Altec
ENVIRONMENTAL PRODUCTS

DANGER

This Manual *SHALL* Be Read and *UNDERSTOOD* *PRIOR* to Operating the Chipper or Performing Maintenance on the Chipper.

OPERATIONS MANUAL

MODELS
W/C-126
W/C-166

ALTEC ENVIRONMENTAL PRODUCTS, LLC

Quality Heavy Duty Chippers

512 North Post Road
Shelby, North Carolina 28150
Telephone: 800-269-5188

ATTENTION

UPON SALE OF THIS CHIPPER PLEASE COPY AND REMIT THIS FORM TO ALTEC ENVIRONMENTAL PRODUCTS, LLC.

In the event that Safety or Recall information notices shall be required, it is critical that Altec Environmental Products, LLC quickly identify all chipper owners. Your cooperation in forwarding this form to Altec Environmental Products, LLC can impact the safety of others. *Do Not Disregard* your personal responsibility to the new owners and operators of this equipment.

NEW OWNER OR FIRM NAME

ADDRESS

CITY STATE ZIP

PHONE NUMBER

AUTHORIZED SIGNATURE

UNIT SERIAL NUMBER

PLEASE REMIT TO:
ALTEC ENVIRONMENTAL PRODUCTS, LLC
512 NORTH POST ROAD
SHELBY NC 28150

ALTEC ENVIRONMENTAL PRODUCTS, LLC

OWNER RECORD

WC-126 ☐ WC-166 ☐

SERIAL NUMBER:

ENGINE: MAKE:

MODEL:

SERIAL NUMBER:

CUTTER HEAD NUMBER:

CUSTOMER: NAME:

ADDRESS:

CITY:

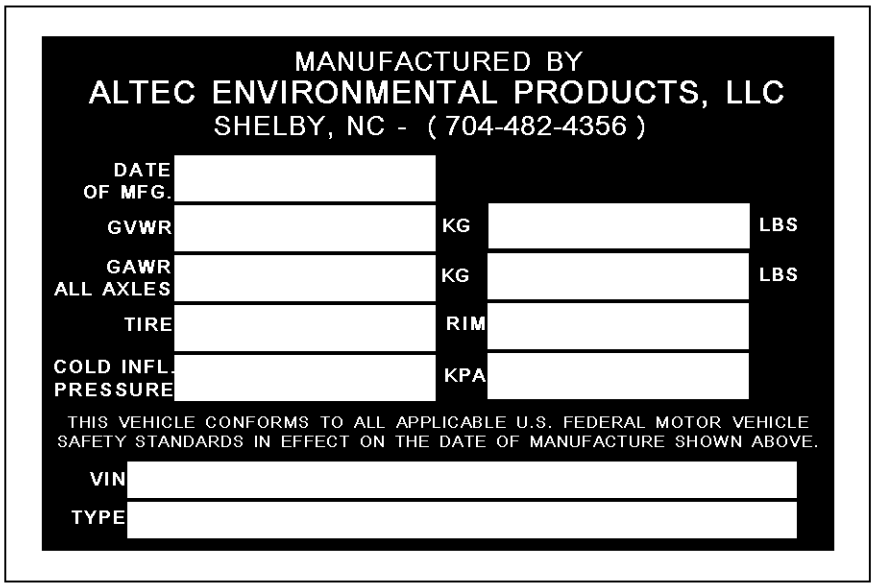
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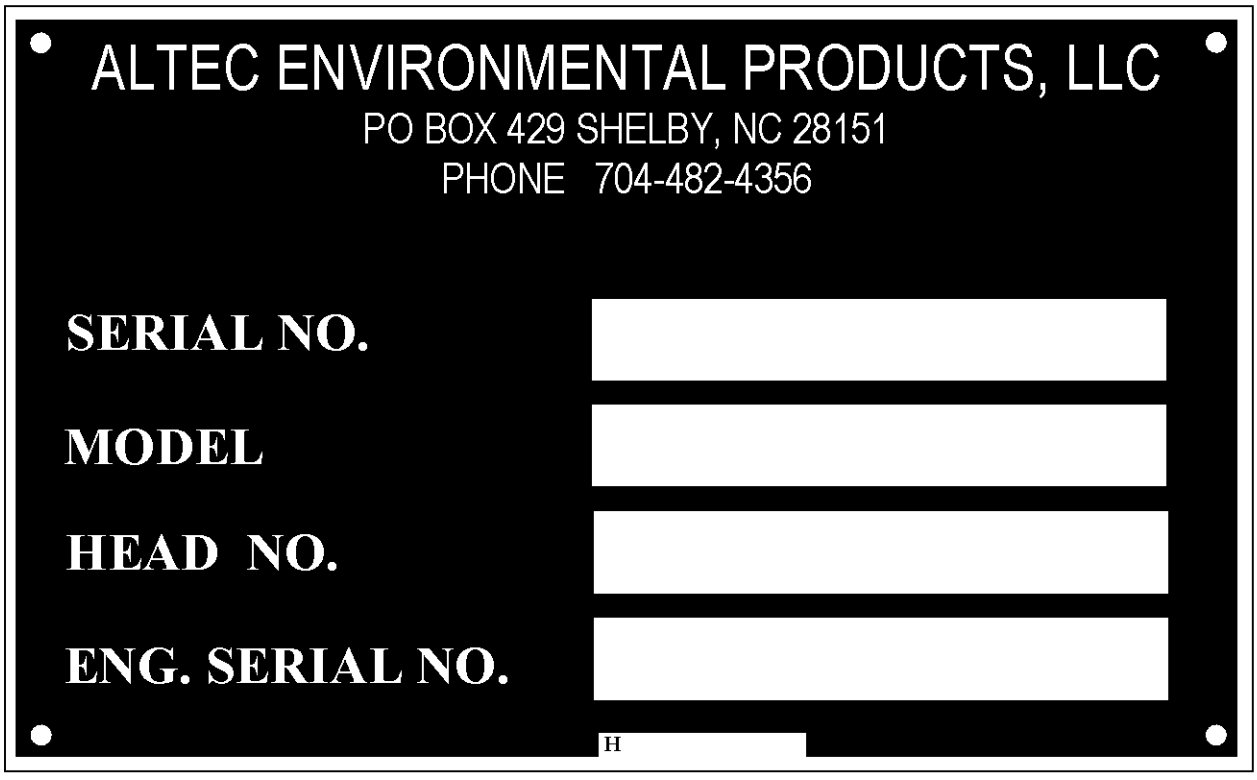
DELIVERY DATE: / /

DEALER NAME:

Altec Environmental Products, LLC
P.O. Box 429
Shelby, North Carolina 28151 Telephone:
Parts & Service 704-482-4356
Parts & Service Fax 704-482-5926
Sales 704-481-1465
Website altecenvironmentalproducts.com



LOCATED ON THE TRAILER FRAME IN FRONT OF THE FENDER, ON THE LEFT SIDE OF THE CHIPPER.



LOCATED ON THE IN-FEED CHUTE ON THE LEFT SIDE OF THE CHIPPER.

⚠ WARNING **Read and understand this entire manual before operating the chipper or feeding brush.**

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Dear Customer,

Congratulations and thank you for your purchase of the *Altec Environmental Products, LLC Chipper*.

This Chipper design is the result of applying years of field experience to provide a product that has become a leader in the industry. Safety, Quality and Customer Support is a philosophy that will always be maintained at *Altec Environmental Products, LLC*.
This manual is furnished with your Chipper to acquaint you with its operation and to provide the necessary maintenance procedures and service information. The efficiency, performance and life service of your Chipper depends on the care it receives. Service and operation information for the heavy-duty industrial engine used on your chipper is contained in a separate Owner and Operator's Manual furnished with your unit. All operators and service personnel responsible for this unit should become thoroughly familiar with the procedures in this manual and refer to them during operation ,maintenance and training.

If you should need major repair information not given in this manual or require the services of a trained mechanic familiar with your Chipper, we urge you to use the facilities offered by your nearest authorized service center. They are qualified in the best and latest methods of servicing your equipment and are adequately equipped to perform minor and major repair and furnish technical service and advice regarding the engine on your chipper.

I would like to take this opportunity to emphasize that it is the responsibility of the owner and/or employer to ensure a safety oriented work environment. It is also your responsibility to use only factory approved parts when performing repairs or regularly scheduled preventative maintenance outlined in this manual. Use of unapproved parts may reduce performance, cause personal injury or property damage, and void any warranties. Modifications to any component of this chipper can create a safety hazard. Any modifications to this chipper must receive prior written approval from *Altec Environmental Products, LLC*. .

We recommend that all manuals be placed and kept in the tool box, or the manual holder, of the chipper. Ensure that all employees, operators and maintenance personnel know the location and have access to this manual. If you sell this chipper please ensure the manual is in good condition and contact *Altec Environmental Products, LLC*. with the new owners name and address so we may forward all safety and/or maintenance updates to the new owner.

Please contact us with any suggestions or comments (positive or negative) concerning the design or operation of your chipper. Your input is greatly appreciated and ensures product development that will meet or exceed the needs of the tree care professionals such as yourself.
Please visit our website frequently to review the most current operational and safety materials.

Again, thank you and please call us for your future chipper requirements.

Altec Environmental Products, LLC.
512 North Post Road
Shelby, North Carolina 28150
Phone -1-704-482-4356

The descriptions and specifications contained in this manual were in effect at the time of printing. The right is reserved to make changes at anytime without prior obligation.

⚠WARNING **Read and understand this entire manual before operating the chipper or feeding brush. It is the owners responsibility to ensure all operators and maintenance personnel have a complete understanding of this manual, decals and applicable work rolls and standards.**

1.1 SAFETY DESIGNATIONS

This manual provides the owner/operator with specifications and procedures for operation, maintenance and repair of the chipper. As with any machine, there are hazards associated with their operation. For this reason there is a need to emphasize safety throughout this manual. To highlight specific safety information the following safety designations are provided to assist the reader.

SAFETY DESIGNATION	SAFETY DESIGNATION DEFINITION
⚠DANGER	**Disregarding the information highlighted by this safety designation *WILL* cause severe equipment damage, injury or possibly death.**
⚠WARNING	**Disregarding the information highlighted by this safety designation *CAN* cause severe equipment damage, injury or possibly death.**
⚠CAUTION	**Disregarding the information highlighted by this safety designation *MAY* result in minor or moderate injury or property damage.**

Every *Altec Environmental Products, LLC.* chipper is manufactured in accordance with national industry standards and the applicable ANSI Z133.3 standard. There may be additional regulations or policies associated with the operation and/or maintenance of this equipment. It is the responsibility of the owner or operator to ensure compliance with *ALL* applicable federal, state, local or company regulations or policies.

Every effort has been made to provide safeguards against injury. Compliance with these standards alone will not ensure complete safety. It is the responsibility of all those who operate, maintain and repair this chipper to observe and comply with the procedures and safety designations emphasized in each section of this manual. Common sense and safety practices should always be utilized around this equipment.

1.2 TRAINING

⚠WARNING

Improper use of the chipper *CAN* result in severe personal injury or death. All personnel using this chipper must be trained and qualified with all the operations, maintenance, repair and safety procedures defined in this manual.

The procedures and warnings regarding safety in this manual apply to those situations that occur within the scope of the material covered. It is impossible to allow for every contingency encountered in the field. For this reason it is imperative that the owner or employer accept the responsibility to implement a training and qualification program that will provide every operator a basis for good judgement and action in all situations.

This training program must include the proper indoctrination of all the specific requirements of applicable government regulations, precautions and hazards encountered in a work situation and provide the understanding and the need for regularly scheduled preventative maintenance and equipment safety checks.

Altec Environmental Products, LLC. strongly recommends all training programs be documented to ensure all operators and maintenance personnel receive initial training and keep abreast of *Altec Environmental Products, LLC.* and governmental regulations or guidelines concerning the safe and efficient operation of your chipper.

Training shall include descriptions (definitions) and work assignments (job descriptions) so that personnel are instructed as to the procedures that each is allowed to perform. *Altec Environmental Products, LLC.* recommends that certification, documentation and recognition of personnel that are qualified to perform the activities, and limitations, relating to this machine. All personnel must be instructed to report to their supervisor if an activity outside of their qualifications must be performed.

2.1 WARRANTY PROCEDURES

Every Altec Environmental Product, LLC chipper is designed, fabricated and assembled to give years of reliable performance. Implementing a scheduled preventative maintenance program, outlined in both the Chipper Manual and the Engine Owner's Manual, will ensure reliability. A vigorous quality control program is an integral part of our manufacturing process. It is our goal to provide a product that has been thoroughly inspected and tested to exact specifications before shipping. It is our desire that our customer's do not experience any warranty problems, however, when this unlikely event does occur it is imperative that the following procedures be complied with. We thank you for your understanding and cooperation.

NOTE:

ONLY ALTEC ENVIRONMENTAL PRODUCTS, LLC *APPROVED* PARTS SHALL BE USED ON THE CHIPPER.

⚠WARNING

Failure to install approved replacement parts will jeopardize personnel and equipment, possibly causing serious injury or death and void all warranties and liabilities.

A warranty approval number *SHALL* be issued by Altec Environmental Product, LLC *PRIOR* to any work performed on your chipper during the warranty period to validate any work to be done. It is in Altec Environmental Product, LLC and our customer's best interest to be aware of any problem as soon as it occurs. Prior approval is necessary to assure a correct diagnosis of the problem, specifying the correct replacement parts and issuance of appropriate compensation. No warranty claim will be honored if this procedure is not followed or the warranty information is not supplied in items 1 through 10 of the Warranty Information.

The warranty does not compensate for down time or expenses incurred in travel.

The warranty does not compensate damage resulting from negligence or improper preventative maintenance.

(continued)

2.2 LIMITED WARRANTY

Products manufactured by Altec Environmental Products, LLC ("AEP"), are warranted to be free from defects in material and workmanship at the time of initial delivery to the original retail purchaser, subject to the following provisions:

For a period of one (1) year from the date of delivery to the original retail purchaser or two thousand hours of use, whichever comes first (or for a period of ninety (90) days following such delivery, where the equipment is used for lease, rental, or demonstration), AEP will replace or repair, in its sole discretion and at a location it designates, any parts AEP determines, in its sole discretion, to have been defective in workmanship or material upon initial delivery.

This Limited Warranty does not cover (a) equipment not operated and maintained in accordance with AEP operator's and maintenance manuals, (b) equipment and components not manufactured by AEP, (c) equipment damaged through abuse or accident, (d) equipment which has been subjected to unauthorized alteration or repair, or repaired using unauthorized parts, (e) equipment damaged through the failure to replace normal wear items (f) transportation or delivery to an AEP service facility or to the customer's location, and (g) the power unit for the equipment, which is warranted, if at all, by its manufacturer, according to its terms, and not by AEP.

Labor expenses incurred during approved warranty work will be reimbursed by AEP only when AEP has authorized such work in advance, in writing, and then only to the extent stated in the written authorization. Such approved labor credit will be based on reasonable labor rates and factory replacement time.

This Limited Warranty is non-transferable unless prior written authorization is obtained from AEP.

This Limited Warranty is expressly in lieu of any and all other warranties, express or implied, including, but not limited to, any warranty of merchantability or fitness for a particular purpose. Except as authorized above, no AEP Associate is authorized to extend any warranty on AEP's behalf. Remedies under this Limited Warranty are expressly limited to the repair or replacement of parts, as specified above, and any claims for other loss or damages of any type (including, but not limited to, loss from failure of the equipment to operate for any period of time, other economic or moral loss, or direct, immediate, special, indirect, incidental, or consequential damage) are expressly excluded.

This Limited Warranty is void unless the warranty form is completed and returned to AEP within 10 days of delivery to the original retail purchaser.

Claims for coverage under this Limited Warranty should include the following information:

1) Location from whom equipment was purchased.
2) Date of delivery.
3) Warranty registration card number.
4) Trailer serial number
5) Chipper head serial number.
6) Chipper model number.
7) Engine make and serial number.
8) Length of time in use (number of hours shown).
9) Date of failure.
10) Nature of failure and events surrounding the failure.

For information or claims contact:

Altec Environmental Products, LLC
512 N. Post Road
Shelby, North Carolina 28150
704-481-1465

3.1 EQUIPMENT OUTLINE

The Altec Environmental Products Chipper is an apparatus specifically designed to reduce brush and tree limbs into chips and debris. The chipper is manufactured as a unit consisting of a gasoline or diesel fueled engine, clutch, V-belt and chipper mechanism mounted on a dual-functioning steel reinforced frame and trailer combination.

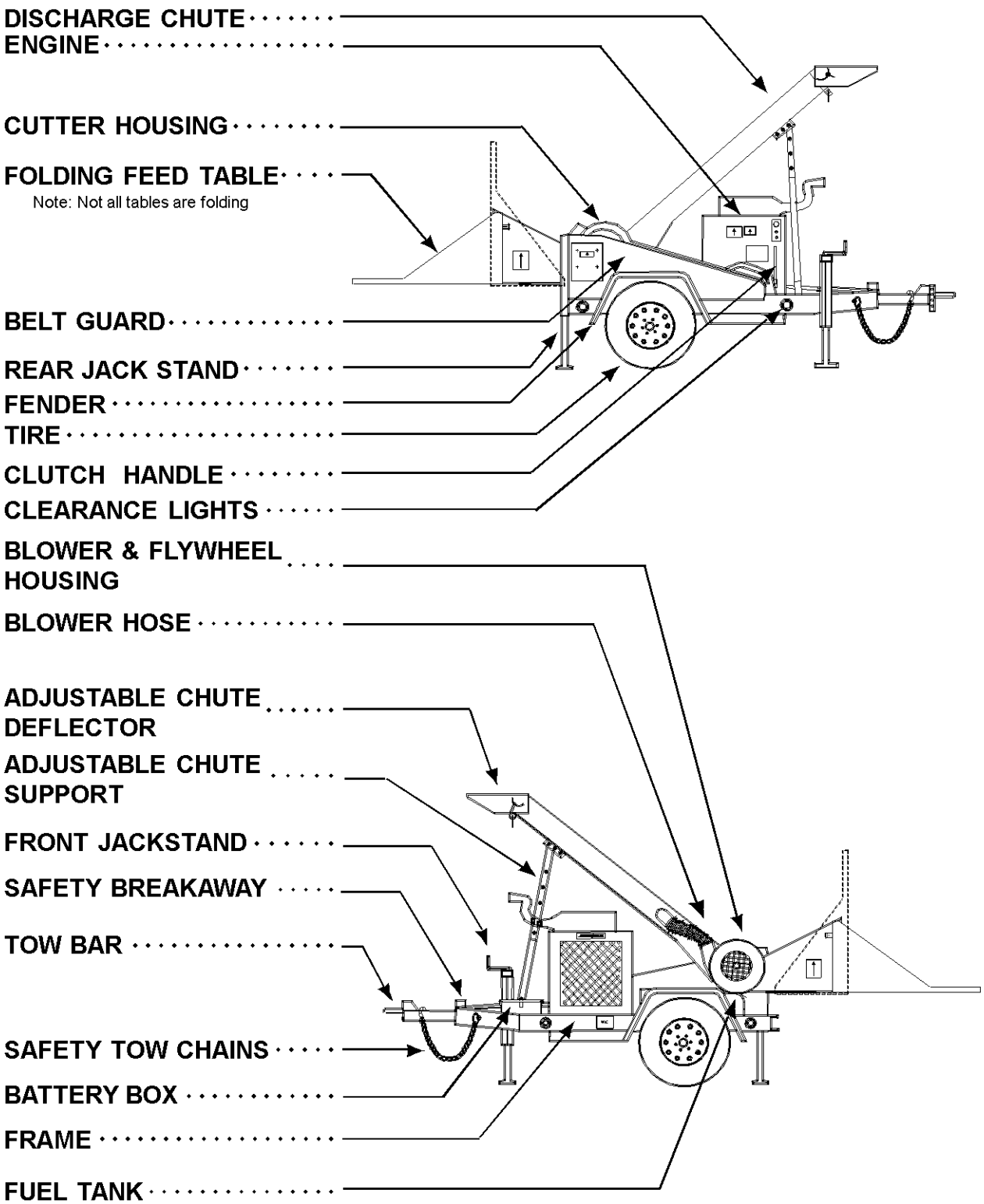
A selection of engines are provided to match a variety of field applications. For engine specifications consult the engine manual supplied with this chipper.

The chipping mechanism consists of a welded steel housing containing a forged steel, dynamically balanced rotor and strain tempered alloy steel shaft supported by two, high quality, heavy-duty bearings. The rotor is equipped with four replaceable hi-carbon chrome alloy steel knives working in combination with an adjustable and replaceable bed knife to simultaneously pull through and cut the brush and branches fed into the chipper. The chips and debris are then propelled and aided by a high velocity blower, integrally mounted to the flywheel, and ejected out of the discharged chute.

The dual-functioning trailer and frame combination is equipped with a suspension to provide support and stability over a wide range of towing situations. The trailer/frame is equipped with towing safety chains, electric brakes, and an electric breakaway switch. Devices have been installed to comply with day and night towing requirements specified by the National Traffic Safety Administration (N.T.S.A.).

The Altec Environmental Products Chipper is designed to operate at reduced sound levels. Without any chipping operations being performed and the clutch is engaged and the engine is set at full throttle, sound levels will typically be at or below 80 db(A) at a distance of 50 feet. Depending on the material being fed into the chipper, sound levels will be higher during chipping operations.

3.2 NOMENCLATURE



3.3 SPECIFICATIONS

TRAILER: Frame 6" channel steel, 8.2 pounds per foot. Main rails are turned with the flange inside allowing Altec Environmental Products to cope all cross-members and interlocking flanges with a continuous weld. Epoxy primed inside and out.

SAFETY CHAINS: Two (2) 3/8" x 6' safety chains with slip hooks.

AXLE: Heavy duty 6,000 lb. axle - 5 year warranty. Six lug hub pattern is standard. Easy lube grease zerks to insure proper grease to both front and rear bearings.

BRAKES: Heavy duty electric brakes which are self- adjusting. Safety breakaway switch is standard.

BATTERY BOX: Frame mounted and lockable with padlock standard. Box is bolted directly to the frame.

TIRES: Two (2) 2.25 x 75 x 15 Load Range "D" mounted on heavy duty 6 lug wheels.

TOW BAR: 2" Ball or 2 1/2" Pintle ring adjustable for height. Telescoping tongue to allow for length adjustment.

FUEL TANK: Plastic 26 gallons minimum. Tank is strapped inside the frame for protection.

LIGHTING: To conform to all D.O.T. specifications. Heavy duty tail light package with hermetically sealed lights, shock mounted grommet. Clearance lights mounted flush with frame to protect against damage. Wiring protected in conduit for shielding at all strategic points. All connections soldered in wiring harness.

FRONT JACK: Bolt on 5,000 lb. capacity. Flip up jack with pin for safety and convenience. Stationary foot pad is standard.

PAINT: Primer coated with epoxy primer and finish coated with acrylic enamel. Standard color is Altec Environmental Products yellow.

FEED CHUTE: Heavy duty 10 gauge high strength. Folds up. 45" wide and 50" long. Overall length of feed table from outer edge of rotor is 77". Exceeds safety requirements of length from ground to rotor.

DISCHARGE CHUTE: 9" Round Chute with adjustable deflector. Adjustable for height. Easily disengaged from cutter housing for knife inspection and adjustment.

REAR DROP STAND: Standard. Adjustable stand fabricated from heavy gauge square tubing with a clevis pin lock.

ROTOR KNIVES: Four (4), High carbon knives. Quick changing serrated back, interlocking full length support 3/8" x 3" x 12".*

ROTOR: Hammered steel forging RT 1020 rotor blank which is precision machined and dynamically balanced. Rotor is 12" in length* by 11-1/2" finished diameter. Knife pockets are serrated to insure blade security and to ease installation.

ROTOR SHAFT: 2 15/16" diameter steel machined to exact tolerances. Shaft is press fit and welded into rotor.

ROTOR DRIVE: Sheaves and bushings are high-speed, and dynamically balanced. A four section high capacity power band belt is used for transmission of power.

ROTOR HOUSING: Solid welded, one piece housing with 5/8" steel side plates. Housing is machined and line bored to insure long bearing life. End plates and bearing carriers are CNC machined from A-36 steel.

BEARINGS: High-speed roller bearings, greasable for long life.

FEED PLATE: Heavy duty reinforced steel weldment. Easily adjustable and removable. Bed knife face is machined for proper fit.

BED KNIFE: Special high alloy abrasion resistant steel 3/4" x 3" x 12" long*. Four cutting edges. Regrindable.

FLYWHEEL: Solid A-36 steel machined and dynamically balanced. Flywheel is 18" diameter and 4-3/4" thick.

SAFETY CURTAIN: Flexible rubber shroud over feed opening to reduce chip kickback.

BLOWER: High velocity blower directly mounted to flywheel. To insure adequate flow to keep discharge chute clean and dry.

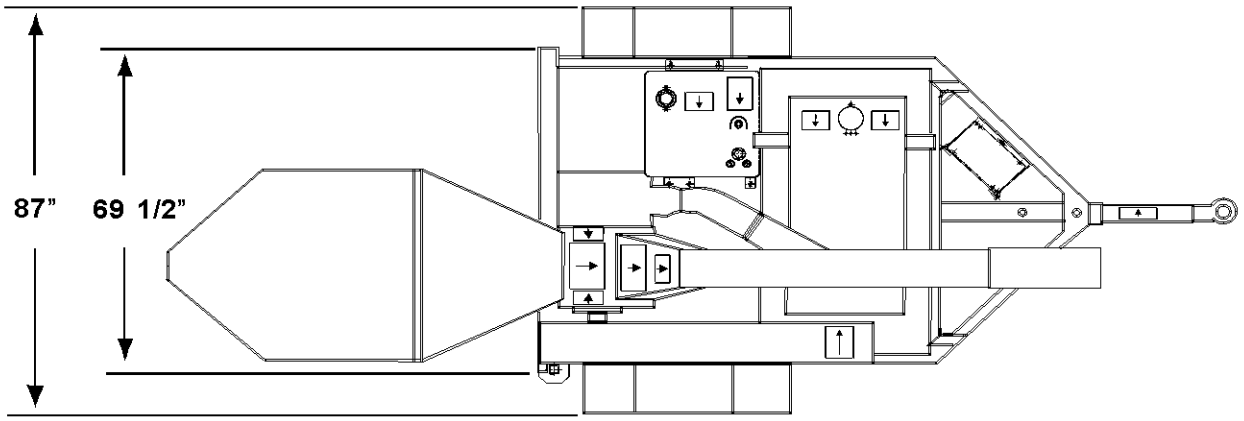
FENDERS: One piece 11 gauge fender, bolted to frame for ease of replacement. Backing splash guard is standard.

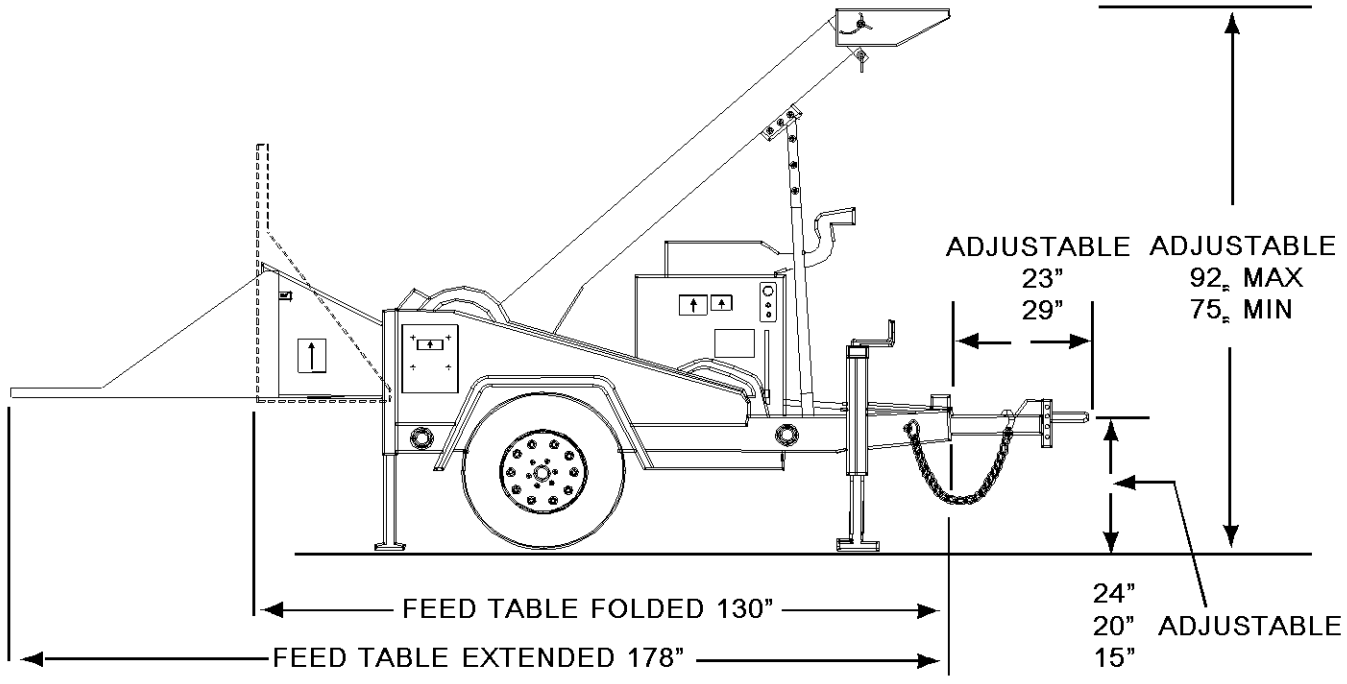
POWER UNIT: Standard with complete enclosure including side panels. Safety shutdown gauges, tachometer, and heavy duty dry type filter standard on all engine packages. Refer to your Engine Owners Manual **(EOM)** for specifications on the power unit supplied with your chipper.

***NOTE: Rotor, knives and bed knife lengths are 16" on the WC/166 chipper.**

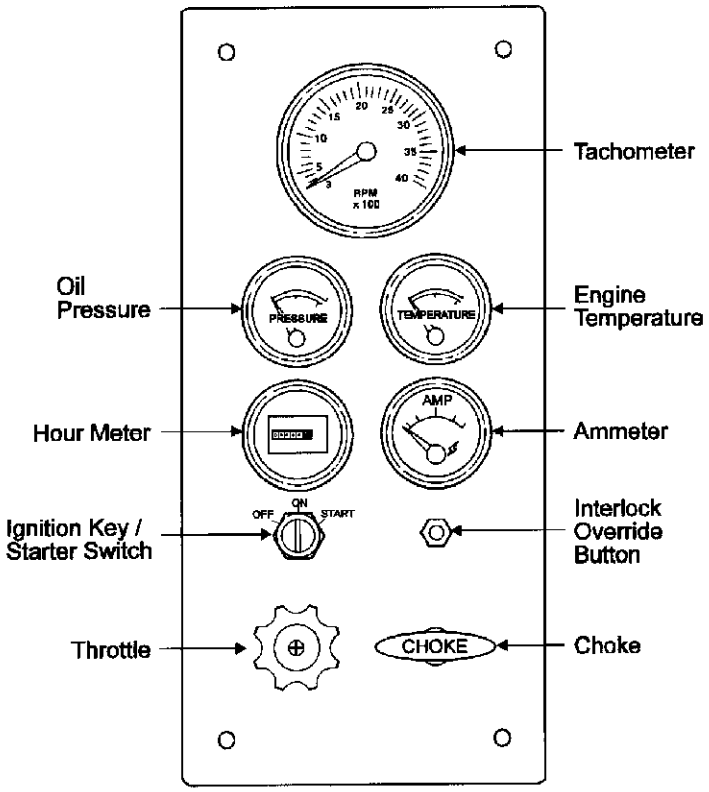
Altec Environmental Product, LLC chippers meet or exceed all applicable national D.O.T. Specifications and ANSI Z133.1 Standards as of the date of manufacture. Altec Environmental Product, LLC reserves the right to improve models and change specifications without notice or obligation. Specifications may vary with the addition of options.

3.4 DIMENSIONAL DATA





4.1 CONTROLS IDENTIFICATION ENGINE



(Typical Control Panel)
Actual control panel layout and controls are determined by engine type and model. Please check the **E**ngine **O**perator Manual **(EOM)** supplied with your chipper.

⚠ CAUTION ***Always*** **ensure that the PTO is disengaged before starting the engine.**

Ignition Key/Starter Switch.
Insert key; OFF - fully counterclockwise. IGNITION ON - first position clockwise. STARTER ENGAGE - second position clockwise (spring return to first position).

Interlock Override Button. This switch overrides the engine low oil pressure, high coolant temperature automatic cutoff control. You must press this button and hold while engaging the engine starter. After the engine starts, wait for the engine oil pressure to rise before releasing the button.

Throttle. A control providing positive locking and vernier adjustment of engine R.P.M. **Note:** Some engine packages have electronic governor and throttle controls with predetermined multiple positions "Idle" through "Full Throttle". Check your **(EOM)** supplied with your chipper.

Choke. (Gasoline engines only)
Enriches fuel mixture for cold engine starts by pulling the handle out. Push the handle in after the engine warms up. **Note:** Some engine packages have automatic choke controls.

Tachometer. This device indicates engine R.P.M.

Ammeter. Indicates the status of the engine charging system. A positive deflection indicates a charging condition. A negative deflection indicates a discharging condition.

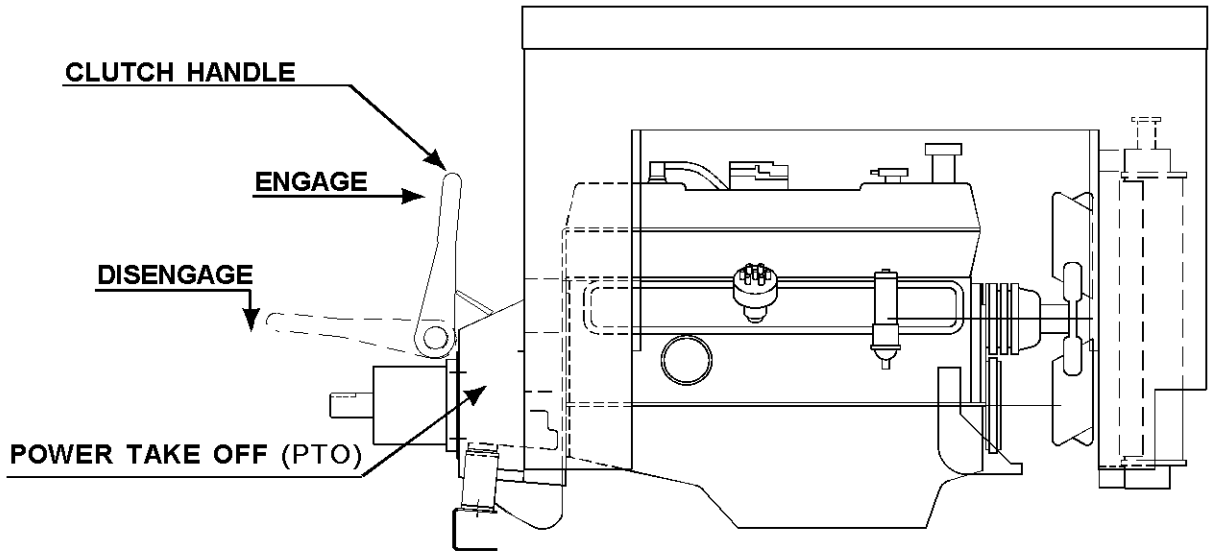
Oil Pressure. Confirms and indicates the presence and pressure of engine lubricating oil.

Engine Temperature. Indicates the engine coolant temperature.

Hour Meter. Indicates accumulated hours of operation on the engine. Specific service intervals can be established using this meter.

4.1 CONTROLS IDENTIFICATION ENGINE

NOTE: **Shown is a Stein PTO. The PTO supplied with your chipper may operate in a different manner. Please familiarize yourself with the proper operation of your PTO prior to chipper operation.**



⚠WARNING **The rotor and drive system *WILL* continue to rotate after the engine has stopped and the clutch has been disengaged.**

⚠DANGER ***DO NOT*** **attempt to perform service on the PTO, Engine or Chipper Head until the rotor has come to a complete stop Servicing these areas before the rotor has come to a complete stop can result in serious injury or death.**

⚠WARNING **DO NOT LEAVE THE CHIPPER UNATTENDED UNTIL THE ROTOR HAS COME TO A COMPLETE STOP.**

5.1 SAFE OPERATIONS

⚠WARNING

ALL personnel using this chipper _MUST_ be trained and qualified in all aspects of the operations, maintenance, repair and safety procedures defined in this manual prior to conducting any operations or procedures. Improper or careless use of this chipper _CAN_ result in serious injury, or _DEATH_. All procedures in section 5 must be completed in a timely fashion to ensure safe operation. See Section 1.0 GENERAL for additional information.

Operations shall be restricted to:

1. Properly trained, qualified and experienced operators and/or qualified and experienced maintenance and test personnel.

2. Trainees under the direct supervision of qualified and experienced personnel.

3. Qualified and experienced maintenance and test personnel only in the performance of their duties.

Personnel who qualify to operate this equipment under the above restrictions shall also comply with the following physical requirements:

1. Have good vision and the ability to read and understand this manual as well as all safety and operational decals and placards on the equipment.

2. Be capable of hearing, with or without a hearing aid, at a level adequate for the assigned operation.

3. A record of mental stability with no history of epileptic seizures, dizziness, or any other disability that may result in injury to him/herself or others.

4. If any of these requirements are not satisfied at any time, the person failing to meet these requirements **must not operate this equipment.**

Additional requirements.

1. Each operator must demonstrate competence to understand all placards, operator's manuals, safety codes, applicable government regulations, and all other information applicable to the safe and proper operation of this chipper.

(continued)

(continued)

5.1 SAFE OPERATIONS

Additional requirements.

2. Each operator must demonstrate the ability to recognize an emergency condition that may arise during chipper operations and the knowledge and procedures to implement corrective action.
3. Each operator must demonstrate or provide evidence of qualification and experience prior to operating this chipper.
4. Each operator must be able to recognize existing or potential problems regarding the mechanical integrity of the chipper and report any maintenance requirements to the supervisor in charge.
5. Each operator must wear the proper personal clothing and safety gear. (Refer to SAFETY PRECAUTIONS Section 5.4).
6. Operators must not be mentally or physically fatigued.
7. Operators must not be under the direct or indirect influence of alcohol and/or drugs. This includes prescription drugs that could cause drowsiness, dizziness, or any other condition that would impair their ability to operator or use this equipment in a safe manner.

5.2 PREPARATION FOR OPERATION

⚠ CAUTION

Before your chipper is put into operation it is very important to read and follow procedures outlined in the engine manufacturer's ENGINE OWNER'S MANUAL. (EOM).

To assist the reader in determining when to refer to the ENGINE OWNER'S MANUAL, look for this symbol. **(EOM)** You will find this symbol used throughout the rest of this manual.

For specific information regarding the following checks please refer to the "MAINTENANCE" section of this manual and the **(EOM).**

⚠ DANGER

Disengage clutch.

NOTE: Ensure the clutch is functioning properly so as to fully disengage. Refer to maintenance section (6.4.1.2).
Remove keys from the ignition switch.

⚠ DANGER

Rotor and drive system continue to move after the clutch has been disengaged and the engine has been cut off. Ensure that the rotor and drive system have come to a complete stop before attempting any maintenance in this area!
When accessing the cutter head, extreme care must be taken to avoid contact with pinch points. Failure to do so WILL result in severe injury.
Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so WILL result in severe injury.

⚠ CAUTION

Always secure rotor to prevent rotation before tightening fasteners or performing maintenance in the cutter head areas.

(continued)

(continued)

5.2 PREPARATION FOR OPERATION

IMPORTANT CHECKS

Note: The following checks contained in sections 5.2, 5.3 and 5.4 should be preformed prior to leaving the storage area for several reasons.

a) Tools and spare parts may not be available at the job site.
b) Safety gear and procedures can not be followed if they are not available at the work site.
c) Unscheduled delays at the work site cost you lost time and money.
d) You may leave a bad impression on your customers if you are not ready to go to work once arriving on the job site.

1. Check engine fuel, coolant and oil levels. **(EOM)**
2. Check the engine air filter. **(EOM)**
3. Check all bolts and nuts to ensure they are tight.
4. Check cutting knives to ensure all attachment bolts are tight and knives are in good condition.
5. Inspect anvil to ensure all attachment and adjustment bolts are secure.
6. Check all controls for free and proper operation.
7. Check chipper main drive belt for proper adjustment.
8. Inspect discharge chute to determine if it is clear, positioned and secure.
9. Inspect the chipper frame and structure for any bent, broken, cracked, missing or loose parts.
10. Check all guards to ensure they are undamaged, in place and properly secured.
11. All decals must be in place and legible prior to operating the chipper. See Section 8.0 Decal Placement.

5.3 PRE-TRANSPORT CHECKS

⚠WARNING

FAILURE to properly hitch chipper to tow vehicle, verify the road-worthiness of the chipper and tow vehicle, and verify all equipment is properly stowed, may cause serious injury or death to yourself or others. _TOW VEHICLE MUST_ have proper towing capacity for the chipper being towed. Check the tow vehicles operating manual for rated capacity. _Do not_ tow the chipper unless all the important checks listed below are satisfactorily completed.

1. Hitch secured to tow vehicle and safety pin/latch secured.
   a. Frame must be level or the tongue slightly lower than the rear of the chipper while towing to ensure proper weight distribution. The hitch may have to be adjusted when towing with vehicles of varying tow hitch height.

2. Safety chains installed correctly.
   a. Chains routed under trailer tongue in an "X" pattern between tow vehicle and trailer.
   b. Slack in chain should be adjusted to permit turning but not dragging on the ground.

3. Connect trailer wiring to the tow vehicle and ensure that all trailer lighting is operating properly.

4. Ensure that the safety breakaway switch is functioning properly and attached securely to the tow vehicle. Allow enough slack to ensure that vehicle turns will not activate the safety break away switch.

5. Ensure the tow vehicle has a properly adjusted brake controller. Refer to the controller's operating manual for proper operating, adjusting and maintenance information.

6. Check the general condition of the tires, tire pressure and ensure that all lug nuts are securely fastened.

7. Visual examination of chipper frame, suspension and structure to determine if all components are correctly positioned and secured for travel.

8. Manually check discharge chute to confirm it is positioned and secured for travel.

9. Verify there are no loose tools or materials on the chipper or in the feed chute.

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10. Check all cones, wheel-chocks, signs or other support tools and materials to ensure proper stowage.

5.4 PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

All chipper operators ***MUST*** wear appropriate protective equipment and clothing to protect them from possible injury during operations.

PROTECTIVE EQUIPMENT:

a. **Head Protection:** Hard hats without under-chin strapping.

b. **Eye Protection:** Wraparound goggle type eye protection held in place with an elastic band around the head - **OR** - a hard hat mounted face shield, which provides full protection of the face.

c. **Hearing Protection:** Plug type ear protection. Full ear coverage devices (muff type) are vulnerable to being entangled by whipping branches when feeding the chipper.

d. **Breathing Protection:** Paper filter type dust masks that will tear away if entangled in brush being fed into the chipper.

CLOTHING:

⚠ DANGER

Work clothes *MUST* be close fitting, but not restrictive of movement, without any decorations or loose parts that may become entangled in the material being fed to the chipper. Items such as jewelry, chains and backpacks, shall not be worn while operating this unit.

Jackets or shirts with straps at the cuff or shoulders, scarves, neckties, or gauntlet, cuffed or strapped type gloves *MUST NOT* be worn. Hooded sweat shirts may be worn only if the hood is tightly drawn around the face with the drawstring and the drawstrings tucked into the outer garment. Tuck the hood under the outer garment when not in use.

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5.4 PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

CLOTHING

⚠ DANGER

Jackets, shirts, or other outer garments *MUST* be closed and free from pockets, straps, buckles, etc. which could become entangled in the equipment or on brush being fed into the chipper.

Remove all climbing equipment which is not approved for the chipper feeding operation.

⚠ WARNING

Some work areas *MAY* require the wearing of reflective or highly visible clothing such as a vest to alert passing traffic.

EQUIPMENT

⚠ WARNING

Paper filter type dust masks *CAN* reduce or eliminate the breathing of dust produced by the chipping operation.

***ALWAYS* wear safety glasses.**

***ALWAYS* wear loose fitting gloves, *NEVER* wear gauntlet cuffed or strapped gloves. NOTE: gloves should easily release from the hand when pulled from the fingers or cuff.**

***ALWAYS* wear head protection while engaged in tree operations. Head protection *MUST* conform to the applicable provisions of ANSI Z89.1.**

***ALWAYS* wear footwear as approved by employer appropriate to the work location and conditions.**

HEARING

⚠ WARNING

Prolonged exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protective devices such as earplugs to protect against objectionable or uncomfortable loud noise.

5.5 WORK SITE PREPARATION

⚠WARNING

Never place any part of the body under or behind guards or any other visually obscured area.

If you are unhitching the chipper from the tow vehicle confirm the wheels are blocked. Ensure the jackstand is undamaged and properly configured to support the weight of the chipper. The rear jackstand must be lowered after the chipper is leveled, but before operation. Damaged jack stands should be replaced before supporting the chipper. Failure to do so may cause serious personal injury and/or property damage. The chipper tongue weight is too great for one person to lift safely. Serious muscle strains may occur if attempted alone. _GET HELP_ when hitching and unhitching the chipper.

NEVER stand between the tow vehicle and the chipper while the tow vehicle is backing. Ensure that the tow vehicle is securely parked and the driver notified before approaching the area between the chipper unit and the tow vehicle.

Check to ensure discharge chute is properly directed and locked in place.

Prior to starting the engine, check feed chute to _ENSURE_ it is clear of foreign material such as wrenches, axes, etc.

Organization and preparation of the work site and brush is a major factor in safe chipper operations. Operating personnel _MUST_ observe the following outlines to ensure safety.

1. Work sites should be clear of mainstream traffic and inhabitable buildings.

2. Signs, cones, ropes, barriers and/or flagmen may be required to provide adequate warning and diversion of automotive and pedestrian traffic.

3. Positioning the chipper beneath any tree being trimmed is not permitted.

4. Provide a clear area on the curb side of the chipper to allow the operator to maneuver while feeding the chipper.

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5.5 WORK SITE PREPARATION

5. Position the chipper in an area free of flammable materials to reduce the risk of starting a fire from sparks emitted from the engine exhaust or heat.

6. Verify that no one is performing other work overhead.

⚠ DANGER

An electrically energized tow vehicle (such as a bucket truck) can also energize the chipper and *WILL* cause serious injury or death. Never approach a chipper that is connected to an energized tow vehicle.

7. Confirm that all operators are wearing the proper clothes and personal protective equipment.

8. Restrict all personnel, except the operators feeding the chipper, from the feed and discharge areas of the chipper.

9. Set the chipper up on level ground with no stumps or trip hazards in the loading area. During chipper operation keep the loading area free of limbs, tools or other objects which may become a trip hazard.

10. Confirm all operators are properly trained, have read and understand all placards and decals.

⚠ WARNING

Inspect all brush for all non-wood material such as anything made of metal, glass or stone. Feeding such materials into the chipper will not only damage the cutting blades, they may even shatter, scattering blade fragments. These fragments *CAN* cause serious personal injury, death and/or property damage.

Remove vines from the material being chipped and dispose of properly. Do not leave vines in the area around the chipper and DO NOT ATTEMPT to place vines into the chipper. Material, clothing or personnel entangled in vines *CAN* result in personnel becoming entangled resulting in *SERIOUS* injury or *DEATH*. Vines may hide foreign materials that *CAN* cause equipment damage. Vines wrapping around the rotor shaft *CAN* result in bearing failure.

5.6 BRUSH PREPARATION

Inspection and organizing the brush prior to chipping will allow the job to be performed more efficiently and provide added safety in performing the job by minimizing the danger of foreign material, vines, etc. entering the chipper. Pre-trimming and proper de-limbing will allow the brush to be drawn easily through the chipper.

⚠WARNING

Inspect all brush for all non-wood material such as anything made of metal, glass or stone. Feeding such materials into the chipper will not only damage the cutting blades, they may even shatter, scattering blade fragments. These fragments *CAN* cause serious personal injury, death and/or property damage.

Remove vines from the material being chipped and dispose of properly. Do not leave vines in the area around the chipper and DO NOT ATTEMPT to place vines into the chipper. Material, clothing or personnel entangled in vines *CAN* result in personnel becoming entangled resulting in *SERIOUS* injury or *DEATH*. Vines may hide foreign materials that *CAN* cause equipment damage. Vines wrapping around the rotor shaft *CAN* result in bearing failure.

1. Arrange trees, tree limbs, or brush with the cut ends facing the chipper infeed chute.

2. **Do Not** cut the trees, tree limbs, or brush into short pieces, i.e. short logs or sticks.

3. **Do** cut the trees, tree limbs, or brush into the longest lengths that can be **safely** and **easily handled**. This will reduce the number of pieces of material that have to be handled and fed into the chipper and will reduce the time required to perform the job.

⚠WARNING

Be sure to cut all trees, tree limbs, and brush into lengths that can be safely handled by the operating personnel available. *DO NOT* attempt to lift material that is too heavy to be lifted safely. Serious back injury *CAN* result from attempting to lift material that is too heavy or from improper lifting technique. *ALWAYS* keep your back straight when lifting and lift with your legs.

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5.6 BRUSH PREPARATION

⚠ CAUTION

Know the limitations of your chipper. Never attempt to feed material to large for your chipper, always pre-cut large crotches to ensure adequate clearance through the rotor opening area.

There are several major factors which determine the limitations of your chipper. Understanding these limitation during the trimming process will greatly reduce the amount of downtime created from clogged discharge chutes and jammed material in the infeed area. Some of these major factors are:

- Engine horse power and general condition of engine.
- Condition and setting of cutter knifes.
- Condition of all the drive components. (Belt, Pulleys, PTO)
- Type of material being chipped. Softer woods require less horse power than hardwoods.
- Diameter and length of material being chipped.

To ensure proper chip discharge prepare material so as to maintain no more than a 500 RPM drop in engine operating speed.

⚠ DANGER

***NEVER* attempt to control feed rate by holding onto material being chipped. See Section 5.9 for proper feeding procedures**

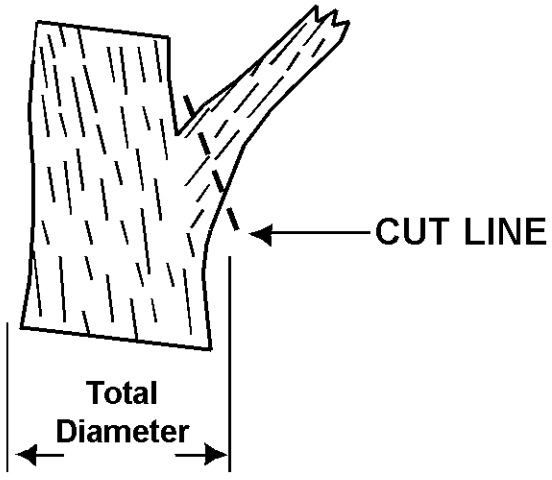


Figure 5.6.1

5.7 STARTING ENGINE (ALL ENGINES)

NOTE:
DISENGAGE CLUTCH ! ***NEVER*** FORCE CLUTCH LEVER. YOU ***MAY*** DAMAGE THE LINKAGE. ENSURE THE CLUTCH HANDLE HAS ADEQUATE FREE PLAY BEFORE OPERATING
(See section 6.4.1.2)

NEVER ENGAGE THE STARTER FOR MORE THAN 30 SECONDS CONTINUOUSLY.

Allow (2) two minutes between attempts to start.
This will allow the starter to cool down.

FAILURE TO OBSERVE THIS NOTICE *WILL* CAUSE DAMAGE TO THE STARTER.

The greatest amount of wear to an engine occurs when it is first started and is cold. The lubricating oil has drained back into the oil pan and does not flow freely to the entire engine when first started. To achieve the greatest life from your engine, do not operate at high speed or heavy loads until the engine has warmed up.

HELPFUL HINT!

Engine life will be significantly increased by allowing the engine to operate at a fast idle for 7 to 10 minutes before engaging the clutch.

SEE ENGINE OPERATING MANUAL SUPPLIED WITH YOUR CHIPPER FOR SPECIFIC START UP, OPERATING AND MAINTENANCE INSTRUCTIONS.

5.8 ENGAGING/DISENGAGING ROTOR

5.8.1 ENGAGING ROTOR

⚠ DANGER ***NEVER*** **start the engine with the discharge chute open.**

⚠ WARNING ***BEFORE*** **starting the engine, recheck the feed chute to ensure that it is clear of any foreign objects and that the discharge chute is directed away from personnel.**

1. When the engine has reached operating temperature and is running smoothly at 1/4 to 1/3 throttle, slowly engage the clutch. Engaging the clutch too quickly or slowly can cause excessive clutch wear. During clutch engagement the operator must ensure clutch shaft movement. If no movement is seen you must stop and investigate immediately .The ideal rate of engagement will cause the rotor to rotate up to speed without causing the engine to lose speed or stall. **Any unusual sounds or noise should be investigated immediately.**

2. With the clutch fully engaged and the engine running smoothly, set the throttle control to its maximum setting to bring the rotor up to the factory set cutting speed.

⚠ WARNING **Always operate the chipper at full factory thottle position. The maximum throttle setting is factory preset to produce 2600 R.P.M. at the rotor. This provides maximum efficiency of the chipper. Tampering with the engine speed governor *CAN* cause personal injury or equipment damage and will void the warranty.**

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5.8 ENGAGING/DISENGAGING ROTOR

5.8.2 DISENGAGING ROTOR

1. Push the throttle control in to reduce engine speed to idle.
2. When the engine and rotor reach idle speed, disengage clutch.
3. Turn off the ignition switch, and remove the key.

⚠ DANGER

The ROTOR and drive system *WILL* continue to rotate after the engine has stopped and the clutch has been disengaged.

Do not attempt to remove gaurds or attenpt repairs until the rotor and drive system have come to a complete stop.

DO NOT LEAVE THE CHIPPER UNATTENDED UNTIL THE ROTOR HAS COME TO A COMPLETE STOP.

5.9 FEEDING BRUSH TO THE CHIPPER

⚠WARNING **Read and understand this entire manual before operating the chipper or feeding brush.**

Feeding brush to the chipper involves a technique that requires a smooth continuous motion. Placing the prepared brush on the feed apron, pushing it into the throat of the cutter housing, and then moving quickly to the curb side of the chipper. (See Figure 5.9) Please follow the procedures and safety designations listed below:

⚠WARNING **Only personnel properly trained and authorized may operate this equipment. (Refer to section 5.1)**

NOTE: Confirm that site preparation is completed and brush has been prepared properly. (Refer to Sections 5.5 and 5.6)

⚠WARNING ***Ensure*** **all personnel operating the chipper are properly clothed and are using *ALL* personal protective equipment as per section 5.4.**

1. Position the cut end of the brush toward the feed apron, approach the feed apron from the curb side at an angle that will not position you directly in front and to the side of the feed apron to avoid brush kickback and traffic hazards.

⚠WARNING ***Ensure*** **the Chip Deflector Curtain is in place and secure. This device is provided to stop or reduce the velocity of any kickbacks during chipping operations. Operations without this device *CAN* cause serious personal injury.**

2. Place the brush on the feed table. Feed the cut end toward the throat of the cutter housing.

3. Release the brush before the rotor fully grabs the material. Smaller pieces of brush may be thrown in on larger pieces being pulled in.

⚠WARNING **During chipping operations, never position yourself directly in front of the infeed chute. A piece of brush or debris *CAN* be kicked back, without warning, possibly causing personal injury.**

⚠DANGER **CHIPPERS ARE DANGEROUS MACHINES THAT CAN CAUSE INJURY OR DEATH. ENSURE THAT YOU ARE PROPERLY TRAINED IN THE CONTROLS, HAVE PROPERLY PREPARED THE BRUSH AND THE WORK ZONE.**

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5.9 FEEDING BRUSH TO THE CHIPPER

4. As the brush begins to self-feed, quickly turn your face away from the chipper.

5. Keep moving quickly forward and to the curb side of the feed apron. **Do not** wait for the brush to finish feeding. The distinctive sound of the chipper cutting will confirm proper operation.

6. If the rotor fails to grab and self-feed the brush, use a separate piece of brush to push the stalled brush toward the cutter until it begins to self-feed. Never position yourself directly in front of the feed apron during this operation. Stand to the curb side of the apron.

7. Do not re-feed small pieces of brush which remain on the feed apron. Reserve a large piece of brush as the last piece to be fed to the chipper. This will clean up any small pieces left on the feed apron.

⚠ DANGER **_NEVER_ place hands, arms, legs or feet into the infeed chute. _NEVER_ attempt to push material into the infeed chute using your hands or feet. Loss of life or limb(s) _WILL_ occur.**

⚠ CAUTION **When feeding the chipper keep moving with the brush. This will minimize the impact of small branches and twigs on you as the brush self-feeds.** (see figure 5.9).

⚠ DANGER **_Do not_ use any item with metal components as a tool to push brush into the cutter mechanism. Blade failure _CAN_ occur and cause violent discharge from the cutter mechanism causing serious personal injury or death. Only materials which are being chipped should be used as push or drag tools.**

⚠ DANGER **_Do not_ feed crotches or multiple pieces of wood that can become a pinch point during feeding.**

⚠ DANGER **_Do not_ lean, stand, sit or, permit others to lean, stand or sit on the feed apron during chipping operations. Loss of balance _CAN_ result in serious injury or death.**

⚠ DANGER **_NEVER_ reach into or lean over the feed table or into the feed chute. _DEATH_ or serious injury will occur.**

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5.9 FEEDING BRUSH TO THE CHIPPER

⚠WARNING

Keep the working area clear of limbs and debris. Tripping or entanglement *CAN* allow the operator to be dragged into the chipper causing serious injury or death.

Do not throw clean up sweepings into the cutter mechanism. Foreign material such as stones, wire or metal scrap *CAN* cause blade failure, resulting in serious personal injury.

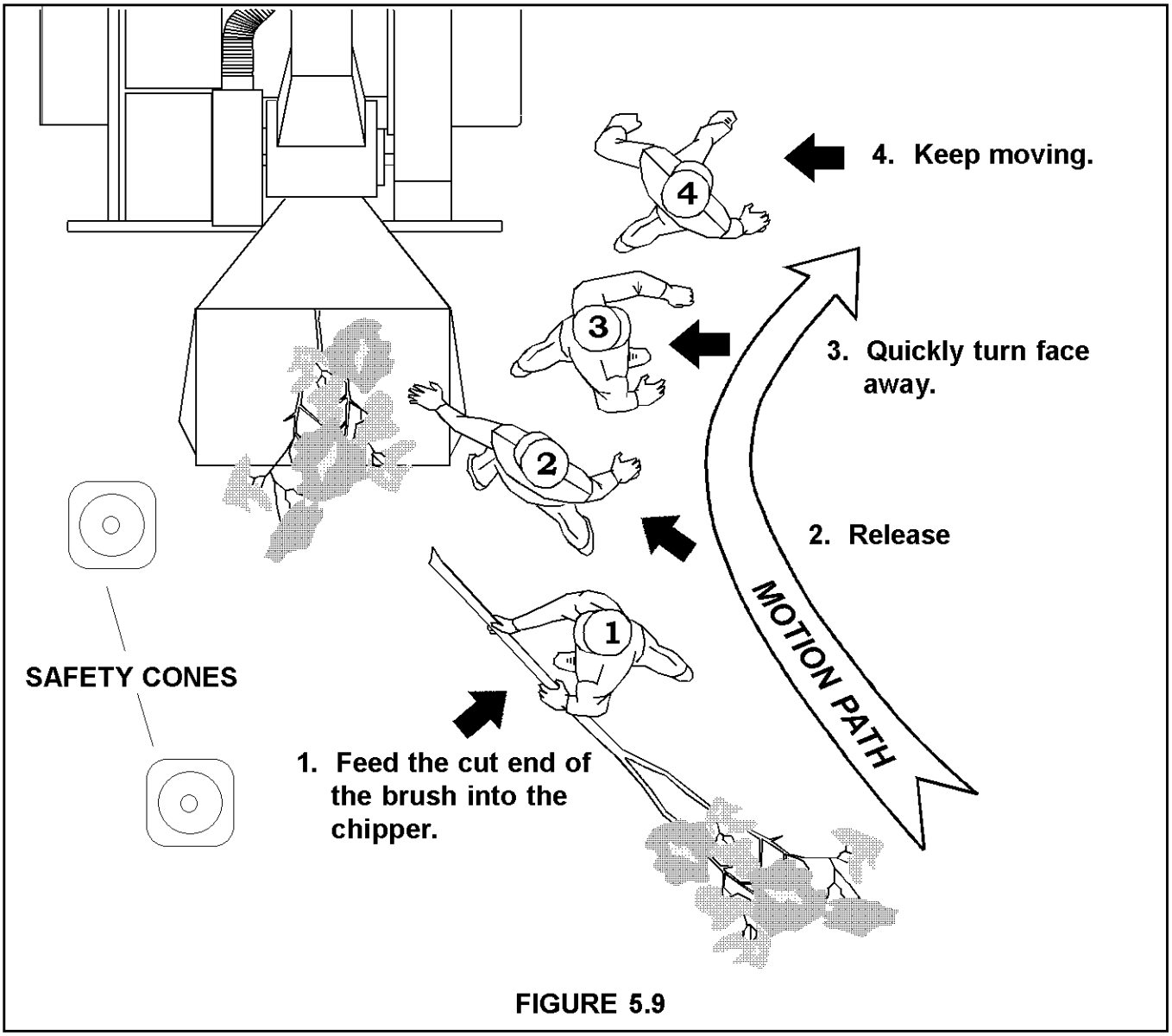


FIGURE 5.9

5.10 DISCHARGE CHUTE

⚠ DANGER

Only personnel properly trained and authorized may preform this operation.

Rotor and drive system continue to move after the clutch has been disengaged and the engine has been cut off. Ensure that the rotor and drive system have come to a complete stop before attempting any maintenance in this area!
When accessing the cutter head, extreme care must be taken to avoid contact with pinch points. Failure to do so WILL result in severe injury.
Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so WILL result in severe injury.

NEVER **operate the chipper with the discharge chute removed or material jammed in the chute.**

NEVER **attempt to clear the discharge chute while the chipper is in operation.**

ALWAYS **ensure the engine is shut off, ignition keys removed.**

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5.10 DISCHARGE CHUTE

⚠ CAUTION

PTO or drive train *MAY* be damaged from chute plugging or attempting to start the chipper with obstructions in the disc housing or discharge chute. This damage is not covered under Altec Environmental Products chipper warranty policy.

There are many factors contributing to discharge chute clogging. Most of these factors are controllable through proper maintenance and operator training.

Listed below are the most common problems associated with chute clogging and the suggested corrective action.

PROBLEM	CAUSE & CORRECTIVE ACTION
Stringy chip discharge	A) Dull or damaged knives / Change knives B) Dull or damaged anvil / Rotate or change anvil C) Incorrect anvil/knife clearance / Adjust clearance
Poor chip discharge velocity	A) Engine must be operated at the maximum factory preset governor speeds. During operation the engine speed should not be permitted to drop lower than 500 RPM. You control engine RPM by restricting the size of material being feed to the chipper. B) Clogged or partially clogged discharge chute. / Ensure the chute is clear of all obstructions. C) Damaged blower or blower hose. / Do not operate until the proper repairs can be completed.
Chipping leafy or wet material	A) Feed wet leafy material slower than dry material B) Mix large heavier limbs with leafy wet material so as to purge the rotor housing and discharge chute of the smaller wet materials

NOTICE!

ONLY PROPERLY TRAINED PERSONNEL SHOULD PERFORM MAINTENANCE OR REPAIR OF THIS EQUIPMENT. CONSULT THE ALTEC ENVIRONMENTAL PRODUCTS BEFORE PERFORMING ANY MAINTENANCE PROCEDURE THAT IS NOT SPECIFICALLY COVERED IN THIS MANUAL. IMPROPER MAINTENANCE OR REPAIR MAY VOID ANY AND ALL WARRANTIES ON THIS EQUIPMENT.

⚠ CAUTION **Improper maintenance or repair can result in equipment damage and/or personal injuries.**

6.1 PREVENTATIVE MAINTENANCE

⚠ WARNING **Before continuing, please refer to Section 5.0 OPERATION, Subsections 5.1, SAFE OPERATION, prior to performing the following operations.**

The following information is general in nature and applies to some of the popular engines available for the chippers. For specific information please refer to your engine owner's manual **(E0M).**

⚠ WARNING **Disengage clutch.**
Remove keys from the ignition switch.

6.1.1 ENGINE OIL

The engine oil level should be checked each day or when the engine has been operated for 10 hours, whichever comes first. It is preferable to check the oil level after the engine has been stopped for a period of time. This allows the oil in the upper section of the engine to drain down into the oil pan. This will allow you to obtain an accurate measurement of the level of oil in your engine. If the level is low, refer to your (EOM) for the recommended viscosity and type of oil for your engine. Refer to Section 6.4, Lubrication, Subsection 6.4.1, Engine.

6.1.2 ENGINE COOLANT

Check the coolant level before starting the engine at the beginning of each work period. The coolant level should not be less than one inch below the top of the radiator upper tank.

⚠ WARNING **Never check the coolant when the engine is HOT! Allow the engine to cool down first. Refer to the Engine Owners Manual (EOM) for proper procedures.**

6.1.3 FUEL TANK

Fill the fuel tank at the end of each work shift leaving a gap at the top of the tank for expansion of fuel. A full tank will not only maximize the work shift but will also reduce the possibility of condensation forming in the tank and moisture entering the fuel lines.

⚠WARNING

Gasoline and diesel fuel are dangerous, first and foremost they are highly flammable, they are easy to ignite and they burn explosively. Secondly, exposure to gasoline or diesel fuel liquid or vapor can affect health adversely. Always insure proper handling and storage of fuels. Improper handling and storage of fuels may result in serious injury , illness or death.

To Avoid Fire:

- Turn off all ignition sources (Chipper & Tow Vehicle).
- Keep fuel away from any flame or spark.
- Discharge potential static electric charge buildup by touch ing chipper metal away from fuel tank with your hand prior to touching the fueling nozzle to the fuel tank.
- Do not smoke.

⚠WARNING

Health Warning:
Long term exposure to vapors has caused cancer in lab animal:

To Minimize Health Risk

- Avoid prolonged breathing of vapors.
- Keep face away from nozzle & gas tank.
- Keep away from eyes & skin.
- Never siphon by mouth.

⚠WARNING

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

6.1.4 BATTERY

⚠WARNING **USE EYE PROTECTION DURING THIS OPERATION.**

After 200 hours of operation or once per month, which ever occurs first, inspect the battery for correct fluid levels. First, remove the protective caps from the top of the battery. This will reveal (6) six openings. These are the fill holes for each cell in the battery. At the bottom of each hole you will notice the opening is smaller. The location of this smaller section is where the level of the (electrolyte) water should be when properly filled. If the water in each of the cells is not at this level then, using distilled water only, fill each cell to this level. REPLACE THE PROTECTIVE CAP.

NOTE: Fill level checks are not required on maintenance free batteries because they are sealed.

If the battery has accumulated some corrosion at the terminals, mix two tablespoons of baking soda to one pint of water and apply with a small brush to terminals. When finished, be sure to flush the surface of the battery with water. Then remove any excess water and coat the terminals with light grease or petroleum jelly to reduce the possibility of corrosion forming. Also check the battery cable for wear and all cable connections and battery tie downs to be certain that they are not loose.

6.1.5 FASTENERS

Fasteners should be visually inspected on a daily basis. Physically torqued weekly for the first 30 days of operation and monthly thereafter. They must be in place at all times and properly torqued. Torque values are given for specific fasteners where applicable. For fasteners in general, refer to the torque value charts in section 6.10.

6.1.6 CUTTER HEAD AND DRIVE BELT

After 200 hours of operation or once a month, whichever occurs first, perform the following inspection. Refer to Figures 6.1.6.1 and 6.1.6.2 Proper belt tension and head alignment are crucial to chipper performance and longevity.

⚠ DANGER

Disengage clutch. Remove keys from the ignition switch. Rotor and drive system continue to move after the clutch has been disengaged and the engine has been cut off. Ensure that the rotor and drive system have come to a complete stop before attempting any maintenance in this area! Failure to Ensure The rotor and drive system have come to a complete stop *WILL* result in serious *PERSONAL INJURY OR DEATH.*

⚠ DANGER

Never place any part of the body in a potential pinch point. This not only applies to the head and chute, but also rotor and sheave/belt contacts. Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so WILL result in severe injury.

HEAD ALIGNMENT AND DRIVE BELT INSPECTION

1. Remove belt guard.
2. Visually inspect drive belt for cracks or fraying.
3. Visually inspect sheaves for signs of wear, cracks or loose bushings.
4. Inspect belt tension. At the center point between the sheaves the belt should deflect 3/4" with 16 pounds of pull. Refer to Figure 6.1.6.2

   NOTE: Under-tensioning can cause unnecessary belt wear. Over-tensioning can cause premature PTO and/or bearing failure.

5. Check cutter head-rotor / engine alignment by placing a non-flexible straight edge against the outside surface of the cutter head/ rotor sheave and the engine sheave. Alignment is correct when both inner and outer surfaces of both sheaves are in contact with the straight edge (See figure 6.1.6.2). If alignment is found to be incorrect see section 6.1.7 for proper alignment procedure.

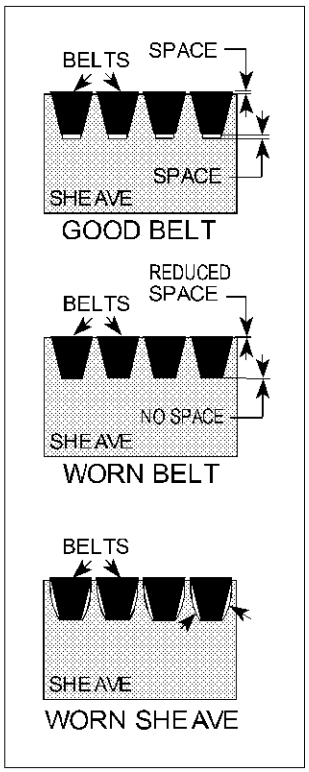


FIGURE 6.1.6.1

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6.1.6 CUTTER HEAD AND DRIVE BELT

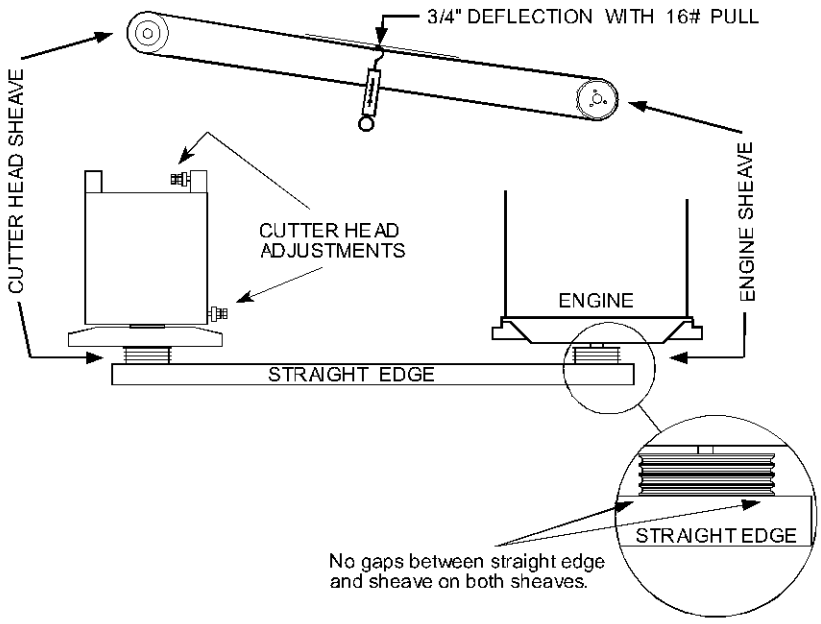


FIGURE 6.1.6.2

6.1.7 DRIVE BELT REALIGNMENT PROCEDURE FOR CUTTER HEAD

⚠ DANGER

Never place any part of the body in a potential pinch point. This not only applies to the head and chute, but also rotor and sheave/belt contacts. Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so WILL result in severe injury.

1. Back-off the head mounting plate adjustment screw locking nut. refer to Figure 6.1.6.3
2. Loosen all of the head mounting plate hold down bolts. refer to Figure 6.1.6.3
3. Tighten or loosen the adjustment screws, as appropriate, while monitoring the sheave alignment and belt tension.
4. When the proper sheave alignment and belt tension have been achieved, retighten the head mounting plate hold down screws and torque to 282 ft./lbs.
5. Retighten the adjustment screw locking nut.
6. Reinstall the belt guard and tighten all fasteners securely.

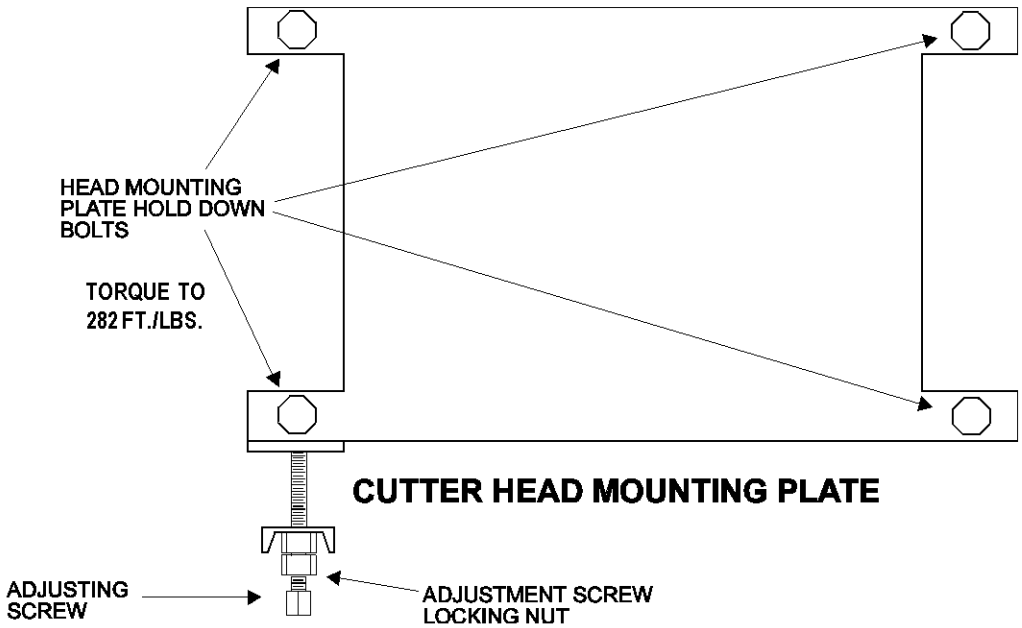


FIGURE 6.1.6.3

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6.1.7 DRIVE BELT REALIGNMENT PROCEDURE FOR CUTTER HEAD

⚠ DANGER

Ensure that all tools and hardware are removed from the heads and discharge chutes or any other area where maintenance, inspection or service was performed. Ensure that all fasteners and adjustments are secured properly before starting the unit. Do not operate the equipment unless all covers and guards are in place and properly secured.

6.1.8 ENGINE AIR CLEANER

Due to the varying degrees of dust produced during the normal chipper operation, it is critical to the life of your engine to maintain a clean air filter. Do not hit the filter against an object to clean the filter. Check your filter daily and clean or replace as specified in your EOM. Failure to properly maintain the engine intake system and filters can quickly decrease the engines effective horse power and cause failure of your engine. **Note:** Failures due to improper air intake system maintenance are not covered under engine warranty.

6.1.9 ENGINE RADIATOR

The engine radiator can quickly become plugged with wood particles. This ***WILL*** cause improper engine cooling, and ***MAY*** cause extensive damage to your engine. Many factors contribute to the buildup of wood particles in the radiator. The main contributor to radiator plugging is clouding of particles from the chipper discharge to the engine radiator area. Directing your discharge downwind of the engine radiator area or if discharging into a chip bed the use of chip box screens or canvases will greatly reduce this clouding effect. Proper belt condition and coolant mix-ratio/ level are also critical to proper engine cooling. The radiator should be inspected and cleaned on a daily basis using compressed air.

Note: Improper radiator maintenance can result in engine damage that will not be covered under the engine warranty.

⚠ DANGER

You must *NEVER* attempt to clean or inspect the radiator with the engine running or while the engine is hot.

6.1.10 TIRES AND WHEELS

Tires and wheel lugs should be checked on a daily basis. Tires should be inspected for excessive wear and proper pressure. Check the side walls of the tires or contact the tire manufacturer for proper inflation. Torque all 1/2" diameter wheel studs from 90 to 120 foot pounds. Torque all 5/8 diameter wheel studs from 175 to 225 foot pounds.

6.2 SERRATED KNIFE MAINTENANCE

6.2.1 ACCESSING THE CUTTER HEAD

⚠ DANGER

Disengage clutch.
Remove keys from the ignition switch. Rotor and drive system continue to move after the clutch has been disengaged and the engine has been cut off. Ensure that the rotor and drive system have come to a complete stop before attempting any maintenance in this area! Never place any part of the body in a potential pinch point. This not only applies to the head and chute, but also rotor and sheave/belt contacts. Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so *WILL* result in severe *PERSONAL INJURY* or *DEATH*.

⚠ DANGER

Only properly trained, authorized personnel which have read and understand the entire manual, placards and decals shall access the cutter head.

1. Remove the belt guard (not shown in figure 6.2.1).
2. Disconnect the flexible blower hose from the discharge chute (not shown in figure 6.2.1).
3. Support the weight of the discharge chute with a lifting sling (strap) using the "choker" method (as shown in figure 6.2.1) and a lifting device that is capable of supporting and lifting at least 500 pounds. (Figure 6.2.1 item A).
4. Remove the wing-nut and pull the "L" shaped pin from the discharge chute and the chute support rod. (Figure 6.2.1 item B)
5. Remove the cotter pin and pull the "L" shaped pin from the cutter head outlet and the discharge chute. (Figure 6.2.1 item C)
6. Carefully pull the discharge chute away from the cutter housing.

(continued

(continued)

6.2 SERRATED KNIFE MAINTENANCE

6.2.1 ACCESSING THE CUTTER HEAD

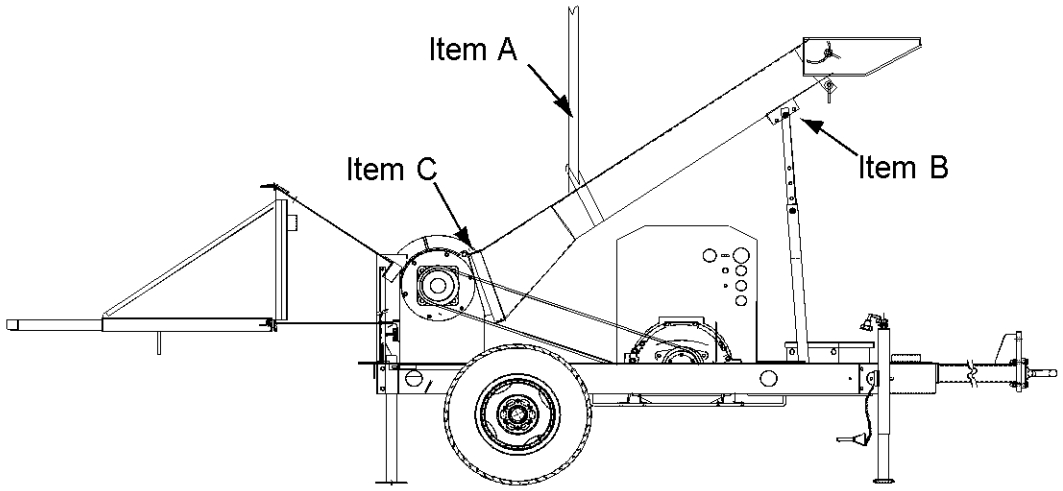


FIGURE 6.2.1

6.2.2 BED KNIFE ADJUSTMENT

⚠ DANGER

Only properly trained, authorized personnel which have read and understand the entire manual, placards and decals shall access the cutter head.

⚠ DANGER

Disengage clutch.
Remove keys from the ignition switch. Rotor and drive system continue to move after the clutch has been disengaged and the engine has been cut off. Ensure that the rotor and drive system have come to a complete stop before attempting any maintenance in this area! Never place any part of the body in a potential pinch point. This not only applies to the head and chute, but also rotor and sheave/belt contacts. Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so *WILL* result in severe *PERSONAL INJURY* or *DEATH*.

The bed knife is designed with 4 cutting edges. To select a new edge remove the bolts securing the knife to the feed plate then reposition the new edge against the feed plate. Replace bolts, adjust and tighten bed knife as shown in figure 6.2.2.

NOTE: A worn or dull bed knife will result in poor feeding and will diminish chip quality.

(continued)

(continued) 6.2 SERRATED KNIFE MAINTENANCE

BED KNIFE ADJUSTMENT

1. Access the cutter head using the instructions provided in section 6.2.1 and figure 6.2.1.

2. Remove screws that secure the chip plate to the cutter head housing (See Figure 6.2.3, items **L** and **M**,) then remove the plate.

3. Loosen bed knife screws securing bed knife to feed plate.

4. Back off the locknuts on the bed knife adjusting bolts and turn bolts clockwise to raise the knife 1/16" above the top edge of the feed plate. Check to assure both ends of the blade are adjusted equally.

5. Retighten the locknuts and the bed-knife screws then recheck the bed-knife to insure that the 1/16" clearance has been maintained. (See Figure 6.2.2). If the 1/16" clearance has not been maintained repeat steps 3 through 5.

6. Reinstall the chip plate and the screws that were removed in step 2.

6.2.2 BED KNIFE ADJUSTMENT

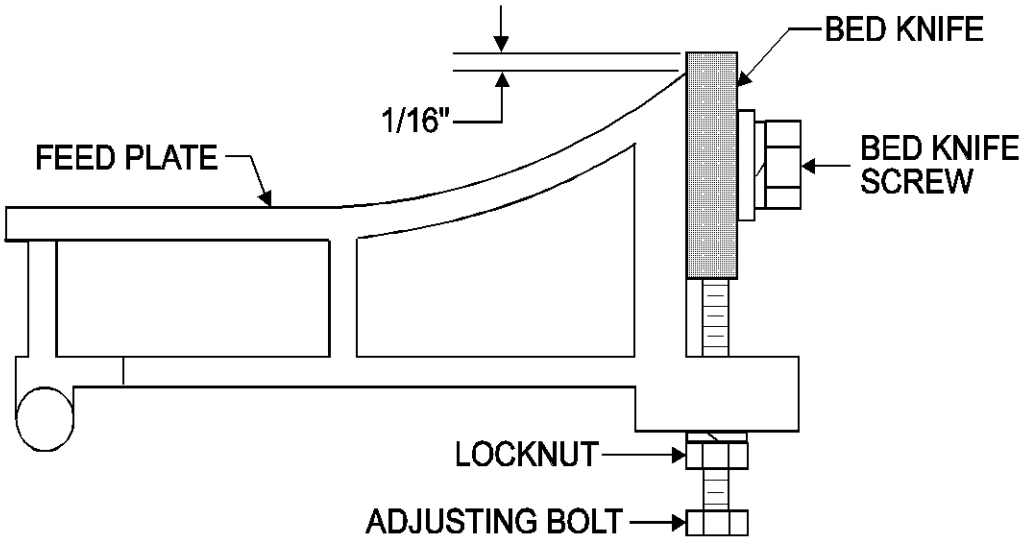


FIGURE 6.2.2

6.2 SERRATED KNIFE MAINTENANCE

6.2.3 REMOVING CUTTER KNIVES

⚠ DANGER

Only properly trained, authorized personnel which have read and understand the entire manual, placards and decals shall access the cutter head.

⚠ DANGER

Disengage clutch.
Remove keys from the ignition switch. Rotor and drive system continue to move after the clutch has been disengaged and the engine has been cut off. Ensure that the rotor and drive system have come to a complete stop before attempting any maintenance in this area! Never place any part of the body in a potential pinch point. This not only applies to the head and chute, but also rotor and sheave/belt contacts. Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so *WILL* result in severe *PERSONAL INJURY* or *DEATH*.

(continued)

(continued) 6.2 SERRATED KNIFE MAINTENANCE

6.2.3 REMOVING CUTTER KNIVES

A. ROTOR
B. ROTOR SHAFT
C. FEED PLATE
D. BED KNIFE
E. BED KNIFE SCREWS
F. ADJUSTING NUT
G. JAM NUT
H. FEED PLATE FLANGE
J. KNIFE SLOT
K. ROTOR HOUSING
L. CHIP PLATE BOLT
M. CHIP PLATE

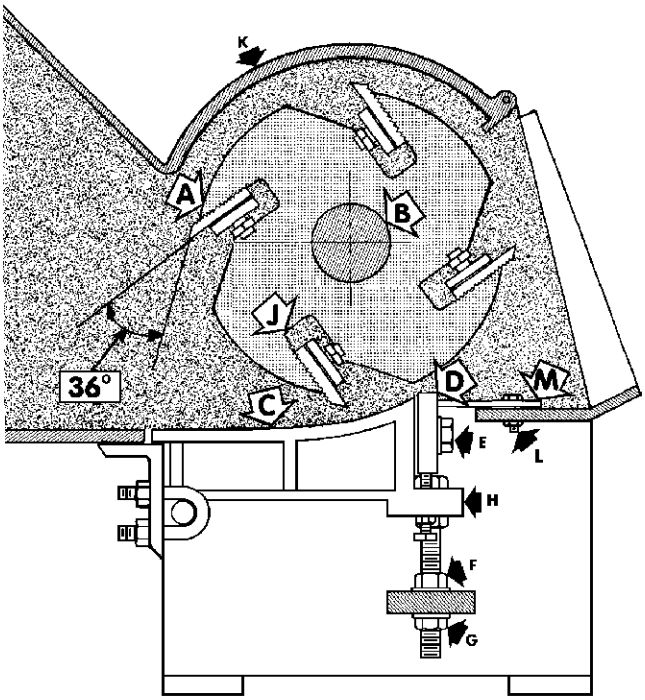


FIGURE 6.2.3

1. Access the cutter head using the instructions provided in section 6.2.1,and figure 6.2.1.
2. Remove screws (Item L) that secure the chip plate to the cutter head housing then remove the chip plate (Item M).
3. Loosen the jam nuts (Item G), and turn the adjusting nuts (Item F), counter clockwise to lower the feed plate until the bed knife clears the rotor at both ends by 1/2 inch.
4. Using the rotor locking pin mechanism (located between the belt guard and the rotor housing) position and secure the rotor toallow access to the gib locking screws on the cutter knife to be removed. Place the knife edge guard on the knife to be removed Turn each of the gib locking screws clockwise until the head of the screw shoulders against the gib insert. Remove the cutter knife and then the gib bar.
5. Repeat step 4 for each cutter knife.

6.2 SERRATED KNIFE MAINTENANCE

6.2.4 INSTALLING CUTTER KNIVES

⚠ DANGER

Only properly trained, authorized personnel which have read and understand the entire manual, placards and decals shall access the cutter head.

⚠ DANGER

Disengage clutch. Remove keys from the ignition switch. Rotor and drive system continue to move after the clutch has been disengaged and the engine has been cut off. Insure that the rotor and drive system have come to a complete stop before attempting any maintenance in this area! Always secure rotor to prevent rotation before removing or replacing cutter knives. Always install knife guard on knife edge before removing or replacing cutter knives. Never place any part of the body in a potential pinch point. This not only applies to the head and chute, but also rotor and sheave/belt contacts. Blades are extremely sharp. Care must be taken to avoid contact with the blades and blade pinch points. Failure to do so *WILL* result in *SEVERE PERSONAL INJURY OR DEATH*.

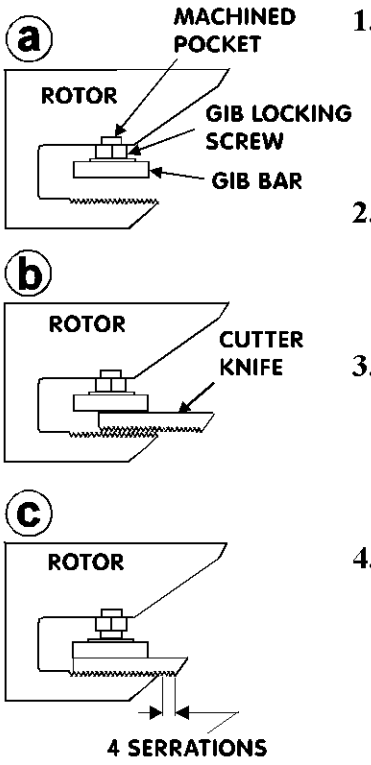


FIGURE 6.2.4

1. Refer to Figure 6.2.3, loosen the jam nuts (item G), turn the adjusting nuts (item F), counterclockwise to lower the feed plate until the bed knife clears the rotor at both ends by 1/2 inch.

2. Position and secure the rotor (using the rotor locking pin mechanism) to allow access to the slot requiring the installation of a cutter knife and gib bar.

3. Clean out all foreign material from all of the surfaces in the knife slot. Special care must be given to cleaning out the serrations in the knife slot. Foreign material may not allow the cutter knife to seat properly and cause misalignment and premature failure.

4. Clean the cutter knife and gib bar, with special care given to the serrations on the cutter knife. Position the gib bar to permit the heads of the gib locking screws to fit inside of the pocket machined into the rotor (see Figure 6.2.4a). While holding the gib bar in this position carefully slide the cutter knife into the opening below the gib bar (see Figure 6.2.4b). Release the gib bar then position the cutter knife to allow 4 serrations to be visible (see Figure 6.2.4c).

(continued)

(continued)

6.2 SERRATED KNIFE MAINTENANCE

6.2.4 INSTALLING CUTTER KNIVES

5. Using an appropriate open end wrench turn each of the gib lock ing screws counter clockwise until they are snug. Recheck cutter knife positioning and confirm that the gib bar and cutter knife do not protrude beyond each end of the rotor.

6. Using an appropriate open end wrench tighten each gib screw securely and evenly across the gib bar.

REPEAT STEPS 2 THROUGH 7 FOR EACH OF THE REMAINING CUTTER KNIVES.

NOTE: All cutter knives must be adjusted to the same setting! {Four (4) serrations visible.}

7. Using a thickness gauge, adjust the feed plate upward by adjusting the feed plate adjusting nuts (See Figure 6.2.2, Item F), to obtain a clearance of .013" to .016" between the bed knife and the cutter knives. Make this adjustment by taking the measurements at each end of the bed knife until the desired results are obtained. Exercise extreme caution to prevent the cutter knives from coming in contact with the bed knife. After obtaining the proper clearance tighten jam nuts (Figure 6.2.3, Item G). Re check clearance.

8. Using extreme caution (see CAUTIONS and DANGERS on the previous page) roll the rotor slowly by hand and check each knife clearance as in Step 7. A variation between the knives of .002" and .003" is acceptable.

⚠ DANGER

Ensure that all tools and hardware are removed from the head and discharge chute or any other area where maintenance, inspection or service was performed. Ensure that all fasteners and adjustments are secured properly before starting the unit. Do not operate the equipment unless all covers and guards are in place and properly secured.

6.2 SERRATED KNIFE MAINTENANCE

6.2.5 GRINDING CUTTER KNIVES

The Altec Environmental Products strongly recommends that worn cutter knives be replaced rather than reground. If you should choose to regrind used cutter knives, consult with the cutter knife manufacturer for proper procedures. Also refer to figure 6.2.5

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⚠ DANGER

Improper grinding procedures can result in blade failure and cause extensive equipment damage and serious personal injury or death.

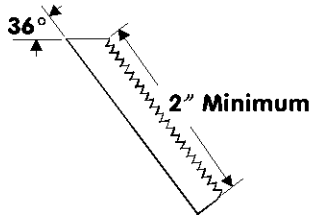


FIGURE 6.2.5

6.5 LUBRICATION

6.5.1 ENGINE

The following information is general in nature and applies to engines supplied on Altec Environmental Products. For specific information refer to your engine owners manual (**EOM**).

⚠ CAUTION

Failure to follow maintenance interval schedules or procedures defined in your engine owners manual can void the engine warranty.

6.5.1.1 ENGINE OIL

⚠ CAUTION

Never operate the engine when the engine crankcase oil level is low or overfilled.

Change the engine oil and filter according to schedules and instructions provided in your engine owners manual (**EOM**).

6.5.1.2 ENGINE POWER TAKE-OFF

The engine power take-off (PTO) clutch mechanism is supplied by the engine manufacturer. It is very important to lubricate the PTO bearings, clutch levers and linkage. For specific information and lubrication interval requirements refer to your Power Take Off Owners Manual.

General Inspection:

- Verify all bolts, pins and linkage components are in good condition and properly tightened.
- Verify adequate free-play on the clutch handle linkage assembly.

⚠ CAUTION

Without proper free-play premature failure of the clutch will occur. Damage occurring from improper clutch adjustment will not be covered under warranty. See Power Take Off owners manual for detailed adjustment procedures.

(continued)

(continued)

6.5 LUBRICATION

6.5.2 TRAILER WHEEL BEARINGS

Standard axles on Altec Environmental Product Chippers have the E-Z Lube feature. Figure #6.5.2.1 Shows how this feature flushes and relubricates both the inner and outer wheel bearings. If your axle is equipped with the E-Z Lube feature, the bearings can be periodically repacked and lubricated without removing the hubs.

The procedure is as follows:

1. Remove the rubber plug from the end of the grease cap.
2. Place a standard grease gun onto the grease zerk located in the end of the spindle. Make sure the grease gun is fully engaged on the fitting.
3. Pump grease into the zerk. The old, displaced grease will begin to flow back out the cap around the grease gun nozzle.
4. When the new, clean grease is observed, remove the grease gun, wipe off any excess, and replace the rubber plug in the cap.

The trailer wheel bearings should be repacked once a year or every 20,000 miles (whichever comes first). Use a premium grade, high temperature lithium based EP #2 grease.

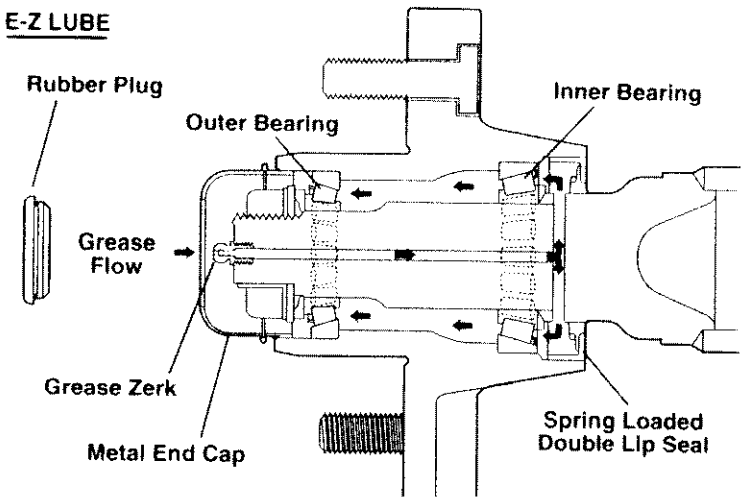


Figure #6.5.2.1

6.5 LUBRICATION

6.5.3 HINGE AND FRICTION POINTS

Chipper operation and longevity can be improved by keeping all hinges and friction points lubricated. Altec Environmental Products recommends that lubrication be performed weekly. Use SAE 30 weight oil on hinges and a premium grade, high temperature lithium based EP #2 grease on friction points.

6.5.4 ROTOR BEARINGS

Lubricate daily with a premium quality NLGI # 2 grade multipurpose roller bearing grease. Some suggested greases are: Mobil Mobilith AW 2, Shell Alvaina Grease 2, Texaco 1939 Premium RB, Amoco Rykon Premium Grease #2 or an equivalent. Grease each bearing daily with (3) three or (4) four pumps with a standard grease gun.

6.5.5 HITCH AND TONGUE TUBE

The hitch and tongue tube must be checked daily to ensure the proper torque of all bolts and inspected for excessive wear of all hitch components. Proper lubrication of the hitch ball, ring and other high contact areas of the hitch is essential to minimize wear in these areas.

Note: Always lubricate bearings and fill fuel and hydraulic tanks at the end of each work day. This will displace any moisture in the bearings and tanks. Also lubricate thoroughly prior to any extended shutdown or storage.

6.6 MAINTENANCE INTERVALS

OPERATION	MANUAL SECTION	(10 HRS.) DAILY	(50 HRS.) WEEKLY	(200 HRS.) MONTHLY	(1000 HRS.) YEARLY
Engine Oil Level	**6.1.1**	✓			
Radiator Coolant Level	**6.1.2**	✓			
Fuel Level	**6.1.3**	✓			
Pre-Operation Procedure	**5.2**	✓			
Rotor Bearings	**6.5.4**	✓			
Grease Clutch Bearings	(EOM)		✓		
Change Engine Air Filter	(EOM)		✓		
***Battery Water Level**	**6.1.4**	✓		✓	
Fasteners	**6.1.5**			✓	
Head Alignment/Drive Belt Tension	**6.1.6**			✓	
Change Engine Oil & Filter	(EOM)			✓	
***Grease Clutch Lever & Linkage**	(EOM)			✓	
Grease Trailer Wheel Bearings	**6.5.2**				✓
Replace Fuel Filter	(EOM)				✓
Flush & Replace Engine Coolant	(EOM)				✓
Bed Knife Rotation	**6.2.1**	(As Required)			
Blade Change	**6.2.2 - 6.2.4**	(As Required)			

*** Only Where Applicable**

6.7 MINOR SERVICE AND ADJUSTMENT

SPECIAL TOOLS
The following special tools are recommended and should be kept with your chipper to facilitate maintenance and repairs. Only the knife guard and 5/8" wrench are furnished by Altec Environmental Products. All of the other items can be procured from your local supplier.

QUANTITY	DESCRIPTION
1	**Knife guard**
1	**5/8" Wrench, Comb. Long handle**
1	Open end wrench, 1-1/16" and 1-1/8", Long handle
1	Feeler gauge, long blade
1	Grease gun
	NOTE: Items in Bold are supplied by Altec Environmental Products.

6.8 EXTENDED STORAGE

6.8.1 Engine Storage
Prior to extended storage please refer to your engine owners manual for proper storage procedure.

6.8.2 PTO Storage
Prior to extended storage please refer to your PTO owners manual for proper storage procedure.

6.8.3 Chipper Storage
Prior to extended chipper storage:
- Let the chipper cool to ambient temperature.
- While slowly rotating the rotor, grease both rotor bearings untill new grease is seen purging from the bearing shaft/seal area.
- Repack wheel bearing per section 6.5.2

6.9 TROUBLE DIAGNOSIS

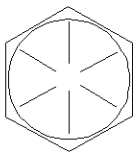
The following chart lists possible chipper malfunctions along with the probable causes. Refer to the Engine Owner's Manual **(EOM)** for repair of the heavy-duty industrial engine supplied with your chipper.

CONDITION	POSSIBLE CAUSE
Starter will not crank engine	• Battery discharged. • Defective ignition switch or starter solenoid. • Malfunctioning starter.
Engine will not start	• Fuel tank empty. • Engine flooded. • Choke inoperative. (Gasoline Engines Only) • Battery partially discharged. • Faulty engine carburetion or ignition. • Air in fuel line. (Diesel Only)
Engine runs but rotor doesn't turn.	• Slipping or broken drive belt. • Defective clutch.
Chipper cuts too slowly	• Cutter head not operating @ 2600 R.P.M. • Dull knives. • Material is too large for the chipper.
Chipper will not self-feed properly or rejects material.	• Dull knives. • Improper knife setting. • Improper setting of bed knife or feed plate. • Material is too large for the chipper.

6.10 TORQUE VALUES

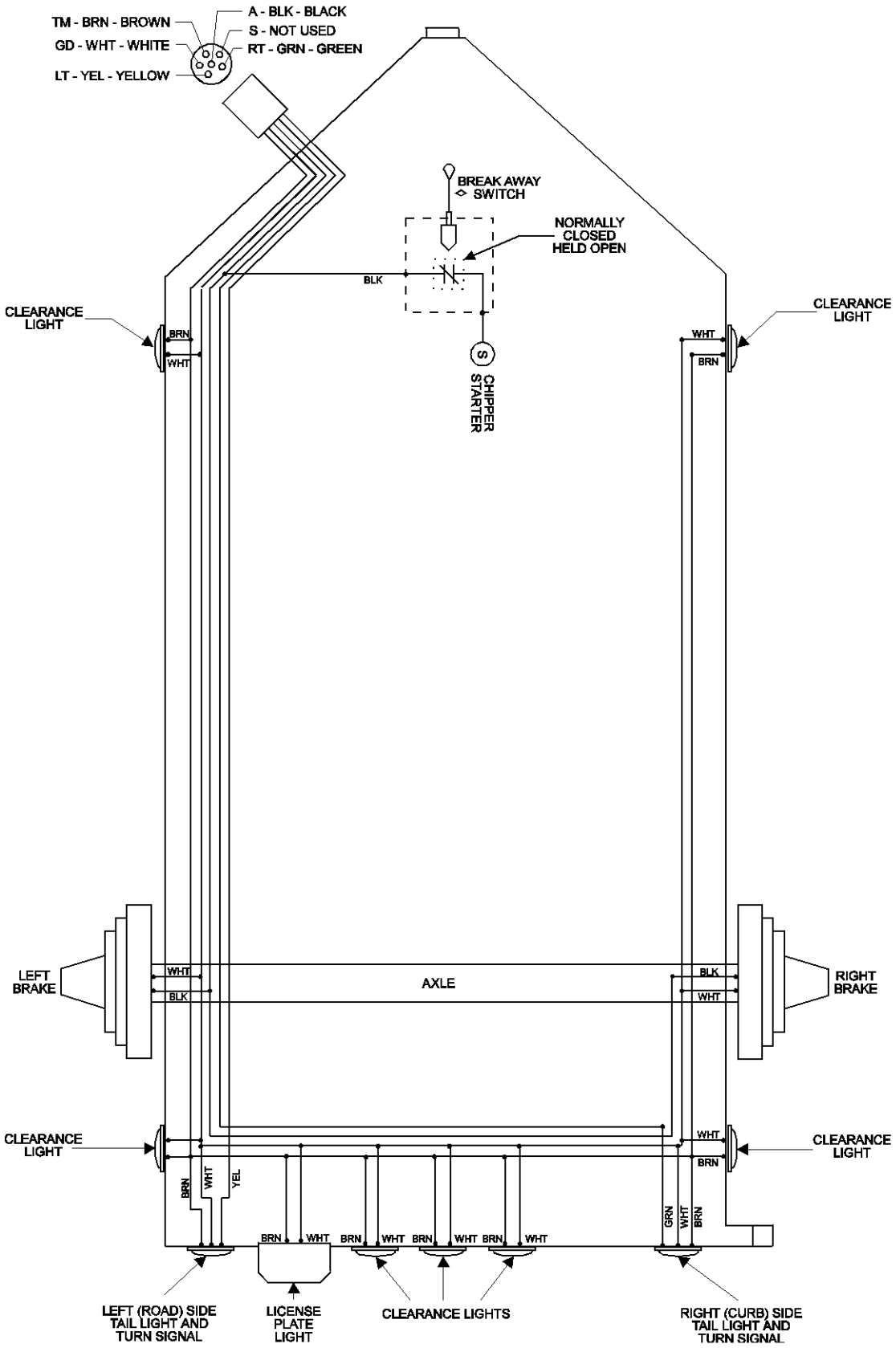
Torque values recommended produce 75% of the torque required to reach the yield strength of the bolt. The torque values shown below are to be used unless otherwise specified in maintenance instructions in this manual.

SAE GRADE 8
PLATED
HEAD MARKING



RECOMMENDED TORQUE IN FOOT POUNDS

SIZE	INITIAL INSTALLATION
1/4-20	9
5/16-18	19
3/8-16	33
7/16-14	52
1/2-13	80
9/16-12	115
5/8-11	159
3/4-10	282


TM - BRN - BROWN
GD - WHT - WHITE
LT - YEL - YELLOW
A - BLK - BLACK
S - NOT USED
RT - GRN - GREEN
BREAK AWAY SWITCH
NORMALLY CLOSED HELD OPEN
BLK
S
CHIPPER STARTER
CLEARANCE LIGHT
BRN
WHT
CLEARANCE LIGHT
WHT
BRN
LEFT BRAKE
WHT
BLK
AXLE
BLK
WHT
RIGHT BRAKE
CLEARANCE LIGHT
BRN
WHT
YEL
CLEARANCE LIGHT
WHT
BRN
GRN
WHT
BRN
BRN WHT BRN WHT BRN WHT BRN WHT
LEFT (ROAD) SIDE TAIL LIGHT AND TURN SIGNAL
LICENSE PLATE LIGHT
CLEARANCE LIGHTS
RIGHT (CURB) SIDE TAIL LIGHT AND TURN SIGNAL

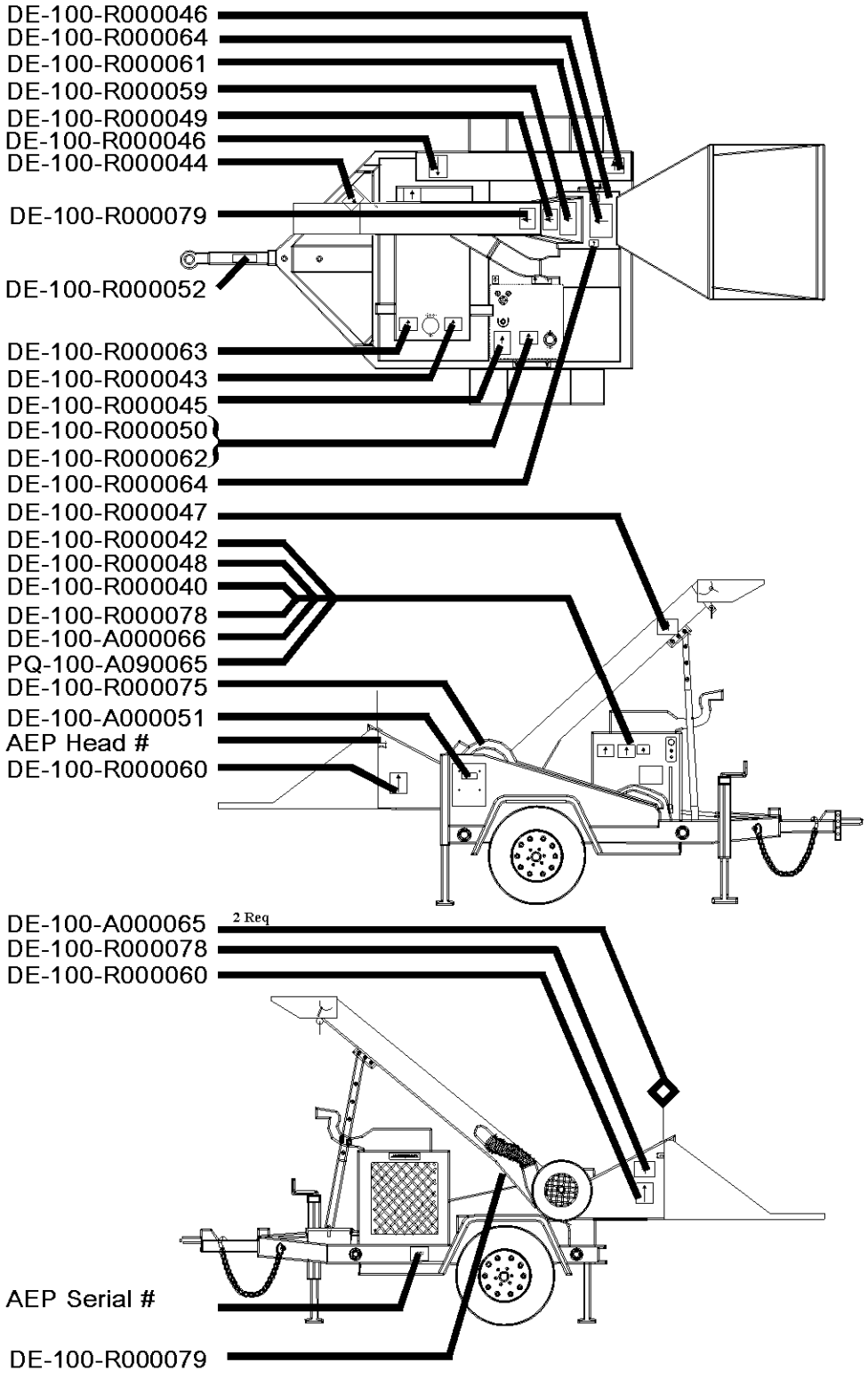
⚠WARNING IT IS THE RESPONSIBILITY OF THE OWNERS AND/OR MANAGERS OF THE CHIPPER TO ENSURE ALL DECALS ARE IN PLACE, LEGIBLE AND IN GOOD OVERALL CONDITION.

Decals are strategically located on your machine to provide important information that can help you operate the machine properly and safely.

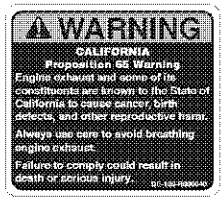
Please insure that the decals remain in place and keep them in good condition by following the instructions listed below.

- **Keep all decals clean. Use a mild soap and water to clean the decals. Never use chemical or abrasive cleaners on the decals.**
- **Before painting the unit, mask off the decals or replace the decals after painting.**
- **Inspect the decals on your unit often and replace any missing or damaged decals immediately.**
- **You may purchase replacement decals from your authorized dealer.**
- **Apply safety labels to a clean surface with temperature of at least 40° F (5° C). Spray a small amount of mild soapy water to the back of each safety label before placement. The soapy water will allow movement and positioning of the label, if necessary. After the correct placement of the safety label has been achieved, press out any excess water and air pockets on the safety label.**

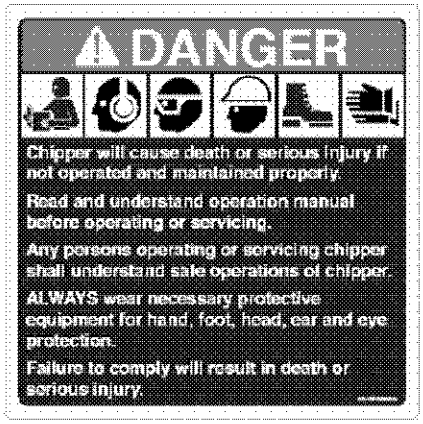
NOTE: Decals may vary according to model, options and engine supplied.



Please contact Altec Environmental Products parts and service should you have any questions.
1-704-482-4356



Part Number
DE-100-R000040
SIZE 2.5" x 2.25"



Part Number
DE-100-R000042
SIZE 7" x 7"



Part Number
DE-100-R000043
SIZE 5" x 5"



Part Number
DE-100-R000044
SIZE 5" x 5"



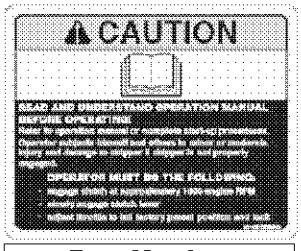
Part Number
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SIZE 5" x 8"



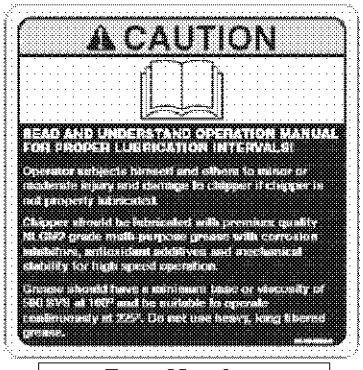
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SIZE 5" x 5"



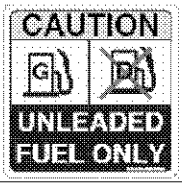
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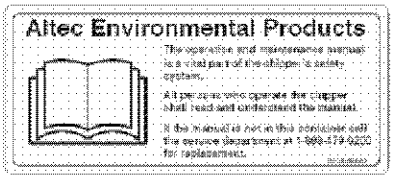
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SIZE 5" x 4"



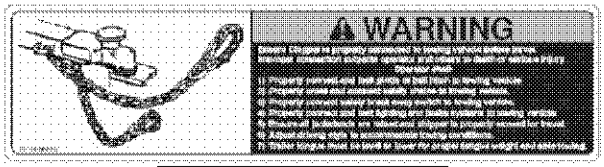
Part Number
DE-100-R000049
SIZE 6" x 6"



Part Number
DE-100-R000050
SIZE 3" x 3"



Part Number
DE-100-A000051
SIZE 3" x 3"



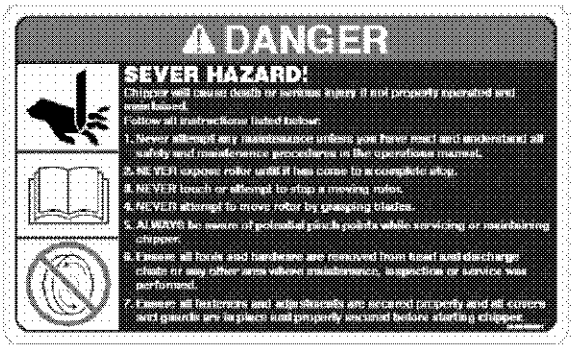
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SIZE 2 1/2" x 9 3/4"



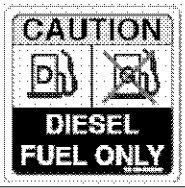
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SIZE 6" x 4"



Part Number
DE-100-A000060
SIZE 8" x 10"



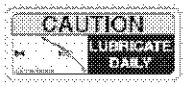
Part Number
DE-100-R090061
Size 6" x 10"



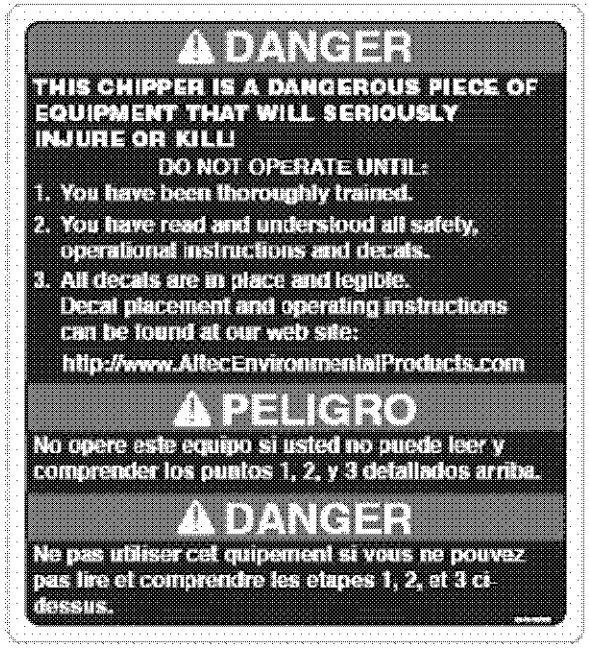
Part Number
DE-100-R000062
SIZE 3" x 3"



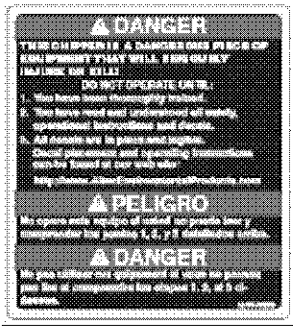
Part Number
DE-100-R000063
SIZE 3" x 3"



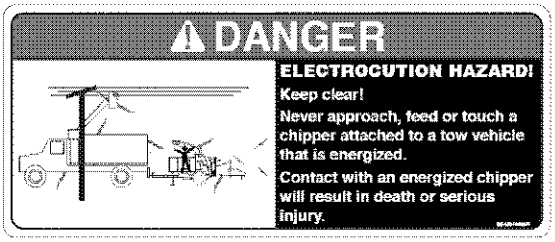
Part Number
DE-100-R000064
SIZE 3" x 1 1/4"



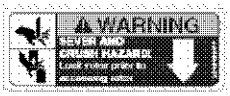
Part Number
DE-100-A000065
SIZE 10 3/8" x 11 1/2"



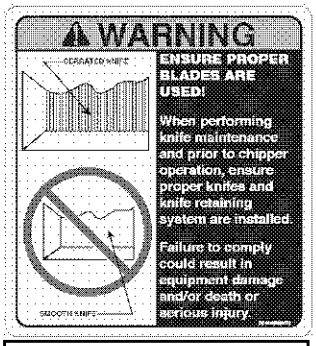
Part Number
DE-100-A000066
SIZE 5" x 5 5/8"



Part Number
DE-100-R000071
Size 4.75" x 8 .5"



Part Number
DE-100-R000075
SIZE 1.5" x 4"



Part Number
DE-100-R000079
Size 6.75" x 6.25"

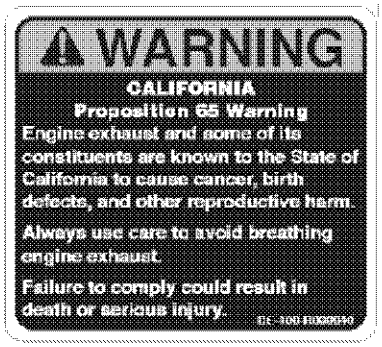


Part Number
PQ-100-R090064
SIZE 1.25" x 5"



Part Number
PQ-100-R090065
SIZE 6.62 x 5

9.1 SPECIAL WARNINGS : STATE OF CALIFORNIA ONLY



P/N DE-100-R000040

NOTE: The above decal applies only to diesel units manufactured for use in the State of California.

⚠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.**

NOTES

NOTICE!

NO ONE SHOULD BE ALLOWED TO OPERATE, SERVICE, OR ORDER PARTS FOR THIS CHIPPER UNTIL THEY HAVE READ AND UNDERSTAND THE APPLICABLE SECTIONS OF THIS MANUAL. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN PERSONAL INJURY, DEATH OR EQUIPMENT DAMAGE.

THIS MANUAL SHOULD BE CONSIDERED A PERMANENT PART OF YOUR CHIPPER. DUE TO THE FACT THAT EVERY POSSIBLE SITUATION CANNOT BE ANTICIPATED, COMMON SENSE AND SAFETY PRACTICES ARE REQUIRED FOR OPERATION OF THIS EQUIPMENT. THIS MANUAL SHOULD REMAIN WITH THE CHIPPER IF YOU SELL IT. YOU SHOULD RECORD IDENTIFICATION NUMBERS IN THE OWNERS RECORD SECTION OF THIS MANUAL. YOU SHOULD ALSO KEEP A COPY OF THE IDENTIFICATION NUMBERS IN A SECURE PLACE. THE IDENTIFICATION NUMBERS WILL BE NEEDED SHOULD YOUR CHIPPER BE STOLEN. YOU SHOULD ALWAYS HAVE THE IDENTIFICATION NUMBERS AVAILABLE WHEN ORDERING PARTS FOR YOUR CHIPPER.

IT IS THE OWNER'S RESPONSIBILITY TO CONFIRM THE PRESENCE AND MAINTENANCE OF ALL OF THE PAGES OF THIS MANUAL.

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