Bearings
12	645HM	Clean Hydraulic Tank Strainer
8	522JT	Clean and Grease Moldboard Turnbuckle Assembly (2)
25	549AS10A 549AS08 549AS20	Inspect and Reshim Conveyor Rollers, If Necessary (10)

Every 1000 Hours or Once Every 3 Years:

Chart Ref. #	Barber Part #	Description (Quantity)
5	645HYOIL	Change Hydraulic Fluid 13 Gal (ISO-32 Grade or Equivalent)

MAINTENANCE AND LUBRICATION CHART

GREASE EVERY 40 HOURS OR EVERY WEEK - BOTH SIDES
INSPECT AND ADJUST EVERY 40 HOURS OR EVERY WEEK
INSPECT AND MAINTAIN EVERY 200 HOURS OR BIMONTHLY
INSPECT AND MAINTAIN EVERY 500 HRS OR EVERY YEAR
INSPECT AND MAINTAIN EVERY 1000 HRS OR EVERY THREE YEARS



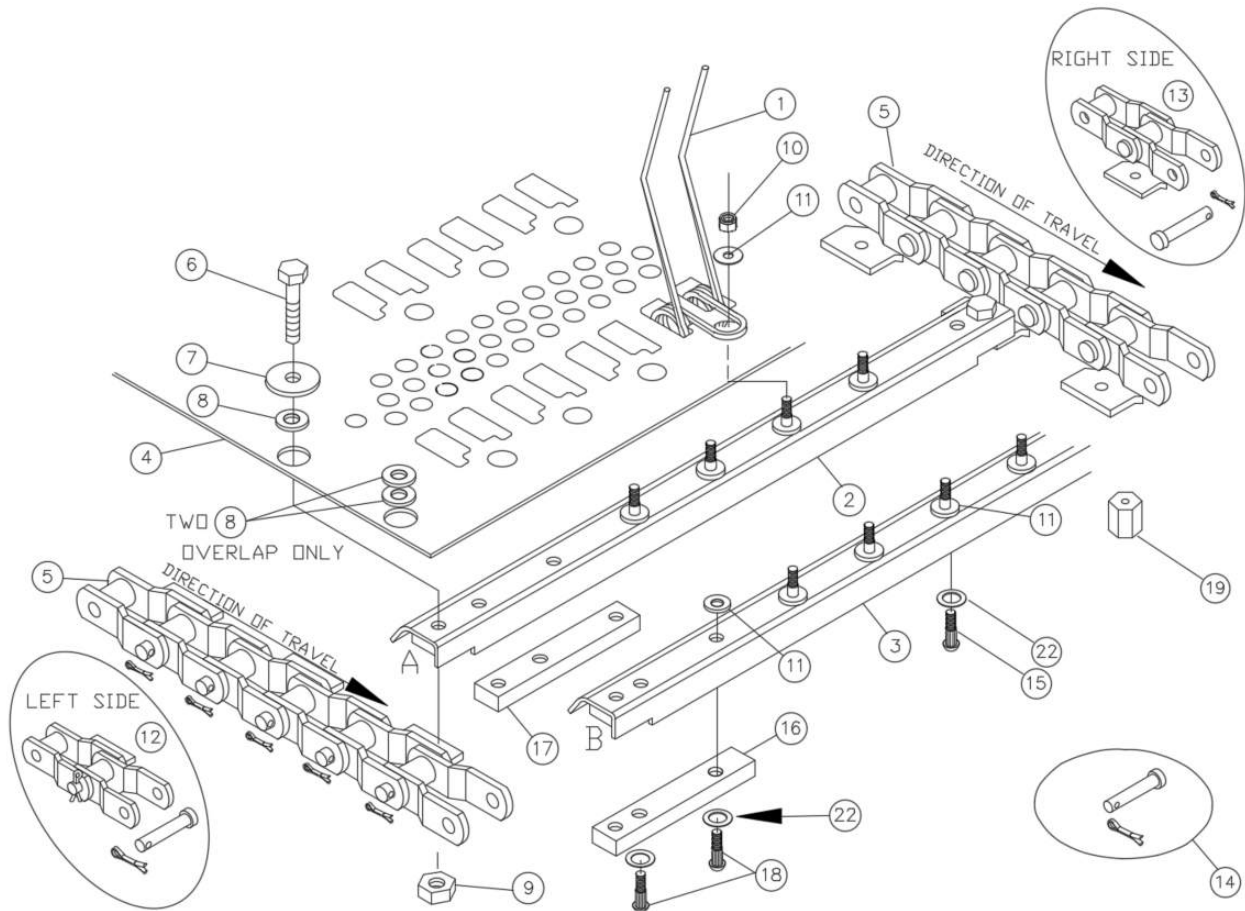
BARBER SURF RAKE® MODEL 600HD

SECTION 6 – PARTS CATALOG AND ORDERING

When Ordering Parts, please have the following information available:

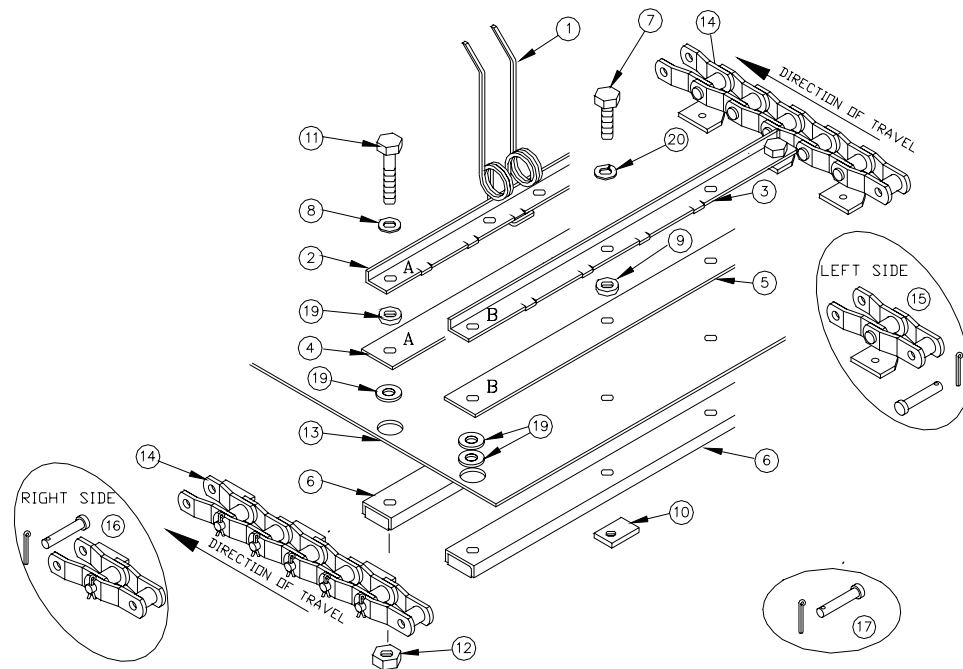
1. Model and serial number of your SURF RAKE®
2. Part number, description and page number
3. Shipping and billing address
4. Method by which shipment is to be made
5. Full name of consignee
6. Catalog number of this parts book

CONVEYOR



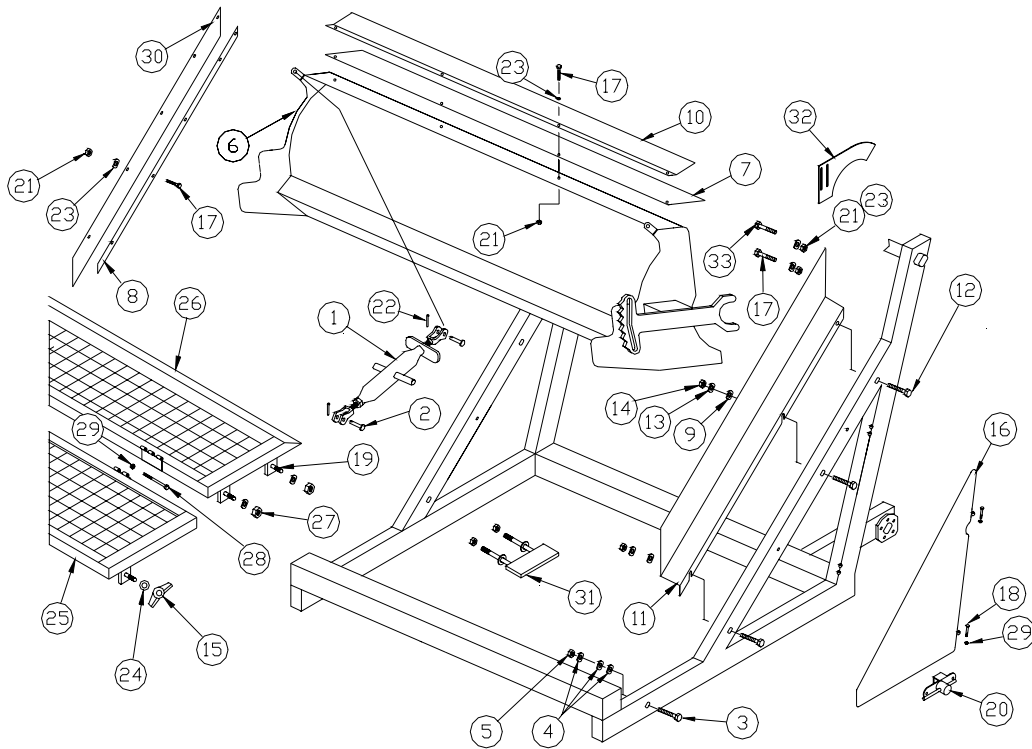
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS	05/21
1	504FH	700	TINE		
2	510HA	14	CHANNEL A WITH STUDS AND WASHERS		
3	510HB	14	CHANNEL B WITH STUDS AND WASHERS		
4	504AH	1	BELT		
5	504DK	1	OFFSET CHAIN, COMPLETE (BOTH SIDES)		
6	504G	56	CAPSCREW		
7	560W06S	56	WASHER		
8	560W06H	58	SPACER, SILVER		
9	504H	56	LOCKNUT		
10	560N05LS	700	LOCKNUT		
11	560W05S	1400	WASHER		
12	504DKSL		OFFSET CHAIN SEGMENT, LEFT SIDE		
13	504DKSR		OFFSET CHAIN SEGMENT, RIGHT SIDE		
14	404DB		CHAIN PIN AND COTTER		
15	560B05095S	588	STUD, SHORT		
16	510FB01	28	END BLOCK		
17	510FB02	28	END BLOCK		
18	560B05144S	112	STUD, LONG		
19	504CM02		CHANNEL STUD REPLACEMENT TOOL		
20	A504H		CONVEYOR ASSEMBLY COMPLETE (NOT SHOWN)		
21	504AH02		BELT SPLICE (NOT SHOWN)		
22	560W05N	700	WASHER, PLASTIC		

CONVEYOR



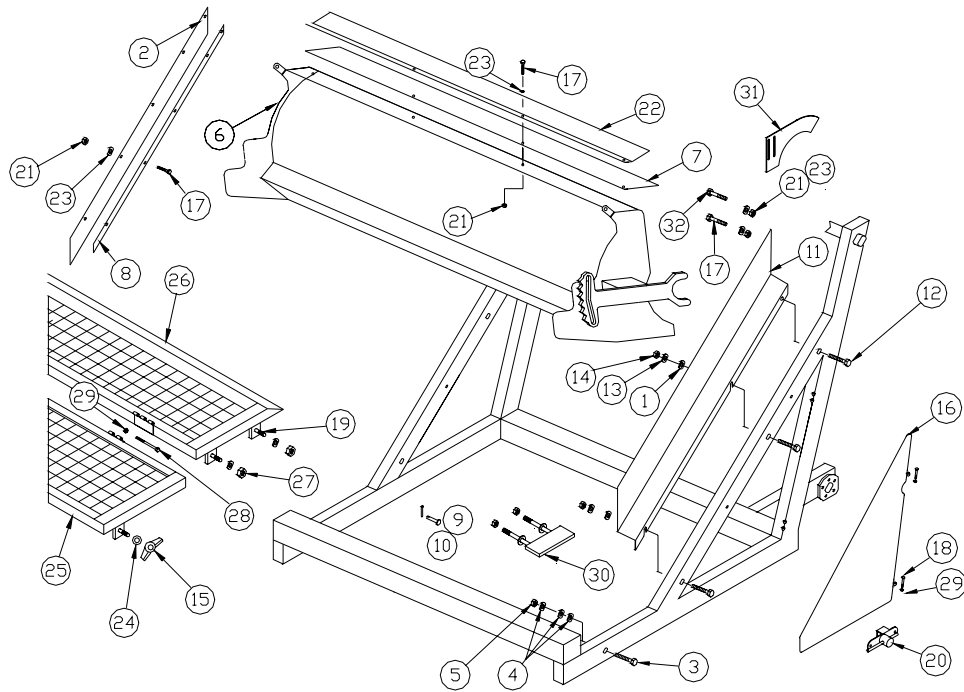
ITEM	PART NUMBER	QTY	DESCRIPTION	600HD
1	504F-1	714	TINE	
2	516A	14	RETAINING BAR A TO IDENTIFY NOTE HOLE AND DIVOT SPACING	
3	516B	14	RETAINING BAR B TO IDENTIFY NOTE HOLE AND DIVOT SPACING	
4	512A	14	BACKING STRIP A (IDENTIFIED BY MATCHING HOLE PATTERN TO RETAINING BAR A)	
5	512B	14	BACKING STRIP B (IDENTIFIED BY MATCHING HOLE PATTERN TO RETAINING BAR B)	
6	510	28	CHANNEL	
7	504J	378	CAPSCREW	
8	504M	56	WASHER	
9	504N	378	WASHER, SPACER, NYLON, BLACK	
10	504K	378	ANCHOR NUT	
11	504G	56	CAPSCREW	
12	504H	56	LOCKNUT	
13	504A	1	BELT	
14	504DK	1	OFFSET CHAIN, COMPLETE (BOTH SIDES)	
15	504DKSL		OFFSET CHAIN SEGMENT, LEFT SIDE	
16	504DKSR		OFFSET CHAIN SEGMENT, RIGHT SIDE	
17	404DB		CHAIN PIN WITH COTTER PIN	
18	A504S		CONVEYOR ASSEMBLY COMPLETE (NOT SHOWN)	
19	504P	114	WASHER, SPACER, STEEL, GOLD	
20	509H	378	LOCKWASHER	

MOLDBOARD & SHIELDS



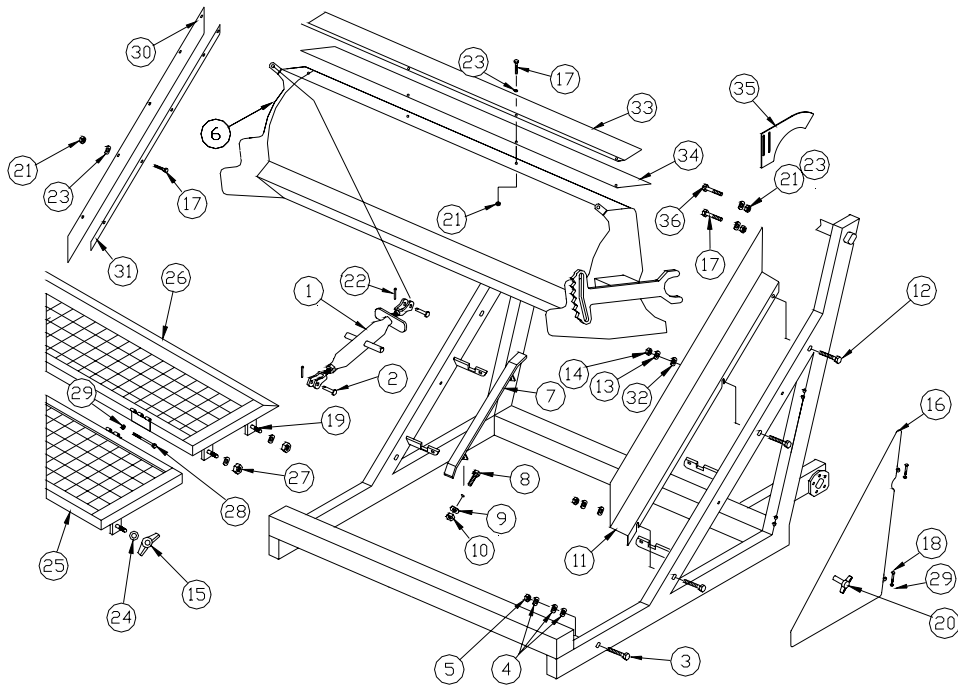
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS	"S" BELT STANDARD
1	522JT	2	TURNBUCKLE		
2	522JT1	4	PIN		
3	509D	2	BOLT		
4	509C	8	FLAT WASHER		
5	509FA	2	LOCK NUT		
6	522AS01	1	MOLDBOARD		
7	522F	1	MOLDBOARD FLAP		
8	542DB	2	STONE GUARD FLAP HOLD DOWN		
9	514G	6	FLAT WASHER		
10	522G	1	MOLDBOARD FLAP HOLD DOWN		
11	542AS01 (R/L)	2	SIDE GUARD (LEFT SHOWN)		
12	514D	6	CAPSCREW		
13	509H	6	LOCK WASHER		
14	509J	6	HEX NUT		
15	518AA	2	WINGNUT		
16	543AS04 (R/L)	2	SIDE GUARD (LEFT SHOWN)		
17	524X	14	CAPSCREW		
18	560B04175	4	CAPSCREW		
19	560B08100	4	CAPSCREW		
20	560LA01	2	SPRING LATCH ASSEMBLY		
21	560N05L	14	HEX NUT		
22	522JT2	4	COTTER PIN		
23	524S	14	FLAT WASHER		
24	603GG	6	FLAT WASHER		
25	542EB	1	LOWER TOP SHIELD ASSEMBLY		
26	542EA	1	UPPER TOP SHIELD ASSEMBLY		
27	560N08L	4	LOCKNUT		
28	560B04450	2	CAPSCREW		
29	560N04L	8	HEX NUT		
30	542DA	2	STONE GUARD FLAP		
31	541AS01	2	SKID SHOE (SIFTING BELT ONLY)		
32	542BU05	2	TAKE UP GUARD		
33	560B05125	2	CAPSCREW		

MOLDBOARD & SHIELDS



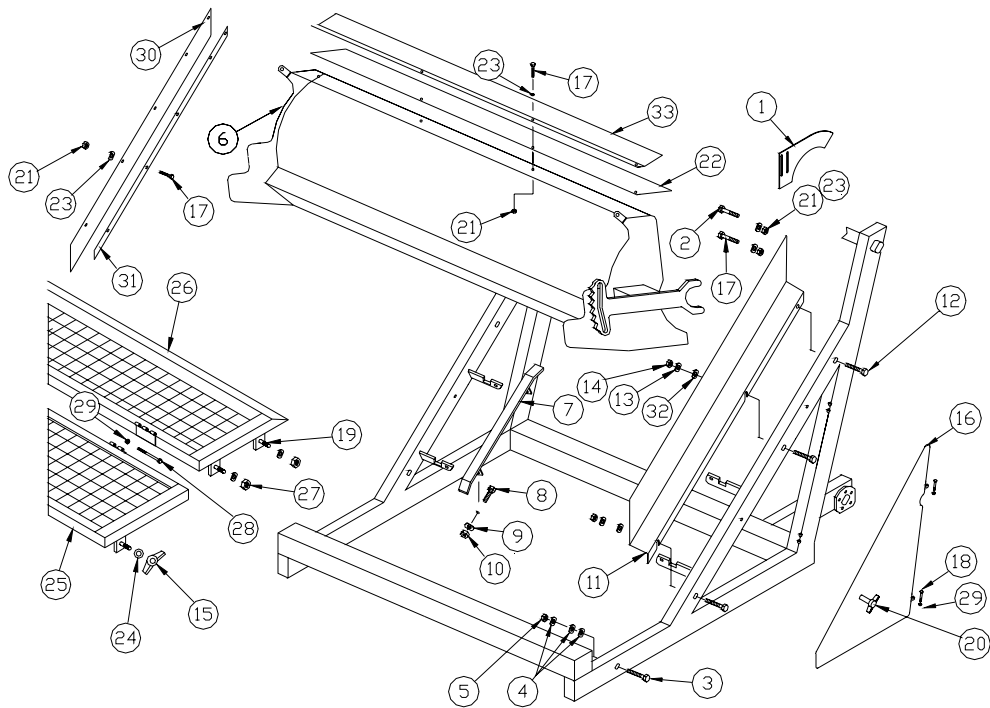
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS "S" BELT HYDRAULIC (OPTION)
1	514G	6	FLAT WASHER	
2	542DA	2	STONE GUARD FLAP	
3	509D	2	BOLT	
4	509C	8	FLAT WASHER	
5	509FA	2	LOCK NUT	
6	522AS02	1	MOLDBOARD, HYDRUALIC OPERATED	
7	522F	1	MOLDBOARD FLAP	
8	542DB	2	STONE GUARD FLAP HOLD DOWN	
9	530CM06	4	PIN	
10	560C02150	4	COTTER PIN	
11	542AS01 (R/L)	2	SIDE GUARD (LEFT SHOWN)	
12	514D	6	CAPSCREW	
13	509H	6	LOCK WASHER	
14	509J	6	HEX NUT	
15	518AA	2	WING NUT	
16	543AS04 (R/L)	2	SIDE GUARD (LEFT SHOWN)	
17	524X	14	CAPSCREW	
18	560B04175	4	CAPSCREW	
19	560B08100	4	CAPSCREW	
20	560LA01	2	SPRING LATCH ASSEMBLY	
21	560N05L	14	HEX NUT	
22	522G	1	MOLDBOARD FLAP HOLD DOWN	
23	524S	14	FLAT WASHER	
24	603GG	6	FLAT WASHER	
25	542EB	1	LOWER TOP SHIELD ASSEMBLY	
26	542EA	1	UPPER TOP SHIELD ASSEMBLY	
27	560N08L	4	LOCK NUT	
28	560B04450	2	CAPSCREW	
29	560N04L	8	HEX NUT	
30	541AS01	2	SKID SHOE (SIFTING BELT ONLY)	
31	542BU05	2	TAKE UP GUARD	
32	560B05125	2	CAPSCREW	

MOLDBOARD & SHIELDS



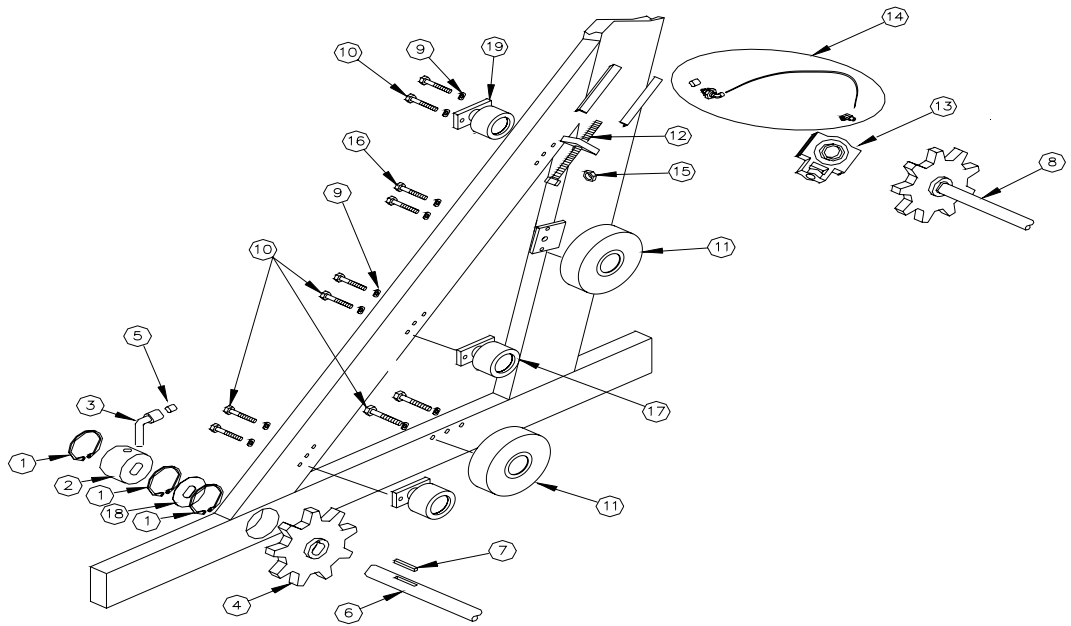
ITEM	PART NUMBER	QTY	DESCRIPTION	600HD	SOLID BELT
1	522JT	2	TURNBUCKLE		
2	522JT1	4	PIN		
3	509D	2	BOLT		
4	509C	6	FLAT WASHER		
5	509FA	2	LOCK NUT		
6	522AS01	1	MOLDBOARD		
7	541	2	SKID SHOE		
8	524D	4	CAPSCREW		
9	524G	4	LOCK WASHER		
10	523R	4	HEX NUT		
11	542AS01 (R/L)	2	SIDE GUARD		
12	514D	6	CAPSCREW		
13	509H	6	LOCK WASHER		
14	509J	6	HEX NUT		
15	518AA	2	WINGNUT		
16	543AS04 (R/L)	2	SIDE GUARD (LEFT SHOWN)		
17	524X	16	CAPSCREW		
18	560B04175	4	CAPSCREW		
19	560B08100	4	CAPSCREW		
20	560LA01	4	SPRING LATCH ASSEMBLY		
21	560N05L	18	HEX NUT		
22	522JT2	4	COTTER PIN		
23	524S	18	FLAT WASHER		
24	603GG	6	FLAT WASHER		
25	542EB	1	LOWER TOP SHIELD ASSEMBLY		
26	542EA	1	UPPER TOP SHIELD ASSEMBLY		
27	560N08L	4	LOCKNUT		
28	560B04450	2	CAPSCREW		
29	560N04L	8	HEX NUT		
30	542DA	2	STONE GUARD FLAP		
31	542DB	2	STONE GUARD FLAP HOLD DOWN		
32	514G	6	FLAT WASHER		
33	522G	1	MOLDBOARD FLAP HOLD DOWN		
34	522F	1	MOLDBOARD FLAP		
35	542BU05	2	TAKE UP GUARD		
36	560B05125	2	CAPSCREW		

MOLDBOARD & SHIELDS



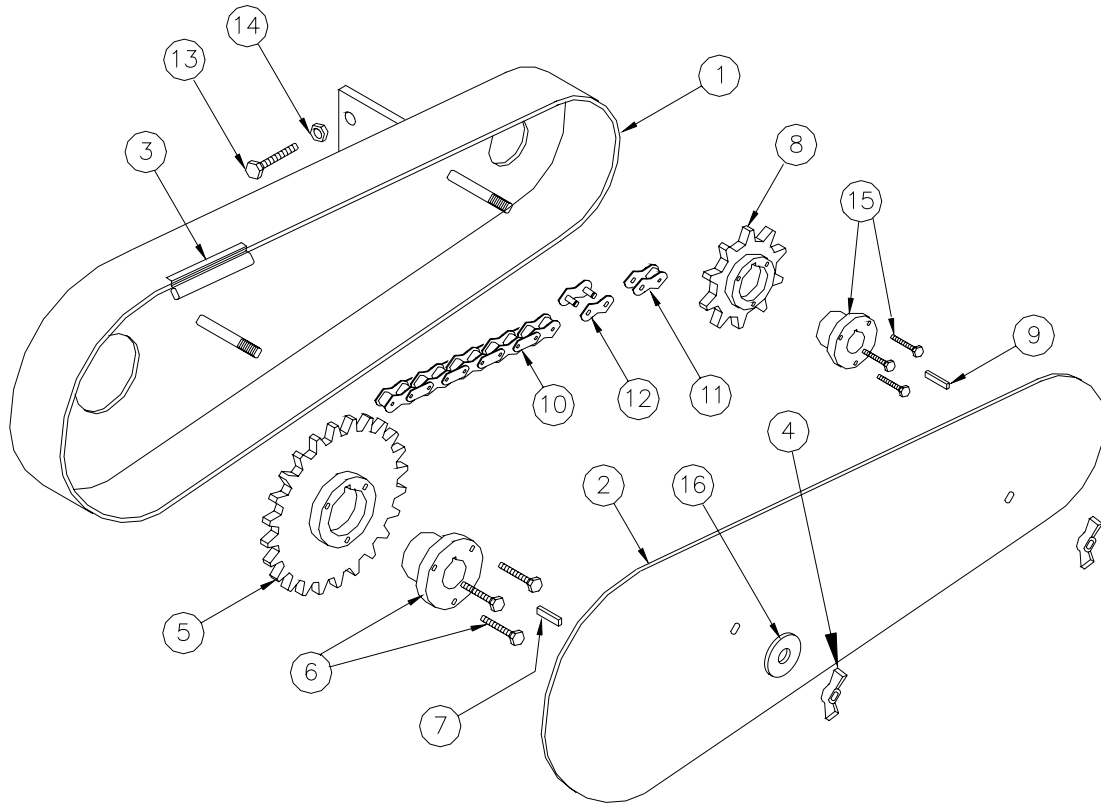
ITEM	PART NUMBER	QTY	DESCRIPTION	600HD	SOLID BELT HYDRAULIC (OPTION)
1	542BU05	2	TAKE UP GUARD		
2	560B05125	2	CAPSCREW		
3	509D	2	BOLT		
4	509C	6	FLAT WASHER		
5	509FA	2	LOCK NUT		
6	522AS02	1	MOLDBOARD		
7	541	2	SKID SHOE		
8	524D	4	CAPSCREW		
9	524G	4	LOCK WASHER		
10	523R	4	HEX NUT		
11	542AS01 (R/L)	2	SIDE GUARD		
12	514D	6	CAPSCREW		
13	509H	6	LOCK WASHER		
14	509J	6	HEX NUT		
15	518AA	2	WINGNUT		
16	543AS04 (R/L)	2	SIDE GUARD (LEFT SHOWN)		
17	524X	16	CAPSCREW		
18	560B04175	4	CAPSCREW		
19	560B08100	4	CAPSCREW		
20	560LA01	4	SPRING LATCH ASSEMBLY		
21	560N05L	18	HEX NUT		
22	522F	1	MOLDBOARD FLAP		
23	524S	18	FLAT WASHER		
24	603GG	6	FLAT WASHER		
25	542EB	1	LOWER TOP SHIELD ASSEMBLY		
26	542EA	1	UPPER TOP SHIELD ASSEMBLY		
27	560N08L	4	LOCKNUT		
28	560B04450	2	CAPSCREW		
29	560N04L	8	HEX NUT		
30	542DA	2	STONE GUARD FLAP		
31	542DB	2	STONE GUARD FLAP HOLD DOWN		
32	514G	4	FLAT WASHER		
33	522G	1	MOLDBOARD FLAP HOLD DOWN		

DRIVE MECHANISM



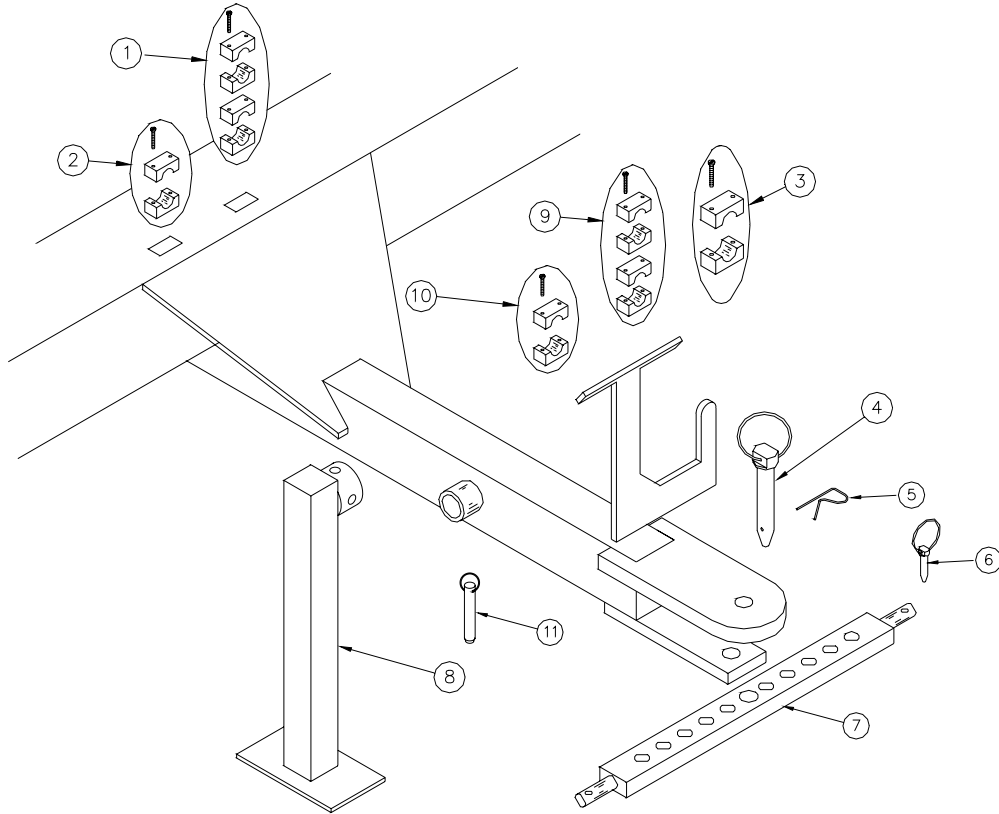
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	503KK	6	RETAINING RING	
2	503JJ	2	BEARING	
3	503LL	2	GREASE FITTING	
4	503AA	2	SPROCKET	
5	503CAP	12	GREASE COVER	
6	536	1	SHAFT	
7	503J	2	KEY	
8	595AS01	1	SPROCKET AND SHAFT ASSEMBLY	
9	509H	20	LOCK WASHER	
10	560B06250	16	CAPSCREW	
11	549AS08	4	SEE IDLER ROLLER ASSEMBLY PAGE	
12	540G	2	TAKE UP BOLT	
13	503VV	2	BEARING	
14	503AS01	2	GREASE LINE ASSEMBLY	
15	560N12S	2	JAMB NUT	
16	560B06100	4	CAPSCREW	
17	549AS10A	4	SEE ROLLER ASSEMBLY PAGE	
18	508CM01	2	BEARING COVER	
19	549AS20	2	TOP IDLER ROLLERS	

CHAIN CASE



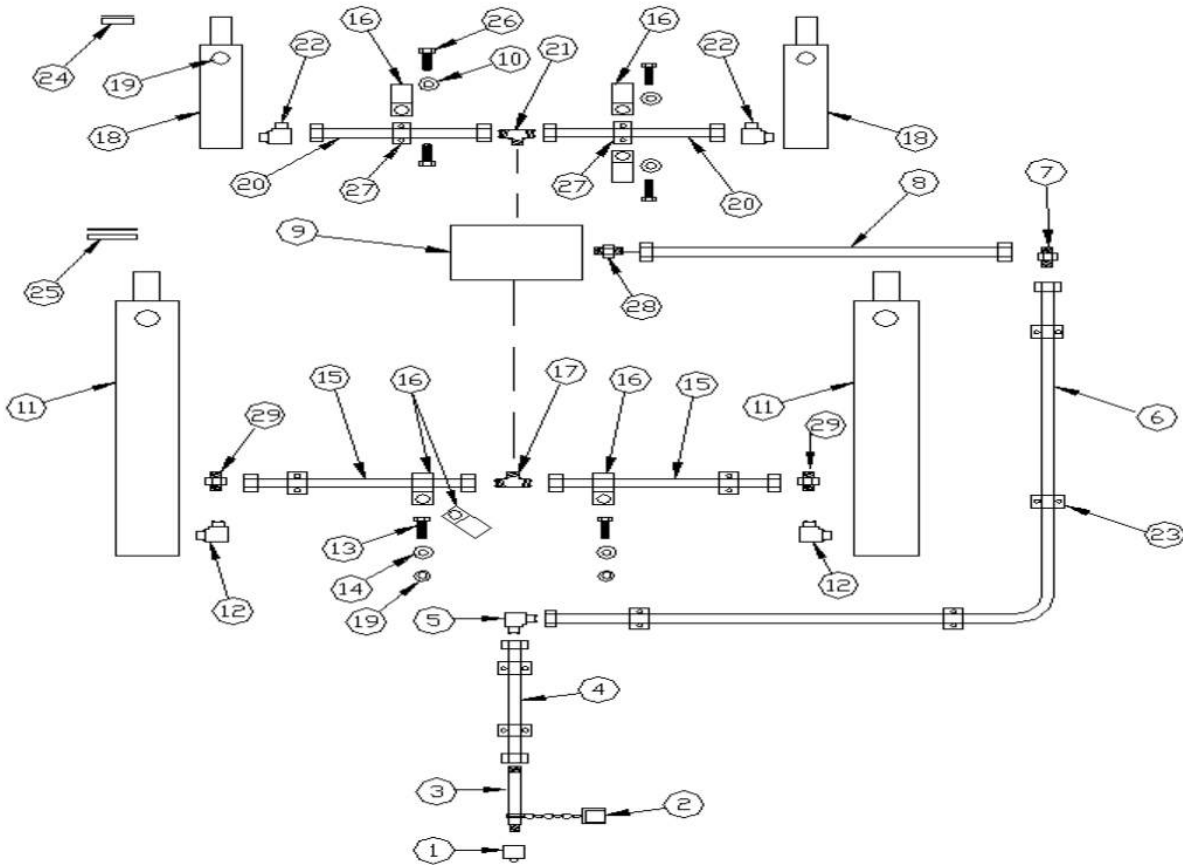
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	A518	1	CHAIN CASE ASSEMBLY	
2	518C	1	COVER PLATE	
3	518D	1	GASKET	
4	518AA	2	WING NUT	
5	603E	1	SPROCKET	
6	603D	1	BUSHING	
7	503X	1	KEY	
8	503W12	1	SPROCKET	
9	503WHK	1	KEY	
10	503MMC	1	CHAIN	
11	503NN-1	1	HALF LINK	
12	503NN-2	1	CONNECTING LINK	
13	518K	1	CAPSCREW	
14	523R	1	HEX NUT	
15	503WB	1	BUSHING	
16	603GG	2	FLAT WASHER	

HITCH



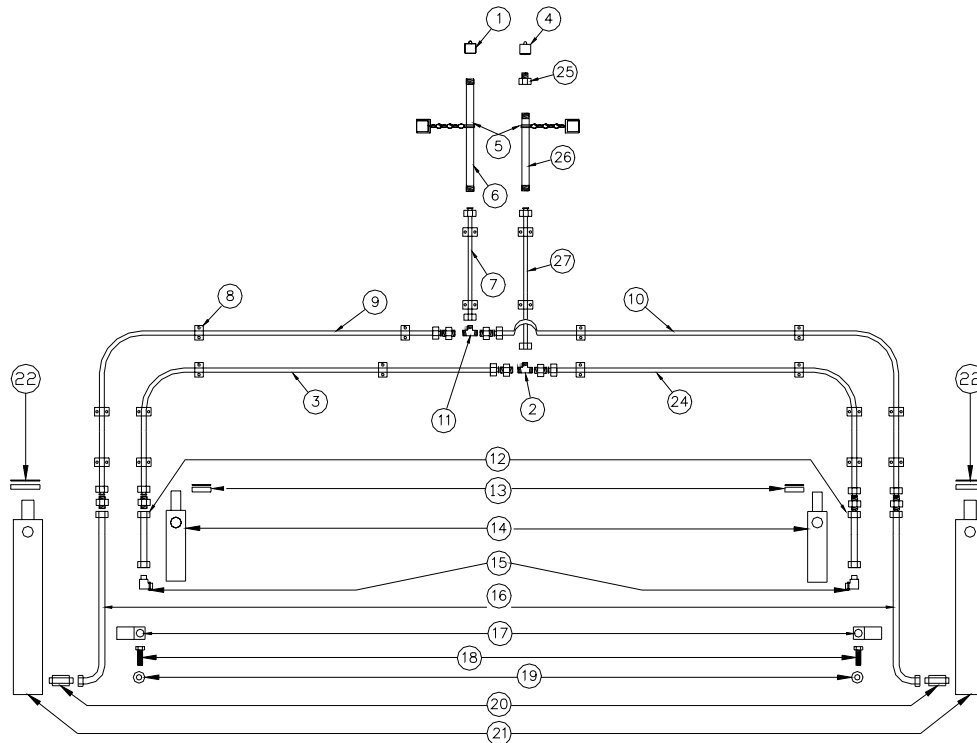
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	540C1001	10	HOSE CLAMP, DOUBLE	
2	608HX	1	HOSE CLAMP 1/2"	
3	645HBB	1	HOSE CLAMP 1"	
4	A552-1	1	HITCH PIN WITH COTTER	
5	552D	1	HITCH PIN COTTER	
6	552C	2	DRAW BAR SNAP PIN	
7	552CAT2	1	DRAW BAR WITH SNAP PINS IS EITHER CATEGORY 1 OR 2 DEPENDING ON TRACTOR	
8	553AS02	1	JACK STAND	
9	540C1001	1	HOSE CLAMP DOUBLE W/ LARGER BASE BOLT	
10	608HX	1	HOSE CLAMP W/ LARGER BASE BOLT	
11	553CM02	1	JACK PIN	
12	552AS01	1	PINTLE ATTACHMENT (NOT SHOWN)	

HYDRAULIC MANIFOLD LIFT



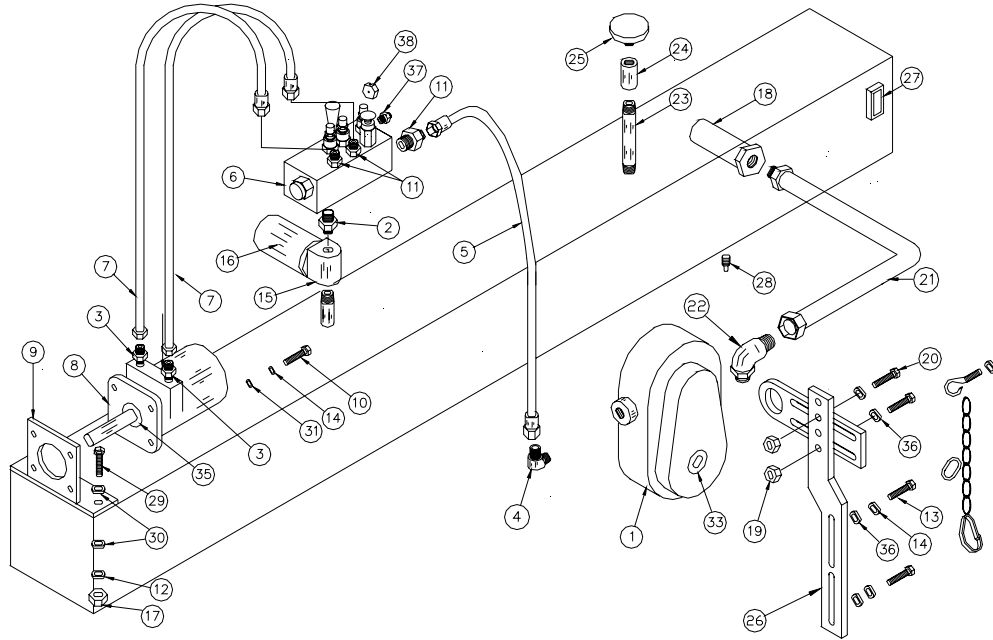
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS 0117
1	540A1001	1	QUICK DISCONNECT, MALE	
2	545HD-13	1	QUICK DISCONNECT COVER	
3	540H10050	1	HOSE	
4	540B1001	1	TUBE	
5	540E1003	1	ELBOW	
6	540B1002	1	TUBE	
7	540A0803	1	ADAPTER	
8	540H080645	1	HOSE	
9	540V006	1	MANIFOLD ASSEMBLY	
10	560W04	3	WASHER	
11	545JJF	2	CYLINDER	
12	540E0803	2	ELBOW	
13	524X	2	CAPSCREW	
14	524S	2	WASHER	
15	540H08060	2	HOSE	
16	540C0801	6	HOSE CLAMP	
17	540T0801	1	BRANCH TEE	
18	545JJH	2	CYLINDER	
19	524Y	2	LOCK WASHER	
20	540H06045	2	HOSE	
21	540T0601	1	BRANCH TEE	
22	540E0601	2	ELBOW	
23	540C1001	6	TUBE CLAMP	
24	545JJHP	2	REPLACEMENT SEAL KIT PER CYLINDER	
25	545JJFP	2	REPLACEMENT SEAL KIT PER CYLINDER	
26	560B04225	4	CAPSCREW	
27	540C1011	2	HOSE CLAMP	
28	540A0801	1	ADAPTER	
29	540F0801	2	VELOCITY FUSE	

HYDRAULIC LIFT



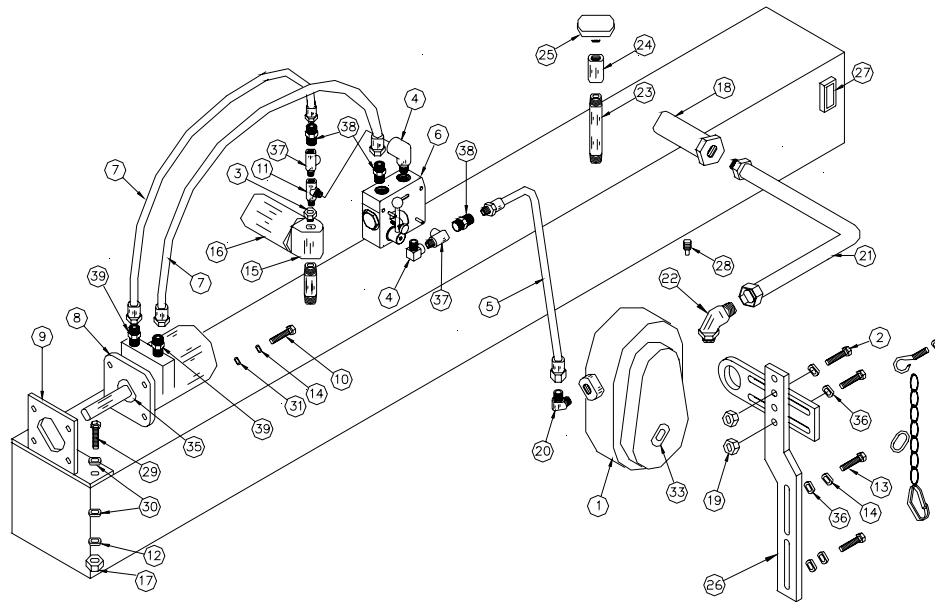
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	540A1001	1	QUICK DISCONNECT, MALE	
2	540T0602	1	TEE	
3	540B0602	1	TUBE, LEFT	
4	540A0809	1	QUICK DISCONNECT, MALE	
5	545HD-13	2	QUICK DISCONNECT COVER	
6	540H10045	1	HOSE	
7	540B1001	1	TUBE	
8	540C1001	10	HOSE CLAMP, DOUBLE	
9	540B1002	1	TUBE, LEFT	
10	540B1003	1	TUBE, RIGHT	
11	540T1001	1	TEE	
12	540H06026	2	HOSE	
13	545JJHP	2	REPLACEMENT SEAL KIT PER CYLINDER	
14	545JJH	2	CYLINDER	
15	540E0601	2	ELBOW	
16	540H08036	2	HOSE	
17	540C0801	2	HOSE CLAMP	
18	524X	2	CAPSCREW	
19	524S	2	WASHER	
20	540A0801	2	ADAPTER	
21	545JJF	2	CYLINDER	
22	545JJFP	2	REPLACEMENT SEAL KIT PER CYLINDER	
23	540M002	1	O-RING ASSORTMENT PACKAGE (NOT SHOWN)	
24	540B0603	1	TUBE, RIGHT	
25	540R08073	1	ADAPTER / RESTRICTOR	
26	540H06050	1	HOSE	
27	540B0601	1	TUBE	

HYDRAULIC DRIVE WITH MANIFOLD



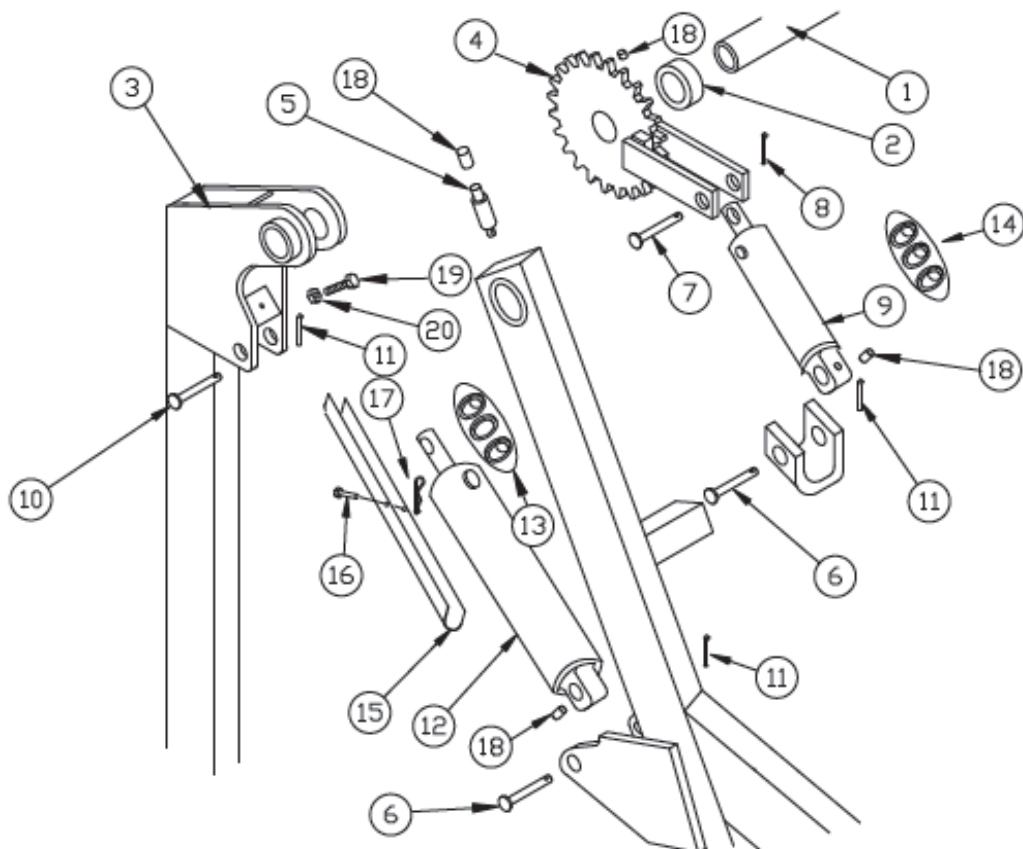
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS 0118
1	645HA	1	PUMP	
2	540A1205	1	ADAPTER	
3	540A1003	2	ADAPTER	
4	540E1202	1	ELBOW	
5	540H08105	1	HOSE	
6	540V015	1	CONTROL MANIFOLD, REVERSING & FLOW	
7	540H08024	2	HOSE	
8	645HF	1	MOTOR	
9	645HF-1	1	MOUNTING BRACKET	
10	504J	4	CAPSCREW	
11	540A0801	3	ADAPTER	
12	503Q	2	LOCK WASHER	
13	560B06100	2	CAPSCREW	
14	509H	4	LOCK WASHER	
15	545B	1	FILTER BASE	
16	545C	1	FILTER ELEMENT	
17	503S	2	HEX NUT	
18	645HMA	1	FILTER - SUCTION SAE	
19	560N06L	2	LOCKNUT	
20	560B06125	2	CAPSCREW	
21	540H16077	1	SAE SUCTION HOSE ASSEMBLY	
22	540E1604	1	ELBOW	
23	645HS	1	NIPPLE	
24	545T	1	COUPLER	
25	545MM	1	BREATHER	
26	645HEG	1	PUMP BRACKET AND CHAIN	
27	645HUA	1	GAUGE - OIL LEVEL	
28	645HV	1	PIPE PLUG - MAGNETIC	
29	560B09175	2	CAPSCREW	
30	503R	4	FLAT WASHER	
31	514G	4	FLAT WASHER	
32	645HAAA	1	PUMP SEAL KIT, COMPLETE (NOT SHOWN)	
33	645HAAB	1	PUMP SPLINE SEAL	
34	645HFA	1	MOTOR SEAL KIT, COMPLETE (NOT SHOWN)	
35	645HFB	1	MOTOR DRIVESHAFT DIRT SEAL	
36	560W06S	4	FLAT WASHER	
37	540A0602	1	ADAPTER	
38	540R4500236	1	ORIFICE PLATE	

HYDRAULIC DRIVE



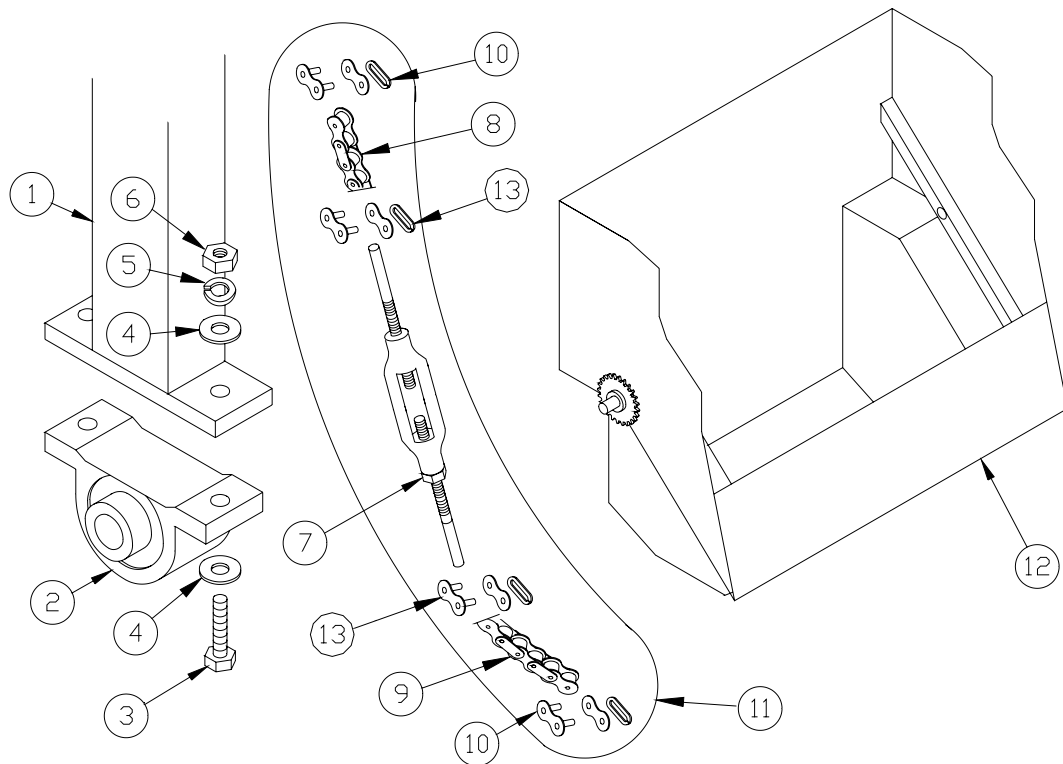
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS 0818
1	645HA	1	PUMP	
2	560B06125	2	CAPSCREW	
3	645HC	1	REDUCER BUSHING	
4	545R	2	STREET ELBOW	
5	540H08105	1	HOSE	
6	645HDD	1	FLOW CPNTROL	
7	540H08024	2	HOSE	
8	645HF	1	MOTOR	
9	645HF-1	1	MOUNTING BRACKET	
10	504J	4	CAPSCREW	
11	540T0803	1	TEE	
12	503Q	2	LOCK WASHER	
13	560B06100	2	CAPSCREW	
14	509H	4	LOCK WASHER	
15	545B	1	FILTER BASE	
16	545C	1	FILTER ELEMENT	
17	503S	2	HEX NUT	
18	645HMA	1	FILTER - SUCTION SAE	
19	560N06L	2	LOCKNUT	
20	540E1202	1	ELBOW	
21	540H16077	1	SAE SUCTION HOSE	
22	540E1604	1	ELBOW	
23	645HS	1	NIPPLE	
24	545T	1	COUPLER	
25	545MM	1	BREATHER	
26	645HEG	1	PUMP BRACKET AND CHAIN	
27	645HUA	1	GAUGE - OIL LEVEL	
28	645HV	1	PIPE PLUG - MAGNETIC	
29	560B09175	2	CAPSCREW	
30	503R	4	FLAT WASHER	
31	514G	4	FLAT WASHER	
32	645HAAA	1	PUMP SEAL KIT, COMPLETE (NOT SHOWN)	
33	645HAAB	1	PUMP SPLINE SEAL	
34	645HFA	1	MOTOR SEAL KIT, COMPLETE (NOT SHOWN)	
35	645HFB	1	MOTOR DRIVESHAFT DIRT SEAL	
36	560W06S	4	FLAT WASHER	
37	540T0804	2	TEE	
38	540A08010	3	ADAPTER	
39	540A1005	2	ADAPTER	

LIFT ARM AND TRIP MECHANISM



ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	526	1	TIE BAR	
2	523S	2	SET COLLAR	
3	524M	1	LIFT ARM ASSEMBLY	
4	523AS01	2	SPROCKET (RIGHT SHOWN)	
5	508RG	2	GREASE NIPPLE	
6	545NN-1	4	PIN	
7	523EHD	2	PIN	
8	522JT2	2	COTTER PIN	
9	545JJH	2	HYDRAULIC CYLINDER	
10	545NN	2	PIN	
11	502P	6	COTTER PIN	
12	545JJF	2	HYDRAULIC CYLINDER	
13	545JJFP	2	PACKING FOR 545JJF	
14	545JJHP	2	PACKING FOR 545JJH	
15	545JJCA	1	SAFETY SUPPORT	
16	545JJCF	1	PIN	
17	207CM07	1	SNAP PIN	
18	503CAP	10	GREASE CAP	
19	560B09175	2	CAPSCREW	
20	503S	2	HEXNUT	

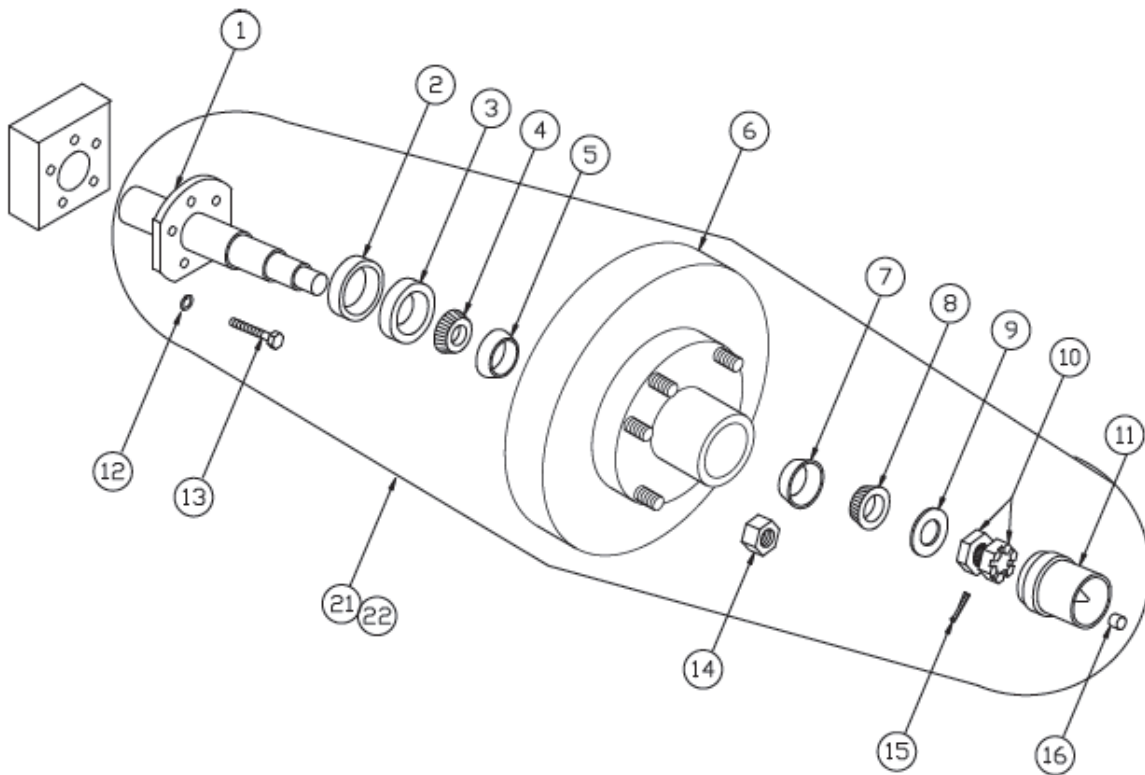
BUCKET AND CHAIN 3 CUBIC YARD HOPPER



ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	524M	1	LIFT ARM ASSEMBLY	
2	225CM02	2	BEARING	
3	560B10300	4	CAPSCREW	
4	560FW10	8	FLAT WASHER	
5	560LW10	4	LOCK WASHER	
6	560N10	4	HEX NUT	
7	525ZPA	2	TURNBUCKLE	
8	525ZPB	2	CHAIN* SEE BELOW	
9	525ZPC	2	CHAIN* SEE BELOW	
10	503NN-4	4	CONNECTING LINK* SEE BELOW	
11	525ZP	2	CHAIN ASSEMBLY* (ONE SIDE) SEE BELOW	
12	525AS01	1	BUCKET	
13	503NN-4PF	4	CONNECTING LINK* SEE BELOW	

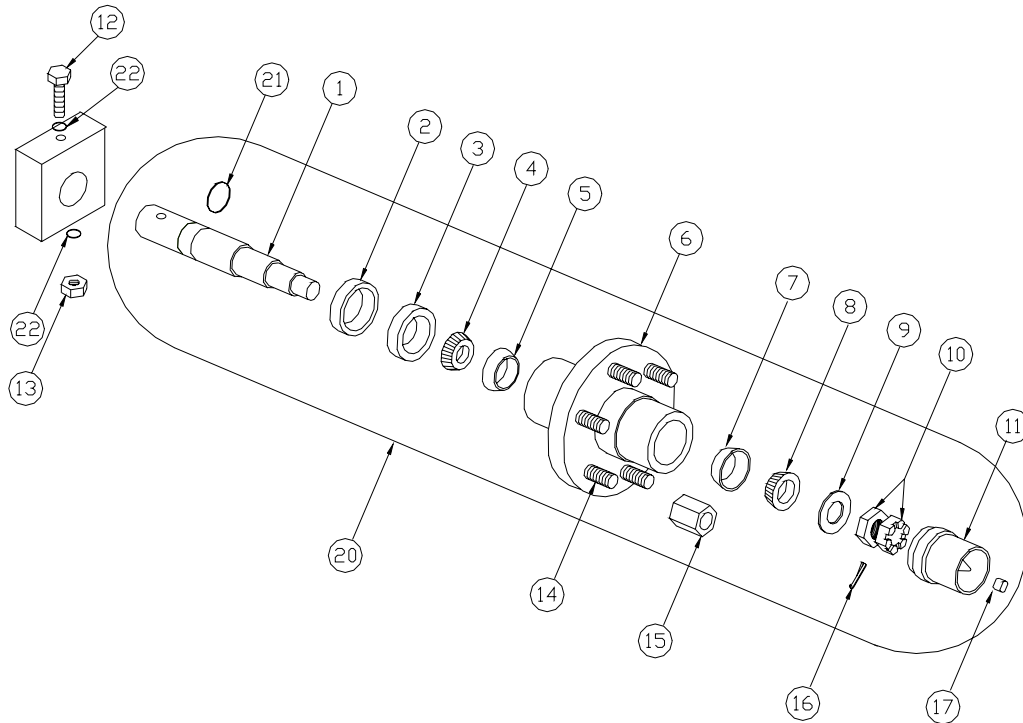
***ONLY USE BARBER CHAIN AND LINKS!
20,000 LB MINIMUM TENSILE!
CORROSION PROTECTED ON CHAIN AND PINS
SUBSTITUTE CHAINS ARE A SAFETY HAZARD!**

HUB, WHEEL, TIRE, BRAKES



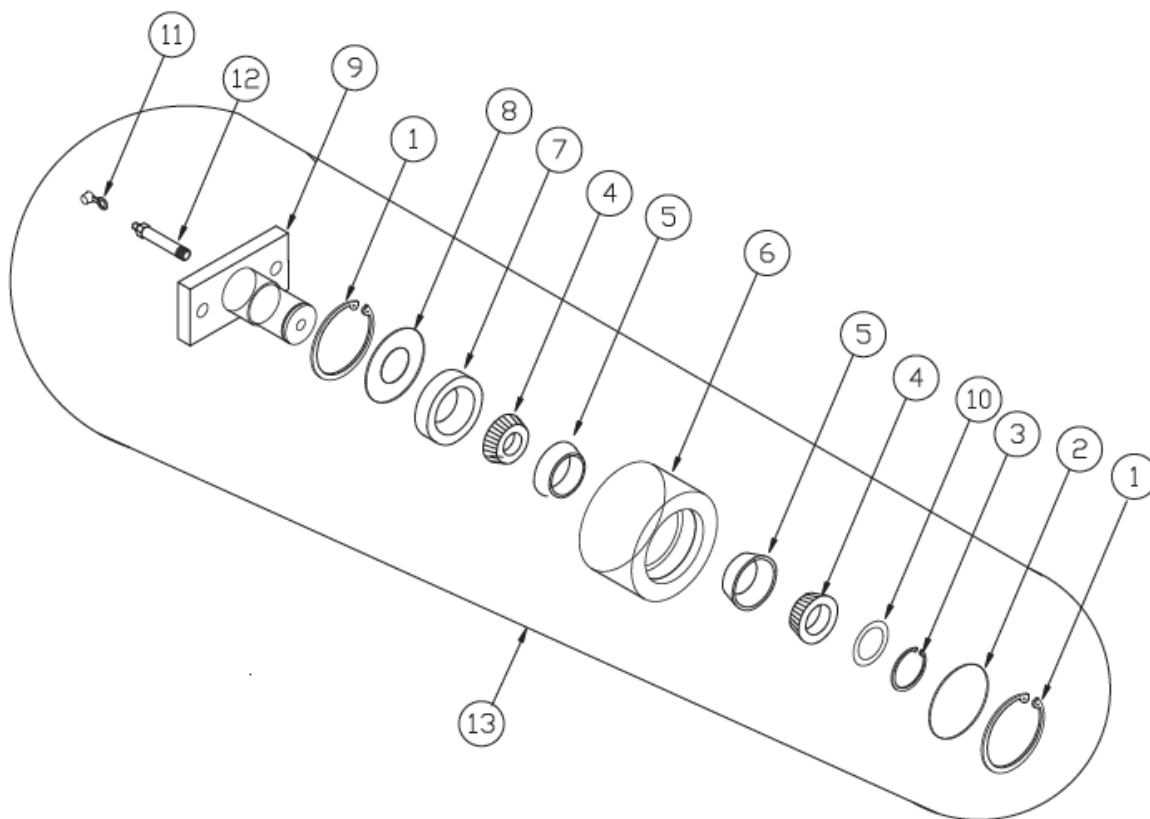
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	527GF-10A	2	SPINDLE WITHOUT FLANGE	
2	527GF-11	2	RACE, STAINLESS SLEEVE	
3	527GF-6A	2	GREASE SEAL 3.38" OD	
4	527GF-1	2	HUB BEARING, LARGE	
5	527GF-8	2	RACE, LARGE	
6	527GF-12	2	DRUM WITH RACES, BEARINGS AND SEAL	
7	527GF-9	2	RACE, SMALL	
8	527GF-2	2	HUB BEARING, SMALL	
9	527GF-5	2	WASHER	
10	527GF-3	2	CASTLE NUT AND RETAINER	
11	527GF-4A	2	BUDDY HUB 2441	
12	509H	2	LOCK NUT	
13	504J	2	CAPSCREW	
14	527GF-7A	12	LUG NUT	
15	522JT2	2	COTTER PIN	
16	503CAP	2	GREASE CAP	
17	527HA	2	WHEEL (NOT SHOWN)	
18	527KCA	2	TIRE (NOT SHOWN)	
19	527GF-13	-	LEFT BRAKE ASSEMBLY (NOT SHOWN)	
20	527GF-14	-	RIGHT BRAKE ASSEMBLY (NOT SHOWN)	
21	527GF-15	-	LEFT HUB, SPINDLE END UNIT AND BRAKE ASSEMBLY, COMPLETE	
22	527GF-16	-	RIGHT HUB, SPINDLE END UNIT AND BRAKE ASSEMBLY, COMPLETE	

HUB, WHEEL, TIRE



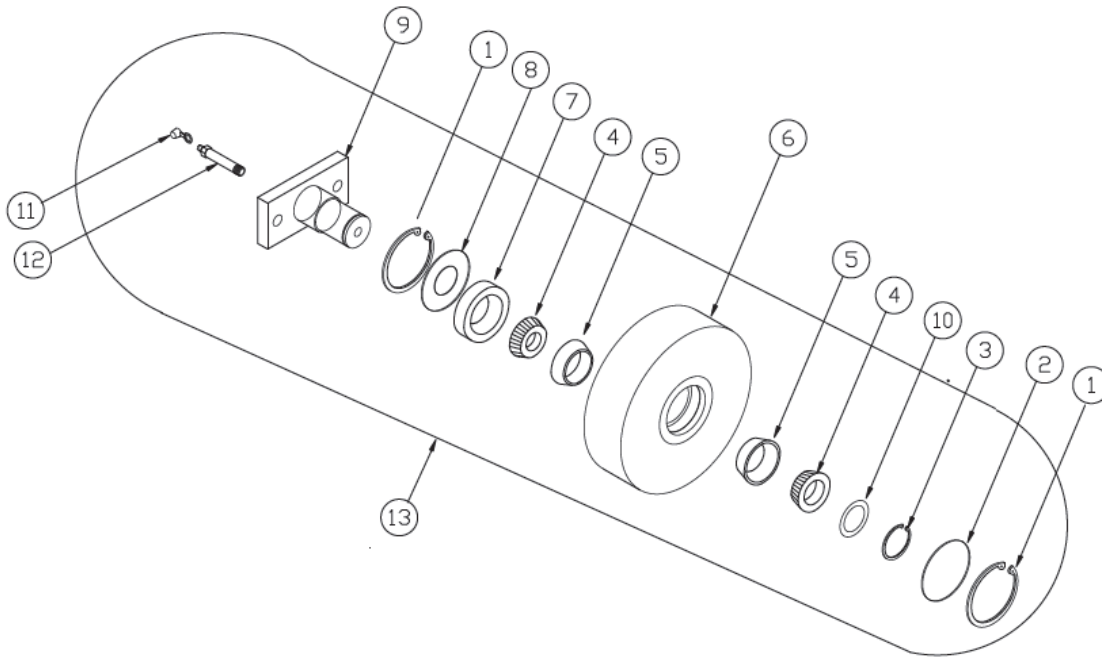
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	527GF-10A	2	SPINDLE WITHOUT FLANGE	
2	527GF-11	2	RACE, STAINLESS SLEEVE	
3	527GF-6A	2	GREASE SEAL 3.38" OD	
4	527GF-1	2	HUB BEARING, LARGE	
5	527GF-8	2	RACE, LARGE	
6	527GF	2	HUB WITH RACES	
7	527GF-9	2	RACE, SMALL	
8	527GF-2	2	HUB BEARING, SMALL	
9	527GF-5	2	WASHER	
10	527GF-3	2	CASTLE NUT AND RETAINER	
11	527GF-4A	2	BUDDY HUB	
12	560B08475	2	CAPSCREW	
13	560N08L	2	LOCK NUT	
14	527GF-7PA	12	HUB STUD .563" SPLINE Ø	
15	527GF-7B	12	LUG NUT, ALUMINUM WHEEL	
16	522JT2	2	COTTER PIN	
17	503CAP	2	GREASE CAP	
18	527HC	2	WHEEL (NOT SHOWN)	
19	527KCA	2	TIRE (NOT SHOWN)	
20	A527GFB	2	HUB, SPINDLE END UNIT ASSEMBLY WITHOUT FLANGE	
21	527GF-18	1	O RING, LARGE	
22	527GF-19	2	O RING, SMALL	

ROLLER ASSEMBLY



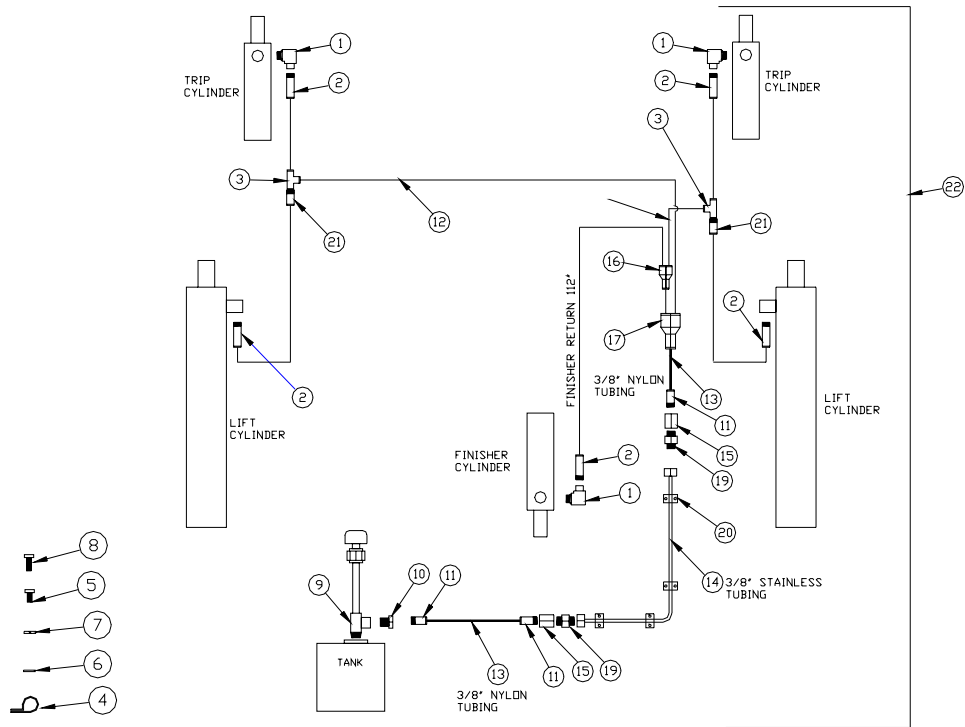
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	549CM02	2	SNAP RING, LARGE INTERNAL	
2	549FM01	1	FRONT COVER PLATE	
3	549CM03	1	SNAP RING, SMALL EXTERNAL	
4	527GF-2	2	ROLLER BEARING	
5	527GF-9	2	RACE	
6	549TB01A	1	ROLLER	
7	549CM01	1	SEAL	
8	549FM02	1	REAR COVER PLATE	
9	549AS01	1	PIN AND BASE ASSEMBLY	
10	549CM05	2	SHIM	
11	503CAP	1	GREASE COVER	
12	503ZE01	1	GREASE FITTING	
13	549AS10A	1	ROLLER ASSEMBLY, COMPLETE	

IDLER ROLLER ASSEMBLY



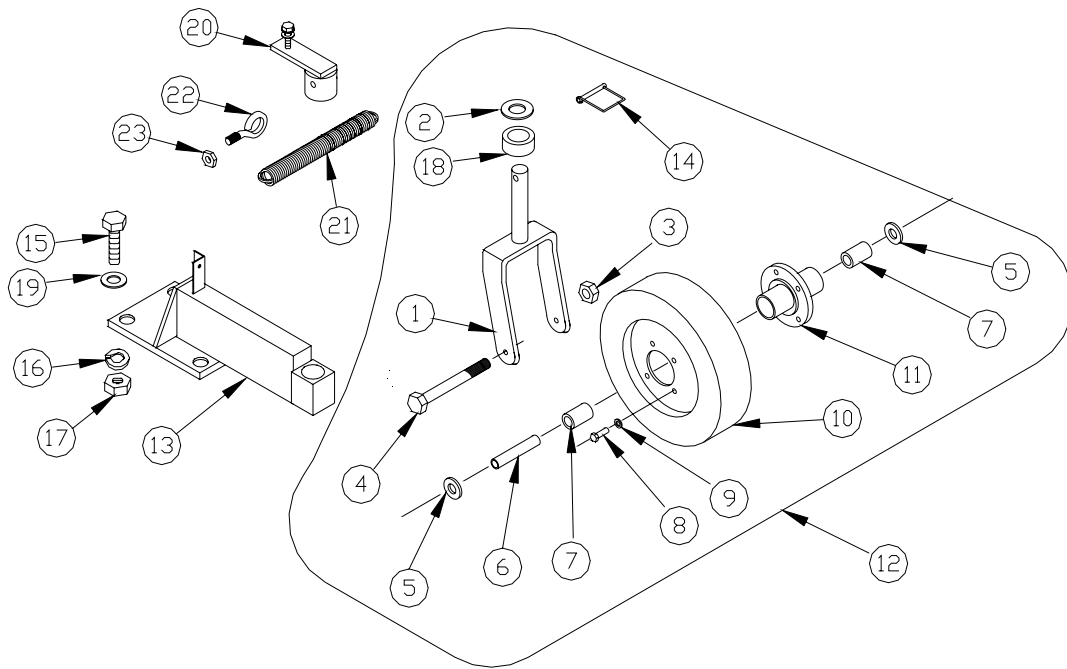
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	549CM02	2	SNAP RING, LARGE INTERNAL	
2	549FM01	1	FRONT COVER PLATE	
3	549CM03	1	SNAP RING, SMALL EXTERNAL	
4	527GF-2	2	ROLLER BEARING	
5	527GF-9	2	RACE	
6	549CM08	2	ROLLER	
7	549CM01	1	SEAL	
8	549FM02	1	REAR COVER PLATE	
9	549AS01	1	PIN AND BASE ASSEMBLY	
10	549CM05	2	SHIM	
11	503CAP	1	GREASE COVER	
12	503ZE01	1	GREASE FITTING	
13	549AS08	1	ROLLER ASSEMBLY, COMPLETE	

HYDRAULIC RETURN



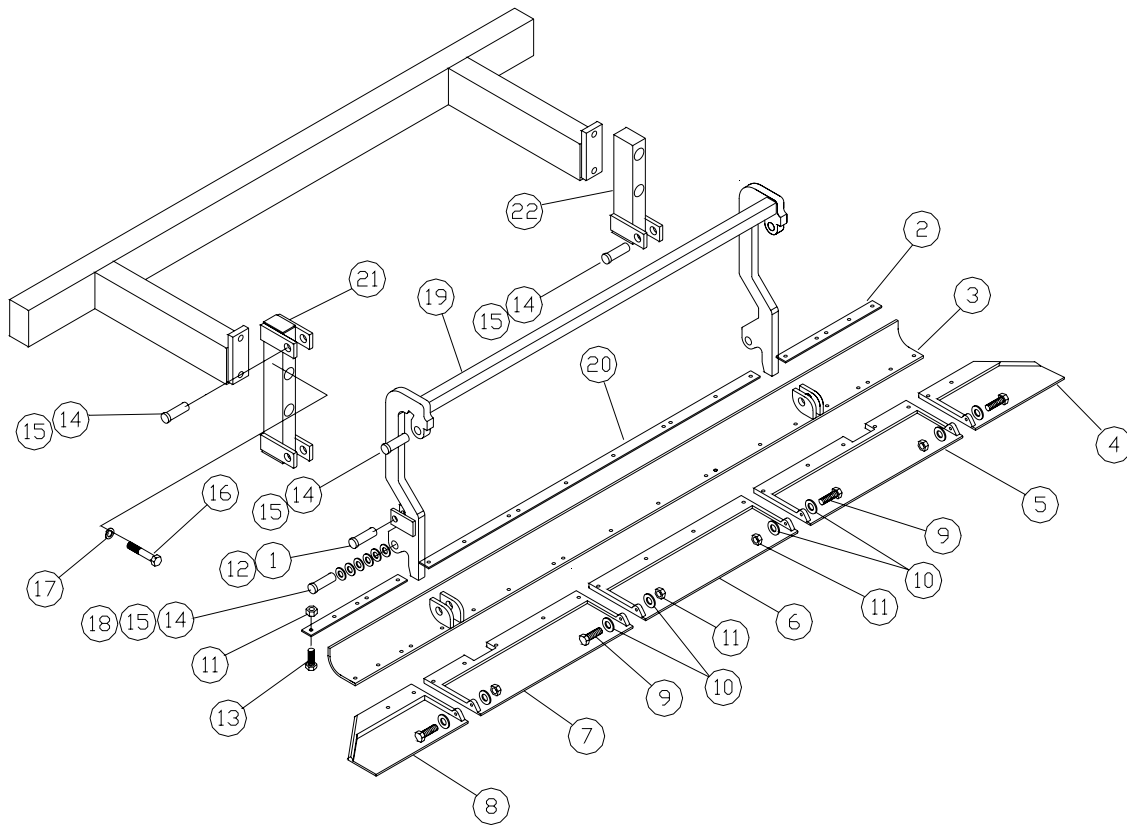
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS 061219
1	540E0401	3	ELBOW	
2	540A0404	5	ADAPTER	
3	540T0402	2	MALE RUN TEE	
4	540C0802	2	CLAMP, VINYL COATED	
5	560B05075	1	CAPSCREW	
6	524S	2	FLAT WASHER	
7	524Y	2	LOCKWASHER	
8	524X	1	CAPSCREW	
9	540T1201	1	TEE	
10	540R1202	1	ADAPTER	
11	540A0612	3	ADAPTER	
12	540TB04000	1	NYLON TUBE, 30 FT.	
13	540TB06000	1	NYLON TUBE, 3 FT.	
14	540B0613	1	TUBING, STAINLESS STEEL	
15	540A0615	2	COUPLER	
16	540A0406	1	ADAPTER, Y 1/4 X 1/4	
17	540A0613	1	ADAPTER, Y 1/4 X 3/8	
18	90304005	33	CABLE TIES	
19	540A0606	2	ADAPTER	
20	540C1015	4	HOSE CLAMP 3/8 TUBE	
21	540A0407	2	BULKHEAD FITTING	
22	540AS04	1	RETURN LINE ASSEMBLY COMPLTE	

OPTIONAL CASTER ASSEMBLY



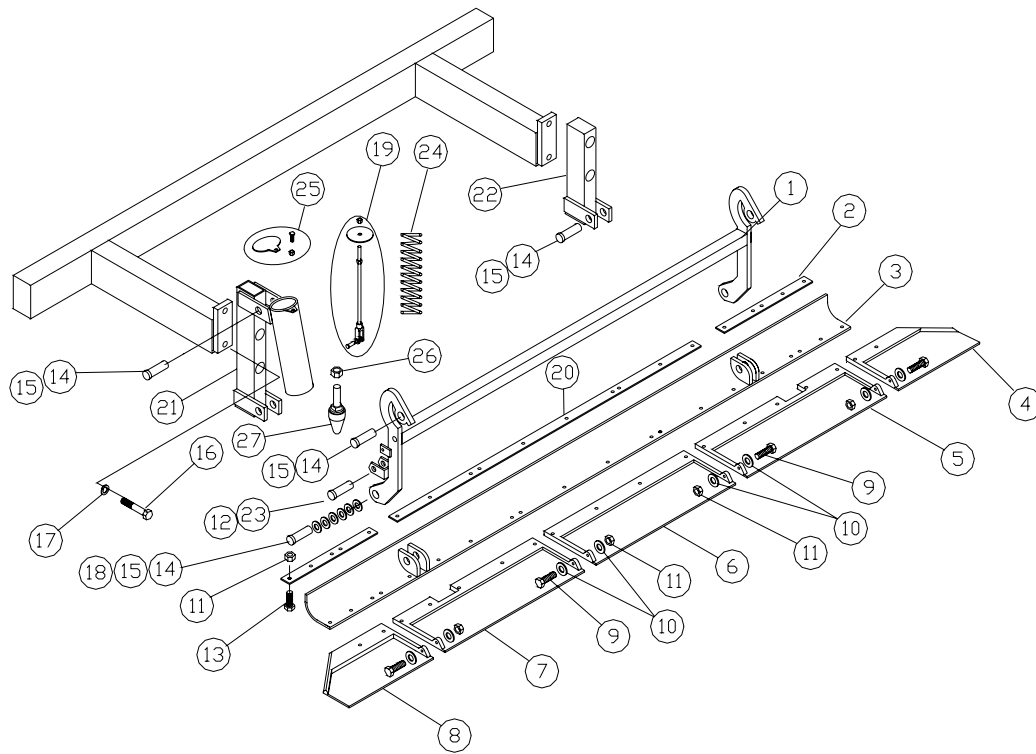
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	251A	2	FORK ASSEMBLY	
2	251B	4	WASHER	
3	509FA	2	LOCK NUT	
4	251C	2	BOLT	
5	251D	4	WASHER	
6	251E	2	SPACER TUBE	
7	251F	4	ROLLER BEARING AND RACE	
8	560B08100	8	BOLT	
9	524G	8	LOCK WASHER	
10	251G	2	WHEEL FLANGE AND TIRE ASSEMBLY	
11	251H	2	HUB	
12	251ASY	2	CASTER ASSEMBLY COMPLETE	
13	251JASY	2	CASTER HOLDER	
14	552CM11	2	SNAP PIN	
15	524D	8	CAPSCREW	
16	524G	8	LOCK WASHER	
17	523R	8	HEX NUT	
18	251TB05	6	SPACER	
19	603GG	8	FLAT WASHER	
20	251AS01	2	RETAINER CAP ASSEMBLY	
21	251TCM07	2	SPRING	
22	560B05100E	2	EYEBOLT	
23	560N05L	4	NUT	

OPTIONAL FINISHER



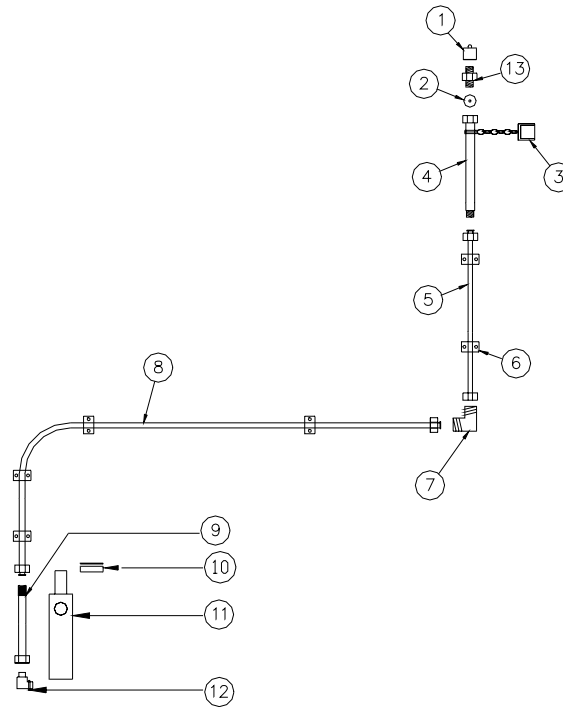
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	522JT2	1	COTTER PIN	
2	530FB01	2	HOLD DOWN BAR	
3	530AS06	1	FINISHING PLATE	
4	530CM02	1	FINISHER (RIGHT OUTSIDE)	
5	530CM05	1	FINISHER (RIGHT INSIDE)	
6	530CM03	1	FINISHER (CENTER)	
7	530CM04	1	FINISHER (LEFT INSIDE)	
8	530CM01	1	FINISHER (LEFT OUTSIDE)	
9	560B05150	4	BOLT	
10	524S	8	WASHER	
11	560N05L	22	NUT	
12	530CM07	1	PIN	
13	560B05150	18	BOLT	
14	560C02150	6	COTTER PIN	
15	530CM06	5	PIN	
16	509D	4	BOLT	
17	560LW12	4	LOCK WASHER	
18	502N	6	FLAT WASHER	
19	530AS04	1	ARM ASSEMBLY	
20	530FB02	1	HOLD DOWN BAR, MIDDLE	
21	530AS03	1	TUBE ASSEMBLY	
22	530AS12	1	TUBE ASSEMBLY	

OPTIONAL AUTO FINISHER



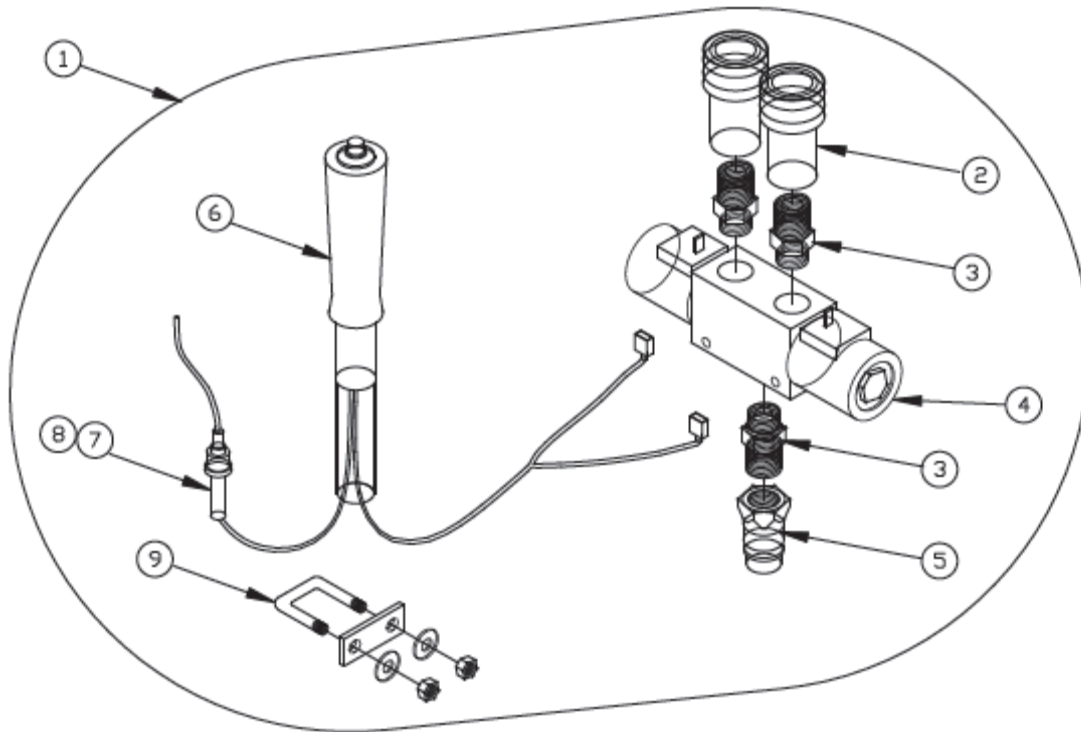
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	530AS17	1	ARM ASSEMBLY	
2	530FB01	2	HOLD DOWN BAR	
3	530AS06	1	FINISHING PLATE	
4	530CM02	1	FINISHER (RIGHT OUTSIDE)	
5	530CM05	1	FINISHER (RIGHT INSIDE)	
6	530CM03	1	FINISHER (CENTER)	
7	530CM04	1	FINISHER (LEFT INSIDE)	
8	530CM01	1	FINISHER (LEFT OUTSIDE)	
9	560B05150	4	BOLT	
10	524S	8	WASHER	
11	560N05L	22	NUT	
12	530CM07	1	PIN	
13	560B05150	18	BOLT	
14	560C02150	6	COTTER PIN	
15	530CM06	5	PIN	
16	509D	4	BOLT	
17	560LW12	4	LOCK WASHER	
18	502N	6	FLAT WASHER	
19	530AS43	1	SPRING TENSIONER ASSEMBLY	
20	530FB02	1	HOLD DOWN BAR, MIDDLE	
21	530AS45	1	TUBE ASSEMBLY	
22	530AS12	1	TUBE ASSEMBLY	
23	522JT2	1	COTTER PIN	
24	530CS01	1	SPRING	
25	530AS44	1	CAP ASSEMBLY	
26	560N12S	1	NUT	
27	530AS46	1	RUBBER STOP	
28	530AS02	1	AUTO FINISHER ASSEMBLY AND AUTO FINISHER HYDRAULICS ASSEMBLY	

OPTIONAL FINISHER HYDRAULICS



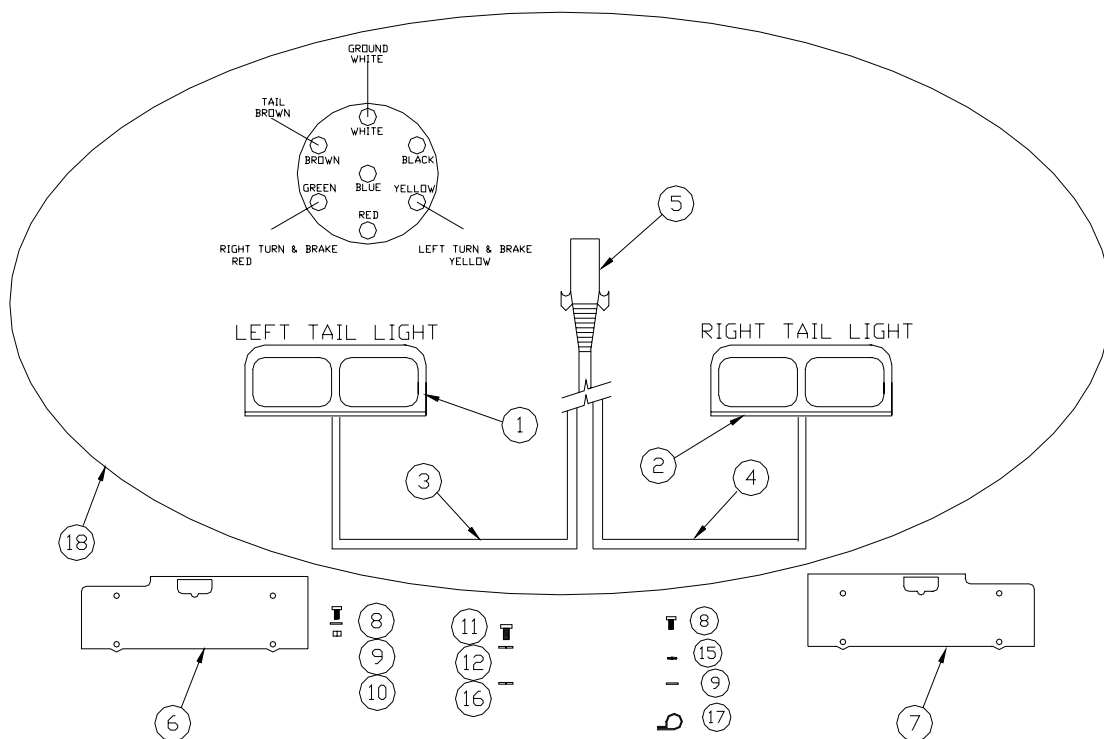
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	540A0809	1	QUICK DISCONNECT, MALE	
2	540R08032	1	RESTRICTOR	
3	545HD-13	1	QUICK DISCONNECT COVER	
4	540H06050	1	HOSE	
5	540B0601	1	TUBE	
6	540C1001A	10	HOSE CLAMP	
7	540E0602	1	ELBOW	
8	540B0602	1	TUBE, LEFT	
9	540H06130	1	HOSE	
10	545JJHP	1	REPLACEMENT SEAL KIT	
11	545JJH	1	CYLINDER	
12	540E0601	1	ELBOW, 90 DEGREES FOR 2X5 CYLINDER	
13	540R0806	1	ADAPTER	

OPTIONAL HYDRAULIC MULTIPLIER



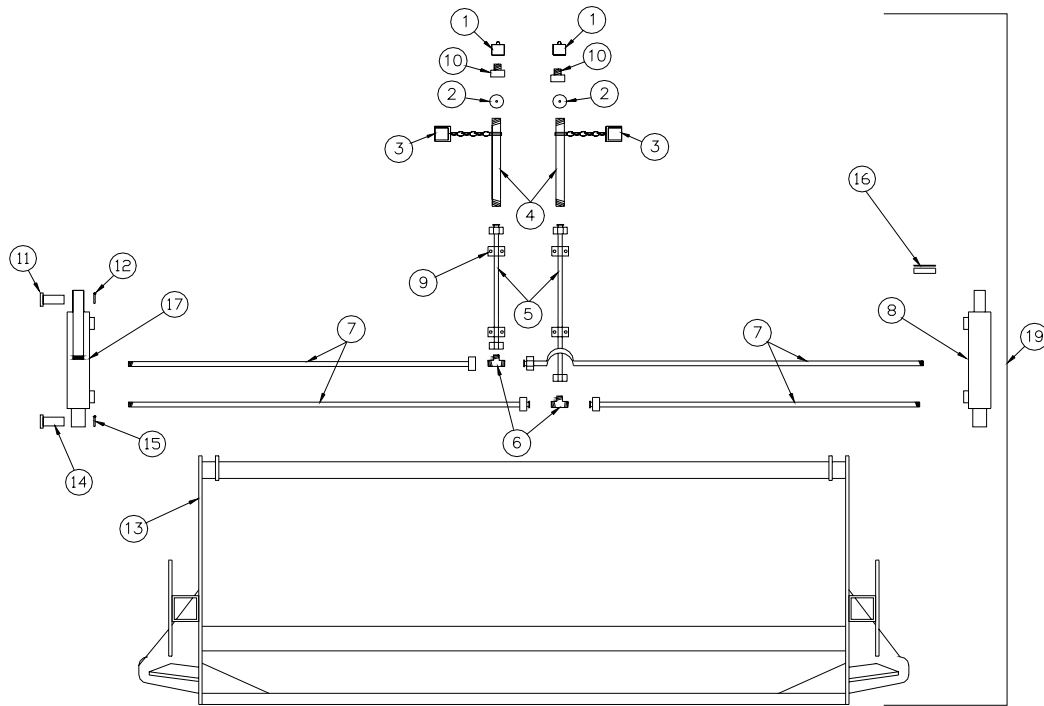
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	540AS01	1	ASSEMBLY KIT COMPLETE – SINGLE ACTING MULTIPLIER	
1	540AS03	1	ASSEMBLY KIT COMPLETE – DOUBLE ACTING MULTIPLIER (NOT SHOWN)	
2	545HDB	2	QUICK DISCONNECT, FEMALE	
3	540A0804	3	ADAPTER	
4	540V040	1	VALVE BODY – SINGLE ACTING MULTIPLIER	
4	540V008	1	VALVE BODY – DOUBLE ACTING MULTIPLIER	
5	545HD-12	1	QUICK DISCONNECT, MALE	
6	540V041	1	HANDLE WITH WIRES	
7	532CM05	1	FUSE HOLDER	
8	540V043	1	FUSE 15 AMP	
9	540V044	1	CLAMP KIT	

OPTIONAL LIGHTING



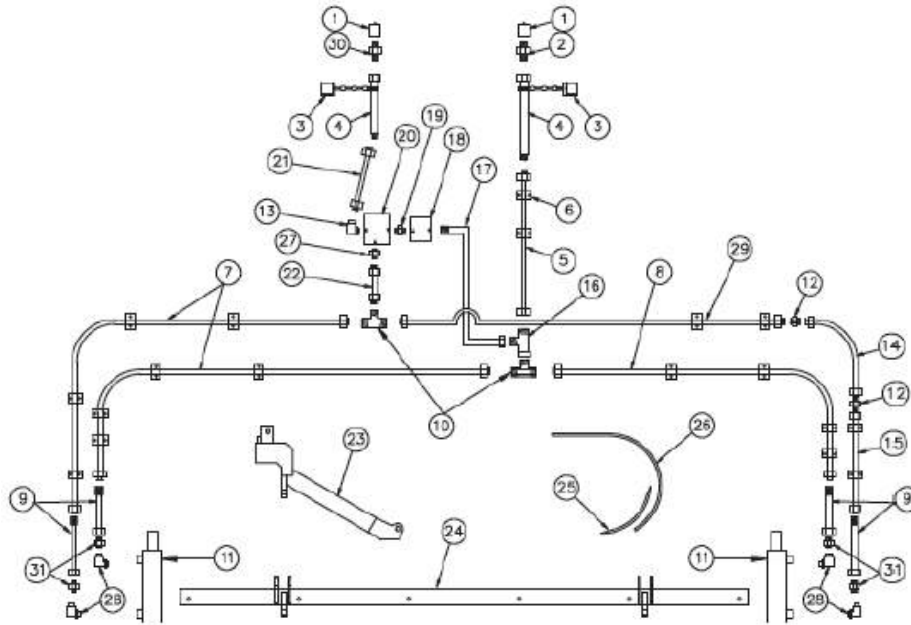
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS 061219
1	565CM32	1	STOP, TURN, TAIL LIGHT	
2	565CM33	1	STOP, TURN, TAIL LIGHT	
3	565CM34	1	HARNESS, LEFT	
4	565CM35	1	HARNESS, RIGHT	
5	565CM06	1	SEVEN WAY PLUG, ROUND	
6	565BU04L	1	LEFT LIGHT BRACKET	
7	565BU04R	1	RIGHT LIGHT BRACKET	
8	560B04100	10	CAPSCREW	
9	560W04	18	FLAT WASHER	
10	560N04L	10	LOCKNUT	
11	524X	4	CAPSCREW	
12	524Y	4	LOCKWASHER	
13	90304005	24	TIE STRAPS (NOT SHOWN)	
14	565CM09	1	WIRE LOOM (NOT SHOWN)	
15	520P	2	LOCKWASHER	
16	524S	4	FLAT WASHER	
17	565CM16	2	HOSE CLAMP	
18	565AS21	1	LIGHTS/HARNESS/PLUG ASSEMBLY COMPLETE	
19	565I001	1	STROBE LIGHT (OPTIONAL) NOT SHOWN	
20	565I14	1	LICENSE LIGHT (OPTIONAL) NOT SHOWN	

OPTIONAL HYDRAULIC MOLDBOARD



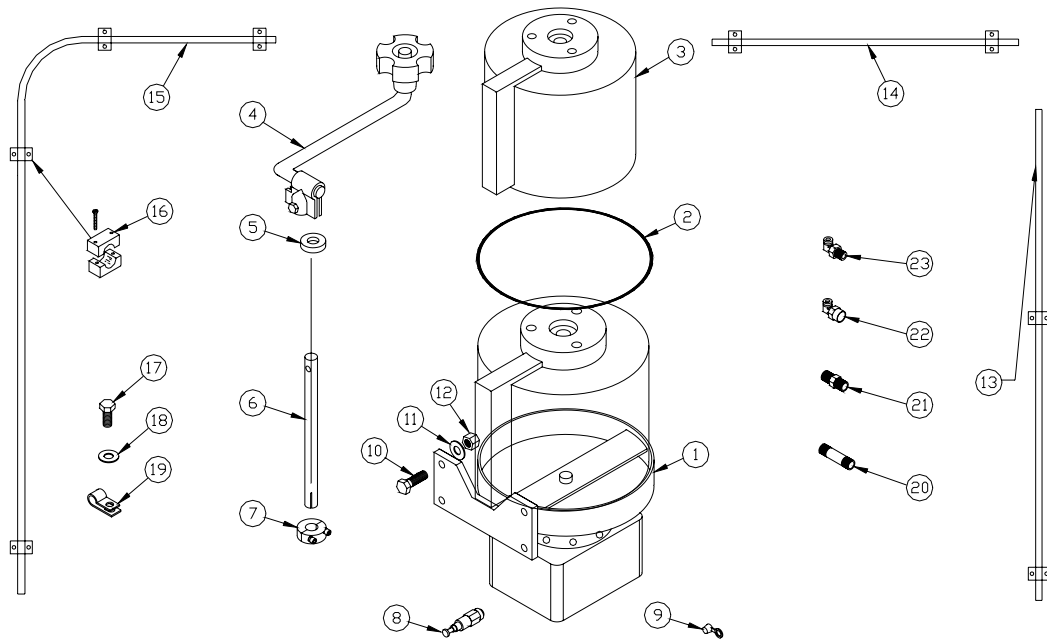
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	540A0809	2	QUICK DISCONNECT, MALE	
2	540R08032	2	ORIFICE DISC	
3	545HD-13	2	QUICK DISCONNECT COVER	
4	540H06050	2	HOSE	
5	540B0601	2	TUBE	
6	540T0602	2	TEE	
7	540H06035	4	HOSE	
8	545JJH	1	CYLINDER	
9	540C1001	4	HOSE CLAMP	
10	540R0806	2	ADAPTER	
11	530CM07	2	PIN	
12	522JT2	2	COTTER PIN	
13	522AS02	1	MOLDBOARD	
14	530CM06	2	PIN	
15	560C02150	2	COTTER PIN	
16	545JJHP	1	REPLACEMENT SEAL KIT PER CYLINDER	
17	545JJHG	1	CYLINDER WITH HEIGHT BAR/GAGE	
18	558HYDMLBD	1	CYLINDER DECAL (NOT SHOWN)	
19	522AS03	1	HYDRAULIC MOLDBOARD ASSEMBLY, COMPLETE	

OPTIONAL CHICAGO RAKE



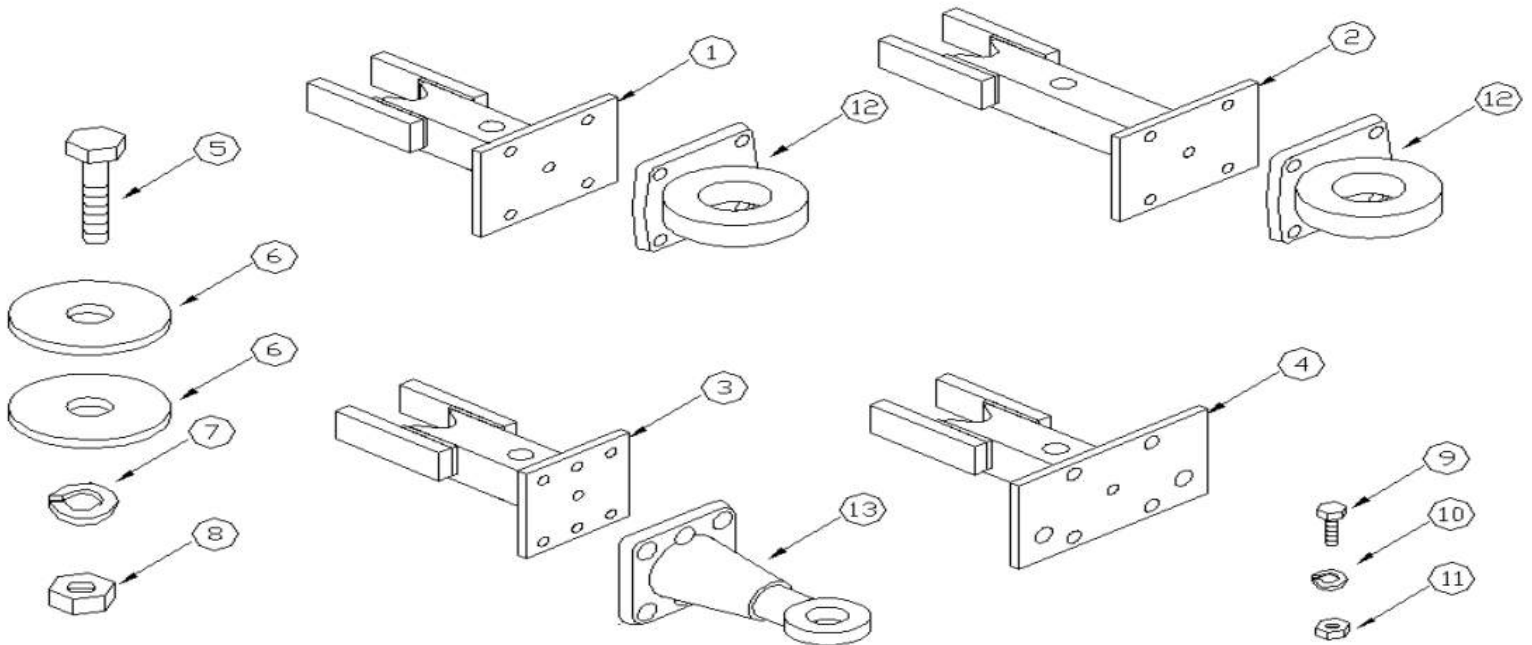
ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	540A0809	2	QUICK DISCONNECT, MALE	
2	540R08032	1	RESTRICTOR	
3	545HD-13	2	QUICK DISCONNECT COVER	
4	540H06050	2	HOSE	
5	540B0601	1	TUBE	
6	540C1001	16	HOSE CLAMP	
7	540B0602	2	TUBE, LEFT	
8	540B0603	1	TUBE, RIGHT	
9	540H06130	4	HOSE	
10	540T0602	2	TEE	
11	530CUPMC19408	2	CYLINDER	
12	540A0609	2	ADAPTER	
13	540E0601	1	ELBOW, 90 DEGREE	
14	530CUH06035	2	HOSE	
15	540B0604	1	TUBE	
16	540T0604	1	RUN NUT TEE	
17	540H06035	1	HOSE	
18	530CUCV01	1	CHECK VALVE	
19	540A0601	1	ADAPTER	
20	540V070	1	PRESSURE REDUCING VALVE	
21	540B0606	1	TUBE	
22	540B0607	1	TUBE	
23	530CUAS03	2	ARM ASSEMBLY	
24	530CUAS02	1	TUBE ASSEMBLY	
25	530CU572005	6	TINE END	
26	530CU571005	6	TINE	
27	540A0602	2	ADAPTER	
28	540E0604	4	STREET ELBOW	
29	540B0608	1	TUBE	
30	540R0806	1	ADAPTER	
31	540A0606	4	ADAPTER	
31	21875	12	CARRIAGE BOLT	
33	1137266	12	TOP LOCK NUT	
34	33814	6	HARDENED WASHER	
35	13360	4	CAPSCREW	
36	13319	6	CAPSCREW	
37	560N10L	6	TOP LOCK NUT	
38	560FW10	4	WASHER	
39	509D	2	CAPSCREW	
40	509FA	6	LOCK NUT	
41	530CUAS01	1	CHICAGO RAKE 6 – ASSEMBLY COMPLETE	

MANUAL GREASE SYSTEM



ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	532AS10	1	MANUAL AUTO GREASE UNIT	
2	532CM08	1	RESEVOIR O-RING	
3	532AS10E	1	COVER ASSEMBLY	
4	532AS10D	1	HANDLE ASSEMBLY	
5	532AS10F	1	SEAL	
6	532AS10C	1	STAINLESS ROD	
7	532AS10G	1	COLLAR	
8	532CM03	12	INJECTOR CARTRIDGE	
9	503CAP	1	GREASE CAP	
10	524X	4	CAPSCREW	
11	524S	4	FLAT WASHER	
12	560N05L	4	LOCKNUT	
13	532TB06	1	STAINLESS TUBING, RIGHT	
14	532TB04	1	STAINLESS TUBING, FRONT/RIGHT	
15	532TB02	1	STAINLESS TUBING, LEFT	
16	540C1001	8	HOSE CLAP 5/8"	
17	520K	6	CAPSCREW	
18	520P	6	LOCKWASHER	
19	540C0401	6	STRAP CLAMP	
20	540N0204	8	NIPPLE	
21	503AHB	2	NIPPLE	
22	532CM04	10	PUSH TO CONNECT SOLID FEMALE FITTING	
23	532CM02	2	PUSH TO CONNECT SWIVEL MALE FITTING	
24	532TBR164	12	GREASE LINE (NOT SHOWN)	
25	532AS02	1	COMPLETE MANUAL AUTO GREASE SYSTEM	

OPTIONAL PINTLE ATTACHMENT



ITEM	PART NUMBER	QTY	DESCRIPTION	600HDS
1	552AS01	1	STANDARD PINTLE ATTACHMENT	
2	552AS01L	1	EXTENDED STANDARD PINTLE ATTACHMENT	
3	552AS01E	1	EUROPEAN PINTLE ATTACHMENT	
4	552AS01A	1	AUSTRALIAN PINTLE ATTACHMENT	
5	560B16600	1	CAPSCREW	
6	502N	2	FLAT WASHER	
7	405F	1	LOCK WASHER	
8	405G	1	HEX NUT	
STANDARD AND EXTENDED STANDARD PINTLE ADAPTER				
9	506B09250	4	CAPSCREW	
10	503R	4	FLAT WASHER	
11	506N09L	4	LOCK NUT	
12	552CM01	1	TOW EYE	
EUROPEAN PINTLE ADAPTER				
9	506B09250	6	CAPSCREW	
10	503R	6	FLAT WASHER	
11	506N09L	6	LOCK NUT	
13	552CM02	1	EUROPEAN TOW EYE	