BANDIT
WHOLE TREE CHIPPERS

OPERATING & PARTS MANUAL

MODEL 20XP

Model No: 20XP

Serial No: _____

DEALER:

Name: _____

Address: _____

City/State: _____

Phone No: _____

Delivery Date: _____

Engine Make: _____

Serial No: _____

Clutch Make: _____

Model: _____ S/N _____

ATTENTION:

Depending on what replacement parts you are ordering, we will need the following information:

CHIPPER COMPONENTS	ENGINE COMPONENTS	CLUTCH COMPONENTS
Serial Number	Brand	Brand
Model Number of Chipper	Engine Serial Number	Clutch Serial Number
	Engine Model Number	Clutch Model Number

Bandit INDUSTRIES, INC.
6750 Millbrook Rd. • Remus, MI 49340 • 1-989-561-2270

MANUFACTURED BY BANDIT INDUSTRIES, INC
PHONE: (989) 561-2270
PHONE: (800) 952-0178 IN USA
FAX: (989) 561-2273 ~ SALES DEPT.
FAX: (989) 561-2962 ~ PARTS/SERVICE
WEBSITE: www.banditchippers.com

CALIFORNIA PROPOSITION 65

⚠ WARNING ⚠ ADVERTENCIA

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- **Always start and operate the engine in a well-ventilated area.**
- **If in an enclosed area, vent the exhaust to the outside.**
- **Do not modify or tamper with the exhaust system.**
- **Do not idle the engine except as necessary.**

For more information go to:
www.P65warnings.ca.gov/diesel

Respirar gases de escape de motores diesel le expone a químicos conocidos por el estado de California como causales de cáncer y defectos congénitos u otros daños reproductivos.

- **Siempre encienda y opere el motor en áreas bien ventiladas.**
- **Si está en un área cerrada, ventile escape hacia el exterior.**
- **No modifique ni altere el sistema de escape.**
- **No deje el motor en ralentí a no ser que sea necesario.**

Para mayor información visite:
www.P65warnings.ca.gov/diesel

SPW-46 8/18

⚠ WARNING
⚠ ADVERTENCIA

Cancer and Reproductive Harm

Cáncer y daño reproductivo

www.P65warnings.ca.gov

SPW-47 8/18

WARRANTY VALIDATION FORM (WHOLE TREE & LOADER FED CHIPPER)

IMPORTANT - WARRANTY WILL BE DEEMED NULL AND VOID IF THIS FORM IS NOT FILLED OUT COMPLETELY AND ACCURATELY AND RETURNED TO THE CUSTOMER DATA DEPARTMENT WITHIN 10 DAYS OF EQUIPMENT DELIVERY

Customer Data Department
6750 Millbrook Road
Remus, MI, USA 49340
Phone: (800) 952-0178 in USA
Phone: (989) 561-2270
Fax: (989) 561-2273
Website: www.banditchippers.com

PURCHASER / OWNER INFORMATION:

Company Name _____ Contact Name _____

Mailing/Street Address _____ City _____

State _____ Zip Code _____ Country _____ Telephone Number (__) _____

E-mail _____ Machine Model No. _____ Date Put Into Service _____

Machine Serial No. _____ Machine Work Order No. _____ Machine Hours _____

Engine Make _____ Engine Serial No. _____ Machine Color _____

DEALER / SELLER INFORMATION:

Dealer/Seller Name _____ Contact Name _____

Mailing/Street Address _____ City _____

State _____ Zip Code _____ Country _____ Telephone Number (__) _____

1. _____ The customer has received instruction and fully understands all operational, safety and maintenance requirements of the equipment.

2. _____ The customer has received instruction and fully understands that everyone within 100 feet of the machine must wear proper personal safety equipment including hard hat, face shield, safety glass, gloves, ear protection and/or other items per OSHA and ANSI requirements.

3. _____ The customer has received instruction and fully understands the equipment maintenance schedules and procedures. The customer understands that it is their responsibility to perform scheduled maintenance that includes periodic relief valve adjustments, retightening all fasteners as needed, periodic cleaning of flow divider, clutch and belt adjustments, and other items.

4. _____ The customer has received instruction and fully understands not to reach into the infeed hopper with hands or feet.

5. _____ The customer has received instruction and fully understands that the operators must always be located within easy reach of all feed control and shut down devices.

6. _____ The customer has received instruction and fully understands that this machine is designed to be 'loader' fed and is to follow all feeding instructions in the manual. The customer understands that under no circumstances should the operator hand feed these machines or use anything other than mechanical devices, knuckle boom loader or the machines loader to feed these machines.

7. _____ The customer has received instruction and fully understands the purpose of and proper operation of any and all safety devices and guards. The customer understands to never attempt to override any safety device or guard.

8. _____ The customer has received instruction and fully understands that before performing any maintenance on the machine the ignition key must be removed, the cables must be completely disconnected from the battery, the disc/drum must have come to a complete stop, and the disc/drum lock must be installed. The customer understands they must allow the necessary time for the disc/drum to come to a complete stop before opening the disc/drum housing or start any maintenance or service procedures. The customer has received instruction and fully understands the purpose of the beltshield inspection hole and that they are never to attempt any maintenance or service procedures until visually confirming the belts have come to a complete stop.

9. _____ The customer has received instruction and fully understands that the machine is not to be operated without the factory approved hood pin assembly in place and padlocked, the machine is not to be operated with any type of make shift hood pin, and the machine is not to be operated under any circumstances with the chipper hood open or unsecured.

10. _____ Customer has reviewed and fully understands limited warranty, and all written and visual instructions.

11. _____ The customer has received instruction and fully understands that warranty will not apply if the machine is operated with replacement parts or equipment not manufactured or recommended by Bandit Industries, Inc.

12. _____ Customer has received, been advised, and understands the manuals, and the Safety/Service video supplied with the chipper. A video is supplied for equipment models as available.

13. _____ All Danger, Warning and Operational decals are properly displayed on equipment and fully understood by customer.

14. _____ Customer has been instructed, understands, and agrees that all potential operators must: See the supplied video, be instructed on all the Danger, Warning and Operational decals, read the manual and follow the procedures.

I have inspected this equipment and find it in correct working condition. To the best of my knowledge, the customer and his/her personnel are aware of, and agree to the above procedures.

Signed: _____ **Date:** _____

(Dealer Representative)

The equipment has been thoroughly checked by the above named dealer representative, and I am satisfied with his/her instructions. I have also read, understand, and agree to reverse side of page.

Signed: _____ **Date:** _____

(Customer)

TO BE RETURNED AFTER THIRTY (30) DAYS OF OPERATION

DATE PURCHASE: _____

MODEL: _____

SERIAL NUMBER: _____

DEALER NAME: _____

_____

Please return to: Customer Data Department
6750 Millbrook Road
Remus, MI 49340

Phone: (800) 952-0178 in USA
Phone: (989) 561-2270
Fax: (989) 561-2273
Website: www.banditchippers.com

EQUIPMENT QUALITY REPORT

All of the employees that build your equipment strive to manufacturer the **very best quality** product on the market. We would appreciate your efforts in letting us know how we are doing.

We would like you to operate your machine for thirty (30) days and then fill out this questionnaire and mail it to us. This will help us to keep producing a good product and improving our products through your recommendations.

1. Did your machine perform to your expectations? _____
2. Was the machine delivered on schedule? _____
3. Was the paint color and finish to your satisfaction? _____
4. Was machine equipment as ordered? _____
5. Did all welds appear to be high quality? _____
6. Was the overall machine to your liking? _____
7. What problems have you experienced? _____
8. Have any components regularly loosened that caused problems? _____
9. Does the hydraulic system seem to have adequate power for feeding wood into the machine? _____
10. Is the machine manufactured to accommodate service in an adequate manner? If not, please explain:
    _____
11. General comments and/or suggestions: _____
    _____
    _____
12. Would you like to be contacted concerning more of our equipment? _____

YOUR COMPANY: _____

NAME: _____

ADDRESS: _____

CITY: _____

STATE & ZIP: _____

PHONE: (____) _____

E-MAIL: _____

TABLE OF CONTENTS

NOTICE

ANY PART, PORTION, DESIGN, NUMBER, SPECIFICATION, AND/OR DIMENSION IN THIS MANUAL IS SUBJECT TO CHANGE WITHOUT NOTICE BY THE MANUFACTURER.

INTRODUCTION

The purpose of this manual is to provide the user with specifications and procedures for the operation, maintenance and repair of this BANDIT product. As with any piece of equipment, safety should always be a constant thought while the machine is being operated, serviced or stored. In order to highlight this consideration, the material which addresses safety is proceeded by the following signal words:

Signal Word	Likelihood of Occurrence	Degree of Potential Injury or Damage
⚠DANGER	Will occur if warning is ignored	Severe
⚠WARNING	Can occur if warning is ignored	Severe
⚠CAUTION	Will or can occur if warning is ignored	Minor to Severe
NOTICE	Important, but not hazard related	Minor

The equipment is designed and manufactured in accordance with the latest product industry standards. This alone does not prevent injury. It is the operator's responsibility to use good judgement and follow the warnings and instructions as indicated in this manual, on the machine and follow all safety standards per ANSI and OSHA instructions.

⚠WARNING

Improper use of the product can result in severe personal injury. Personnel using the equipment must be qualified, trained and familiar with the operating procedures as defined in this manual, prior to operating the product.

⚠WARNING

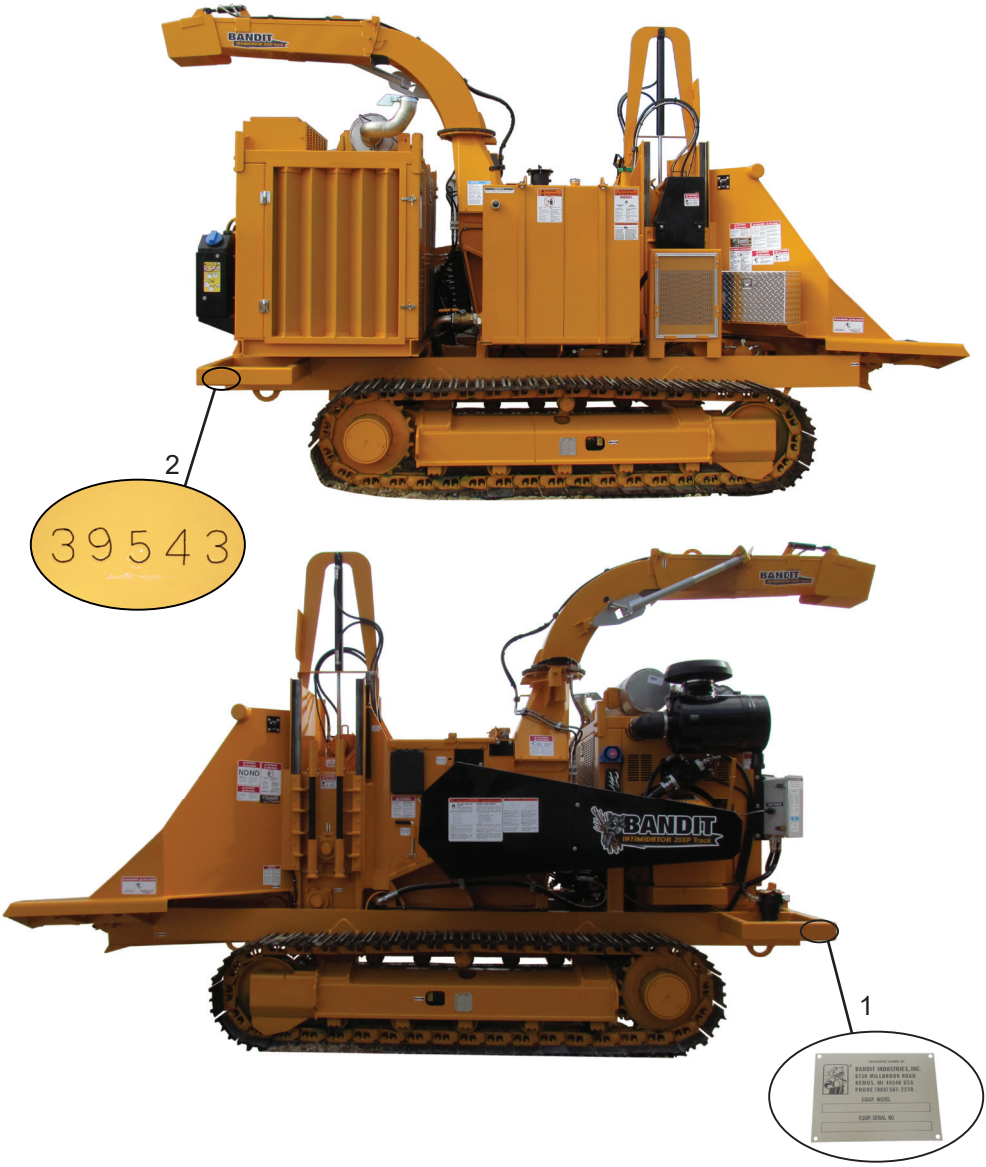
It is the responsibility of the owner or employer to ensure that the operator is trained and practices safe operation while using and servicing the machine. It is also the owner's responsibility to provide and follow a regularly scheduled preventative maintenance and repair program on the product, using only factory approved replacement parts. Any unapproved repairs or modifications may not only damage the machine and its performance, but could result in severe personal injury. Unapproved repairs or modifications will void warranty and eliminate manufacturer of any liability claims. Consult the equipment manufacturer with any questions.

Each machine is shipped with a manual, a customer's check sheet on the product, and any available parts & service manuals on component parts not produced by this manufacturer. Additional copies of these manuals and check sheets can be purchased from the manufacturer, or through the dealer. Engine parts, service and maintenance manuals MUST be purchased through the engine manufacturer or their dealer.

NOTICE

The producer of this Bandit product reserves the right to make any modifications or revisions to the design or specifications of its machine without advance notice. The producer also reserves the right to change machine and part prices as needed without advance notice.

TYPICAL CHIPPER SERIAL NUMBER AND/OR WORK ORDER NUMBER LOCATIONS



1. S/N on side of frame
2. W/O # on top of tongue or frame

NOTICE

The engine information is located on the engine block. The clutch information is located on the clutch plate (if equipped).

SAFETY PROCEDURES

⚠DANGER

The words ⚠Danger, ⚠Warning, ⚠Caution, and Notice are used on the safety decals and throughout this manual, to make you aware of the safety procedures. These procedures are very important, read and obey them.

YOUR SAFETY IS VERY IMPORTANT TO US!

This machine is equipped with safety decals, guards and designs for your protection.

Don't ever take the machine for granted, always be cautious and careful when operating your equipment.

Read and follow all the instructions in your manual thoroughly. Your safety is dependent on your knowledge of how to operate and maintain this machine. You may obtain additional copies of this manual from your Bandit Dealer.

Before operating machine, you must have all potential operators; read and understand manuals and decals, watch the video and follow the recommendations.

Regardless of how hard a manufacturer tries to produce a safe machine, accidents still happen. Normally accidents are caused by people making mistakes. They do not read the manual, they ignore warning decals or do not use lockouts provided for their safety. This normally happens after the person has become accustomed to the machinery. In the initial start up and operation of the machinery, they are cautious, they are very careful because they do not understand the machine.

This equipment is intended for use by adults who have been properly trained and are physically capable of operating the machine safely. Never allow minors to operate this machine. Never operate any machine while under the influence of drugs or alcohol. Never operate equipment that is in need of repair or adjustment. Keep children, bystanders and animals clear of working area.

There must be at least two qualified and trained operators at the work site. They must be positioned in safe working locations, following safety procedures and instructions, and aware of each others whereabouts. There must, also, be at least two people on site during maintenance and service procedures in case an accident should occur.

⚠DANGER

Before starting the machine, take a minute to check a few things. The machine should be in an area restricted from people passing by. This area around the machine must be free of all objects that can obstruct your movement when working with the machine. The machine should be checked for loose tools or foreign objects, especially in the infeed hopper area. All tools not in use should be secured in a tool box.

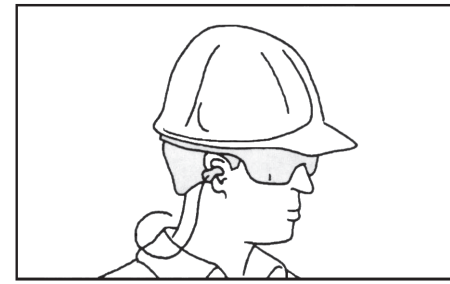
⚠WARNING

Operators **must** at all times be located within easy reach of all feed control and shut-off devices when the unit is running. They must be attentive and prepared to activate the devices.

⚠DANGER

Torn or loose clothing is more likely to get caught in moving machinery parts or tree branches. Keep such items as long hair, shirt sleeves, and shirt tails properly contained. Avoid wearing necklaces, rings, watches, and especially neckties while operating this machinery. Make sure the machine is in excellent condition, and all the guards are in place, tight and secure.

Wear all personal protection equipment and follow all safety standards per ANSI and OSHA instructions. Examples of equipment: hard hat, face shield, safety glasses, gloves, ear protection, etc. Do not wear gauntlet or secured fit gloves. Always keep a fully charged fire extinguisher with the machine while operating or servicing the machine.



SAFETY PROCEDURES

⚠DANGER

NEVER sit, stand, lay, climb or ride anywhere on this machine while it is running, operating, or in transit. You will be injured.

⚠DANGER

Pay attention to the direction of the discharge chute before chipping. Never stand in front of the chipper discharge chute. Never direct the chute towards anyone or anything that could cause an accident or problems. Always stop chipping and warn anyone that comes near the discharge area. Failure to do this could result in severe injury. Wood chips flying out of the discharge chute can be very dangerous!

⚠WARNING

It is very important after you have operated a new machine for approximately an hour to shut down the machine and recheck all nuts and bolts. It is normal for nuts and bolts to loosen once on a new piece of machinery. If you tighten them now, there is a good possibility they won't loosen again. Certain nuts and bolts should be checked periodically such as anvil and knife nuts and bolts, etc. for torque and fit.

Most of the nuts used on the machine are self locking. After a nut or bolt has been removed five times, it should be replaced to ensure proper tightness. This is especially critical on the chipper knife nuts and bolts!

After the engine is started, let the chipper disc/drum turn at the lowest RPM's possible. Listen for any type of noise that is foreign. Any steel on steel noise is foreign. If you hear a noise, stop the engine, find the problem and fix it.

⚠WARNING

It is very important after you have operated a new machine for approximately an hour to shut down the machine and recheck all hydraulic fittings. Relieve all pressure and retighten as needed.

DO NOT GO NEAR HYDRAULIC LEAKS! High pressure oil easily punctures skin causing serious injury, gangrene, or death. Avoid burns from fluid. Hot fluid under pressure can cause severe burns. DO NOT use fingers or skin to check for leaks. Lower load or relieve hydraulic pressure before loosening fittings. Relieve all pressure in the system before disconnecting the lines, hoses, or performing other work. Use a piece of cardboard to find leaks. Never use your bare hands. Allow system to cool down to ambient temperature before opening any coolant or hydraulic oil system.

In cold weather situations let your hydraulic system idle for approximately 15 minutes to allow the system to warm up to operating temperature.

⚠DANGER

Never reach into the infeed hopper area of the machine, there is never any reason to. The feedwheels are designed to pull trees and brush of any length into the machine. Pulling a hand, arm, foot or entire body through the machine is much easier than pulling a tree. Do not think you will be able to pull yourself free of the feedwheels, they will not let go. There is absolutely no reason to work inside of the infeed hopper. If the feedwheels become tangled or clogged: disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery before cleaning them out. If there are short pieces, just leave them until feeding longer pieces. While the longer pieces are feeding, simply put the short pieces on top of them. The longer pieces will take them on into the machine.

If there is larger diameter wood, try to feed it with smaller diameter wood. Start a small diameter limb which will partially open the feedwheels. Once the feedwheels are partially open it is much easier to insert the larger diameter wood.

When feeding larger diameter wood, listen for the engine to possibly lug down. If it starts lugging down stop the feedwheels by stopping the feed system, and let the engine recover to full speed. If the machine is equipped with Autofeed and it is functioning properly, the feed system will automatically stop to let the engine recover. This will help stop the machine from plugging the discharge chute.

⚠DANGER

DO NOT operate this machine indoors! Exhaust fumes can be fatal. Never refuel while the machine is running. Never refuel in the shop or building. Always refuel in a well ventilated area, away from sparks or open flames, DO NOT SMOKE. Extinguish all smoking materials. Wipe up all spilled fuel before restarting the engine. Do not fill above 1/2" (12.7mm) from top of tank.

To obtain the most from your machine, for the least amount of cost, it is a good practice to set up and follow a scheduled preventative maintenance program. It will eliminate many possible problems and down time.

NOTICE

The Bandit has only been run for a short time to test proper hydraulic pressures, possible leaks, etc. The fuel tank will be empty. Fuel is provided through a small auxiliary tank for testing. This immensely helps maintain safety in our manufacturing facility and while shipping.

SAFETY PROCEDURES

⚠DANGER

Keep the machine in good condition. Be sure the machine is in good operating condition and that all safety devices, including guards and shields are installed and functioning properly. Visually inspect the machine daily before starting the machine. Refer to the “Daily Start Up & Maintenance”. Make no modifications to your equipment unless specifically recommended or requested by Bandit Industries Inc.

⚠WARNING

DO NOT operate this machine unless all hydraulic control devices operate properly. They must function, shift and position smoothly and accurately at all times. Faulty controls can cause personal injury!

⚠DANGER

Avoid moving parts. Keep hands, feet, and clothing away from power driven parts. Keep all guards and shields in place and properly secured.

⚠DANGER

Never feed any materials that might contain wires, stones, nails, metal objects, or any foreign object which may damage the knives and become dangerous projectiles.

⚠DANGER

DO NOT run or operate this machine with any door/compartment open. Door enclosures are guards, you can be injured if open during operation.

⚠DANGER

DO NOT attempt to hand feed this machine. DO NOT operate the loader arm or chipper when anyone is standing or working in front of the chipper infeed opening. Failure to do this could result in serious injury or death.

⚠DANGER

DO NOT hand feed this machine! This machine is designed to only be fed by a mechanical log loader. Feeding material into this machine by hand is not permitted or authorized. Severe injury or death can result!

CALIFORNIA

Proposition 65 Warning

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

⚠WARNING

Never use jumper cables during freezing temperatures. Tow the machine inside and allow the battery time to warm up. If the machine must be started outside, inspect the battery acid for ice formation. Explosion will occur with a frozen battery. If the machine is going to be operated in excessively cold conditions, a larger cold cranking amp battery may be needed to ensure proper and prompt starting. Never use jumper cables in a confined or unventilated area. Battery acid fumes are explosive. Battery acid can cause severe burns. Never expose an open flame or spark near the battery. Keep all burning materials away from the battery. When servicing the battery, shield eyes and face, and do not smoke. Service in a well ventilated area.

⚠DANGER

DO NOT remove the hood pin until the chipper disc/drum has came to a complete stop. The chipper disc/drum will coast for several minutes after the engine is shut down. Always wait at least several minutes.

DO NOT operate this machine without the Hood Pin in place. Do not operate the machine with any type of makeshift hood pin or an improperly installed hood pin! The Hood Pin MUST be padlocked.

DO NOT operate the machine with the chipper hood open under any circumstances.

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

ALWAYS install the disc/drum lock pin to prevent inadvertent rotation. On disc chippers insert lock pin through lock pin tube on the belly band under hood rest. On drum chippers insert lock pin through lock pin tube on side of drum housing.

Simply slide the lock pin into the disc/drum lock tube. This is to ensure that the chipper disc/drum cannot be started while you are working inside the machine. If for some reason the chipper disc/drum would start to turn, it would simply hit the lock pin.

⚠DANGER

The knives must be securely fastened and torqued in position. If one comes loose or breaks during operation, someone or something may get injured or damaged.

⚠DANGER

Chipper knives are sharp and can be dangerous. It is always necessary for your protection to be extra careful and wear proper hand protection when handling knives.

SAFETY PROCEDURES

⚠DANGER

Before opening or closing the feedwheel trap door: disengage clutch, turn off engine, wait for the disc/drum to come to a complete stop, install the disc/drum lock pin, disconnect battery, and make sure the ignition key is in your possession. In the event that dirty material is being run through the chipper the feedwheel trap door can be opened.

⚠WARNING

The machine was built with a chipper hood engine disable plug which disables the engine if it is not installed properly with the hood pin holding the chipper hood in the closed position. Correctly installed and maintained, the engine will not start or it will shut off if the chipper hood engine disable plug is disconnected. The chipper hood must NEVER be opened, or pushed closed if the chipper disc/drum is turning.

⚠DANGER

DO NOT slam the chipper hood to the open position. This will cause damage to the hinge. If your hinge has become damaged by slamming the hood to the open position, Replace The Hinge Immediately! If the hinge has become damaged it will cause misalignment of the hood, the chipper disc/drum may then hit the hood and cause a serious accident! Lubricate the hood hinge daily.

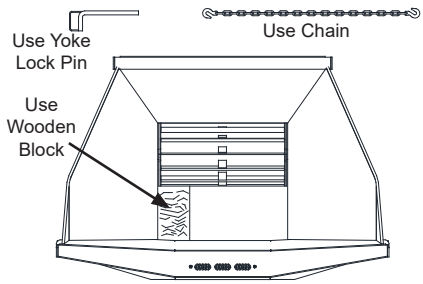
⚠DANGER

Never turn the chipper disc/drum by hand, always carefully use a pry bar or wood bar. This will help prevent the person turning the disc/drum from being injured should the disc/drum break loose.

A sight hole in the chipper beltshield has been provided. If chipper belts are moving do not open chipper hood. Do not stick fingers in sight hole.

⚠DANGER

Do not work inside the mouth of the chipper or around the feedwheel(s), until you have installed the yoke lock pin completely and securely to help keep the top feedwheel in the raised position. Remove top wheel springs if equipped, block and chain top wheel up before doing any work inside throat.



⚠DANGER

If the chipper is properly maintained and operated correctly, the chipper should not plug. In the unlikely event that the chipper becomes plugged, do not attempt to clean out the discharge or chipper housing in the field. Take the machine to a local dealer or professional shop. If the machine is a rental, take it back to the rental company.

⚠DANGER

If the discharge or hood need to be removed, always use some sort of mechanical device like an overhead hoist, loader, lift truck, etc. that is rated for lifting that component. Follow all OSHA instructions for lifting.

NOTICE

Do not attempt to start the engine or engage the engine PTO (power-take-off) system on this machine if the chipper disc/drum is jammed or frozen in place. If you do, you will damage or ruin the drive belts and/or the PTO which will not be covered under warranty and will cost you down time and money.

⚠DANGER

Do not work on the machine if the engine is running with the clutch disengaged. A clutch can self engage if either the pilot or throw-out bearing happens to seize to the main output shaft.

There are various types of clutches (PTO's) available for this type of equipment. Make sure to study the original clutch manufacturer's manual that is provided with the machine and follow its instructions for operation, service, and adjustments. Some styles require clutch engagement to be maintained so that it takes a lot of force, others will require very little force, and some are push button, electric, manual lever, or hydraulic activation. Each different style clutch (PTO) is a very expensive item that will fail if not correctly maintained and adjusted. It will be quite costly if a few minutes are not taken daily, weekly, and monthly to keep the clutch serviced as required.

The operator must take care in the engagement and disengagement of the clutch, engine RPM should always be at idle speed. When the engine has sufficiently warmed up, bump the clutch handle against engagement to start the chipper disc/drum turning. This will have to be repeated until the chipper disc/drum is turning at proper ratio with engine RPM. Then push the handle all the way in gear until it locks into position securely. After engagement raise engine RPM to full throttle. Engaging and disengaging the clutch at high engine RPM will quickly and excessively wear out clutch plates as well as bearings. Refer to clutch manufacturer's manual for proper service and operation.

SAFETY PROCEDURES

⚠DANGER

Always block the tires and the machine tongue whenever the machine is unhooked for operation. DO NOT rely on the hydraulic stabilizers. With the bouncing and rocking, the stabilizer cylinders may have a tendency to leak off allowing the machine to drop down slowly. Do not depend on them for stability. Install secure blocking as needed.

NOTICE

Tongue jacks or optional rear stabilizers, whether hydraulic or manually operated are designed to stabilize the machine. The tongue jack or rear stabilizers are not designed to hold the machine off the ground at any time. Install secure blocking and / or chocking as needed. Before transporting the machine, ensure the tongue jack and rear stabilizers are fully retracted and secured to the transport position.

⚠WARNING

CLEAN MACHINE OF ALL DEBRIS! DO NOT leave this machine unattended until all potential fire debris is removed, no fire or smoldering exists, and hot spots are cold. The engine creates many hot spots including: exhaust manifold, exhaust, turbo (if equipped), etc. Remove all flammable debris such as wood, chips, leaves, oils, fuels, etc. from engine exhaust, engine turbo (if equipped), beside, around, and under engine, around and under tanks, inside belt shields and guards, inside battery and tool boxes, inside cabinets (if equipped), and anywhere materials collect. ALWAYS keep several type A:B:C fire extinguishers operational and on the job at all times.

⚠WARNING

Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrester may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

NOTICE

Expensive damage to the Bandit will occur if proper preparation is not taken before welding on the machine. Be sure to disconnect both battery cables and the engine ECM (engine control module) before welding. Follow the specific Engine MFG. instructions for proper welding and grounding procedures, before attempting to weld on the machine. If welding on the machine, do not ground the welder through the machine bearings, ground near work to be performed.

⚠WARNING

Check laws and regulations. Know and obey all federal, state, and local laws and regulations that apply to your work situation and the transportation of a machine this size.

⚠WARNING

Refer to the Material Safety Data Sheet (MSDS) for information pertaining to the knife babbitt material including the health hazard information, first aid procedures, special handling procedures, disposal procedures, etc. If needed, contact your nearest dealer or Bandit Industries for the knife babbitt MSDS.

⚠DANGER

DO NOT operate this chipper or loader arm when anyone is performing any type of maintenance to the machine. Before attempting any type of maintenance disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, disconnect the battery, and the loader, if equipped, is positioned on the ground. Failure to do this could result in serious injury or death.

⚠WARNING

Before you begin to transport your trailerized machine follow all of the transportation procedures on pages 31 - 33. Make sure that the tongue has been raised to the proper height and attach the machine securely to the towing vehicle. Once secured to vehicle, locate tongue jack and secure it in the transport position. Always hook safety chains to vehicle by crossing them under the tongue allowing enough slack to avoid binding or dragging the ground when making turns. Check brakes and highway lights make sure that they are all operating properly. Check that the plug terminal functions match the towing vehicle for proper operation. Make sure that the discharge chute is in the transport position pointed over the tongue of machine and the transport bolt is securely in its place. Be sure to check tire pressure before you begin to transport the machine. Close the folding pan, if equipped for the infeed hopper and make sure spring latches are locked into place. If machine is equipped with a vise, make sure to secure in place and clamp jaws closed. Close and secure any of the following, if equipped: tool box, battery box, engine cowl doors and side panels, radiator debris screens, inspection doors, cabinet doors, housing covers, tank caps and covers, etc.

SAFETY PROCEDURES

IF MACHINE IS EQUIPPED WITH A SELF PROPELLED UNDERCARRIAGE

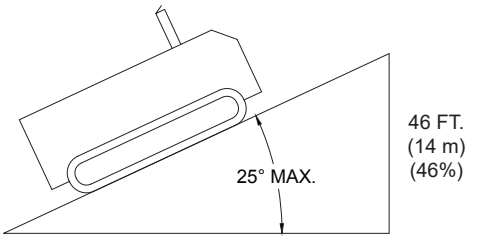
Machines equipped with undercarriage tracks are shipped with a manual from the track manufacturer. Refer to it for service, operation, and safety information.

⚠WARNING

Do not attempt to operate the machine on an ascending or descending slope of more than 25° or 46% or a side slope of more than 17° or 30%, it is Dangerous and could be Fatal. This is the maximum slope grade the machine can be operated on if the hydraulic system, self propelled undercarriage, and engine are running at maximum performance and good traction is sustained.

Maximum Slope Grade

Ascending or Descending Slope



Side Slope

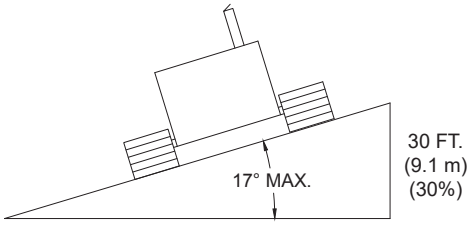


Diagram shows percentage to degree of slope.
Percentage is in vertical feet for every 100 horizontal feet.

⚠WARNING

Any increase from the specified maximum operating angles may cause loss of lubrication function and damage the engine.

⚠DANGER

The machine should never be parked on a slope at any time. The machine can coast or creep causing equipment and/or personal injury.

⚠DANGER

Make sure everyone is clear of machine before moving the machine. Stay clear of undercarriage travel system when the machine is moving.

⚠DANGER

DO NOT entangle feet or hands in undercarriage travel system.

⚠DANGER

Use **EXTREME CAUTION** when traveling over non-level surface! This machine can tip over or tip backwards on non-level surface. You will cause engine damage, machine damage and possible personal injury!

⚠DANGER

NEVER sit, stand, lay, climb or ride anywhere on this machine while it is running, operating, or in transit. You will be injured.

EQUIPMENT SPECIFICATIONS

Approximate Dimensions & Weights

(Dimensions & weights will vary depending on optional equipment)

Model 20XP

Height:	120” (3.0 m)
Length:	247” (6.3 m)
Width:	96” (2.4 m)
Weight:	16,000 lbs. (7260kg)
Fuel Tank Capacity:	60 gal. (227L)
Hydraulic Tank Capacity:	30 gal. (113L)

Model 20XPTRACK

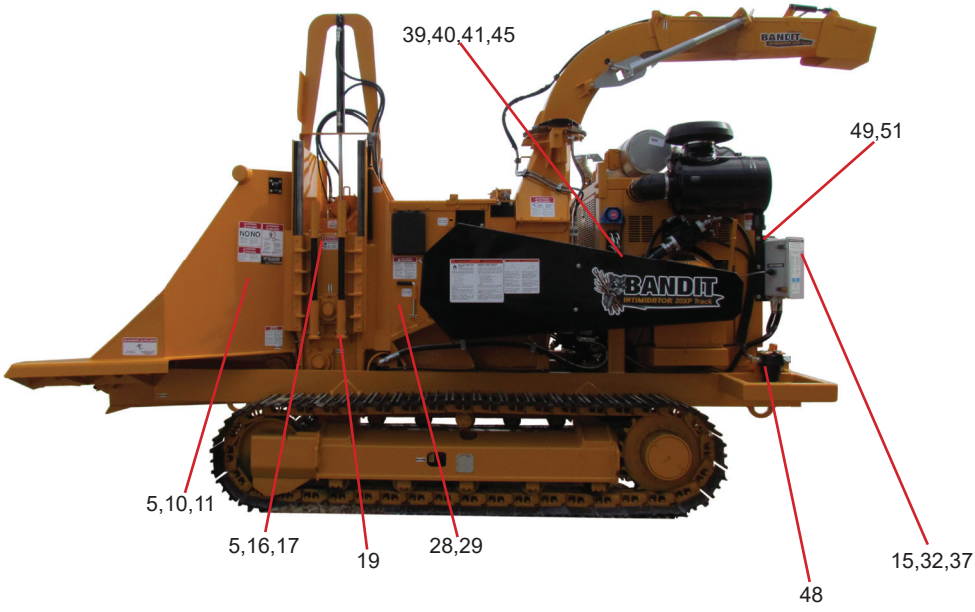
Height:	122” (3.3 m)
Length:	220” (4.9 m)
Width:	102” (2.6 m)
Weight:	21,700 lbs. (9840kg)
Fuel Tank Capacity:	50 gal. (189L)
Hydraulic Tank Capacity:	50 gal. (189L)

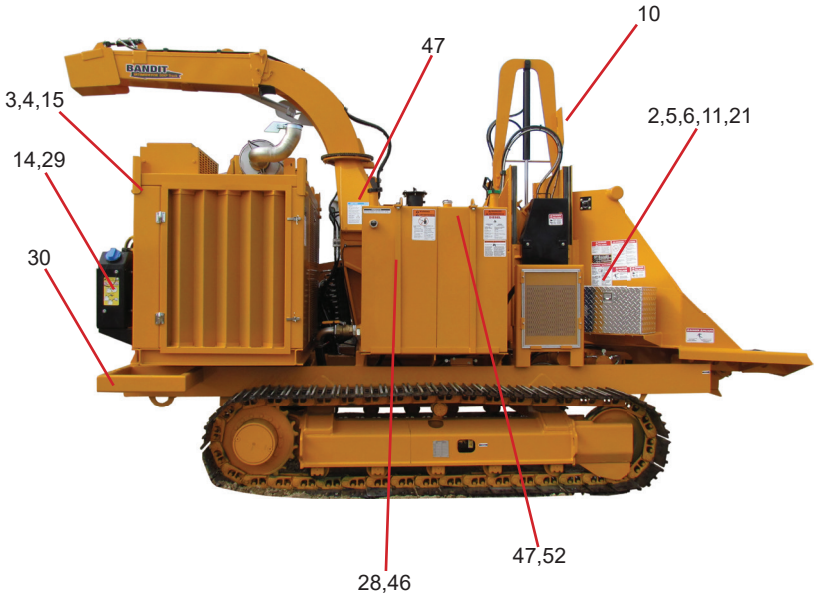
Model 20XP TRACK & LOADER

Height:	132” (3.4 m)
Length:	242” (6.1 m)
Width:	107” (2.7 m)
Weight:	24,000 lbs. (1080kg)
Fuel Tank Capacity:	50 gal. (189L)
Hydraulic Tank Capacity:	50 gal. (189L)

DECAL LOCATIONS

Decal locations may vary, these are general locations.





DECAL LOCATIONS

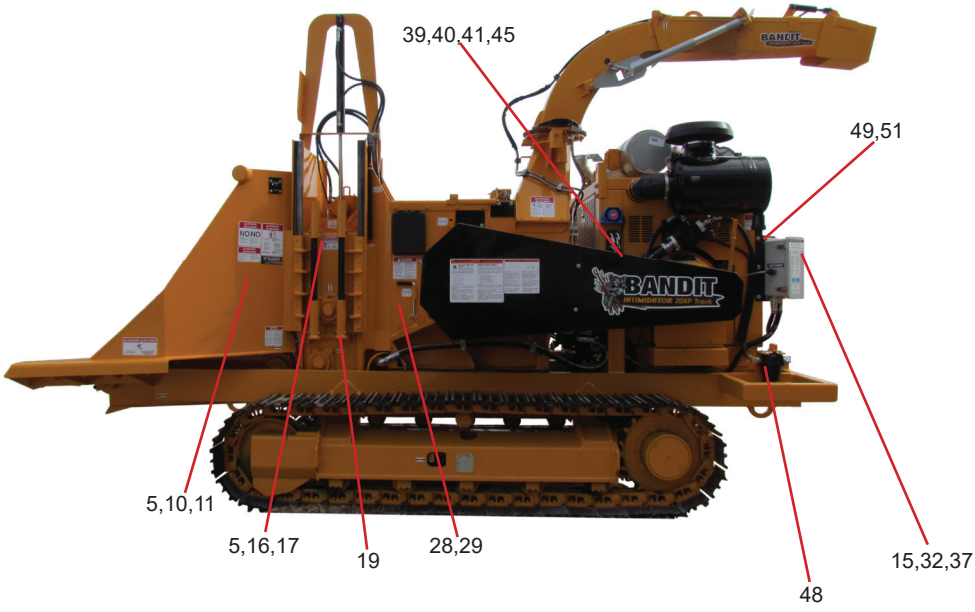
Modifications and/or additions of decals to this list will happen.
Consult chipper dealer or manufacturer for most current decal package.

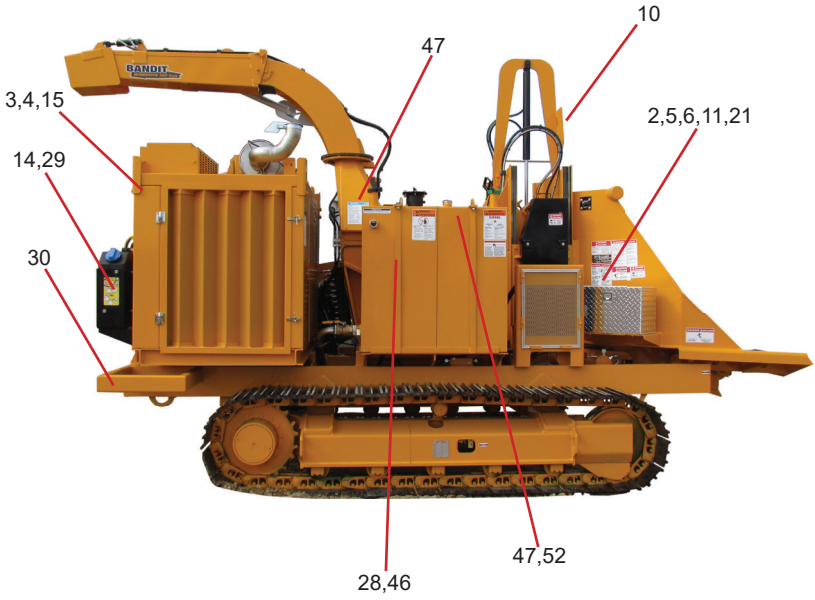
LOCATION	NUMBER	DESCRIPTION
1.	SPD-01	Avoid Injury Or Death...
2.	SPD-02	Moving Parts...
3.	SPD-03	Lockout All Energy Sources...
4.	SPD-04	Flying Discharge Material...
5.	SPD-16	Do Not Hand Feed...
6.	SPD-18	Never Perform Maintenance
7.	SPD-20	Flying Objects Stand Clear...
8.	SPD-28	Do Not Insert Fingers
9.	SPD-30	Do Not Sit, Stand, Lay, Climb...
10.	SPD-32	Do Not Operate This Machine...
11.	SPD-33	Do Not Work Under...
12.	SPD-52	Never Open Bottom Clean-Out Door...
13.	SPD-53	...Always Use Some Sort Of Mechanical Device...
14.	SPD-62	Stay Clear...Tongue Jack
15.	ID-67	Bandit Industries Inc...USA
16.	INST-02	Yoke Lock Hole
17.	INST-03	Yoke Lock Bar
18.	INST-04	Arrow
19.	INST-10	Stabilizer Up / Down
20.	INST-11	Motor Coupler Guard...
21.	INST-12	Grease Daily (Arrow)
22.	INST-16	Grease Weekly Arrow
23.	INST-39	Oil Daily Arrow
24.	INST-44	California Proposition 65
25.	INST-46	Autofeed Basic Info...
26.	INST-48	Disc/Drum Lock Tube
27.	INST-49	Disc/Drum Lock Pin
28.	INST-53	Hydraulic Oil...Hydrex XV...
29.	INST-90	Tongue Up / Tongue Down
30.	INST-95	Electric Plug-In Schematic
31.	INST-101	Canada Engine Decal
32.	INST-109	Basic Maintenance Check List
33.	INST-137	Remote / Tether
34.	INST-199	Grease Axle Torsion Arm Bushing...
35.	INST-276	Test Trailer Brake System
36.	INST-294	Bandit Control System
37.	INST-346	Purge Cutter Head Bearings
38.	N-02	Maintain Lubrication...
39.	N-03	Service Required Under Beltshield...
40.	N-05	Frequently Adjust...PTO...
41.	SPN-06	Decal Maintenance...
42.	N-07	Clutch Operation...
43.	N-09	Adjustable Feed Speed...
44.	SPN-11	Correct Knife And Hardware...
45.	N-69	Patents...

NOTICE Some decals are for optional equipment. Decal locations may vary, these are general locations. If any decals become damaged, replace immediately.

DECAL LOCATIONS

Decal locations may vary, these are general locations.





DECAL LOCATIONS

Modifications and/or additions of decals to this list will happen.
Consult chipper dealer or manufacturer for most current decal package.

LOCATION	NUMBER	DESCRIPTION
46.	SPW-01	Do Not Go Near Oil Leaks...
47.	SPW-02	Diesel Fuel Only...
48.	SPW-04	Frozen Battery Can Explode...
49.	SPW-08	Wear Personal Protection...
50.	SPW-13	Clean Debris...
51.	SPW-27	Creating Sparks
52.	SPW-31	Explosion Hazard
53.	900-8903-12	Basic Safety Decal Kit (Options may require additional decals)
54.	900-8910-79	Bandit Model 20XP Logo Decal Kit
55.	900-8912-62	Bandit Model 20XP Track Logo Decal Kit
56.	900-2909-94	Red Reflective Decal
57.	900-2909-95	Amber Reflective Decal
58.	900-9901-69	Reflective Conspicuity Tape (Red/White)

Additional Decals for Machine Equipped With A Track Undercarriage - Consult dealer or manufacturer for general locations.

59.	SPD-19	...Minimum 10 Feet Away From Tracks...
60.	SPD-38	Do Not Entangle Feet...
61.	INST-137	Remote / Tether
62.	INST-261	Remote Starting Procedure - Kar-Tech
63.	SPW-06	Do Not Attempt...Slope Of More Than...
64.	SPW-07	Do Not Move Machine...Horn Is Blown...
65.	SPW-11	Do Not Leave Unit Parked On A Slope...

Additional Decals for Machine Equipped With A Conveyor - Consult dealer or manufacturer for general locations.

66.	SPD-25	Stand Clear - Moving Conveyor
67.	SPD-29	Do Not Climb

Additional Decals for Machine Equipped With A Loader - Consult dealer or manufacturer for general locations.

68.	SPD-15	Do Not Operate Loader Arm...
69.	INST-58	Wood Assist Loader...
70.	N-10	Always Fold Loader

NOTICE Some decals are for optional equipment. Decal locations may vary, these are general locations. If any decals become damaged, replace immediately.

DECALS

Decals located on your Bandit equipment contain useful information to assist you in operating your equipment safely. Some of the decals on your machine and their location are shown in this section.

It is very important that all decals remain in place and in good condition on your machine. Please follow the care and instructions given below.

1. You should use soap and water to keep your decals clean. Never use mineral spirits or any other abrasive cleaners.
2. Immediately replace any missing or damaged decals. The location the decal is going to be applied to must be clean and dry, and at least 40°F (5°C) before applying decal.
3. When the need arises to replace a machine component with a decal attached, be sure and replace the decal.
4. Replacement decals are available, and can be purchased from the manufacturer or your Bandit Dealer.
5. Peel back about half of the backer paper on the decal. Position it on the flat, dry, clean surface so it is smooth and secure. Peel off the remainder of the backer paper as you continue to stick the decal on the surface.
6. Rub decal from the center outward to remove air bubbles and to secure contact.
7. Combination English / Spanish decals are typically standard. Other foreign language decals are available and may be purchased. Mail translated decals required to Bandit Industries, Inc.

EXAMPLES:

NOTICE

DECAL MAINTENANCE IS THE RESPONSIBILITY OF THE OWNER OF THIS MACHINE. KEEP DECALS LEGIBLE. DECALS (ETC.) ARE AVAILABLE IN OTHER LANGUAGES.

CONTACT: PARTS DEPARTMENT
6750 MILLBROOK RD.
REMUS, MI USA 49340
PHONE (888) 748-6348

⚠ DANGER

DO NOT insert fingers or amputation could occur.

DO NOT perform any maintenance until belts inside this hole have completely stopped moving.

NOTICE

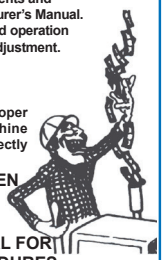
THE CLUTCH SHOULD NOT BE ENGAGED OR DISENGAGED AT ENGINE SPEEDS ABOVE LOW IDLE (ABOUT 1000 RPM'S).

DO NOT operate this Clutch/PTO unless proper adjustments and lubrication are maintained per the Clutch/PTO Manufacturer's Manual. Different brands and models require different service and operation procedures. New Clutch/PTO's require more frequent adjustment.

GOOD OPERATORS DON'T WASTE MONEY!

Clutches will fail, glaze over, and burn up from improper adjustment. This will cost the owner of this machine thousands of dollars to repair. A well maintained, correctly adjusted clutch should function properly for years.

LEAVING THE CLUTCH DISENGAGED EVEN FOR SHORT PERIODS OF TIME WILL REDUCE PILOT BEARING AND CLUTCH PLATE LIFE! REFER TO CLUTCH MANUAL FOR OPERATING AND MAINTENANCE PROCEDURES.



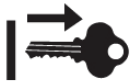
⚠ DANGER

DO NOT sit, stand, lay, climb or ride anywhere on this machine while it is running, operating or in transit.

YOU WILL BE INJURED!

⚠ DANGER

AVOID INJURY OR DEATH!
DO NOT OPERATE THIS MACHINE UNLESS:



- Only properly and fully trained people are used.
- Wearing clothing and personal protective equipment per ANSI Z133 and OSHA 29-1910 standards.
- Constantly prepared and positioned to activate the control and shut down devices.
- All guards and covers are secure and in place.
- Only factory approved pins, guards and replacement parts are used.

- All safety devices and controls are operational.
- Never allow hand, foot or body part to enter infeed area, conveyors or guards during operation or while running.
- All decals are legible, in place and operator thoroughly understands them.

- Never open guards, covers or inspection doors while disc/drum is turning or engine is running.

Follow all safety and operational instructions per manuals decals, video, ANSI Z133 and OSHA 29-1910 standards.

⚠ WARNING

DO NOT GO NEAR LEAKS!

- Pressured oil easily punctures skin causing injury, gangrene or death.
- Seek immediate medical care.
- Do not use finger or skin to check for leaks.
- Remove hydraulic pressure or load before loosening fittings.
- Hydraulic components and oil may be hot. Allow sufficient time to cool.
- Avoid burns from fluid. Hot fluid under pressure can cause severe burns.

⚠ DANGER

DO NOT HAND FEED THIS MACHINE!

- **This machine is designed to ONLY be fed by a mechanical log loader.**
- **Feeding material into this machine by hand is not permitted or authorized.**

SEVERE INJURY OR DEATH CAN RESULT!

AUTOFEED OPTIONS

AUTOFEED SYSTEM

Consult the original manufacturer's manual for your chippers
Autofeed operating and maintenance procedures

When processing material through the chipper, the feed system will automatically stop when the engine drops below a preset RPM point. The engine is constantly being monitored by an adjustable electronic speed switch. The switch can be adjusted so that at a given RPM, an electronic relay system will operate the hydraulic solenoid valves to stop the feedwheels until the engine has recovered speed. The patented "Autofeed Plus" system will reverse the feedwheels for a set period of time and then stop until the engine has recovered speed. Both autofeed systems will then automatically turn the feed on to resume forward travel.

Due to required components and equipment options a machine may have various types or brands of autofeed systems. Each chipper is shipped with the original manufacturer's manual for the autofeed system it is equipped with.

For the approximate autofeed settings on all optional autofeed systems refer to page 23 of the chipper manual. For part numbers on the hydraulic portion of the autofeed systems refer to pages 104 - 105 of the chipper manual. Refer to the Bandit Controls manual for more information.

Do not power wash the digital tach hour meters. Pressure causes unwarranted damage. **Do not spray tach, this will void warranty.**

PART NUMBERS FOR AUTOFEED DIGITAL TACH HOUR METERS

IEC (formerly ESI Intelli-Feed)

Part Number: 900-2908-11

For Service Call: 1-815-985-0383

L.O.R. MFG.

Part Number: 900-2906-82L

For Service Call: 1-866-644-8622

BANDIT CONTROLS

AUTOFEED TERMINOLOGY

PPR Pulses per revolution. On magnetic pick-up machines, this setting will be the number of teeth on the gear or sprocket it is reading. On alternator pick-up machines, the setting will need to be obtained from your local dealer or Bandit Industries.

Mag Pick-up Magnetic pick-up, also called pick-up probe. This is normally located screwed into the flywheel housing on the engine block. It can also be found on the clutch housing or chipper shaft. See Figure 1.

Dual Coil Reverse Valve This will normally be located on the infeed hopper of the machine. It can recognized by a valve with two solenoids bolted on a square block. The solenoid is approximately 2-1/2" (63.5mm) diameter x 2-3/4" (69.9mm) long. It will have two wires coming from it or on the newer machines it will have a connector with a light screwed to it. The feed coil must have power (indicated by the light in the connector) for the feedwheels to feed and pull material in. See Figure 4.

Solenoid Electronically activated to produce a magnetic pull which shifts the spool inside the hydraulic valve. Shifting of the spool changes oil flow direction from operating forward or dumping oil to tank.

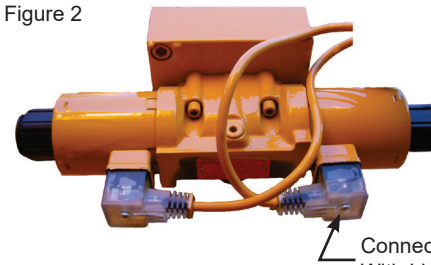
High High or HI is the setting when the feedwheels will turn back on (feeding operation).

Low Low or LO is the setting when the autofeed will reverse (if equipped) the feedwheels and then turn the feedwheels off.

Back Amount of time in seconds the feedwheels will back the wood away from the cutter disc/drum. Normally this will be set at 180 milliseconds (IEC) or .3 seconds (LOR).

Figure 1

Figure 2



APPROXIMATE DIGITAL AUTOFEED SETTINGS
(FOR ALL AUTOFEED SYSTEMS - REFERENCE ONLY)

NOTICE Refer to the Completion/Check Sheet, that is shipped with the machine for the correct engine rpm. If needed, contact your local dealer or Bandit Industries.

Some Current Engine Types	Maximum RPM	PPR	Off RPM	On RPM	Feed Reverse Time
CAT C7.1 / Perkins 1206F - 275 Hp	2200	2	2400	2150	180 / .3
CAT C6.6 - 250 Hp	2380	N/A	2400	2150	180 / .3
CAT C9 - 350 Hp	2200	N/A	2400	2150	180 / .3
John Deere 6068 - 300 Hp	2500	N/A	2350	2150	180 / .3
John Deere 6090 - 300, 325, 350 Hp	2500	N/A	2350	2150	180 / .3
Cummins QSL9 - 350 Hp	2100	N/A	2350	2150	180 / .3
Volvo 873 8L - 315 Hp	2200	N/A	2200	1850	180 / .3

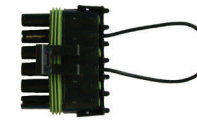
TROUBLE SHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	SOLUTION
No Display	- Gauge not getting power.	- Check continuity of Red wire to a clean power source. - Check fuse (LOR - 7.5 amp; ESI - 10 amp). - Check connection at engine disable plug at hood pin. - Check key switch for switched power in and out.
	- Gauge not properly grounded.	- Check continuity of Black wire to ground connection.
	- Dead battery.	- Charge or replace.
Feedwheels Do Not Stop (Autofeed Doesn't Activate)	- Loose chipper belts.	- Tighten or replace per manual specifications.
	- Clutch slipping.	- Adjust per clutch manufacturer's recommendations.
	- Sticky dump cartridge.	- Lightly tap on dump block to free up. - Take cartridge out and clean free of debris. - Replace solenoid and/or cartridge.
	- No power to dump valve solenoid.	- Check fuse on dump valve signal wire (if equipped). - Check continuity on the dump valve wire (normally green wire).
	- Faulty tach.	- Check autofeed tachometer settings.
	- Low or "LO" setting wrong.	- Check autofeed tachometer settings.
Feedwheels Do Not Re-engage	- Engine RPM not reaching HI set point on tach	- Check for stretched or out of adjustment throttle cable. This would not let engine reach full RPM. - Check HI RPM setting on gauge to make sure it is not set too close to full RPM of engine. HI setting should be 150 to 200 RPM below full engine RPM.
	- Sticky dump cartridge.	- Lightly tap on dump block to free up. - Take cartridge out and clean free of debris. - Replace solenoid and/or cartridge.
	- System pressure.	- Check and readjust per manual specifications.
	- Faulty tach.	- Consult local dealer or Bandit Industries.
No Signal	- Engine not running.	- Normal operating condition.
	- Bad signal wire.	- Check continuity of the signal wire (white wire in autofeed harness).
	- No signal from alternator.	- Check for at least 3.5 VAC output at idle and 10-20 VAC at HI RPM
	- No signal from mag pick-up.	- Check for approx. 2-7 VAC at idle and approx. 14-20 VAC at HI RPM. Testing must be done at the two wires coming out of mag pick-up after disconnecting. Remove and clean off magnet at end. Reinstall by turning it in until it bottoms out. Then back off approx. 1/2 a turn. Lock with jam nut.
	- Bad mag pick-up.	- Replace mag pick-up.
Gauge Jumped Program	- Low voltage to tach.	- Check engine disable plug at hood. Clean and check for tight connection. Re-install using dielectric grease.
	- Shorts in wire harness.	- Check for possible worn wires or loose connections.
	- Faulty ground.	- Check black wire for a good ground.
	- Faulty tach.	- Consult local dealer or Bandit Industries.

TROUBLE SHOOTING GUIDE cont.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Feedwheels Run In Reverse From Normal	- Backup time set wrong.	- Reset backup time. Normal setting is 180 milliseconds (IEC) or .3 seconds (LOR)
	- Sticking reverse valve.	- Check solenoid operation. - Override cartridge manually by sticking a small allen wrench in the end of the solenoid. - Replace solenoid and/or cartridge.
	Type settings programmed wrong.	- Reprogram or consult local dealer or Bandit Ind

NOTICE Autofeeds with dump blocks can be unplugged and run manually. Autofeeds with dual output block will need a jumper plug. This can be a good test to determine if you problem is hydraulic or electronic.

LOR Jumper Plug Part No.: 900-2913-51 	IEC Jumper Plug Part No.: 900-2914-09 

OPERATION

⚠ DANGER

Avoid moving parts. Keep hands, feet, and clothing away from power driven parts. Keep all guards and shields in place and properly secured. Contact with moving parts will result in serious injury or death.

Never feed any materials that might contain wires, stones, nails, metal objects, or any foreign object which may damage the knives and become dangerous projectiles.

Do not operate this machine without the hood pin in place. Do not operate the machine with any type of makeshift hood pin or an improperly installed hood pin. The hood pin must be padlocked.

Do not attempt to hand fed this machine. This machine is designed to be fed by a mechanical log loader. Feeding material into this machine by hand is not permitted or authorized. Severe injury or death can result!

⚠ WARNING

There must be at least two qualified and trained operators at the work site. They must be positioned in safe working locations, following safety procedures and instructions, and aware of each others' whereabouts.

NOTICE

Do not operate this machine unless all machine controls operate properly. They must function, shift smoothly and accurately at all times.

Make sure machine safety guards are properly installed and safety devices are functioning properly.

Check laws and regulations. Know and obey all laws and regulations that apply to your work situation.

Make sure that all required maintenance has been completed before following the set-up procedures.

SET-UP

Before starting the machine, read all safety procedures and watch the start-up and safety videos.

- Prepare and set up the work site. Make sure there are no loose tools, cans, lines or any other foreign objects in the area. Anything not in use must be stored in a tool box or stowed away.
- Stabilize the infeed hopper and tongue if unhooked from a tow vehicle.
- Do not rely on a tongue jack to keep the machine stable if unhooked from a tow vehicle.
- Make sure to chock the tires.
- Check for and remove any foreign objects in the infeed hopper.
- Make sure the discharge is pointed in a safe direction.
- Adjust the flipper as needed.
- Make sure all personal protective equipment (PPE) is worn. Examples of PPE: hard hat, face shield, gloves (no gauntlet style gloves or secured fit), ear protection, high visibility vest, and steel toe boots.
- Follow all start-up procedures.

START-UP

1. Follow all engine manufacturer's recommendations for starting the engine.
2. If equipped with a hydraulic clutch, engage the clutch from the control panel. If equipped with a manual clutch, bump the clutch handle until the drum or disc is moving, then fully engage the clutch handle.
3. Throttle the machine up.

MACHINE OPERATION

1. Once the machine is at full RPM, engage the feedwheels in the forward direction.
2. Fee the machine with a mechanical log loader.
3. Feed large, or butt end, of the branch or log into the infeed hopper first. Never feed this machine by hand.
4. If the limb or log does not feed, it may need repositioned. To reposition, read the following steps:
   A. Reverse the feedwheels, reposition the limb or log, and feed again.
   B. The log may need to be removed from the machine to a safe work area and trimmed before attempting to feed again if it still will not feed.

MACHINE OPERATION

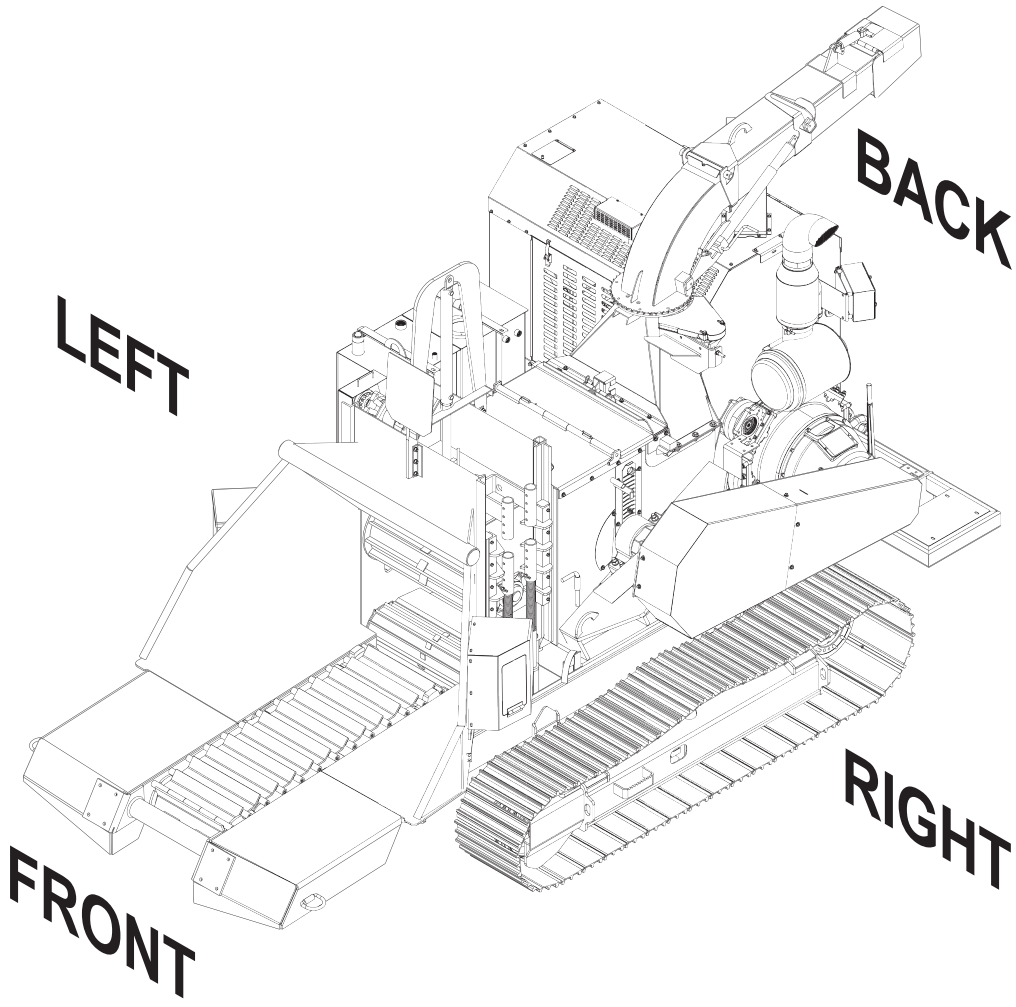
NOTICE

Chippers are not designed to cut chunk wood, dimensional lumber including rail road ties, or end cut logs standing on end. Chipper knives coming in contact with a flat surface puts an extreme shock load on the chipper drum or disc components and bearings. This can cause damage to the machine that will not be covered under warranty.

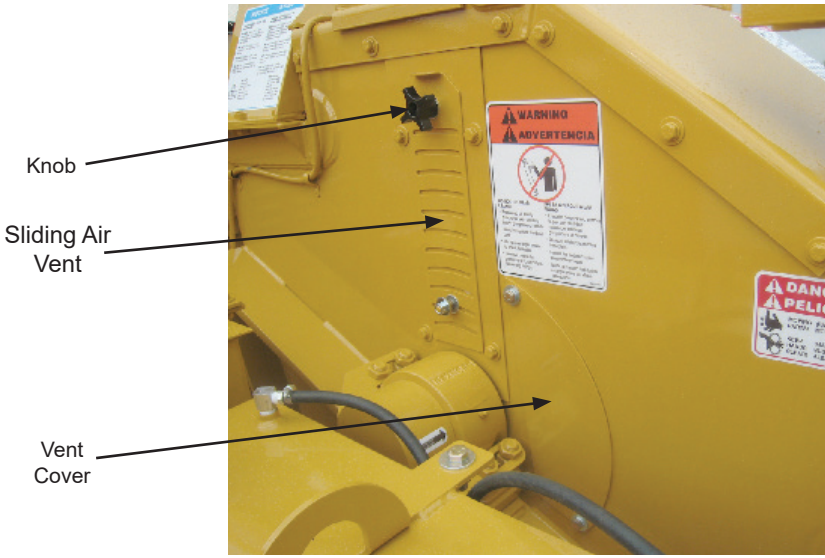
SHUT DOWN

1. Stop feeding material.
2. Allow the machine to clear out any remaining material.
3. Make sure the top feedwheel is in the lowered position.
4. Throttle the machine down.
5. Disengage the clutch.
6. Wait for the chipper drum or disc to come to a complete stop.
7. Shut the engine off.
8. Remove the key, and make sure it stays in your possession.
9. Allow the machine to cool down
10. Remove all debris, wood chips, sawdust, leaves, etc. from the machine.
11. If transporting the machine, follow the transport procedures.

MACHINE ORIENTATION REFERENCE



DRUM HOUSING AIR VENTS



There are two air vents on each side of the drum housing of your machine. The air vents can be opened or closed to adjust the chip throwing to your particular application. The chip throwing distance has many variables for example: type of material chipping, size of material chipping, the machine engine size, if machine is equipped with autofeed or not, etc.

⚠DANGER

Before adjusting the air vents; disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

The vent cover can be bolted on or removed from the drum housing, depending on your needs. There is one vent cover on each side of the drum housing. The beltshield may have to be removed on some machines, depending on model and options, to access the vent cover on the right side.

The sliding air vent can be adjusted by loosening the knob and moving the vent to the open or closed position. There is one on each side of the drum housing.

CHIPPER HOOD ENGINE DISABLE PLUG OPERATION

This chipper hood engine disable plug is installed for safety purposes. It is designed to shut down the engine if the hood pin is not properly in place holding the chipper hood in the closed position. The system must be correctly maintained and operative at all times. If the disable plug is not correctly installed the engine will not start or run.

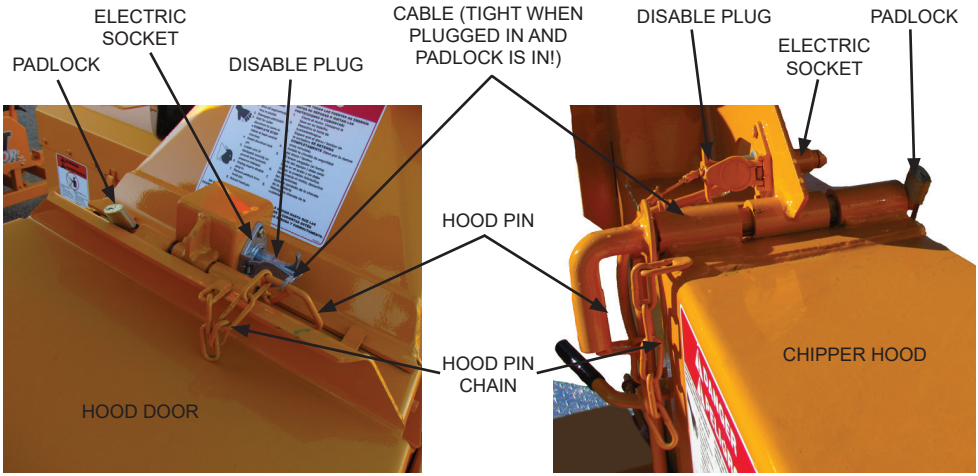
The chipper hood engine disable plug is located on top of the chipper hood. The chipper hood engine disable plug is made up of two parts: an electric socket and a disable plug. The electric socket is bolted to the chipper hood engine disable plug mount bracket and the disable plug is attached by a cable to the hood pin.

If the disable plug is not properly installed then the engine will not start or run. If the disable plug becomes disconnected while the chipper engine is running the engine will be shut down or be disabled from running. This is for safety purposes, to ensure that the hood pin is not removed and the chipper hood is not opened while the engine is running.

The chipper hood engine disable plug is wired to shut down the chipper engine. When the disable plug is pulled out of the electric socket the electric circuit is broken, disabling the engine.

NOTICE

The engine disable plug has a circuit fuse. If the engine will not start or run, check the fuse first before consulting the engine manufacturer's manual. Circuit fuse locations: Caterpillar / Perkins - located at the "BATT" wire near the ignition switch, Cummins - located by engine manufacturer near the starter (wires labeled "POW"), John Deere - located by engine manufacturer "Short Stop" circuit breaker by the ignition switch on the instrument panel or fuse by the ECM, and Deutz, Hatz, Honda, Kohler, and Robin - located at the battery post on the starter.



DRUM CHIPPER DISC CHIPPER

CONSULT THE ENGINE MANUFACTURER'S MANUAL FOR SPECIFIC CONTROLS, OPERATION, & MAINTENANCE FOR TYPICAL ENGINES

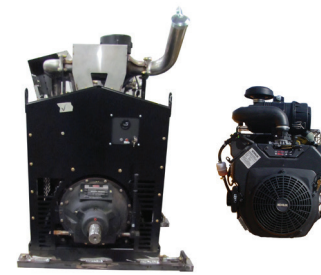
1. **Ignition Switch:** Turn the ignition switch key clockwise one stop (on position) to turn the electrical system on. The key should remain in the on position while the engine is running. Turn the key fully clockwise (start position) this will start the engine. To shut off the engine, return the key to the off position.
2. **Ignition Switch With Preheat:** The typical diesel engine may have a preheat system to assist in starting the engine during cold weather. To activate the preheat system, continue to hold the ignition key in the preheat position for 15 to 20 seconds, then attempt to start the engine. If the engine fails to start within 15 seconds, return the key to the preheat position, hold 10 seconds, and try starting again.
3. **Choke (if equipped):** Some gasoline engines may have a choke, pull the choke lever out to choke the engine. Push the choke lever in for normal engine operations.
4. **Throttle Adjustment (if equipped):** Some engines may have a knob or a handle for the throttle adjustment. Typically you would pull the knob out, or turn the handle to increase the engine R.P.M.'s. To decrease you would push in the knob or turn the handle the opposite way.
5. **"Bandit" Lever Lock Cable Throttle System (if equipped):** The Bandit throttle system has (2) positions, HIGH and LOW. Engine R.P.M. is controlled by moving the lever from one position to the other.
6. **Push Button Or Electric Throttle System (if equipped):** Some engines may have a push button or electric throttle adjustment. Engine R.P.M. is controlled by pushing a button or switch to raise or lower the R.P.M.
7. **Alternator Warning Light:** This light will glow when the alternator is not charging, or when the ignition switch is turned on and the engine is not running.
8. **Oil Pressure Warning Light:** This light will glow when the oil pressure is to low, or when the ignition switch is turned on and the engine is not running.
9. **Engine Temperature Warning Light:** This light will glow when the engine, or engine coolant, is above normal operating temperature. If this occurs allow the engine temperature to cool down. If the engine is overheating because of a loss of coolant, or a broken fan belt, shut the engine off immediately.

NOTICE

Most engines have an automatic low oil pressure shut down device, but some engines do not. Expensive damage may occur if the engine oil level and condition is not checked daily. Follow all maintenance procedures specified by the engine manufacturer's manual. Check the fuel level daily, running out and repriming is time consuming. Do not over fill the tank, there must be expansion space in the top of the tank. Inspect hoses, fittings, lines, tanks, etc. for any oil, fuel, engine coolant, etc. leaks daily. Repair or replace any damaged or leaking components.

TYPICAL DIESEL ENGINES

TYPICAL GASOLINE ENGINES



CONTROLS

STARTING THE MACHINE

Follow the daily start-up and maintenance check list before starting the machine. Before starting the engine make sure that the clutch is not engaged. Make sure the chipper hood engine disable plug is installed properly. Turn the ignition switch to the ON position. This will turn on the electric fuel pump and the rest of the electrical system. Then turn the ignition switch all the way to the right and hold until the engine starts.

Some engine have a pressure override switch wired into their system. In this case, depress the pressure override button and turn the ignition switch all the way to the right, now hold both until the engine starts. Once there is oil pressure the override button may be released.

REMOTE STARTING PROCEDURE

1. Follow the daily start-up and maintenance check list before starting the machine.
2. Put the mode switch on the start panel in the radio/tether position.
3. Turn the ignition key to the ON position.
4. If transmitter has toggle e-stop, switch to the RUN position; if the transmitter has twist e-stop, twist and release to the up position.
5. Turn the transmitter on. If the transmitter is a push button style power button, hold the button down until the green and red lights come on and then release. If the transmitter is a toggle switch style power button, move the toggle switch to the ON position.
6. The engine is ready to be started.

NOTE: To turn the transmitter off: If the transmitter is a push button style power button, hold the button down until the green and red lights alternate coming on and both go out or if the transmitter is a toggle switch style power button, move the toggle switch to the OFF position.

FEED FORWARD RELAY	VBB 1 15A	1
	VBB 2 15A	2
FEED REVERSE RELAY	VBB S 3A	3
	DISPLAY 3A	4
ENGINE START RELAY	FEED 10A	5
	UTILITY 3A	6
ENGINE RUN RELAY	310 15A	7
	311 15A	8
TOGGLE SWITCHES 3A	RADIO 3A	9
KEY 3A	SPARE 15A	10

CONTROL OPERATING PROCEDURES

RADIO REMOTE TRANSMITTER

TETHER CONTROL

Feed Switch:

The feed switch operates the feedwheels and conveyor rotation. To make the feedwheels and conveyor operate so they are pulling material into the machine, push the switch away from the operator. To make the feedwheels and conveyor operate so it is pushing material out of the machine, pull and hold the switch towards the operator. When the switch is let go from the reverse position, the feedwheels and conveyor will stop. To stop the feedwheels and conveyor, pull the switch towards the operator to the center position.

Engine Stop Switch:

The engine stop button cuts off the power. The engine will roll over, but will not start if the switch is in the engine stop position.

Throttle Switch:

To raise the engine rpm, push and hold the switch away from the operator until the desired rpm is reached. To lower the engine rpm, pull and hold the switch towards the operator until the desired rpm is reached.

Track Speed Switch:

To put the tracks in slow speed, push the switch away from the operator. To put the tracks in high speed, pull the switch towards the operator.

Left Track Forward / Reverse:

If the paddle is pushed and held away from the operator, the left track will move forward. If the paddle is pulled and held towards the operator, the left track will move in reverse.

Flipper Out / In:

If the paddle is pushed and held away from the operator, the flipper will move out. If the paddle is pulled and held towards the operator, the flipper will move in.

Yoke Up:

If the paddle is pushed and held away from the operator, the yoke will raise. When the paddle is let go, the yoke will fall down.

Discharge Clockwise / Counter-Clockwise:

If the paddle is pushed and held away from the operator, the discharge will swivel clockwise. If the paddle is pulled and held towards the operator, the discharge will swivel counter-clockwise.

Radio Remote Transmitter Batteries:

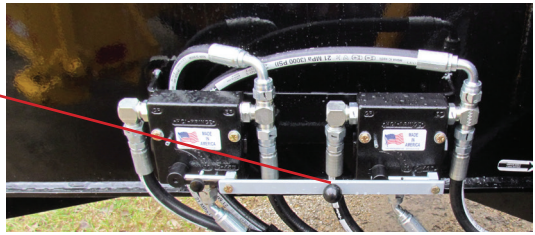
The radio remote transmitter requires a rechargeable battery pack. If the battery pack goes dead in the radio remote transmitter, the engine will shut down.

Right Track Forward / Reverse:

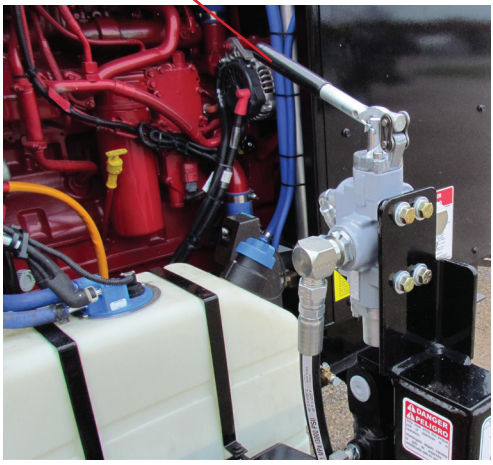
If the paddle is pushed and held away from the operator, the right track will move forward. If the paddle is pulled and held towards the operator, the right track will move in reverse.

CONTROL OPERATING PROCEDURES

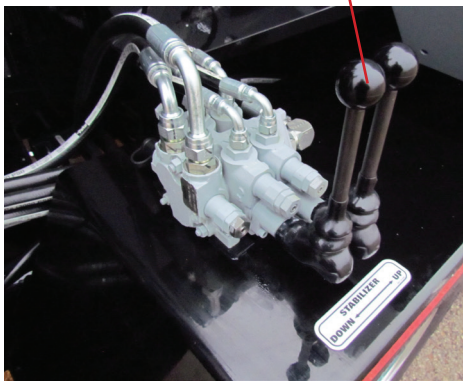
FLOW CONTROL VALVES



TONGUE JACK CONTROL VALVE



REAR STABILIZER CONTROL VALVE



Flow Control Valves (If Equipped):

Only use the adjustable flow control when chipping large diameter trees. Do not leave the flow control partially open for long periods of time. This will cause excessive heat to the hydraulic system! Excessive heat will cause low feedwheel power and premature failure of all hydraulic components. Always operate system at full oil flow unless chipping large diameter trees.

Tongue Jack Control Valve (If Equipped):

NOTE: Remove the lock pin BEFORE operating this function.

The tongue jack control valve operates the tongue jack cylinder. To raise the front of the machine, push the control handle down towards the machine. To lower the front of the machine, pull the control handle towards the operator, away from the machine. The tongue jack control valve is the off position in the center position.

Rear Stabilizer Control Valve (If Equipped):

NOTE: Remove the lock pin BEFORE operating this function.

The rear stabilizer control valve operates the rear stabilizer cylinders, there will be one valve on the curbside of the machine near the beltshield. To lower the rear stabilizer, pull the control handle toward the operator, away from the machine. To lift the rear stabilizer, push the control handle towards the machine, towards the machine. The rear stabilizer control valve is the off position in the center position.

Tether Jack:

If using the tether controls, the cord must be plugged in here located between the exhaust and the clutch of the machine.

TRANSPORTATION PROCEDURES

⚠WARNING

BEFORE TRANSPORTING THE MACHINE THE FOLLOWING MUST BE COMPLETED.

1. Idle engine, disengage clutch.
2. Make sure the top feedwheel is in the lowered position.
3. Raise the front of the machine or transport trailer with the tongue jack and remove the stabilization blocks used. If the machine is equipped with a hydraulic tongue jack, remove the lock pin before raising the front of the machine.
4. Couple machine or transport trailer to transport vehicle by lowering the machine onto the hitch. Make sure the hitch matches the coupling size. Then secure hitch and lock it.
5. Place the tongue jack in the transport position. If the machine is equipped with a hydraulic tongue jack, lift the foot pad to the transport position and install the lock pin.
6. If equipped, place the stabilizer legs in the transport position, fully retracted and install the lock pin.
7. Place all hydraulic controls in the “off” position.
8. Turn off engine, wait for the chipper disc/drum to come to a complete stop and you must have the ignition key in your possession.
9. Disconnect and store the tether remote control or the radio remote control in the cabinet, if equipped.
10. Attach the safety chains by crossing them under hitch, make sure to allow the proper amount of slack in chains to avoid binding or dragging the ground when making turns.
11. If trailerized machine is equipped with a conveyor, secure the tail light tether cords and hook up the plug-ins. The light assembly with the green pigtail is for the curb side and the light assembly with the yellow pigtail is for the road side.
12. Connect the brake breakaway cable (if equipped) and plug in the electrical connection for the lights on the machine or transport trailer.
13. Check running lights, turn signals, and brake lights. All must be operating properly before transporting the machine. If equipped with electric brakes, check brakes to make sure they are operating correctly.
14. If equipped with air brakes, connect the brake lines and make sure the air tank drain valve is closed. Check brakes to make sure they are operating correctly.
15. Remove all excess debris. Remove any wood or debris which may have collected.
16. Store all tools in the tool box and make sure all boxes and cabinets are closed and secured.
17. Check tires for correct pressure, cuts or damaged rims.
18. Check lug nuts and retorque if necessary. Check new units before operation, check again after 20-25 miles (32-40 km) and regularly check at least weekly.
19. Inspect and replace any axle dust caps that are damaged or leaking.
20. Check wheel bearings and grease or oil axles per axle manufacturer’s manual.
21. Walk around the machine to confirm that everything is secure and that there is not anything loose that could fall off during transport. Look under machine to ensure nothing is dragging. Look down both sides of the machine for anything sticking out that may become damaged during transport.
22. If machine is equipped with a vise, make sure to secure in place and clamp jaws closed.
23. Close and secure any of the following, if equipped: engine cowl doors and side panels, radiator debris screens, inspection doors, housing covers, tanks caps and covers, etc.
24. If the machine is self propelled and on a transport trailer, make sure the trailer has the correct load capacity, the machine is positioned on the trailer for correct weight distribution, and the machine is securely bound down to the trailer bed per your States binding requirements. Make sure the loading ramps are securely stored for transport. (See Loading & Unloading Self-Propelled Machines.)
25. The machine is now ready for transport. Make sure to obey all local regulations and laws regarding the transporting of this type of machine.
26. Do not drive too fast for road conditions or exceed speed regulations for equipment towing. Machine must be hauled level and the towing vehicle must be sized to handle hitch weight, towing weight, and braking requirements.

LOADING & UNLOADING SELF-PROPELLED MACHINES

⚠ WARNING

BEFORE ATTEMPTING TO USE A TRAILER FOR TRANSPORT, MAKE SURE THE TRAILER TOWING VEHICLE IS APPROPRIATE FOR THE TASK.

1. The trailer must have a cargo weight rating capacity for the weight of the machine. The combined weight of the trailer and the machine can not exceed the load capacity of the tires, axles, hitch coupler system or the GVWR (Gross Vehicle Weight Rating) of the trailer.
2. The trailer must have a lighting system and a braking system to match and perform correctly off the towing vehicle's system. You must meet the Federal and your States' Department of Transportation Code of Regulations concerning lights, brakes, and highway transit.
3. The towing vehicle must have the hauling and hitch capacity ratings for the trailer and machine combination. The towing vehicle must be mechanically sound and capable of handling the towing job.
4. The trailer must be constructed with appropriate chain down positions for the specific sized machine. You must have binders that will withstand the strain of the machine trying to move while it is being transported.
5. When the machine is positioned on the trailer bed, the trailer must have the right load capacity with the machine positioned on the trailer for the correct weight distribution (follow the manufacturer's recommendations for the amount of weight on the tongue or hitch according to the total machine and trailer weight)
6. The loading ramps or loading gate of the trailer must be constructed to withstand the weight and forces involved in loading and unloading the machine.

⚠ WARNING

BEFORE LOADING OR UNLOADING THE MACHINE, INSPECT AND CONFIRM THE FOLLOWING STEPS: When loading or unloading the self-propelled machine on the trailer, use care and caution. The maneuvering of the equipment must be slow, smooth, and intentional, not fast and jerky.

1. Make sure the trailer and towing vehicle are parked on a flat surface. They must be stable on the surface with the brakes locked and/or the wheels chocked to avoid unwanted movement.
2. Position the loading ramps or loading gate securely between the trailer and the ground level. Have them located so that they are in line with the tires or tracks of the machine when it moves.
3. Remove and store the chains and binders used for transporting.
4. Confirm that there are not any obstacles on the trailer bed, around the trailer that may cause restricted movement of the machine or the operator.
5. The only person in the area should be the one that is operating the machine controls, and he/she should be very experienced with the controls on this machine.
6. If you are on streets, roads or public areas, position the warning cones etc, per your company's safety policy.
7. Follow all pre-startup instructions for the machine.
8. Typically, the engine end of the machine should be positioned so that it is toward the tongue of the trailer, during transport.
9. Align the machine with the trailer bed, and the loading ramps. The only equipment movement should be slowly, straight on or straight off the trailer.
10. With the engine and the machine at as low a speed as possible, move the machine toward the ramp system. Make sure the alignment is correct throughout the travel.
11. Properly secure the equipment and the area to avoid any possible accidents or dangers.

LOADER TRANSPORTATION PROCEDURES

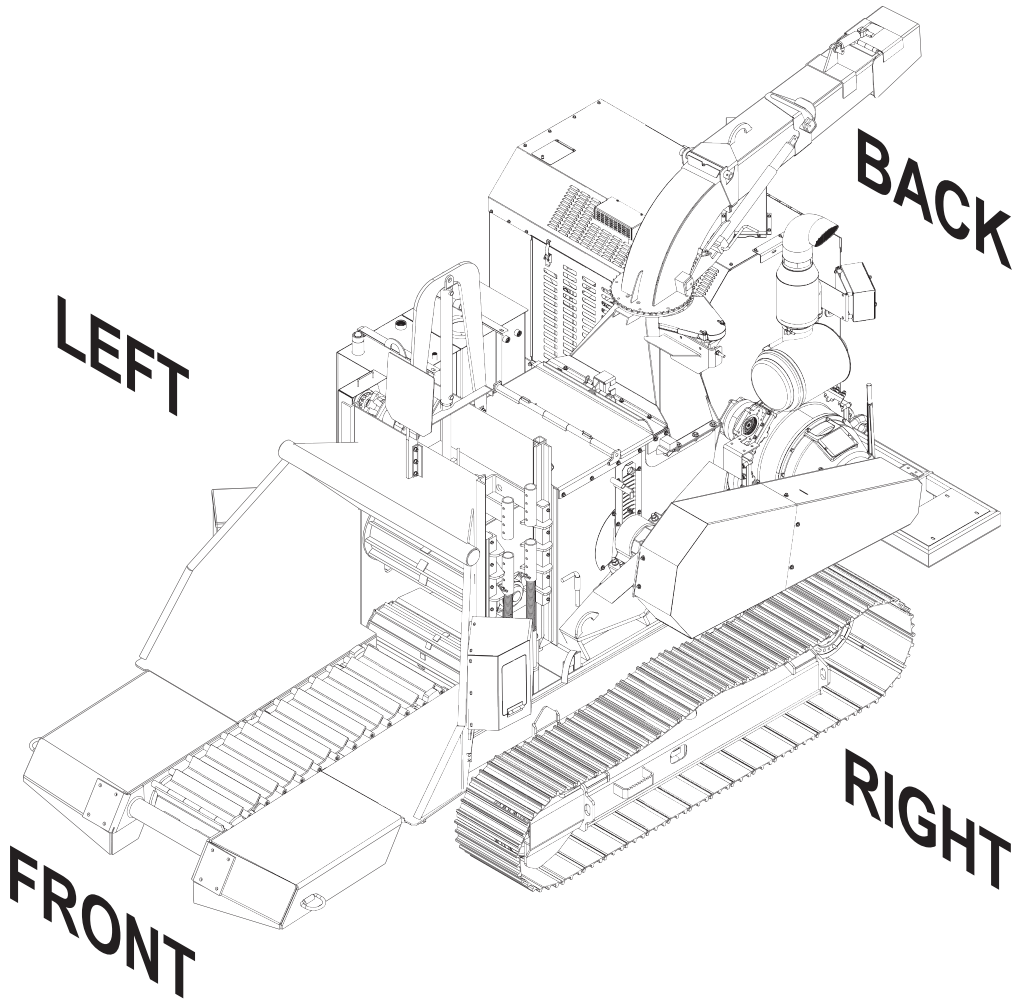
Figure 1

⚠WARNING

IF EQUIPPED WITH LOADER OPTION, BEFORE TRANSPORTING THE MACHINE THE FOLLOWING MUST BE COMPLETED ALONG WITH THE MACHINE TRANSPORTATION PROCEDURES.

1. Idle engine, disengage clutch, and install clutch lock if equipped.
2. Close the jaws on the grapple.
3. Swing the loader to the center from side to side and install the loader swing lock pin.
4. Tuck grapple onto infeed hopper as shown in Figure 1 to help prevent damage to the hydraulic hoses and fittings. Make sure the fittings and hoses are not in a pinched or wear position for transportation.
5. Securely attach transport chain to the jib boom as shown in Figure 1.
6. Lower the main boom and jib boom until the transport chain is tight.
7. Place all hydraulic controls in the “off” position.
8. Wait for the chipper drum to come to a complete stop, turn off engine, disconnect the battery and you must have the ignition key in your possession.
9. Place the joystick swing out in the transport position, if equipped.
10. Make sure running lights, turn signals, and brake lights are visible when loader is in the transport position.
11. Make sure all reflectors and/or lights are in proper place and in working order on the loader per Federal and your States’ Department of Transportation Code of Regulations.
12. With the machine in the transport position, measure the overall height and width to make sure the machine is within the highway clearance regulations of the Department of Transportation.

MACHINE ORIENTATION REFERENCE



MAINTENANCE

The Bandit is a very simple machine to maintain. If you will follow a regular scheduled preventative maintenance program, you should have years of trouble free operation.

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

⚠DANGER

Do not let anyone operate or maintain this machine until they have thoroughly read this manual, reviewed the equipment decals, watched the equipment video, and has been properly trained. You can purchase additional Bandit manuals, decals and videos for a nominal fee.

NOTICE

Consult your engine manual for proper break-in procedures. Various engines require somewhat different procedures, but basically the engines need to operate at lower R.P.M.'s and loads for a specific time.

NOTICE

Failure to properly break-in your engine may result in poor bearing and piston ring surfaces.

NOTICE

The Bandit has only been run for a short time to test proper hydraulic pressures, possible leaks, etc. The fuel tank will be empty. Fuel is provided through a small auxiliary tank for testing. This immensely helps maintain safety in our manufacturing facility and while shipping.

NOTICE

Expensive damage to the Bandit will occur if proper preparation is not taken before welding on the machine. Be sure to disconnect both battery cables and the engine ECM (engine control module) before welding. Follow the specific Engine MFG. instructions for proper welding and grounding procedures, before attempting to weld on the machine. If welding on the machine, do not ground the welder through the machine bearings, ground near work to be performed.

DAILY START UP & MAINTENANCE

1. Check the safety decals and engine gauges:
Replace any missing or damaged decals and/or engine gauges.

2. Check all safety equipment:
Check for proper operation. Repair or replace as needed.

3. Check entire machine for loose bolts, nuts, parts, or components:
Check entire machine for any loose parts or components. Check for loose nuts or bolts. Torque, tighten, or replace any of the loose components. See page 44 for specific bolt torques.

4. Check all guards:
Check to make sure all guards are in place and installed correctly. Make sure they are secure.

5. Check chipper hood hinge:
Make sure the hood hinge operates correctly, and is lubricated. Must replace hinge if damaged.

6. Checking for foreign objects:
Before opening the hood make sure the clutch is disengaged, the engine off, the disc/drum lock pin is installed, battery is disconnected, and also make sure the ignition key is in your possession. Remove the hood pin padlock, disconnect the chipper hood engine disable plug, suppress the spring lock for hood pin on disc chippers, and then remove the hood lock pin. Look for any foreign objects inside the chipper housing or in the knife pockets of the disc/drum. Remove any foreign objects found.

7. Check chipper drum assembly:
Check the condition of knife holder threads, secure welds, torqued bolts, excessive wear and impact cracks. If a problem is found contact the chipper manufacturer or an authorized Bandit dealer. Also check the chipper housing at this time. Check the chipper base, belly band, and hoods for wear or damage. Also inspect the chipper bearings.

DAILY START UP & MAINTENANCE (cont.)

8. Check chipper disc/drum to turn:
Very carefully, manually with a pry bar or wood bar, turn the chipper disc/drum a full revolution. This is to ensure the anvil and knives have proper clearance. If the chipper disc/drum is jammed with debris or frozen in place, DO NOT attempt to start the engine and engage clutch until the chipper disc/drum rotates freely.

9. Check the condition of the knives, anvil, and attaching hardware:
Grind, file, or replace the knives to keep them sharp. Check the anvil and attaching hardware for the knives and anvil. Replace if necessary.

10. Properly torque the knife mounting hardware:
All knife mounting hardware must be factory approved. Knife mounting hardware must be replaced after maximum of 4-5 knife rotations/changes to ensure safe clamping ability.

Torque set, AT ALL TIMES to: See TORQUE CHART on page 44.

11. Hood lock pin and padlock:
After closing chipper hood, reinsert the hood pin and padlock, make sure pin is tight and secure. If worn replace immediately. Don't use a worn or makeshift hood pin. Make sure the spring lock for the hood pin is in the correct position on disc chippers. Make sure the chipper hood engine disable plug is installed correctly and that it is also operating properly.

12. Grease chipper bearings daily:
Use an EP-2 Lithium type grease only for all bearings. Purge chipper bearings with grease. You can not over grease these bearings. This type of bearing is designed with a relief system that will not allow over greasing. In other words, you can not hurt the bearing seals by pumping in too much grease. Most of the failures related to bearings are diagnosed as "Contamination". Contamination is caused by improper lubrication. Wipe off excess grease. **Excessive grease will attract dirt.**

13. Grease all feedwheel and conveyor bearings daily:
Use an EP-2 Lithium type grease only for all bearings. Grease feedwheel and conveyor bearings with one shot of grease. This type of bearing is designed with a relief system that will not allow over greasing. In other words, you can not hurt the bearing seals by pumping in too much grease. Most of the failures related to bearings are diagnosed as "Contamination". Contamination is caused by improper lubrication. Wipe off excess grease. **Excessive grease will attract dirt.**

14. Grease loader and grapple (if equipped):
Grease all loader and grapple pins and bushings with 1 to 2 shots of an EP-2 Lithium type grease. Wipe off excess grease. **Excessive grease will attract dirt.** NOTE: May accept grease easier after the loader has been operated.

15. Check and oil feedwheel slide box:
Check that the feedwheel slide box is working smoothly and oil with 10W/30 type motor oil. Clean and oil the slide guides. After pinning, chaining, and blocking the top yoke in the up position, clean and oil each side of the bottom yoke. New machines, especially, need oiling to ensure correct operation during break-in.

16. Check / adjust the chipper drive belt tension:
Inspect belt condition and replace if needed. The belts will need to be tightened several times in the first few days of operation. A loose belt will slip and then glaze over. Once they slip you must replace them. Check hydraulic pump drive belts also if equipped. See pages 64 - 65 for procedures.

17. Check chain drive tension:
Check tension on all chain drive and tighten as necessary. Chain tension is 1/4" (6 mm) per foot (0.3m) of center distance between sprockets, NOT to exceed a 1/2" (13 mm). Do not over tighten, which may result in premature bearing and hydraulic motor failure.

18. Check the hydraulic pumps and motor shafts:
Check the hydraulic pumps and hydraulic motor shafts for fit and tightness.

19. Check hydraulic oil level:
The hydraulic oil reservoir tank level should always remain at 3/4 to 7/8 full. Remember to check DAILY to avoid excessive heat build up.

20. Check hydraulic shut-off valves:
Check to ensure all shut-off valves are open.

21. Check for any fluid leaks:
Inspect for any oil, fuel, hydraulic oil, or engine coolant leaks. Check all hoses, fittings, lines, and tanks. DO NOT use fingers or skin to check for hydraulic leaks. Repair or replace any damaged or leaking components.

22. Check hydraulic control valves:
Inspect all hydraulic control valves and ensure they operate smoothly and shift correctly.

23. Check the fuel level:
Check the fuel level, running out and repriming is time consuming. Do not over fill, and you must leave fuel expansion space in the top of the tank.

DAILY START UP & MAINTENANCE (cont.)

24. Check engine oil and coolant level:
Follow the engine manufacturer manual recommendations for fluid levels. You MUST follow specific ENGINE MFG. manual recommendations for radiator coolant, additives, lubrication, correct engine speed, ETC.

25. Check radiator, debris screen:
Refer to the engine manufacturer's manual. Thoroughly clean radiator fins at least once a day or more in excessive conditions. Make sure debris is not packed between fins. Use compressed air and/or pressurized water (soap may also be needed) to clean the radiator, depending on the level and type of debris. If pressurized water is used, be careful not to turn the debris hard and pack solid between the radiator fins. Make sure to clean the radiator in the correct direction depending on if the cooling fan is a sucker or a pusher; do not propel the debris into the radiator with compressed air or pressurized water. A partially plugged radiator will not allow the engine to cool properly. Keep the compressed air or pressurized water a safe distance from the radiator fins so they are not damaged. Visually inspect the radiator fins and make sure they are not bent or closed off, repair or replace as needed. Clean cooling fan, shroud on air cooled engines, and the debris screen (if so equipped). Improper service, maintenance, or neglect will cause overheating problems and/or engine failure.

26. Check oil cooler (if equipped):
Thoroughly clean cooler fins at least once a day or more in excessive conditions. Make sure debris is not packed between fins. Use compressed air and/or pressurized water (soap may also be needed) to clean the oil cooler, depending on the level and type of debris. If pressurized water is used, be careful not to turn the debris hard and pack solid between the cooler fins. Make sure to clean the cooler in the correct direction; do not propel the debris into the cooler with compressed air or pressurized water. Keep the compressed air or pressurized water a safe distance from the cooler fins so they are not damaged. Visually inspect the cooler fins and make sure they are not bent or closed off, repair or replace as needed.

27. Fasten debris screen (if equipped):
If equipped, fasten debris screen in front of the radiator.

28. Check air cleaner and precleaner:
Clean or replace element following engine manual recommendations. Also, check and clean the vacuator valve.

29. Check clutch:
Check for proper lubrication, and engagement tension adjustment, frequently adjust and lubricate per PTO clutch manufacturer's manual. Bandit Industries, Inc. does not warranty clutch failures.

30. Check tires (if equipped):
Check tires for wear, weather checking and damage. Replace if damaged.

31. Inspect axle dust caps (if equipped):
Inspect axle dust caps and replace if damaged or leaking.

32. Inspect , adjust, and lubricate tracks (if equipped)
Inspect, adjust, and lubricate tracks as needed per track MFG. manual.

33. Check the infeed hopper:
Check in the infeed hopper for any foreign objects and around the entire machine for tools, cans, saws, etc. All tools not in use should be stored in a tool box.

34. Block the tires and tongue:
Before operation block the tires and tongue for stability. Do not rely on tongue jack for operational stabilization.

35. Check the conveyor drive pins:
Make sure the conveyor drive pins are tack welded in place.

36. Check the discharge direction:
Unfold the discharge and make sure the discharge is pointed in a safe direction.

37. Review all safety procedures on decals, from manual, and from video.

38. Make sure all safety equipment is being worn:
Make sure you are wearing all of your safety equipment: hard hat, face shield, gloves, eye protection, ear protection, etc. per ANSI and OSHA standards.

39. Make sure the throttle switch is in the idle position on the control panel.

40. Remember to check EVERYTHING on the checklist.

WEEKLY MAINTENANCE

1. Check anvil clearance, tightness, and wear:
Measure the anvil clearance. The clearance should be .120" (3.0mm) from highest knife. Check the anvil hardware, make sure the bolts are at the proper torque. The anvil is a normal wear item, if it is worn you can rotate it to a new working edge. Refer to pages 62 - 63 for the exact checking of anvil clearance procedure.

2. Check alternator and fan belts on engine:
Inspect belt condition and replace as needed. As applicable adjust and maintain per the engine manufacturer's manual.

3. Check spring tension on feed system:
Do not over tighten. Keep tight for small diameter material and progressively looser for larger diameter material. See page 34.

4. Check wheel lug nuts (if equipped):
Keep lug nuts tight, retorque, replace if needed.

5. Lubricate all steel friction areas:
Lubricate all steel friction areas including, but not limited to pivoting, hinged, sliding, rotating areas on the machine (i.e. conveyor chain, cabinet doors, discharge, discharge flipper, engine adjusters etc.)

6. Lubricate chain driven components:
Use a dry lube on any chain driven components: hydraulic swivel discharge and chain driven feedwheels.

7. Check fluid in pump bearing block:
Keep the fluid level in the pump bearing block full, use an 80W/90 type gear lube. Requires a minimum of 2.2 oz. (65 ml) and a maximum of 4.4 oz. (130 ml).

MONTHLY MAINTENANCE

1. Check towing hitch (if equipped):
Check for excessive damage or wear. Replace if needed. Keep pintle ring greased to reduce wear.

2. Check discharge and infeed hopper wear:
Check for wear on discharge, infeed hopper, and discharge direction adjustor; build up, repair or replace as needed.

3. Inspect feedwheel and conveyor wheel motor connections, sprockets, and bushings:
Check and maintain correct torque, on feedwheel and conveyor motor connections, sprockets, and bushings. See page 42.

4. Check feedwheel teeth for sharpness:
Replace if needed.

5. Check hydraulic pumps, motors and gear boxes:
Check tightness and connections of all hydraulic pumps, hydraulic motors, and gear boxes. Tighten if needed.

6. Check chipper bearings and chipper sheave:
Check, retighten all bearing bolts, bearing lock collars, and also belt sheave bushings to correct torques.

7. Check infeed conveyor chain (if equipped):
Check the tracking and tightness of the infeed conveyor chain. Make sure the chain is running true. Adjust as needed.

8. Check hydraulic function pressures:
Check, reset and maintain all hydraulic function pressure settings to a maximum of the specified PSI (bar). This will give you the best performance from the hydraulic system.

9. Tire air pressure (if equipped):
Fill each tire to rated capacity on tire.

10. Check wheel bearings (if equipped):
Check and grease or oil wheel bearings per axle manufacturer's instructions.

11. Check and adjust brakes (if equipped):
Check and adjust brakes as needed per axle MFG. manual.

12. Check discharge and feedwheel drive chain tension:
Check tension on hydraulic swivel discharge and feedwheel drive chains and tighten as necessary. Chain tension is 1/4" (6 mm) per foot (0.3 m) of center distance between sprockets, NOT to exceed a 1/2" (13 mm) of deflection. Do not overtighten, which may result in hydraulic motor failure.

3 MONTH MAINTENANCE

1. Hydraulic oil filter(s):
Must be replaced after FIRST 10 HOURS OF OPERATION, USE A 10 MICRON FILTER. After first change replace oil filter every 3 months or 400 hours.

2. Grease discharge swivel plates:
Grease swivel plates for discharge as needed.

3. High pressure oil filter(s) (if equipped):
Must be replaced after FIRST 10 HOURS OF OPERATION. After first change replace oil filter every 3 months or 400 hours.

6 MONTH MAINTENANCE

1. Pump bearing block:
Pack the female splines of the pump bearing block every 6 months or every 1000 hours with an EP-2 Lithium type grease. See page 68.

YEARLY MAINTENANCE

1. Hydraulic oil:
Change hydraulic oil and flush the hydraulic reservoir tank.

2. Hydraulic suction screen(s):
Change hydraulic suction screen(s) yearly or every 2000 hours.

3. Fuel tank:
Drain and clean the fuel tank yearly.

DAILY START UP & MAINTENANCE CHECK LIST

Each day before starting your machine these checks must be made:

		OK	REPAIRED
1.	Check the safety decals and engine gauges, replace if damaged.	☐	☐
2.	Check, maintain, and service all safety equipment for proper operation: engine disable plug, hood pin, spring lock for hood pin (disc chippers only), etc.	☐	☐
3.	Check entire machine for loose nuts, bolts, and components.	☐	☐
4.	Check all guards to make sure they are tight and securely in place.	☐	☐
5.	Make sure hood hinge operates correctly, is not damaged, and is lubricated.	☐	☐
6.	Open chipper hood and check for any foreign objects in chipper housing or knife pockets.	☐	☐
7.	Check the condition of chipper disc/drum assembly.	☐	☐
8.	Carefully rotate the chipper disc/drum with a pry bar or wood bar to ensure proper anvil clearance. If chipper disc/drum is jammed with debris or frozen in place, do not attempt to start engine and engage clutch until chipper disc/drum rotates freely.	☐	☐
9.	Check the condition of your knives, anvil, and attaching hardware.	☐	☐
10.	Properly torque knife mounting hardware.	☐	☐
11.	After closing chipper hood, reinsert the hood pin and padlock, make sure the hood pin is tight and secure. Make sure the hood lock pin is firmly in place, the spring lock for hood pin springs back into position on disc chippers, and the chipper hood engine disable plug is installed correctly.	☐	☐
12.	Grease chipper bearings (purge) daily.	☐	☐
13.	Grease feedwheel and conveyor bearings (1 shot) daily.	☐	☐
14.	Grease loader and grapple pins (1 to 2 shots) daily.	☐	☐
15.	Check feedwheel slide box is working smoothly, clean, and oil.	☐	☐
16.	Check and adjust belt tension on chipper and hydraulic pump belt drives or replace.	☐	☐
17.	Check and adjust chain drive tension.	☐	☐
18.	Check hydraulic pump and motor shafts for fit and tightness.	☐	☐
19.	Check and always maintain hydraulic level at 7/8 full.	☐	☐
20.	Check to ensure all hydraulic shut-off valves are open.	☐	☐
21.	Check all hoses, fittings, lines, and tanks for damage and fluid leaks.	☐	☐
22.	Check hydraulic control valves and ensure they operate and shift correctly.	☐	☐
23.	Check fuel level. (Running out and repriming is time consuming).	☐	☐
24.	Check engine oil, coolant levels, and correct engine speed. Follow ENGINE MANUFACTURER'S manual specs.	☐	☐
25.	Check radiator and debris screen. Clean as necessary. Clean cooling fan and shroud on air cooled engines.	☐	☐
26.	Check oil cooler (if equipped). Clean as necessary.	☐	☐
27.	If equipped, fasten debris screen in front of the radiator.	☐	☐
28.	Check air cleaner, precleaner, and vacuator valve. Clean as necessary.	☐	☐
29.	Check clutch for proper engagement tension and lubrication, frequently adjust and grease per PTO manufacturer's manual recommendations.	☐	☐
30.	Check condition of the tires (if equipped).	☐	☐
31.	Inspect and replace any axle dust caps that are damaged or leaking (if equipped).	☐	☐
32.	Inspect, adjust, and lubricate tracks per MFG's manual (if equipped)	☐	☐
33.	Check infeed hopper and around entire machine for any foreign objects, tools, cans, saws, etc.	☐	☐
34.	Block tires and tongue for stability before operation (if equipped). Do not rely on tongue jack.	☐	☐
35.	Check to make sure the conveyor drive pins are tack welded (if equipped).	☐	☐
36.	Make sure discharge is pointed in safe direction.	☐	☐
37.	Review all safety procedures on decals, from manual, and from video.	☐	☐
38.	Wear all applicable safety equipment: hard hat, face shield, gloves, eye protection, ear protection, etc.	☐	☐
39.	Make sure the throttle switch is in the idle position on the control panel.	☐	☐
40.	Remember to check EVERYTHING on the checklist.	☐	☐

WEEKLY CHECK LIST

Every week these checks must be made:

		OK	REPAIRED
1.	Check anvil clearance, tightness, and wear.	☐	☐
2.	Check alternator and fan belts on engine, adjust or replace.	☐	☐
3.	Check spring tension on easy climb feed system.	☐	☐
4.	Check and retighten wheel lug nuts.	☐	☐
5.	Lubricate steel friction areas: pivoting, hinged, sliding, & rotating areas (i.e. conveyor chain, cabinet doors, discharge, discharge flipper, engine adjusters, etc).	☐	☐
6.	Use a dry lube on any chain driven component.	☐	☐
7.	Check pump bearing block is full of gear lube.	☐	☐

MONTHLY CHECK LIST

Every month these checks must be made:

		OK	REPAIRED
1.	Check towing hitch for wear, keep pintle ring greased (if equipped).	☐	☐
2.	Check discharge, and infeed hopper for wear.	☐	☐
3.	Inspect feedwheel & conveyor motor connection, sprockets, and bushings.	☐	☐
4.	Check feedwheel teeth for sharpness.	☐	☐
5.	Check hydraulic pumps, motors and gear boxes.	☐	☐
6.	Check, retighten all bearing and chipper sheave bolts.	☐	☐
7.	Check infeed conveyor chain tightness and tracking (if equipped).	☐	☐
8.	Check hydraulic function pressures. Set to specified PSI (bar).	☐	☐
9.	Check and fill tires to rated pressure (if equipped).	☐	☐
10.	Check and grease or oil wheel bearings, follow axle MFG. instructions (if equipped).	☐	☐
11.	Check and adjust brakes, follow axle MFG. instructions (if equipped).	☐	☐
12.	Check and adjust discharge swivel and feedwheel drive chain tension.	☐	☐

3 MONTH CHECK LIST

Every 3 months these checks must be made:

		OK	REPAIRED
1.	Replace hydraulic filter(s) after first 10 hours then quarterly or every 400 hours.	☐	☐
2.	Grease swivel plates for discharge as needed.	☐	☐
3.	Replace high pressure oil filter(s) (if equipped) after first 10 hours then quarterly or every 400 hours.	☐	☐

6 MONTH CHECK LIST

Every 6 months these checks must be made:

		OK	REPAIRED
1.	Pack the female splines of the pump bearing block with grease.	☐	☐

YEARLY CHECK LIST

Every 6 months these checks must be made:

		OK	REPAIRED
1.	Change hydraulic oil and flush the hydraulic tank.	☐	☐
2.	Replace hydraulic suction screen(s) annually or every 2000 hours.	☐	☐
3.	Drain and clean the fuel tank.	☐	☐

BOLT TORQUE CHART

(THESE TORQUES ARE BASED ON DRY, CLEAN THREADS)

DESCRIPTION	BOLT SIZE	TORQUE (FT.-LBS.)	TORQUE (Nm)
Chipper Bearing Mounting Bolts	3/4" - 10 NC	220	298
Drum Head Shaft Bushing "4040"	5/8" - 11 NC	142	193
Drum Head Shaft Bushing "5050"	7/8" - 9 NC	258	350
Anvil	1/2" - 13 NC	75	102
Double Edge Knife Bolts	5/8" - 18 NF	180	245
Babbitt Knife Bolts	5/8" - 18 NF	210	285
Knife Holder Bolts	3/4" - 10 NC	250	339
Feedwheel Bearing Bolts	5/8" - 11 NC	80	108
Feedwheel Bearing Set Screws	3/8" - 24 NF	20	27
Conveyor Bearings - Drive Wheel	5/8" - 11 NC	225	305
Conveyor Bearing Set Screws - Drive Wheel	3/8" - 24 NF	20	27
Conveyor Bearings - Idler Wheel	5/8" - 11 NC	80	108
Conveyor Bearing Set Screw - Idler Wheel	3/8" - 24 NF	20	27
Engine Hold Downs	5/8" - 11 NC	125	169
Engine Hold Downs	3/4" - 10 NC	350	475
"DT" Hydraulic Motor Shaft Nut	1 1/8" - 20 NEF	340	461
Engine Sheave Bushing "E"	1/2" - 13 NC	60	81
Engine Sheave Bushing "F"	9/16" - 12 NC	75	102
Chipper Sheave Bushing "F"	9/16" - 12 NC	75	102
Chipper Sheave Bushing "J"	5/8" - 11 NC	135	183
Chipper Sheave Bushing "M"	3/4" - 10 NC	225	305
Pump Sheave Bushing "2517"	1/2" - 13 NC	36	48
Feedwheel Motor Sprocket Bushing "Q2"	3/8" - 16 NC	30	41
Feedwheel Sprocket Bushing "R1"	3/8" - 16 NC	30	41
Autofeed Cartridge Nut	N/A	4 - 6	5 - 8
Autofeed Plus Solenoid Retainer Nut	N/A	4 - 6	5 - 8
Hitch Mount Bolts	5/8" - 11 NC	220	298

Before tightening bolts be sure you have the correct size bolt for the correct amount of torque.
Use only factory approved knives and hardware.

BASIC WHEEL TORQUE REQUIREMENTS (per mfg.)

KEEP LUG NUTS PROPERLY TIGHTENED, CHECK NEW UNIT BEFORE OPERATION, CHECK AGAIN AFTER 20-25 MILES (32-40 km) AND REGULARLY CHECK AT LEAST WEEKLY.

5 & 6 Lug Hubs (1/2" - 20 Studs) .....90 - 120 ft.-lbs. Torque (122 - 163 Nm)
8 Lug Hubs (1/2" - 20 Studs) .....90 - 120 ft.-lbs. Torque (122 - 163 Nm)
8 Lug Hubs (9/16" - 18 Studs) .....110 - 120 ft.-lbs. Torque (149 - 163 Nm)
8 Lug Hubs (5/8" - 18 Studs) .....190 - 210 ft.-lbs. Torque (258 - 285 Nm) (Cone Nut)
8 Lug Hubs (5/8" - 18 Studs) .....275 - 325 ft.-lbs. Torque (373 - 441 Nm) (Flange Nut)
8 Lug Hubs (22mm x 1.5 Studs) .....450 - 500 ft.-lbs. Torque (610 - 678 Nm) (Flange Nut)
10 Lug Hubs (3/4" - 16 Studs) .....450 - 500 ft.-lbs. Torque (610 - 678 Nm)

(Consult axle manufacturers manual shipped with each machine for specific axle-stud-wheel combination lug nut torques.)

PAINT CARE

To help keep up the appearance of your Bandit equipment and reduce the possibility of surface rust follow these steps:

1. The machine should be washed on a regular basis with a non-abrasive mild detergent and then rinsed thoroughly. **Do not pressure wash sensitive areas** like: decals, gauges, electronic devices, autofeed control, etc.
2. When chipping acidic material, for example palm trees and fruit trees, extra care is needed to prevent corrosion. Wash the machine and rinse the inside of the discharge, chipper housing, and feed system daily.
3. If a stone chip, paint scratch, or paint crack occurs - it should be repaired immediately. Simply sand the edges of the damaged paint area, mask off the surrounding area, and apply primer and paint to the dry, clean, and warm area. This will keep the damaged area from spreading or getting worse.
4. If you are unable to sand and mask the area, there are containers of primer and paint available. A small brush can be used to touch up the area.
5. Also, primer and most colors of paint are available in aerosol spray cans to simply spray over the effected area after it is cleaned, dry, and warmed. This method is not as reliable as the process in step #2.

It is also reported that some equipment owners polish their machine at least yearly, and keep good mud flaps on their towing trucks to prolong the machines paint.

⚠ DANGER

LOCKOUT ALL ENERGY SOURCES BEFORE SERVICING OR REMOVING GUARDS OR HOODS!

1. **Shut off engine/motor. Key in possession.**
2. **Disengage pto/clutch.**
3. **Wait for cutter disc/drum to come to a COMPLETE STOP (takes at least several minutes).**
4. **Install disc/drum lock pin.**
5. **Loader arm (if equipped) securely on ground and hydraulic pressure released.**

6. **Unplug engine disable plug-in.**
7. **Remove padlock from hood pin.**
8. **Press down and hold hood spring lock pin (on disc chippers).**
9. **Retract hood pin.**

DO NOT RESTART UNTIL ALL GUARDS AND HOODS ARE SECURELY AND PROPERLY INSTALLED.

TOP 10 CHIPPER MAINTENANCE ITEMS

Maintenance, along with proper operation, is the most important thing you can do to get the optimum production and life out of the chipper. Failure to follow proper maintenance procedures will affect chipper life and void warranty!

⚠DANGER

Before attempting any type of maintenance disengage clutch, turn off engine, wait for the disc/drum to come to a complete stop, install the disc/drum lock pin, disconnect battery, and make sure the ignition key is in your possession.

MAINTENANCE ITEM	WHAT TO CHECK	RESULTS
1. Knives & Anvil	1. Sharp knives - Bandit approved new knives or professionally sharpened 2. Proper knife width and angle 3. Properly torque the knife mounting hardware. 4. Bandit approved knife mounting hardware, must be replaced after 4 - 5 knife rotations/changes to ensure safe clamping ability 5. Correct anvil to knife clearance. 6. Anvil's working edge is not rounded off or chipped up. 7. Anvil hardware properly torqued.	1. Proper sharpening procedures will pay dividends! Maintaining your chipper knives will reduce fuel consumption and increase the life of your chipper. 2. Operating your chipper with dull knives increases the amount of power required to chip, increases machine vibration and cause feeding problems. The extra vibration will cause cracks to develop throughout the machine and **void warranty**.
2. Belt Drives	1. Belts must be tightened several times in the first few days of operation. 2. Proper belt tension. 3. Proper belt alignment.	1. Loose and slipping belts will affect the performance of feeding. Burnt, glazed, and broke belts due to improper adjustments **will not be covered under warranty**.
3. Clutch	1. Adjust the clutch several times in the break-in period per the manufacturer's manual. 2. DO NOT engage/disengage the clutch at high rpm. 3. Do Not use the clutch to dislodge a jam.	1. If not adjusted correctly, the clutch will slip under a load causing feeding problems. Burnt and glazed clutches **will not be covered under warranty**.
4. Lubrication	1. All bearings, pivots points, hinges, chains, etc. need to be greased or oiled per the manual. 2. The feed system slide box must be oiled to ensure proper operation, DO NOT grease.	1. Improper lubrication will cause failure, premature wear, or binding, which **will not be covered under warranty**.
5. Engine Maintenance	1. All filters, radiator screens, radiator, coolant level, water separators, oil, etc. must be checked, serviced, and changed per the engine manufacturer's manual.	1. Not following these maintenance items will cause overheating, poor performance, and could cause possible engine damage that **will not be covered under warranty**.

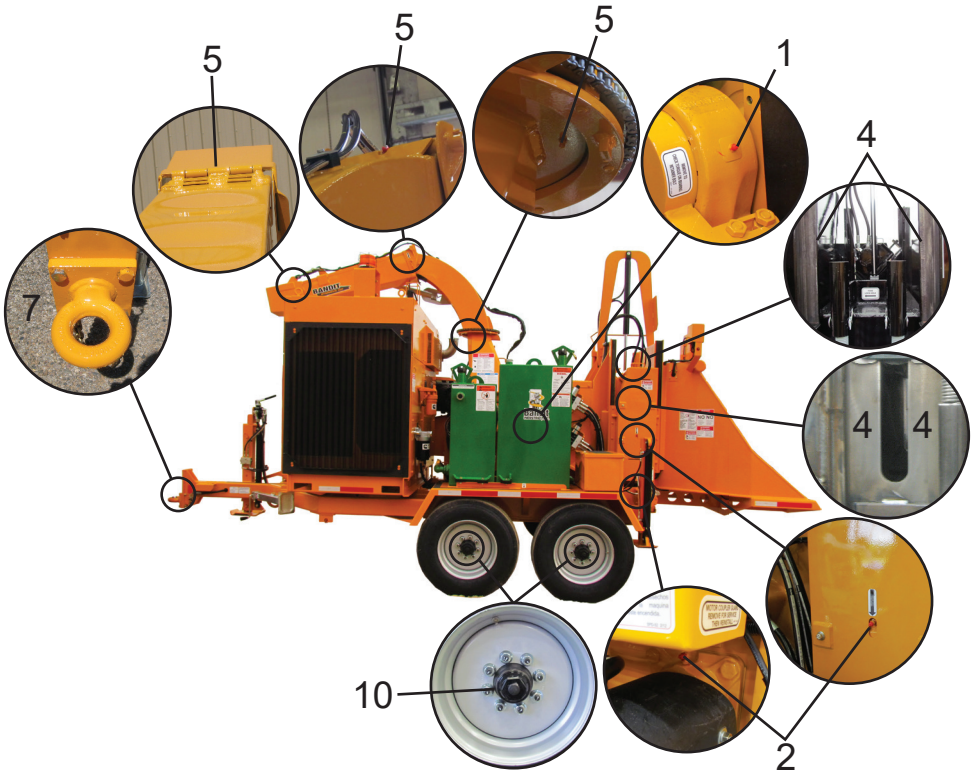
TOP 10 CHIPPER MAINTENANCE ITEMS cont.

MAINTENANCE ITEM	WHAT TO CHECK	RESULTS
6. Engine Radiators & Screens	1. Clean the radiator with compressed air and/or pressurized water (soap may also be needed) to clean the radiator, depending on the level and type of debris. If pressurized water is used, be careful not to turn the debris hard and pack solid between the radiator fins.	1. Not following these maintenance items will cause overheating, poor performance, and could cause possible engine damage that **will not be covered under warranty**.
7. Chipper Hood Engine Disable Plug	1. If the engine does not start, check that the Engine Disable Plug is installed correctly. 2. The terminals on the Engine Disable Plug socket may need to be spread to get a good connection and/or also check for corrosion on the terminals.	1. Engine will not start or will not stay running and will have down time for repairs.
8. Hydraulic System	1. Maintain the hydraulic tank level at 3/4 to 7/8 full. 2. Change hydraulic filters per owners manual. 3. Check hydraulic function pressures per owners manual. 4. Start with simple checks if the feed system is not working properly. Look at any dump cartridges or solenoids on the hydraulic system, often tapping of the block or removing the cartridge and cleaning it will take care of problems.	1. Poor performance and will have down time for repairs.
9. Feed System Slide Box	1. Open the bottom feedwheel clean-out door and clean any debris to make sure no binding occurs. 2. Adjust the yoke springs to the size of the wood. 3. The feed system slide box must be oiled to ensure proper operation, DO NOT grease.	1. Bottom feedwheel binding up and possible down time for repairs. 2. Too much pressure from the yoke springs will not allow the wood to feed properly. Too little pressure will allow the feedwheels to spin on the wood. 3. The slide box may bind up causing down time for repairs.
10. Autofeed	1. Make sure the engine RPM returns to original RPM, if not the autofeed will not allow the feedwheels to run. 2. Make sure the cartridges and valves in the hydraulic system are functioning properly. See if they are stuck or full of debris 3. Refer to the autofeed manual for troubleshooting and the owners manual for additional troubleshooting and information on settings.	1. May let the engine stall out when feeding wood, the chipper could plug with wood chips causing down time for unplugging. 2. Belts may slip and glaze over that **will not be covered under warranty**.

LUBRICATION CHART - 20XP

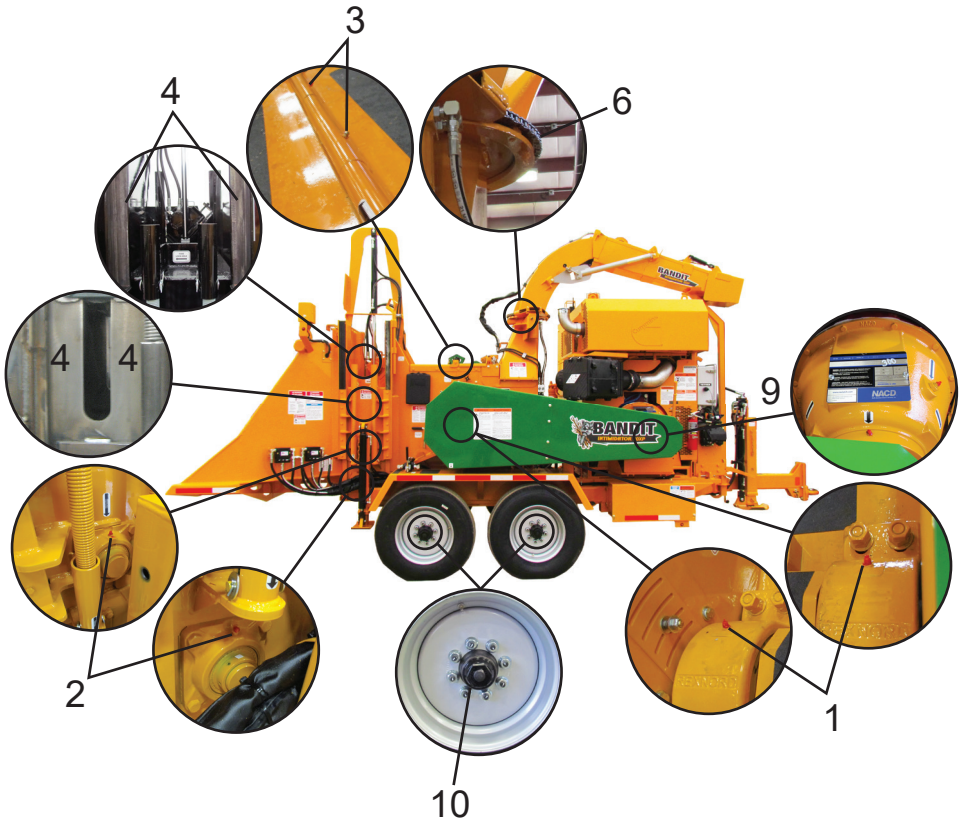
		CHECK			
#	DESCRIPTION	DAY	WEEK	MONTH	PROCEDURE
1	Drum Bearings	X			Purge bearings daily - wipe off excess
2	Feedwheel Bearings	X			Purge bearings daily - wipe off excess
3	Hood Hinge	X			1 - 2 shots of grease - wipe off excess
4	Feedwheel Slide Box	X			Clean and oil with 10W/30
5	Steel Friction Areas: pivoting, hinged, sliding, rolling		X		Lubricate (i.e. discharge flipper, stabilizers, etc.)
6	Chain Driven Components		X		Dry lube (Swivel discharge, chain driven feedwheels, etc.)
7	Pintle Eye Ring			X	Grease to reduce wear
8	Discharge Swivel Plates			3 Months	Grease as needed
9	Clutch	→			Grease per MFG's instructions
10	Wheel Bearings - if equipped	→			Grease or oil per MFG's instructions

A right angle grease fitting may need to be used to grease some of the lubrication points. This type of grease fitting can be obtained from most local automotive parts stores.



NOTICE Use as a reference only, locations may vary depending on options or component manufacturer. Lubrication point instructions are described on the machine, in the Lubrication & Coolant Section and Maintenance Section of this manual, or component manufacturer's manual.

LUBRICATION CHART - 20XP

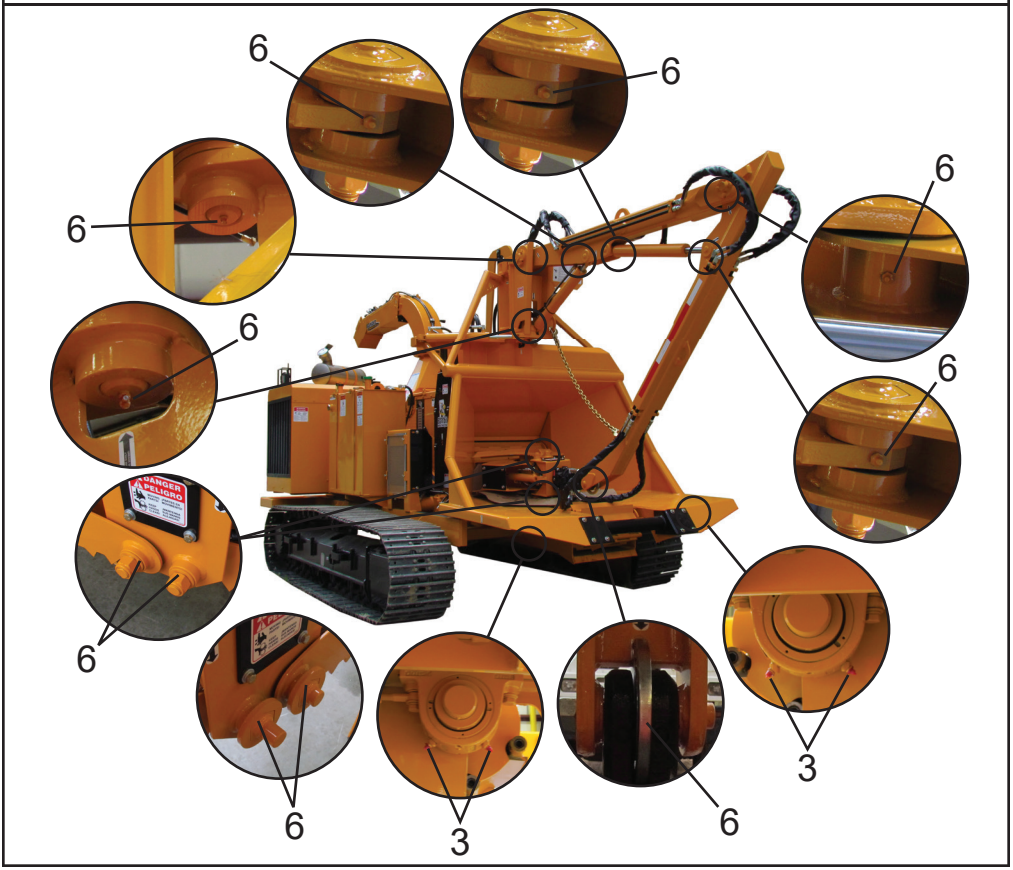


NOTICE Use as a reference only, locations may vary depending on options or component manufacturer. Lubrication point instructions are described on the machine, in the Lubrication & Coolant Section and Maintenance Section of this manual, or component manufacturer's manual.

LUBRICATION CHART - 20XP TRACK/LOADER

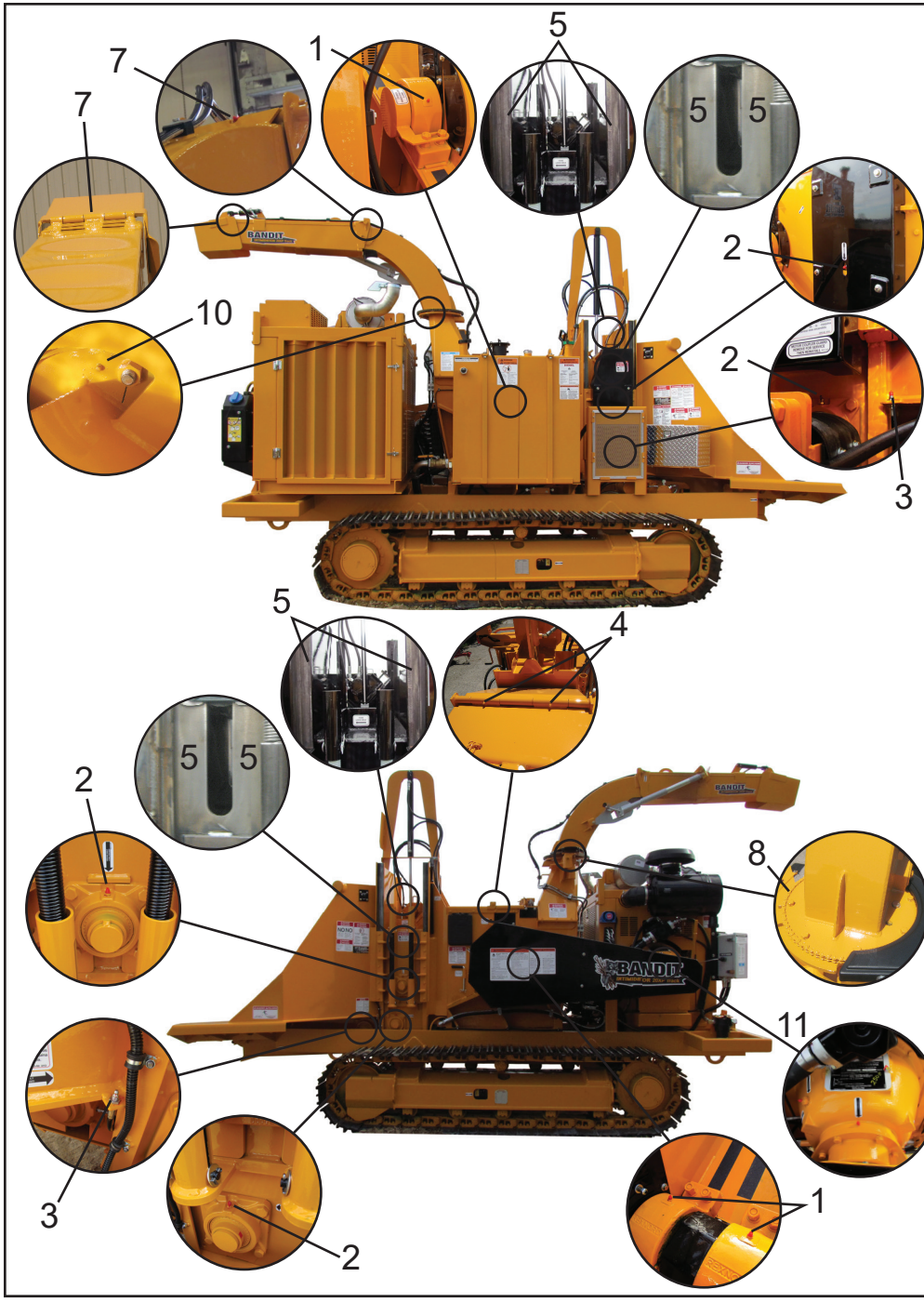
		CHECK			
#	DESCRIPTION	DAY	WEEK	MONTH	PROCEDURE
1	Drum Bearings	X			Purge bearings daily - wipe off excess
2	Feedwheel Bearings	X			Purge bearings daily - wipe off excess
3	Conveyor Bearings	X			Purge bearings daily - wipe off excess
4	Hood Hinge	X			1 - 2 shots of grease - wipe off excess
5	Feedwheel Slide Box	X			Clean and oil with 10W/30
6	Loader Arm & Grapple	X			1 - 2 shots of grease - wipe off excess
7	Steel Friction Areas: pivoting, hinged, sliding, rolling		X		Lubricate (i.e. discharge flipper, stabilizers, etc.)
8	Chain Driven Components		X		Dry lube (Swivel discharge, chain driven feedwheels, etc.)
9	Pintle Eye Ring			X	Grease to reduce wear
10	Discharge Swivel Plates			3 Months	Grease as needed
11	Clutch	→			Grease per MFG's instructions
12	Tracks	→			Grease per MFG's instructions

A right angle grease fitting may need to be used to grease some of the lubrication points. This type of grease fitting can be obtained from most local automotive parts stores.



NOTICE Use as a reference only, locations may vary depending on options or component manufacturer. Lubrication point instructions are described on the machine, in the Lubrication & Coolant Section and Maintenance Section of this manual, or component manufacturer's manual.

LUBRICATION CHART - 20XP TRACK



NOTICE Use as a reference only, locations may vary depending on options or component manufacturer. Lubrication point instructions are described on the machine, in the Lubrication & Coolant Section and Maintenance Section of this manual, or component manufacturer's manual.

LUBRICATION & COOLANT

1. **Engine:** Follow original equipment manufacturer's requirements for both changing oils and filters, refer to engine manual specifications.

2. **Engine Coolant:** Refer to engine manufacturer's manual specifications.

3. **Clutch:** Follow original equipment manufacturer's requirements for both greasing and adjusting. Frequently, adjust and lubricate per PTO manufacturer's manual.

4. **Wheel Bearings (if equipped):** Follow axle manufacturer's instructions for greasing or oiling wheel bearings.

5. **Tracks (if equipped):** Follow track manufacturer's instructions for specific track lubricating procedures.

6. **Hydraulic Reservoir Tank:** Completely change hydraulic oil, suction screen(s), and flush the tank annually. Change hydraulic oil filter(s) AFTER FIRST 10 HOURS OF OPERATION. Then change hydraulic oil filter(s) every 3 months or 400 hours thereafter. Maintain hydraulic oil level 7/8 full. See hydraulic oil requirements below. Check hydraulic oil level in tank daily.

7. **High Pressure Filter(s) (if equipped):** If machine is equipped, change high pressure oil filter(s) AFTER FIRST 10 HOURS OF OPERATION. Then change high pressure oil filter(s) every 3 months or 400 hours thereafter.

8. **Hydraulic Fluid Requirements:** See pages 102 - 75 for hydraulic fluid requirements.

9. **Discharge Swivel:** Grease swivel plates for discharge every 3 months or as needed.

10. **Hood Hinge:** Make sure the hood hinge operates correctly, and is lubricated daily. Must replace hinge if damaged.

11. **Steel Friction Areas:** Lubricate all steel friction areas including, but not limited to pivoting, hinged, sliding, and rotating areas weekly. (i.e. conveyor chain, cabinet doors, discharge, discharge flipper, engine adjusters, etc.)

12. **Pintle Eye Ring (if equipped):** Keep greased monthly to reduce wear and extend the normal life of your pintle eye ring.

13. **Chain Operated Components:** Use a dry lubricant on any chain driven component weekly. (i.e. hydraulic swivel discharge, chain driven feedwheels, etc)

14. **Chipper, Feedwheel, & Conveyor Bearings:** Use an EP-2 Lithium type grease only for all bearings. Purge chipper bearings with grease, you can not over grease these bearings. Grease feedwheel and conveyor bearings daily with one shot of grease. Both types of bearings are designed with a relief system that will not allow over greasing. In other words, you can not hurt the bearing seals by pumping in too much grease. Wipe off excess grease. **Excessive grease will attract dirt.**

Most of the failures related to bearings are diagnosed as "Contamination". Contamination is caused by improper lubrication.

Especially important is proper lubrication when the chipper is setting idle. The bearings must be fully purged when shut down. Then the bearings must be again fully purged each thirty (30) days and the machine allowed to run for approximately 10 minutes. Then fully purged again before the machine is put back into operation. Failure to do this will ruin the bearings. Bearings corrode when the machine is setting idle.

The second largest cause of bearing failure is operating them at high speeds when the grease is cold. This causes the bearing race to turn on the shaft. Naturally this ruins the bearing as well as the shaft. Allow the bearings to turn at slower speeds for at least five minutes. Also check the bearing lock collar set screws or bearing locknut for tightness each 30 days. Loose set screws or locknut allows the race to turn on the shaft. Failed bearings diagnosed as contamination or cold starts at high speed are not covered by warranty of the bearing manufacturer.

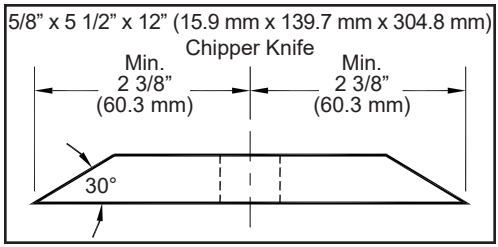
15. **Feedwheel Slide Box:** Check that feedwheel slide box is working smoothly, oil with 10W/30 type motor oil weekly. Clean and oil the slide guides. After pinning, chaining, and blocking the top yoke in the up position, clean and oil each side of the bottom yoke. Especially new machines need oiling to ensure correct operation during break-in.

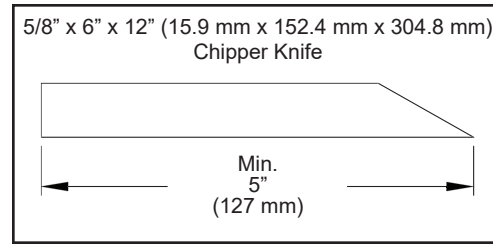
16. **Pump Bearing Block:** Check the fluid in the pump bearing block weekly, keep full. Use an 80W/90 type gear lube. Requires a minimum of 2.2 oz (65 ml) and a maximum of 4.4 oz. (130 ml). Pack the female splines of the bearing block every 6 months or every 1000 hours with an EP-2 Lithium type grease.

17. **Loader (if equipped):** Grease all pins and bushings on loader and grapple daily. Use 1 or 2 shots of EP-2 Lithium type grease. Wipe off excess grease. **Excessive grease will attract dirt.** NOTE:

CHIPPER DRUM

Knives should be replaced in sets. These sets are determined by the amount of resharpening done to the knives. It should be reinstalled with another knife of comparable usage. It helps to keep the disc/drum balanced, and it helps maintain chip quality. NEVER allow these knives to wear or be sharpened beyond absolute specified minimum distance from the center line of bolt.





TROUBLE SHOOTING CHIPPER PROBLEMS

1. Chipper makes poor quality chips or does not feed properly.

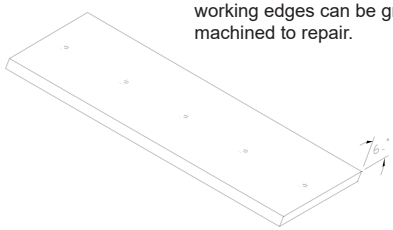
A. Knives have lost their edge. File, grind or replace knives. **DO NOT** operate the Bandit with dull knives.
B. Knife anvil worn or needs adjustment. Rotate, repair or replace (see Figure 1).
C. Feedwheel(s) are not operating correctly. (SEE HYDRAULIC TROUBLE SHOOTING).
D. The throat/base opening is a high-wear area. The feed plate anvil takes much of this wear but other areas wear as well. Attention must be paid to any areas where outer, noncutting edges of chipper knife are exposed. These areas must be built up with weld to maintain the original integrity.
E. Knives are at the wrong angle. Knives must be ground at a 30° to 30 1/2° angle.
F. Feedwheel teeth worn (REPLACE).
G. Material being chipped is very small, dry or rotting. This type of material does not produce good chip quality.

2. Chipper Knife Hits Anvil.

A. Check the anvil clearance at both sides of the knife by using a feeler gauge, the clearance should be the specified distance from the highest knife (SEE ANVIL ADJUSTMENT).
B. Check the chipper bearing shaft lock nut for tightness.

FIGURE 1

If anvil is not too worn, the two working edges can be ground or machined to repair.



NOTE: Make sure the anvil clearance will still be obtainable after grinding or machining.

3. Discharge Plugs or Does Not Throw Chips Properly.

A. Lugging engine on large material - keep engine RPM up.
B. Knives are dull or worn to minimum size.
C. Obstruction in discharge chute. Patches welded into the chute can cause obstruction of chip flow. Anything causing an obstruction will cause the chute to plug.
D. Chipping rotting material that has little substance can also plug the discharge chute.
E. Worn fan blades.

4. Chipper Bearings Running Too Hot.

A. Improper lubrication - purge bearings once a day with EP-2 Lithium type grease.
B. Chipper drum operating at too high RPM's. DO NOT exceed recommended RPM's.
C. Check the chipper bearing locking collars for tightness.
D. Bearings worn out (REPLACE).

KNIFE SAVER KIT

Through various tests, Bandit has found that using the Knife Saver will increase the life span of chipper knives if used during the recommended times. Each knife installed in every new machine at Bandit has the Knife Saver used on it before leaving the factory. The Knife Saver can be purchased from your local Bandit dealer.

- Use the Knife Saver on brand new knives.
- Use the Knife Saver on freshly resharpened knives.
- Use the Knife Saver every day during the Daily Start-Up & Maintenance while the knives are checked.
- Use the Knife Saver when the machine is shut down for a break during the day.

PART NO.	DESCRIPTION
900-9901-68	Knife Saver Kit
900-9901-65	File For Knife Saver Kit Only
900-9901-63	Replacement Blades For Knife Saver
900-9901-66	Knife Changing Gloves

KNIFE SHARPENING

Only Bandit knives and hardware are recommended for use in your Bandit chippers. Only then can you be assured of a quality product that fits and performs the best to the standards of excellence that is expected from the Bandit chipper.

Chipper knives MUST be kept sharp at all times for the ultimate chipper and knife performance. The main cause of poor cutting performance is dull knives.

Dull Knives Cause:

- Excessive waste of engine horsepower
- Bad quality chips; chunks, slivers, etc.
- Excessive strain on knives and mounting hardware
- Excessive strain on chipper disc/drum bearings and total machine
- Excessive chipping vibration damaging the machine
- Excessive strain on drives, PTO's, engines, etc.
- Increase the probability of the discharge plugging and decreases the throwing distance
- Loss of time and money

The Dulling Of Chipper Knives Is Caused By:

- Poor quality knives
- Improper anvil to knife clearance
- Force feeding wood faster than chipper will accept
- Dirt, grit, or foreign material on the wood
- Chipper knives sharpened at wrong angle
- Improper care of knives and knife hardware

These are just a few factors, there are other situations that can lead to the dulling of chipper knives.

NOTICE

Many times a chipper knives cutting edge/point can be brought back to a good edge with a #10 Flat Bastard Mill File. This can reduce the amount of resharpening.

Typical Knife Sharpening Angles:
"Bolt-In" Knives = 30° to 30 1/2° Angle

Knives should be replaced in sets. These sets are determined by the amount of resharpening done to the knives (knife width). Resharpening knives reduces the width of the knife. Knife replacement should be done in sets of the same width knives. That will reduce chipping vibration and increase chipping performance.

NOTICE

- Keep knives sharp.
- Keep knife angle correct when sharpening.
- Do not over sharpen so knife is narrower than allowed width, or you will pack wood and break knives.
- Use correct knife size, knife quality, knife mounting hardware, and torque knife mounting hardware to the specified torque.
- Replace knife mounting hardware after (5) times of tightening.

⚠CAUTION

Do not sharpen the knives in a direction which produces a radius, or hollow grind, on the surface of the knife. Strength and life of the cutting edge is reduced.

- For maximum chipper efficiency, the original cutting angle must be maintained when the knives are sharpened. The knives should be machine ground to produce a flat, straight edge.
- Do not sharpen the knives with a hand held power grinder. The knife angle can't be held and heat will distort the metal.
- Sharpening techniques should be the same as those employed for any high carbon steel cutting edge. Use a coolant and exercise care not to draw temper or crack the cutting edges by excessive heating.
- Knives may be sharpened repeatedly as long as their original width is not reduced to less than the specified minimum width. If a knife measures less than the specified minimum width after sharpening, it must be discarded.
- Inspect the knives after sharpening to ensure the knives are free of cracks.
- Maintain spare sharpened knives to avoid downtime for knife sharpening.

⚠DANGER

Chipper knives are sharp and can be dangerous. It is always necessary for your protection to be extra careful and wear proper hand protection when handling knives.

NOTICE

USE CORRECT KNIFE AND HARDWARE

DO NOT use a size or style chipper knife, bolt or nut other than factory approved for this chipper - see manual.

DO NOT over torque or under torque knife bolts and nuts - see manual.

DO NOT resharpen knife more than minimum width - see manual.

DO NOT use a knife bolt or nut which has been tightened over (5) times - replace.

DO NOT improperly install the knife nuts. Flat surface of nut goes toward the chipper disc.

DO check the chipper disc/drum daily for secure welds, cracks, excessive wear, torqued bolts, elongated bolt holes and/or good bolt hole threads. If problem is found, contact chipper manufacturer or authorized dealer.

KNIFE CHANGING PROCEDURE

Only Bandit knives and hardware are recommended for use in your Bandit chippers. Only then can you be assured of a quality product that fits and performs the best to the standards of excellence that is expected from the Bandit chipper.

⚠DANGER

Chipper knives are sharp and can be dangerous. It is always necessary for your protection to be extra careful and wear proper hand protection when handling knives. Before changing knives make sure all shut down procedures are followed.

1. Before attempting any type of maintenance disengage clutch, install clutch lock if equipped, turn off engine, wait for the disc/drum to come to a complete stop, install the disc/drum lock pin, disconnect battery, and make sure the ignition key is in your possession.

2. Disconnect the chipper hood engine disable plug.

3. Remove the padlock from the hood pin.

4. On disc chippers, recess the spring lock for the hood pin and retract the hood pin. On drum chippers, retract the hood pin.

5. Carefully open the hinged part of the chipper hood. Do not slam the chipper hood to the open position. This will cause damage to the hinge. If the hinge becomes damaged by slamming the hood open, replace the hinge immediately! If the hinge has become damaged, it will cause misalignment of the hood, the chipper disc/drum may hit the hood and cause a serious accident!

6. Changing the chipper knives is a two person job. One person, using a wooden block, holds the chipper knife in place while the other person removes the chipper knife hardware. Remove all of the knives in each pocket. If the machine is a disc chipper with 5/8” knife bolts, typically a 3/8” allen key and a 1 1/16” socket is required to change or torque the knife hardware. If the machine is a disc chipper with 1/2” knife bolts, typically a 5/16” allen key and a 7/8” socket is required to change or torque the knife hardware. If the machine is a drum chipper, typically a 15/16” socket is required to change or torque the knife hardware.

7. Once the knives have been removed, inspect the knife pocket. Check for secure welds, excessive wear, impact cracks, and elongated bolt holes on disc chippers or the condition of the knife bolt threads on drum chippers. If a problem is found, contact your local dealer or Bandit Industries.

8. Clean out the knife pocket at this time. Remove all debris from the pocket and knife bolt holes.

9. Sharpen, rotate, or replace the chipper knife. Knives should be professionally sharpened, maintaining angle and dimensional specifications. Knives should be replaced in sets. These sets are determined by the amount of resharpening done to the knives. It should be reinstalled with another knife of comparable usage. It helps to keep the disc/drum balanced, and it helps maintain chip quality. Do not allow the knives to wear beyond the absolute minimum specified distance from the center line of the bolt hole. Reinstall the chipper knives. Make sure to properly torque the knife hardware, see Bolt Torque Chart. Do not apply anti-seize to the knife bolts. Knife mounting hardware must be replaced after maximum of 4 - 5 knife rotations/changes to in sure safe clamping ability. All knives and knife mounting hardware must be factory approved.

10. Remove the disc/drum lock pin. Very carefully, manually with a bar, turn the chipper disc/drum to the next knife pocket. Reinstall the disc/drum lock pin.

11. Repeat steps 6 though 10, for each knife pocket.

12. Once the knives have been changed or rotated, check the anvil clearance. Make sure the clearance is maintained to the specified distance from the highest knife. Do Not under any circumstance attempt to rotate the chipper disc/drum while someone is inside the infeed hopper. They may become seriously injured, Do Not Do This!

13. Close the hinged part of the chipper hood and reinstall the hood pin, hood pin padlock, chipper hood disable plug, and on disc chippers make sure the spring lock for the hood pin springs back into position.

BABBITT KNIFE & HOLDERS INSTALLATION

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

⚠DANGER

Never turn the chipper drum by hand, always carefully use a pry bar or wood bar. This will help prevent the person turning the disc/drum from being injured should the drum break loose.

A sight hole in the chipper beltshield has been provided. If chipper belts are moving do not open chipper hood. Do not stick fingers in sight hole.

⚠DANGER

The knives must be securely fastened and torqued in position. If one comes loose or breaks during operation, someone may get injured or something may get damaged.

⚠DANGER

Chipper knives are sharp and can be dangerous. It is always necessary for your protection to be extra careful and wear proper hand protection when handling knives. Before changing knives make sure all shut down procedures are followed.

1. Follow all pre-maintenance shut down procedures.
2. Clean the surface of the knife sub holder, knife holder, all threaded holes, and all bolt threads of all debris. See Figure 1.
3. If replacing counter knife: be sure counter knife, bolts, and threaded holes are also clean of debris. The counter knife must be installed using Loctite 243 (blue) on the socket head cap screws and torqued to 15 ft.-lbs (20 Nm). See Figure 2. If the counter knife is not replaced, make sure the socket head cap screws are not sticking above the knife holder surface.
4. Inspect the knife holder and drum head pocket to make sure there is no debris on either.
5. Place the knife holder in the drum head pocket making sure the knife holder sits flat. The knife holder may look different than the knife holder shown in Figure 3, depending on knife options.
6. Apply Loctite 243 (blue) or equivalent to the knife holder bolts.
7. After the bolts have been started, push the knife holder back in to the drum head pocket to make sure the knife holder is tight against the back of the drum head pocket.
8. Using the pattern shown in Figure 3, tighten and torque the knife holder bolts to 250 ft.-lbs. (339 Nm). If the knife holder bolts have been tightened or removed five times, the bolts need to be replaced to ensure proper tightness.
9. Repeat steps 2 through 8 for every drum head pocket.
10. After all the removable knife holders are installed, the knives can be installed. See Figure 3.
11. Make sure the knife is of at least minimum width, refer to the manual.
12. Remove any debris from the knife, knife bolt, and bolt holes and then place the knife on the knife holder.
13. Remove any debris from the top clamp and look for dishing or wear. Replace if needed. Place the top clamp on the knife.
14. Thread the knife bolts through the top clamp and knife and hand tighten as far as possible. Do Not Use an impact wrench to start the knife bolts, the knife holder bolt holes can strip.
15. Make sure the knife babbitt is tight against the back of the knife holder.
16. Using the pattern shown in Figure 4, tighten and torque the knife bolts to 210 ft.-lbs. (285 Nm). After the bolts have been tightened to the correct torque, check the torque on the knife bolt one more time by checking the bolts in a row. If the knife bolts have been tightened or removed five times, the bolts need to be replaced to ensure proper tightness.
17. Repeat steps 9 through 15 for every drum head pocket.
18. After all the knives are installed, the anvil needs to be checked for proper clearance. See the Anvil Adjustment section.
19. Slowly turn the drum head with a pry bar or wood bar to make sure everything clears.

BABBITT KNIFE & HOLDERS INSTALLATION

Figure 1

Clean all the threaded holes if the knife holder is removed or replaced.

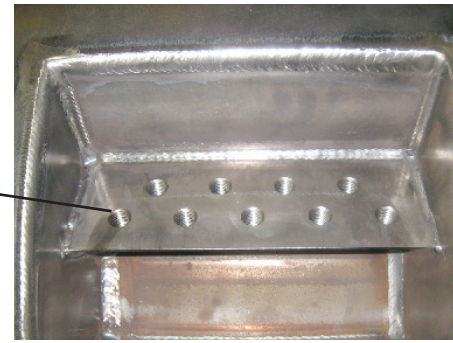


Figure 2

If replacing the counter knife, apply Loctite 243 to the socket head cap screws and torque to 15 ft.-lbs. (20 Nm).

Counter Knife

Figure 3

Knife Holder

Apply Loctite 243 to the knife holder bolts and torque to 250 ft.-lbs. (339 Nm).

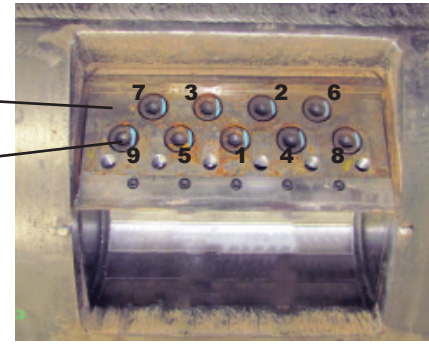
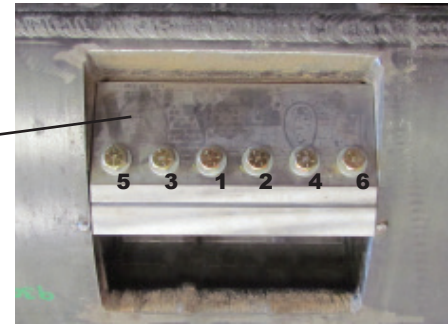


Figure 4

Install the knives and torque the knife bolts to 210 ft.-lbs. (285 Nm)



REMOVABLE KNIFE HOLDERS

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

⚠DANGER

Never turn the chipper drum by hand, always carefully use a pry bar or wood bar. This will help prevent the person turning the drum from being injured should the drum break loose.

A sight hole in the chipper beltshield has been provided. If chipper belts are moving do not open chipper hood. Do not stick fingers in sight hole.

⚠DANGER

The knives must be securely fastened and torqued in position. If one comes loose or breaks during operation, someone may get injured or something may get damaged.

⚠DANGER

Chipper knives are sharp and can be dangerous. It is always necessary for your protection to be extra careful and wear proper hand protection when handling knives. Before changing knives make sure all shut down procedures are followed.

1. Follow all pre-maintenance shut down procedures.
2. Clean the surface of the knife sub holder, knife holder, all threaded holes, and all bolt threads of all debris. See Figure 1.
3. If the removable knife holders are removed or replaced, be sure to clean all the threaded holes in the drum head before reinstalling the knife holders. See Figure 1.
4. Inspect the knife holder and drum head pocket to make sure there is no debris on either.
5. Place the knife holder in the drum head pocket. The knife holder may look different than the knife holder shown in Figure 2, depending on knife options.
6. Apply Loctite 243 (blue) or equivalent to the knife holder bolts.
7. After the bolts have been started, push the knife holder back in to the drum head pocket to make sure the knife holder is tight against the back of the drum head pocket.
8. Using the pattern shown in Figure 2, tighten and torque the knife holder bolts to 250 ft.-lbs. (339 Nm). if the knife holder bolts have been tightened or removed five times, the bolts need to be replaced to ensure proper tightness.
9. Repeat steps 2 through 8 for every drum head pocket.
10. After all the removable knife holders are installed, the knives can be installed. See Figure 3.
11. Make sure the knife is of at least minimum width, refer to the manual.
12. Remove any debris from the knife, knife bolt, and bolt holes and then place the knife on the knife holder.
13. Thread the knife bolts through the knife and hand tighten as far as possible. Do Not Use an impact wrench to start the knife bolts, the knife holder bolt holes can strip.
14. Make sure the knife is pushed back into the pocket as far as possible.
15. Using the pattern shown in Figure 3, tighten and torque the bolts to 180 ft.-lbs (245 Nm) for double sided knives. After the bolts have been tightened to the correct torque, check the torque on the knife bolt one more time by checking the bolts in a row. If the knife bolts have been tightened or removed five times, the bolts need to be replaced to ensure proper tightness.
16. Repeat steps 10 through 15 for every drum head pocket.
17. After all the knives are installed, the anvil needs to be checked for proper clearance. See the Anvil Adjustment section.
18. Slowly turn the drum head with a pry bar or wood bar to make sure everything clears.

REMOVABLE KNIFE HOLDERS

Figure 1

Clean all the threaded holes if the knife holder is removed or replaced.

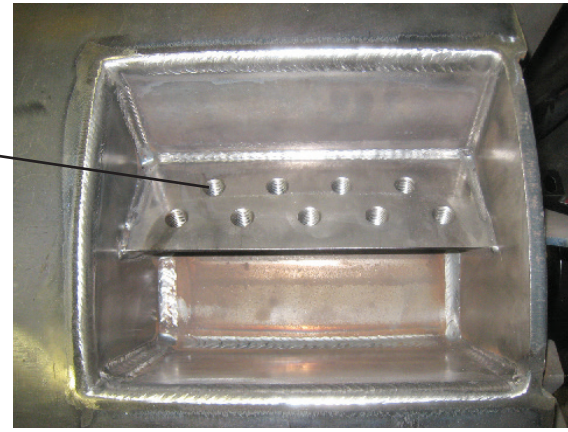


Figure 2

Install knife holder, apply Loctite 243 to the knife holder bolts and torque to 250 ft.-lbs. (339 Nm).

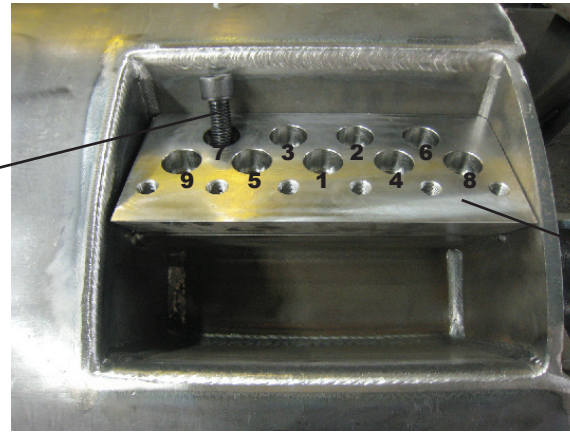
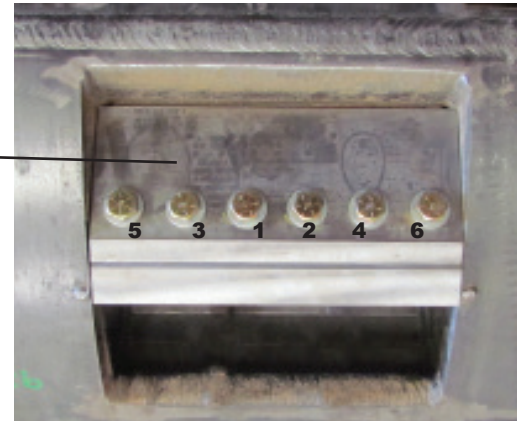


Figure 3

Install the knives and torque the knife bolts to 210 ft.-lbs. (285 Nm)



CHIPPER DRUM
"CLAMP-IN" KNIFE HARDWARE

⚠DANGER

Replace the bolts, nuts, knives, clamps and holder when they need it. DON'T stretch it! You will pay for it either by damage to machine or possible damage to a person. Knife pocket bolts should be replaced after (5) uses.

Using a piece of wood and a screwdriver install the sharp babbitted knife and hold it firmly into position. The piece of wood will hold the knife back into pocket and the screwdriver must be used to raise the knife to the outer edge of pocket.

To retighten the knife clamp; first tighten center knife bolt and then tighten the outside bolts. Knife bolts must be torqued tight at 210 ft.-lbs. (285 Nm).

Always check with a .002 to .005 feeler gauge to make sure the knife, counter knife and clamps are seated tight at all seams when done. There should not be any gap between the knife pocket pinch points in hardware.

To remove the dull knife, hold the knife in position carefully with leather gloves. Then loosen the bolts with a 6-point socket. They only need to be loosened enough to let knife slide out. Clean all debris out of the knife pocket and hardware.

KNIFE BABBITTING PROCEDURES

1. Insert the knives into the knife gauge and slide the spacers up tight to avoid overspill of the babbitt material.
2. Heat the knife and knife gauge with a torch (see Figure 1). This will prevent blow back which could occur if there were any moisture left in the fixture.
3. Pour babbitt slowly from the ladle on to knife gauge between steps gradually filling the cavity (see Figure 2).
4. Once the babbitt has cooled remove the knife (see Figure 3) and place on a stand so the access babbitt can be filed away (see Figure 4). Do not allow the babbitt to extend over the edges of the knife or serious damage will result to the components in the knife pocket.

FIGURE 1

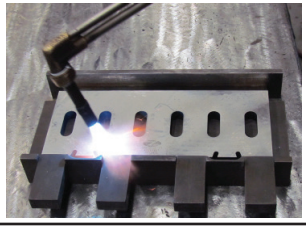


FIGURE 2

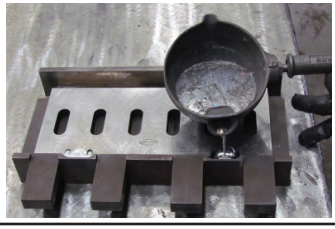


FIGURE 3

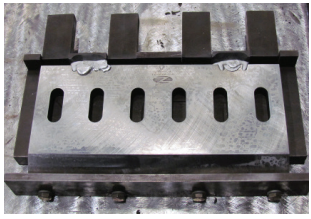
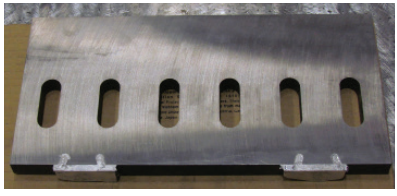
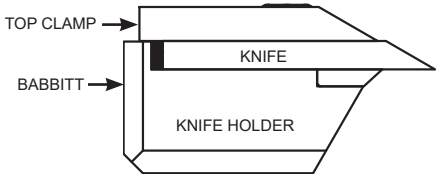


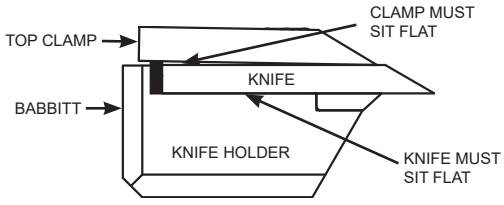
FIGURE 4



PROPER USE OF BABBITT ON CHIPPER KNIVES



IMPROPER USE OF BABBITT ON CHIPPER KNIVES



OPTIONAL CHIP BREAKER ASSEMBLY

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

⚠DANGER

The chip breaker assembly is sharp and can be dangerous. It is always necessary for your protection to be extra careful and wear proper hand protection when handling the chip breaker assembly. Before removing or installing the chip breaker make sure all shut down procedures are followed.

The chip breaker assembly must be installed as shown in Figure 1. Bolt the chip breaker assembly to the bottom mount plate and then bolt in to the belly band of the drum housing.

If the chip breaker assembly is removed, the replacement plate must be bolted to the bottom mount plate in place of the chip breaker assembly (see Figure 2) and mounted to the belly band of the drum housing. A machine without a replacement plate or chip breaker assembly will be more susceptible to plugging.

FIGURE 1

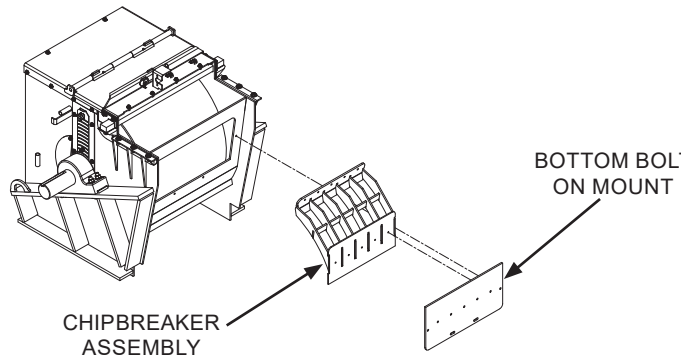
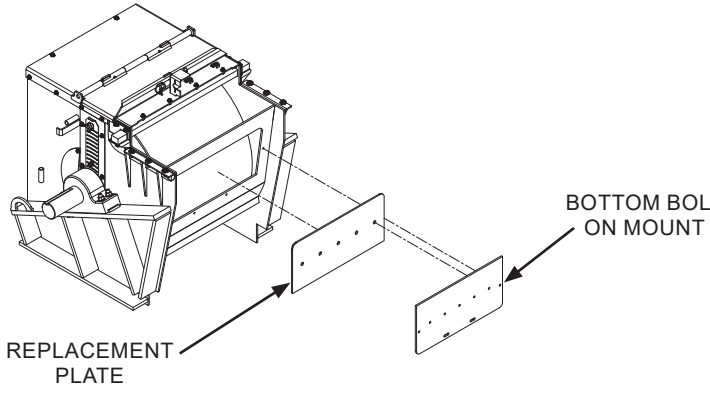


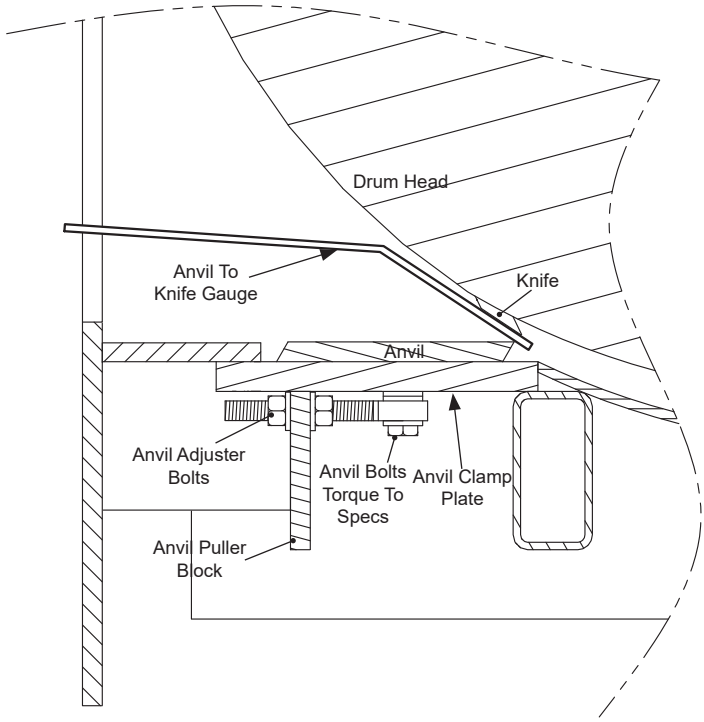
FIGURE 2



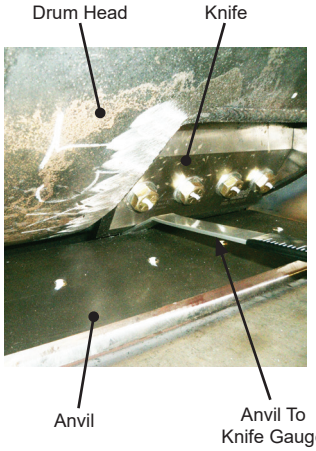
⚠DANGER

Do not operate the machine without the chip breaker assembly or the replacement plate bolted to the bottom mount plate and the bottom mount plate bolted to the belly band of the drum housing.

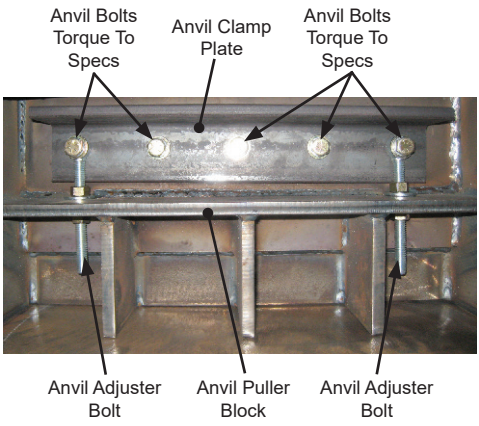
ANVIL ADJUSTMENT



View looking through the feedwheels at the throat area



View looking up underneath drum head and base area

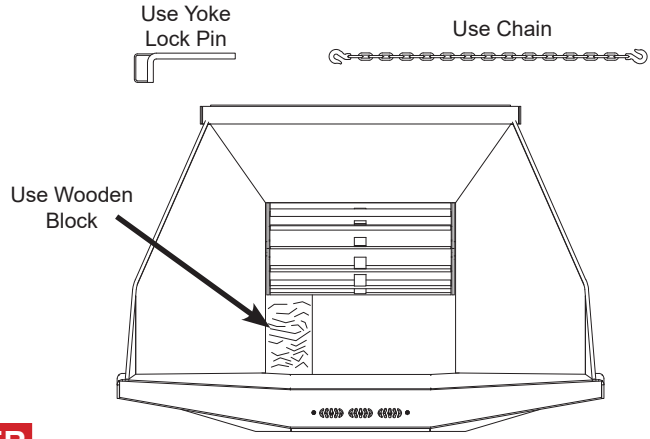


ANVIL ADJUSTMENT

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

Before working inside the infeed hopper or under the top feedwheel remove the yoke springs from the top yoke, raise the yoke , install the yoke lock pin, safety chain the yoke in the raised position, and insert a wooden block to assist in holding the yoke in the raised position.



⚠DANGER

Do Not under any circumstance attempt to rotate the chipper drum while someone is inside the infeed hopper. They may become seriously injured, Do Not Do This!

CHECK THE ANVIL TO KNIFE CLEARANCE

1. This clearance should be checked on a weekly basis or as knives are changed. To check the anvil clearance, follow all pre-maintenance shut down procedures. Once all safety procedures are completed the anvil to knife clearance can be checked.
2. In order to check the clearance one person will need to climb into the infeed hopper. Use a feeler gauge or the anvil to knife gauge supplied by Bandit to check the clearance of the first knife to the anvil. Check the clearance at the left and right sides of the knife.
3. Once that knife has been checked climb back out of the infeed hopper, remove the drum lock pin, and very carefully rotate the chipper drum so the other knives can be checked.
4. Once all knives have been checked adjust the anvil according to the closest knife. The anvil to knife clearance should be .120 inches (3.0 mm).
5. Set the closest knife to this distance.

ANVIL ADJUSTMENT PROCEDURE

1. To adjust the anvil first loosen two of the hex nuts on either the inside or outside of the anvil puller block. If the anvil needs to be adjusted closer to the drum, loosen the outside anvil adjuster hex nuts. If the anvil needs to be adjusted away from the drum, loosen the inside anvil adjuster hex nuts.
2. Loosen the anvil bolts from underneath the machine.
3. Once the components have been loosened, move the anvil to the correct clearance using the anvil adjuster bolts and hex nuts.
4. Once the knife is set to the correct clearance, .120 inches (3.0 mm), retighten all components.
5. Make sure bolts are torqued to their specific bolt torques refer to bolt torques on page 44.
6. Carefully rotate the chipper drum to make sure all the knives clear the anvil.

CHIPPER BELT TENSION

GENERAL RULES FOR TENSIONING

1. Check tensioning during the first 2 through 48 hours of run-in operation especially.
2. Over tensioning or under tensioning shortens belt and bearing life.
3. Keep belts free from foreign materials that may cause the belt to slip.
4. Make V-drive inspection on a periodic basis. Never use belt dressing as this will damage the belt and cause early failure.
5. Belts should never be forced over the sheave. Allow enough room for belts to slip on.
6. Always make sure sheaves are aligned properly.

TENSIONING PROCEDURE

Main Drive Belts

Follow all pre-maintenance shut down procedures. Locate the center of the belt span between the sheaves. Push or pull on the belt until the belt has deflected 7/8" to 1" (22.2 to 25.4 mm). Record the push or pull force. The force should be 28 lbs./belt (13 kg/belt). If the machine has poly band belts, see note below. Adjust the belt tension if the force falls outside of this range. If belts are not properly adjusted belts will slip, glaze over, and be ruined. This is NOT covered by warranty.

1. Remove beltshield.
2. To adjust the belt tension, loosen the four engine mounting bolts and the jam nuts on the engine adjuster on the radiator end of the engine.
3. Adjust the belt tension with the engine adjuster on the clutch end of the engine. If you have to push the engine with the adjuster, the belts will tighten slightly after the engine is realigned.
4. Use the engine adjuster on the radiator end of the engine to realign the engine, so the engine sheave and chipper sheave are aligned. The sheaves can be checked with a string or straight edge.
5. Torque the two engine mounting bolts (see Torque Chart for the correct torque) on the opposite side of the engine from the engine adjusters.
6. Loosen the jam nuts on the engine adjuster on the radiator end of the engine.
7. Torque the engine mount bolt and then tighten the engine adjuster jam nuts on the radiator end.
8. Hand tighten the remaining engine mount bolt. Loosen the engine adjuster jam nuts all the way and torque the engine mount bolt.
9. Tighten the engine adjuster jam nuts on the clutch end.
10. Recheck the belt tension and alignment, if readjustment is needed go back to step 2.
11. Reinstall beltshield.

Pump Drive Belts (If equipped)

1. Locate the center of the span between sheaves.
2. Push or pull down on the belt until the belt has deflected 1/4" (6.4 mm).
3. Record push or pull down force. The force should be 14 to 17 lbs (6.4 to 7.7 kg).
4. Adjust the belt tension if the force falls outside of this range.

NOTICE

lbs./belt (kg/belt) is per 1 belt. If equipped with 4 groove poly band belt, lbs./belt (kg/belt) must be multiplied by 4. If equipped with two 3 groove poly band belts, lbs./belt (kg/belt) must be multiplied by 3 for each poly band belt. If equipped with 2 groove poly band belts, lbs./belt (kg/belt) must be multiplied by 2 for each poly band belt.

NOTICE

Every month, the beltshield needs to be removed and the belts need to be checked and adjusted. For best results use a good belt tension tester. The slot in the beltshield is for a quick daily check of the belt tension.

NOTICE

It is a good practice to rotate the belts during tensioning. Then recheck deflections. The belts may need to be tightened again.

NOTICE

Do not over tighten the hydraulic pump belt. Most all pump failures result from too much side load on the pump shaft. Too much belt tension is very easy to detect inside a failed pump. Pumps with this condition will not be covered under warranty.

NOTICE DO NOT IGNORE THIS MAINTENANCE RULE!

New belts stretch very soon and must be adjusted several times in the first few hours of operation. Adjust after one hour of operation, then every four hours until the belts quit stretching. Failure to do this will cause the belts to burn and fly off. **THIS FAILURE IS NOT COVERED BY WARRANTY!**

CHIPPER BELT TENSION

FIGURE 1

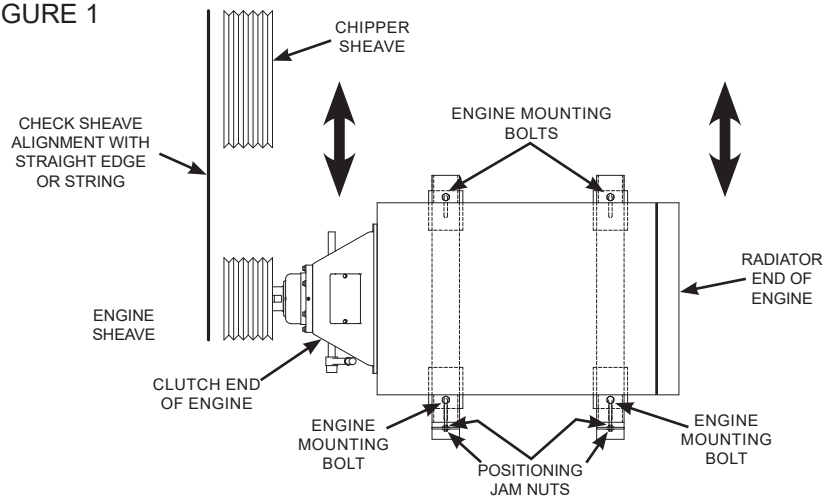
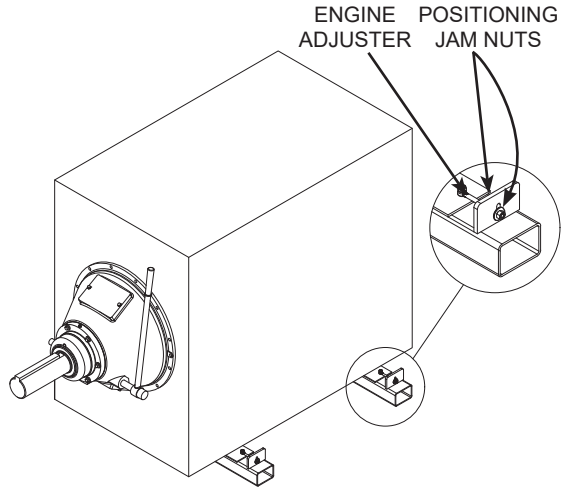


FIGURE 2



BELT TENSION GAUGES

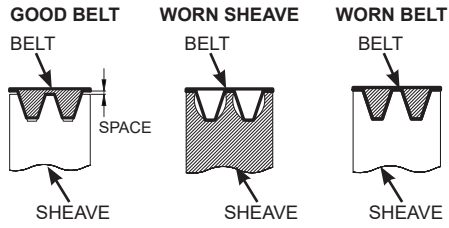
SINGLE BARREL GAUGE
(UP TO 30 lbs.) **900-1919-23**

DOUBLE BARREL GAUGE
(UP TO 66 lbs.) **900-1917-02**

TRIPLE BARREL GAUGE
(UP TO 90 lbs.) **900-1919-67**

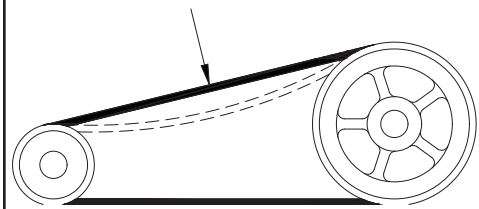
FIVE BARREL GAUGE
(UP TO 165 lbs.) **900-1919-66**

Worn or misaligned belts and sheaves in the power train causes belt slippage, thus power loss. Keep the power train working for you, not against you, by checking for needed adjustment or replacement.



Main Drive Belts: 7/8" to 1" deflection with 28 lbs.

Pump Drive Belts: 1/4" deflection with 14 - 17 lbs. of force.



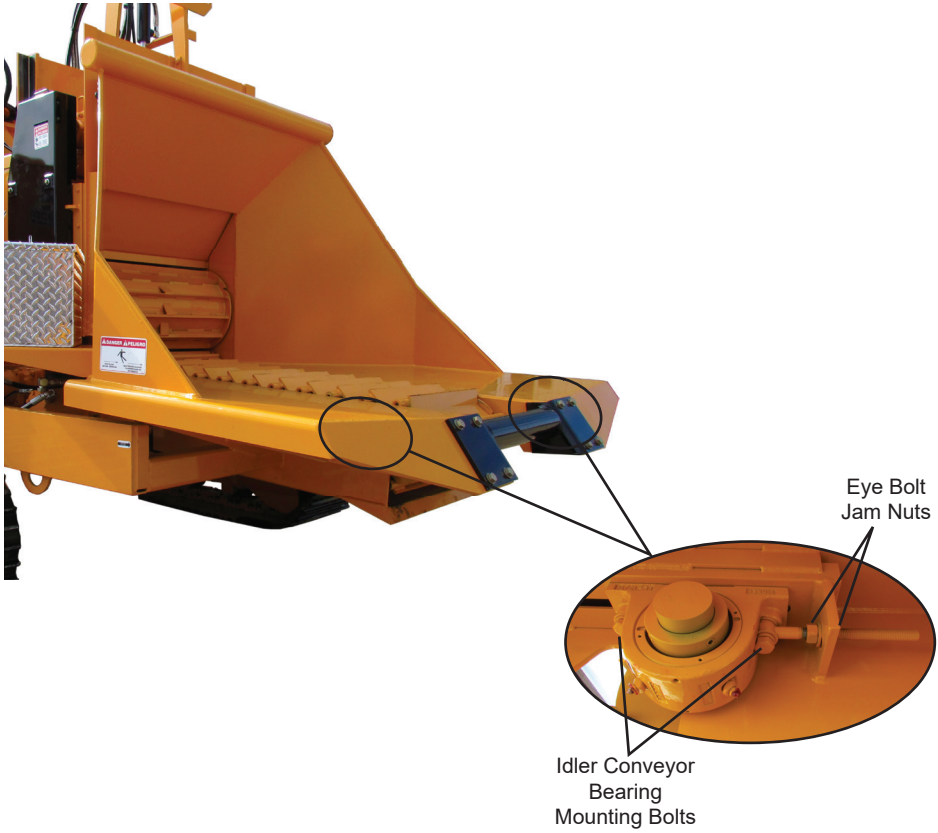
INFEED CONVEYOR MAINTENANCE

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

ADJUSTING INFEED CONVEYOR CHAIN TENSION

1. Follow all pre-maintenance shut down procedures.
2. The infeed chain is tightened or loosened by moving the idler conveyor wheel (located at the end on the conveyor).
3. Loosen the conveyor wheel bearing mounting bolts.
4. Loosen the eye bolt jam nuts and adjust the conveyor idler out to tighten or adjust the conveyor idler in to loosen the conveyor chain.
5. Be sure that the bearings on both sides are tensioned the same and that the infeed conveyor chain is running straight.
6. The infeed chain needs to have some sag between the conveyor wheels.
7. Running the infeed conveyor chain too loose may cause premature wear and running the infeed conveyor chain too tight may cause premature failure.
8. When adjustment is finished be sure to tighten the bearing adjuster bolts and nuts.



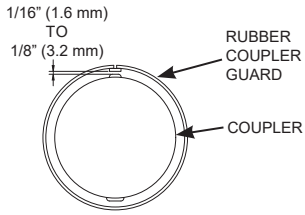
PROPER PROCEDURE FOR INSTALLATION AND REMOVAL OF J.B. COUPLERS AND TAPERED FEEDWHEEL MOTORS

A. **Proper Equipment Needed**

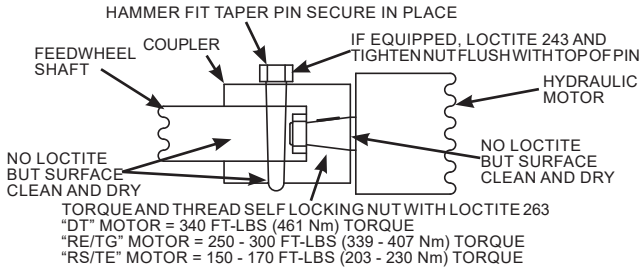
1. Feedwheel motor with tapered shaft.
2. 5/16" x 9/32" x 1 1/4" long key (900-3937-23) for "DT" motor.
   5/16" x 9/32" x 15/16" long key (900-3934-06) for "RE/TG" motor.
   3/16" x 3/16" x 3/4" long key (900-3937-03) for "RS/TE" motor.
3. Correct feedwheel shaft, coupler and taper ass'y
4. Loctite 263 (red).
5. Loctite 243 (blue).
6. Emery cloth and/or a file.
7. A degreaser agent.
8. Self locking nut.
9. Hammer.
10. Torque wrench and 1 5/8" socket for "DT" motor.
    1 3/8" socket for "RE/TG" motor.
    1 3/16" socket for "RS/TE" motor.
11. 1 1/16" hand wrench for "RE/TG" motor
    7/8" hand wrench for "RS/TE" motor

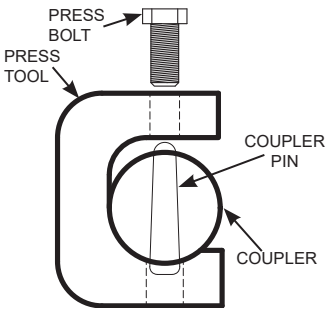
B. **Installation Procedure**

1. Remove any sharp edges on the coupler bores or the motor shaft. Example: Emery cloth or file for burrs on keyways or shafts.
2. Clean the coupler bores and motor shaft with a degreasing solvent.
3. Install the correct key in the feedwheel motor shaft.
4. Slide the coupler onto the motor shaft, making sure that the two mate tightly. Example: The coupler does not rock or slop on the shaft.
5. Install the self locking nut with Loctite 263 on the threads.
6. Tighten to the correct torque, 340 ft.-lbs. (461 Nm) for "DT" motor, 250-300 ft.-lbs. (339-407 Nm) for "RE/TG" motor, & 150-170 ft.-lbs. (203-230 Nm) for "RS/TE" motor.
7. Slightly tap with a hammer on the coupler face to ensure proper seating.
8. Retorque self locking nut.
9. Deburr and degrease the feedwheel shaft.
10. Install the motor and coupler assembly onto the feedwheel shaft.
11. Install the correct tapered pin through the coupler and feedwheel shaft.
12. If coupler pin is threaded and is equipped with a nut, make sure the nut is flush with top of pin.
13. Hammer the pin into the coupler to secure the coupler and feedwheel shaft. If the pin is threaded and has a nut do not hammer the pin directly, use a piece of wood as a buffer.
14. If the tapered pin is equipped with a nut, put Loctite 243 on the threads and then tighten nut flush with top of pin.

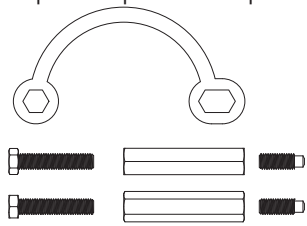


Press Tool for Coupler Pin Removal
Part Number: 981-0501-61





Removal if tapered pin is equipped with a nut to assist in pin removal: Use a hand wrench and turn the tapered pin nut clockwise, half a turn and then hit the small end of the tapered pin with a hammer and punch. Repeat this process until pin is removed.



Coupler Removal Tool Kit
Part Number: 980-2003-59

⚠CAUTION Always wear proper safety equipment and take caution with tapered pin when attempting to remove. The use of this tool will assist in the removal of the tapered pin in the feedwheel coupler. Lubricate end of bolt and threads with grease. Position the press tool so that it cradles the coupler, with the large end of the tapered pin at the side opposite the press bolt. You may want to remove yoke springs to get easier access to coupler. Set the tool as described and hand tighten press bolt to snug tool against coupler. Make sure press bolt is set on small end of tapered pin, and that pin will go through hole in tool without interference. Use of a 1/2" impact wrench is recommended. Run impact on bolt to start pin removal, then usually a good hit with hammer on the end of bolt will knock out the pin. You may have to run impact on bolt and hit with hammer a few times to remove pin. Do not spend excessive time trying to remove the pin and coupler. If problems occur during pin and coupler removal, contact your nearest dealer or Bandit Industries.

SERVICING / CHANGING CHIPPER BEARING
(FOR REXNORD® 6000 SERIES)

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

NOTICE Proper installation is critical to bearing life. Improper installation could cause premature or immediate failure. Particular care must be taken not to create a preload on the bearings while tightening the locknut. Use of a good quality torque wrench is also important to your safety as well as proper bearing installation.

STEPS TO REPLACE A CHIPPER BEARING

1. Clean the shaft so that it is free from burrs and rust. Do not coat the chipper shaft or the bore of the bearing adapter with a preservative, lubricant, or other substance such as Loctite®.
2. If the adapter sleeve happens to get removed from the bearing during installation, the locking pin in the adapter sleeve must be aligned with the keyway in the inner bore. See Figure 3.
3. Offset the bearing on the shaft about 1/8" (3.2 mm) from its intended position towards the base, so when the bearing is tightened up on the shaft, the bolt holes will line up.
4. Hand tighten the locknut to take out the looseness, the use a hook type spanner wrench to bring the locknut to a snug fit.
5. Mark the locknut and chipper drum shaft with a grease pencil or a dark marker. Use a soft steel drift pin and a hammer to drive the locknut clockwise one full turn. Make sure the adapter sleeve does not turn on the shaft while tightening. If the adapter sleeve is turning, it can be held by placing a hook type spanner wrench in the split area of the sleeve.
6. Look at the visual indicators on the locknut. At least one of the visual indicators should show an indication of deflection. See Figure 1. If at least one indicator does not show indication of tightness after 1/4 turn beyond the final adjustment, the locknut needs to be completely loosened and start over with step 3.
7. If the entire indicator window becomes completely blue with the possibility of yellow and red fringing, the bearing has been over-tightened. See Figure 2. The locknut needs to be completely loosened and start over with step 3.
8. Loosen all the bearing bolts to release the preload on the bearings if there is any. Keep the weight of the drum head off the bearings while bolting down. Bolt both bearings down and torque the bolts to 220 ft.-lbs. (298 Nm).
9. If the drum head does not spin freely, there is a preload on the bearings. The bearing will need to be completely loosened and steps 3 through 8 need to be repeated.
10. Tighten the set screws in the locknut to 13-15 ft.-lbs. (18-20 Nm) of torque with a 5/32" hex type torque wrench.

Figure 1

STEPS TO REMOVE A CHIPPER BEARING

1. Back out the locknut set screws.
2. Loosen the locknut with an impact spanner wrench or a soft drift pin in a counter-clockwise direction until the bearing adapter assembly becomes completely loose.
3. Remove the mounting bolts.
4. The bearing should slide freely off the shaft.

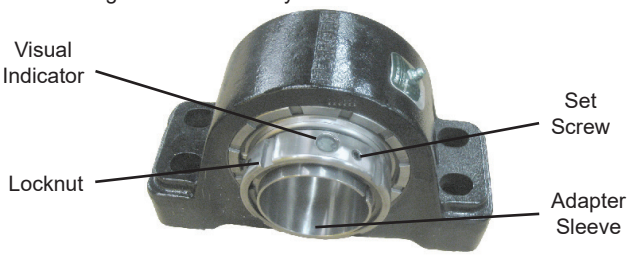
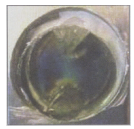


Figure 2



SERVICING / CHANGING CHIPPER BEARING
(FOR REXNORD® 6000 SERIES)

⚠DANGER

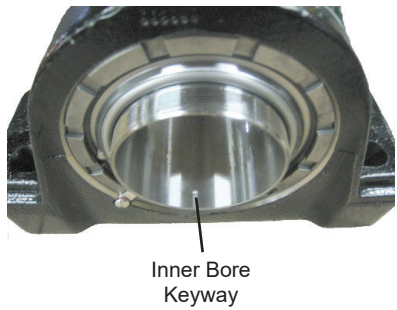
Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

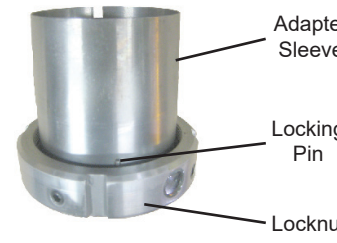
NOTICE Proper installation is critical to bearing life. Improper installation could cause premature or immediate failure. Particular care must be taken not to create a preload on the bearings while tightening the locknut. Use of a good quality torque wrench is also important to your safety as well as proper bearing installation.

STEPS TO INSTALL BOTH CHIPPER BEARINGS

1. Clean the shaft so that it is free from burrs and rust. Do not coat the chipper shaft or the bore of the bearing adapter with a preservative, lubricant, or other substance such as Loctite®.
2. If the adapter sleeve happens to get removed from the bearing during installation, the locking pin in the adapter sleeve must be aligned with the keyway in the inner bore. See Figure 3.
3. Position the bearings on the shaft to their intended position. If the bearings do not slide freely on the shaft, loosen the locknut until the bearing does.
4. Keep the weight of the drum head off the bearings while bolting the bearings down.
5. Center the chipper drum inside the base and bolt the bearing down on the right side of the machine and tighten the four bearing bolts to 220 ft.-lbs. (298 Nm) of torque.
6. Offset the chipper drum approximately 1/8” (3.2 mm) from center of the base to the left side of the machine.
7. Hand tighten the locknut to take out the looseness, then use a hook type spanner wrench to bring the locknut to a snug fit.
8. Mark the locknut and chipper drum shaft with a grease pencil or a dark marker. Use a soft steel drift pin and a hammer to drive the locknut clockwise one full turn. Make sure the adapter sleeve does not turn on the shaft while tightening. If the adapter sleeve is turning, it can be held by placing a hook type spanner wrench in the split area of the sleeve.
9. Look at the visual indicators on the locknut. At least one of the visual indicators should show an indication of deflection. See Figure 1. If at least one indicator does not show indication of tightness after 1/4 turn beyond the final adjustment, the locknut needs to be completely loosened and start over with step 6.
10. If the entire indicator window becomes completely blue with the possibility of yellow and red fringing, the bearing has been over-tightened. See Figure 2. The locknut needs to be completely loosened and start over with step 6.
11. Offset the bearing on the left side of the machine about 1/8” (3.2 mm) from its intended position towards the base, so when the bearing is tightened up on the shaft, the bolt holes will line up.
12. Repeat steps 7 through 10 to tighten the right side bearing on the shaft.
13. Loosen all the bearing bolts to release the preload on the bearings if there is any. Bolt both bearings down and torque the bolts to 220 ft.-lbs. (298 Nm).
14. If the drum head does not spin freely, there is a preload on the bearings. The bearings will need to be completely loosened and steps 3 through 13 need to be repeated.
15. Tighten the set screws in the locknut of both bearings to 13-15 ft.-lbs. (18-20 Nm) of torque with a 5/32” hex type torque wrench.

Figure 3



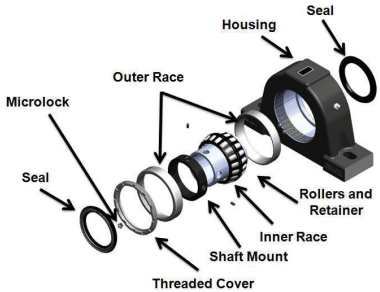


SERVICING / CHANGING CHIPPER BEARING
(FOR REXNORD LINK BELT B22600 SERIES)

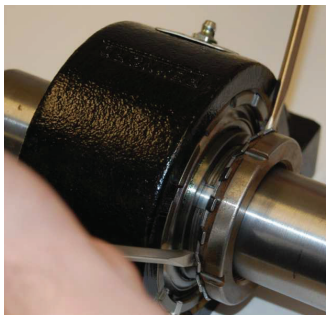
NOTICE

Proper installation is critical to bearing life. Improper installation could cause premature or immediate failure. Particular care must be taken not to create a preload on the bearings while tightening the locknut. Use of a good quality torque wrench is also important to your safety as well as proper bearing installation.

1. Clean the shaft so that it is free from burrs and rust. Do not coat the chipper shaft or the bore of the bearing adapter with a preservative or lubricant.
2. Remove the bearing adapter and apply a light weight oil to the outer surface and threads. Reassemble the adapter in the bearing with about 1/4" (6.4 mm) of clearance between the bearing face and lockwasher. Repeat the process to the other bearing.



3. Center the chipper drum inside the base and bolt the bearing down on the road side of the machine and tighten the four bearing bolts to 220 ft.-lbs. (298 Nm) of torque.
4. Keeping the drum centered and the weight of the drum head off the bearings, take a large flat blade screwdriver to wedge between the bearing's face and lockwasher on the road side of the machine. Use the screwdriver to draw the adapter through the bearing until there is a snug fit between the adapter and chipper drum shaft. Finger tighten the locknut, then use a hook type spanner wrench to bring the locknut to a snug fit.
5. Mark the locknut and chipper drum shaft with a grease pencil or a dark marker. Use a soft steel drift pin and a hammer to drive against the face in a circular movement of the locknut as shown in the following picture. Retighten the locknut with a spanner wrench and repeat procedure until 7/8 of a turn is achieved.
6. Find the tang of the lockwasher that is in line with a slot in the locknut and bend it over into the slot. If needed tighten the locknut slightly until one of the slots line up.

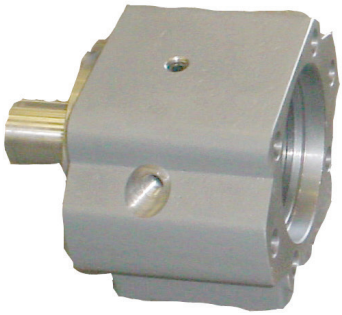


7. Offset the bearing on the curb side of the machine about 1/8" (3.2 mm) to 3/16" (4.8 mm) away from the drum housing, so that when the bearing is tightened up on the shaft, the bolt holes will line up. The bearing housing should not be wedged up against the base, if it is the bearing will have a preload.
8. Repeat steps 4 through 6 to tighten the curb side bearing on the shaft.
9. Loosen all the bearing bolts to release the preload on the bearings if there is any. Bolt both bearings down and torque the bolts to 220 ft.-lbs. (298 Nm)
10. If the drum head does not spin freely, there is a preload on the bearings and steps 7 through 9 need to be repeated.

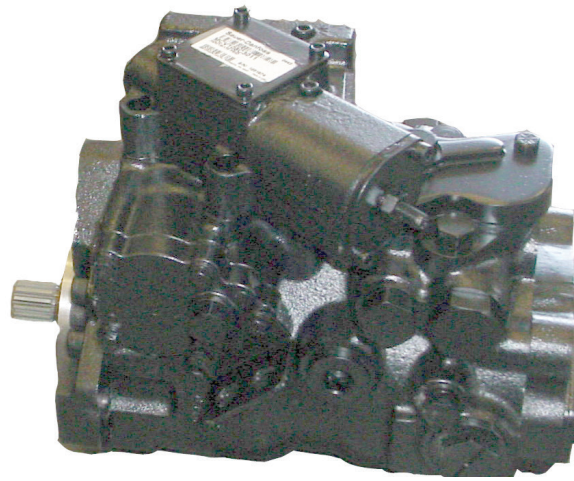
SERVICING BEARING BLOCK

The female splines in the bearing block need to be packed with an EP-2 Lithium type grease every six months or every 1000 hours. To do this, unbolt the hydraulic pump from the bearing block and slide the hydraulic pump out of the bearing block. There is no need to loosen or remove the hydraulic lines. Once the hydraulic pump is removed from the bearing block, inspect the internal splines of the bearing block and the external splines of the hydraulic pump. The tops of the splines should be flat. If the splines are pointed, they are wore and need to be replaced. If the splines are good, pack the internal splines of the bearing block with an EP-2 Lithium type grease, reinstall the hydraulic pump, and bolt the hydraulic pump to the bearing block.

The fluid in the bearing block needs to be checked weekly and kept full with an 80W/90 type gear lube. See the Weekly Maintenance for the capacity, if needed.

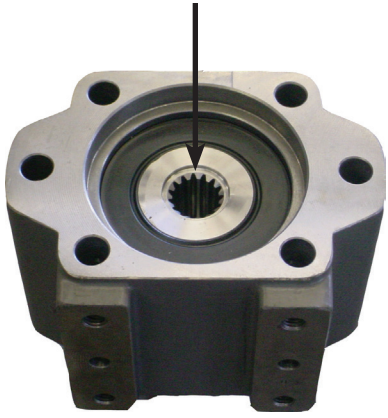


BEARING BLOCK

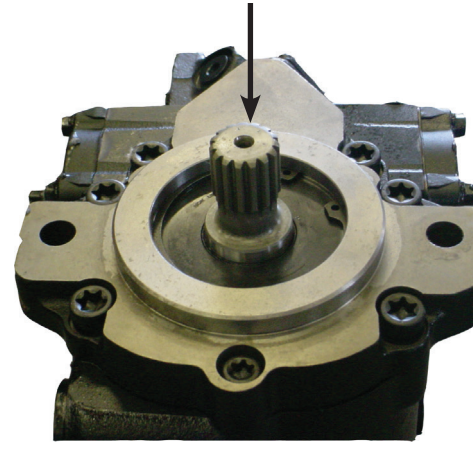


HYDRAULIC PUMP

INTERNAL SPLINES OF THE BEARING BLOCK



EXTERNAL SPLINES OF THE HYDRAULIC PUMP



NOTICE Parts may not be exactly as shown.

PROCEDURE FOR UNPLUGGING YOUR CHIPPER

If your chipper is plugging, it is usually caused by allowing the engine to drop below required R.P.M.'s. This can be resolved by simply shutting the feedwheel(s) off when the engine begins to lug down. Operating the engine at speeds lower than full R.P.M.'s causes your chipper to plug. **Always run the chipper at full engine speed.** If your chipper is equipped with the optional autofeed feature, make sure it is set correctly. The setting for the low R.P.M. stop must be high enough not to allow the chipper discharge to plug. Dull chipper knives also contribute to chipper plugging. Dull knives can create slivers and chunks, causing the engine to lug excessively. Both of the aforementioned conditions cause a plugging situation.

⚠DANGER

If the chipper is properly maintained and operated correctly, the chipper should not plug. In the unlikely event that the chipper becomes plugged, do not attempt to clean out the discharge or chipper housing in the field. Take the machine to a local dealer or professional shop. If the machine is a rental, take it back to the rental company.

⚠DANGER

If the discharge or hood need to be removed, always use some sort of mechanical device like an overhead hoist, loader, lift truck, etc. that is rated for lifting that component. Follow all OSHA instructions for lifting.

⚠DANGER

Pinch points are created between the disc/drum and the housing for the disc/drum. Use a pry bar or wood bar to turn the disc/drum during the unplugging process. Do not use your hands to try to break free and turn a jammed disc/drum. The disc/drum could break free suddenly and your hand could become injured in the pinch point.

⚠DANGER

The knives are very sharp and can cause injury if you come in contact with the knives during the unplugging process.

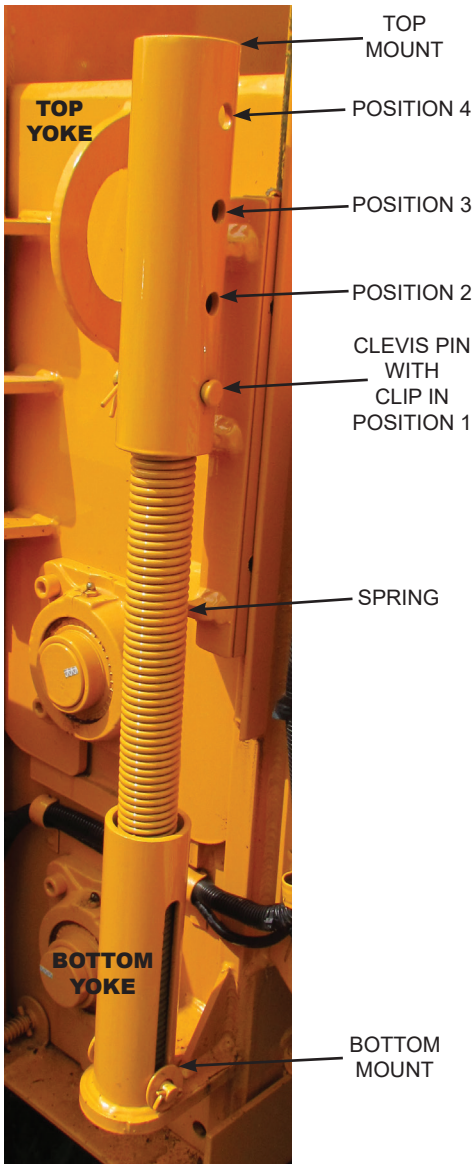
STEPS TO FOLLOW WHEN UNPLUGGING YOUR CHIPPER

1. Before attempting any type of maintenance disengage clutch, turn off engine, wait for the disc/drum to come to a complete stop, install the disc/drum lock pin, disconnect battery, and make sure the ignition key is in your possession.
2. There should, also, be at least two people on site during maintenance and service procedures in case an accident should occur.
3. Make sure the chipper disc/drum is **NOT** turning and then open the hinged portion of the chipper hood.
4. Using gloved hands and some type of raking tool, dig the chips out of the chipper housing.
5. If the discharge chute is plugged, use a raking tool to pull the majority of chips out of the open outlet end of the chute. If the discharge chute needs to removed, use some sort of mechanical device like an overhead hoist, loader, lift truck, etc. that is rated to lift the discharge. Follow all OSHA instructions for lifting.
6. Never allow a person to turn the chipper disc/drum when someone else is working inside the chipper housing. More than likely, the chipper disc/drum will turn hard then loosen causing it to turn faster. If another person is anywhere near the chipper disc/drum, they may be injured.
7. Never turn the chipper disc/drum by hand. Always use a pry bar or wood bar. This will prevent the person turning the disc/drum from being injured should the disc/drum break loose.
8. Reinstall the discharge chute, mount securely and point it in a safe direction away from anything.
9. Never leave the chipper hood open and try to start the engine in order to engage the chipper disc/drum to blow chips out of the housing, this is very hard on the P.T.O. of the chipper and may burn clutch plates. Also, the flying debris is very dangerous. An exposed chipper disc/drum turning very fast creates an unsafe condition. In other words, **DO NOT** start the chipper with the hood open because it is just too dangerous.
10. Once the disc/drum turns freely, close the chipper hood, insert the hood pin, install the padlock in the hood pin, reinstall the chipper hood engine disable plug, make sure the spring lock for hood pin springs back to the correct operating position on disc chippers, pick up all tools, make sure the chipper is free of all debris, start engine, properly engage clutch and throttle to full speed. Insert a small branch into the feedwheel(s). If the chips discharge properly, the chipper is clear and normal operation may resume.

EASY CLIMB FEED SYSTEM

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.



The Easy Climb System allows you to adjust the amount of spring tension put on the top feedwheel. The more spring tension you have the harder it will be for your top feedwheel to raise. More spring tension will keep the top feedwheel down on smaller brush material. The less spring tension you have the easier it will be for the top feedwheel to raise. Less spring tension allows the top feedwheel to raise, and climb over the larger diameter material. Additional spring tension requires more hydraulic yoke lift cylinder power to raise the top feedwheel. May require slight hydraulic relief valve adjustment.

There are four adjustment positions on the Easy Climb System. When adjusting spring tension have the top feedwheel in the lowered position. Use the Clevis Pin with Clip to adjust the tension. Make sure that the Clevis Pin is installed properly and that the Clip is secured tightly in place.

With the pin in position 1 the Easy Climb System will have approximately 6" (152 mm) of travel before you start spring tension. Use this position when chipping the maximum diameter material allowed by the chipper.

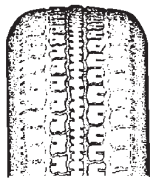
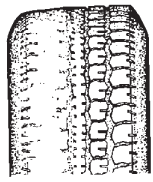
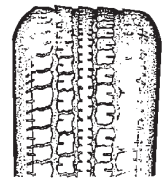
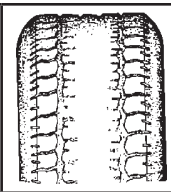
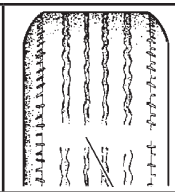
With the pin in position 2 the Easy Climb System will have approximately 4" (102 mm) of travel before you start spring tension. Use this position while chipping slightly smaller material than the maximum diameter material allowed by the chipper.

With the pin in position 3 the Easy Climb System will have approximately 2" (51 mm) of travel before you start spring tension. Use this position when chipping brush type material.

With the pin in position 4 the Easy Climb System will have approximately 0" of travel before you start spring tension. Use this position when chipping small brush type material.

ADJUST ACCORDINGLY AS SPRINGS STRETCH.

TIRE WEAR DIAGNOSTIC CHART

Wear Pattern					
	Edge Wear	Side Wear	Cupping	Center Wear	Flat Spots
Cause	• Under Inflation	• Not hauling trailer level • Bent axles • Wide tires • Wheel bearings	• Out of balance wheel bearings	• Over inflation	• Wheel lock up and tire skidding
Action	• Adjust pressure to particular load per tire catalog	• Must be hauled parallel to the ground • Replace as needed • Characteristic of wide flotation tires • Adjust or replace	• Check bearing adjustment and balance tires • Adjust or replace	• Adjust pressure to particular load per tire catalog	• Avoid sudden stops and adjust brakes

The wear pattern and tread life of tires involves many variables that the user has control of, but DOES NOT fall under faulty manufacture or design.

The following is a list of some causes supplied by tire suppliers and axle manufacturers:

- Misalignment - from rough roads, pot holes, excessive speeds and hitting curbs.
- Tire Width - the wider the tire for flotation, the more uneven the tire wear.
- Tire Air Pressure - to much or too little, for the load.
- Vehicle Hitch Height - if trailer is not level with ground, axle camber is misaligned.
- Maintenance - wheel bearing lubrication and adjustment. Follow axle MFG. instructions.
- Brakes - uneven or misadjusted brakes cause irregular brake activation.

RECOMMENDED BRAKE ADJUSTMENT PROCEDURE PER AXLE MANUFACTURER.

The proper clearance between the shoe and drum surfaces will be set up initially from our factory to assure proper operation during the normal break in period. No further adjustment will be necessary until the vehicle completes the recommended break in period of 200 miles (322 km).

Since all brakes of this type must be burnished or “run in” before their full effectiveness can be achieved, the MFG. maintenance manuals call for readjustment after the first 200 miles (322 km) of operation. This usually allows ample time for the burnishing to take place. Readjustments are not necessary for brakes fitted with self-adjustment features although periodic inspection is suggested.

The following shows the correct adjustment for the MFG. brakes of 12 1/4” diameter

NOTICE

Clearances that are too small will result in excessive drag and overheating while too much clearance can render the brake nonfunctional.

AXLE SIZE	SIZE	TYPE	DIAMETRAL CLEARANCE	CLICKS TO BACK OFF
10,000 LBS.	12 1/4” x 3.38”	Elec. or Hyd.	.040” (1 mm)	Automatic Adjusting
12,000 LBS.	12 1/4” x 5”	Elec. or Hyd.	.040” (1 mm)	Automatic Adjusting

For additional brake adjustment procedures consult the axle manufacturer manual.

For additional parts break downs and service videos go to www.dexteraxle.com

HYDRAULICS

WARNING

DO NOT GO NEAR LEAKS!

- Pressured oil easily punctures skin causing injury, gangrene or death.
- Seek immediate medical care.
- Do not use finger or skin to check for leaks.
- Remove hydraulic pressure or load before loosening fittings.
- Hydraulic components and oil may be hot. Allow sufficient time to cool.
- Avoid burns from fluid. Hot fluid under pressure can cause severe burns.

DANGER

LOCKOUT ALL ENERGY SOURCES BEFORE SERVICING OR REMOVING GUARDS OR HOODS!

1. **Shut off engine/motor. Key in possession.**
2. **Disengage pto/clutch.**
3. **Wait for cutter disc/drum to come to a COMPLETE STOP (takes at least several minutes).**
4. **Install disc/drum lock pin.**
5. **Loader arm (if equipped) securely on ground and hydraulic pressure released.**

6. **Unplug engine disable plug-in.**
7. **Remove padlock from hood pin.**
8. **Press down and hold hood spring lock pin (on disc chippers).**
9. **Retract hood pin.**

DO NOT RESTART UNTIL ALL GUARDS AND HOODS ARE SECURELY AND PROPERLY INSTALLED.

HYDRAULICS

⚠WARNING

It is very important after you have operated a new machine for approximately an hour to shut down the machine and recheck all hydraulic fittings. Relieve all pressure and retighten as needed.

DO NOT GO NEAR HYDRAULIC LEAKS! High pressure oil easily punctures skin causing serious injury, gangrene, or death. Avoid burns from fluid. Hot fluid under pressure can cause severe burns. DO NOT use fingers or skin to check for leaks. Lower load or relieve hydraulic pressure before loosening fittings. Relieve all pressure in the system before disconnecting the lines, hoses, or performing other work. Use a piece of cardboard to find leaks. Never use your bare hands. Allow system to cool down to ambient temperature before opening any coolant or hydraulic oil system.

In cold weather situations let your hydraulic system idle for approximately 15 minutes to allow the system to warm up to operating temperature.

⚠WARNING

DO NOT operate this machine unless all hydraulic control devices operate properly. They must function, shift and position smoothly and accurately at all times. Faulty controls can cause personal injury!

HYDRAULIC FLUID REQUIREMENTS

This machine is equipped with “Petro-Canada Hydrex XV” hydraulic fluid. It is recommended to replace with the same. “Petro-Canada Hydrex XV” is an all season hydraulic fluid. This is a premium performance, long life anti-wear, hydraulic fluid, designed for all season use in heavy duty hydraulic systems. “Petro-Canada Hydrex XV” allows year round use under wide extremes of temperature. It allows the hydraulic system to start at temperatures as low as -40°C/-40°F, under no load conditions and it improves lubrication of hydraulic components at high operating temperatures. It will also help protect against hydraulic failures during the wide temperature swings of spring and fall. To find the closest “Petro-Canada Hydrex XV” dealer call 1-888-284-4572.

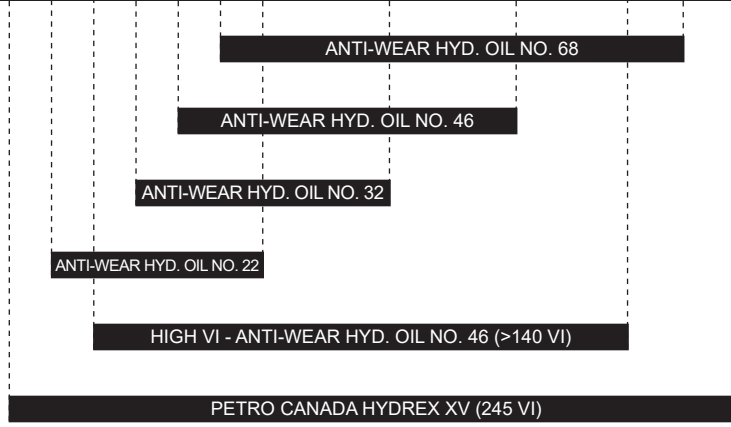
Multi Viscosity motor oils are not recommended to mix with “Petro-Canada Hydrex XV” hydraulic oil. AW oils may mix with “Petro-Canada Hydrex XV” hydraulic oil. The following are specifications and authorizations of compatible oils. Only a high quality anti-wear (AW) hydraulic oil containing foam, corrosion, rust and oxidation inhibitors should be used. This viscosity grade depends on the oil temperature in service, based on the climate and operating conditions.

	Hydrex XV	ISO 22, AW	ISO 32, AW	ISO 46, AW	ISO 68, AW	ISO 100, AW
Viscosity Index	>235	>95	>95	>95	>95	>95
Flash Point	>240°C/464°F	>200°C/395°F	>210°C/410°F	>220°C/430°F	>220°C/430°F	>240°C/464°F
Oxidations Stability (ASTM D0943)	>9,000 Hours	>3,000 Hours	>3,000 Hours	>3,000 Hours	>3,000 Hours	>3,000 Hours
Cold Start-up, No Load, Max	-40°C/-40°F	-34°C/-29°F	-26°C/-14°F	19°C/-3°F	-9°C/16°F	-4°C/24°F

HYDRAULICS

Alternate hydraulic oils are available, but they do not equal the performance or longevity of the “Hydrex XV” oil. Consult the following information supplied by the oil distributor.

CELSIUS (C)	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+43	+49	+54
FAHRENHEIT (F)	-40	-30	-15	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+110	+120	+130



NOTICE

The above chart is a suggested guide for viscosity of hydraulic fluids at start up ambient temperature. The load, demand, and cleanliness of the equipment will affect actual oil temperatures which can increase dramatically above ambient air temperatures during operation. The actual viscosity needed is based on oil temperature during operation and not air temperature. Compare your fluid specifications with the specifications below to verify compliance.

When choosing a hydraulic fluid - these maximum and minimum specifications must be met:

Minimum Viscosity during operation = 12 cSt
Maximum No-Load Viscosity at start-up = 2000 cSt

Hydraulic fluids vary in their resistance to oxidation at elevated temperatures, their ability to protect against metal-to-metal contact under increasing temperature, and their ability to separate water from the fluid. Viscosity is temperature dependant. Fluids with high viscosity-index (VI) will thin out slower at higher temperature and thicken slower at colder temperatures allowing a wider operating range. Choose a fluid that has test results in these areas for best results.

Based on the varying temperatures of the area where Bandit equipment is used, and the high demand and loads placed on this equipment, Bandit has filled each hydraulic system with Petro-Canada’s Hydrex XV All Season Hydraulic Fluid for maximum protection and performance.

Contact Petro Canada at (888) 284-4572 to find a dealer near you.

NOTICE

Some equipment and components such as a fluid engagement clutch (PTO) have their own lubrication requirements. Consult their manufactures manual for that information.

HYDRAULICS

TYPICAL HYDRAULIC RELIEF PRESSURE SETTINGS
TYPICAL HYDRAULIC FLOWS AND RPM SETTINGS
(Approximate, For Reference Only, Engine At Full RPM)

Equipment Model	20XP		20XP Track	
Pump GPM (LPM)	28 (106)		Feed 28 (106)	Track 24 (91)
Top Feedwheel GPM (LPM)	12 (45.4)		12 (45.4)	
Bottom Feedwheel GPM (LPM)	16 (60.5)		16 (60.5)	
Feedwheel RPM	Top 28	Bottom 41	Top 28	Bottom 41
Main Relief PSI (bar)	Top 2300 (159)	Bottom 2600 (179)	Top 2300 (159)	Bottom 2600 (179)
Yoke Relief PSI (bar)	Up 1150 (79)	Down 1850 (128)	Up 1150 (79)	Down 1850 (128)
Discharge Rotate PSI (bar)	1000 (69)		2000 (138)	
Discharge Flipper PSI (bar)	1000 (69)		2200 (152)	
Stabilizers PSI (bar)	1000 (69)		N/A	
Tongue Jack PSI (bar)	2200 (152)		N/A	
2 Speed PSI (bar)	N/A		750 (52)	

Equipment Model	75 Loader	
Jib In/Out PSI (bar)	2200 (151)	
Swing Left/Right PSI (bar)	1800 (124)	
Grapple Rotate PSI (bar)	2200 (151)	
Main Boom PSI (bar)	Up 2600 (179)	Down 1000 (69)
Grapple PSI (bar)	2200 (151)	

NOTICE

DO NOT UNDER ANY CIRCUMSTANCES OVER-SET THESE RELIEF PRESSURES, BECAUSE IT WILL CAUSE DAMAGE TO COMPONENT PARTS AS WELL AS HYDRAULIC PARTS.

NOTICE

These typical hydraulic flows and relief pressure settings are with the engine at full RPM. All settings are subject to change!

⚠CAUTION

After the initial start-up of the machine and after any replacement of hydraulic components, that fittings and hoses should be re-checked for leaks and clearances.

HYDRAULICS
THE BANDIT HYDRAULIC SYSTEM

The Bandit is equipped with a very efficient, simple hydraulic system. Each component is capable of withstanding a specified PSI (bar) and still operate for a very long time.

If the simple rules mentioned below are followed, the hydraulic components will last for years:

- After you have operated a new machine for approximately an hour shut down the machine and recheck all hydraulic fittings for tightness and leaks.
- Avoid hydraulic pump cavitation. Low oil levels or cold start-ups will cause the hydraulic pump to cavitate. Cavitation will ruin the pump and possibly the entire hydraulic system. Cavitation only has to happen once. This will start the pump on its way to ruin. Allow hydraulic system to turn slowly for several minutes in cold weather in order for hydraulic system to warm up. Cavitation is not covered under warranty.
- Do not increase the feedwheel relief valve settings beyond specified PSI (bar). This will cause damage to hydraulic components. Do not set any other hydraulic component past it's specified pressure or this will cause damage to the hydraulic components.
- Keep hydraulic oil clean. Dirty oil will cause excessive wear and loss of hydraulic power.
- Replace the hydraulic oil filter(s) after first 10 hours and with each 400 hours of operation or 3 months.
- Replace hydraulic oil & suction screen(s) at least once yearly. This is also a very good time to flush and clean the tank. Replace hydraulic oil immediately if it is contaminated or looks "milky". See pages 74 - 75 for hydraulic oil requirements.
- If the Bandit's hydraulic system is kept clean and the hydraulic pressures are not increased beyond the specified PSI (bar), the maximum use and life should be received from the Bandit chipper hydraulic system.
- If a problem is encountered, it will more than likely be located in the relief valve or something as simple as belts or clutch slipping, check these first.
- Only use the optional adjustable flow control when chipping large diameter trees. Do not leave the speed adjustment partially open for long periods of time. This will cause excessive heat to the hydraulic system! Excessive heat will cause low feedwheel power and premature failure of all hydraulic components. Always operate system at full oil flow unless chipping large diameter trees.
- Do not close the optional hydraulic shut-off valve for more than 3 to 4 seconds. Hydraulic shut-off valve handle must be completely turned on (in line with hose) at all times unless checking hydraulic pressure. Pressure gauge should be safely stored and installed only when checking pressure. Follow above instructions or this will cause unwarranted damage to the hydraulic components.
- Never close the ball valves on the hydraulic tank suction ports (if equipped) while the machine is running, this will ruin the hydraulic pump and components.
- Some component manufacturers require different specific hydraulic lubrication, such as gear boxes, undercarriage drives, etc. Refer to their manuals and maintenance section of this manual.

⚠CAUTION

After the initial start-up of the machine and after any replacement of hydraulic components, that fittings and hoses should be re-checked for leaks and clearances.

HYDRAULICS

⚠WARNING

It is very important after you have operated a new machine for approximately an hour to shut down the machine and recheck all hydraulic fittings. Relieve all pressure and retighten as needed.

DO NOT GO NEAR HYDRAULIC LEAKS! High pressure oil easily punctures skin causing serious injury, gangrene, or death. Avoid burns from fluid. Hot fluid under pressure can cause severe burns. DO NOT use fingers or skin to check for leaks. Lower load or relieve hydraulic pressure before loosening fittings. Relieve all pressure in the system before disconnecting the lines, hoses, or performing other work. Use a piece of cardboard to find leaks. Never use your bare hands. Allow system to cool down to ambient temperature before opening any coolant or hydraulic oil system.

In cold weather situations let your hydraulic system idle for approximately 15 minutes to allow the system to warm up to operating temperature.

⚠WARNING

DO NOT operate this machine unless all hydraulic control devices operate properly. They must function, shift and position smoothly and accurately at all times. Faulty controls can cause personal injury!

NOTICE

Some equipment and components such as fluid engagement clutch's (PTO's) have their own lubrication requirements. Consult their manufactures manual for that information.

⚠DANGER

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

NOTICE

DO NOT UNDER ANY CIRCUMSTANCES OVER-SET THESE RELIEF PRESSURES, BECAUSE IT WILL CAUSE DAMAGE TO COMPONENT PARTS AS WELL AS HYDRAULIC PARTS.

NOTICE

These typical hydraulic flows and relief pressure settings are with the engine at full RPM. All settings are subject to change!

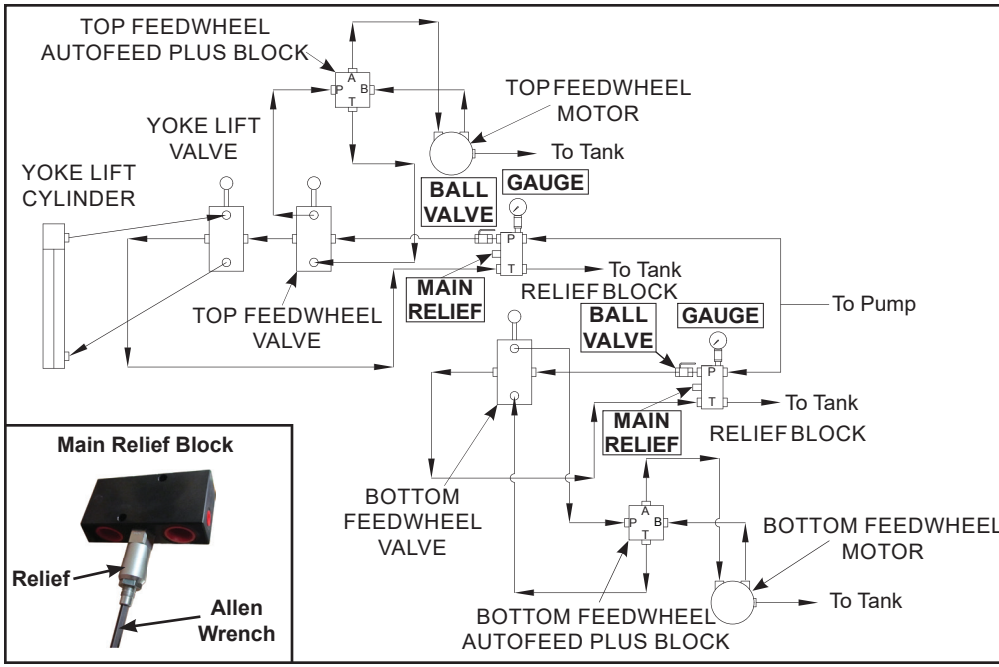
⚠CAUTION

After the initial start-up of the machine and after any replacement of hydraulic components, fittings and hoses must be re-checked for leaks and clearances.

NOTICE

When returning hydraulic components for warranty make sure to box up all warranted parts to avoid additional damage while shipping. **Do not disassemble any hydraulic components which are to be warranted.** Anything which has been disassembled or tampered with will not be warranted. Items being returned must be clean. All hydraulic components must have all hosing ports plugged. Failure to plug ports will allow debris to enter components which will void warranty.

ADJUSTING THE FEEDWHEEL MAIN PRESSURE



⚠WARNING

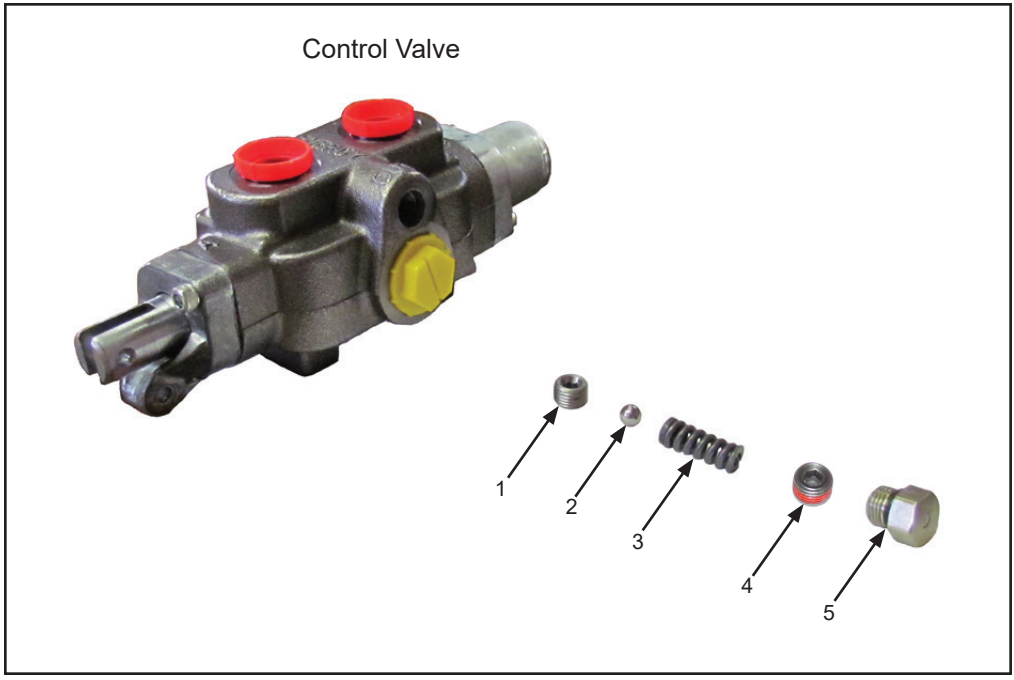
Before attempting any hydraulic pressure settings, make sure engine is shut off, engine key removed and in your possession, hydraulic oil is clean, hydraulic tank is 3/4 to 7/8 full, and the machine has been pre-run to warm the hydraulic oil. To correctly check relief valve pressure, gauge MUST be installed correctly.

1. Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.
2. Install pressure gauge on the test nipple that is on the main relief.
3. Start the engine.
4. Make sure the feed control is in the off position.
5. Adjust engine to full throttle.
6. Close the ball valve.
7. Pressure gauge should read maximum specified PSI (bar).
   ONLY CLOSE BALL VALVE FOR 4-5 SECONDS TO SET PRESSURE OR YOU MAY DAMAGE HYDRAULICS.
8. Locate the relief on the main relief block, loosen jam nut, use an allen wrench to readjust relief pressure setting if needed, and then retighten jam nut.
9. Remove the pressure gauge and place the rubber cap back on the test nipple.
10. Check for hydraulic leaks.
11. Relief valve pressure should be checked and/or readjusted every month for best performance.

MAINTAIN FEEDWHEEL HYDRAULIC PRESSURE AT SPECIFIED PSI (bar).

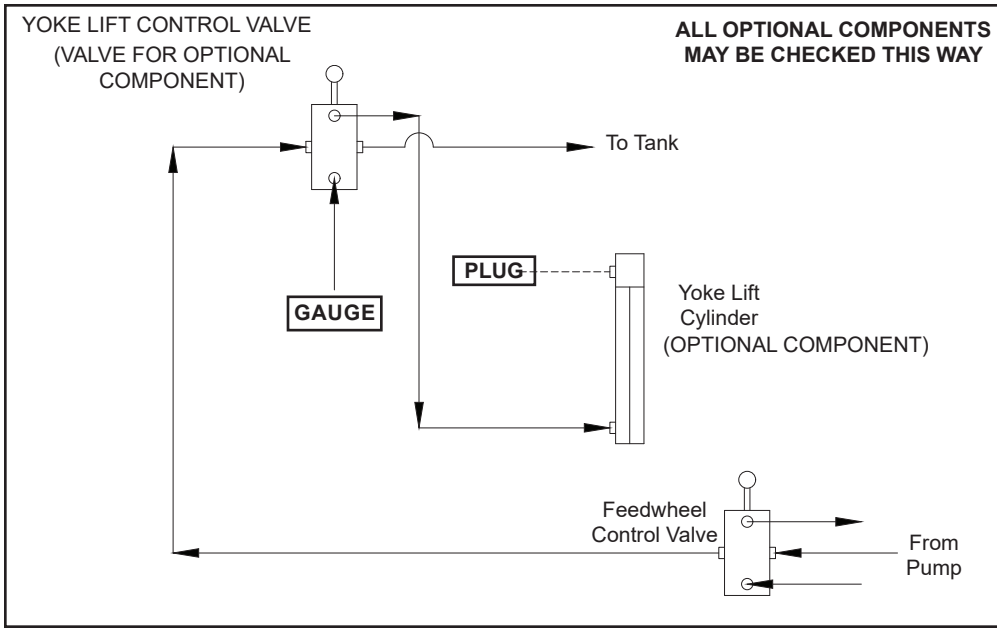
PROCEDURE FOR CHECKING OPTIONAL HYDRAULIC COMPONENTS

The relief valve is typically located internally in the control valve. Do not adjust this relief valve above 2500 PSI (172 bar). The relief valve system is a simple spring tension design but small pieces of debris can stick the valve partially open which weakens the feedwheel power. The relief as well as hydraulic oil, and screen must be kept clean.



1. **VALVE SEAT:**
   The springs pushes the relief valve ball against it, until pressure builds.
2. **POPPIT VALVE:**
   This ball opens and closes to relieve excess pressure on hydraulic system.
3. **RELIEF SPRING:**
   This spring tensions the amount of pressure required to open the relief valve ball. This spring weakens and must be checked and/or readjusted every month for best performance.
4. **ALLEN SET SCREW:**
   Turn clockwise using a 1/4” allen wrench to increase pressure, but do not surpass maximum of the specified PSI (bar). Previous valves require 7/32” allen wrench or a flat head screw driver.
5. **HEX HEAD PLUG:**
   Remove to access the relief valve.

PROCEDURE FOR CHECKING OPTIONAL HYDRAULIC COMPONENTS



⚠WARNING

Before attempting any hydraulic pressure settings, make sure engine is shut off, engine key removed and in your possession, hydraulic oil is clean, hydraulic tank is 3/4 to 7/8 full, and the machine has been pre-run to warm the hydraulic oil. To correctly check relief valve pressure, gauge MUST be installed correctly.

1. First put control bar in off position.
2. Disconnect hose coming out of the port farthest from the handle of the control valve from the optional motor or cylinder, and plug the hose.
3. Leave all other hydraulic hoses connected.
4. Install pressure gauge in the valve port which had the hose of the optional motor or cylinder disconnected.
5. Start engine with the control bar in the off position.
6. Adjust engine to full throttle.
7. Only operate the valve for that component to activate pressure gauge. Pressure gauge should read the maximum specified PSI (bar) for that component, see page 77.
   ONLY OPERATE VALVE FOR 4-5 SECONDS TO SET PRESSURE OR YOU MAY DAMAGE HYDRAULICS.
8. Readjust relief pressure setting if needed, if not needed, shut off engine and remove plug and pressure gauge. Reassemble control valve to optional motor or cylinder.
9. Check for hydraulic leaks.
10. Relief valve pressure should be checked and/or readjusted every month for best performance.

MAINTAIN HYDRAULIC PRESSURE AT SPECIFIED PSI (bar).

HYDRAULIC SYSTEM TROUBLE SHOOTING

Before attempting any type of maintenance, disengage clutch, wait for the disc/drum to come to a complete stop, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the disc/drum lock pin, and disconnect the battery.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Feedwheel(s) turn at normal speed but does not chip wood properly	1. Dull knives 2. Worn feed teeth 3. Low feedwheel relief valve setting 4. Pump is worn 5. Motor is weak 6. Feedwheel springs too loose 7. Clutch / belts out of adjustment 8. Engine not running at full RPMs	1. Replace knives 2. Replace 3. Readjust to specified PSI (bar) 4. Replace 5. Replace 6. Adjust 7. Adjust 8. Adjust
Feedwheel(s) slow or stop when feeding	1. Dull knives 2. Relief valve is worn or dirty 3. Pump is worn 4. Motor is worn 5. Feedwheel springs too tight 6. Feedwheel slide box sticking or hanging up	1. Replace knives 2. Clean, reset, or replace 3. Replace 4. Replace 5. Adjust 6. Lubricate
Feedwheel(s) turn slowly or not at all	1. Relief valve stuck open 2. Worn hydraulic motor 3. Pump is worn 4. Feedwheel relief pressure not correct 5. Pinched or damaged hydraulic hose 6. Feedwheel valve (control valve) worn & leaking internally 7. Autofeed dump valve stuck open 8. Low hydraulic oil level 9. Plugged oil screen 10. Binding such as worn bearings, etc. 11. Control lever improperly shifting valve	1. Clean or replace 2. Replace 3. Replace 4. Reset to specified PSI (bar) 5. Replace 6. Replace 7. Lightly tap on dump block, remove & clean, or replace 8. Fill 3/4” to 7/8” full 9. Replace 10. Repair 11. Readjust, valve must open completely
Hydraulic oil very hot, causing system to operate slowly	1. Dull knives 2. Low oil level 3. Pump is worn 4. Relief valve stuck open or opens easily 5. Damaged hose 6. Oil suction screen or filter plugged 7. Oil cooler plugged, if equipped 8. Motor is worn 9. Binding 10. Operator running oil over relief too much 11. Flow control is on for too long	1. Replace knives 2. Fill 3/4” to 7/8” full 3. Replace 4. Clean, reset, or replace 5. Replace 6. Clean or replace 7. Clean 8. Replace 9. Repair 10. **Do not** do this 11. Open flow control

MAINTAIN FEEDWHEEL HYDRAULIC PRESSURE AT SPECIFIED PSI (bar)

Follow typical hydraulic flow and relief settings on pages 76 - 81.
Follow proper hydraulic oil requirements on pages 74 - 75.

CORRECTING HYDRAULIC PROBLEMS

Before attempting any type of maintenance disengage clutch, turn off engine, wait for the disc/drum to come to a complete stop, install the disc/drum lock pin, disconnect battery, and make sure the ignition key is in your possession!

COMPONENT	PROCEDURE
Checking relief valve setting	Refer to the hydraulic pressure adjustment procedure section of the manual to find the correct procedure for checking relief valve setting. (pages 79 - 81)
Adjusting relief valve setting	Refer to the hydraulic pressure adjustment procedure section of the manual to find the correct procedure for adjusting relief valve pressure settings. (pages 79 - 81)
Cleaning relief valve (with engine shut off)	1. Remove plug from feedwheel valve (control valve), see illustration of relief valve components. (page 80) 2. Unscrew slotted set screw completely out of the valve. 3. Remove poppit spring. 4. Remove poppit ball. 5. Clean all parts, inspect for damage and blow out relief hole with air. 6. Reassemble, set and maintain feedwheel hydraulic pressure at specified PSI (bar).
Checking for defective pump	See pages 84 - 85 on how to check a hydraulic pump.
Checking for defective motor	1. If everything checks out as correct, it may be time to check the hydraulic motor. 2. If your machine has Live Hydraulics, see page 86 on how to check a hydraulic motor. 3. If your machine does not have Live Hydraulics, contact your local dealer or Bandit Industries for instructions.

NOTICE

When returning hydraulic components for warranty make sure to box up all warranted parts to avoid additional damage while shipping. **Do not disassemble any hydraulic components which are to be warranted.** Anything which has been disassembled or tampered with will not be warranted. Items being returned must be clean. All hydraulic components must have all hosing ports plugged. Failure to plug ports will allow debris to enter components which will void warranty.

MAINTAIN FEEDWHEEL HYDRAULIC PRESSURE AT SPECIFIED PSI (bar)

Follow typical hydraulic flow and relief settings on pages 76 - 81.

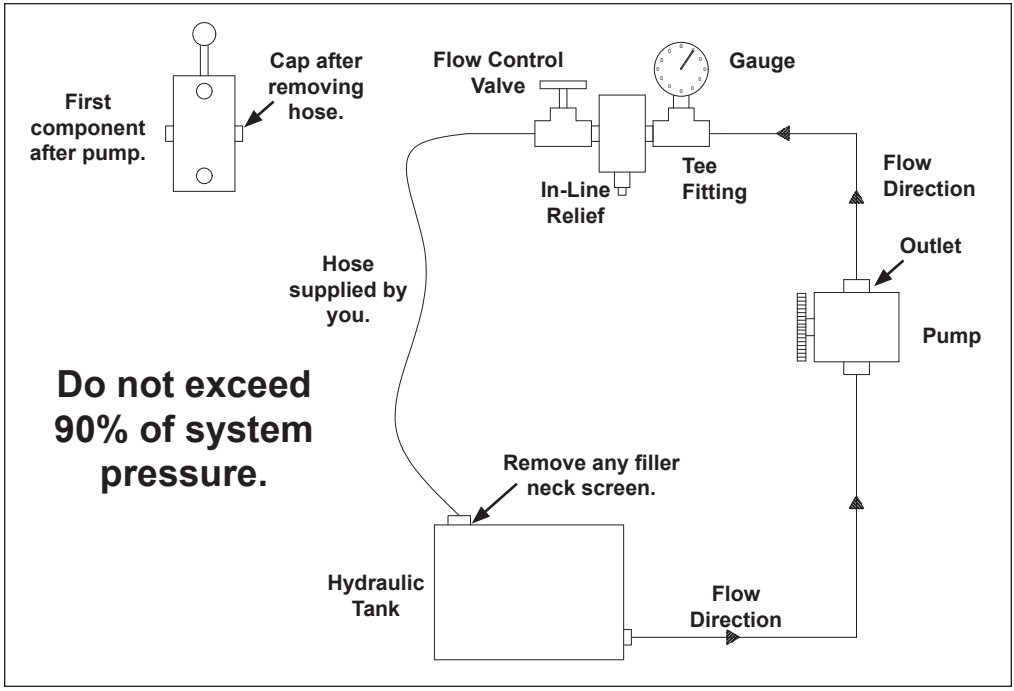
Follow proper hydraulic oil requirements on pages 74 - 75.

HYDRAULIC PUMP CHECK OUT

HYDRAULIC PUMP CHECK WITHOUT USING A FLOW METER

To check out the hydraulic pump the mechanic will need a needle type control valve, a pressure gauge capable of reading 3000 psi (207 bar), an in-line 2500 psi (172 bar) relief, and a hose long enough to span between the pump and the hydraulic tank.

1. Disconnect the pressure line going from the pump at the first component and cap the fitting at the component.
2. Attach a Tee fitting to the end of the pressure hose (which was removed from the component) and install the Tee fitting and gauge.
3. Attach an in-line 2500 psi (172 bar) relief to the Tee fitting with the gauge.
4. Attach the hydraulic flow control valve to the in-line relief and the hose (you supply) to the outlet port of the flow control valve.
5. **Make sure the pressure gauge is installed up stream from the flow control valve. Failure to do this will cause serious damage to the hydraulic pump when testing.**
6. If the hydraulic oil tank is equipped with a mesh strainer in the fill neck, remove it and place the open end of the hose (you supply) into the tank fill neck.
7. **MAKE SURE THAT THE FLOW CONTROL VALVE IS FULLY OPEN SO AS TO ALLOW UNRESTRICTED FLOW TO PASS THROUGH IT.**
8. Start the engine to engage the pump, the clutch may have to be engaged if the pump is belt driven.
9. Have a second person lift the hydraulic hose far enough out of the tank inlet to observe the flow of oil going into the tank. Observe the pressure gauge reading to make sure a high pressure does not exist.
10. Increase the engine speed slowly to full rpm and at the same time observe the pressure. This should still remain low.
11. **SLOWLY** turn the needle valve on the flow control in and observe the pressure increase on the pressure gauge.
12. Continue closing the flow control valve until the pressure gauge reading reaches 90% of the normal relief valve setting (example: if system operates at 2500 psi (172 bar), do not exceed 2250 psi (155 bar). **Never allow the pressure to go more than 90% of the main relief pressure.**
13. If the pump is good there should be no noticeable decrease in the flow rate coming out of the hose and into the hydraulic tank.
14. If 90% of the main relief pressure can not be obtained and/or the flow rate of the hose is considerably less, then the pump is worn or damaged.

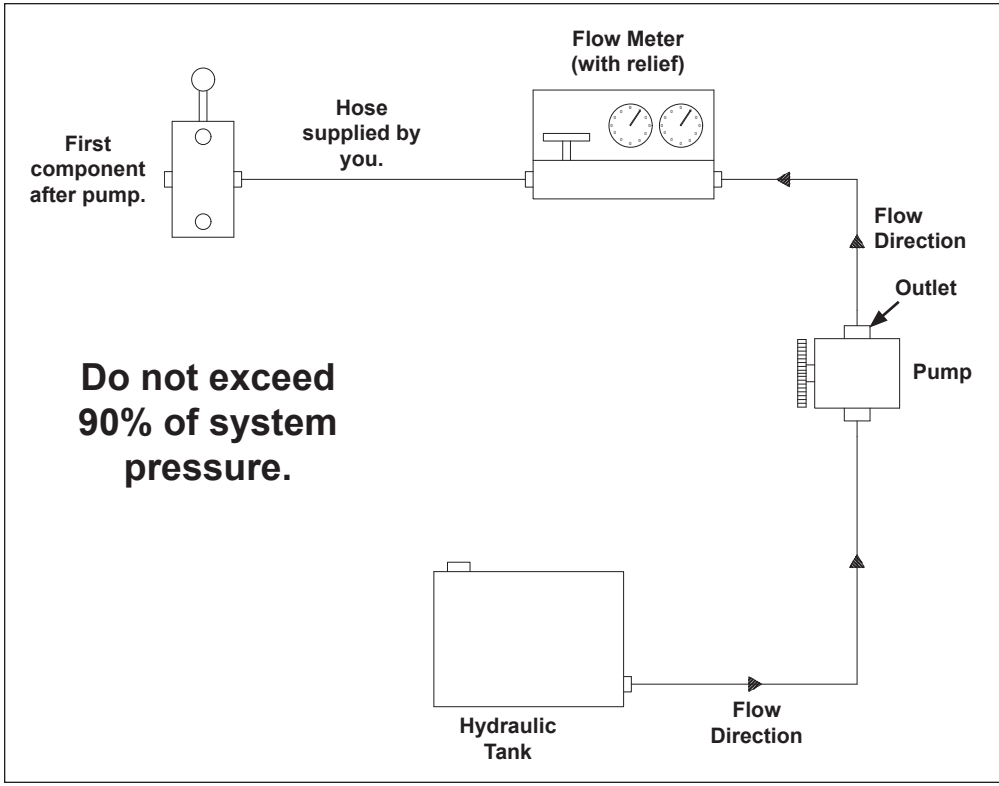


HYDRAULIC PUMP CHECK OUT

HYDRAULIC PUMP CHECK OUT USING A FLOW METER (WITH RELIEF)

To check out the hydraulic pump the mechanic will need a needle type flow meter capable of reading 3000 psi (207 bar) and a long enough hose that will go from the flow meter back to the first component.

1. Disconnect the pressure line going from the pump at the first component.
2. Attach the flow meter to the end of the pressure hose (which was removed from the component).
3. Attach the hose you supplied to the outlet of the flow meter and run the hose back to the first component. **MAKE SURE THE HOSES ARE ON THE CORRECT SIDES OF THE FLOW METER.**
4. **Make sure the pressure gauge is installed up stream from the flow control valve. Failure to do this will cause serious damage to the hydraulic pump when testing.**
5. **MAKE SURE THAT THE FLOW CONTROL VALVE IS FULLY OPEN SO AS TO ALLOW UNRESTRICTED FLOW TO PASS THROUGH IT.**
6. Start the engine to engage the pump, the clutch may have to be engaged if the pump is belt driven.
7. Observe the flow rate through the meter and pressure gauge reading to make sure a high pressure does not exist.
8. Increase the engine speed slowly to full rpm and at the same time observe the pressure and flow rate. The pressure should still remain low. Make a note of the flow rate (gpm or Lpm) at full engine rpm.
9. **SLOWLY** turn the needle valve on the flow control in and observe the pressure increase on the pressure gauge.
10. Continue closing the flow control valve until the pressure gauge reading reaches 90% of the normal relief valve setting (example: if system runs at 2500 psi (172 bar), do not exceed 2250 psi (155 bar). **Never allow the pressure to go more than 90% of the main relief pressure.**
11. If the pump is good, you should have at least 80% of the flow rate (gpm or Lpm) passing through the flow meter as noted at low pressure and full rpm (example: 10 gpm (38 Lpm) and low pressure = 8 gpm (30 Lpm) at 90% pressure).
12. If 90% of the main relief pressure can not be obtained and/or the flow rate passing through the meter is considerably less, then the pump is worn or damaged.

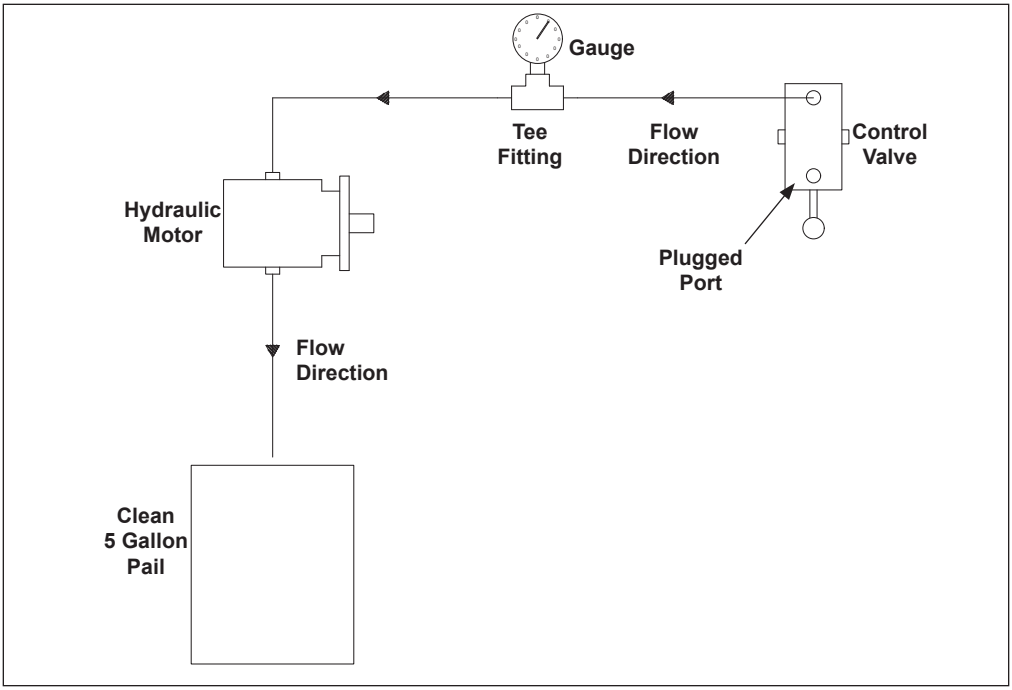


HYDRAULIC MOTOR CHECK OUT

HYDRAULIC MOTOR CHECK OUT FOR MACHINES WITH LIVE HYDRAULICS

To check out the hydraulic motor the mechanic will need a pressure gauge capable of reading 3000 psi (207 bar), a Tee fitting to install to the control valve, a plug fitting to install in the control or relief valve, and a clean 5 gallon (19L) pail.

1. The following instructions are for machines with Live Hydraulics, for machines without Live Hydraulics contact your local dealer or Bandit Industries.
2. In order to check out a hydraulic motor, it is necessary to mechanically stop the motor from turning while under load. The hydraulic pump needs to be driven without turning the chipper disc/drum (Live Hydraulics). Feed a reasonably large size log into the machine until it contacts the stationary disc/drum. This should stall the hydraulic motor(s). It may also be necessary to apply down pressure by operating the yoke control valve (if equipped).
3. With the feedwheel(s) mechanically locked as described, turn the engine off and keep the key in your possession. If the hydraulic motor does not have a case drain, unhook the hose going from the hydraulic motor back to the control valve at the valve, some machines will be equipped with a flow divider between the hydraulic motor and the control valve. If the hydraulic motor has a case drain, unhook the case drain hose that goes to the relief valve at the valve and put the hose into the hydraulic tank.
4. Place the end of the hose in a clean 5 gallon (19L) pail.
5. Plug the open port of the control valve or main relief valve.
6. Unhook the other hose in the control valve and install a Tee fitting into the control valve and attach the hose to the Tee fitting.
7. Install a pressure gauge in the other port in the Tee fitting to monitor hydraulic pressure.
8. Put the infeed control valve in the center position and start the engine.
9. Increase the engine speed slowly to full rpm.
10. Operate the infeed control valve to feed the log into the stationary disc/drum. If the feedwheel(s) try to turn, apply down pressure by using the yoke control valve (if equipped).
11. Providing the pump and the relief are functioning properly, the pressure gauge should read the specified main relief setting.
12. Observe the amount of hydraulic fluid coming from the hose into the pail. If the amount of leakage in the pail is 1 g.p.m. (3.8 L.p.m.) or less the motor is good. If the amount of leakage in the pail is over 1 g.p.m. (3.8 L.p.m.) the motor needs to be replaced.



CONTROL VALVE DETENT ASSEMBLY AND O-RING REPLACEMENT

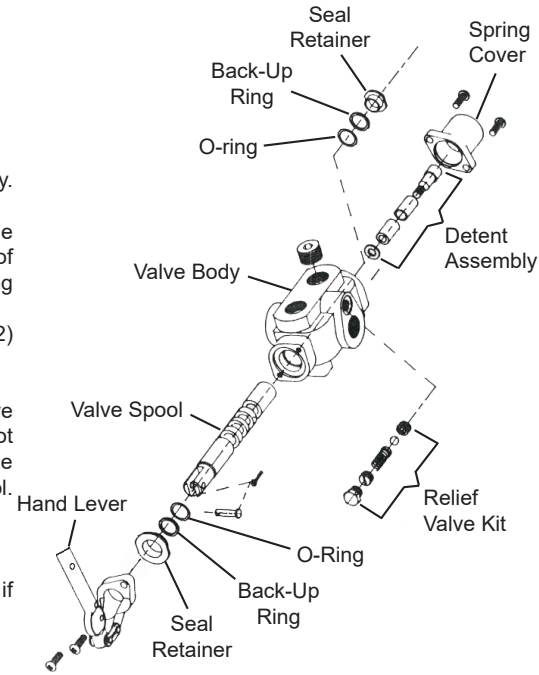
Tools Required:

- Small amount of clean hydraulic oil
- Clean working area, free of debris and shop rags
- 3/16” Tee handle hex driver
- 3/4” drag link drive socket
- Jawed vice

GENERAL PROCEDURE:

Disassembly:

1. Secure valve in vice or suitable method to firmly hold valve.
2. Note the orientation and placement of all components during disassembly.
3. Using the 3/16” Tee handle hex driver, remove (2) two socket head cap screws which hold the spring cover to the valve body. Set aside for re-use.
4. The detent assembly is now visible. Insert the 3/4” drag link drive socket blade into slot of retaining screw. Loosen and remove the retaining screw along with the entire detent assembly.
5. With the 3/16” Tee handle hex driver, remove (2) two socket head cap screws that hold the control lever assembly to the valve body.
6. Detach hand lever from spool. Carefully remove the spool from the valve body. Take care not scratch, dent, or nick the spool. Note the orientation of handle attachment point on spool. Set aside for re-use.
7. Remove (2) two seal retainers, o-rings, and back-up rings from both ends of the valve.
8. Inspect and replace o-ring and back-up ring if cut, or if leak is suspected.



Assembly:

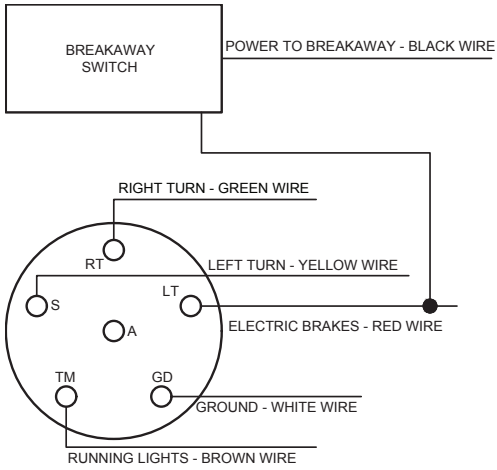
1. Lubricate spool, o-rings, and back-up rings with clean oil. Insert spool and center it in the valve body.
2. Place the new o-rings and back-up rings over spool ends and seat them into the valve body. Seat the seal retainer onto back-up ring making sure not to pinch the o-ring or back-up ring against the valve body.
3. Re-attach the hand lever to the spool. Mount control lever assembly onto the valve body using (2) two socket head cap screws. Apply Loctite 243 (blue) to the screws.
4. Thread a new detent assembly onto the spool end and hand tighten to 72 in-lbs (8 Nm) with the 3/4” drag link drive socket blade. No additional lubricant is required.
5. Mount the spring cover and the (2) two socket head cap screws. Apply Loctite 243 (blue) to the screws.
6. Hand tighten all (4) four socket head cap screws with the 3/16” Tee handle hex driver.
7. Shift valve with hand lever to assure operation. With some effort, the hand lever should move between three positions. The detent will hold the hand lever in the three positions.

Instructions and illustrations provided by component manufacturer.

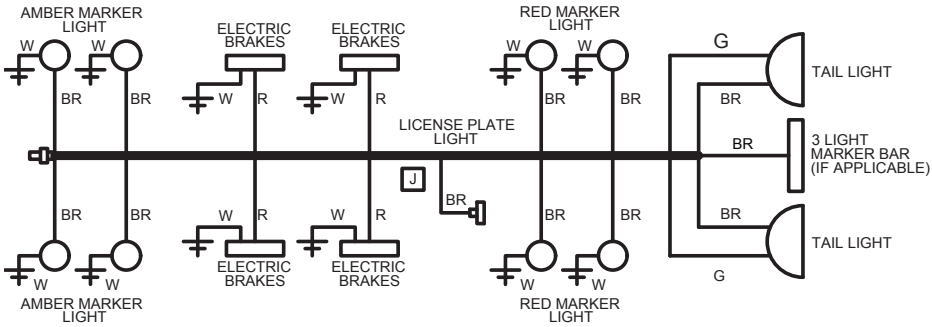
TYPICAL ELECTRICAL WIRING DIAGRAMS

WIRING FOR STANDARD 6 PRONG PLUG AND 6 WIRE MAIN CABLE

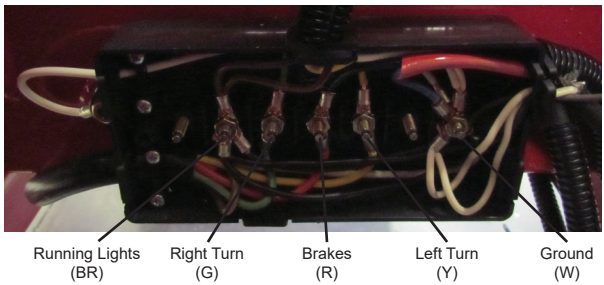
6 Wire Main Cable Color Code
Red R (Brakes & Breakaway Switch)
White W (Ground)
Green G (Right Turn)
Yellow Y (Left Turn)
Brown BR (Running Lights)
Black BL (Power to Breakaway Switch)



J **JUNCTION BOX**
WIRES SPLICED TOGETHER WHITE
WIRES GROUNDED



JUNCTION BOX



REPLACEMENT PARTS SECTION

Depending on what replacement parts you are ordering
the following information will be needed:

CHIPPER COMPONENTS
Serial Number
Model Number of Chipper

ENGINE COMPONENTS
Brand
Engine Serial Number
Engine Spec. Number

CLUTCH COMPONENTS
Brand
Serial Number
Assembly Number of Clutch

NOTICE

When ordering any replacement parts you should have the serial number (S/N) and model of the machine to ensure that you receive the correct replacement part. See page 6 for typical serial number & work order number locations.

NOTICE

All nuts, bolts, washers, and many other components can be ordered by physical description.

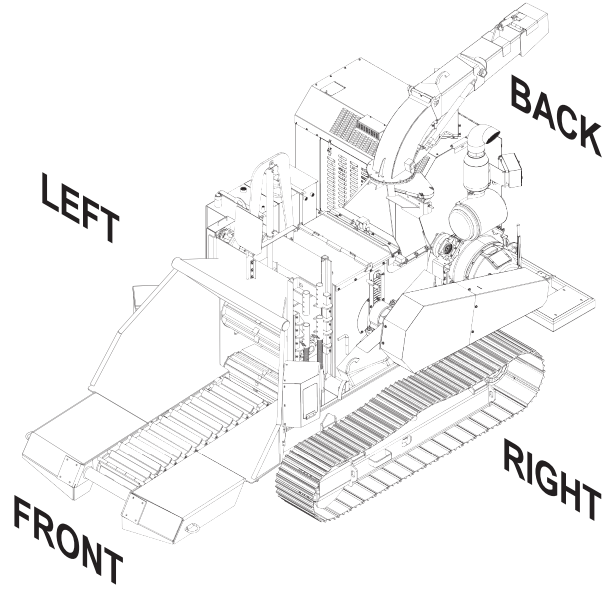
NOTICE

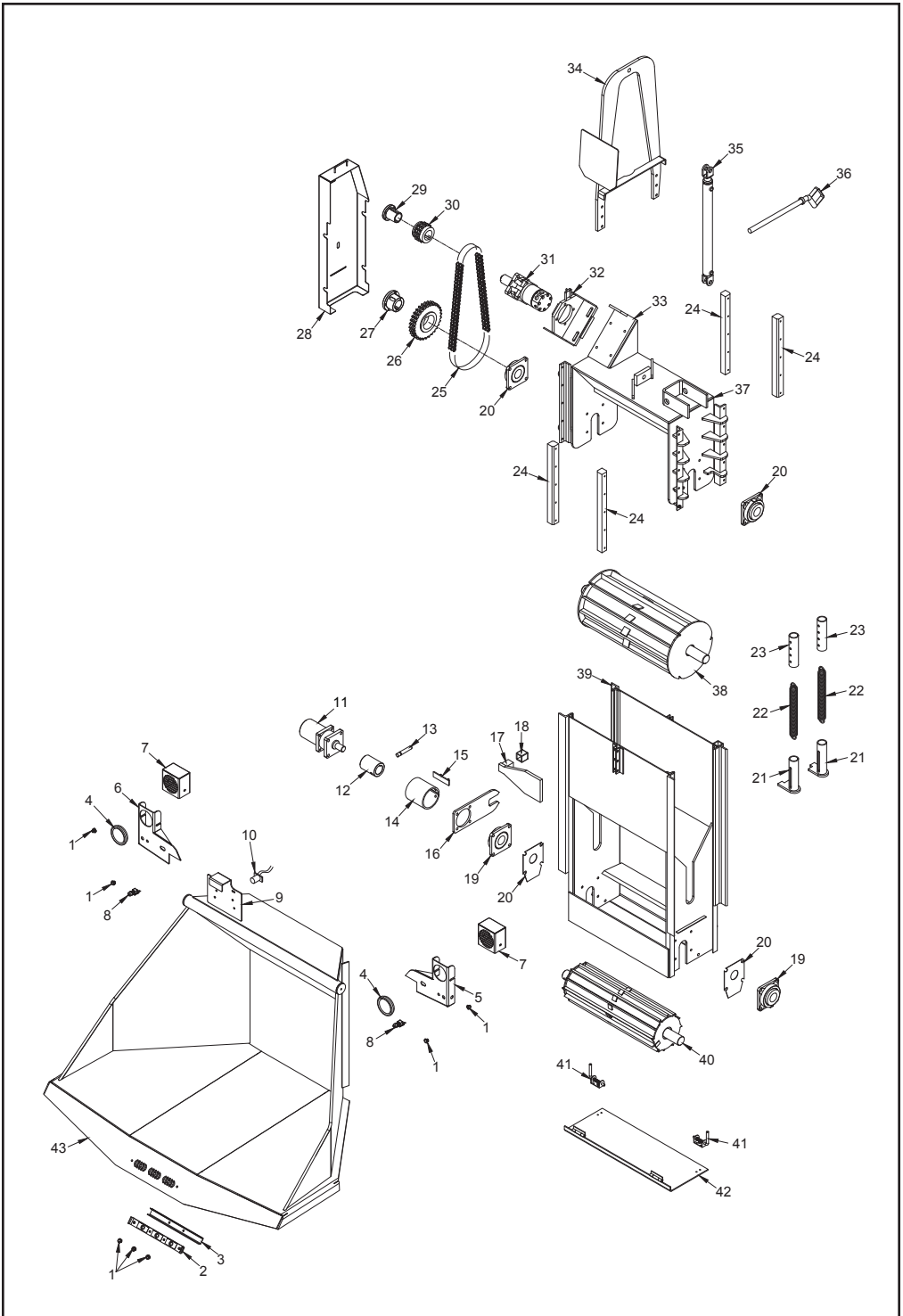
Some of the components shown in this section are for optional equipment and may not apply to every machine.

NOTICE

Bandit Industries Inc. reserves the right to make changes in models, size, design, installations and applications on any part without notification.

MACHINE ORIENTATION REFERENCE

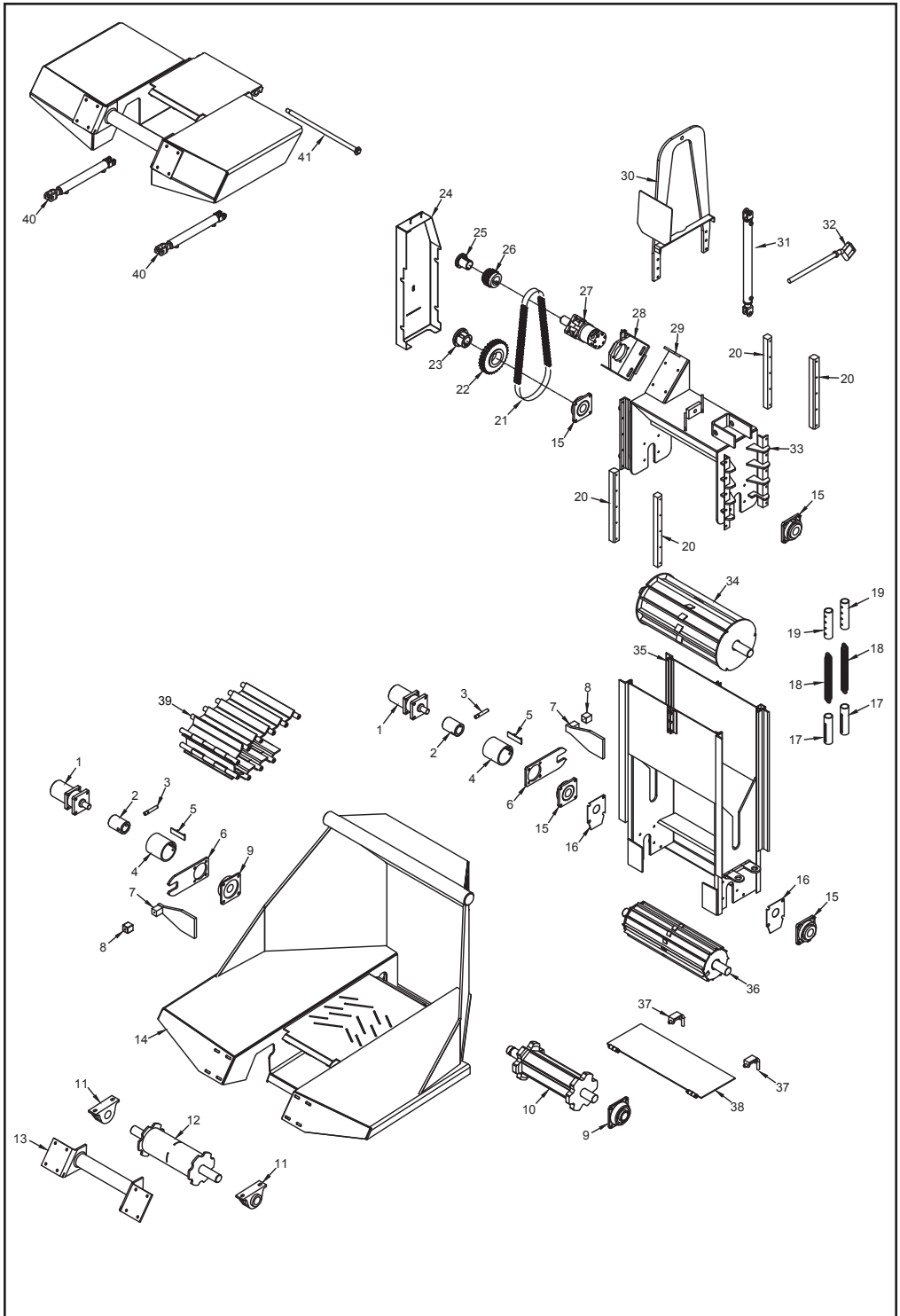




NOTICE Parts may not be exactly as shown.

LOCATION	PART NUMBER	DESCRIPTION
1.	900-2927-85	Red LED Light
2.	937-2004-33	Light Mount
3.	937-3016-09	Light Mount Holder
4.	900-2923-53	LED Taillight
5.	914-2001-15	Right Side Taillight
6.	914-2001-14	Left Side Taillight
7.	980-2002-82	Heavy Duty Taillight Cover
8.	905-8000-07	Fuel Saver
9.	980-300290	License Plate Mount
10.	900-2927-84	License Plate Light
11.	900-3907-71	Bottom Feedwheel Hydraulic Motor
12.	937-1004-34	Coupler
13.	900-4905-56	Tapered Pin for Coupler
14.	937-1004-97	Rubber Coupler Guard
15.	937-1009-94	Coupler Guard Mount
16.	955-300103	Torque Arm
17. a.	937-3014-09	Torque Arm Stop
b.	937-300316	Torque Arm Cushion Mount
18.	937-900009	Torque Arm Stop Cushion
19. a.	900-1904-07	Feedwheel Bearing
b.	900-4900-19	Feedwheel Bearing Bolt (Not Shown)
20.	955-1002-14	Bottom Feedwheel Bearing Backer Plate
21. a.	981-300031	Bottom Mount for Easy Climb System
b.	900-4905-79	Clevis Pin (Not Shown)
c.	900-4905-80	Cotter Pin for Clevis Pin (Not Shown)
d.	900-4906-90	Flat Washer (Not Shown)
22.	900-4905-18	Yoke Spring
23. a.	981-300030	Top Mount for Easy Climb System
b.	900-4905-14	Clevis Pin (Not Shown)
c.	900-4905-19	Hair Pin for Clevis Pin (Not Shown)
24.	937-300285	Yoke Slide - 2” x 2” x 24”
25.	900-1901-37	Sprocket for Top Feedwheel
26. a.	900-1901-39	Top Feedwheel Drive Chain (80-2)
b.	900-1905-62	Master Link
c.	900-1905-61	Half Link
27.	900-1900-08	Tapered Bushing
28.	937-2002-46	Top Drive Chain Guard
29.	900-1901-36	Top Feedwheel Motor Sprocket Bushing
30.	900-1901-35	Sprocket for Top Hydraulic Motor
31.	955-2001-68	Bolt on Motor Mount Assembly
32.	900-3906-29	Top Feedwheel Hydraulic Motor
33.	955-2002-24	Top Drive Motor Mount
34.	937-0502-01	Top Yoke Lifting Assembly
35. a.	900-3925-07	Yoke Lift Cylinder-Welded
b.	904-0007-14	Pin For Welded Cylinder (Not Shown)
c.	900-4913-23	Rubber Washer - Top Of Cylinder (Not Shown)
36.	955-2002-11	Yoke Lock Pin
37.	937-0501-89	Top Yoke Assembly
38. a.	937-0501-10	Top Feedwheel Assembly
b.	937-1007-63	Top Feedwheel Tooth
c.	937-1007-41	Top Feedwheel Shaft
39.	937-2004-01	Feedwheel Slide Box Assembly
40. a.	937-0501-09	Bottom Feedwheel Assembly
b.	937-1007-50	Bottom Feedwheel Tooth
c.	937-0501-57	Bottom Feedwheel Shaft & Coupler Assembly
41.	900-4901-83	Spring Loaded Pin
42. a.	937-1009-07	Trap Door Assembly
b.	981-1000-60	Hinge For Trap Door
43.	937-1015-19	Infeed Hopper Assembly

NOTICE **Nuts, bolts, washers, and all other components can be ordered by physical description.**



NOTICE Parts may not be exactly as shown.

LOCATION	PART NUMBER	DESCRIPTION
1.	900-3907-71	Hydraulic Conveyor / Bottom Feedwheel Motor
2.	937-1004-34	Feedwheel Coupler
3.	900-4905-56	Taper Pin for Feedwheel Coupler
4.	937-1004-97	Rubber Coupler Guard
5.	937-1009-94	Coupler Guard Mount
6.	955-300103	Torque Arm
7. a.	937-3014-09	Torque Arm Stop
b.	937-300316	Torque Arm Cushion Mount
8.	937-900009	Torque Arm Stop Cushion
9.	900-1900-34	Conveyor Bearing
10.	937-2003-70	Conveyor Drive Wheel
11.	900-1906-33	Idler Bearing for Conveyor
12.	249-2000-08	Conveyor Idler Assembly
13.	249-2000-28	Rear Bumper
14.	937-1014-83	Conveyor Infeed Assembly
15. a.	900-1904-07	Feedwheel Bearing
b.	900-4900-19	Feedwheel Bearing Bolt
16.	955-1002-14	Bottom Feedwheel Bearing Backer Plate
17. a.	981-300031	Bottom Mount for Easy Climb System
b.	900-4905-79	Clevis Pin (Not Shown)
c.	900-4905-80	Cotter Pin for Clevis Pin (Not Shown)
d.	900-4906-90	Flat Washer (Not Shown)
18.	900-4905-18	Yoke Spring
19. a.	981-300030	Top Mount for Easy Climb System
b.	900-4905-14	Clevis Pin (Not Shown)
c.	900-4905-19	Hair Pin for Clevis Pin (Not Shown)
20.	987-300285	Yoke Slide - 2” x 2” x 24”
21. a.	900-1901-39	Top Feedwheel Drive Chain (80-2)
b.	900-1905-62	Master Link
c.	900-1905-61	Half Link
22.	900-1901-37	Sprocket for Top Feedwheel
23.	900-1900-08	Bushing for Top Feedwheel Sprocket
24.	937-2002-46	Top Feedwheel Chain Guard
25.	900-1901-36	Top Feedwheel Motor Sprocket Bushing
26.	900-1901-35	Sprocket for Top Feedwheel Motor
27.	900-3906-29	Top Feedwheel Hydraulic Motor
28.	955-2001-68	Bolt-On Motor Mount Assembly
29.	955-2002-24	Top Feedwheel Hydraulic Motor Mount
30.	937-0502-01	Yoke Lift Assembly
31. a.	900-3925-07	Yoke Lift Cylinder - Welded
b.	904-0007-14	Pin for Welded Cylinder (Not Shown)
c.	900-4913-23	Rubber Washer - Top of Cylinder (Not Shown)
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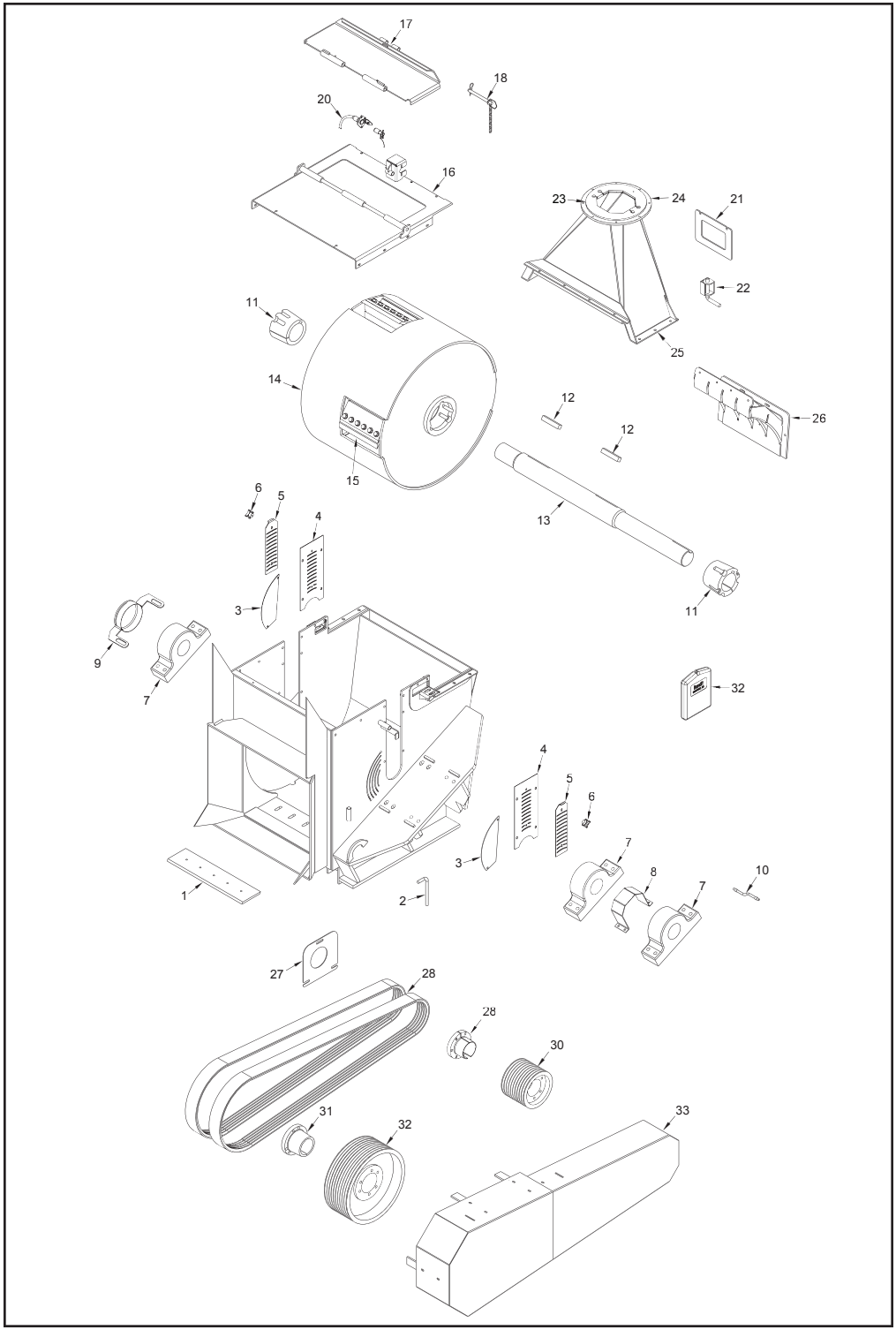
33.	937-0501-89	Top Yoke Assembly
34. a.	937-1007-62	Top Feedwheel Assembly
b.	937-1007-63	Top Feedwheel Tooth
c.	937-1007-41	Top Feedwheel Shaft
35.	937-2004-01	Feedwheel Slide Box Assembly
36. a.	937-0501-09	Bottom Feedwheel
b.	937-1007-63	Bottom Feedwheel Tooth
c.	937-1007-41	Bottom Feedwheel Shaft
37.	900-4901-83	Trap Door Lock Pin
38. a.	937-2004-65	Trap Door
b.	937-1015-31	Trap Door Assembly (Includes 36)
39.	955-0501-47	Conveyor Chain Link (24 Links Required)
40.	900-3925-07	Folding Conveyor Cylinder
41.	937-2001-81	Folding Conveyor Pin

NOTICE **Nuts, bolts, washers, and all other components can be ordered by physical description.**



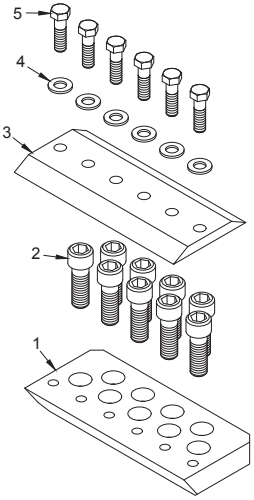
NOTICE Parts may not be exactly as shown.

LOCATION	PART NUMBER	DESCRIPTION
1.	See Page 102	Anvil
2.	955-1003-94	Drum Lock Pin
3.	911-1001-88	Vent Cover
4.	920-300066	Base Slot Cover
5. a.	937-300007	Air Vent Cover - Steel
b.	937-300008	Air Vent Cover - Aluminum
c.	937-100001	Air Vent Cover Kit - Steel (Includes Two Pieces of 4a, 5, & 6)
d.	937-100000	Air Vent Cover Kit - Aluminum (Includes Two Pieces of 4b, 5, & 6)
e.	900-4908-33	Spring for Vent Cover (Not Shown)
6.	900-4908-29	Plastic Knob for Vent Cover
7. a.	900-1906-51	Chipper Drum Bearing
b.	900-4910-41	Chipper Drum Bearing Bolt (3/4”-10NC x 5” Hex Head) (Left Side Only)
c.	900-4910-34	Chipper Drum Bearing Bolt (3/4”-10NC x 4 1/2” Hex Head) (Right Side Only)
d.	900-4901-47	Washer for Chipper Drum Bearing (3/4” Mill Carb)
e.	900-4910-19	Chipper Drum Bearing Jam Nut (3/4”-10NC Hex Jam Nut) (Left Side Only)
f.	900-4901-23	Chipper Drum Bearing Nut (3/4”-10NC Hex Nut) (Right Side Only)
8.	937-3012-85	Drum Shaft Bearing Cover
9.	920-200033	Bearing Cover
10.	900-3921-02	Chipper Bearing Grease Line
11.	900-1911-83	Taper Lock Bushing
12.	920-300064	Drum Shaft Key
13.	920-3008-44	Drum Head Shaft
14.	920-1000-60	Drum Head
15.	See Page 96	Chipper Knife
16.	920-2001-63	Drum Housing Door Assembly (Includes 18 & 19)
17.	920-300310	Drum Housing Door
18.	900-4905-37	Hood Pin With Attaching Chain
19. a.	900-4902-20	Padlock For Hood Pin (Not Shown)
b.	900- 4917-21	Key For Padlock (Not Shown)
20. a.	909-1000-01	Engine Disable Plug Kit (Includes Plug, Wiring, & Mounts)
b.	980-100083	6-Prong Male Plug With Wire Loop & Crimp Sleeves
21.	937-1008-47	Clean Out Frame
22. a.	900-4908-27	Discharge Spring Lock
b.	900-7900-96	Rubber Cap (Not Shown)
23.	937-1005-63	Transition Flange
24.	980-0122-18	Bottom Swivel Ring For Hydraulic Swivel Discharge
25.	937-1014-42	Transition Assembly
26.	937-2002-47	Optional Chip Breaker Assembly
27.	937-300189	Adjustable Cover - Engine PTO Sheave
28.	**	Chipper Belts
29.	**	Engine Sheave Bushing
30.	**	Engine Sheave
31.	**	Chipper Sheave Bushing
32.	**	Chipper Sheave
33. a.	920-200051	Beltshield Assembly - 1500 Belts
b.	937-2004-35	Beltshield Assembly - 1700 Belts
34.	900-9910-28	Manual Holder - 8” x 11” x 2”

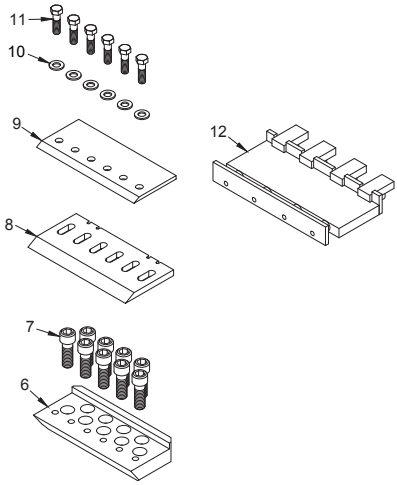
**** Components vary with engine options order by physical description or machine S/N.**

NOTICE **Nuts, bolts, washers, and all other components can be ordered by physical description.**

DOUBLE EDGE STYLE KNIFE



BABBITT STYLE KNIFE



NOTICE **KNIFE BOLTS MUST BE INSTALLED THROUGH KNIFE AS SHOWN.**

DOUBLE EDGE STYLE KNIFE

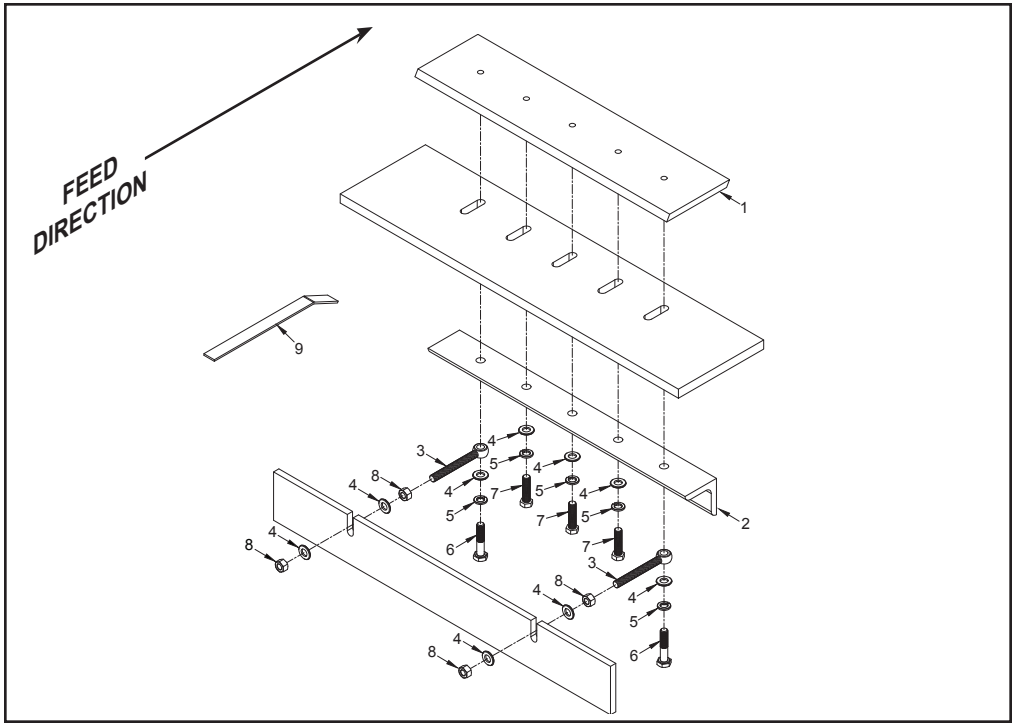
LOCATION	PART NUMBER	DESCRIPTION
1.	938-301104	Knife Holder
2.	900-4914-30	3/4”-10NC x 2 1/4” Socket Head Cap Screw
3.	900-9904-38	Double Edge Chipper Knife
4.	900-4901-32	5/8” Mill Carb Washer
5.	900-4913-99	5/8”-18NF x 2” Knife Bolt

BABBITT STYLE KNIFE

LOCATION	PART NUMBER	DESCRIPTION
6.	938-3013-36	Knife Holder - Babbitt Style Knife
7.	900-4914-30	3/4”-10NC x 2 1/4” Socket Head Cap Screw
8.	900-9906-73	Babbitt Style Chipper Knife
9.	938-3013-37	Top Clamp
10.	900-4901-32	5/8” Mill Carb Washer
11.	900-4914-27	5/8”-18NF x 2 1/4” Knife Bolt
12.	959-1000-02	Knife Gauge
13.	900-9906-90	Ladle (Not Shown)
14.	900-9900-60	1/2 Ball of Babbitt (Not Shown)

Torque Double Edge Knife Bolt to 180 ft.-lbs. (245 Nm)
Torque Babbitt Knife Bolt to 210 ft.-lbs. (285 Nm)
Torque Knife Holder Bolt to 250 ft.-lbs. (339 Nm)

NOTICE Parts may not be exactly as shown.



LOCATION	PART NUMBER	DESCRIPTION
1. a.	937-300159	Anvil Only
b.	937-300159A	“AR” Anvil Only
2.	937-300161	Anvil Clamp Plate
3. a.	900-4907-91	Anvil Eye Bolt - 1/2”-13NC x 4 1/2” (Current)
b.	900-4902-73	Anvil Eye Bolt - 1/2”-13NC x 5 1/2” (Prior)
4.	900-4909-18	1/2” Mill Carb Washer
5.	900-4902-11	1/2” Lock Washer
6.	900-4903-17	1/2”-13NC x 2 1/2” Hex Head Bolt
7.	900-4900-74	1/2”-13NC x 2” Hex Head Bolt
8.	900-4906-82	1/2”-13NC Hex Nut
9.	981-1006-25	Anvil Gauge
10.	904-0003-90	Anvil Hardware Kit Only (Includes 3 - 8)
11.	937-200031	Anvil & Hardware Kit (Includes 1a & 3 - 8)

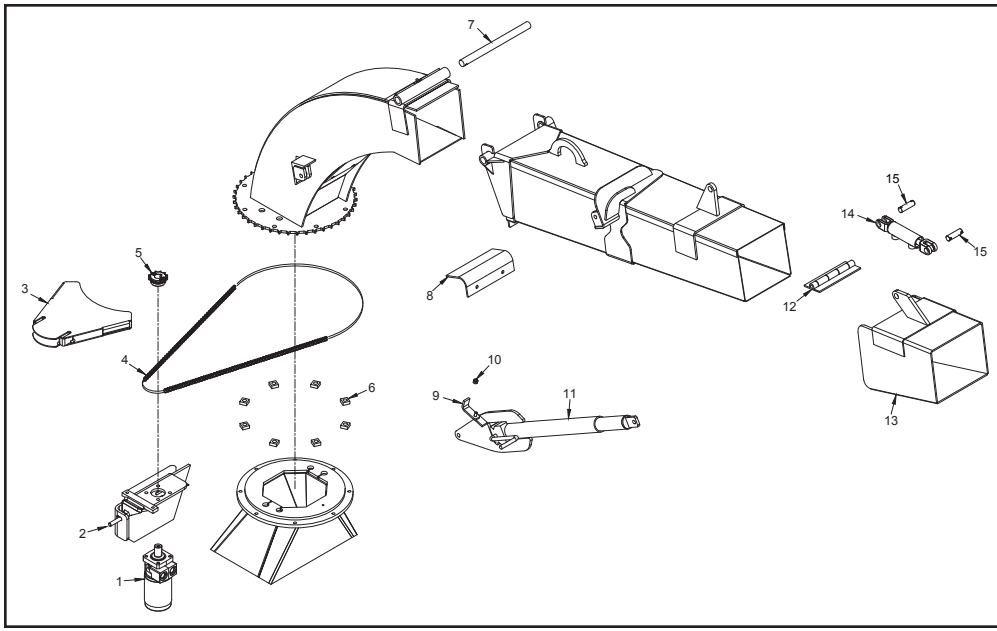
Anvil Bolt Torque: 75 ft.-lbs. (102 Nm)

NOTICE Parts may not be exactly as shown.

LOCATION	PART NUMBER	DESCRIPTION
1.	900-9901-68	Knife Saver Kit
2.	900-9901-65	File For Knife Saver Kit Only
3.	900-9901-63	Replacement Blades For Knife Saver
4.	900-9901-66	Knife Changing Gloves

NOTICE Parts may not be exactly as shown.

STANDARD DISCHARGE

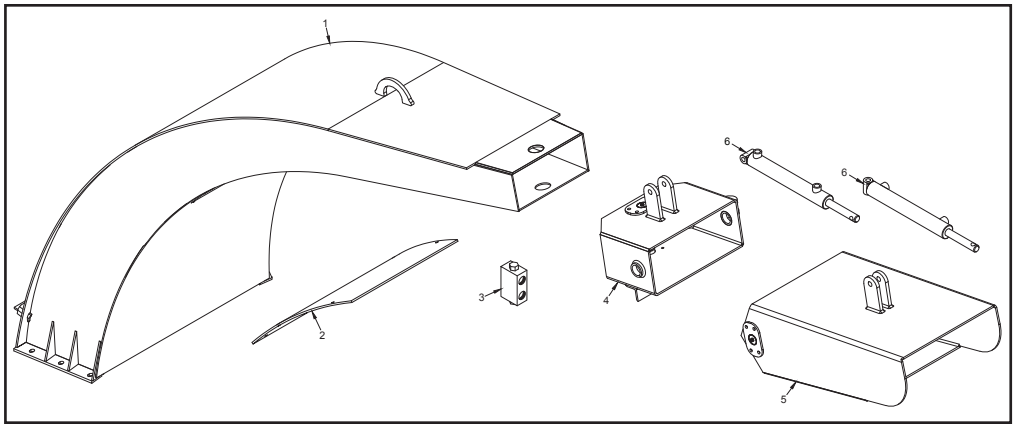


LOCATION	PART NUMBER	DESCRIPTION
1.	900-3921-57	Discharge Swivel Hydraulic Motor
2. a.	920-2002-33	Hydraulic Swivel Motor Mount
b.	920-2002-34	Hydraulic Swivel Mount
c.	937-1005-35	Chain Guard Mount
3.	937-200061	Hydraulic Swivel Chain Guard
4. a.	900-1901-20	#50 Roller Chain
b.	900-1901-18	Half Link- Chain (Not Shown)
c.	900-1901-19	Master Link - Chain (Not Shown)
5.	900-1915-71	Sprocket For Hydraulic Motor
6.	980-0137-35	Spacer Block
7.	980-300209	Pivot Pin
8.	980-0126-12	Rubber Guard
9.	955-300434	Handle Lock
10.	900-4906-60	3/8”-16NC Hex Bolt
11.	980-0510-86	Hand Crank Discharge Jack
12.	980-0101-59	Discharge Flipper Hinge
13.	937-0501-63	Discharge Flipper Assembly
14.	900-3928-16	Hydraulic Flipper Cylinder
15.	900-3930-71	Flipper Cylinder Lug Pin

NOTICE **Nuts, bolts, washers, and all other components can be ordered by physical description.**

NOTICE Parts may not be exactly as shown.

FORESTRY DISCHARGE



LOCATION	PART NUMBER	DESCRIPTION
1.	937-2003-66	Forestry Discharge Chute Assembly
2. a.	920-3006-05	Discharge Clean Out Door
b.	001-3004-10	Hinge - 18” (Not Shown)
3.	900-3949-09	Check Valve
4.	259-2000-56	Flipper Discharge - Inner
5.	259-2000-36	Flipper Discharge - Outer
6.	900-3943-75	Hydraulic Flipper Cylinder

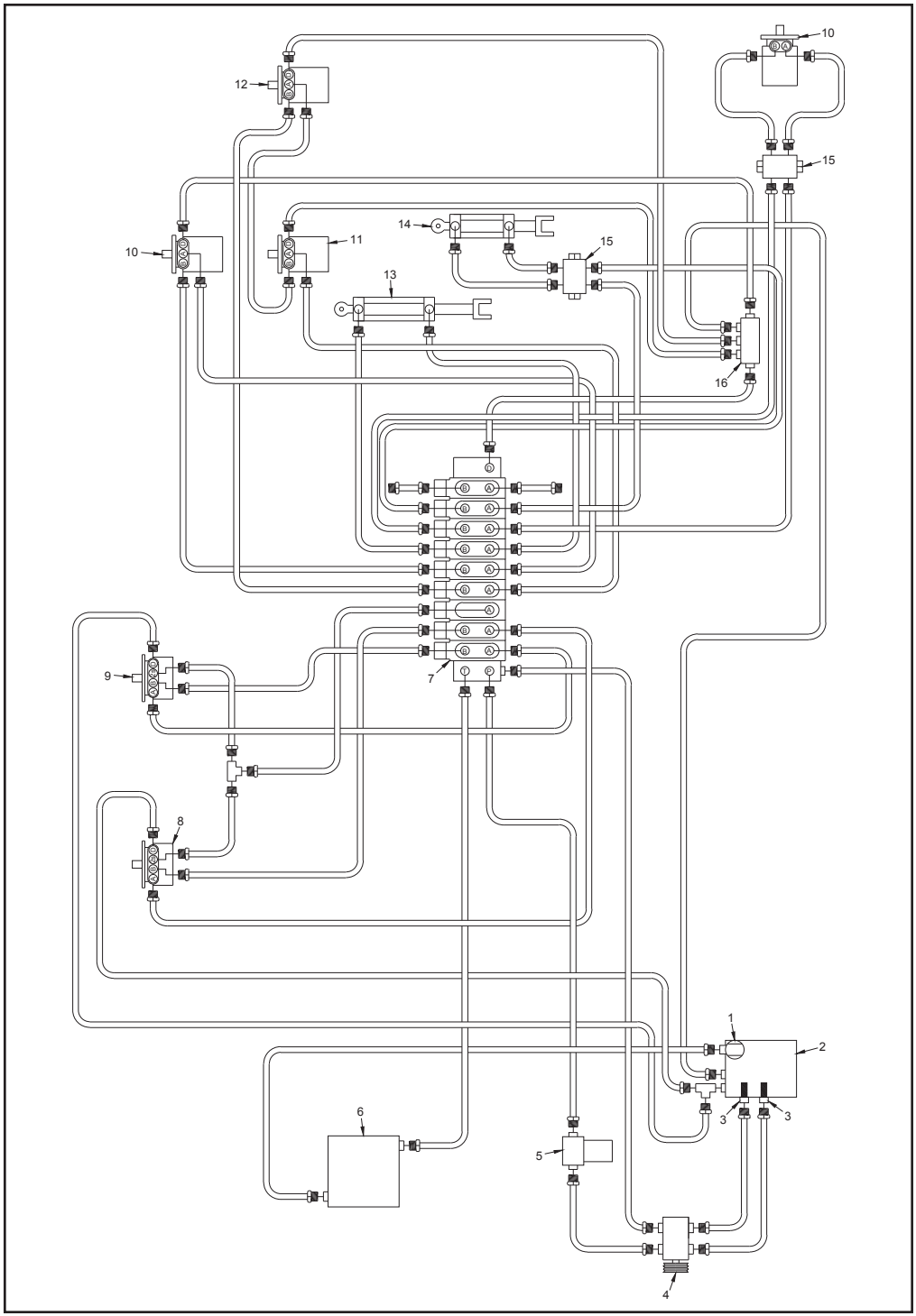
NOTICE **Nuts, bolts, washers, and all other components can be ordered by physical description.**

NOTICE Parts may not be exactly as shown.

IN-LINE HYDRAULIC PRESSURE CHECK KIT

LOCATION	PART NUMBER	DESCRIPTION
1.	900-3920-73	5000 PSI Gauge
2.	900-3902-24	Quick Coupler
3.	900-3902-23	Test Nipple
4.	900-3911-47	Rubber Cap For Test Nipple
5.	900-3924-86	Fitting
6.	900-3926-11	Ball Valve
7.	900-3922-14	Fitting
8.	980-100121	In-Line Pressure Check Kit - With Autofeed (Includes 1-7)

TRACK MACHINE



NOTICE Parts may not be exactly as shown.

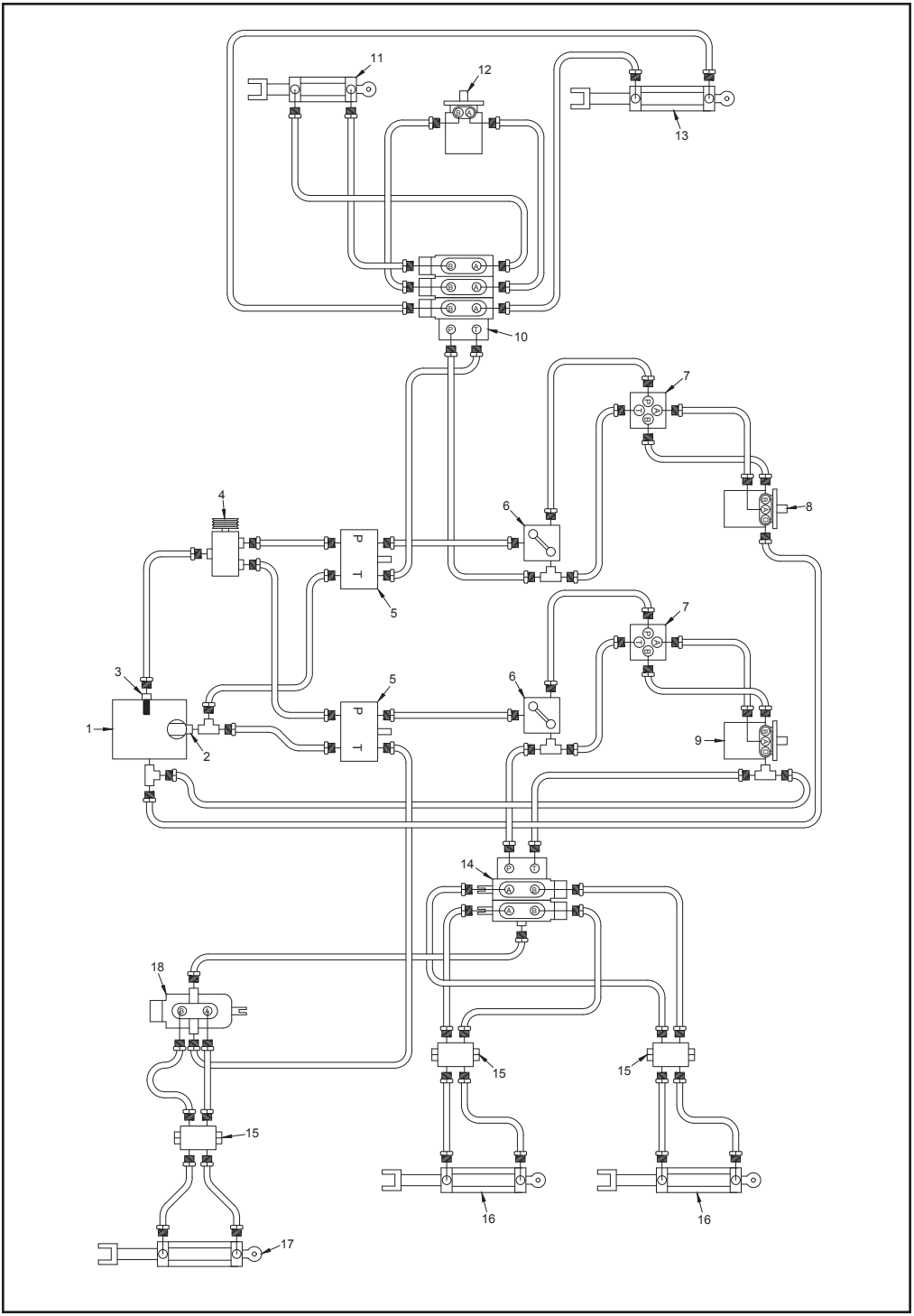
TRACK MACHINE

LOCATION	PART NUMBER	DESCRIPTION
1. a.	900-3932-95	In-Tank Filter Assembly
b.	900-3931-34	Filter Element Only
2.	See Page 114 - 115	Hydraulic Tank
3. a.	900-3925-22	Suction Screen - 2”
b	900-3932-06	Ball Valve - 2”
4.	**	Hydraulic Pump
5. a.	900-3934-84	High Pressure Filter Assembly
b.	900-3931-35	High Pressure Filter Element Only
6.	900-3915-67	Oil Cooler
7.	900-3979-65	9 Section Valve Bank
8.	**	Right Track Motor
9.	**	Left Track Motor
10.	900-3906-29	Top Feedwheel Hydraulic Motor
11.	900-3906-29	Bottom Feedwheel Hydraulic Motor
12.	900-3906-29	Conveyor Hydraulic Motor
13. a.	900-3925-07	Yoke Lift Cylinder - Welded
b.	904-0007-14	Pin For Welded Cylinder (Not Shown)
c.	904-0006-90	Seal Kit - Welded Lift Cylinder (Not Shown)
14.	900-3934-24	Folding Discharge Cylinder
15.	900-3949-09	Check Valve
16.	975-300464	Return Manifold

** Hydraulic components, fittings, hoses will very depending on optional equipment.
Order by physical description.
** Hydraulic pumps, track motors, and valve banks need to be ordered by serial number of machine.

NOTICE Make sure to order components according to fitting type, fittings may vary on all components.

TRAILERIZED MACHINE



NOTICE Parts may not be exactly as shown.

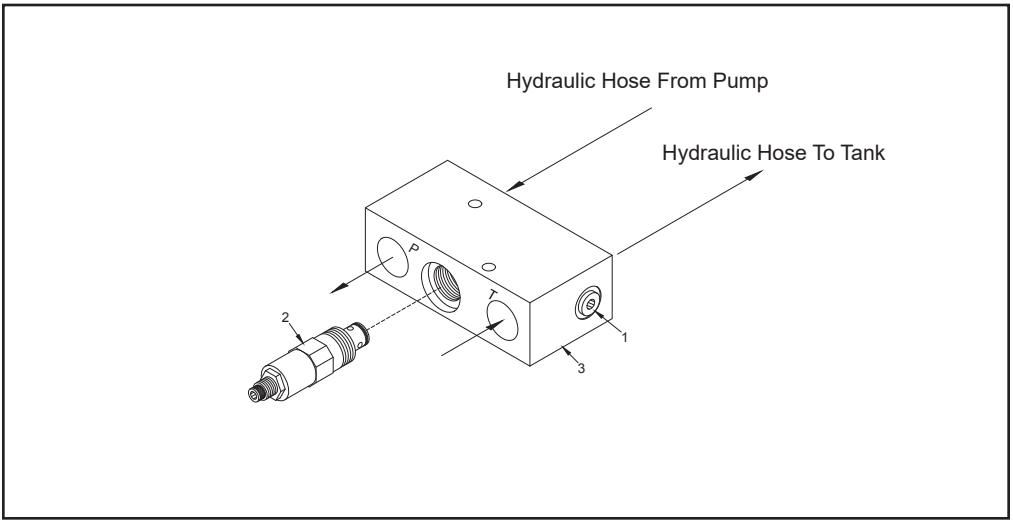
TRAILERIZED MACHINE

LOCATION	PART NUMBER	DESCRIPTION
1.	See Page 114 - 115	Hydraulic Tank
2. a.	900-3932-95	In-Tank Filter Assembly
b.	900-3931-34	Filter Element Only
3. a.	900-3925-21	Suction Screen - 1 1/2”
b.	900-3932-07	Ball Valve - 1 1/2”
4.	**	Pump
5.	See Page 106	Relief Block
6.	900-3924-55	Variable Speed Flow Control Valve
7.	See Page 95	Reversing “Autofeed Plus”
8.	900-3906-29	Top Feedwheel Motor
9.	900-3906-29	Bottom Feedwheel Motor
10.	900-3981-95	3 Section Valve Bank
11.	900-3928-16	Flipper Cylinder
12.	900-3921-57	Swivel Discharge Hydraulic Motor
13. a.	900-3925-07	Yoke Lift Cylinder - Welded
b.	904-0007-14	Pin For Welded Cylinder (Not Shown)
c.	904-0006-90	Seal Kit - Welded Lift Cylinder (Not Shown)
14.	900-3902-08	2 Section Valve Bank
15.	900-3949-09	Check Valve
16.	900-3934-24	Rear Stabilizer Cylinder
17.	900-3934-24	Tongue Jack Cylinder
18.	900-3920-01	Tongue Jack Valve

** Hydraulic components, fittings, hoses will very depending on optional equipment. Order by physical description.
** Hydraulic pumps, track motors, and valve banks need to be ordered by serial number of machine.

NOTICE Make sure to order components according to fitting type, fittings may vary on all components.

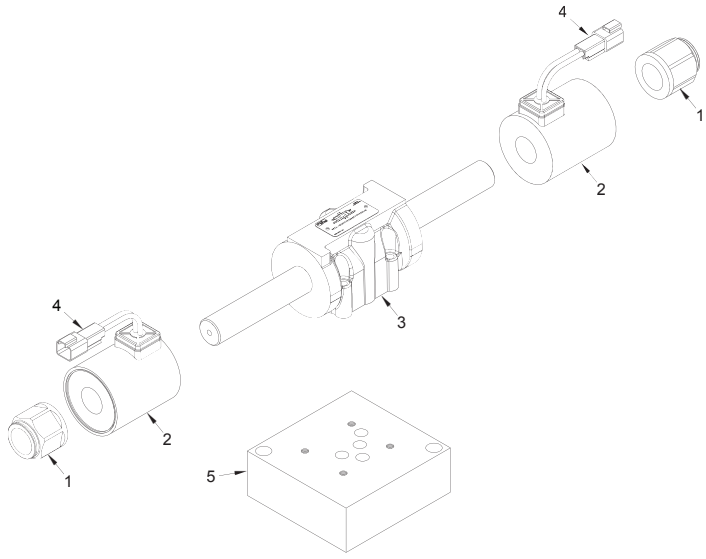
MAIN RELIEF BLOCK



LOCATION	PART NUMBER	DESCRIPTION
1.	900-3928-06	Plug for Main Relief Only
2.	900-3919-96	Main Relief Only
3.	900-3977-40	Main Relief Block
4.	500-0000-73	Main Relief Block Assembly (Includes 1 - 3)

NOTICE Parts may not be exactly as shown.

"AUTOFEED PLUS" VALVE (DUAL SOLENOID)

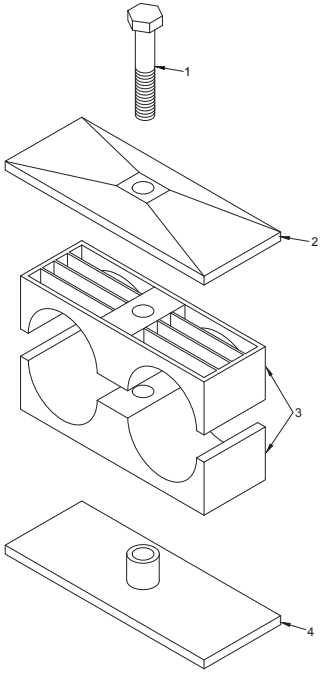


Torque Retainer Nut to a maximum of 4 to 6 ft.-lbs. (5 to 8 Nm) and install Loctite 243.
Over torque will cause damage and will also void warranty.

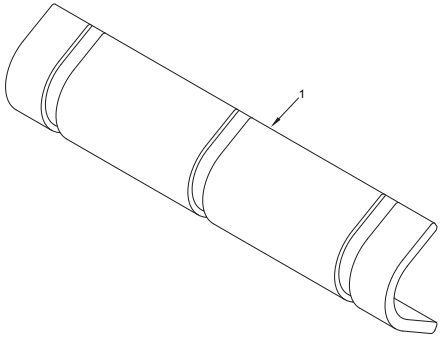
LOCATION	PART NUMBER	DESCRIPTION
1.	900-3920-20	Retainer Nut (Danfoss)
2.	900-2909-55	Herschman Connector Only
3. a.	900-3920-19	Solenoid Only - 12v (Danfoss)
b.	900-3923-58	Solenoid Only - 24v (Danfoss)
4.	900-3919-47	Solenoid Assembly (Danfoss Includes #'s 1,3,4, & 6)
5.	900-3918-38	Autofeed Plus Relief Block Subplate (DTS)
6.	900-3915-44	Seal Kit (Not Shown)
7. a.	900-3925-89	10' Cord and Molded Herschman Connector (Not Shown)
b.	900-3920-71	16' Cord and Molded Herschman Connector (Not Shown)
c.	900-3918-63	25' Cord and Molded Herschman Connector (Not Shown)

NOTICE Parts may not be exactly as shown.

HOSE CLAMP



HOSE GUARD



NOTICE Parts may not be exactly as shown.

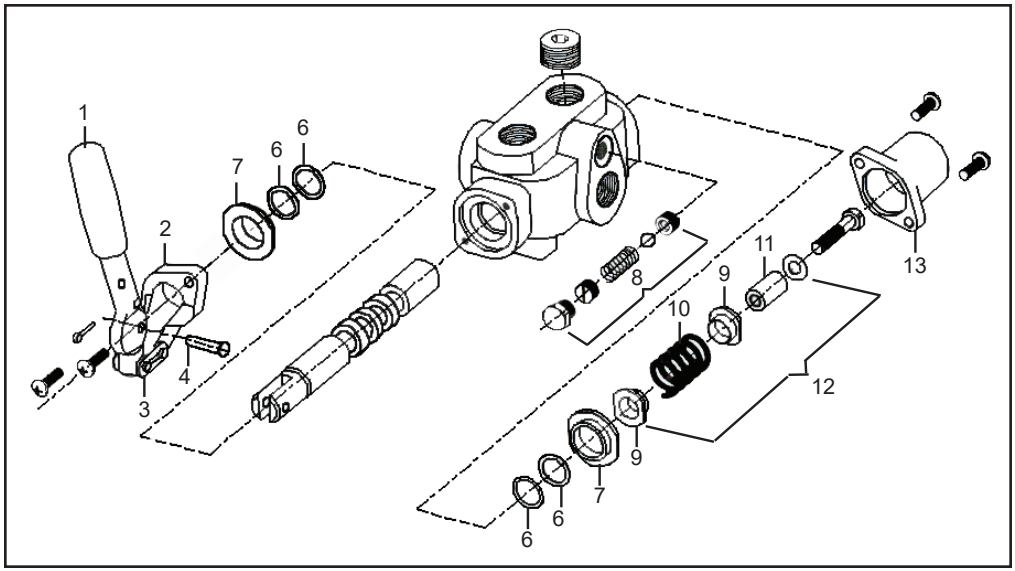
HOSE CLAMP

LOCATION	PART NUMBER	DESCRIPTION
1.	N/A	Bolt
2.	N/A	Locking Plate
3.	N/A	Plastic Clamp
4. a.	900-3914-09	Weld Plate for 1/4” Double Clamp
b.	900-3914-08	Weld Plate for 1/2” Double Clamp
c.	900-3926-47	Weld Plate for 3/4” Double Clamp
5. a.	900-3917-25	1/4” Double Clamp Assembly (Includes #’s 1-4)
b.	900-3926-44	3/8” Double Clamp Assembly (Includes #’s 1-4)
c.	900-3928-19	1/2” Single Clamp Assembly (Includes #’s 1-4)
d.	900-3914-02	1/2” Single Clamp Assembly For Steel Lines (Includes #’s 1-4)
e.	900-3915-61	1/2” Double Clamp Assembly (Includes #’s 1-4)
f.	900-3913-32	1/2” Double Clamp Assembly For Steel Lines (Includes #’s 1-4)
g.	900-3914-03	3/4” Single Clamp Assembly (Includes #’s 1-4)
h.	900-3914-07	3/4” Double Clamp Assembly (Includes #’s 1-4)
i.	900-3914-04	1” Single Clamp Assembly (Includes #’s 1-4)
j.	900-3914-05	1 1/4” Single Clamp Assembly (Includes #’s 1-4)
k.	900-3914-06	1 1/2” Single Clamp Assembly (Includes #’s 1-4)
6. a.	900-3914-10	Stacking Bolt for 1/2” Double Clamp (Not Shown)
b.	900-3920-11	Stacking Bolt for 3/4” Double Clamp (Not Shown)

HOSE GUARD

LOCATION	PART NUMBER	DESCRIPTION
1. a.	900-3934-76	Hose Guard - 4” Long
b.	900-3934-77	Hose Guard - 6” Long
c.	900-3934-78	Hose Guard - 8” Long

TYPICAL SPRING LOADED CONTROL VALVE



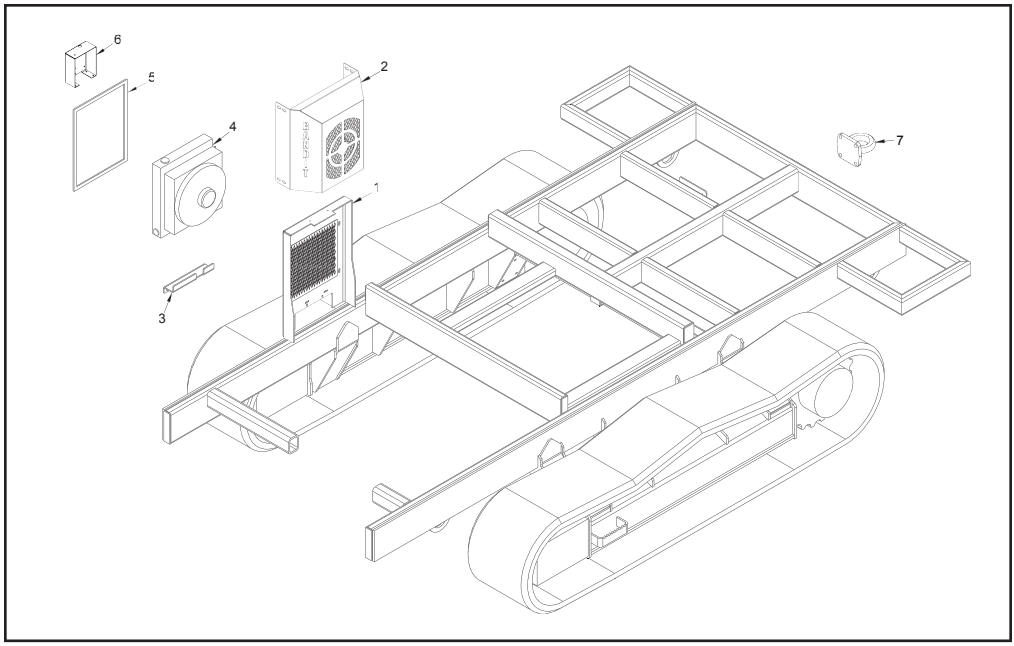
LOCATION	PART NUMBER	DESCRIPTION
1.	904-0003-29	Handle Only (Long)
2.	900-3905-95	Valve Bracket Only With Screws
3.	904-0003-30	Master Link Only Control Valve
4.	904-0003-31	Pin And Cotter Key For Control Valve
5.	904-0003-32	Bracket, Handle And Chain Link **NOTE:** INCLUDES #'s 1, 2, 3, 4
6.	900-3937-34	Seal Kit For Control Valve
7.	904-0003-33	Seal Retainer For Control Valve **NOTE:** NOT INCLUDED IN SEAL KIT
8. a.	900-3901-12	Relief Valve Kit - Spring, Ball, Screw **NOTE:** SOLD ONLY AS A KIT
b.	900-3959-80	Allen Set Screw Only
c.	900-3941-12	Hex Head Plug & O-ring
9.	904-0003-34	Valve Spool Stop For Spring Loaded Valve
10.	904-0003-35	Valve Spool Spring
11.	904-0003-36	Valve Spacer For Yoke Lift Valve
12.	900-A-2941	Spring Center Kit For Spring Loaded Valve
13.	904-0003-37	Detent Cap Only For Spring Loaded Valve (Short)

CONTROL VALVES

LOCATION	PART NUMBER	DESCRIPTION
1.	900-3920-01	Discharge Lock, Discharge Fold, Stabilizers, and Tongue Jack

NOTICE Parts may not be exactly as shown.

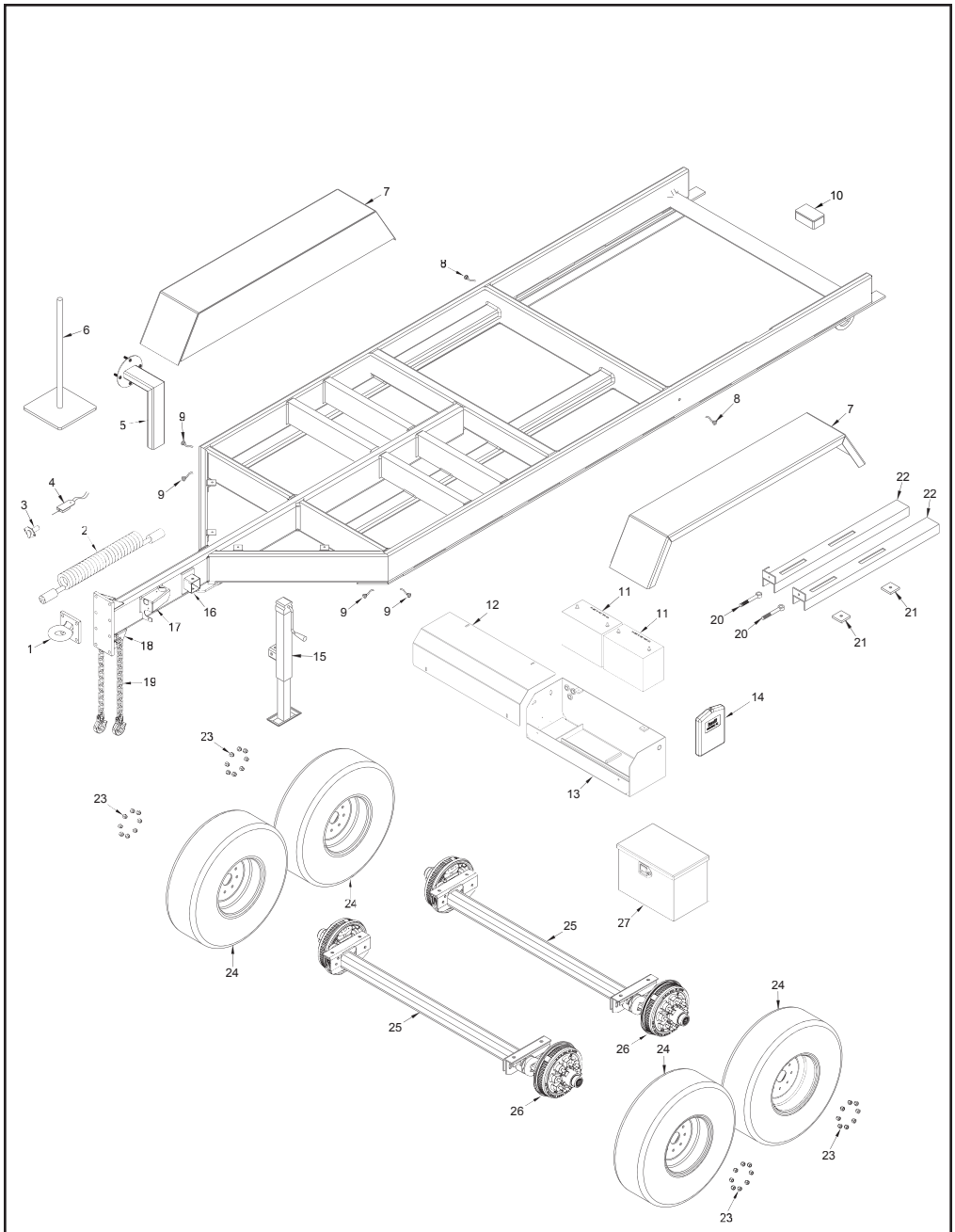
TRACK MACHINE



LOCATION	PART NUMBER	DESCRIPTION
1.	937-1014-65	Oil Cooler Mount
2.	937-2004-89	Oil Cooler Guard
3.	937-3014-36	Remote Cooler Support Mount
4.	900-3952-11	Oil Cooler
5.	904-0007-30	Slide-in Screen
6.	999-3000-63	Radio Protection and Mounting Box
7.	900-5900-71	Pintle Ring

NOTICE Parts may not be exactly as shown.

TRAILERIZED MACHINE



NOTICE Parts may not be exactly as shown.

TRAILERIZED MACHINE

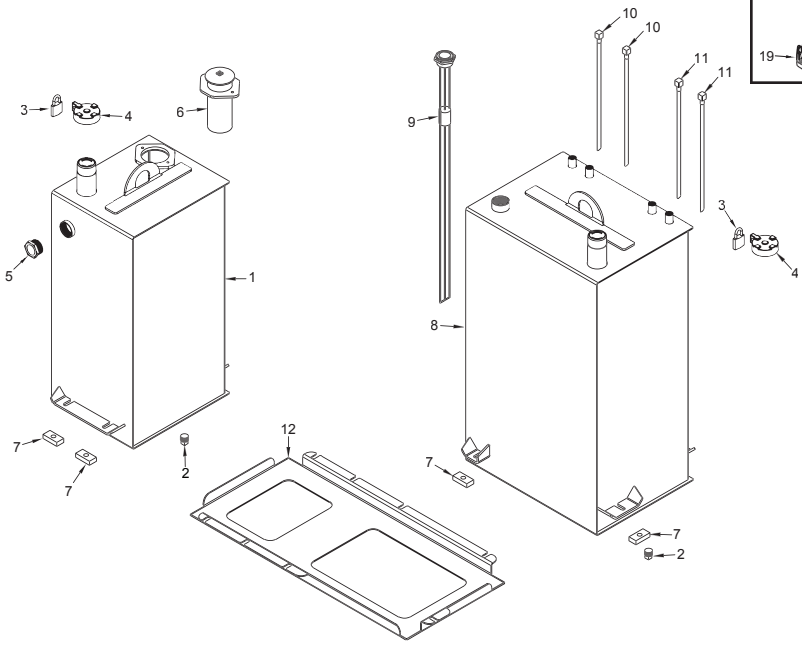
LOCATION	PART NUMBER	DESCRIPTION
1. a.	900-5905-73	3” Heavy Duty Pintle Ring Hitch
b.	980-0505-33	2 5/16” Ball Coupler Assembly
c.	*--*	Other Hitch Options Available
2. a.	900-2916-63	Coil Cable Assembly With 6 Prong Plugs - 15’
b.	900-2904-12	6-Prong Trailer Plug Male Plug Only
3.	900-2904-13	6-Prong Trailer Plug Female Plug Only
4.	900-5900-09	Electrical Breakaway Switch
5.	980-0510-51	Optional Spare Tire Mount
6. a.	980-200202	Optional Cone Holder
b.	980-200215	Optional Bolt-On Cone Holder (Not Shown)
c.	980-200107	Optional Hoop Style Cone Holder (Not Shown)
d.	900-7900-86	Cap For Cone Holder (Not Shown)
7.	937-200121	Fender
8.	900-2927-86	LED Amber Marker Light - 3/4” Round
9.	900-2927-85	LED Red Marker Light - 3/4” Round
10.	911-100001	Junction Box for Wiring
11. a.	900-6915-42	1000 CCA Battery
b.	900-6907-88	1400 CCA Battery
12.	937-3017-70	Battery Box Cover
13.	937-2004-88	Battery Box
14.	900-9910-28	Manual Holder - 8” x 11” x 2”
15. a.	900-5908-78	8,000 Lbs. Drop Leg Jack - Zinc
b.	900-5904-82	10,000 Lbs. Drop Leg Jack
16. a.	980-0127-45	Mount For 8,000 Lbs. Drop Leg Jack
b.	980-0127-44	Pin For 8,000 Lbs. Drop Leg Jack (Not Shown)
c.	900-5905-71	Pivot Mount For 5,000 Lbs. Jack - Square Mount
17.	980-300106	Trailer Plug Receptacle Mount
18.	980-0121-31	Safety Chain Holder
19. a.	900-4912-71	Safety Chain With Hooks and Spring Latches for Standard Tongue
b.	900-4905-77	Hook For Safety Chain
20.	900-4905-11	Engine Adjuster Rod End - 5/8”-11NC x 6”
21.	*-*	Engine Rails
22.	980-0101-33	Engine Mount Pad For 5/8” Engine Hold Down
23.	900-5904-59	5/8”-18NF Wheel Flange Nut
24. a.	900-5904-76	235/75R-17.5” Tire and Solid Gray, 8-Bolt Rim
b.	900-5908-81	235/75R-17.5” Tire and Aluminum, 8-Bolt Rim
c.	900-5904-48	235/75R-17.5” Tire Only
d.	900-5904-49	17” x 6.75” Solid Gray, 8-Bolt Rim Only
e.	900-5908-78	17” x 6.75” Aluminum, 8-Bolt Rim Only
f.	900-5904-22	16” x 6” White Spoke, 8-Bolt Rim Only
25. a.	900-5903-93	10,000 Lb. Torflex Axle Assembly - Electric Brake
b.	900-5909-08	10,000 Lb. Torflex Axle Assembly - Electric Brake - 0° Down Trail
c.	900-5908-83	10,000 Lb. Leaf Spring Assembly - Electric Brake
d.	900-5904-06	12,000 Lb. Leaf Spring Assembly - Electric Brake
26.	**	Brake Hub and Drum Assembly
27. a.	900-7900-78	Aluminum Tool Box - 18” Wide
b.	980-0508-37	Steel Tool Box
28.	980-200205	Tool Box Mount
29. a.	980-0508-25	Optional Wheel Chock Holders Aluminum Bolt-On (Not Shown)
b.	980-0508-26	Optional Wheel Chock Holders Metal Weld-On (Not Shown)
30.	900-5902-32	Optional Rubber Wheel Chock (Not Shown)
31.	900-5904-52	Optional Safety Marker For Fenders (Not Shown)
32.	900-7900-48	Optional Mud Flap (Not Shown)

** Order Brake Hub And Drum Assembly According To Axle Type.
(Grease Type, Oil Type, Never Lube Type).

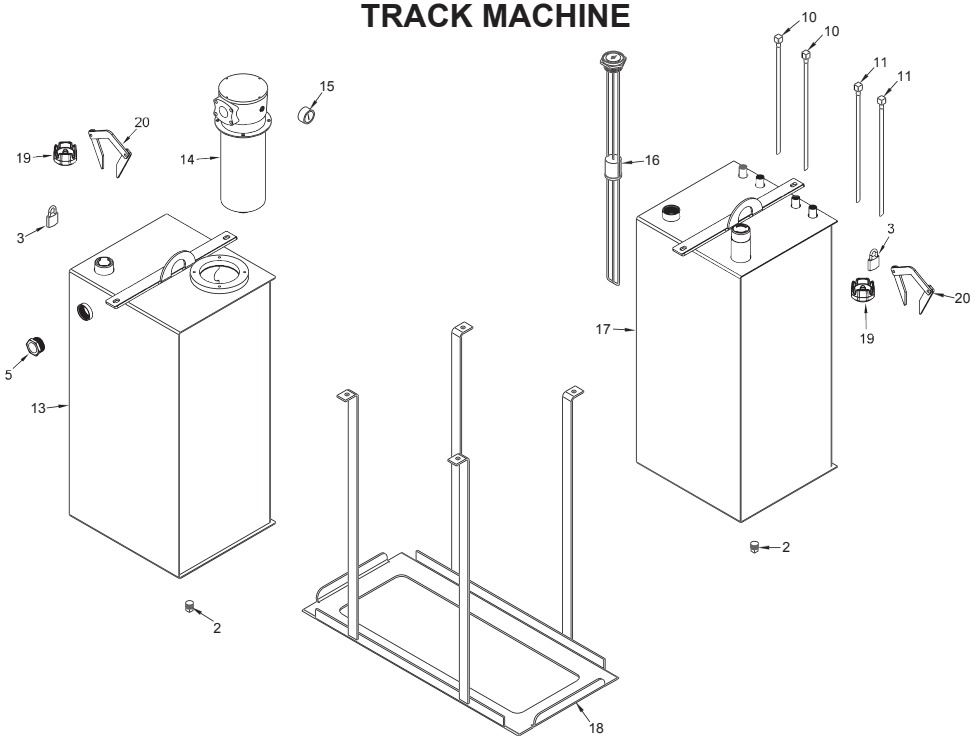
- Engine Rails And Adjusters Will Vary Depending On Engine And Component Options.
Order By Serial Number Of Chipper Or Physical Description.

NOTICE Other fenders and fender stone shields are optional.

TRAILERIZED MACHINE



TRACK MACHINE



NOTICE Parts may not be exactly as shown.

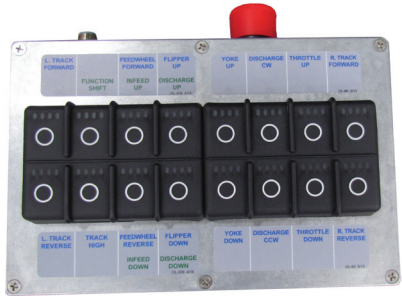
LOCATION	PART NUMBER	DESCRIPTION
1.	937-2001-63	30 Gallon Rectangle Hydraulic Tank Assembly - In Tank Filter)
2.	900-3922-60	Magnetic Drain Plug
3. a.	900-4912-40	Padlock With Short Shackle for Tank With Locking Cap
b.	900-4917-21	Key for Padlock (Not Shown)
4. a.	900-3941-31	Fuel (Diesel) Locking Fill Cap - Green
b.	900-3941-30	Hydraulic Locking Fill Cap - Black
c.	900-3935-06	Keeper for Fuel & Hydraulic Locking Fill Cap (Not Shown)
5.	900-3975-03	Sight Gauge
6. a.	900-3950-56	In Tank Filter Assembly
b.	900-3950-58	In Tank Filter
7.	900-7900-14	Rubber Mounting Pad
8.	937-200029	60 Gallon Rectangle Fuel Tank Assembly
9. a.	900-2903-95	Rochester Sight Gauge for 40 Gallon Rectangle Fuel Tank (Start 12/05)
b.	900-3923-28	Rochester Sight Gauge for 60 Gallon Rectangle Fuel Tank
c.	900-2903-55	Face for Sight Gauge Only
10. a.	900-3926-84	Suction Drop Pipe Ass'y Without Hose Barb (1/2" NPTF Male x 3/8" NPTF Female)
b.	900-3926-83	3/8" NPTF To 1/2" Hose Barb
c.	900-3926-82	3/8" NPTF To 3/8" Hose Barb
d.	900-3931-53	3/8" NPTF To 5/16" Hose Barb
11. a.	900-3909-00	Return Drop Pipe Ass'y Without Hose Barb (3/8" NPTF Male x 1/4" NPTF Female)
b.	900-3925-48	1/4" NPTF To 3/8" Hose Barb
c.	900-3909-01	1/4" NPTF To 5/16" Hose Barb
d.	900-3909-02	1/4" NPTF To 1/4" Hose Barb
e.	900-3943-22	3/16" NPTF To 3/16" Hose Barb
f.	900-3943-21	1/4" NPTF To 3/16" NPTF Bushing
12. a.	937-300088	Combination Tank Mount - 40 or 60 Gal. Fuel Tank & 24 or 30 Gal. Hyd. Tank
b.	900-0104-95	Rubber Tank Pad (Not Shown)
c.	900-7900-35	Tank Cushion Material (Not Shown)
13.	937-200074	50 Gallon Rectangle Hydraulic Tank Assembly
14. a.	900-3932-95	Filter Head Assembly (Includes Filter)
b.	900-3931-34	Filter Only
15.	900-3901-73	Filter Gauge
16.	900-3923-28	Rochester Sight Gauge for 50 Gallon Fuel Tank
17.	937-200073	50 Gallon Rectangle Fuel Tank Assembly
18. a.	937-2002-64	Tank Tray - 50 Gallon Rectangle Tank
b.	900-0104-95	Rubber Tank Pad (Not Shown)
c.	900-7900-35	Tank Cushion Material (Not Shown)
19.	980-0506-85	Optional Fill Cap Lock Assembly for Steel Tank With 900-3917-71 Fill Cap
20.	900-3917-71	Optional Fill Cap Only No Dipstick (Steel Tank)

NOTICE Tank assemblies vary with options. Specify all options when ordering.

1.

2.

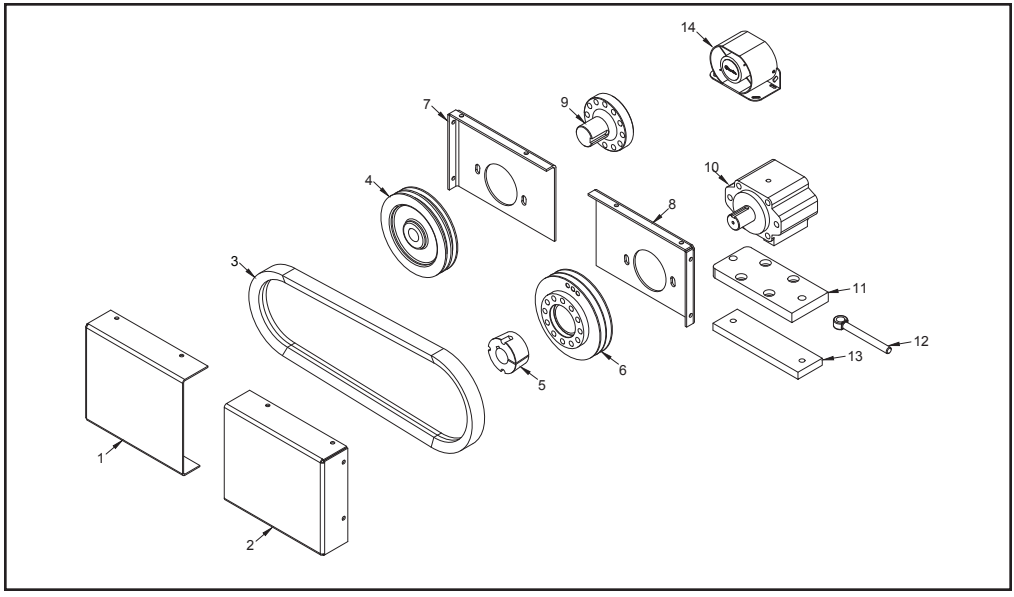
3.



LOCATION	PART NUMBER	DESCRIPTION
1. a.	**	Transmitter - Kar-Tech
b.	**	Cigarette Lighter Charger for Kar-Tech Transmitter
c.	**	Wall Charger for Kar-Tech Transmitter
2.	**	Receiver - Kar-Tech
3. a.	**	Tether
b.	**	Cable Only for Tether

**** Components vary with options order by machine S/N or refer to machine check sheet.**

NOTICE Parts may not be exactly as shown.

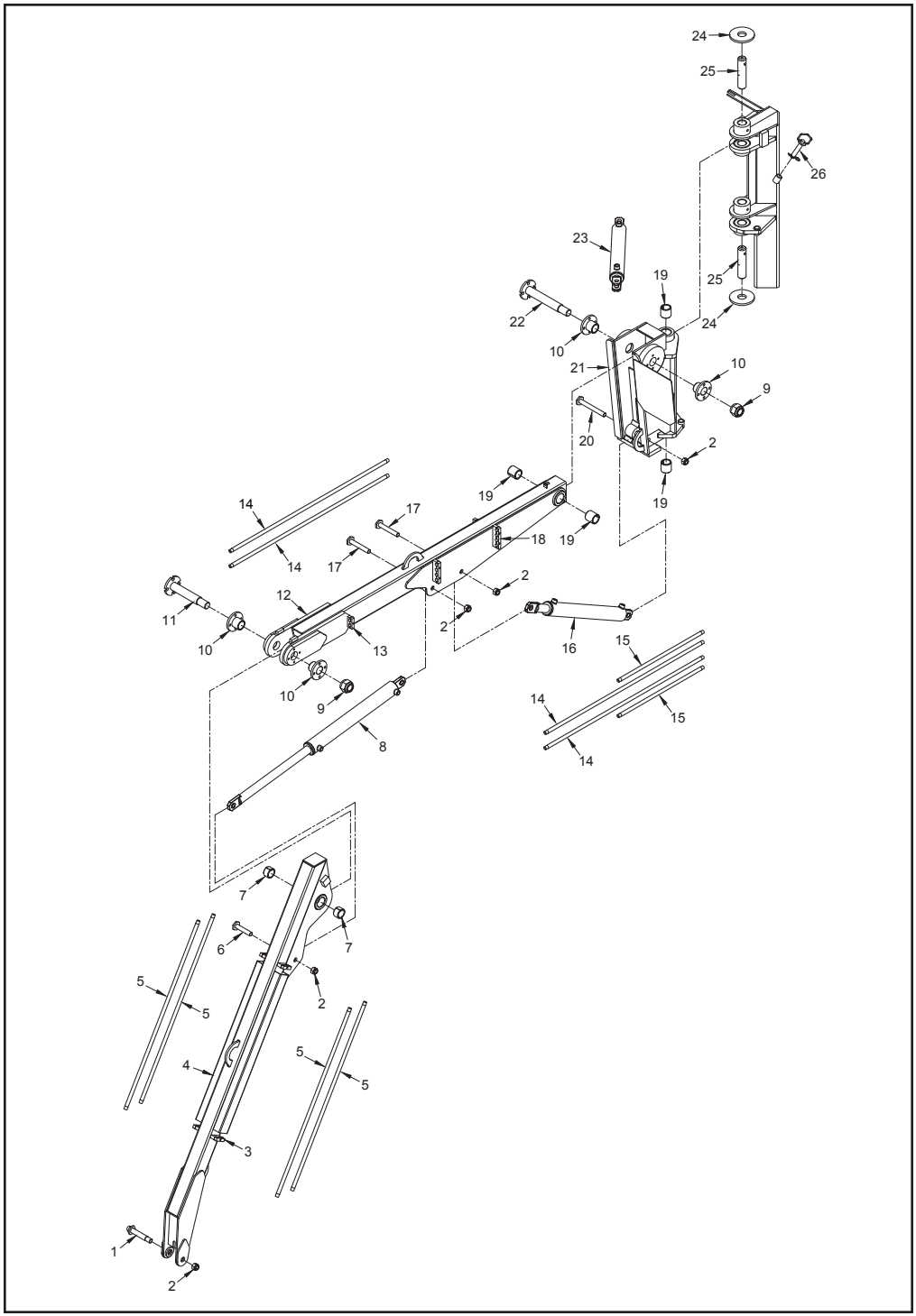


LOCATION	PART NUMBER	DESCRIPTION
1.	955-3006-91	Sheave Guard Cover
2.	955-1010-86	Sheave Guard Cover
3.	**	Pump Belt
4.	**	Engine Sheave
5.	**	Pump Bushing
6.	**	Pump Sheave
7.	955-1011-25	Sheave Guard Mount
8.	955-3006-92	Sheave Guard Mount
9.	**	Stub Shaft For Engine
10.	900-3954-49	Pump Bearing Block
11.	978-300129	Pump Mount Slide
12.	900-4902-75	Pump Belt Tension Adjuster
13. a.	978-300126	Pump Mount Plate
b.	955-2002-04	Pump Mount Assembly (Includes 11 - 13)
14.	900-2907-52	Back-Up Beeper
15.	900-2914-81	Main Circuit Breaker (Not Shown)

**** Components vary with engines order by machine S/N or physical description.**

NOTICE Parts may not be exactly as shown.

MODEL 75 LOADER

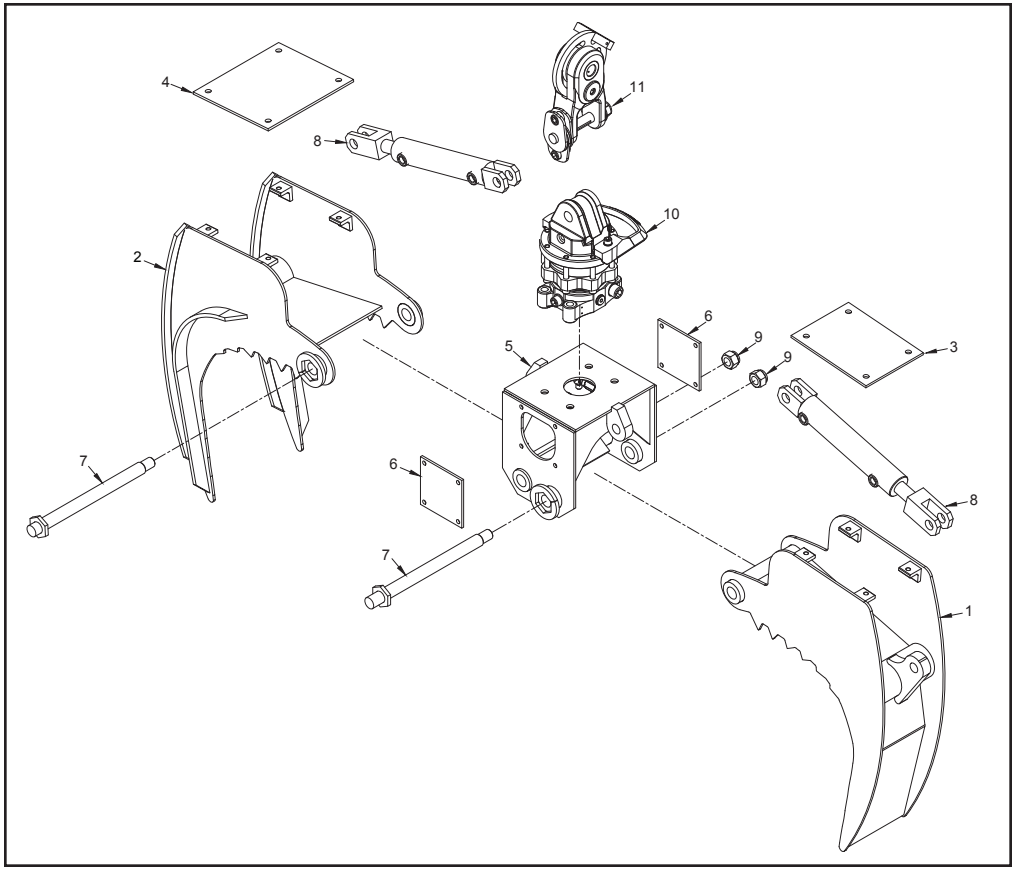


NOTICE Parts may not be exactly as shown.

MODEL 75 LOADER

LOCATION	PART NUMBER	DESCRIPTION
1. a.	914-1017-14	Pivot Pin for Swing Brake - 7 5/8”
b.	955-1010-72	Pivot Pin Keeper - Weld On
2.	900-4900-80	Nylon Lock Nut for Main Boom Pin
3.	955-1016-01	Clamp for Jib Boom Pipe
4.	914-0502-97	Jib Boom Assembly
5.	914-1018-24	Pipe for Jib Boom
6. a.	914-1017-13	Cylinder Pin - 5 1/2”
b.	955-1010-72	Cylinder Pin Keeper - Weld On
7.	900-1905-35	Split Steel Bushing - 2 1/2” OD x 2” ID x 1 1/2”
8.	900-3924-07	Hydraulic Cylinder - 3” x 24”
9.	955-3006-85	Loader Pin Lock Nut - 1 3/4”
10.	960-0011-67	Bushing for Pivot Pin
11. a.	914-1017-16	Main to Jib Pivot Pin
b.	960-0013-47	End Cap for Pivot Pin - Weld On
12.	914-0502-96	Main Boom Assembly
13.	955-1010-62	Pipe Clamp for Main Boom
14.	914-1018-22	Pipe for Main Boom - SCH 40 x 29”
15.	914-1018-23	Pipe for Main Boom - SCH 40 x 54”
16.	900-3924-06	Hydraulic Cylinder - 3” x 24” with a 4” Stop
17. a.	914-1017-15	Cylinder Pin - 7”
b.	955-1010-72	Pivot Pin Keeper - Weld On
18.	916-0006-21	Pipe Clamp for Main Boom
19.	900-9900-35	Split Steel Bushing - 2 1/2” x 2” x 2 1/2”
20. a.	914-1016-98	Cylinder Pin - 9”
b.	955-1010-72	Pivot Pin Keeper - Weld On
21.	914-0503-10	Pedestal Assembly
22. a.	914-1017-17	Pivot Pin - 14 5/8”
b.	960-0013-47	End Cap for Pivot Pin - Weld On
23.	900-3903-01	Hydraulic Cylinder - 3” x 16”
24.	914-1017-86	Pad Support
25.	914-1016-40	Pivot Pin
26.	900-4902-35	Pin - 1” 4 1/4”

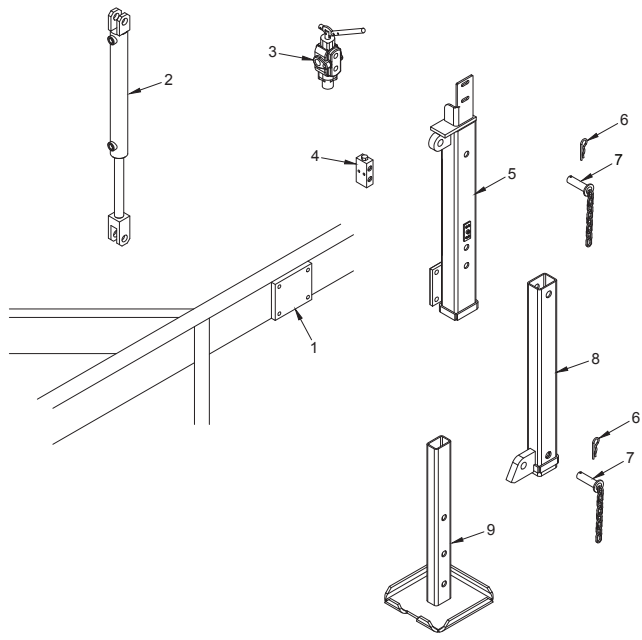
MODEL 75 LOADER GRAPPLE



LOCATION	PART NUMBER	DESCRIPTION
1.	914-2000-94	Narrow Jaw Assembly (Includes 3)
2.	914-2000-93	Wide Jaw Assembly (Includes 4)
3.	955-1011-66	Cylinder Cover - Narrow Jaw
4.	955-1011-67	Cylinder Cover - Wide Jaw
5.	914-2000-95	Grapple Head Assembly (Includes 6)
6.	955-3009-15	Grapple Fitting Bolt On Cover
7. a.	955-1012-61	Pivot Pin
b.	955-1010-72	Pivot Pin Keeper
8.	900-3933-18	Hydraulic Cylinder - 2 x 8
9.	900-4900-80	Lock Nut for Grapple Pin
10.	900-3910-19	Grapple Rotator
11.	900-4905-69	Swing Brake

NOTICE Parts may not be exactly as shown.

HYDRAULIC TONGUE JACK



LOCATION	PART NUMBER	DESCRIPTION
1.	920-300340	Tongue Jack Mount Plate
2. a.	900-3934-24	Tongue Jack Cylinder - Welded
b.	904-0007-14	Pin For Welded Cylinder (Not Shown)
3.	900-3920-01	Tongue Jack Valve
4.	900-3949-09	Check Valve
5.	--	Outside Tube Assembly
6.	900-4907-60	Cotter Hair Pin
7.	914-1000-38	Lock Pin
8.	980-0131-50	Inside Tube Assembly
9.	980-0509-53	Drop Leg Foot Pad Assembly
10.	980-0509-00	Bolt-On Hydraulic Tongue Jack Kit (Includes #'s 1 - 9)

NOTICE Parts may not be exactly as shown.

SERVICE RECORD

DATE	DESCRIPTION	AMOUNT