



OPERATING & PARTS MANUAL

MODEL ZT1844



Model No: **ZT1844**

Serial No: _____

DEALER:

Name: _____

Address: _____

City/State: _____

Phone No: _____

Delivery Date: _____

Engine Make: _____

Serial No: _____

Clutch Make: _____

Model: _____ S/N _____

Copyright 9/18

ATTENTION:

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

STUMP GRINDER COMPONENTS

Serial Number

Model Number of Stump Grinder

ENGINE COMPONENTS

Brand

Engine Serial Number

Engine 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 (STUMP GRINDER)

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

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

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 (____) _____

- _____ The customer has received instruction and fully understands all operational, safety and maintenance requirements of the equipment.
- _____ 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.
- _____ 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.
- _____ The customer has received instruction and fully understands not to reach near the cutter head with hands or feet or to be located near debris field with engine running.
- _____ The customer has received instruction and fully understands that the operators must always be located within easy reach of all control and shut down devices.
- _____ The customer has received instruction and fully understands to not start grinding a stump without checking for power lines, water lines, sewer lines, phone lines, etc.
- _____ The customer has received instruction and fully understands the purpose of and how to operate the shut down/shut-off devices, and will not attempt to override any safety devices or guards.
- _____ 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 cutter head must have come to a complete stop, and the cutter head lock must be installed. The customer understands they must allow the necessary time for the cutter head to come to a complete stop before opening the cutter head guard or start any maintenance or service procedures. If applicable 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.
- _____ The customer has received instruction and fully understands the machine is not to be operated without the factory approved cutter head guard in place, the machine is not to be operated with any type of make shift cutter head guard, and the machine is not to be operated under any circumstances with the cutter guard open or unsecured.
- _____ The customer has reviewed and fully understands limited warranty, and all written and visual instructions.
- _____ 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.
- _____ The customer has received, been advised, and understands the manuals, and the Safety/Service video supplied with the grinder. A video is supplied for equipment models as available.
- _____ All Danger, Warning and Operational decals are properly displayed on equipment and fully understood by customer.
- _____ The 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

STUMP GRINDER / FORESTRY MOWER 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? _____
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

	PAGE
INTRODUCTION & WARRANTY.....	2
SERIAL NUMBER LOCATIONS.....	6
SAFETY PROCEDURES.....	7
EQUIPMENT SPECIFICATIONS.....	12
DECALS.....	13
CONTROLS.....	17
MACHINE OPERATION.....	22
TRANSPORTATION PROCEDURES.....	24
MAINTENANCE.....	26
HYDRAULICS.....	38
ELECTRICAL.....	46
REPLACEMENT PARTS.....	47
ENGINE SIDE COMPONENTS.....	48
CUTTER WHEEL SIDE COMPONENTS.....	50
FRAME COMPONENTS.....	52
SWING OUT & TANK COMPONENTS.....	54
CUTTER WHEEL BAR COMPONENTS.....	56
SERVICE RECORD.....	57
OGURA CLUTCH MANUAL.....	59

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 preceded 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.

EXPLANATION OF LIMITED WARRANTY

The warranty validation form must be completed and submitted to Bandit Industries within 10 business days of the purchase of your Bandit machine. **Any and all warranty is NULL AND VOID if the Warranty Validation Form is not returned within 10 business days of the original purchase of the machine.** If the original owner elects to sell the machine within the warranty period, the remaining warranty transfers to the new owner. Do not submit a new Warranty Validation Form upon the sale of the machine within the warranty period. Please contact Bandit Industries to report the sale.

The quickest and easiest way to solve most problems is to use this manual to identify and resolve the issue. If you are unable to do this or need additional assistance, please contact the authorized dealer and/or Bandit Industries directly.

To initiate a warranty claim, complete and submit a Warranty Consideration Form. This form is available online at www.banditchippers.com, through the authorized dealer or through Bandit Industries, Inc. While some warranty claims will be covered by the vendor, all claims should be initiated through and facilitated by Bandit Industries or the authorized dealer.

Regardless of warranty consideration, all parts will be invoiced at the time of shipment. Warranty credits may be issued only if the claim forms are completed and all defective parts requested to be returned have been returned to the requested location.

The manufacturer may elect, at its discretion, to reimburse reasonable labor costs to the customer or dealer for defect repairs. No reimbursement will be considered without prior approval from the manufacturer. The hours allowed for repair will be determined by Bandit Industries. Diagnostic labor and travel expenses will not be covered under warranty.

The manufacturer will not reimburse the customer or dealer labor costs incurred for installing “bolt-on” or “slip-on” items, such as hydraulic pumps and motors, control valves, flow dividers, belts, sheaves, etc. The manufacturer will provide replacement parts to the customer for defective parts during the warranty period. Please keep the defective parts as you may need to return them for warranty consideration. A Bandit representative will issue a RMA (Return Merchandise Authorization) and contact the customer if the defective parts need to be returned.

The manufacturer will not reimburse the customer or dealer for shipping or freight charges for replacement parts or returned defective parts during the warranty period without prior approval. It is the customer’s responsibility to install any replacement parts unless the authorized dealer agrees to install them.

The manufacturer will not reimburse travel costs to the servicing dealer without prior approval from the manufacturer. It is the customer’s responsibility to deliver the machine to dealer’s service facility unless the authorized dealer agrees to assist with machine transportation.

All warranty consideration is NULL AND VOID If the Warranty Validation Form has not been submitted. The Warranty Validation Form can be mailed in or e-mailed to warrantyval@banditchippers.com.

NOTICE

Prior to delivery to final owner and during storage, this machine must be serviced and lubricated to avoid damage that will not be covered under warranty, see “Maintenance” section.

Any damage or equipment failure due to incorrect or incomplete service or maintenance by the equipment owner will not be covered under warranty.

All controls, safety devices, guards, and shields must be correctly operational and securely in place at all times during equipment operation.

BANDIT INDUSTRIES INC. LIMITED WARRANTY

(989) 561-2270

Bandit Industries Inc., also referred to as “Manufacturer” warrants this new product to be free of defects in workmanship and material for a period of 1 year or 2000 operating hours, whichever ever comes first. Any machine used for lease or rental purposes warranty is limited to 90 days or 500 hours from the first day of initial service.

This warranty takes effect upon delivery to the original retail purchaser and return of the Warranty Validation Form to Bandit Industries. The warranty is **NULL AND VOID** if the Warranty Validation Form is not returned within 10 business days. The manufacturer at its option will replace or repair at a point designated by the manufacturer, any parts which appear to have been defective in material or workmanship. The manufacturer is not responsible for labor, consequential damages, traveling expenses, down time expenses, or shipping and freight charges.

This warranty and any possible liability of Bandit Industries Inc., is expressly in lieu of any other warranties, expressed or implied, including but not limited to, any implied warranty or merchantability of fitness for a particular purpose and of any noncontractual liabilities including product liabilities based upon negligence or strict liability. Bandit Industries Inc., will not be liable for consequential damages resulting from breach of warranty.

All parties involved agree that the Owner’s Sole and Exclusive Remedy against the Manufacturer, whether in contract or arising out of this warranty, instructions, representations, or defects shall only be for the replacement or repair of defective parts as provided herein. In no event or circumstances shall the Manufacturer’s liability exceed the purchase price of the machine. The buyer also agrees that no other remedy (including but not limited to consequential or incidental loss) shall be available to him or her.

It is absolutely necessary to return the Warranty Validation Form, completely and accurately filled out to Bandit Industries Inc. or e-mailed to warrantyval@banditchippers.com, within ten (10) business days from the date of purchase to validate this warranty. All warranty consideration is NULL AND VOID if the Warranty Validation Form has not been submitted.

This warranty will not apply if the Bandit product is not operated with replacement parts or equipment not manufactured or recommended by Bandit Industries, Inc.

This warranty will not apply if the Bandit product is not operated in a manner recommended by the manufacturer. The following examples would void the warranty:

1. The completed Warranty Validation Form has not been submitted.
2. The Bandit product has been abused, or not serviced properly.
3. Repairs or attempted repairs made without prior written authorization.
4. Repairs made due to normal wear are not warrantable.
5. The machine was involved in, or damaged by an accident.
6. The machine was damaged from any type of foreign material.

The owner is responsible for all scheduled maintenance as explained in the Operators Manuals. Negligence of proper maintenance or any other negligence, accident or fire; nor with failure to adjust, tighten, or replace wear items included but not limited to items such as knives, anvil, teeth, belts, lubrication fluids, bearings, filters, hydraulic components, loose nuts or bolts, etc. may void warranty.

All components and parts being returned for warranty consideration must be complete and assembled when delivered. Warranty will not be considered if the failed component has been disassembled at any point in time. Hydraulic components and parts must be returned assembled with all fluid ports capped or plugged and free of foreign contamination, or warranty will not be considered.

BANDIT INDUSTRIES, INC. LIMITED WARRANTY

(989) 561-2270

NOTICE This warranty applies only to new and unused equipment or parts thereof manufactured by Bandit Industries Inc. and is void if the machine is operated with replacement parts or equipment not manufactured or recommended by Bandit Industries Inc.

All other components are warranted by their respective manufacturers (i.e. engines, axles, hydraulic pumps and motors, clutches, tires, batteries, etc.) Even though certain warranties are not handled through Bandit Industries, the warranty procedure for those components should be facilitated through Bandit Industries or your nearest dealer.

Any machine used for lease or rental purposes warranty is limited to 90 days or 500 hours from the first day of initial service.

In order to process any warranty claims, it is the owner's responsibility to fill out a warranty consideration form and send it in with pictures and detailed information within 10 business days of the failure to the Manufacturer or our authorized dealer. If an RMA is given to return the failed parts, they must be returned within 10 business days to the respective vendor or Bandit Industries depending on the instructions given. The new parts must be installed and work be complete within 10 business from receiving the parts to receive credit.

It is necessary to include the following information on any and all requests for warranty:

1. Warranty Consideration Form, obtained from Bandit Industries or its dealers, completely and accurately filled out.
2. Dealer from whom purchased.
3. Date of delivery.
4. Serial number of unit.
5. Model number of unit.
6. Engine make and serial number.
7. Length of time in use (hours on machine).
8. Date of Failure.
9. Nature of Failure.

Bandit Industries Inc., reserves the right to alter, improve, revise or modify any parts or products. They also may change design, specifications, or part prices without advance notice.

Bandit Industries Inc., is **NOT** responsible for updating or upgrading completed machines with design changes that are made after its production.

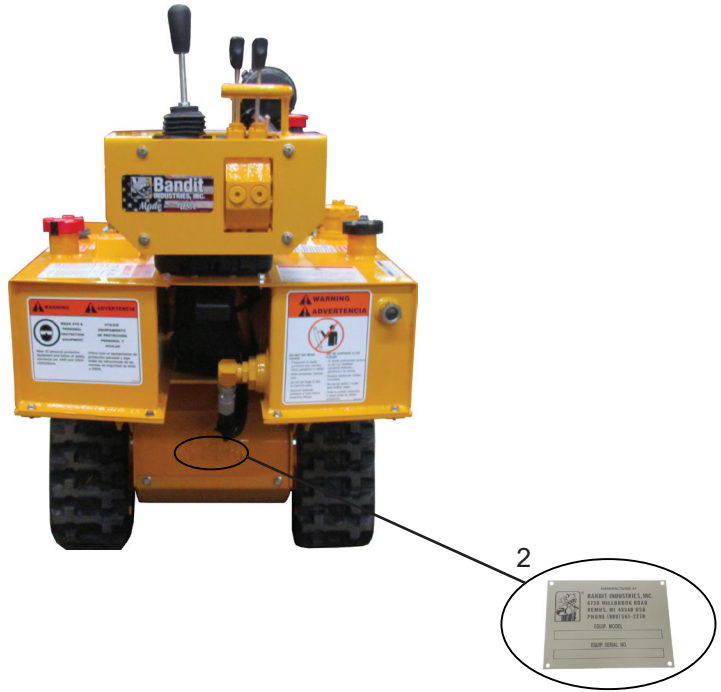
Bandit Industries Inc., may require the Customer/Owner to bring their machine to the Dealer/Manufacturer for warranty repairs. The Manufacturer **DOES NOT** pay Dealers or Customers for travel time or travel costs. The Manufacturer does not furnish loaner machines or reimburse for rental machines.

NOTICE Clutch and engine maintenance (air filter maintenance, oil changes, oil filter maintenance, etc.) are important to your machine. Refer to the clutch or engine manual for the maintenance schedule. Failure to perform the clutch or engine maintenance will void the warranty with the respective manufacturer. Bandit Industries Inc. does not warranty these components.

EXAMPLES OF COMPONENTS WARRANTIED BY THE COMPONENT MANUFACTURER.

- | | |
|------------------------|-----------|
| -Engines | -Belts |
| -Clutches | -Bearings |
| -Hydraulic Components | -Axles |
| -Electronic Components | -Tires |
| -Batteries | -Tracks |

TYPICAL SERIAL NUMBER AND/OR WORK ORDER NUMBER LOCATIONS



1. W/O # on top of frame.
2. S/N in between the tracks on the frame.

NOTICE

The engine information is located on the engine block.

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 grinder should be in an area restricted from people passing by. This area around the grinder must be free of all objects that can obstruct your movement when working with the grinder. The machine should be checked for loose tools or foreign objects, especially in the grinding area. All tools not in use should be secured in a tool box.

⚠ DANGER

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

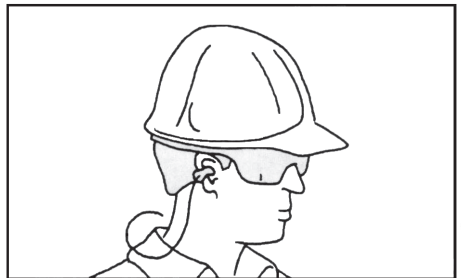
⚠ WARNING

Operators **must** at all times be located within easy reach of all 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. 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 (PPE) and follow all safety standards per ANSI and OSHA instructions. Examples of PPE equipment: hard hat, face shield, safety glasses, gloves, ear protection, etc. Always keep a fully charged fire extinguisher with the machine while operating or servicing the machine.



⚠ WARNING



WEAR EYE & PERSONAL PROTECTION EQUIPMENT

Wear all personal protection equipment and follow all safety standards per ANSI and OSHA instructions.

SAFETY PROCEDURES

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 cutter teeth bolts, etc. for torque and fit.

Most of the nuts used on the Bandit Grinder 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 cutter tooth bolts!

After the engine is started, let the grinder wheel 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 pressures 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!

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.

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 for diesel engines and 2" (50mm) from the top of the tank for gasoline engines.

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.

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

Before attempting any type of maintenance, disengage clutch or cutter wheel engagement, wait for the cutter wheel to come to a complete stop, position and lock the cutter wheel arm in the transport position, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the cutter wheel lock pin, wait 2 minutes then disconnect the battery.

ALWAYS install the lock pin into the cutter lock tube before working on the grinder.

Simply slide the lock pin into the cutter wheel lock tube. This is to ensure that the cutter wheel cannot be started while you are working on the grinder. If for some reason the cutter wheel would start to turn, it would simply hit the lock pin.

SAFETY PROCEDURES

⚠ DANGER

DO NOT start the engine with the clutch or cutter wheel engaged.

NOTICE

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

NOTICE

Engage and disengage cutter wheel at low rpm.

⚠ DANGER

Do not work on the machine if the engine is running with the clutch or cutter wheel disengaged. Injury or death may occur if the clutch or cutter wheel was engaged.

Your machine may or may not be equipped with a clutch. If equipped with a clutch, 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. 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 or cutter wheel, engine RPM must always be at idle. After engagement raise engine RPM to full throttle. Engaging and disengaging the clutch or cutter wheel at high engine RPM will quickly and excessively wear out the clutch, belts, or hydraulic components. If equipped, refer to clutch manufacturer's manual for proper service and 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.

⚠ DANGER

DO NOT go near the rotating cutter wheel for any reason. DO NOT go near the cutter wheel while the engine is running or the cutter wheel is coasting to a stop. Contact with a rotating cutter wheel will result in serious bodily injury or death.

⚠ DANGER

DO NOT go near or in-line with the debris field of the stump grinder while in operation. While grinding stumps, the chips and portions of the stump fly from the cutter wheel and can cause severe injury.

⚠ DANGER

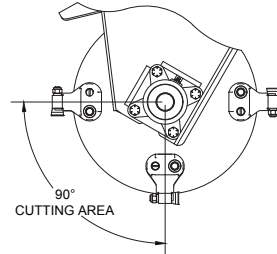
Never grind materials that might contain wires, stones, nails, or other metal objects which may damage the teeth and become dangerous projectiles. Remove all rocks and stones from stump grinding area.

⚠ DANGER

DO NOT start to grind a stump unless you are completely sure there are not any utility lines in the area above or below the ground level where you are grinding. Always contact the utility locating service in your area or local utility companies to mark underground utility lines.

⚠ DANGER

For optimum performance, the stump should be cut with the portion of the cutter wheel shown below. **NEVER UNDERCUT THE STUMP.** Undercutting the stump may cause severe kickback, vibration and component damage. **NEVER CUT THE STUMP FROM THE TOP.** The cutter wheel will throw debris up and toward the operator, instead of down and under the machine.



⚠ DANGER

The stump must be cut as low to the ground as possible to reduce the amount of grinding material and debris in the work area.

If the grinding material starts to interfere with the machine operation, follow the steps below before removing any grinding material. Never remove any grinding material with cutter wheel running. Contact with a rotating cutter wheel will result in serious bodily injury or death.

1. Disengage the cutter wheel.
2. Position the machine away from the stump.
3. Before attempting any type of maintenance, disengage clutch or cutter wheel engagement, wait for the cutter wheel to come to a complete stop, position and lock the cutter wheel in the transport position, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the cutter wheel lock pin, wait 2 minutes then disconnect the battery.
4. Clear the grinding material away from the stump.
5. Start the machine and reposition it at the stump before engaging the cutter wheel.

SAFETY PROCEDURES

WARNING

Sparks can occur if cutter teeth strike rocks, metal, or other hard objects.

DO NOT use in high or very high fire hazard severity zones.

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.

WARNING

Do Not continue to operate the machine if the cutter wheel stalls. Immediately lift cutter wheel out of the stump, dirt, etc. and start again with less bite. Prolonged cutter wheel stall will ruin the hydraulic components or belts, creating extreme heat and possible fire hazard.

WARNING

Before performing maintenance on the machine remove all debris, oil, grease, water, snow, ice, etc. from all machine surfaces.

WARNING

Unless going through a narrow passageway or gate, always keep the dual tires installed or the tracks expanded for machine stability.

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

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.

DANGER

Keep hands clear of all pinch points.

DANGER

Do not touch hot machine surfaces. The machine surfaces may be hot due to the machine operating recently or the machine setting in the sunlight.

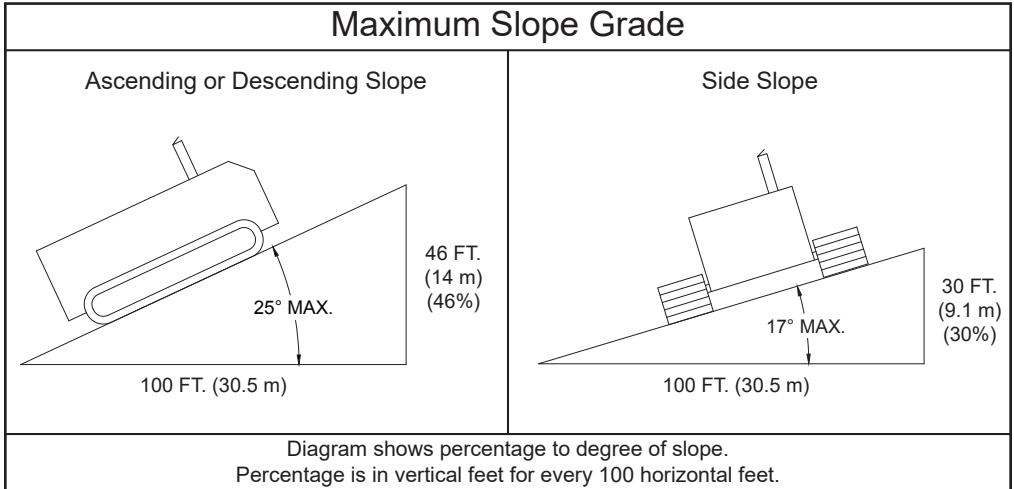
SAFETY PROCEDURES

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.



⚠ 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 damage 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

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

⚠ 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

DO NOT entangle feet or hands in undercarriage travel system.

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.

EQUIPMENT SPECIFICATIONS



Approximate Dimensions & Weights

(Dimensions & Weights will vary depending on optional equipment)

Model ZT1844

Height:		48" (1.2 m)
Length:		100" (2.5 m)
Width:		29" (0.7 m)
Weight:	26.5 Hp:	1420 lbs. (640kg)
	38 Hp:	1540 lbs. (700kg)

Cutter Wheel Height:	22" (0.6 m)
Cutter Wheel Depth:	12" (0.3 m)

Fuel Tank Capacity:	7 gal. (26L)
Hydraulic Tank Capacity:	7 gal. (26L)

Cutter Wheel Diameter:
Number of Teeth:

Green Wheel:
Green Wheel:

18" (0.5 m)
8

DECAL LOCATIONS

⚠ DANGER

DO NOT go near the rotating cutter wheel for any reason. **DO NOT** go near the cutter wheel while the engine is running or the cutter wheel is coasting to a stop. Contact with a rotating cutter wheel will result in serious bodily injury or death.



⚠ DANGER

DO NOT start to grind a stump unless you are completely sure there are not any utility lines in the area above or below the ground level where you are grinding. Always contact the utility locating service in your area or local utility companies to mark underground utility lines.

⚠ WARNING

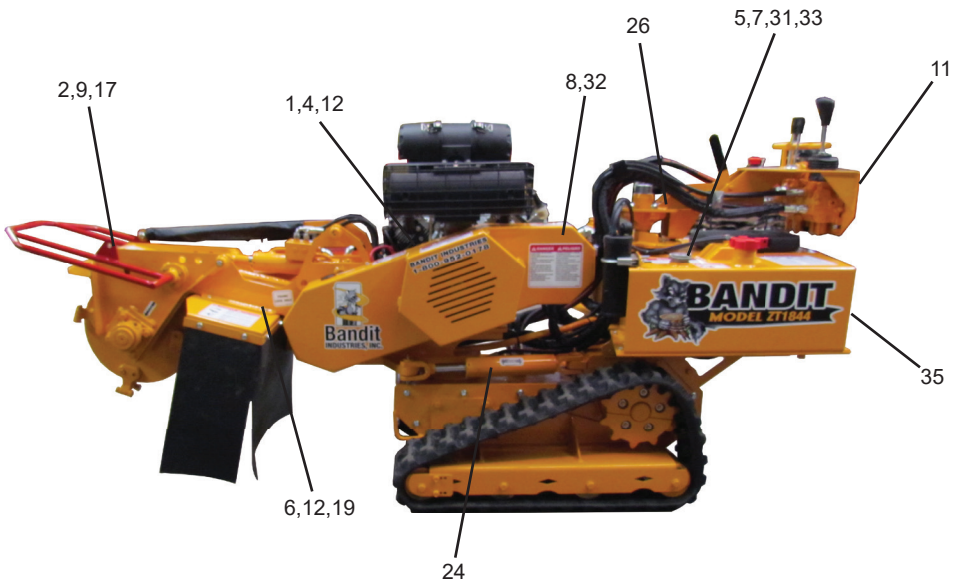
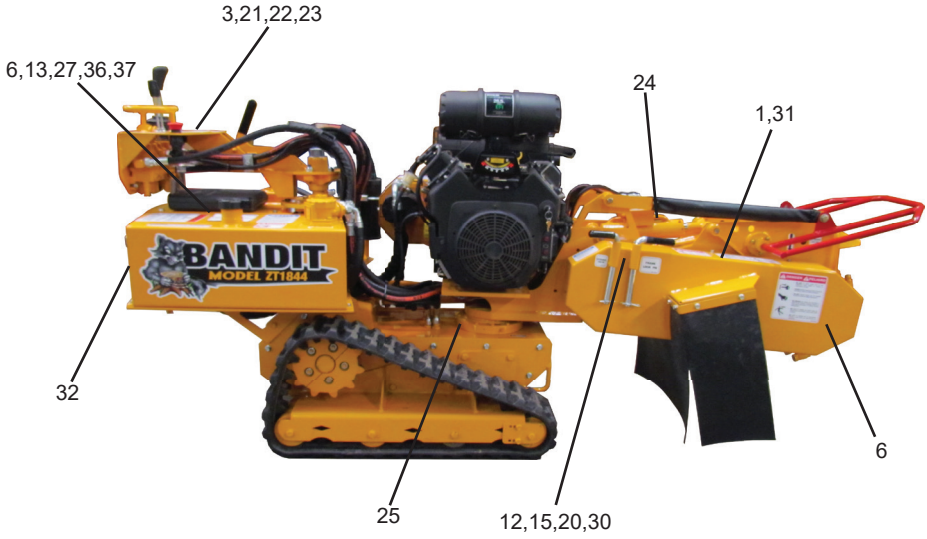


WEAR EYE & PERSONAL PROTECTION EQUIPMENT

Wear all personal protection equipment and follow all safety standards per ANSI and OSHA instructions.

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-02	Moving Parts...
2.	SPD-20	Flying Objects Stand Clear...
3.	SPD-22	Emergency Shut Down Only
4.	SPD-28	Do Not Insert Fingers...
5.	SPD-30	Do Not Sit, Stand, Lay, Climb...
6.	SPD-36	...Debris Field...
7.	SPD-38	Do Not Entangle Feet...
8.	SPD-39	Do Not Operate...
9.	SPD-63	Do Not Go Near Cutter Wheel...
10.	SPD-69	Do Not Start To Grind A Stump...
11.	ID-67	Bandit Industries Inc...USA
12.	INST-12	Grease Daily - Single Arrow
13.	INST-53	Hydraulic Oil...Hydrex XV...
14.	INST-73	Cutter Head Lock Hole
15.	INST-74	Cutter Head Lock Pin
16.	INST-81	Swing Speed Controls
17.	INST-86	Grease Daily - Double Arrow
18.	INST-101	Canada Engine Decal
19.	INST-111	Frame Lock Hole
20.	INST-112	Frame Lock Pin
21.	INST-180	Cutter Wheel On/Off
22.	INST-365	Joystick Functions
23.	INST-366	Swing-Out Console Lock
24.	INST-393	Grease Weekly - Double Arrow
25.	INST-394	Grease Every 6 Months
26.	INST-395	Grease Yearly
27.	N-02	Maintain Lubrication...
28.	SPN-06	Decal Maintenance...
29.	N-33	Engine Oil Lubrication...Break-In...
30.	N-71	Patents
31.	N-72	Service Required Under Beltshield
32.	SPW-01	Do Not Go Near Oil Leaks...
33.	SPW-03	Gasoline Fuel Only...
34.	SPW-04	Frozen Battery Can Explode...
35.	SPW-08	Wear Personal Protection...
36.	SPW-28	...Fire Hazard...
37.	SPW-43	Do Not Attempt...Slope of More Than...
38.	900-8911-97	Bandit Model ZT1844 Logo & Safety Decal Kit - English/Spanish
39.	900-1912-53	Bandit Model ZT1844 Logo & Safety Decal Kit - English Only

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

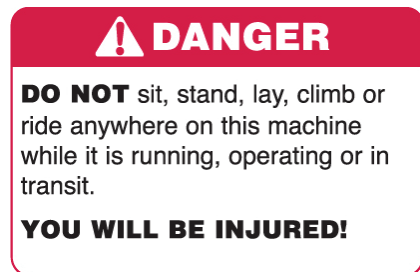
DECALS

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.

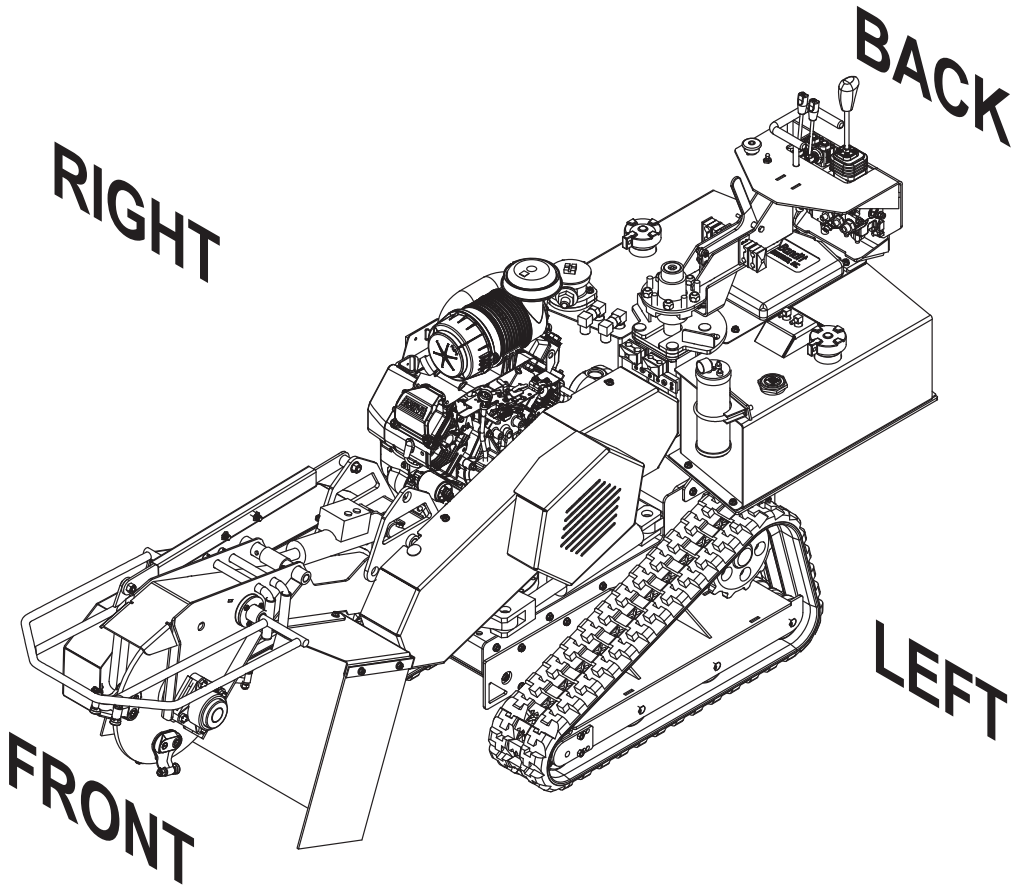
It is very important that all decals remain in place and in good condition on your machine. Please follow the care and instructions given below:

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. Send translated decals required to Bandit Industries, Inc.

EXAMPLES:



MACHINE ORIENTATION REFERENCE



ENGINE OPERATING SPEEDS

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.

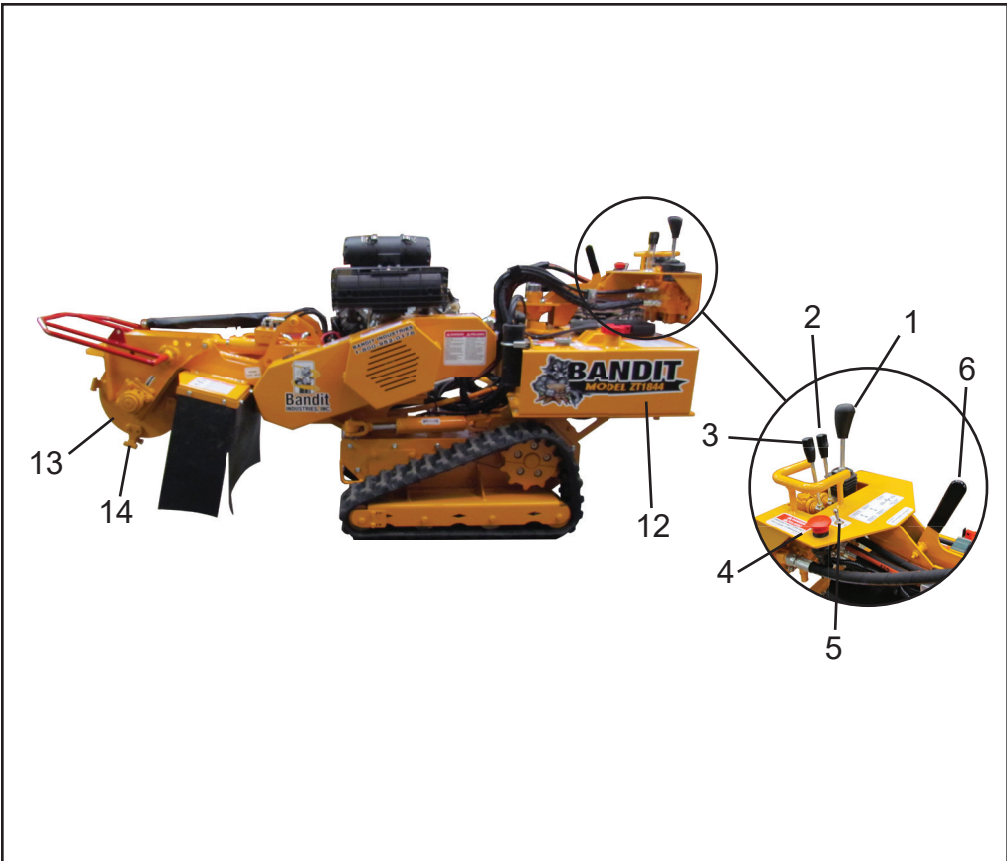
Some Current Engine Types	Maximum RPM
Kohler CH740 26.5 Hp EFI	3600
Kohler CH980 38 Hp EFI	3600

CONTROLS & COMPONENTS

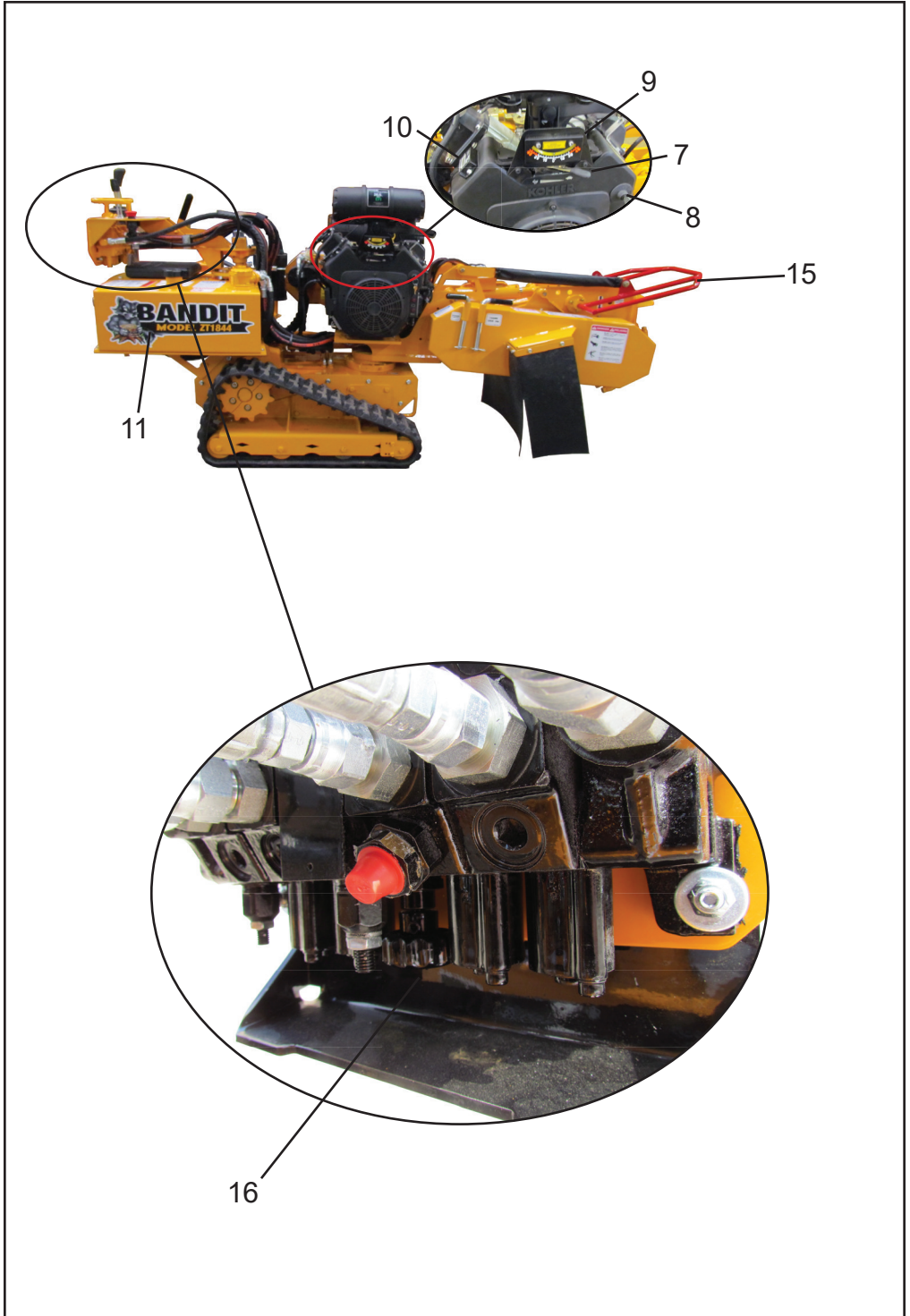
Basic Location of Controls & Components

LOCATION SHOWN

- | | |
|---|-------------------------|
| 1. Cutter Head Up / Down & Swing Left / Right | 9. Level Gauge |
| 2. Left Track Forward / Reverse | 10. Tach / Hour Meter |
| 3. Right Track Forward / Reverse | 11. Hydraulic Tank |
| 4. Emergency Stop Button | 12. Fuel Tank |
| 5. Cutter Wheel On / Off Switch | 13. Cutter Wheel |
| 6. Swing Out Lock | 14. Cutter Wheel Teeth |
| 7. Throttle Up / Down Lever | 15. Nose Bar |
| 8. Ignition Switch | 16. Swing Speed Control |



CONTROLS & COMPONENTS cont.



EMERGENCY STOP (E-STOP)

⚠ 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

DO NOT go near the rotating cutter wheel for any reason. DO NOT go near the cutter wheel while the engine is running or the cutter wheel is coasting to a stop. Contact with a rotating cutter wheel will result in serious bodily injury or death.

NOTICE

IF THE EMERGENCY STOP OR E-STOP BUTTON IS PUSHED THE ENTIRE MACHINE WILL SHUT DOWN. THE CUTTER WHEEL WILL NOT STOP IMMEDIATELY, IT WILL COAST TO A STOP



Emergency Stop: 900-2931-47
(Machine Harnesses will vary depending on machine model and options)

Machines with Manual Controls



Machines with Swing Out Controls



Machines with Remote Controls



The Emergency Stop is located near the machine controls. The location will vary depending on the machine model and options.



Radio Remote Controls

Tether Controls



Emergency Stops or E-stops are also located on the radio remote controls and tether controls. The operation of the e-stop will vary depending on the make and model of the remote or tether.

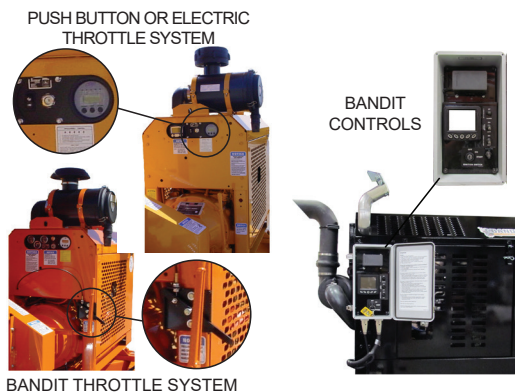
CONSULT THE ENGINE MANUFACTURER'S MANUAL FOR SPECIFIC CONTROLS, OPERATION, & MAINTENANCE FOR TYPICAL ENGINES

- 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.

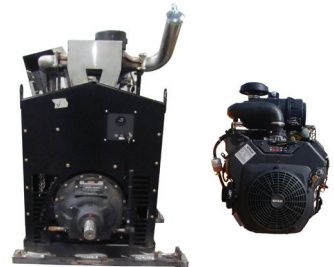
NOTICE

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



MACHINE OPERATION

- Check all fluids before starting the machine.
- Make sure to go through the daily start-up and maintenance procedures before operating the machine.
- Cutter wheel must be disengaged before starting.
- Start engine at idle speed and allow for sufficient time for oil to circulate before proceeding.
- Test all controls for proper operation.
- Avoid transversing slopes.

DANGER

DO NOT START TO GRIND A STUMP UNLESS YOU ARE COMPLETELY SURE THERE ARE NOT ANY UTILITY LINES IN THE AREA ABOVE OR BELOW THE GROUND LEVEL WHERE YOU ARE GRINDING. ALWAYS CONTACT THE UTILITY LOCATING SERVICE IN YOUR AREA OR LOCAL UTILITY COMPANIES TO MARK UNDERGROUND UTILITY LINES.

DANGER

WEAR ALL PERSONAL PROTECTIVE EQUIPMENT PER ANSI, OSHA AND MANUALS.

DANGER

KEEP CLEAR OF CUTTING WHEEL, MOVING MACHINE PARTS AND GRINDER DEBRIS FIELD.

DANGER

The stump must be cut as low to the ground as possible to reduce the amount of grinding material and debris in the work area.

If the grinding material starts to interfere with the machine operation, follow the steps below before removing any grinding material. Never remove any grinding material with cutter wheel running. Contact with a rotating cutter wheel will result in serious bodily injury or death.

1. Disengage the cutter wheel.
2. Position the machine away from the stump.
3. Follow all pre-maintenance shut-down procedures.
4. Clear the grinding material away from the stump.
5. Start the machine and reposition it at the stump before engaging the cutter wheel.

Position machine at stump with cutter wheel a slight distance away from stump.

Reduce engine RPM to idle.

Raise cutter wheel clear of stump.

Engage the cutter wheel.

Increase engine RPM to full.

Test the controls for proper operation, speed, and unobstructed movement.

The cutter wheel swing should be at a rate that will allow cutter wheel to pass through stump smoothly. If jerking, bouncing or significant drops in engine speed occur, the swing rate is too rapid and must be slower.

A swing speed control is located on the bottom of the valve bank. To adjust this, turn the dial clockwise to slow the swing speed.

Lower the spinning cutter wheel to the stump and make a few light passes at the stump to get a feel for the cutting action.

Gradually increase cutting action and work away at the stump by swinging cutter wheel left-to-right-to-left through stump in a sideways motion. Smooth, effortless cutting lengthens machine life, minimizes down time and is more profitable in the long run.

Continue cutting stump by adjusting cutting wheel progressively lower until stump is cut well below ground level.

Swing cutter wheel clear of stump and position machine closer to stump for next series of passes and continue cutting.

Continue in this manner until stump has been removed.

After removing the stump, raise the cutter wheel clear of the chips and return to center position.

Larger stumps may require repositioning machine to remove complete stump.

Raise cutter wheel clear of stump and return to center position.

Reduce engine speed to idle and disengage the cutter wheel. Follow the engine manual to start the recommended manufacturer's shut down procedures.

DO NOT ENGAGE OR DISENGAGE CUTTER WHEEL AT A HIGH ENGINE SPEED. Damage to machine will occur.

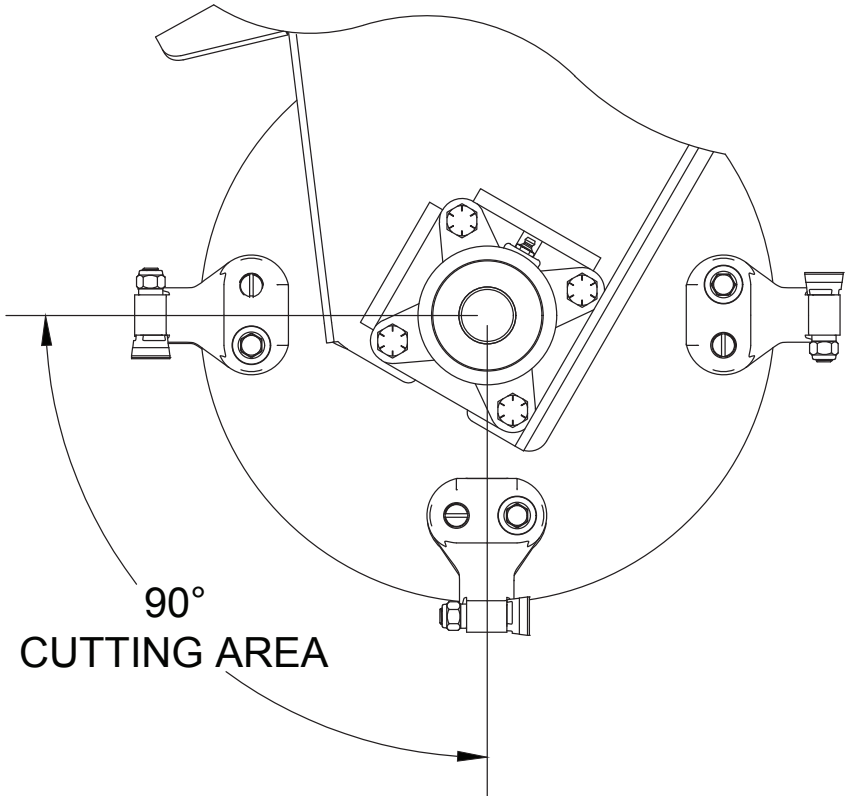
Turn off engine.

Allow cutter wheel to come to a complete stop before inspecting.

CUTTING AREA

⚠ DANGER

For optimum performance, the stump should be cut with the portion of the cutter wheel shown below. **NEVER UNDERCUT THE STUMP.** Undercutting the stump may cause severe kickback, vibration and component damage. **NEVER CUT THE STUMP FROM THE TOP.** The cutter wheel will throw debris up and toward the operator, instead of down and under the machine.



⚠ DANGER

DO NOT go near the rotating cutter wheel for any reason. **DO NOT** go near the cutter wheel while the engine is running or the cutter wheel is coasting to a stop. Contact with a rotating cutter wheel will result in serious bodily injury or death.

A red prohibition sign (a circle with a diagonal slash) over an illustration of a person's foot near a rotating cutter wheel, indicating that it is forbidden to be near the wheel.

⚠ DANGER

**FLYING OBJECTS
STAND CLEAR
OR YOU WILL BE
INJURED!**

A warning sign featuring a silhouette of a person being struck by a flying object, with an arrow pointing to the object. The text "FLYING OBJECTS STAND CLEAR OR YOU WILL BE INJURED!" is written in bold capital letters.

TRANSPORTATION PROCEDURES

WARNING

BEFORE TRANSPORTING THE MACHINE, INSPECT AND CONFIRM THE FOLLOWING STEPS:

1. The trailer must have a cargo weight rating capacity for the weight of the stump grinder. The combined weight of the trailer and the stump grinder 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 towing vehicle must be rated for and have the towing capabilities to haul the stump grinder package (includes the stump grinder and a trailer). The towing vehicle must be mechanically sound and capable of handling the towing job.
3. The hitch on the towing vehicle and the coupler on the trailer must match in size, type, and needed capacity.
4. Make sure both the towing hitch and the coupler are in good mechanical and wear condition, that they are joined together securely, and the coupler/hitch is locked in place.
5. The safety chains must have the correct capacity for the equipment being towed.
6. The safety chains are crossed under the coupler/hitch then securely attached to the towing vehicle. The safety chains are long enough to not restrict the turning movement, but short enough to not drag on the road.
7. The electrical plug-in on the towing vehicle and the trailer must be wired for the same functions and they fit securely together. The plug-in wire is long enough to not restrict the turning movement, but short enough to not drag on the road. The trailer must have a lighting system and braking system to match and perform correctly off the towing vehicles system. You must meet the Federal and your States' Department of Transportation Code of Regulations concerning lights, brakes, and highway transit.
8. The break-away actuator (if equipped) that is installed on the trailer correctly works and is appropriately attached to the towing vehicle.
9. All lights and brakes on the trailer must correctly function when activated by the systems in the towing vehicle.
10. The tires must be checked for cuts or damaged rims, air pressure is correct, and the axle lug nuts have been checked for correct torque (refer to trailer manual).
11. When the stump grinder is on the trailer, the trailer must have the right load capacity, with the stump grinder positioned on the trailer for the correct weight distribution (follow the trailer manufacturer's recommendations for the amount of weight on the tongue or hitch according to the total stump grinder package weight), the stump grinder brakes, if equipped, are locked, the cutter wheel is raised off the trailer bed with the lock pin installed, and the stump grinder is securely bound down to the trailer bed per your States binding requirements.
12. Any loose debris, tools or parts must be cleared off or are put away.
13. Make sure to 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, vise, etc.
14. Make sure the load ramps are securely stored for transport.
15. Make sure the stump grinder's engine is not running, the ignition key is in your possession, and all controls are stored correctly and locked in place for transport.
16. The stump grinder package must be hauled level and the towing vehicle must be sized to handle hitch weight and towing weight. The towing vehicle or the combination of towing vehicle and towing package must have enough braking capacity to meet the Federal and your State Department of Transportation requirements.
17. The stump grinder package is now ready for transport. Make sure to obey all local regulation and laws regarding the transporting of this type of stump grinder.
18. Do not drive too fast for road conditions or exceed speed regulations for equipment towing.

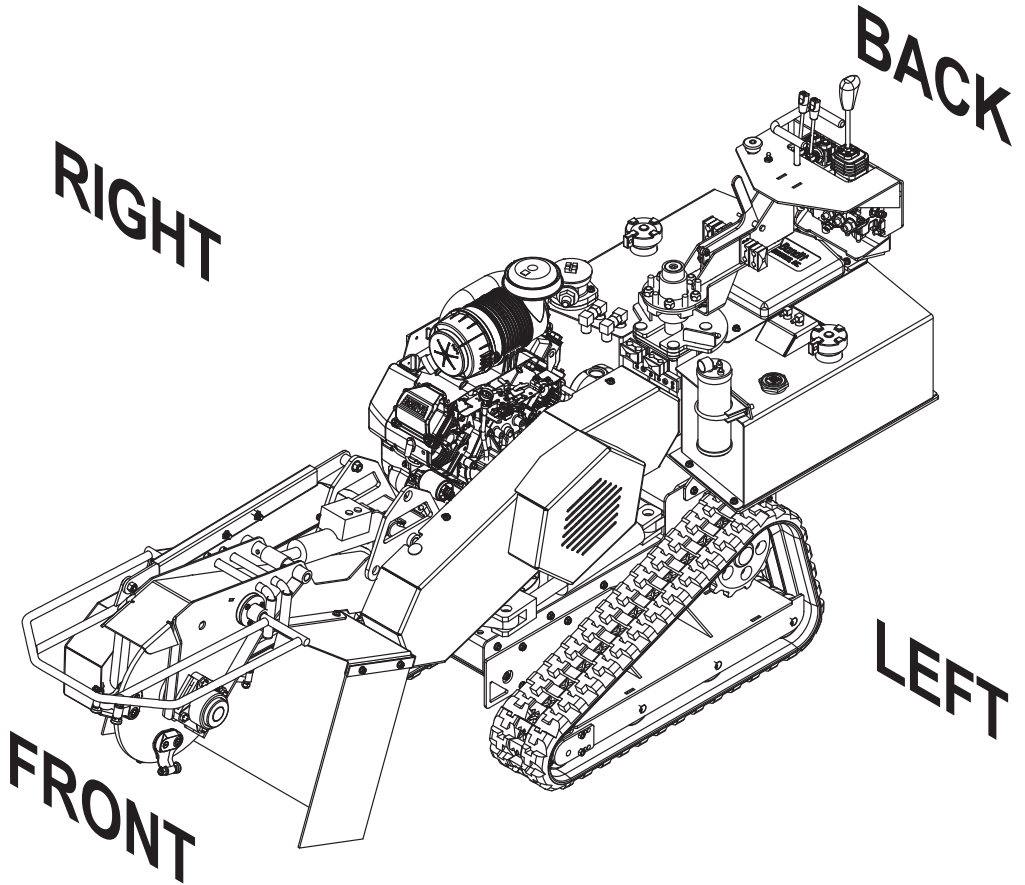
LOADING & UNLOADING

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 they 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. Once the engine is running at as low a speed as possible, carefully raise the cutter wheel slightly up off the ground or trailer bed. While loading or unloading the stump grinder, the cutter wheel should not be raised any higher than necessary to just clear whatever is under it. You need to keep the center of gravity as low as possible to avoid tipping the machine while it is moving.
9. The cutter wheel end of the machine should always be positioned so that it is toward the rear of the trailer, not the tongue, during transport.
10. Follow the trailer manufacturer's recommendations for the amount of weight on the tongue or hitch according to the total machine package weight to correctly position the machine on the trailer bed.
11. 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.
12. With the engine and the machine at as low of speed as possible, move the machine toward the ramp system. Make sure the alignment is correct throughout the travel, and carefully readjust the cutter wheel height so that it barely clears obstacles as it is going up or down the ramp system.
13. Properly secure the equipment and the area to avoid any possible accidents or dangers.
14. The trailer should 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.
15. 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.

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 or cutter wheel engagement, wait for the cutter wheel to come to a complete stop, position and lock the cutter wheel in the transport position, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the cutter wheel lock pin, wait 2 minutes then 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.

DANGER

Do **Not** start to grind a stump unless you are completely sure there are not any utility lines in the area above or below the ground level where you are grinding. Always contact the utility locating service in your area or local utility companies to mark underground utility lines.

DANGER

Keep hands clear of pinch points.

NOTICE

Consult your engine manual for proper break-in procedures. Various engines require somewhat different procedures.

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 31 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 the cutter wheel and pockets for wear:

Check for elongated bolt holes, secure welds, torqued bolts, excessive wear, and impact cracks. If a problem is found, contact the grinder manufacturer or an authorized Bandit dealer.

6. Check condition of cutter teeth, pockets, and hardware:

Replace or rotate your cutter teeth to keep them sharp. Check the condition of your teeth, pockets, and hardware. Replace if necessary.

7. Check cutter wheel pocket bolts:

All cutter wheel pockets bolts must be factory approved. Bolts must be replaced after a maximum of 4-5 rotations/changes to ensure safe clamping ability. See Torque Chart for proper torque.

DAILY START UP & MAINTENANCE (cont.)

8. Grease cutter wheel and jack shaft bearings daily:

Use an EP-2 Lithium type grease only for all bearings. Purge cutter wheel and jack shaft 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.**

9. Clean debris from beltshields:

Inspect the drive side beltshield and the cutter head beltshield for debris and clean out any chips.

10. Check / adjust the belt tension and alignment:

The drive belt, cutter wheel belt and the pump belt will need to be tightened several times in the first few days of operation. A loose belt will slip and glaze over. Once they slip, you must replace them. See pages 32-33 for procedures. Check the grinder belt sheaves with a straight edge to ensure they are in line.

11. 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.

12. 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.

13. Check hydraulic control valves:

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

14. 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.

15. 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.

16. 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 and parallel to the 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.

17. Check air cleaner and precleaner:

Clean or replace element following engine manual recommendations. Also, check and clean the vacuator valve.

18. Check track assembly:

Check track tension, the tracks must be at 1/2" (12.7 mm) deflection with 100 lbs (45.3 kg) of force. Check for wear or damage. Repair or replace as necessary.

19. Check around machine:

Check around the entire machine for tools, cans, saws, etc. All tools not in use should be stored in a tool box.

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

21. 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.

22. Remember to check EVERYTHING on the checklist.

WEEKLY MAINTENANCE

1. Grease cylinder lug pin bushings:

Grease cylinder lug pin bushings with 1 to 2 shots of EP-2 Lithium type grease. Wipe off excess grease. **Excessive grease will attract dirt.**

2. 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. cutter wheel guard, control box doors, etc.).

3. Check set screws in bearings:

Check set screws in cutter wheel and jack shaft bearings for tightness.

4. Check alternator and fan belts on engine (as applicable):

Adjust and maintain per the engine manufacturer's manual.

MONTHLY MAINTENANCE

1. Check grinder bearings and grinder sheaves:

Check and retighten all bearing bolts and belt sheave bushings to correct torque.

2. Check bearing and bearing lock collars:

Check and retighten bearing lock collars to correct torque.

3. 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.

4. Check stump grinder slewing ring bearing:

Check and retorque the stump grinder slewing ring bearing bolts.

3 MONTH MAINTENANCE

1. Hydraulic oil filter:

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. Located in the hydraulic tank.

6 MONTH MAINTENANCE

1. Grease slew ring bearing:

Grease slew ring bearing every six months 1 - 2 shots on each side with an EP-2 Lithium type grease. Wipe off excess grease. **Excessive grease will attract dirt.**

YEARLY MAINTENANCE

1. Swing Out Console Pivot:

Grease swing out console pivot once every year 1 - 2 shots with an EP-2 Lithium type grease. Wipe off excess grease. **Excessive grease will attract dirt.**

2. Fuel tank:

Drain and clean the fuel tank yearly.

3. Hydraulic oil:

Change hydraulic oil and flush the hydraulic reservoir tank.

4. Hydraulic suction screen(s):

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

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.	<input type="checkbox"/>	<input type="checkbox"/>
2. Check, maintain, and service all safety equipment for proper operation.	<input type="checkbox"/>	<input type="checkbox"/>
3. Check entire machine for loose nuts, bolts, and components.	<input type="checkbox"/>	<input type="checkbox"/>
4. Check all guards to make sure they are tight and securely in place.	<input type="checkbox"/>	<input type="checkbox"/>
5. Check the condition of the cutter wheel and teeth pockets.	<input type="checkbox"/>	<input type="checkbox"/>
6. Check the condition of the cutter teeth, pockets, and hardware.	<input type="checkbox"/>	<input type="checkbox"/>
7. Properly torque cutter wheel pocket bolts.	<input type="checkbox"/>	<input type="checkbox"/>
8. Grease cutter wheel and jack shaft bearings daily - purge	<input type="checkbox"/>	<input type="checkbox"/>
9. Clean debris from beltshields.	<input type="checkbox"/>	<input type="checkbox"/>
10. Check / adjust the drive belt, cutter wheel belt, and pump belt tension and alignment.	<input type="checkbox"/>	<input type="checkbox"/>
11. Check and always maintain hydraulic level at 3/4 to 7/8 full.	<input type="checkbox"/>	<input type="checkbox"/>
12. Check all hoses, fittings, lines, and tanks for damage and fluid leaks.	<input type="checkbox"/>	<input type="checkbox"/>
13. Check hydraulic control valves and ensure they operate and shift correctly.	<input type="checkbox"/>	<input type="checkbox"/>
14. Check fuel level. (Running out and repriming is time consuming).	<input type="checkbox"/>	<input type="checkbox"/>
15. Check engine oil, coolant levels, and correct engine speed. Follow ENGINE MANUFACTURER'S manual specs.	<input type="checkbox"/>	<input type="checkbox"/>
16. Check radiator and debris screen. Clean as necessary. Clean cooling fan and shroud on air cooled engines.	<input type="checkbox"/>	<input type="checkbox"/>
17. Check air cleaner, precleaner, and vacuator valve. Clean as necessary.	<input type="checkbox"/>	<input type="checkbox"/>
18. Check track assembly for wear and damage. Repair or replace as necessary. Check the rubber track tension (1/2" deflection with 100 lbs. of force).	<input type="checkbox"/>	<input type="checkbox"/>
19. Check around the entire machine for any foreign objects, tools, cans, saws, etc.	<input type="checkbox"/>	<input type="checkbox"/>
20. Review all safety procedures on decals, from manual, and from video.	<input type="checkbox"/>	<input type="checkbox"/>
21. Wear all applicable safety equipment: hard hat, face shield, gloves, eye protection, ear protection, etc.	<input type="checkbox"/>	<input type="checkbox"/>
22. Remember to check EVERYTHING on the checklist.	<input type="checkbox"/>	<input type="checkbox"/>

WEEKLY CHECK LIST

Every week these checks must be made:

	OK	REPAIRED
1. Grease cylinder lug pin bushings with 1 - 2 shots.	<input type="checkbox"/>	<input type="checkbox"/>
2. Lubricate steel friction areas: pivoting, hinged, sliding, & rotating areas (i.e. cutter wheel guard, control box doors, etc.).	<input type="checkbox"/>	<input type="checkbox"/>
3. Check set screws in bearings.	<input type="checkbox"/>	<input type="checkbox"/>
4. Check alternator and fan belts on engine, adjust, or replace.	<input type="checkbox"/>	<input type="checkbox"/>

MONTHLY CHECK LIST

Every month these checks must be made:

	OK	REPAIRED
1. Check grinder bearings and grinder sheaves.	<input type="checkbox"/>	<input type="checkbox"/>
2. Check bearing and bearing lock collars.	<input type="checkbox"/>	<input type="checkbox"/>
3. Check hydraulic function pressures. Set to specified PSI (bar).	<input type="checkbox"/>	<input type="checkbox"/>
4. Check and retorquer the slew ring bearing bolts.	<input type="checkbox"/>	<input type="checkbox"/>

3 MONTH CHECK LIST

Every three months these checks must be made:

	OK	REPAIRED
1. Replace hydraulic filter(s) after first 10 hours then quarterly or every 400 hours. Located in the hydraulic tank.	<input type="checkbox"/>	<input type="checkbox"/>

6 MONTH CHECK LIST

Every six months these checks must be made:

1. Grease slew ring bearing with 1 - 2 shots.

OK REPAIRED

YEARLY CHECK LIST

Every year these checks must be made:

1. Grease swing out console pivot with 1 - 2 shots.
2. Drain and clean the fuel tank.
3. Change hydraulic oil and flush the hydraulic tank.
4. Replace hydraulic suction screen(s) annually or every 2000 hours.

OK REPAIRED

BOLT TORQUE CHART

(THESE TORQUES ARE BASED ON DRY, CLEAN THREADS)

DESCRIPTION	BOLT SIZE	TORQUE (FT.-LBS.)	TORQUE (Nm)
Cutter Wheel Green Tooth Pocket Bolts	5/8" - 18 NF	180	244
Cutter Wheel Green Tooth Nut	7/16" - 14 NC	35	47
Cutter Wheel Sheave Bushing	3/8" - 16 NC	30	41
Jack Shaft Sheave Bushing - Cutter Wheel Side	3/8" - 16 NC	30	41
Jack Shaft Sheave Bushing - Engine Side	5/16" - 18 NC	15	20
Engine Sheave Bushing	3/8" - 16 NC	30	41
Hydraulic Pump Sheave Bushing	3/8" - 16 NC	30	41
Cutter Wheel Bearing Bolts	5/8" - 11 NC	190	258
Cutter Wheel Bearing Set Screws		57	77
Track Drive Sprocket	1/2" - 20 Lug Nut	90	122

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

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. 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.
3. 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.
4. 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.

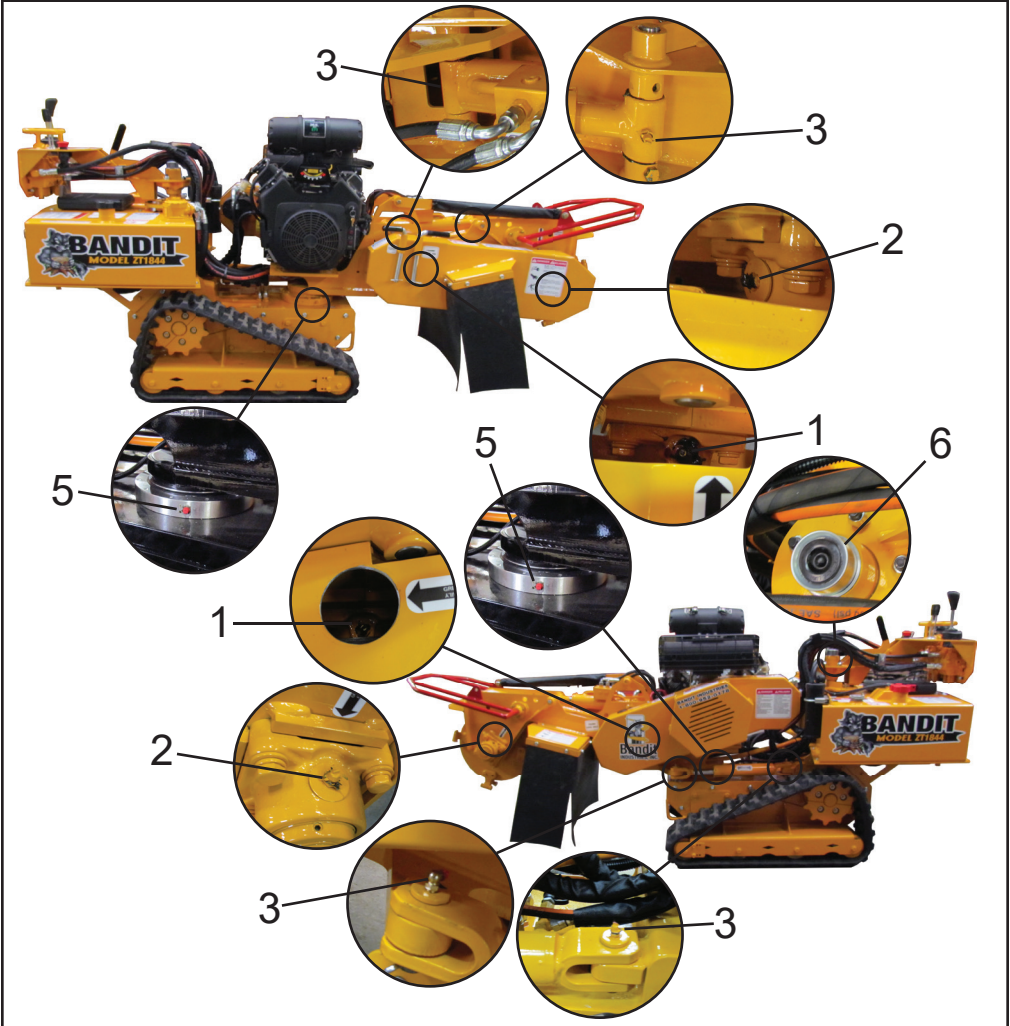
It is also reported that some equipment owners polish their machine at least yearly, and keep good mud flaps on their towing trucks.

LUBRICATION CHART

#	DESCRIPTION	CHECK			PROCEDURE
		DAY	WEEK	MONTH	
1	Jack Shaft Bearings	X			Purge bearings daily - wipe off excess
2	Cutter Wheel Bearings	X			Purge bearings daily - wipe off excess
3	Cylinder Lug Pin Bushings		X		1 - 2 shots of grease - wipe off excess
4	Steel Friction Areas: pivoting, hinged, sliding, rolling		X		Lubricate (i.e. cutter wheel guard, control box doors, etc.)
5	Slew Ring Bearing			6 Months	1 - 2 shots of grease - wipe off excess
6	Swing Out Console Pivot			Yearly	1 - 2 shots of grease - wipe off excess



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.

CUTTER WHEEL - GREEN TEETH

⚠ DANGER

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

⚠ DANGER

DO NOT go near the rotating cutter head for any reason. DO NOT go near the cutter head while the engine is running or the cutter head is coasting to a stop. Contact with a rotating cutter head will result in serious bodily injury or death.

⚠ DANGER

Never use hand on cutter wheel to hold in place while changing teeth. Be sure to remove locking pin before operating the machine.

⚠ DANGER

DO NOT operate machine with extremely worn or broken teeth.

⚠ WARNING

DO NOT operate machine without a full set of teeth. Operating the machine without a full set of teeth can cause excessive vibration and premature bearing failure.

⚠ WARNING

Use only original equipment manufacturer's teeth. The use of any other aftermarket teeth may cause damage or premature failure to the drive train.

NOTICE

A locking pin is provided to hold the cutter wheel in position during tooth removal and reinstallation. Locking pin will only lock on outer teeth.

NOTICE

There are eight (8) teeth and eight (8) angle pockets to a complete set.

TOOTH ARRANGEMENT

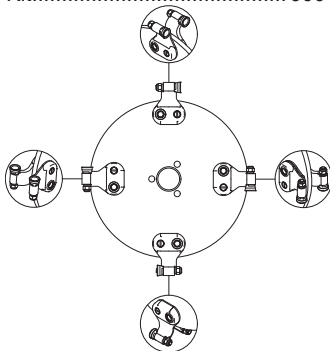
Inspect pockets, teeth and bolts for damage and replace as required.

When replacing pockets, always replace new pockets across from each other (180°) in order to prevent vibration.

Replacement teeth must be carbide tipped and of like design as provided with the machine.

Use anti-seize on threads to help prevent bolts from "freezing up" in cutter wheel pockets.

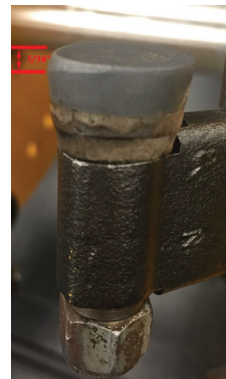
WearSharp Tooth.....	900-9926-71
WearSharp Tooth Nut.....	900-3937-58
Angle Pocket	900-9907-86
Pocket Spacer	900-9938-57
Pocket Bolt w/ Spacers.....	900-9916-03
Pocket Bolt w/o Spacers.....	900-9907-42
8 Tooth Kit.....	900-9938-33



When replacing complete set of teeth, be sure to duplicate original factory tooth arrangement, with the carbide tip facing the cutter wheel rotation. Typically a 1/2" allen key socket is required to change or torque the teeth. Torque pocket bolts to 180 ft.-lbs. (244 Nm). Torque tooth nut to 35 ft.-lbs. (47 Nm).

Inspect pockets, teeth and bolts for damage and replace as required.

Each pocket requires an angle pocket mounted away from the cutter wheel. Every other pocket requires an additional spacer mounted between the angle pocket and the cutter wheel on each side of the cutter wheel.



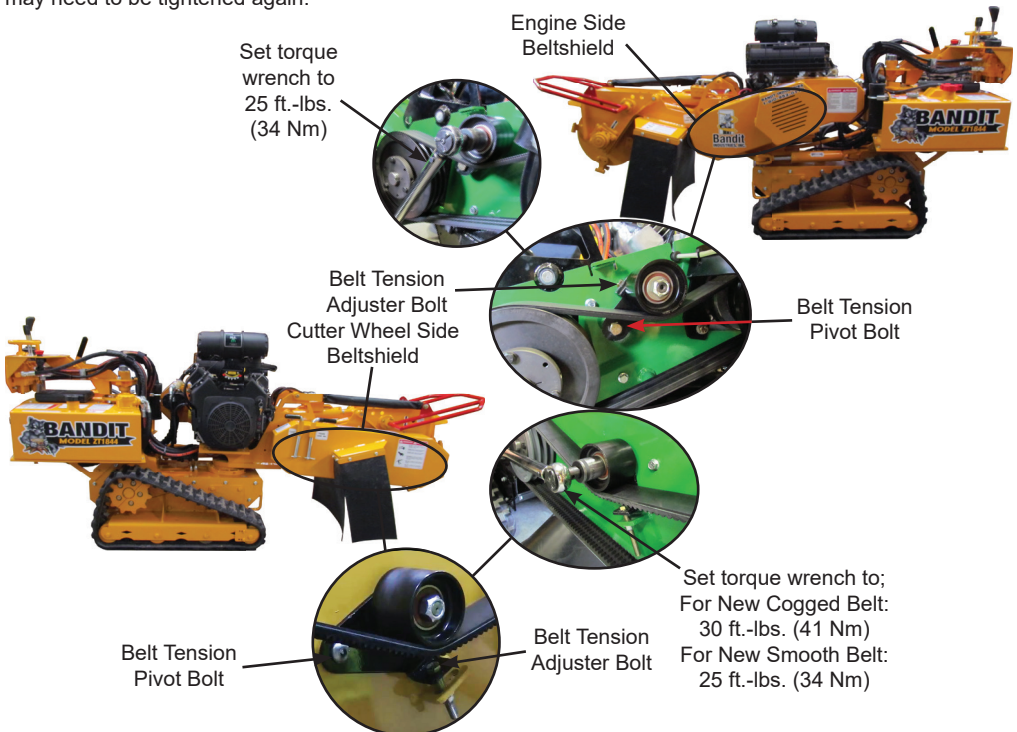
When the tooth has 1/16" of wear on the carbide tip, it is time to rotate or replace the tooth.

BELT TENSION

1. Before attempting to install a new belt or check the tension on a new belt, make sure to disengage the cutter wheel, wait for the cutter wheel to come to a complete stop, position and lock the cutter wheel in the transport position, turn off engine, remove the ignition key, and make sure the ignition key is in your possession.
2. Remove the engine side beltshield
3. Remove the belt tensioner pivot bolt, clean the threads and reinstall the bolt but do not tighten.
4. On the engine side; set torque wrench to 25 ft.-lbs. (34 Nm) for new belt. On the cutter wheel side; set torque wrench to 30 ft.-lbs. (41 Nm) for a new cogged belt or 25 ft.-lbs. (34 Nm) for a new smooth belt.
NOTE: For a used belt, set the torque wrench to 18 ft.-lbs. (24 Nm) on both belts.
5. Put the torque wrench on the belt tensioner bolt, parallel to the ground and pointing to the cutter wheel and tighten in a clockwise rotation until it clicks.
6. Tighten or loosen the tension adjuster bolt and check the torque on the belt tensioner bolt. Repeat this until the belt tensioner barely moves and the torque wrench clicks.
7. Once the correct tension is achieved, tighten the belt tensioner pivot bolt to 80 ft.-lbs. (108 Nm).
8. Reinstall the beltshield.
9. Make sure the area is clear and start the engine.
10. Run the machine and cycle the cutter wheel on for 10 seconds and off for 5 seconds, 10 - 15 times. This process will stretch the new belt
11. Turn off engine and remove ignition key, make sure the ignition key is in your possession.
12. Remove the beltshield.
13. Loosen the belt tensioner pivot bolt.
14. Set torque wrench to 18 ft.-lbs. (24 Nm).
15. Put the torque wrench on the belt tensioner bolt, parallel to the ground and pointing to the cutter wheel and tighten in a clockwise rotation until it clicks.
16. Tighten or loosen the tension adjuster bolt and check the torque on the belt tensioner bolt. Repeat this until the belt tensioner barely moves and the torque wrench clicks.
17. Back out the belt tensioner pivot bolt and reapply Loctite 243 (blue) on the engine side only, and tighten the bolt.
18. Reinstall the engine side beltshield.
19. Repeat steps 1 through 18 for the cutter wheel side belt.
20. After 10 minutes and 30 minutes of stump grinding, check and make sure belt tension is 18 ft.-lbs. (24 Nm).

NOTICE Maintain both engine side and cutter wheel side belts at 18 ft.-lbs. (24 Nm).

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



BELT TENSION

⚠ DANGER

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

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.

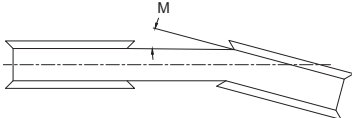
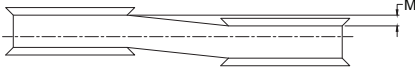
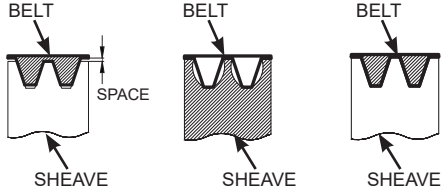

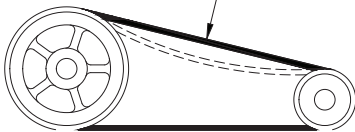
Pump Drive Belt

1. Locate the center of the span between sheaves.
2. Push or pull down on the belt until the belt has deflected 0.18" (4.5 mm).
3. Record push or pull down force. The force should be 5.5 - 5.9 lbs (2.5 - 2.7 kg) for a new belt and 4.7 - 5.1 lbs (2.1 - 2.3 kg) for a used belt.
4. Adjust the belt tension if the force falls outside of this range.
5. If adjustment is needed, loosen both pump mount bolts.
6. Adjust the pump to achieve the required force and deflection
7. Tighten the pump mount bolts.

Do not over tighten the hydraulic pump belt. For best results use a good belt tension tester. 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.

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.

<p>ANGULAR MISALIGNMENT</p>  <p>PARALLEL MISALIGNMENT</p> 	<p>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.</p> <p>GOOD BELT WORN SHEAVE WORN BELT</p>  <p>BELT BELT BELT</p> <p>SHEAVE SHEAVE SHEAVE</p> <p>SPACE</p>
<p>BELT TENSION GAUGES</p> <p>SINGLE BARREL GAUGE (UP TO 30 lbs.) 900-1919-23</p> <p>DOUBLE BARREL GAUGE (UP TO 66 lbs.) 900-1917-02</p> <p>TRIPLE BARREL GAUGE (UP TO 90 lbs.) 900-1919-67</p> <p>FIVE BARREL GAUGE (UP TO 165 lbs.) 900-1919-66</p> 	<p>Pump Drive belts maximum of 0.18" (4.5 mm) deflection with 5.5 - 5.9 lbs. (2.5 - 2.7 kg) of force. For used belts, maximum of 0.18" (4.5 mm) deflection with 4.7 - 5.1 (2.1 - 2.3 kg) lbs. of force.</p> 

TRACK TENSION

⚠ DANGER

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

⚠ DANGER

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

1. Measure the deflection with 100 lbs. of force. If the deflection is not 1/2" follow the steps below to adjust.
2. Block the frame so both of the tracks are clear of the ground.
3. Install the cutter wheel lock pin and the frame lock pin.
4. Start the engine. Make sure the engine is in the low idle position.
5. Track only one side forward until the small half of the sprocket is towards the ground (See Figure 1).
6. Turn the engine off, remove the ignition key, and make sure the ignition key is in your possession.
7. Unbolt and remove the small half of the sprocket (See Figure 2).
8. Start the engine. Make sure the engine is in the low idle position.
9. Track the same side forward until the large half of the sprocket is completely off the track (See Figure 3).
10. Turn the engine off, remove the ignition key, and make sure the ignition key is in your possession.
11. Reposition the track adjuster to obtain the correct track tension and bolt into place on each side of the track assembly (See Figure 4).
12. Start the engine. Make sure the engine is in the low idle position.
13. Track the large half of the sprocket back through the tracks.
14. Turn the engine off, remove the ignition key, and make sure the ignition key is in your possession.
15. Install the small half back on to the machine.
16. Make sure the tension is 1/2" deflection at 100 lbs. of force.
17. If correct tension is not achieved, go back to step 4.

FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4

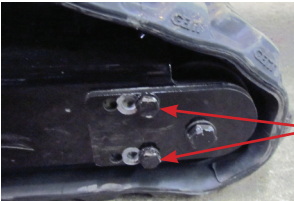
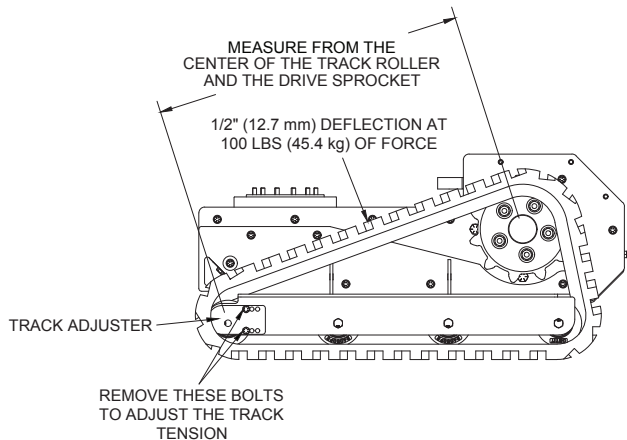


FIGURE 5



TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Engine will not start. (See Engine Mfg. manual for further information)	<ol style="list-style-type: none"> Loose ground cable. Loose hot cable. Dead battery. Cutter wheel was engaged before the machine was started. Emergency stop activated. 	<ol style="list-style-type: none"> Clean and tighten. Clean and tighten. Recharge or replace. Make sure the ignition switch is off, disengage cutter wheel, and then restart the machine. Pull or twist the emergency stop to deactivate.
Cutter wheel vibration.	<ol style="list-style-type: none"> Tooth missing. Pocket out of balance. Do not mix new and worn out teeth. Improper tooth arrangement. Do not mix new and worn out teeth. 	<ol style="list-style-type: none"> Replace missing teeth Always replace pockets in pairs across from each other. Install correctly with like pairs of teeth directly across from each other.
Cutter wheel throwing teeth.	<ol style="list-style-type: none"> Bad pocket. Dirt in pocket 	<ol style="list-style-type: none"> Replace pocket Clean pocket and replace teeth Always replace pockets in pairs across from each other.
Breaking teeth.	<ol style="list-style-type: none"> Operator hitting rocks. 	<ol style="list-style-type: none"> Avoid rocks, stones, etc.
Cutter wheel stops turning.	<ol style="list-style-type: none"> Cutter wheel belt loose or broke. Low hydraulic pressure. Debris wedged around cutter wheel. 	<ol style="list-style-type: none"> Adjust or replace. Reset pressure. Clean out debris.
Belt squeal.	<ol style="list-style-type: none"> Belt tension too loose. Belt out of alignment 	<ol style="list-style-type: none"> Tighten or replace. Align sheaves.
Belt jumping off.	<ol style="list-style-type: none"> Engaging or disengaging belt at high engine RPM. Belt tensioners are too loose. Sheaves out of alignment 	<ol style="list-style-type: none"> Engage/disengage belts at low engine speed or replace. Adjust belt tension. Refer to belt tension of the maintenance section. Make sure sheaves are aligned properly.
Roar in machine when cutter wheel is engaged.	<ol style="list-style-type: none"> Belt guards rubbing on motor shaft or cutter wheel shaft. Cutter wheel bearings going bad. 	<ol style="list-style-type: none"> Reposition guards off of shafts. Replace bearings.
Bearing will not take grease.	<ol style="list-style-type: none"> Grease fitting clogged 	<ol style="list-style-type: none"> Replace.

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

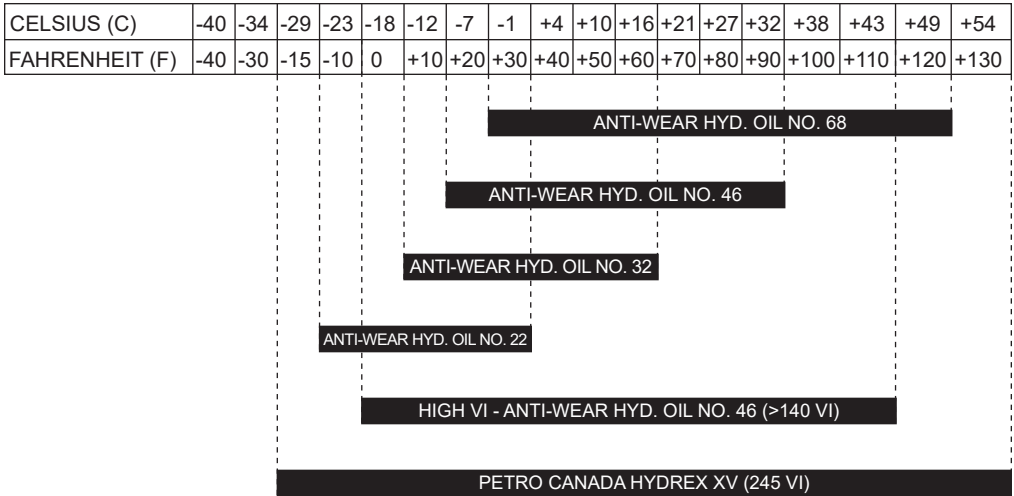
This machine is equipped with “Petro-Canada Hydrex XV” hydraulic fluid. It is recommended to replace with the same. “Petro-Canada Hydrex XV” is an all season hydraulic fluid. This is a premium performance, long life anti-wear, hydraulic fluid, designed for all season use in heavy duty hydraulic systems. “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.



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 dependent. 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.

Go to: lubricants.petro-canada.com to find a dealer near you.

NOTICE

Some component manufacturers require different specific lubrication requirements, such as gear boxes, undercarriage drives, fluid engagement clutches, etc. Refer to the manufacturer’s manual for information.

HYDRAULICS

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

Equipment Model	ZT1844
Track Drive PSI (bar)	2400 (165)
Swing Setting - Right PSI (bar)	1000 (68)
Swing Setting - Left PSI (bar)	1200 (82)
Cutter Wheel Up / Down PSI (bar)	1800 (124)

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.

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 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 38 - 39 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 grinder 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.
- 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, fittings and hoses must be re-checked for leaks and clearances.

 **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.

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 or cutter wheel engagement, wait for the cutter wheel to come to a complete stop, position and lock the cutter wheel in the transport position, turn off engine, remove the ignition key, make sure the ignition key is in your possession, install the cutter wheel lock pin, wait 2 minutes then 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.

CHECKING HYDRAULIC PRESSURE

The relief valve is typically located internally in the valve bank. Do not adjust the relief valves above the specified psi (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 hydraulic power. The relief as well as hydraulic oil, and suction screen must be kept clean.

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.

CUTTER HEAD LEFT/RIGHT & UP/DOWN PROCEDURES

1. Make sure all the controls are in the off position.
2. Install pressure gauge into the test port, see below.
3. Start engine and adjust engine to full throttle.
4. Engage the control lever or switch so that the cylinder of the function that needs to be checked, bottoms out and then read the pressure gauge.
5. Adjust relief if necessary. Turn the relief clockwise to increase pressure and counter-clockwise to decrease the pressure.

RIGHT & LEFT TRACK PROCEDURES

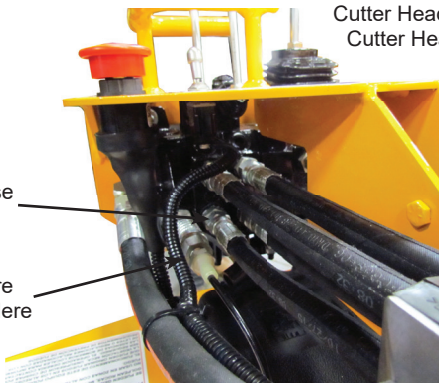
1. Make sure all the controls are in the off position.
2. Swing the console to the right side, and place a drip pan below.
3. Unhook the Right Track B-Port hose and plug it off.
3. Install pressure gauge into the test port, see below.
4. Start engine and adjust engine to full throttle.
5. Engage the Right Track in the forward position and read the pressure gauge.
6. Adjust relief if necessary. Turn the relief clockwise to increase pressure and counter-clockwise to decrease the pressure.



Cutter Head Swing Left/Right & Cutter Head Up/Down Relief

Unhook this hose and plug it off

Insert Pressure Check Gauge Here



HYDRAULIC SYSTEM TROUBLE SHOOTING

⚠ DANGER

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

PROBLEM	POSSIBLE CAUSE	SOLUTION
Hydraulic oil very hot, causing system to operate slowly.	<ol style="list-style-type: none"> 1. Dull teeth. 2. Low oil level. 3. Worn pump. 4. Poor oil quality. 5. Damaged hose. 6. Oil suction screen or filter plugged. 7. Oil cooler plugged. 8. Binding. 	<ol style="list-style-type: none"> 1. Replace teeth. 2. Fill 3/4 to 7/8 full minimum. 3. Replace. 4. Replace. 5. Replace. 6. Replace. 7. Clean 8. Repair.
Hydraulic system loss of power.	<ol style="list-style-type: none"> 1. Low oil level. 2. Poor oil quality. 3. Bad cylinder. 4. Bad Pump. 5. Bad Motor. 6. Relief stuck open. 	<ol style="list-style-type: none"> 1. Fill 3/4 to 7/8 full minimum 2. Replace. 3. Replace or repair. 4. Replace. 5. Repair or replace. 6. Clean or replace.
Swing cylinder loss of power.	<ol style="list-style-type: none"> 1. Bad cylinder. 2. Bad Pump. 3. Relief stuck open. 	<ol style="list-style-type: none"> 1. Repair or replace. 2. Replace. 3. Clean or replace.
Cutter wheel does not stay in up position, creeps down.	<ol style="list-style-type: none"> 1. Counter balance is out adjustment. 2. Bad cylinder 	<ol style="list-style-type: none"> 1. Adjust counter balance valve or replace counter balance cartridge. 2. Repair or replace.

NOTICE

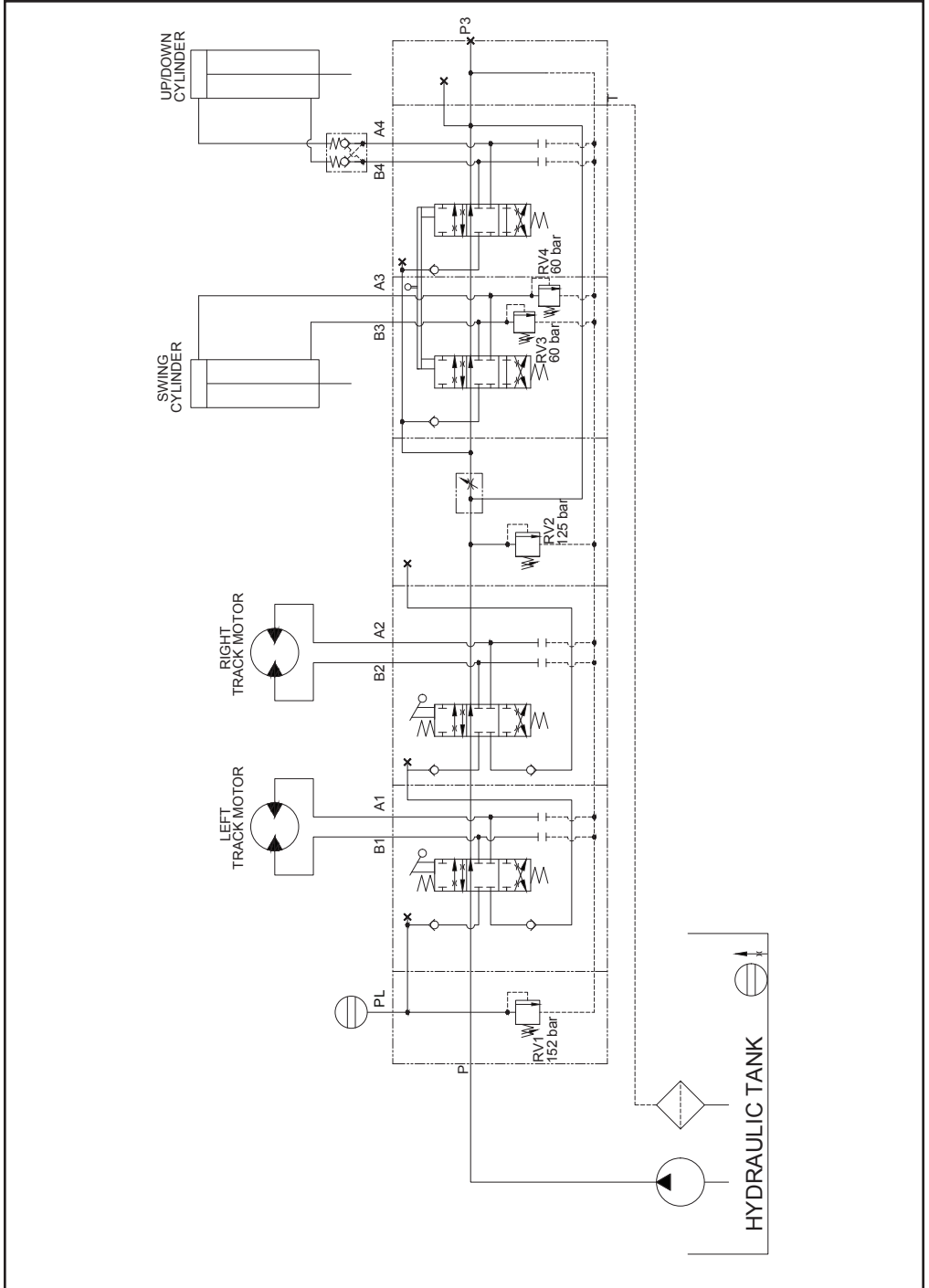
In cold weather situations, let the hydraulic system idle for approximately 15 minutes to allow the system to warm up to operating temperature. Running cold oil through the hydrostatic motor can raise the case drain pressures and damage the shaft seals.

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.

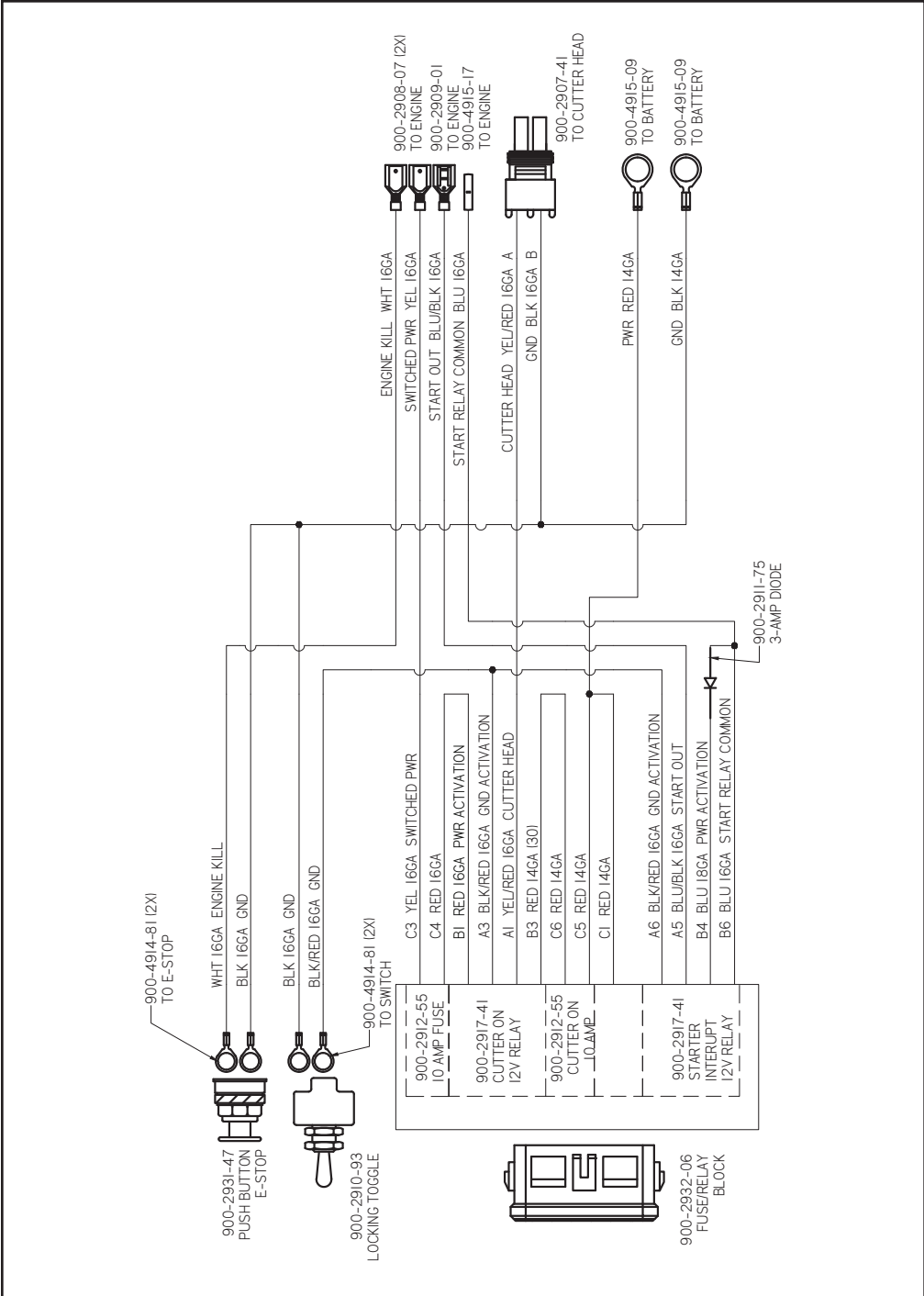
HYDRAULIC SCHEMATIC

SPECIFIC SCHEMATIC FUNCTION MAY VARY DEPENDING ON OPTIONS OR COMPONENT MANUFACTURER.



MACHINE HARNESS - 208-8000-01

SPECIFIC SCHEMATIC FUNCTION MAY VARY DEPENDING ON OPTIONS OR COMPONENT MANUFACTURER.



REPLACEMENT PARTS SECTION

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

GRINDER COMPONENTS

Serial Number
Model Number of Grinder

ENGINE COMPONENTS

Brand
Engine Serial Number
Engine Spec. Number

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.

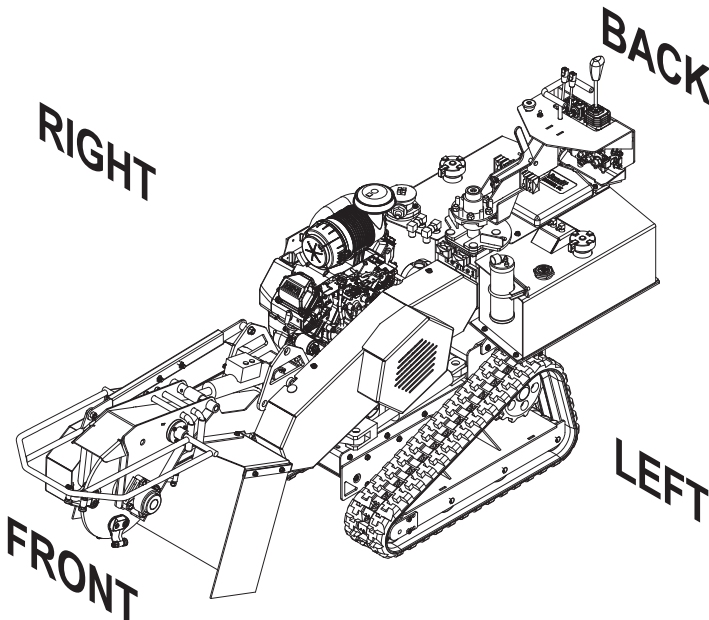
NOTICE

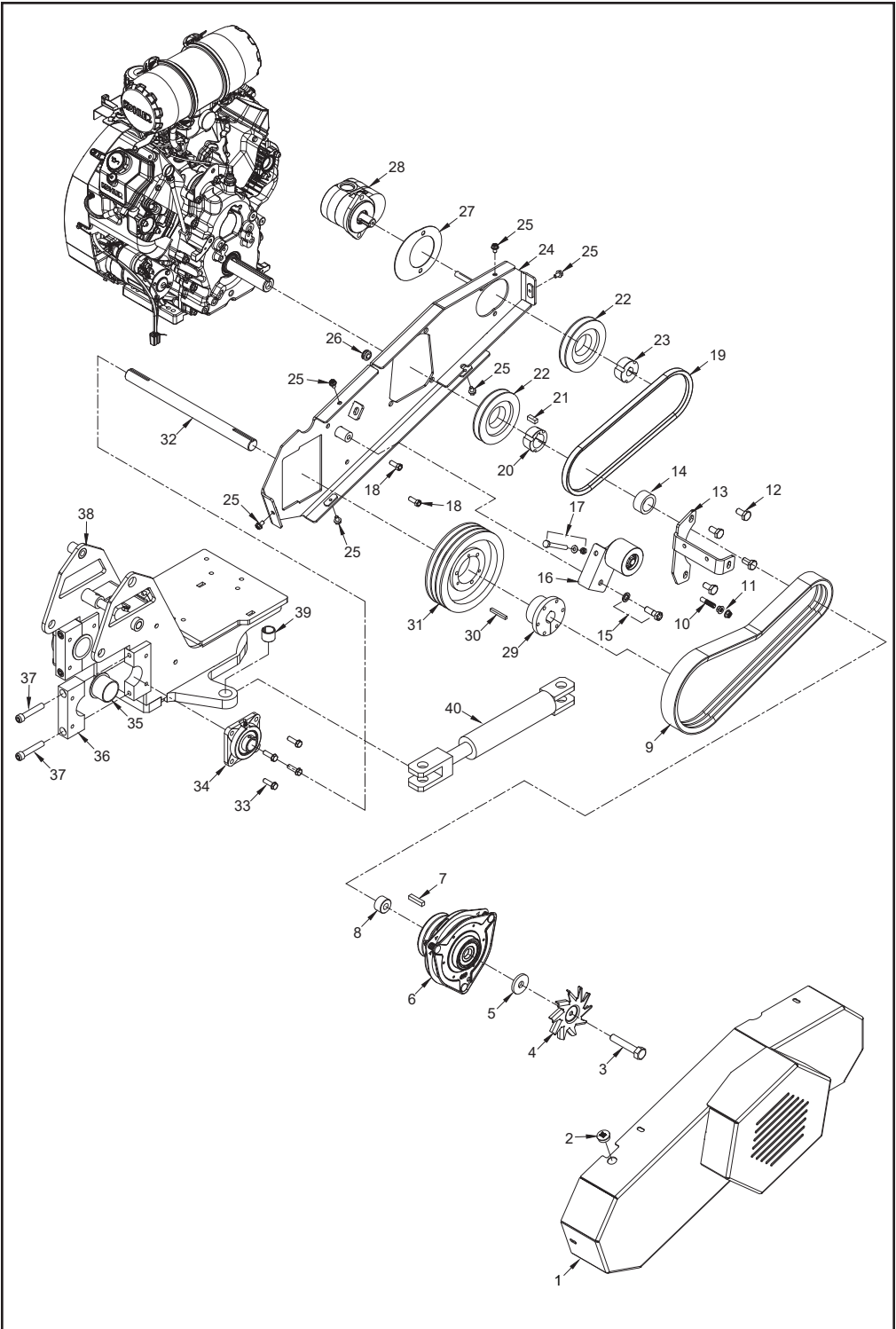
Some of the components shown in this section are for optional equipment and may not apply to every machine.

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

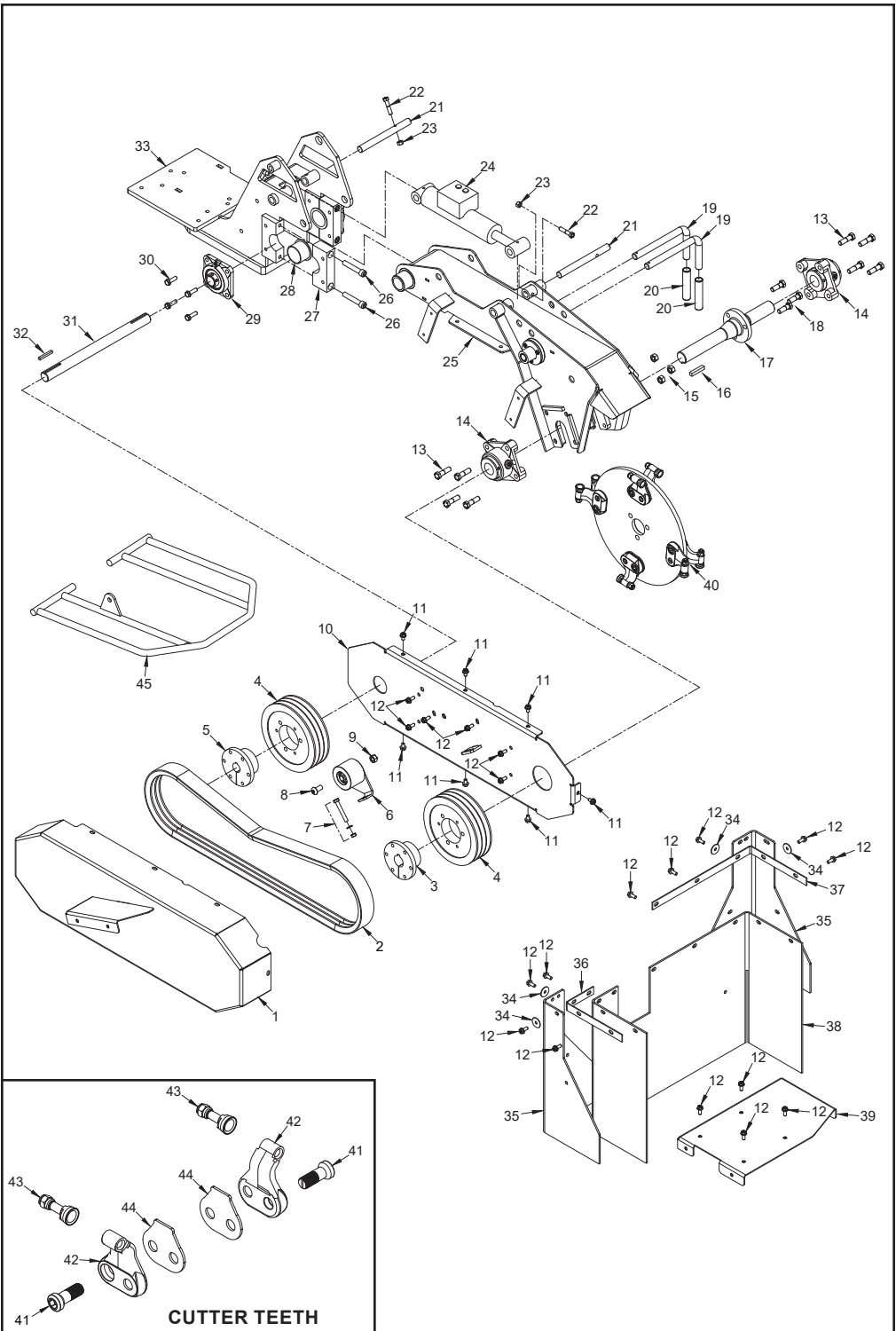




NOTICE Parts may not be exactly as shown.

LOCATION	PART NUMBER	DESCRIPTION
1.	208-2000-16	Beltshield Assembly
2.	904-0009-82	Grease Zerk Access Cover
3.	900-4917-99	Clutch Fan Bolt - 5/8"-18NC x 3 1/2" Hex Head Bolt
4.	900-6970-04	Clutch Fan
5.	208-3000-89	Clutch Fan Spacer
6.	900-6912-24	Clutch
7.	001-3007-04	Key for Clutch
8.	208-3000-71	Clutch Spacer (Inside Clutch)
9.	900-1924-55	Engine to Jack Shaft Drive Belt
10.	208-3001-09	Clutch Retainer Bolt - 3/8"-16NC x 1 3/4"
11.	900-4906-12	Clutch Retainer Nut - 3/8"-16NC Serrated Flange Nut
12.	900-4906-66	Beltshield Engine Bolt - 7/16"-14NC x 1" Hex Head
13.	208-3000-65	Clutch Retainer
14.	208-3001-10	Clutch Spacer (Between Clutch and Engine Sheave)
15. a.	900-4906-72	Belt Tensioner Pivot Bolt - 1/2"-13NC x 1 1/2" Hex Head Bolt
b.	900-4906-86	1/2" Lock Washer
16.	208-1000-15	Clutch Belt Tensioner Assembly
17. a.	900-4923-66	Tension Adjuster Bolt - 3/8"-16NC x 3" Hex Head Bolt
b.	900-4906-60	3/8"-16NC Lock Nut
c.	900-4910-46	3/8" Mill Carb Washer
18.	900-4906-50	Beltshield Mount Bolt - 3/8"-16NC x 1"
19.	900-1924-79	Engine to Hydraulic Pump Drive Belt
20.	900-1924-50	Engine Sheave to Pump Sheave Bushing
21.	001-3007-05	Key for Engine to Pump Bushing
22.	900-1924-78	Engine & Pump Sheave
23.	900-1924-62	Pump Sheave to Engine Sheave Bushing
24.	208-2000-15	Beltshield Mount
25.	900-4924-54	Beltshield Bolt - 5/16"-18NC x 1/2" Serrated Flange Bolt
26.	900-7900-10	Rubber Grommet
27.	208-3000-75	Hydraulic Pump Mount
28.	900-3982-38	Hydraulic Pump
29.	900-1924-31	Jack Shaft Sheave Bushing
30.	200-300087	Key for Jack Shaft Sheave Bushing
31.	900-1924-54	Jack Shaft Sheave
32.	208-3000-43	Jack Shaft
33.	900-4913-92	Jack Shaft Bearing Bolt - 3/8"-16NC x 1 1/4" Serrated Flange Bolt
34.	900-1923-25	Jack Shaft Bearing
35.	900-1923-27	Pivot Flange Bushing - 2 3/16" OD x 2" ID x 1 1/2"
36.	208-3000-90	Pivot Bearing Cap
37.	900-4916-70	Pivot Bearing Cap Bolt - 1/2"-13NC x 2 3/4"
38.	208-1000-07	Pivot Assembly (Includes 32 - 39)
39.	900-1902-42	Bushing - 1" ID x 1 1/4" OD x 1"
40.	900-3958-08	Hydraulic Swing Cylinder

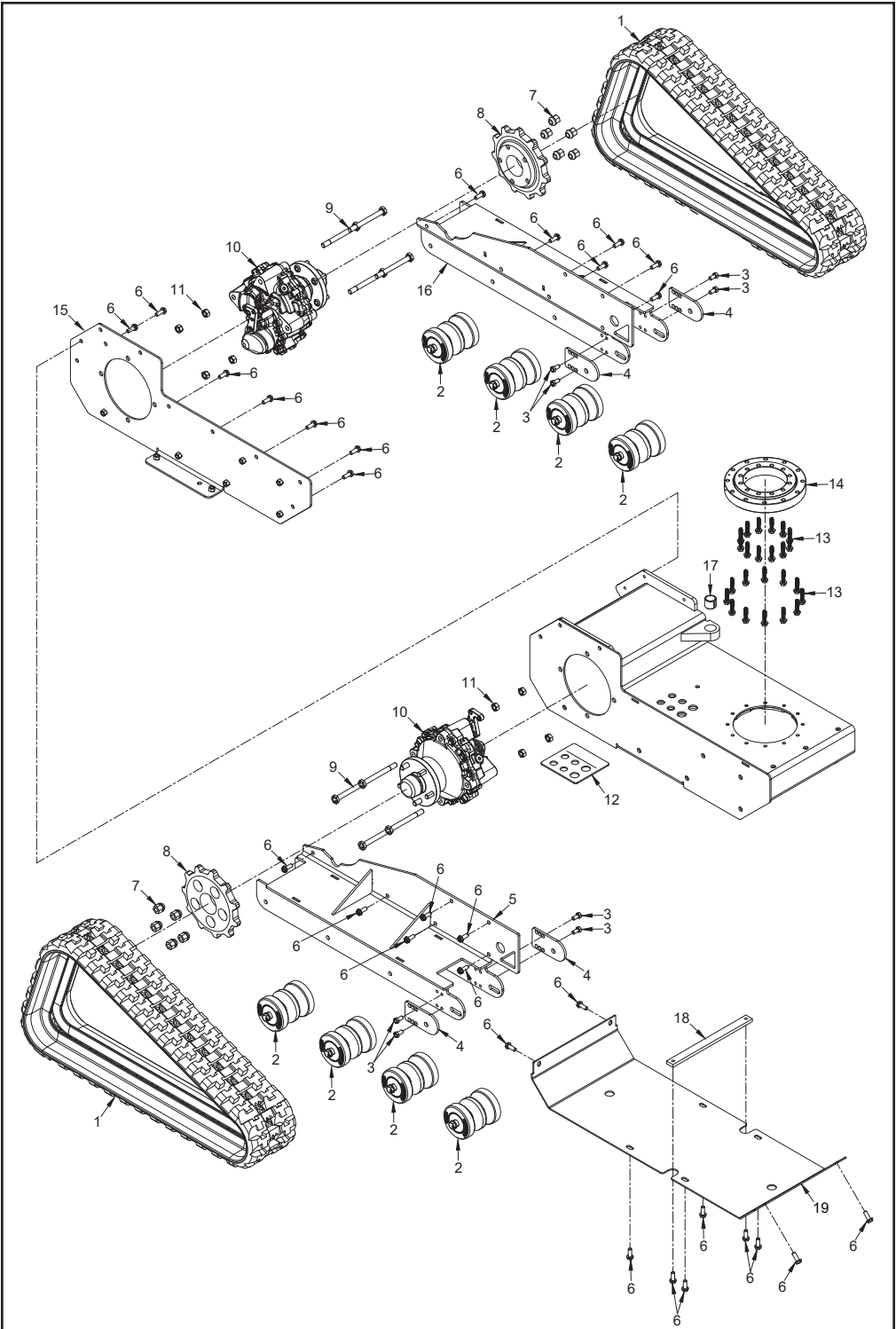
NOTICE Nuts, bolts, washers, and all other components can be ordered by physical description.



NOTICE Parts may not be exactly as shown.

LOCATION	PART NUMBER	DESCRIPTION
1.	207-2000-44	Beltshield
2. a.	900-1926-40	Cutter Wheel Belt (Start 8/18)
b.	900-1926-12	Cutter Wheel Belt (Pre 8/18)
3.	900-1909-19	Cutter Wheel Sheave Bushing
4.	900-1924-42	Cutter Wheel & Jack Shaft Sheave
5.	900-1924-43	Jack Shaft Sheave Bushing
6. a.	208-1000-21	Cutter Wheel Belt Tensioner (Start 8/18)
b.	208-1000-17	Cutter Wheel Belt Tensioner (Pre 8/18)
7. a.	900-4924-91	Belt Tensioner Adjuster Bolt - 3/8"-16NC x 2 1/2"
b.	900-4906-60	3/8"-16NC Lock Nut
c.	900-4910-46	3/8" Mill Carb Washer
8.	900-4924-90	Belt Tensioner Mount Bolt - 1/2"-13NC x 1" Button Head Cap Screw
9.	900-4906-84	Belt Tensioner Mount Nut - 1/2"-13NC Hex Head Nut
10.	207-2000-57	Beltshield Mount
11.	900-4924-54	Beltshield Bolt
12.	900-4910-90	5/16"-18NC x 3/4" Serrated Flange Bolt
13.	900-4906-73	Cutter Wheel Bearing Bolt - 1/2"-13NC x 1 3/4" Hex Head Bolt
14.	900-1924-11	Cutter Wheel Bearing
15.	900-4913-93	Cutter Wheel Shaft Nut - 1/2"-13NC Lock Nut
16.	001-3007-08	Key for Cutter Wheel Shaft
17.	208-3000-35	Cutter Wheel Shaft
18.	900-4906-72	Cutter Wheel Shaft Bolt - 1/2"-13NC x 1 1/2" Hex Head Bolt
19.	955-300086	Cutter Wheel Lock Pin
20.	900-7900-96	Cutter Wheel Lock Pin Rubber Handle
21.	208-3000-26	Lift Cylinder Pin
22.	900-4903-31	Lift Cylinder Pin Bolt - 3/8"-16NC x 1 3/4" Hex Head Bolt
23.	900-4906-56	Lift Cylinder Pin Nut - 3/8"-16NC Nut
24.	900-3941-35	Lift Cylinder
25.	208-2000-06	Cutter Wheel Arm
26.	900-4916-70	Pivot Bearing Cap Bolt - 1/2"-13NC x 2 3/4"
27.	208-3000-90	Pivot Bearing Cap
28.	900-1923-27	Pivot Flange Bushing - 2 3/16" OD x 2" ID x 1 1/2"
29.	900-1923-25	Jack Shaft Bearing
30.	900-4913-92	Jack Shaft Bearing Bolt - 3/8"-16NC x 1 1/4" Serrated Flange Bolt
31.	208-3000-43	Jack Shaft
32.	200-300087	Key for Jack Shaft Sheave Bushing
33.	208-1000-07	Pivot Assembly (Includes 21 - 23 & 25 - 30)
34.	900-4913-46	Fender Washer - 5/16" x 1 1/4"
35.	208-3001-12	Chip Curtain - Small
36.	208-3000-33	Chip Pan Strap - Right Side
37.	208-3000-30	Chip Pan Strap - Left Side
38.	208-3000-29	Chip Curtain - Large
39.	208-2000-11	Bolt On Chip Pan
40.	208-1000-05	Cutter Wheel Assembly (Includes 14, 16, 17 & 40 - 43)
41. a.	900-9907-42	Pocket Bolt
b.	900-9916-03	Pocket Bolt w/ Spacer
42.	900-9907-86	Angle Pocket
43. a.	900-9926-71	Wear Sharp Tooth
b.	900-9937-58	Wear Sharp Tooth Nut
44.	900-9938-57	Spacer (4 Required - Every Other Pocket)
45.	See Page 56	Nose Bar Assembly

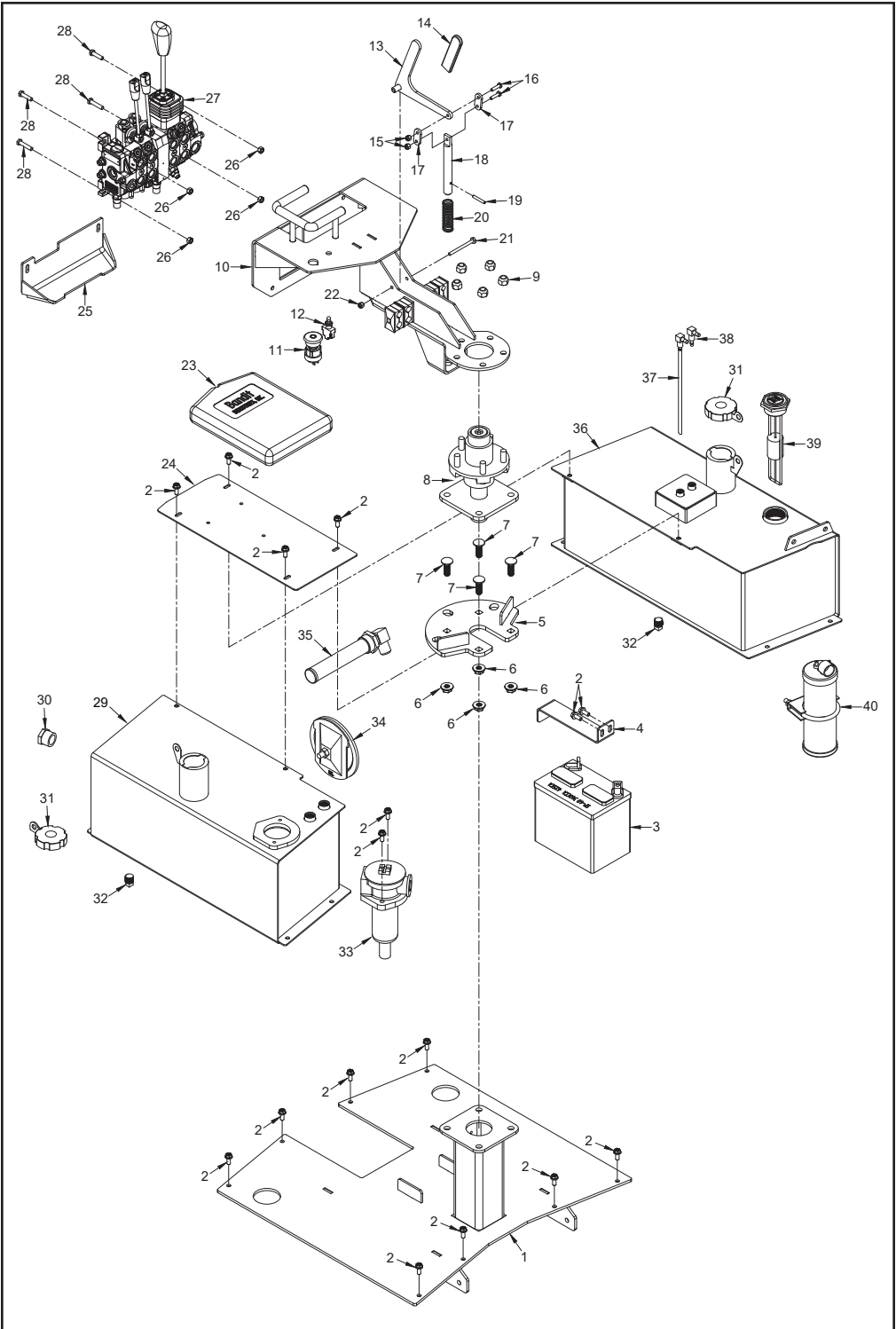
NOTICE Nuts, bolts, washers, and all other components can be ordered by physical description.



NOTICE Parts may not be exactly as shown.

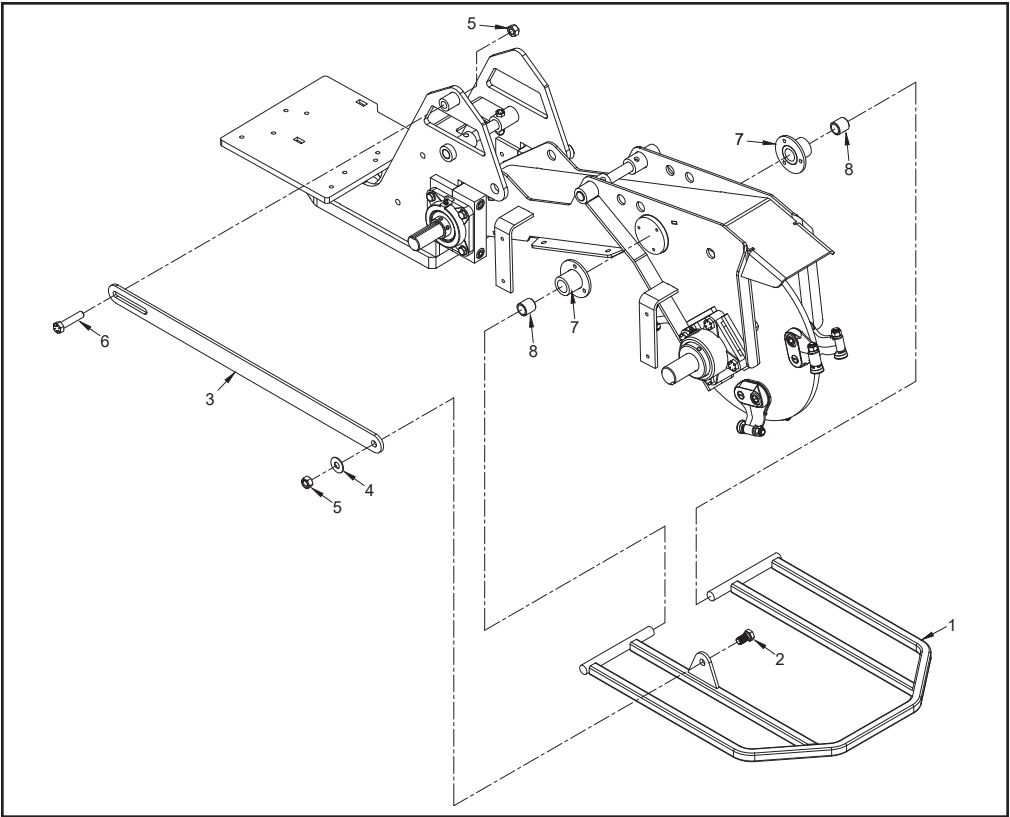
LOCATION	PART NUMBER	DESCRIPTION
1.	900-5914-89	Tracks
2.	900-5914-27	Track Rollers
3.	900-4906-54	Track Roller Adjuster Bolt - 3/8"-16NC x 3/4" Hex Head Bolt
4.	208-3000-12	Track Roller Adjuster
5.	208-2000-25	Track Carriage - Right Side
6.	900-4913-91	3/8"-16NC x 1" Serrated Flange Bolt
7.	900-4924-16	1/2" Lug Nut
8.	208-3001-05	Track Drive Sprocket
9.	900-4906-81	Track Drive Motor Bolt - 1/2"-13NC x 5" Hex Head Bolt
10.	900-3978-18	Track Drive Motor
11.	900-4906-84	Track Drive Motor Nut - 1/2"-13NC Lock Nut
12.	208-3001-13	Bulkhead Plate
13.	900-4924-97	Slew Ring Bearing Bolt - M8 x 1.25 x 40MM Serrated Flange Bolt
14.	900-1923-23	Slew Ring Bearing
15.	208-2000-01	Bolt On Right Side Plate
16.	208-2000-04	Track Carriage - Left Side
17.	900-1902-42	Bushing - 1" ID x 1 1/4" OD x 1"
18.	208-3001-19	Base Brace
19.	208-3000-08	Bolt On Skid Plate

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



NOTICE Parts may not be exactly as shown.

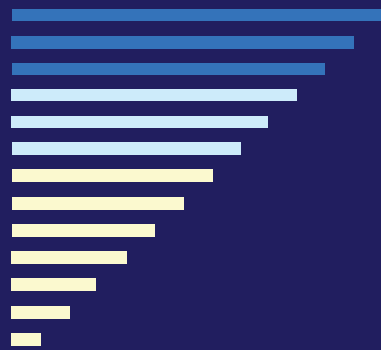
LOCATION	PART NUMBER	DESCRIPTION
1.	208-2000-04	Tank Deck Assembly (Includes 4)
2.	900-4910-90	5/16"-18NC x 3/4" Serrated Flange Bolt
3.	900-6911-34	SP40 Battery
4.	208-3000-66	Battery Strap
5.	208-2000-13	Swing Out Arm Lock Assembly (Includes 6 - 7)
6.	900-4913-58	1/2"-13NC Serrated Flange Nut
7.	900-4913-28	1/2"-13NC x 1 1/2" Carriage Bolt
8. a.	900-5912-79	Swing Out Arm Spindle
b.	900-5915-82	Grease Cap for Hub
c.	900-5911-99	Inner and Outer Bearing for Hub
d.	900-5912-00	Inner and Outer Bearing Cup for Hub
e.	010-060-00	Inner and Outer Seal for Hub
9.	900-4909-42	1/2"-20NF Lug Nut
10. a.	208-1000-11	Swing Out Arm Assembly (Includes 9, 11 - 22 & 25 - 28)
b.	208-2000-12	Swing Out Arm
11.	900-2931-47	E-Stop
12.	900-2910-93	Cutter Wheel On/Off Switch
13.	208-2000-14	Swing Out Lock Assembly
14.	900-9906-75	Rubber Grip for Lock Handle
15.	900-4909-68	Swing Out Arm Linkage Nut - 1/4"-20NC Hex Head Nut
16.	900-4909-72	Swing Out Arm Linkage Bolt - 1/4"-20NC x 1" Hex Head Bolt
17.	996-3007-25	Swing Out Arm Linkage
18.	208-3000-60	Swing Out Arm Locking Pin
19.	900-4923-40	Swing Out Arm Spring Pin
20.	900-4923-61	Swing Out Arm Locking Pin Spring
21.	900-4909-80	Swing Out Lock Bolt - 1/4"-20NC x 3" Hex Head Bolt
22.	900-4909-68	Swing Out Lock Nut - 1/4"-20NC Hex Head Nut
23.	900-9910-28	Manual Holder
24.	208-3000-68	Tank Spacer Cover
25.	208-3001-00	Swing Out Support
26.	900-4910-74	5/16"-18NC Hex Head Bolt
27.	900-3981-98	Hydraulic Control Valve
28.	900-4906-39	Valve Bolt - 5/16"-18NC x 1 1/2" Hex Head Bolt
29. a.	208-1000-09	Hydraulic Tank Assembly (Includes 30 - 35)
b.	208-2000-10	Hydraulic Tank
30.	900-3900-44	Sight Gauge
31. a.	900-3988-07	Tank Cap (Start 1/18)
b.	900-3941-30	Hydraulic Tank Cap - Black (Pre 1/18)
c.	900-3966-01	Gasoline Tank Cap - Red (Pre 1/18)
32.	900-3921-01	Magnetic Drain Plug
33. a.	900-3951-31	Hydraulic Filter
b.	900-3951-32	Filter Only
34.	900-3980-29	Hydraulic Clean Out Door
35.	900-3944-78	Suction Screen
36. a.	208-1000-08	Fuel Tank Assembly (Includes 31 - 32 & 37 - 40)
b.	208-2000-09	Fuel Tank
37. a.	900-3909-04	1/4" NPT 90° Fuel Line
b.	900-3909-03	Drop Pipe
38.	900-3909-04	1/4" NPT 90° Fuel Line
39.	900-2929-09	8" Sight Gauge
40. a.	900-3967-53	Carbon Cannister
b.	900-6910-94	Cannister Clamp



LOCATION	PART NUMBER	DESCRIPTION
1.	208-2000-28	Cutter Wheel Bar Assembly
2.	900-4906-70	1/2"-13NC x 1" Hex Head Bolt
3. a.	208-3001-25	Cutter Wheel Bar Linkage
b.	208-1000-16	Cutter Wheel Bar Linkage
4.	900-9940-86	1/2" x 1 1/4" OD Nylon Flat Washer
5.	900-4906-84	1/2"-13NC Lock Nut
6.	900-4909-27	1/2"-13NC x 2 1/4" Hex Head Bolt
7.	208-2000-18	Cutter Wheel Bar Mount
8.	900-1924-80	Polymer Bushing - 1" OD x 3/4" ID x 1"

NOTICE Parts may not be exactly as shown.

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



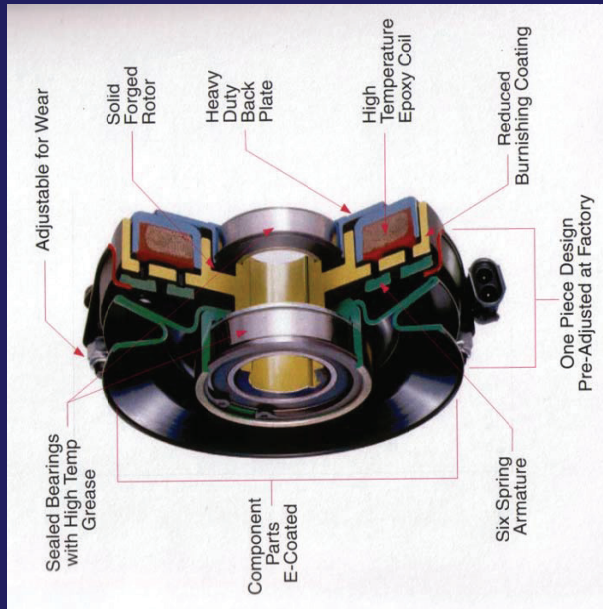
PTO Clutch/Brake

Installation and
Maintenance

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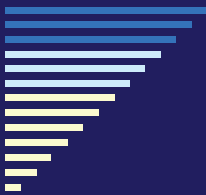
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Outline

- Pre-Installation
- Installation
- Maintenance

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Pre-Installation

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Pre-Installation Check

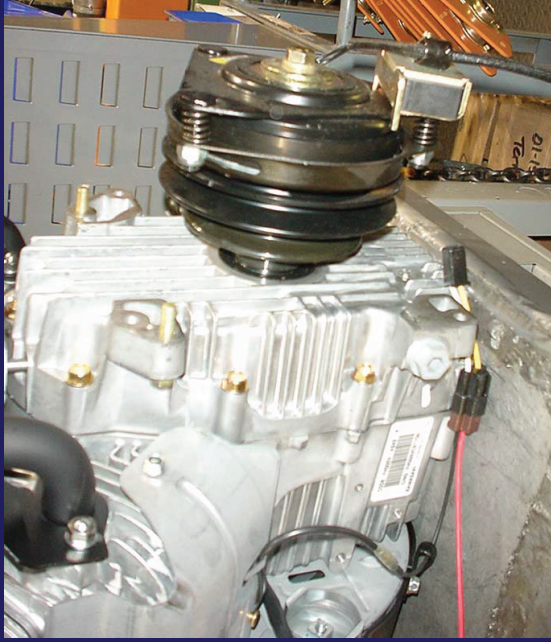
- Engine Shaft
- Key Length and Height
- Direction of Rotation
- Backing Plate Restraint

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Pre-Installation Check Engine Shaft

- PTO clutches are almost always mounted on engine shaft



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Pre-Installation Check Engine Shaft

- Shaft should be long enough to support clutch
 - Minimum shaft length = bore diameter



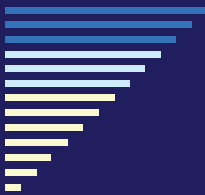
Pre-Installation Check Engine Shaft

- For two-piece design, both halves need shaft support



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Pre-Installation Check Engine Shaft

- Engine shaft needs step



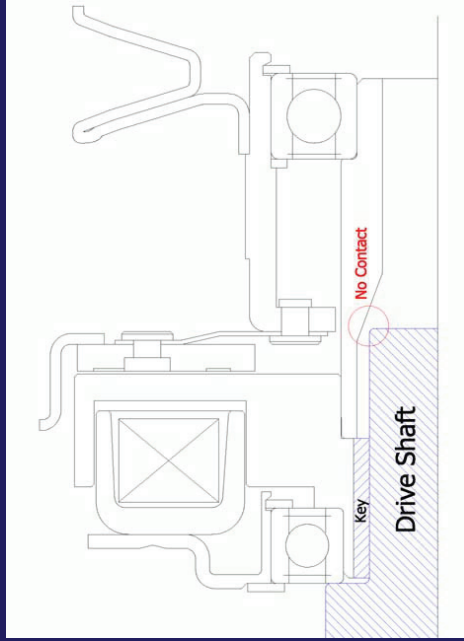
Pre-Installation Check Engine Shaft

- Engine shaft needs to be tapped



Pre-Installation Check Key Length and Height

- For clutch without through-keyway (keyway in rotor only), key should be short enough that it will not hit pulley bearing carrier



Pre-Installation Check

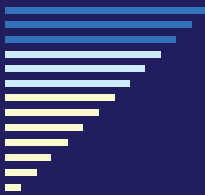
Key Length and Height

- For clutch with open keyway on field-side bearing race, key may need reduced height



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Pre-Installation Check

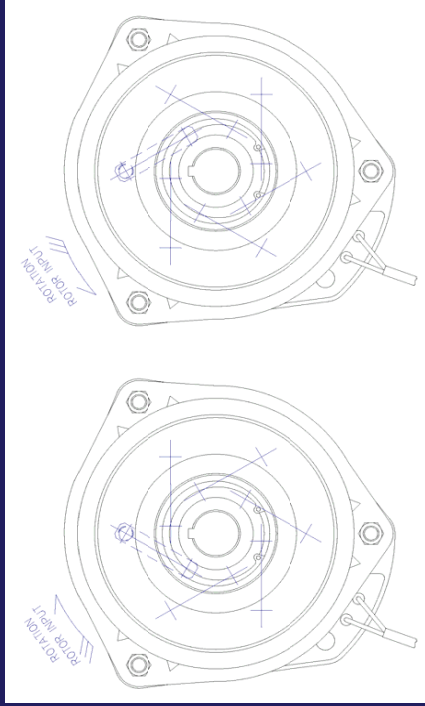
Direction of Rotation

- ❑ Clutches can mount with pulley facing toward or away from engine



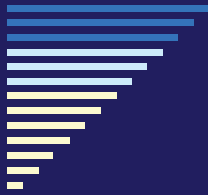
Pre-Installation Check Direction of Rotation

- Leaf springs are set at factory to run either clockwise or counter-clockwise



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Pre-Installation Check

Direction of Rotation

- ❑ Check direction of rotation to verify that spring direction is correct
- ❑ Springs should operate in tension and not compression (most engines rotate counterclockwise)



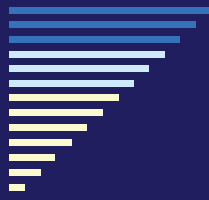
Pre-Installation Check

Backing Plate Restraint

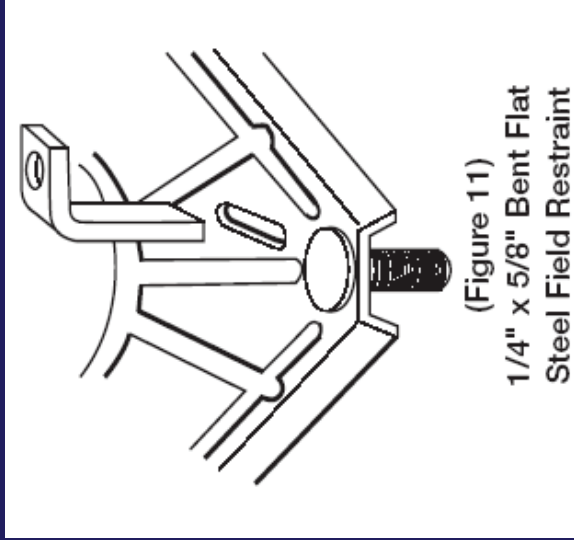
- PTO backing plate only needs to withstand brake force
 - This can be 2 ~ 10 ft-lbs depending on clutch size

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Pre-Installation Check Backing Plate Restraint



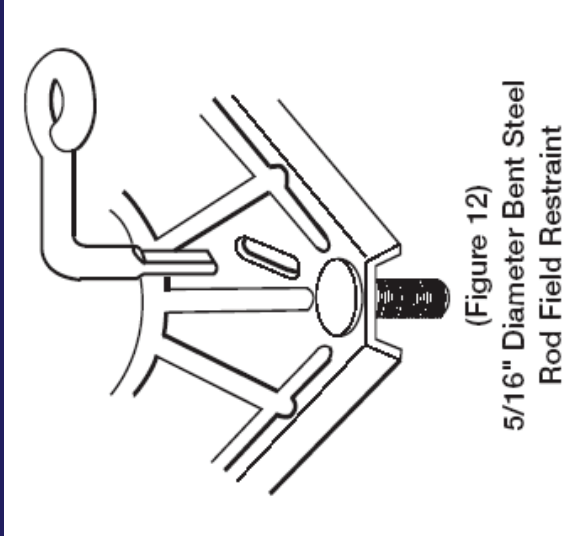
(Figure 11)
1/4" x 5/8" Bent Flat
Steel Field Restraint

□ Tab Type

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Pre-Installation Check Backing Plate Restraint

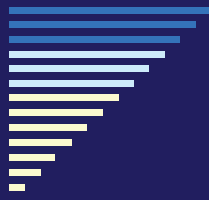


(Figure 12)
5/16" Diameter Bent Steel
Rod Field Restraint

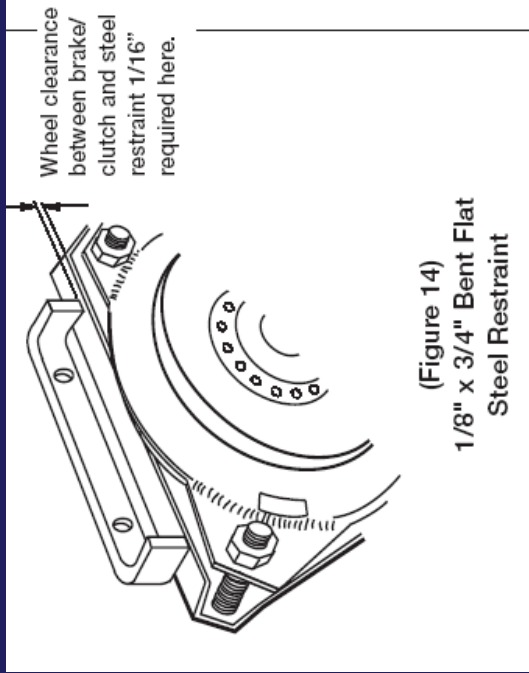
□ Rod Type

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Pre-Installation Check Backing Plate Restraint



(Figure 14)
1/8" x 3/4" Bent Flat
Steel Restraint

□ Flat Type

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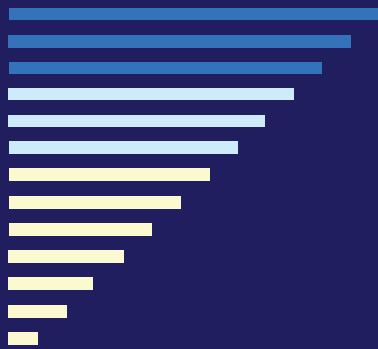
Pre-Installation Check
Backing Plate Restraint



□ Rubber Bushing Type

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Installation

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PTO Clutch Installation

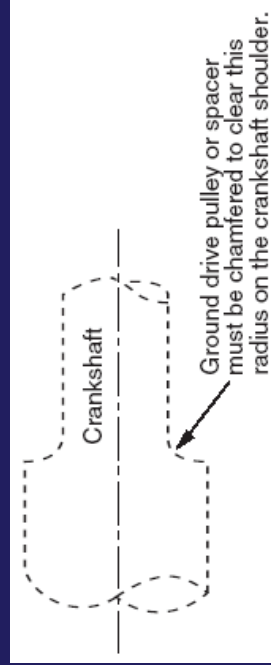
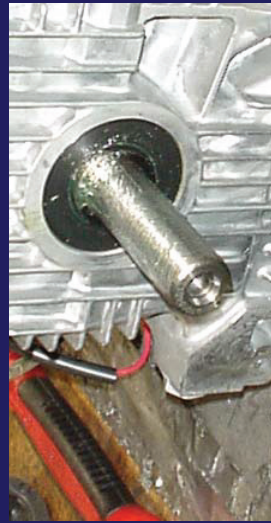
- ① Verify appropriate shaft/pulley for clutch
- ② Set key in shaft keyway if required (some clutches have internal key)
- ③ Slide clutch onto shaft
- ④ Verify good contact with face of bearing inner ring
- ⑤ Tighten center bolt and washer
- ⑥ Verify backing plate has slight axial and radial freedom
- ⑦ Connect power
- ⑧ Burnish clutch

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PTO Clutch Installation #1 Installing Pulley

- Most installations require drive pulley to be installed before clutch
- Pulley must not contact radius of shaft shoulder
 - Pulley must sit against shoulder face, otherwise center bolt could become loose



PTO Clutch Installation #2 Installing Key

- If clutch requires key, first set key in key way on shaft, then mount clutch (some clutches have internal key)
- Do not force clutch onto shaft or it will damage bearing races



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PTO Clutch Installation #4 Mounting Clutch

- Clutch should be mounted such that bearing race makes contact with:
 - Shaft step
 - Drive pulley
 - Washer
- All faces must be normal to shaft within 0.003"



PTO Clutch Installation #5 Installing Center Bolt

- Install center bolt and washer on end of tapped shaft
- Washer should be about 0.250" thick with OD \geq ID of bearing inner ring



PTO Clutch Installation #5 Installing Center Bolt

- Center bolt tightening torque is based on bolt grade
 - Torque should be about 30 ~ 55 ft-lbs
- In diesel or heavy vibration application, adhesive should be used to lock bolt in place



PTO Clutch Installation #6 Installing Restraint

- Install backing plate restraint
 - If pin or slot type is used, restraint may already be on machine frame or engine face
- After mounting, verify slight axial and radial movement is present ($1/16$ " ~ $1/8$ ")
(very important to avoid field bearing failure)



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PTO Clutch Installation #7

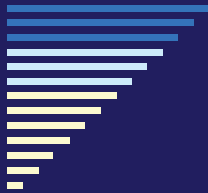
Connecting Power

- Attach terminal housing on clutch lead wire to corresponding power terminal
- Turn on electrical power on mower without starting engine if possible
- Turn on PTO switch to verify clutch pulls in
 - Clutch will make “click” sound at engagement



PTO Clutch Installation #8 Burnishing

- What is it?
 - Wearing/mating of armature and rotor surfaces
- Why is it important?
 - To achieve greater initial torque
- How is it done?
 - Cycle clutch 20 ~ 50 times lightly loaded at under 2,000 rpm



Burnishing Recommendations

Deck Size	Cycles	On/Off
32" ~ 42"	25 ~ 50	10 / 5 sec
48" ~ 52"	25 ~ 50	10 / 10 sec
61"	25 ~ 50	10 / 15 sec
72"	25 ~ 50	10 / 20 sec



Maintenance

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Maintenance

- Most clutch parts do not require maintenance and can not be replaced
 - Bearings are sealed for life of clutch
 - Armature, rotor, and brake wear evenly and can not be replaced individually
 - Coil can not be removed

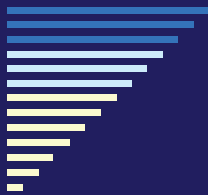


Adjustment for Wear

- All Ogura one-piece clutches are adjusted at factory (no initial adjustment required)
- As adjustable clutches wear, they can be re-gapped to extend overall life

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Adjustment for Wear

- If clutch fails to pull in or will not continue to pull in when hot, air gap may need adjustment
- To make adjustments, taking PTO off mower may be easier
- Necessary equipment
 - 0.015"~0.022" feeler gauge
 - $\frac{9}{16}$ " open-end box wrench

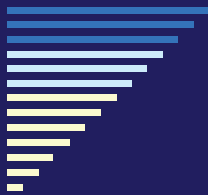


Adjustment for Wear

- Identify clutch model from label located on back of field
- There are three inspection slots on brake shroud
- Place feeler gauge in slot between armature and rotor
- Slowly tighten brake nut until armature and rotor contact feeler gauge

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Adjustment for Wear

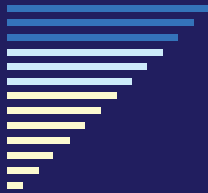
- Almost all Ogura clutches use 24UNF brake bolt, thus one turn of brake nut equates to approximately 0.04” of axial movement
(for reference only: feeler gauge is still required)

Adjustment for Wear



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Adjustment for Wear

Model Type	Air Gap Range
GT1, GT1A	0.012" ~ 0.024"
GT2, GT2.5	0.015" ~ 0.024"
GT3.5, GT4, GT5	0.016" ~ 0.024"



Adjustment for Wear

- Setting gap towards low range will increase cycle life between adjustments
- **Caution:** do not set gap below minimum or clutch may be damaged
- Once gap is set, rotate armature and rotor, check gap with feeler gauge, and make adjustments as required

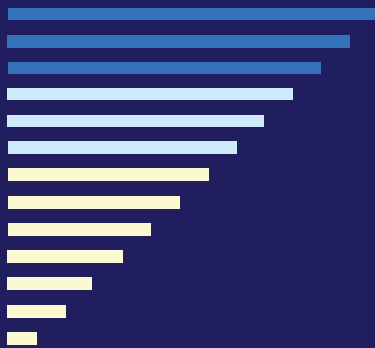
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Adjustment for Wear

- Apply full voltage to clutch
- Rotate armature and rotor to verify no contact between armature and brake shroud
- If there is contact, back off brake nuts and retry until there is no contact



Thank You

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clutches, visit us on the web at
www.ogura-clutch.com

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