INSTRUCTION MANUAL



MANUAL NUMBER - J104

Style Numbers - DLU1 , DLB1, DLW1 REVISION - 00

Manufactured by CARTER DAY

Carter Day International, Inc. 500 73rd Avenue N.E., Minneapolis, Minnesota 55432 (763) 571-1000 • FAX: (763)571-3012

READ AND FOLLOW THE GUIDELINES ESTABLISHED WITHIN THIS MANUAL TO ENSURE WARRANTY COVERAGE AND YEARS OF LOW-COST OPERATION.



INTERNAL MOVING PARTS CAN BE DANGEROUS.

BEFORE ATTEMPTING SERVICE OR INTERNAL INSPECTION, DISCONNECT AND LOCKOUT ELECTRIC POWER.

DO NOT OPERATE THIS EQUIPMENT WITHOUT REQUIRED SAFETY GUARDS OR COVERS IN PLACE.

KEEP HANDS CLEAR OF INLETS AND OUTLETS.

CARTER DAY

IMPORTANT

Shown below is an example of a nameplate from a Carter Day machine. Please locate the nameplate on your machine and fill in the Order No., Serial No., and Style No. from it onto the nameplate on this page, for future reference. Having this information at hand when you call us for parts or service will be helpful.

onnen us	
ORDER NO.	
SERIAL NO.	
STYLE NO.	
MANUFACTURED IN U.S.A. BY	
Carter-Day Compai	

Carter Day International, Inc. <u>Machinery Storage Requirements</u>

Machinery should be placed into service as soon as possible after delivery.

If storage is required Carter Day recommends the following storage guidelines for its finished products.

While in storage machinery should be protected from corrosion and contamination.

The storage area temperature should be maintained between 0 degrees C (32 degrees F) and 40 degrees C(104 degrees F), temperature fluctuations should be limited to no more than 5 degrees C per 24 hour period.

The relative humidity should be maintained below 60%.

The storage area should be kept free from airborne contaminants such as, but not limited to: dust, dirt, harmful vapors, etc.

The storage area should be isolated from undue vibration.

Extreme conditions of any kind should be avoided.

If storage exceeds one month, shafts should be rotated monthly to insure proper lubrication of the bearings.

Failure to follow these guidelines may result in reduced product performance and component life. Equipment failure attributable to corrosion or contamination will not be covered by warranty. For example corrosion will cause shaft bearing failures, typically indicated by high bearing temperatures.

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GENERAL INFORMATION

SAFETY

If, after receiving your equipment, you observe that guards or any other protective devices are missing, **DO NOT INSTALL EQUIPMENT!** Call Carter Day at 1-763-571-1000.

DANGER!

This equipment has rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating parts unless it is disconnected from its power source and all rotating parts have stopped moving. Make certain that when machine is shut down for service that appropriate lockout procedures are followed. Read all operating instructions before starting equipment.

CAUTION!

This equipment will be installed as an integral part of a complete process system. It is impossible to provide permanent protection for the material inlet and outlet at the Carter Day factory. However, temporary shipping covers are provided at each inlet and outlet. It is the responsibility of the buyer, installer, contractor, owner and user to provide proper protection against unsafe access to the inlet and outlet of the machine after it is installed and operating. Carter Day can not accept responsibility for protection at inlets and outlets.

OWNER'S RESPONSIBILITIES

It is the responsibility of the contractor, installer, owner and user to install, maintain and operate this equipment, component assemblies and parts, either manufactured or supplied by Carter Day, in such a manner as to comply with all OSHA and any other standards that may be applicable to your particular industry, location or other safety codes that apply.

STORAGE

If the equipment is stored prior to installation, it is the responsibility of others (not Carter Day) to provide the necessary protection from damage due to conditions such as:

- Freezing temperatures
- Flooding
- Dust and dirt
- Falling articles, etc.

SUCH DAMAGE IS NOT COVERED BY THE WARRANTY

INTRODUCTION

This manual was prepared especially for owners and operators of XLT Series Pulverator Hammermills and should be carefully read before attempting to use or maintain the machine.

The Hammermill is precision engineered and fabricated and will provide efficient, long-lasting performance when installation, operation, inspection and maintenance procedures are carefully followed. The Carter Day guarantee of performance is valid only if the procedures in this manual are followed.

Should it become necessary to order replacement parts, be sure to check the Recommended Spare Parts section in this manual and call Carter Day at **1-763-571-1000**. Be sure to have the model and serial number of the machine, which is written on the Important Page in the front of this manual, to give to your representative.

SAFETY

To prevent possible injury to personnel operating or maintaining the equipment, it is essential that these instructions be read and carefully followed.

- See the Installation section for safe types and locations for electrical interlocks and starting switches. By following these recommendations both safety and convenience can be attained. All electrical boxes and switch enclosures should be kept closed to ensure security of all electrical connections.
- No unauthorized operators or maintenance people should work on the machine. Only authorized personnel should operate or service the equipment.
- All covers, doors and guards must be in place when the machine is started up and must not be removed during operation.
- The machine will continue to rotate for a time after the power is turned off. **DO NOT** attempt to open access doors until the machine has come to a complete stop.
- Any equipment found to be damaged or malfunctioning should be replaced or repaired before the machine is operated.
- **DO NOT** substitute equipment or parts for those originally furnished on or with the machine. **DO NOT** make machine modifications without consulting Carter Day. Changes in adjustments or settings should be made only by authorized personnel
- A number of safety decals have been placed on the machine before shipping. Should these warnings be defaced or missing, contact Carter Day for immediate replacement.

DESCRIPTION

The principal parts of the XLT Pulverator are listed below and shown in Figure 3.

- A. Deflector Arm
- B. Upper Housing
- C. Hammers
- D. Base and Lower Housing
- E. Screen Cage Lifting Bar
- F. Screen Carriage
- G. Screen
- H. Coupling and Guard

Material enters at the top of the machine and flows into the grinding chamber where the hammers grind the material. When the pulverized material has been reduced to the proper size, it passes through the screen into the chamber below.

Other features of the Pulverator include:

- Easy access to hammers and screen.
- Uniform grind, with a minimum of fines.
- Hammer arrangements to suit applications.
- Reversible feed deflector.
- Reversible grinding motion.
- Reversible hammers, allowing use of all four corners of the hammers.
- Rotor and shaft supported between the bearings.
- One-piece welded base.

Table 1 (next page) provides quick reference specifications for each of the XLT Pulverators. Figure 4 (next page) indicates the dimensions of the respective machines. These dimensions are approximate. Please refer to the certified engineering drawing obtained from Carter Day for the exact dimensions.

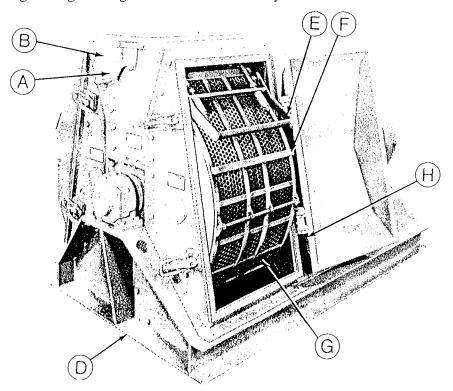


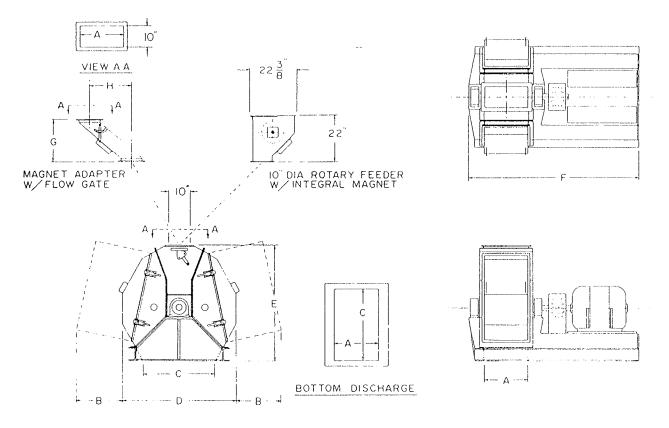
TABLE 1 - SPECIFICATIONS

XLT PULVERATOR 42"

1800 – 1200 RPM
19,020 ft/min @ 1800 RPM
12,500 ft/min @ 1200 RPM
1/4" x 2-1/2" x 10"
42"

All XLT Models feature:

- Externally adjusted feed deflector for reverse rotation.
- Gravity bottom discharge.
- Screens made in two sections, available in all peroration sizes.
- Four rows of hammers.
- Variety of hammer arrangements.



SPECIFICATION DRAWINGS

						1						
MODEL	H.P.	RPM	*WT.	SCREEN AREA	A	В	C	D	E	F	G	H
XLT-42311	75-100	1800	2800	1320	11-1/4	12	34	52	54	71-1/2	20	20
XLT-42320	100-200	1800	3300	2460	20-3/4	21-1/2	34	52	54	81	20	20
XLT-42326	150-250	1800	3800	3240	27-1/4	28	34	52	54	91-1/2	20	20
XLT-42336	200-350	1800	4700	4270	35-3/4	36-3/4	34	52	54	119-3/8	20	20

FIGURE 4 – GENERAL DIMENSIONS FOR ALL MODELS

INSTALLATION

RECEIPT OF SHIPMENT

Immediately upon receipt of your shipment, check for shortages and damage. Check the shipment against the order acknowledgement transmitted earlier. The Hammermill shipment should include, in addition to the mill itself, extra screens, miscellaneous instructions and parts information envelopes. If the installation includes a mixer, feeder, or other optional equipment furnished by Carter Day, and check for V-belts, pulleys, bushings and miscellaneous parts necessary for installation as listed on the bill of lading. All equipment furnished is detailed in a file kept by Carter Day, including exactly what was ordered, manufactured and shipped. If there are any questions concerning the completeness of the shipment, please contact Carter Day immediately.

UNCRATING

All equipment is factory inspected and in perfect condition before shipment. If upon arrival, the crates show evidence of damage, have the transporting company acknowledge this on the bill of lading. Carefully uncrate the Hammermill and examine all the parts for obvious damage. Immediately notify the carrier and advise Carter Day of any damage observed.

LOCATION

The location of the machine will of course, vary with the needs of individual owners. However, it is important that the site selected provides a stable foundation and ample clearance around the machine for inspection, service changing screens and hammers and for adequate ventilation.

FOUNDATION

A solid, level foundation is essential for heave equipment such as Hammermills. For 50HP or smaller machines, a heavy wood floor is normally satisfactory, although a 4 to 6" thick concrete floor is preferred. For larger Hammermills, a 6" thick concrete base is preferred. The concrete base should be about 6" larger than the Hammermill base. To allow for advance preparation of the base, Carter Day will furnish a dimension setting plan. Isolation pads, sheet cork, rubber, or rubber belting may be used between the mill base and the foundation slab to reduce normal vibration and noise. If the installation is on ground level where a new concrete slab will be installed, it may be preferable to provide an oversize foundation slab for the machine, isolated from the main slab. By doing this, machine vibrations will not be transmitted to the rest of the building. For installation on upper floors of a building, the machine should be bolted solidly to the floor.

ELECTRICAL

When the equipment is received, check the nameplate data on the motor, starter feeder motor or any other electrical devices to be sure that they correspond with the plant voltage. Also, make sure the plant electrical service has sufficient capacity to accommodate the equipment to be installed. The electrical installation should be in accordance with all national and local codes. The starting device should be placed near (in sight of) the motor so the operator may observe the motor when starting it up. A disconnect device should be installed adjacent to the motor with a lockout to protect personnel working on the Hammermill. If an ammeter is provided with the mill to show full load for the motor, the ammeter should be installed where it is clearly visible to the operator when they are adjusting the feed control. The full load marking on the ammeter should be checked with the ampere rating on the motor nameplate. The electrician should follow applicable instructions for installing the ammeter and the current transformer, and compare the readings with a separate ammeter. If the feeder has a separate motor, it should be interlocked with a Hammermill control, so that it is not started until the Hammermill has come up to speed, and may be stopped before the Hammermill, so that the grinding chamber is empty when the machine is stopped.

COUPLING ALIGNMENT

Even though Carter Day Hammermills are correctly aligned at the factory before shipment, it is necessary to check the alignment of the coupling between the machine and the motor. The procedure for this check is given in the Maintenance section.

AUXILIARY EQUIPMENT

Any auxiliary equipment furnished by Carter Day will be accompanied by installation instructions. Along with your Carter Day equipment, you may also have other equipment such as a conveyor or a feeder. These units have gear reducers and variable speed drive units that must be filled with oil before operating. Inspect all such equipment for proper pre-operation servicing especially checking for warning tags, plates or labels.

NOTE

Carter Day Hammermill bearings are factory lubricated and require only periodic maintenance. Motor bearings are prelubricated and sealed.

OPERATION

BASIC OPERATION

The material enters the Hammermill at the top of the grinding chamber, (Figure 5). The rate of flow of the material into the grinder is controlled by some type of feeder such as a rotary feeder, an auger or the flow gate supplied with the Hammermill. The impact of hammers against the material fractures the particles. The screen, which is the classifier, retains the particles in the grinding chamber until they are small enough to pass through the perforations to the chamber under the screen. We recommend that a vent system be used with the Hammermill to remove the moisture vapor created in the grinding. The makeup air will permit maintenance of a lower temperature in the grinding chamber.

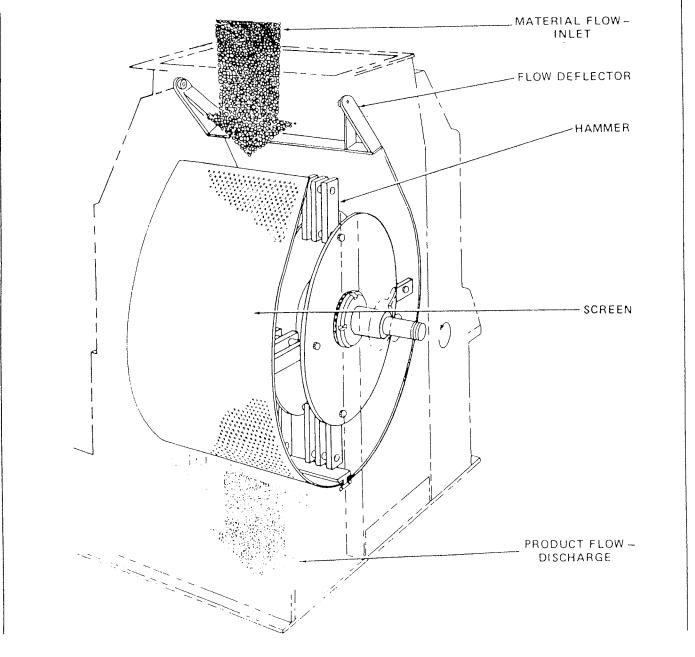


FIGURE 5 – MATERIAL FLOW

STARTUP

Observe the following precautions and procedures:

- All doors must be closed and all protective covers and guards must be in place.
- The rotor must turn freely.
- The grinding chamber must be empty. The motor will not start with excess material in the grinding chamber.
- Check direction of rotation.
- Screens must be in place and the screen carriage in the locked position.
- Be sure that the deflector is adjusted to conform to the direction of hammer rotation.
- The feed rate must be gradually increased while observing ammeter. The ammeter should be redlined for full load. Operate near the line.

AIR CIRCULATION

Carter Day recommends that an optional vent system is used to maintain a slight negative pressure in the system, to prevent dusting and to remove any moisture and heat created in grinding. The optimum condition is to introduce sufficient outside air to keep the temperature in the grinding chamber below 115°F, and to remove moisture created in grinding, by means of the vent system.

SHUTDOWN

Shutdown of the Hammermill is a simple process, but it must be carefully followed to ensure that the machine is empty when turned off.

- Shut off feed to the machine so that no additional material enters the grinding chamber.
- Allow the machine to operate until the load indicator (ammeter) shows no load, indicating that the grinding chamber is empty.
- Shutdown the Hamermill and any auxiliary systems.
- CAUTION: Rotor must be stopped before opening any covers, doors, guards, etc.

VIBRATION

Rotors are dynamically and statically balanced at the factory without hammers in place and run at operating speed with hammers to assure smooth operation. If vibration exists, uneven wear of hammers or misalignment of the coupling usually causes it. See the Maintenance section for alignment checking procedures.

SCREENS

If it is necessary to obtain a finer or coarser grind of the product, this may be accomplished by using screens with smaller or larger perforations. The procedure for changing screens is given in the Maintenance section.

HAMMERS

Based on buyer-furnished information concerning the proposed application of the Hammermill, Carter Day installs an appropriate number of hammers in the machine. The goal is to maintain 1" to 1-1/2" of material on the screen. Should the use of the machine change materially or should it become necessary to replace hammers or hammer pins for any other reason, refer to the Maintenance section for proper procedures.

OPTIONAL EQUIPMENT

Follow operating procedures given with optional equipment, to ensure proper operation of such equipment, whether it is furnished by Carter Day or by others.

MAINTENANCE

To assure trouble-free operation and a long service life, it is essential that preventive maintenance procedures be carefully followed. Inspections, checks and procedures recommended for the XLT Pulverator Hammermill are presented in this section. If worn or damaged parts or improperly lubricated parts are found during inspections, immediate corrective action must be taken to prevent the possibility of future major damage.

LUBRICATION

Check quantity of grease in ball or roller bearings. Ball bearing motors should be lubricated while in operation. When using a grease gun, remove drain plug in bearing housing so that excessive grease pressure will not be built up to overload the bearings and cause overheating.

This applies only to greasable bearings, not prelubricated bearings. Frequency of lubrication will vary by size and application of motors (some motors are lubrication free for life). Bearing grease should be lithium base NLGI #1 or #2 (see recommended lubricants listing below). **DO NOT MIX WITH OTHER TYPES.**

Recommended lubricants for bearings are as follows:

Chevron	254599	NLGI1
Chevron	254600	NLGI2
Lubriplate	1200-2	NLGI2
Mobile	Mobilith AW-1	NLGI2
Mobile	Mobility AW-2	NLGI2
Penzoil	707-L	NLGI2
Texaco	Marfak All Purpose	NLGI2
Texaco	Regal AFB-2	NLGI2

For procedures and frequency of lubrication, see subsections title "Bearings and Motors". Carter Day further suggests you refer to the Bearing Manufacture's recommendations.

BEARINGS

The frequency and quantity of grease required in bearing is different for each bearing and machine. Upon initial installation, temperature should be monitored twice per 8 hour shift (daily thereafter). If the temperature rises above 120-130°F, it indicates:

- Need for grease.
- Problem related to the bearing.
- Problem related to the use of the machine.

Initial "run-in" may cause bearing temperatures to fluctuate around 130-150°F for up to 10 or 20 hours.

DO NOT allow temperatures to exceed 160°F. If a small addition of grease causes a drop in temperature, this will indicate the time interval required for lubrication. If the temperature does not drop, it indicates a problem related to the bearing or the use of the machine. Typical lubrication intervals could be 20 to 50 hours (heavy duty), or 100-300 hours (average duty), or 300 hours or more (light duty). In most applications, bearings should not exceed 200 hours operation without additional lubrication.

NOTE: In most machines, one bearing may require more frequent lubrication than the other bearing(s). The quantity of grease required for bearings (equipped with "flingers") is easily determined by adding small quantities while the machine is running. The bearings should be up to normal operating temperatures. When a thin ribbon or trace of grease is forced out of the bearing (around the perimeter of the flinger) there will be a proper quantity of grease within the bearing.

MOTOR

GENERAL

When material is fed into the Hammermill faster than it can be ground, the motor will be overloaded. If the overload protection in the starting switch is properly adjusted, the motor should stop without any damage being caused. I the grinding chamber is full of material, it will have to be removed before the machine can be started again.

A decal arrow indicates the direction of rotation of the Hammermill. Interchanging any two wires of the power service may reverse rotation of a 3-phase motor. However, some motors have an arrow indicating rotation direction. These motors should not be run in the opposite direction, as excessive heating will result due to lack of cooling air.

NOTE:

It is extremely important that the motor, particularly the air cooling fins, be kept clean to maintain proper operating temperature.

EVERY 6 MONTHS

LUBRICATION

Check quantity of grease in ball or roller bearings. Ball bearing motors should be lubricated while in operation. When using a grease gun, remove drain plug in bearing housing so that excessive grease pressure will not be built up to overload the bearings and cause overheating. This applies only too greasable bearings, not prelubricated bearings. Frequencies of lubrication will vary by size and application of motors. Some motors are lubrication-free for life.

NOISES

At operating speeds, listen for unusual noises that may indicate points off wear and trouble.

ALIGNMENT

Check for tightness of motor base bolts and for correct alignment of pulleys or shafts. See that the end play is normal.

TIGHTNESS

Check motor foot bolts, end shield bolts, pulley and coupling and journal set screws. See that guards are in proper position and securely fastened.

STARTER CONTACTS

Check for excess wear. Replace if worn. Poor electrical contact will cause reduction in power to this phase of the winding, resulting in reduced power and overheated contacts.

ANNUALLY

MOTOR BEARINGS

Motor bearings should be checked for unusual noises or excessive heating.

INSULATION

Test insulation resistance of windings with a "Megger". Resistance should not be less than 1 megohm. If the reading is less than 1 megohm, the motor should be taken to an authorized shop for repair.

COUPLINGS

Before starting up your Hammermill for the first time, a check of coupling alignment should be made whether the motor was furnished by Carter Day or by others. Alignments should be checked periodically thereafter.

Lay a steel straight edge level across the top of the flanges, as shown in Figure 6, to check for misalignment (this is the 12 o'clock position). Also check at 3, 6 and 9 o'clock position.

Angular misalignment is indicated y unequal spacing between flanges when measured at 90° intervals. Shimming the low corner of side of the motor should correct this type of misalignment.

Parallel misalignment is corrected by raising (or lowering) the whole motor evenly with shims or by moving the motor sideways until the shafts and couplings are parallel.

In time, the Carter Day coupling disc and bushings may become worn, and should be replaced. To do this, remove the lock nuts under the coupling flange on each side, unscrew the pins. The disc will then slide out. If you move the motor, be sure to replace any shims just as they were originally and set the dowel pins in the motor feet carefully back into the same holes so as to maintain motor alignment. If the coupling discs wear out, it is advisable to check motor alignment, as described above. Should the machine vibrate excessively (see reference) and the vibration is not attributable to hammer or shaft problems, check for a worn disc or

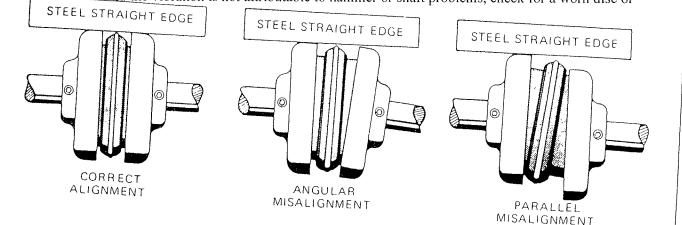


FIGURE 6 - COUPLING ALIGNMENT

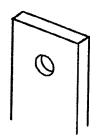
HAMMER REPLACEMENT

Service Bulletin

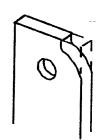
Your JACOBSON Hammermill came equipped with the type and number of hammers best suited for your application as specified when you purchased your machine. Refer to your original purchase order for ordering replacement hammers. If however, the process application of your hammermill has changed, contact JACOBSON for replacement hammer recommendations.

Hammer wear will effect the performance of your hammermill. Hammers should be inspected periodically and reversed or replaced per the guideline illustrations shown in Figure 1. Hammers should be rotated to increase service life. On some hammermill designs, you can simply reverse the rotation of the rotor instead. Refer to your owners manual to determine the proper method of hammer rotation / replacement or rotor rotation if available.

Figure 1. INDICATED SERVICE



NEW **Best Grinding** Action



PARTIALLY WORN Turn Hammer or Reverse Rotor Rotation



FULLY WORN Replace Hammer

CAUTION

JACOBSON does not recommend the use of two hole hammers. Upon turning the hammer end for end, more often than not a notable vibration will be evident when grinding with the third comer of the hammer and often will increase on the fourth corner. This vibration can contribute to or accelerate bearing and structural loads, resulting in reduced useful life of the hammermill. If you choose to turn two hole hammers end for end structural integrity will be at risk if the hole is worn larger than 1/8" greater than the hammer pin diameter or the minimum wall thickness from the hole to the edge of the hammer is less than 80% of the original thickness as illustrated in Figure 2.

Figure 2. MAXIMUM WEAR FOR TURNING 2 HOLE HAMMERS END FOR END

Hole should be round, with straight sides for 75% of the Hammer thickness, with a diameter no greater than 1/8" over the hammer pin diameter



Minimum width should be greater than 80% of original width

Original Width

CHANGING HAMMERS

(Refer to Figure 3.)

WARNING

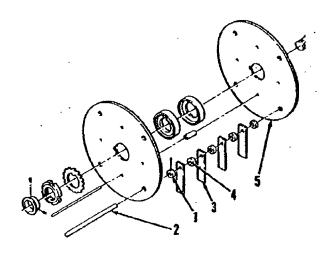
Tum off and lock out power to drive motor before servicing hammers

- 1. Remove hammer pin covers for access.
- 2. Loosen bolts in lock collars (1).
- 3. Hammer pins (2) may then be pushed right or left to remove hammers (3) and spacers (4).
- 4. Hammers can now be reversed, turned end for end, or replaced.
- 5. Examine spacers and replace if excessive wear is found.
- 6. Examine hammer pins carefully for surface wear(also called tracking a). Any pin exhibiting even minor wear tracks on the surface should not be reused.
- 7. Hammer pin (2) should be pushed back in when installing hammers (3) and spacers (4) as required.
- 8. Adjust hammer pin (2) between head disks (5) such that pin extends through head discs equally on both ends of rotor.
- 9. Tighten bolts in lock collars (1).
- 10. Repeat process for the other 3 hammer pins.
- 11. Replace hammer pin covers.
 - a. While surface tracks (groves) are considered normal pin wear after repeated hammer changes, tracking after only one hammer change may be symptomatic of more serious problems and should be discussed with a JACOBSON applications engineer.

CAUTION

When hammer pins, hammers, and spacers are reinstalled, tighten lock collars (1) on hammer pins so that pin ends are at least flush with the outside of head discs (5) or protrude up to but not more than 1/4".

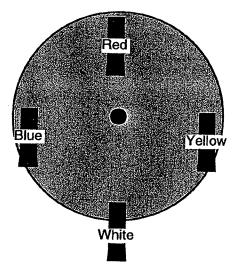
Figure 3. HAMMER PIN LOCKING ARRANGEMENT



NOTE: When hammers or hammer pins are replaced, or if any hammers are removed from service, the hammers and pins diametrically opposite must be replaced (or removed) to maintain proper balance. Also, hammers furnished by JACOBSON in sets are matched (the same weight). They should be installed as illustrated in Figure 4. DO NOT mix JACOBSON hammers with other brands

Figure 4. HAMMER SET CODING

Theses hammers are balanced in rod sets & color coded. All hammers of the same color go on the same rod in the configuraion shown below:



Note: If hammers are numbered, they must be installed in the same order as the opposing rod.

REMEMBER: It is not cost effective to wear hammers until the corners are badly rounded, as this causes a loss of capacity, increased power consumption, and increased potential for screen breakage due to pressure applied by packed materials. Sharp cutting edges throughout give the most efficient and economical service.

> **JACOBSON PRODUCTS DIVISION** CARTER DAY INTERNATIONAL, INC. www.carterday.com

SCREENS

If the Hammermill user had specified the nature of grinding to be done, the machine is delivered with screens having appropriate perforation sizes. When the screens are worn, or it is desired to change the screens for a different perforation size:

- 1. Shut down the machine.
- 2. CAUTION: Rotor must be stopped before opening any covers, doors, guards, etc.
- 3. Open access doors.
- 4. Pull up on screen carriage latching handle to release the screen from the carriage (see Figure 10). It is necessary to release the lever slightly to disengage carriage hooks from latching rod.
- 5. Lift out screens.
- 6. Replace screens, either changing from one side to the other or with new screens. **NOTE**: If machine is equipped with reversing switch on the motor, reversing motor rotation will achieve the same purpose as switching screens from one side to the other. If this is done, the low deflector (see Figure 7) must be reset.
- 7. When replacing screens, it is important to insert them so that the bottom edges slide under the cross-member (see Figure 5 on page 10), to provide a seal between the screens and the cross-member.
- 8. Pull down on screen carriage latching handle to position screens. Again, it is necessary to release the lever, to engage the latching rod in the carriage hooks.
- 9. Screen should fit tightly on top, bottom and sides to avoid leaks. Adjust latching rod spring tension if necessary.
- 10. Close doors.
- 11. Restart machine.

Screen selection is critical for efficient operation of the machine. A screen that is too thin may rupture. One too thick will reduce product capacity. As coarse a screen as possible to produce an acceptable grind should be used. Should you have questions concerning screen thickness or perforation size, contact Carter Day for recommendation.

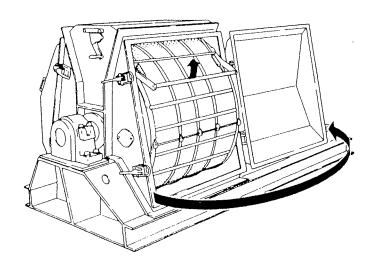


FIGURE 10 - SCREEN LATCHING MECHANISM

VIBRATIONS

The Hammermill rotor is extremely heavy, made of uniform plates and spacers. This is to maintain a careful balance and alignment of the machine throughout its lifetime. In order to eliminate vibration, every rotating part must be in perfect balance. In a machine that is subject to the kind and amount of wear that a Hammermill is, it is a matter of continual vigilance to keep these rotating parts balanced.

CAUTION: DO NOT CONTINUE TO OPERATE A MACHINE THAT IS VIBRATING BADLY.

When a machine starts to vibrate excessively, uneven wear of the hammers or misadjustment and wear of the coupling usually cause the unbalance causing the vibration. To determine to cause, remove the hammers and run the machine with the hammer pins and squeeze lock collars in place. If the vibration ceases, replace the old hammers with new ones (see "Hammers"). If the vibration continues, check coupling alignment (see "Couplings"). If the vibration persists, contact Carter Day.

OPTIONAL EQUIPMENT

For maintenance of optional equipment such as the rotary feeder, vent system or magnet adapter, refer to instructions provided with the equipment on delivery.

APPENDIX – A RECOMMENDED SPARE PARTS LISTING

APPENDIX B MAIN MOTOR

APPENDIX B - MAIN MOTOR

MOTORS

Maintenance of electric motors consists of periodical inspection of insulation levels, temperature rise, wear, bearing lubrication and the occasional checking of fan air flow. The frequency of inspection depends upon the condition under which the motor operates.

CLEANLINESS

Motors should be kept clean, free of dust, debris and oil. Soft brushes or clean cotton rags should be used. A jet of compressed air should be used to remove non-abrasive dust from the fan cover and any accumulated grime from the fan and cooling fins. Oil or damp impregnated impurities can be removed with rags soaked in suitable solvent.

LUBRICATION

Motors are supplied with sufficient grease for a long running period. However, lubricants deteriorate with time and mechanical operation. For this reason, lubrication should be part of planned maintenance. The recommended lubricant, lubrication schedule and lubrication procedure for the specific motor supplied with the XLT Pulverator are given in the motor instruction manual. The motor instruction manual is included in the manual pocket.

MOTOR TROUBLESHOOTING

TROUBLE	SOLUTION
Motor fails to start	• Check voltage supply. Check that voltage remains within 10% of the rated voltage shown on the motor nameplate.
	• Check connections with wiring diagram on the motor nameplate. Tighten all connections.
	Check for an overload condition or blocking of the starting mechanism.
	• Check brushes. Brushes may be worn, dirty or incorrectly fitted.
High noise level	Check rotor balance.
	• Check shaft for warping or bearing wear.
	Check motor alignment with machine running.
	• Check motor for cleanliness. Dismantle motor and clean.
	Check lubrication.
Overheating of bearings	Check grease level.
	Check belt tension.
	• Check for deformed shaft. Have shaft straightened and check rotor balance.
	Check end shields for close fit around circumference and tightness.
	Replace bearings.
	• Flush out housings and relubricate.
Intense bearing vibration	Balance rotor statically and dynamically.
	• Relubricate bearings if in perfect condition, otherwise replace bearing.
	• Check that bearing dimensions correspond to manufacturer's specifications.
Overheating motor	Check for obstructed cooling system. Clean and dry motor.
	Check for overload.
	Check bearing wear and shaft curvature.
	Check voltage supply.
	Check for unbalanced voltages or operation under single-phase condition.
Brush sparking	Check brush setting. Adjust for correct pressure.
	Check for overload. Reduce load.
	Check slip rings. Clean rings and reset brushes.
	• Check for excessive vibration. Balance the rotor, check the brushes for free
	movement within holders.

APPENDIX C BEARINGS

APPENDIX C - BEARINGS

Lubrication is one of the primary factors governing the service life of rolling contact bearings. The lubricant performs the following functions:

- Lubricates the load carrying surfaces.
- Lubricates the sliding contact between the rolling elements and the cage.
- Lubricates the sliding contact between land riding cages and rings.
- Lubricates the sliding contact between rollers and guide lips or flanges of roller bearings.
- Excludes dirt and foreign matter.
- Prevents corrosion.
- Cools the bearing assembly.

The limiting speed of a bearing depends to a great extent on the ability of the lubricant to reduce and carry away the heat generated in the sliding contact areas. Proper precautions during installation and maintenance can greatly prolong the life of a bearing, avoiding premature failure and costly replacement. Where bearings are installed improperly, the resulting damage may often involve parts of the machine other than the bearings themselves. Probably the most important single factor to keep in mind is **CLEANLINESS**. Dust, dirt or any form of abrasive material is an anti-friction bearing's greatest enemy. The following are some "Do's and Don'ts" for the care and handling of roller bearings.

Do's	Den'ts
Work with clean tools in clean surrounding.	Don't remove grease from new prelubricated bearings or take them apart.
Keep bearings wrapped in oil-proof paper when not in use.	Don't expose bearings to moisture or dirt at any time.
Handle bearings with clean, dry hands.	Don't use wooden mallets or work on rough or dirty bench tops.
If bearing must be laid down, use clean paper.	Don't use dirty, brittle or chipped tools.
Use clean, lint-free rags if bearings are wiped.	Don't spin any bearings with compressed air.
Clean inside of housing before installing or replacing bearings.	Don't spin uncleaned bearings.
Treat a used bearing as carefully as a new one.	Don't use same container for cleaning and final rinsing of bearings.
Use only clean solvents and flushing oils when washing used bearings, or when necessary to wash corrosion preventatives from new bearings.	Don't use cotton waste or dirty clothes to wipe bearings.
Protect disassembled bearings from dirt and moisture.	Don't scratch or nick bearing surfaces.

CLEANING THE BEARINGS

- 1. Don't try to judge the condition of a bearing until after it has been cleaned.
- 2. Don't spin dirty bearings. Rotate them slowly while washing. If dirt is present in the races, spinning can cause serious scratching. Don't spin any bearings with an air hose. When using air, rotate one ring slowly by hand to expose all parts of the bearing.
- 3. Bearings with removable seals should be washed and inspected after removal of seals, in the same manner as bearings without seals. Bearings with permanent shields or seals on both sides should not be washed. Wipe them off to keep dirt from working inside. Smooth turning bearings can be coated with protective lubricant and then wrapped and stored or re-used in their original application. If bearings with two shields or seals stick or feel too rough for further use, they should be replaced. In general, replacement of standard bearings is so economical that it does not pay to re-install a bearing if there is any doubt as to its condition.
- 4. Preferably, small tank and wire baskets should be used for soaking and washing bearings. However, if not available, a clean grease drum or bucket filled with solvent can be used. Let the bearings soak long enough to loosen the grease and dirt. This may take several hours or longer. Then slosh the bearing around near the top of the container, giving it a turn now and then until it is clean. Rinse in a clean container of cleaning solvent.
- 5. Bearing cleaning solutions such as kerosene are often used, but petroleum solvents intended for bearing cleaning are preferred. A short, clean bristle brush from which the bristles will not come out or break off is helpful in removing dirt, scale or chips.
- 6. Inspected bearings, which are good enough to use again, but can't be reassembled in the equipment on the same day, should be dipped in a rust preventative and stored overnight in a tightly covered container. If inspected bearings are to be stored for more than a few days, dip them in a protective lubricant or thoroughly coat all surfaces with light grease. Wrap the bearings in greaseproof paper and place in a clean box or carton. Where cartons are not available, wrap them in waterproof paper and mark the package to identify the bearing.

BEARING INSPECTION

- 1. After a bearing is washed clean it should be carefully inspected to determine its serviceability. A little tarnish, stain or corrosion on the outside surfaces of the rings is not detrimental to the operation of the bearing and need not be removed.
- 2. Unless better equipment is available, cleaned bearings that are not separable, are inspected by first holding the inner ring so its axis is vertical, and by turning the outer ring slowly. Then turn the bearing over and repeat turning the outer ring. If there is any roughness or sudden stopping of the bearing it should be recleaned.
- 3. If any of the following defects are found, or suspected, the bearing should be rejected and replaced with a new one:
 - Broken or cracked rings.
 - Dented seals or shields.
 - Broken or cracked cages.
 - Broken or cracked balls or rollers.
 - Bearings which have been overheated. These bearings are generally darkened to brownish blue or blueblack color.
 - Flaked areas on balls, rollers or raceways.
 - Bearings whose raceways are indented or brindled by balls or rollers being impressed into the races.
- 4. Even if no defects are found or suspected, the age of the bearing should be taken into consideration before replacing it in the equipment. An old, but seemingly perfect bearing may be nearing the end of its useful life due to fatigue. In such cases, it would be more economical to replace it with a new bearing.

Bearing Troubleshooting

Trouble	Solution
Bearing noise - high pitched, steady.	 Check for excessive axial load, correct outer ring fit in housing and/or shoulder location to allow thermal expansion. Check for excessive radial load, correct fit of inner ring on shaft. For radial bearings, use bearing with greater internal clearance. For preloaded paired bearings, use lighter preload. Check and correct any misalignment.
Bearing noise - low pitched, continuous or intermittent.	 Too much clearance in bearing, correct shaft fit. Bearing brinelled, replace bearing. Raceway pitted due to dirt. Wash all parts, replace bearings, use clean lubricant and improve seals.
Bearing Noise - intermittent squeal or high pitch noise	 Balls skidding. Provide thrust preload spring, use thinner grease. Shaft rubbing housing. Correct seals and machine parts.
Bearing Noise - intermittent rumbles, rattles, clicks, etc.	 Too much clearance in bearing, correct shaft fit. Dirt in bearing, wash all parts, replace with new bearings if necessary, use clean lubricant, improve seals. Loose machine parts. Tighten all fans, pulleys, closures, spacers, slingers, etc.
High bearing temperature continuous during operation.	 Lubricant inadequate. try less grease, stiffer grease, add lubricant. Excessive axial load - Check for excessive axial load, correct outer ring fit in housing and/or shoulder location to allow thermal expansion. Excessive radial load - Check for excessive radial load, correct fit of inner ring on shaft. For radial bearings, use bearing with greater internal clearance. For preloaded paired bearings, use lighter preload. Bearing misaligned, correct machine parts and alignment. Excessive seal drag - use different type of seal.
Excessive bearing vibration during acceleration or deceleration.	Adjust machine components and/or feed rate to avoid critical speeds.
Excessive bearing vibration during operation at fixed speeds.	 Check and improve component imbalances. Shaft bent, repair or replace. Check and adjust, improve or redesign cams, gears and linkage. Check for component misalignment and correct. Bearing brinelled, replace bearings.
Shaft does not run true and binds when rotated by hand.	 Shaft bent, straighten & re-balance. Check and correct bearing/machine misalignment. Check and remove dirt in bearings. There is machine deflection, stiffen machine components.
Bearing inner ring becomes loose on shaft.	Incorrect shaft fit. Re-fit.Poor shaft finish, refinish to correct size.
Bearing outer ring wears loose in housing.	 Housing fit too loose, use correct fit. Unbalanced, re-balance rotating parts. Housing finish damaged. Bore, grind or use steel liners if necessary

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APPENDIX D BEARING LUBRICANT GUIDE

APPENDIX D - BEARING LUBRICANT GUIDE

LUBRICANTS

Bearing units are shipped prelubricated from the factory. A lithium base grease conforming to a NLGI grade #2 consistency is used. This grease type has been chosen for its chemical and mechanical stability. This medium viscosity, low torque grease is rusting inhibited and water-resistant. Its temperature range is -30°F to +200° with intermittent highs of 250°F.

LUBRICATION

Bearings must be relubricated periodically to insure long life. The length of interval between greasing is dependent on the running speed and ambient conditions. That following covers most situations and can be used as a guide.

CONDITIONS

SPEED	TEMPERATURE	CLEANLINESS	GREASING INTERVAL
100 RPM	Up to 120°F	Clean	6 to 12 Months
500 RPM	Up to 150°F	Clean	2 to 6 Months
1000 RPM	Up to 210°F	Clean	2 Weeks to 2 Months
1500 RPM	Over 210°F	Clean	Weekly
Any Speed	Up to 150°F	Dirty	1 Week to 1 Month
Any Speed	Over 150°F	Dirty	Daily to 2 Weeks
Any Speed	Any Temperature	Very Dirty	Daily to 1 Week
Any Speed	Any Temperature	Extreme Conditions	Daily to 1 Week

For normal operating conditions the grease should conform to the NLGI grade #2 consistency and be free of any chemical impurities such as free acid or free alkali dust, rust, metal particles or abrasives.

For best results, bearings should be relubricated while in operation. **DUE CAUTION FOR PERSONAL SAFETY MUST BE OBSERVED WHEN SERVICING ROTATING EQUIPMENT.** The grease should be pumped in slowly until a slight bead forms around the seals. This bead, in addition to acting as an indicator of adequate relubrication, provides additional protection against the entry of foreign material. By the time the slight grease bead is formed, it will be noted that the temperature rise is in the neighborhood of 10° to 30°F. If necessary to relubricate while the bearing is idle, refer to relubrication table for the maximum grease capacity for the various sizes of bearings.

RE-LUBRICATION OF BEARINGS

SHAFT SIZE IN INCHES	MAXIMUM GREASE CAPACITY OF BEARING CHAMBER IN OUNCES		
½ To ¾	1/8		
7/8 To 1-3/16	3/8		
1-1/4 To 1-1/2	5/8		
1-11/16 To 1-15/16	7/8		
2 to 2-7/16	1-1/4		
2-1/2 To 2-15/16	2		
3 To 3-7/16	3-1/2		
3-1/2 To 4	6		
4-3/16 To 4-15-16	10		

Grease in the bearing prevents excessive wear of parts, protects ball races, balls, etc. from corrosion, helps to seal against contamination and aids in heat dissipation within the bearing.

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APPENDIX E DRAWINGS