

EM

GRANULATORS

I.O.M. #045 2/01

INSTRUCTION MANUAL

- INSTALLATION
- OPERATION
- MAINTENANCE



TEMPTEK

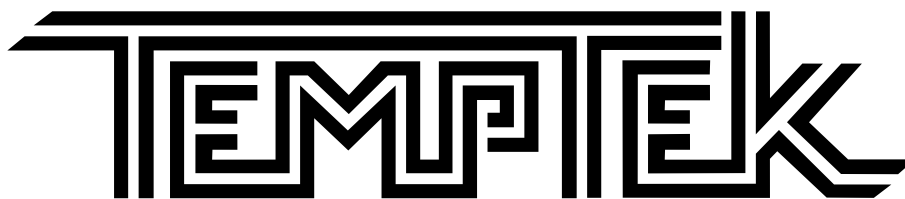
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EM

GRANULATORS

INSTRUCTION MANUAL
"EM SERIES"
GRANULATORS
MODELS 88, 1010, 1216, and 1420

COVERING
INSTALLATION
OPERATION
MAINTENANCE



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MACHINE SERIAL NUMBER

ALL CORRESPONDENCE REGARDING THE OPERATION
OR REPLACEMENT OF PARTS FOR THIS GRANULATOR
MUST REFERENCE THE MACHINE SERIAL NUMBER.

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1.0 GENERAL

- 1.1 SAFETY INSTRUCTIONS
- 1.2 SAFETY INTERLOCKS
- 1.3 GENERAL SAFETY RULES
- 1.4 CLEARING JAMMED CUTTING CHAMBER
- 1.5 INTERLOCK SAFETY FEATURES



1.1 SAFETY INSTRUCTIONS

- A. This machine is constructed for maximum operator safety when under standard operating conditions and when recommended instructions are followed in the maintenance and operation of the machine.
- B. All personnel engaged in the use of the machine should become familiar with its operation as described in this manual. **PROPER OPERATION OF THE MACHINE PROMOTES SAFETY FOR THE OPERATOR AND ALL WORKERS IN ITS VICINITY.**

1.2 SAFETY INTER LOCKS

- A. Interlocks are provided on the cutting chamber and hopper preventing access to these areas until the interlocks are disengaged. Refer to Page 10 of this manual.

1.3 GENERAL SAFETY RULES

- A. **ABIDE BY YOUR COMPANY'S SAFETY REGULATIONS.**
- B. **LOCATE THE MACHINE SO THAT ACCESS IS GIVEN TO ELECTRICAL COMPONENTS SCREEN, HOOPER, ETC.** Safety of service and maintenance personnel is involved. Maintenance personnel should have unobstructed access to the units on which they will be working.
- C. **LOCATE FOR ADEQUATE CLEARANCE.** To avoid squeezing people working near a machine, there should be adequate clearance maintained between machines, walls or partitions.
- D. **CHECK OPEN POSITION OF DOORS.** Hinged doors and covers should have full swing. Restrictions may force work in cramped quarters. An off-balance operator with an awkward reach into a partially obscured area is unsafe.
- E. **CHECK DIRECTION OF ROTATION OF MOTORS.** Test motors for rotational direction as stipulated in the manual. Wrong direction may cause damage, back off threaded fasteners, make pieces of materials being granulated fly up in unexpected directions.
- F. **GROUND THE MACHINE.** This will make sure the machine will never be a "Hot Wire", a source of electrical potential.
- G. **MAINTAIN A SAFE WORKING AREA.** Your working area should be clean and uncluttered. Give yourself room for a firm, well-balanced stance.
- H. **BE HARD TO CATCH.** Don't wear dangling neckties, necklaces, medallions, loose fitting clothing, wrist watches, bracelets or rings, tie back long hair or wear hair net.



- I. **WEAR A FACE SHIELD OR SAFETY GLASSES** .Unexpected heavy cutting or granulating may give a shower of abrasive pieces. Protect your eyes.
- J. **CHECK: ARE ALL COVERS, SCREENS, AND GUARDS IN POSITION AND SECURELY FASTENED?** Be sure all covers and guards are in position before operating the machine. Do not operate a machine with missing covers, screens, or guards. Be sure that all fasteners are being used and that all are firmly tightened.
- K. **REMOVE WRENCHES, LOOSE TOOLS AND ALL LOOSE OBJECTS FROM THE MACHINE.** Free objects may walk into the machine areas and cause unexpected interferences and damage.
- L. **DON'T LEAN AGAINST THE MACHINE OR REST YOUR HANDS OR FEET ON IT.** You may be surprised or injured by a moving part or shower of material. Don't let talking companions lean on your machine while it is running: They, too, might be surprised and injured.
- M. **DISCONNECT ALL POWER TO THE MACHINE BEFORE TILTING THE HOPPER BACK OR ATTEMPTING ANY INSPECTION OR SERVICING OF THE CUTTING CHAMBER.**
- N. **NEVER OPEN OR REMOVE ANY MACHINE COMPONENTS, WHICH ARE SECURED BY WRENCH-TYPE FASTENERS, UNLESS THE MOTOR IS ELECTRICAL LOCKED OUT AND THE ROTOR IS COMPLETELY MOTIONLESS.**

1.4 CLEARING A JAMMED CUTTING CHAMBER

1. Never put hands and arms into hopper.
 2. Disconnect and lock-out power.
 3. Be certain that rotor is motionless.
 4. Open machine as per instructions.
 5. Remove screen.
- A. **NEVER ATTEMPT TO FREE JAMMED MACHINE BY PLACING HANDS ON ROTOR, ROTOR KNIVES OR WITHIN CUTTING CHAMBER.**
 - B. **HANDS MUST BE KEPT CLEAR OF THE ROTATIONAL PATH OF THE ROTOR KNIVES.**
 - C. A wood pry bar should be used to exert force on the rotor, usually in the direction opposite normal rotation. If at all possible, do not use steel tools to clear jam. Use wood or brass.
 - D. Good footing on a clean floor is essential and the body should be well braced when performing this act. Guard against loss of balance should the jammed condition suddenly come free.



- E. A leather mallet and block of wood of sufficient length to keep hands away from path of knives can be used if required.
- F. Use pliers in removing material from the cutting chamber, keeping in mind that the removal of material may cause rotation of the rotor and rotor knives.
- G. After clearing the jam, be certain that the hopper screen and all guards and covers are secured in place before connecting power and starting machine.

1.5 INTERLOCK SAFETY FEATURE

Each machine is supplied with an electrical safety interlock. This interlock must be unscrewed first, disconnecting operating power. Before the machine can be opened, the machine must be properly closed before the interlock can be replaced and power restored to start the machine.

Note: THIS INTERLOCK MUST NEVER BE MODIFIED OR REMOVED.

All Granulators are equipped with a safety interlock which will permit operation of the drive motor only if the granulator is in the closed position. To open the granulator unscrew safety rod (usually a knob located in front of the machine). After unscrewing safety rod a short distance, the limit switch contacts are opened which de-energizes the starter coil. Note the limit switch fails it will fail to safety. The time it takes to turn out the safety rod is intended to let the rotor coast to a full stop. When the granulator is opened a mechanical interference is introduced making it impossible to turn in the safety rod and start the drive motor. To test the cutting chamber safety switch, proceed as follows: With the machine properly closed and idling, begin unscrewing the safety switch rod. The motor starter should disconnect with a few turns of the rod. The motor starter should disconnect with a few turns of the rod. After unscrewing the safety switch rod completely, push the motor start button.

MOTOR SHOULD NOT START IN THIS POSITION.



2.0 RECEIVING & SET-UP

- 2.1 CONNECTING UNIT TO POWER
- 2.2 CHECKING MOTOR ROTATION



CAUTION: DO NOT MAKE THIS TEST WITH A SUBSTANTIAL AMOUNT OF PLASTIC MATERIAL IN THE CUTTING CHAMBER, OTHERWISE THE GRANULATOR MAY STALL ON RESTART & REQUIRE CLEAN-OUT.

2.1 CONNECTING UNIT TO POWER

CAUTION: SUPPLY POWER MUST BE "OFF" PRIOR TO MAKING ELECTRICAL CONNECTIONS. LOCK OUT MAIN DISCONNECT OR PULL ALL THREE MAIN FUSES.

- A. The following steps should be followed when connecting power to the granulator.
1. Use a qualified electrician.
- B. Be certain supply voltage is the same as the machine operating voltage. Operating voltage is indicated by a label on the control box.
1. If voltage change is required, proceed as follows:
 - a. Rewire motor leads accordingly.
 - b. Exchange overload heaters to comply with power drain on new voltage (Table inside cover of starter housing).
 - c. Rewire primary control transformer leads to a new voltage.
- C. Use only NEC, UL approved IEC or NEMA rated components (i.e., wire, plugs, and fittings).
- D. Be sure wire size is adequate to carry amperage draw of the motor.
- E. The supply line to the granulator must have each leg fused as required by NEC and local codes.
- F. Connect supply lead wires to starter terminals L1, L2, and L3.
- G. Be sure machine is properly grounded.
- H. Be sure machine is properly closed and all guards, screen and material bins are in place.

**NOTE: NEC IS THE NATIONAL ELECTRICAL CODE.
IEC IS THE INTERNATIONAL ELECTRICAL CODE.
UL IS UNDERWRITERS LABORATORIES.
NEMA IS NATIONAL ELECTRICAL MANUFACTURERS'
ASSOCIATION.**



2.2 CHECKING MOTOR ROTATION

When power connection is complete and chamber is locked closed, jog the motor to check for correct and unobstructed rotation of the rotor. Direction of rotation is indicated by a directional arrow on the bearing housing. If the arrow is missing, the rotation of the cutting rotor is clockwise when viewed from the right hand side of the machine. If excessive noise is noticed the knives may be too close or hit the screen and/or the inside of the cutting chamber.

NOTE: JOGGING THE MOTOR IS DONE BY PUSHING THE ON AND OFF BUTTON IN QUICK SUCCESSION.



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3.0 OPERATION

3.1 OPERATION

3.2 OPENING OF GRANULATOR FOR CLEAN-OUT OR KNIFE ADJUSTMENT



3.1 OPERATION

A. GENERAL INFORMATION

1. After starting the machine, allow it to reach full speed before introducing material. Feed the material slowly and evenly into the granulator to obtain maximum cutting efficiency. **It is recommended to first run a small amount of plastic scrap not intended for re-use. This will clean out any remaining rust protection material, degreasing fluid, rust or weld splatter.**

NOTE: ALWAYS START THE MACHINE EMPTY. ALWAYS RUN THE MATERIAL OUT OF THE MACHINE BEFORE SHUT-DOWN.

CAUTION: DO NOT EXCEED THE CAPACITY OF THE MACHINE. MOTOR BURN-OUT MAY RESULT FROM FREQUENT OVER-LOADING OR STALL-OUT CONDITION.

CAUTION: DO NOT ALLOW KNIVES TO BECOME DULL.

2. Maximum cutting efficiency and minimum power consumption, noise and fines will be realized by keeping knives sharp by resharpening at regular intervals. Rotary knives must be sharpened in matched sets.
3. Check the material bin frequently to avoid granulated material from backing up into the cutting chamber. This could cause fines generation or plasticizing in the cutting chamber. If the granulator is used with a blower system or a hopper loader, be certain they are operating before introducing material into the granulator. Recommended cycle time for hopper loaders is 45 second load, 15 second off or dwell time.

3.2 OPENING OF GRANULATOR FOR CLEAN-OUT OR KNIFE ADJUSTMENT

DANGER: FOLLOW PROCEDURE CAREFULLY TO AVOID ACCIDENTS

- A. Push "OFF" button on motor starter.
- B. Unplug or disconnect and lock-out incoming electric supply lines.
- C. Disengage safety interlocks.
- D. Remove screen chamber and hopper bolts (1420 NO BOLTS). Pivot screen chamber down and hopper back (1420 No pivoting of back) to stop positions.
- E. Be aware of very sharp knives.
- F. Be careful when turning rotor manually. Inertia created can cause serious injury.



- G. Before reclosing the granulator, make sure no tools are left inside the machine. Brush off any plastic particles which may lay on the mating surfaces between upper and lower cutting chamber.



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4.0 SCREENS

4.1 SCREEN ACCESS AND REPLACEMENT

4.2 CLOSING SCREEN CHAMBER



4.1 SCREEN ACCESS AND REPLACEMENT

A. OPENING SCREEN CRADLE

1. Remove evacuation wand when applicable. Remove material bin from underneath screen chamber.
2. Loosen 5/8 hex nut located on the end of the eye bolt. Hold screen chamber with one hand while loosening to prevent screen chamber from falling.
3. When the 5/8 hex nut has been loosened sufficiently swing eye bolt out of the way and slowly lower the screen chamber to the floor.
4. The screen can be easily removed by simply lifting it out of the chamber.
5. In this condition, only after disconnecting main power, can work be performed on rotor and bed knives, screen chamber or cleaning of the machine.

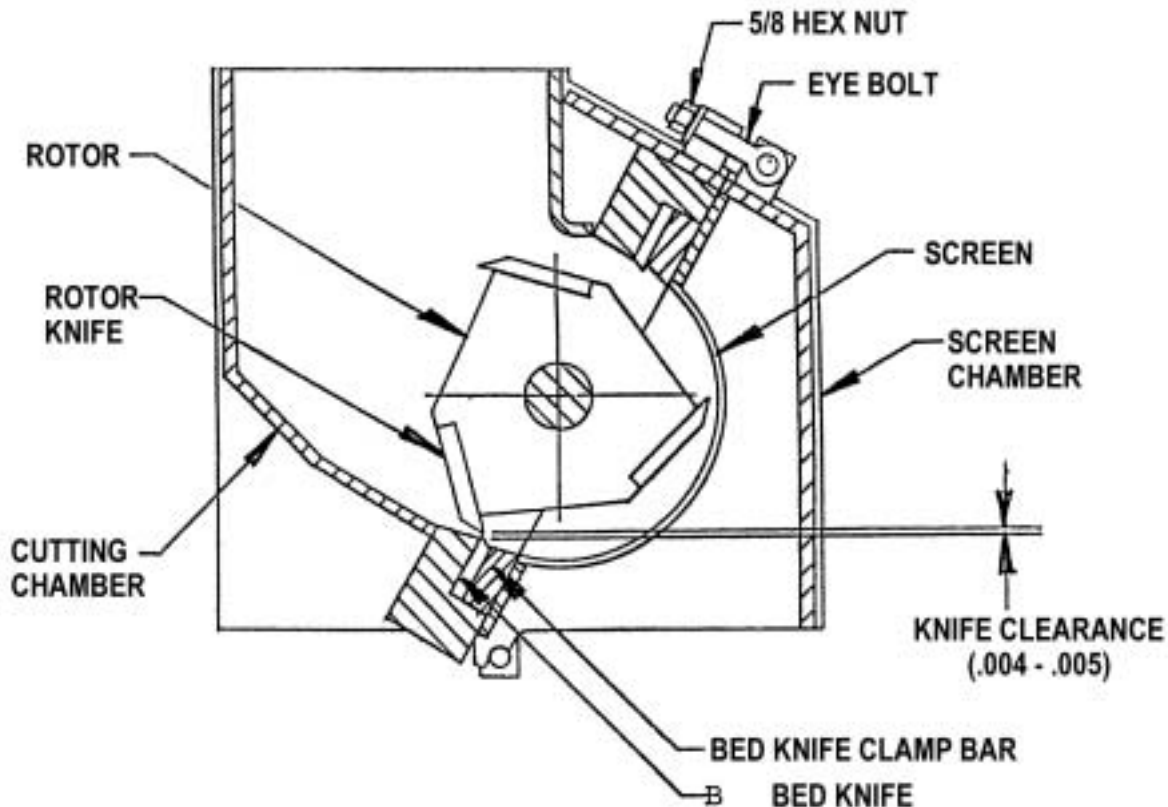


Fig. 4.1a

6. Screens can be provided in various hole sizes to meet your regrind molding requirements, (consult spare parts list page 28 of this manual).

4.2 CLOSING SCREEN CHAMBER

- A. Check cutting chamber and screen chamber for foreign material.
- B. Place screen in chamber and lift screen chamber to closed position. While holding chamber closed with one hand swing eye bolt over hold down lugs located on cutting chamber.
- C. Completely tighten the 5/8 hex nuts insuring that screen chamber seals tight against cutting chamber. This prevents leakage and helps hold screen in position.
- D. Rotate rotor sheave slowly by hand to insure free wheeling of rotor and no obstructions to knives.
- E. Replace material bin.



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5.0 KNIVES

- 5.1 KNIFE RECOMMENDATIONS
- 5.2 INSTRUCTIONS FOR CHANGING AND SETTING KNIVES
- 5.3 ROTOR KNIFE REMOVAL
- 5.4 ROTOR KNIFE INSTALLATION
- 5.5 BED KNIFE INSTALLATION
- 5.6 RECOMMENDED TORQUE FOR BED KNIFE SCREWS
- 5.7 RECOMMENDED TORQUE FOR ROTOR KNIFE SCREWS
- 5.8 RECOMMENDED KNIFE RESHARPENING INSTRUCTIONS
- 5.9 RECOMMENDED KNIFE RESHARPENING INSTRUCTIONS



5.1 KNIFE RECOMMENDATIONS

1. The rotor and bed knives are subjected to hard work and it is recommended that they be inspected periodically for sharpness.
2. The sharper the knives are kept, the better the machine will operate, and the better the quality of granulate produced.
3. Waiting until knives have been chipped or heavily damaged will result in heavy stock removal which will cause a reduction in knife life.
4. For resharpening date, refer to "Resharpening Instructions", Page 29 of this manual.
5. Rotor knives should be sharpened in sets.

5.2 INSTRUCTIONS FOR CHANGING AND SETTING KNIVES

1. Disconnect main power
2. Open machine per previous instructions (page 20).
3. Clean machine of all plastic materials
4. Loosen all bed knife screws.

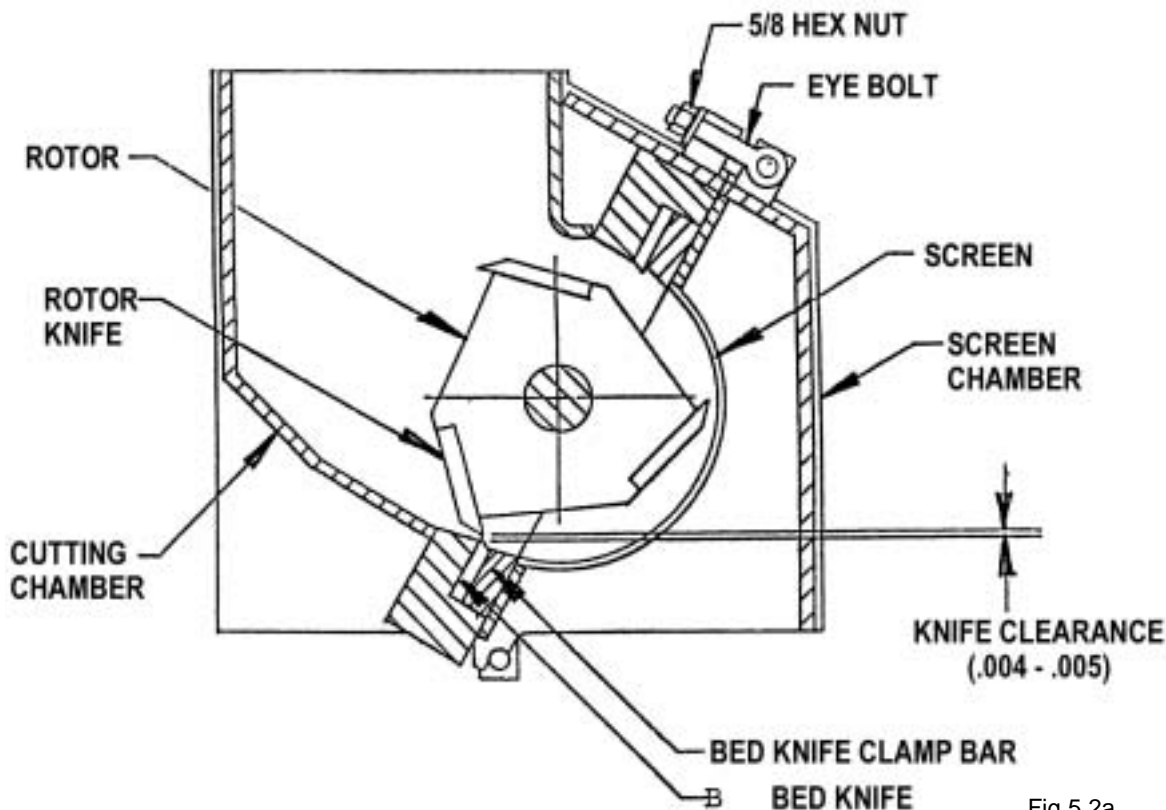


Fig 5.2a

5. Completely remove bed knife screws while holding knife and clamp bar in place.
6. Remove clamp bar and knife from machine and repeat for second bed knife.

5.3 ROTOR KNIFE REMOVAL

1. With object knife in lower open area place a block of wood against a second knife to prevent rotor from turning.
2. Break hexagon rotor knife bolts loose. Remove, taking care that the knife does not fall out.
3. Remove knife and repeat procedure for remaining knives.

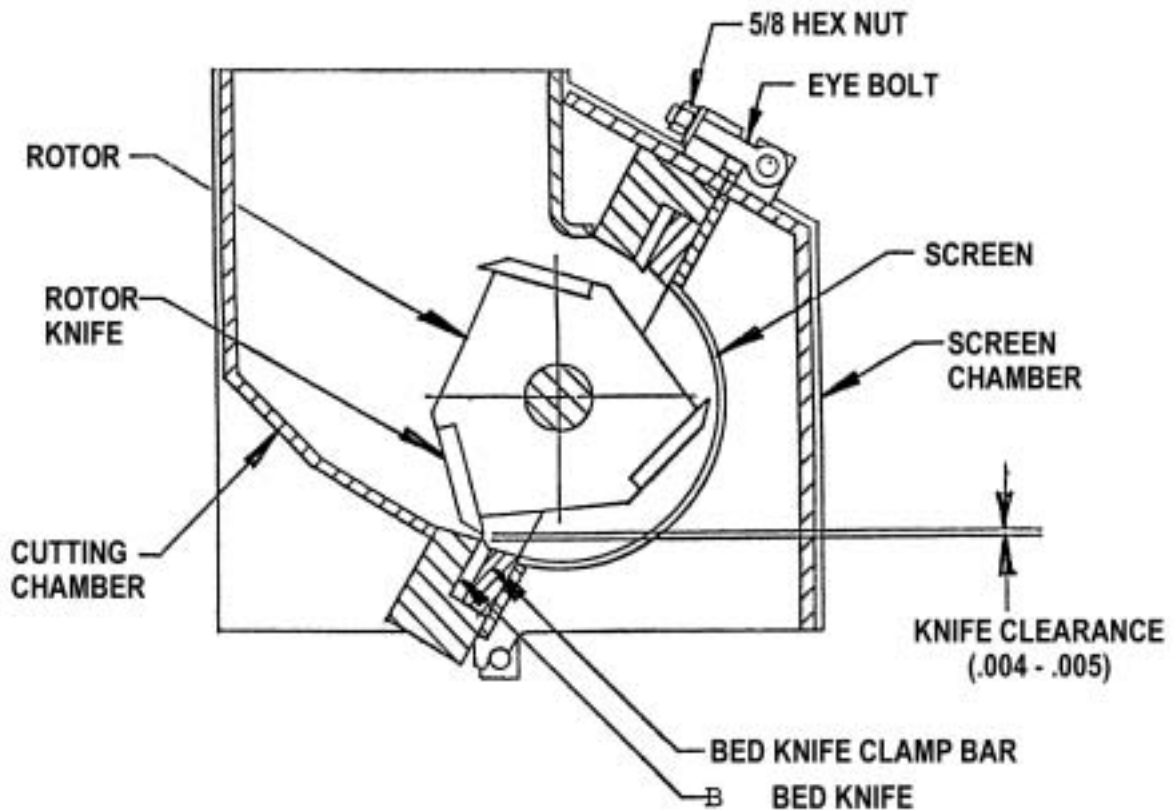


Fig 5.3a

NOTE: ROTOR KNIVES SHOULD BE INSTALLED FIRST, AS THEY HAVE A FIXED SETTING.

5.4 ROTOR KNIFE INSTALLATION

1. Block rotor in place, as in removal procedure, with object knife in lower open area.
2. Hold knife in position on rotor seat and insert rotor knife bolts finger tight. Seat knives firmly by tapping with lead hammer.
3. Rotor knife bolts should be torqued according to the chart provided in this manual.
4. Repeat procedure for remaining rotor knives.

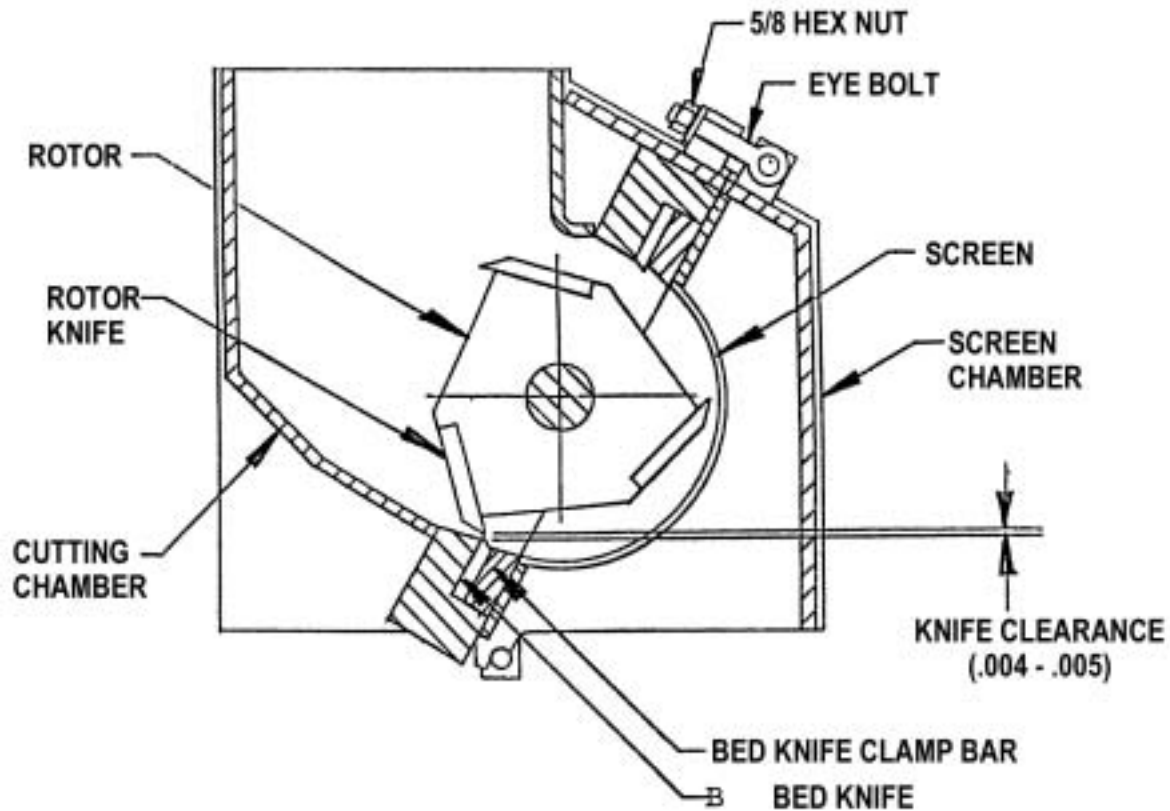


Fig 5.4a

5.5 BED KNIFE INSTALLATION

1. Be sure bed knife seats are clean. Back off bed knife adjusting screw sufficiently so that the knife adjusting pins are flush with the back of the bed knife seats. **Do not remove the knife adjusting screws.**
2. Place bed knife and clamp bar in position of knife seat (check cross-section for correct knife positions), insert bed knife screws and snug into position.
3. Using knife adjusting screws, adjust clearance (see machine cross-section) between bed knife and highest rotor knife. Setting should be checked across length of knife. To avoid breaking knives, rotate rotor opposite of normal cutting direction when setting knives.
4. After knife clearance has been set, tighten socket head cap screws completely and according to torque chart provided, later in this section. Repeat procedure for second bed knife.

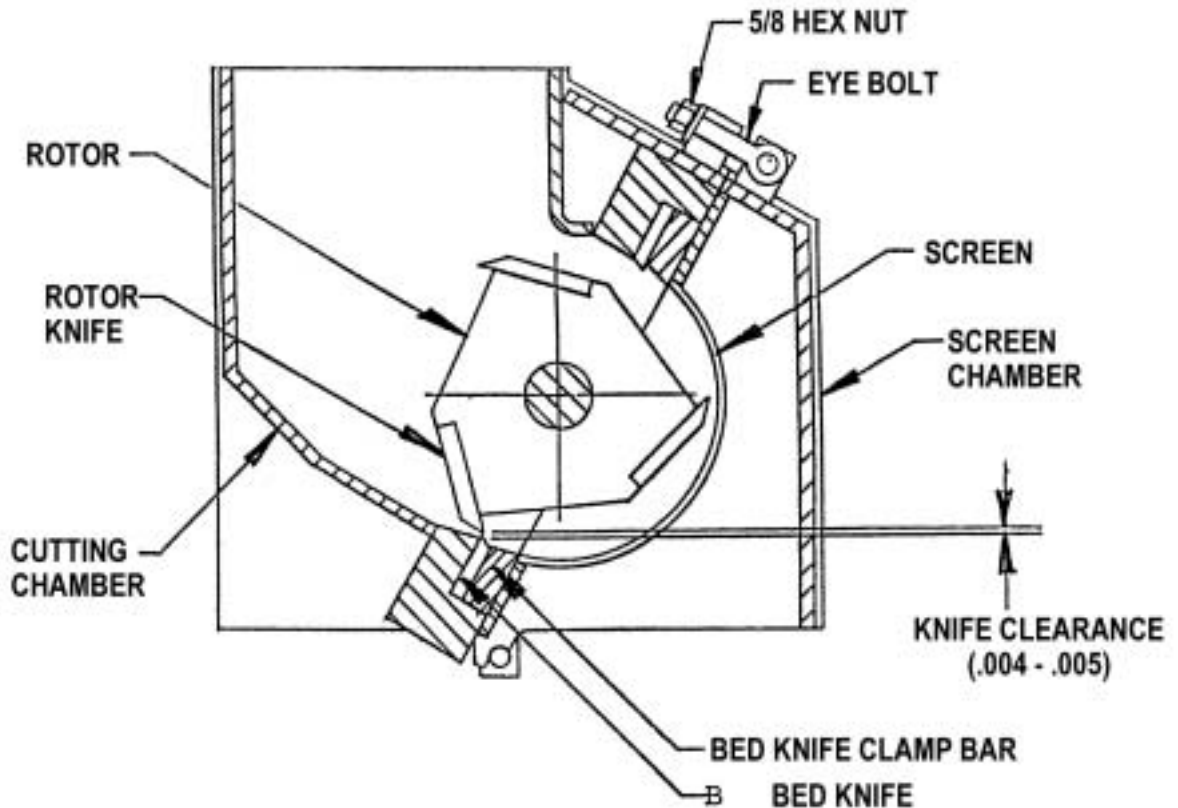


Fig 5.5a

NOTE: FOR BED KNIFE APPLICATIONS

5.6 RECOMMENDED TORQUE FOR BED KNIFE SCREWS

MACH MODEL	SCREW TYPE		FT/LB. TORQUE (DRY)
88EM	5/16-18 HEX HEAD	Grade 5	28
1010EM	3/8-16 SOCKET HEAD	Grade 8	51
1216EM	1/2-20 HEX HEAD	Grade 5	85
1420EM	1/2-20 HEX HEAD	Grade 5	85

NOTE: FOR BED KNIFE APPLICATIONS

5.7 RECOMMENDED TORQUE FOR ROTOR KNIFE SCREWS

MACH MODEL	SCREW TYPE		FT/LB. TORQUE (DRY)
88EM	1/2-20 HEX HEAD	Grade 5	85
1010EM	5/8-18 SOCKET HEAD	Grade 8	240
1216EM	1/2-20 HEX HEAD	Grade 5	85
1420EM	1/2-20 HEX HEAD	Grade 5	85



5.8 RECOMMENDED KNIFE RESHARPENING INSTRUCTIONS

A. Bed Knife

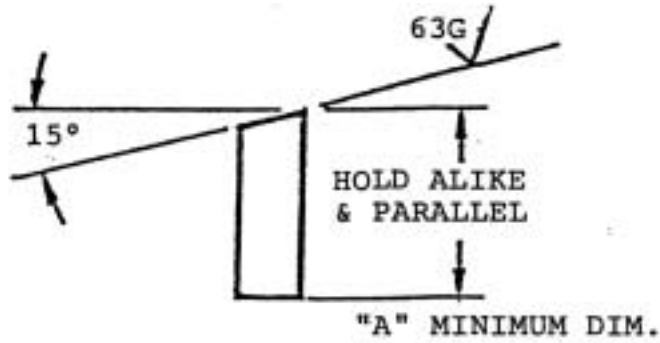


Fig 5.8a

MODEL	"A"
88EM	1.250
1010EM	1.500

B. Standard Rotor Knife (Steep Angle)

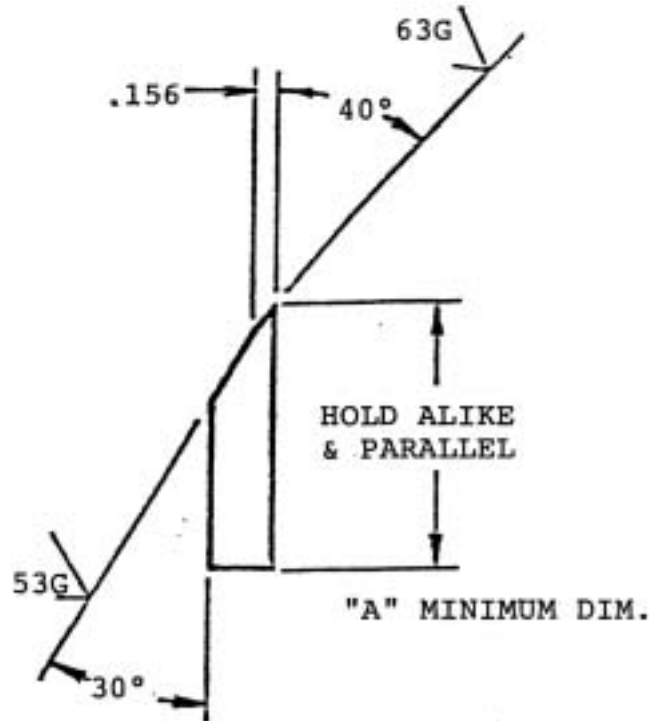


Fig 5.8b

MODEL	"A"
88EM	2.032
1010EM	2.407

5.9 RECOMMENDED KNIFE RESHARPENING INSTRUCTIONS

A. Bed Knife

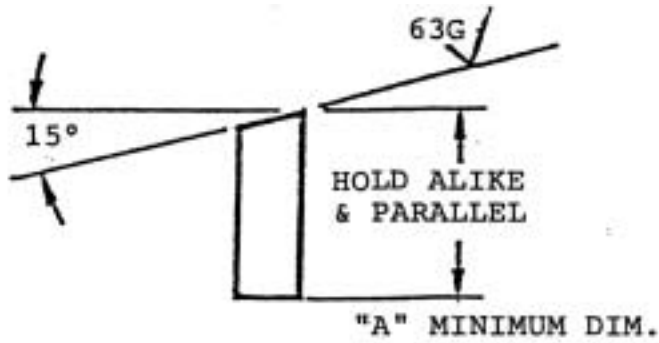


Fig 5.9a

MODEL	"A"
1216EM	2.437
1420EM	2.437

B. Standard Rotor Knife (Steep Angle)

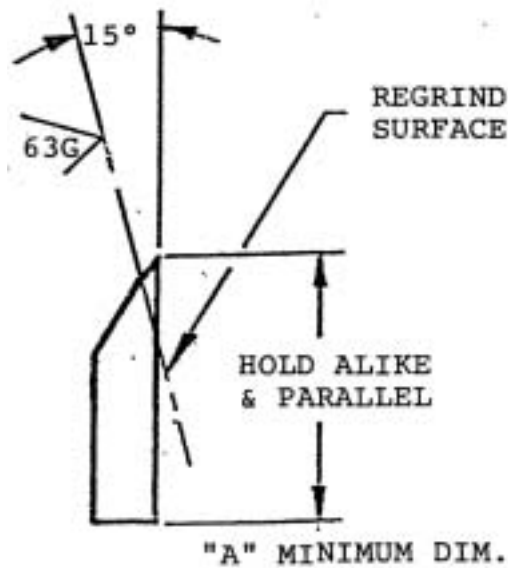


Fig 5.9b

MODEL	"A"
1216EM	2.593
1420EM	2.593

6.0 DRIVE BELTS

- 6.1 GENERAL INFORMATION
- 6.2 BELT WEAR
- 6.3 BELT TENSION
- 6.4 BELT ADJUSTMENT IF TOO LOOSE



6.1 GENERAL INFORMATION

- A. The belts on Beside-The-Press Granulators are of the highly efficient "BX" profile. The belts are supplied in matched sets. It is suggested to replace all belts with a new set even if only 1 or 2 belts are worn. Single belt replacements will only cause excessive belt wear and increased down time. For replacement purposes, V-belt sizes are listed in the appendix.

6.2 BELT WEAR

- A. Undue belt wear is caused by either insufficient belt tension, by improper belt alignment or by overloading. For corrective measures, see appropriate sections that follow.

6.3 BELT TENSION

- A. Check for proper belt tension after the first few days of operation and there after on a monthly basis. Insufficient belt tension will cause loss of power and accelerated belt wear.
- B. At the same time, check the belts for wear, cracks or fractures.
- C. Disconnect and lock out electric power. Remove sheave guard. Use a commercially available (from belt supply house) belt tension checker to measure the tension of the belts.

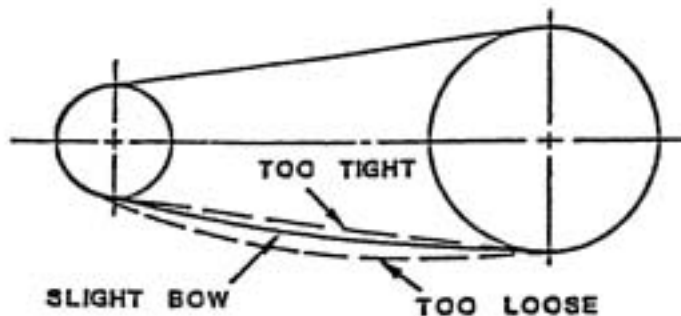


Fig 6.3a

- D. Belt tension is measured by the deflection in inches which occurs when a defined force (weight in lbs.) is applied to the belt in mid span.
- E. The deflection should be approximately $1/64$ of the center to distance between the sheaves.
- F. The applicable force is dependent on the pitch diameter of the drive sheave and the belt profile. (All grinder belts are of the BX profile.)
- G. For convenience, the following table indicates center distances, maximum permissible deflection and applicable force for all granulator models.

GRANULATOR MODEL	CENTER DISTANCE INCHES	PERMISSIBLE DEFLECTION 1/64 OF CENTER DISTANCE INCHES	APPLIED FORCE LBS.	
			MIN.	MAX.
88EM	20.75	5/16	5.55	6.2
1010EM	20.00	5/16	6.5	7.2
1216EM	28.00	7/16	6.5	7.2
1420EM	28.00	7/16	6.5	7.2

1. If a belt tension checker is not available, a superficial check can be made by pressing the belts in mid-span hard with your thumb. If a belt pushes in easily more than 3/4 inches, it is definitely too loose.

6.4 BELT ADJUSTMENT IF TOO LOOSE

- A. Move the motor further away from the cutting chamber. For this purpose a jack screw is supplied located to the rear of the motor base.
- B. Loosen the 4-motor mounting bolts and manually push the back end of the motor further away from the cutting chamber by about 1/4". Then tighten motor mounting bolt "A". Now jack motor away from cutting chamber by turning the jack screw until the motor sheave is realigned with the rotor sheave. Check belt tension and repeat if belts are still too loose. **Afterwards, retighten the other 3 motor mounting screws.**



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7.0 ROTOR & MOTOR

- 7.1 MOUNTING INSTRUCTIONS FOR SHEAVES (PULLEYS)
- 7.2 REPLACING ROTOR BEARINGS (PILLOW BLOCKS)
- 7.3 EXCHANGING ROTOR BEARING INSERTS



7.1 MOUNTING INSTRUCTIONS FOR SHEAVES (PULLEYS)

- A. Remove any burrs and rough spots or deep grooves on the sliding surfaces of bushing and bushing seat inside sheave with emery cloth. Degrease and clean shaft, bushing and bushing surface of sheave.
- B. With bushing mounted in sheave very loosely, place sheave on shaft at its proper location. Engage drive key where provided. However, some granulators do not use drive keys on the rotor sheave. On these units it would be desirable to use Loctite High Strength Cat. #02-50 as bonding fluid between shaft and bushing and between bushing and sheave. Tough assembly without Loctite will be quite satisfactory also.
- C. Tighten bushing sufficiently to hold sheave in place. Tighten bushing with hammer to line up with other sheave to avoid side wear on v-belts.
- D. Using a torque wrench tighten all bolts on bushing evenly up to the torque specified. Rap bushing with soft faced hammer to drive bushing further in. This will push the bushing over high spots on the sliding surfaces. Retighten all screws using same torque. Repeat several times until screws do not loosen up anymore when bushing is rapped.
- E. Recheck alignment with other sheave. If necessary, loosen bushing, realign sheave and retighten as described above.

7.2 REPLACING ROTOR BEARINGS (PILLOW BLOCKS)

For order information on pillow blocks and bearing inserts, see appendix.

- A. Disassemble machine sufficiently to allow removal of this whole rotor assembly.
- B. Remove rotor sheave by unscrewing the taperlock bushing mounting screws and inserting them into the tapped holes on the flange of the bushing. Turning these screws in evenly will back out the bushing and free the sheave.
- C. Mark each bearing housing to establish from which side of the rotor it came from. This will assure that on reinstallation the locating pins will fit back into their place.
- D. Loosen the set screws in the locking collar of the rotor shaft. Make sure that the bearings are placed onto the same side of the rotor where they were removed, to assure line-up with the locating pin holes. Follow the installation instructions and lubrication instructions of the bearing manufacturer.
- E. The whole assembly can now be mounted back onto the rotor shaft. Make sure that the bearings are placed onto the same side of the rotor where they were removed, to assure line-up with the locating pin holes. Follow the installation instructions and lubrication instructions of the bearing manufacturer.



7.3 EXCHANGING ROTOR BEARING INSERTS

- A. The rotor bearings are within pillow block housings which are fixed in their location to the machine base by one or more locating pins. If the bearings need replacement, it is by far not the cast iron housing. The table located in the appendix, shows the bearing used on the various models and the part numbers for the whole bearing assembly (housing and insert) and for the bearing insert alone. The following is a description of how to remove and reinstall the bearing inserts.
1. Remove the grease nipple and turn the pillow block upside down to drop out the locking pin which is located underneath the grease nipple. It may be necessary to rap the pillow block hard onto the work table in this position, since the pin may be held in place by grease residue. This locking pin engages with an indentation in the outer bearing race to prevent rotation of the bearing within the housing.
 2. Position bearing in a vise and tighten. Pay attention that the side of the bearing with the locking collar is facing towards you. This side will be called "front of bearing" in the casting on the rear side.
 3. Use a suitable piece of bar, insert it into the bearing and push straight up. This will tilt the bearing within the housing. Push as far as the tube permits and then push the bearing manually further until it is perfectly horizontal, locking collar facing up. While the bearing is turning, try to keep it within the location of the two cutouts, otherwise tap the bearing on the right or the left until it lines up again with the cutouts. When the bearing is completely horizontal and lined up with the cutouts, it can be pushed out easily toward the rear by using the clearance provided by the cutouts.
- B. Follow the reverse order for reinstallation of the bearing. Push the bearing at the points of the cutouts horizontally into the housing, locking collar facing up. At this point make sure that the indentation of the outer bearing race is located in such a way that it will line up with the hole for housing. Using the length of pipe, rotate the bearing fully into the housing, check again to make sure that the indentation on the bearing race will be lined up with the grease nipple hole. If inside the housing, reinstall the locking pin (which will drop in place properly only if the indentation in the outer bearing race lines up with the hole) and then replace the greased nipple.

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8.0 LUBRICATION

- 8.1 DRIVE MOTOR
- 8.2 ROTOR BEARINGS
- 8.3 LUBRICATION INSTRUCTIONS FOR BALL BEARING MOTORS



8.1 DRIVE MOTOR

1. The drive motor bearings are prelubricated at assembly, but should be relubricated as stipulated in this manual.

8.2 ROTOR BEARINGS

1. Refer to Manufacturer's Instruction.

8.3 LUBRICATION INSTRUCTIONS FOR BALL BEARING MOTORS**A. LUBRICATION**

1. This is a ball bearing motor. No lubrication need be added before start up. The bearing have been lubricated at the factory.

B. RELUBRICATION INTERVALS

The following intervals are suggested as a guide:

HOURS OF SERVICE PER YEAR	H.P. RANGE	SUGGESTED RELUBE INTERVAL
5,000	1/8 to 7 ¹ / ₂ 10 to 40 50 to 150	5 years 3 years 1 years
Continuous Normal Applications	1/8 to 7 ¹ / ₂ 10 to 40 50 to 150	2 years 1 years 9 months
Seasonal Service motor is idle for 5 months or more.	All	1 year (beginning of season)
Continuous High ambients, dirty or moist locations, high vibrations, or where shaft end is hot (pumps - fans)	1/8 to 40 50 to 150	6 months 3 months

C. LUBRICATION

1. Use high quality ball bearing grease. Use consistency of grease suitable for class of insulation stamped on nameplate as follows.

INSULATION CLASS	CONSISTENCY	TYPE	TYPICAL GREASE	FRAME TYPE
A & B	Medium	Polyurea	Shell DoliumR	215T & Smaller
A & B	Medium	Polyurea	Shell DoliumR	254 & Larger
F & H	Medium	Polyurea	Shell DoliumR	All

D. PROCEDURE

1. If motor is equipped with Alemite fitting, clean tip of fitting and apply grease gun. Use 1 to 2 full strokes on motors in NEMA 215



frame and smaller. Use 2 to 3 strokes on NEMA 254 thru NEMA 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. On motors having drain plugs, remove grease drain plug and operate motor for 20 minutes before replacing drain plug.

2. On motors equipped with slotted head grease screw, remove screw and apply grease tube to hold. Insert 2 to 3 inch length of grease string into each hole on motors in NEMA 215 frame and smaller. Insert 3 to 5 inch length on larger motors. Motors having grease drain plugs, remove plug and operate motor for 20 minutes before replacing drain plug.

CAUTION: KEEP GREASE CLEAN. LUBRICATE MOTORS AT STANDSTILL. REMOVE AND REPLACE DRAIN PLUGS AT STANDSTILL. DO NOT MIX PETROLEUM GREASE AND SILICONE GREASE IN MOTOR BEARINGS.

E. LUBRICATION

1. Relubrication Type Bearings must be relubricated periodically to assure long life. The length of interval between greasing is dependent on the running speed and ambient conditions. The 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	UP TO 210°F	CLEAN	weekly
ANY SPEED	UP TO 150°F	DIRTY	1 Week to 1 Month
ANY SPEED	UP TO 150°F	DIRTY	Daily to 2 Weeks
ANY SPEED	ANY TEMP	VERY DIRTY	Daily to 1 Week
ANY SPEED	ANY TEMP	EXTREME CONDITIONS	Daily to 1 Week

1. For normal operating conditions the grease should conform to the NLGI grade two consistency and be free of any chemical impurities such as free acid or free alkali, dust, rust metal particles or abrasives.
2. For best results, bearings should be relubricated while in operation.

NOTE: DUE CAUTION FOR PERSONAL SAFETY MUST BE OBSERVED WHEN SERVICING ROTATING EQUIPMENT. THE GREASE SHOULD BE PUMPED IN SLOWLY UNTIL AND 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 MATTER.



3. 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.

MODEL SIZE	Maximum grease Capacity of Bearing Chamber in Ounces
88EM	.2oz
1010EM	.3oz
1216EM	.5oz
1420EM	.5oz

4. 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

F. GREASE FITTINGS

1. A hydraulic grease fitting is furnished as standard on all relubricable bearings. The patented locking pin prevents rotation of outer race ring in the bearing housing and locates the lubricating hole in the outer race ring. This pin allows several degrees of misalignment in any direction and the pin's V-shaped groove permits free flow of grease into the sealed bearing chamber.
2. If required, bearings can be fitted with an extended adapter. If fittings are changed in the field, the threaded end of the adapter must be the same size and length as the original fitting. Care must be taken to see that the original locking pin is used and in proper position before replacing the fitting. If an adapter of improper size and length is fitted to the bearing, the locking pin will be either too tight or too loose and will not permit proper relubrication or bearing alignment.

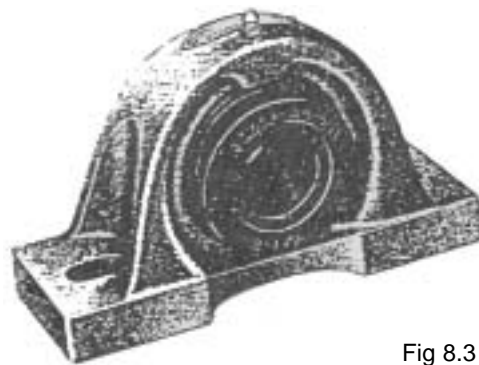


Fig 8.3

9.0 SPARE PARTS

- 9.1 SPARE PARTS FOR MACHINE MODEL 88EM
- 9.2 SPARE PARTS FOR MACHINE MODEL 1010EM
- 9.3 SPARE PARTS FOR MACHINE MODEL 1216EM
- 9.4 SPARE PARTS FOR MACHINE MODEL 1420EM



9.1 SPARE PARTS FOR MACHINE MODEL 88EM

PART DESCRIPTION	PART NUMBER	QTY	MACH MODEL
Screen 3/16 dia.	06133	1	88EM
Screen 1/4 dia.	06130	1	88EM
Screen 5/16 dia.	06131	1	88EM
Screen 3/8 dia.	06132	1	88EM
Knives Standard			
Rotor	01368	3	88EM
Bed	06129	2	88EM
Knife Kit (including knives, bolts, washers)	K13251	1	88EM
Belts	00437	3	88EM
Sheaves			
Motor	00285	1	
Rotor	00027	1	
Sheave Bushing			
Motor	00409	1	
Rotor	00060	1	
Bearings			
Rotor pillow block	13183	2	



9.2 SPARE PARTS FOR MACHINE MODEL 1010EM

PART DESCRIPTION	PART NUMBER	QTY	MACH MODEL
Screen 3/16 dia.	06102	1	1010EM
Screen 1/4 dia.	06159	1	1010EM
Screen 5/16 dia.	06161	1	1010EM
Screen 3/8 dia.	06160	1	1010EM
Knives Standard			
Rotor	06173	3	1010EM
Bed	06169	2	1010EM
Knife Kit (including knives, bolts, washers)	K01840	1	1010EM
Belts	05475	3	1010EM
Sheaves			
Motor	04930	1	
Rotor	10917	1	
Sheave Bushing			
Motor	00197	1	
Rotor	03237	1	
Bearings			
Rotor pillow block	00422	2	



9.3 SPARE PARTS FOR MACHINE MODEL 1216EM

PART DESCRIPTION	PART NUMBER	QTY	MACH MODEL
Screen 1/4 dia.	13062	1	1216EM
Screen 5/16 dia.	13063	1	1216EM
Screen 3/8 dia.	13064	1	1216EM
Knives Standard			
Rotor	60667	3	1216EM
Bed	06169	2	1216EM
Knife Kit (including knives, bolts, washers)	K13068	1	1216EM
Belts	13037	2	1216EM
Sheaves			
Motor	10396	1	
Rotor	13036	1	
Sheave Bushing			
Motor	85404	1	
Rotor	85030	1	
Bearings			
Rotor pillow block	85021	2	



9.4 SPARE PARTS FOR MACHINE MODEL 1420EM

PART DESCRIPTION	PART NUMBER	QTY	MACH MODEL
Screen 1/4 dia.	16610	1	1420EM
Screen 5/16 dia.	16611	1	1420EM
Screen 3/8 dia.	16612	1	1420EM
Knives Standard			
Rotor	00251	3	1420EM
Bed	60669	2	1420EM
Knife Kit (including knives, bolts, washers)	K16607	1	1420EM
Belts	00229	2	1420EM
Sheaves			
Motor	17516	1	
Rotor	17261	1	
Sheave Bushing			
Motor	05751	1	
Rotor	12649	1	
Bearings			
Rotor pillow block	85021	2	



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10.0 ROBOTIC HOPPER CHUTE

10.1 ROBOTIC HOPPER CHUTE



10.1 ROBOTIC HOPER CHUTE

A. The hopper on the EM Series comes standard with a removeable plate on top for robotic feed applications. Once removed a chute may be fabricated utilizing the drawing and specifications below as a guide.

NOTE: HEIGHT OF CHUTE IS DEPENDENT ON DROP HEIGHT OF SPRUE PICKER. MAXIMUM FLOARE OF SIDES SHOULD BE 45°.

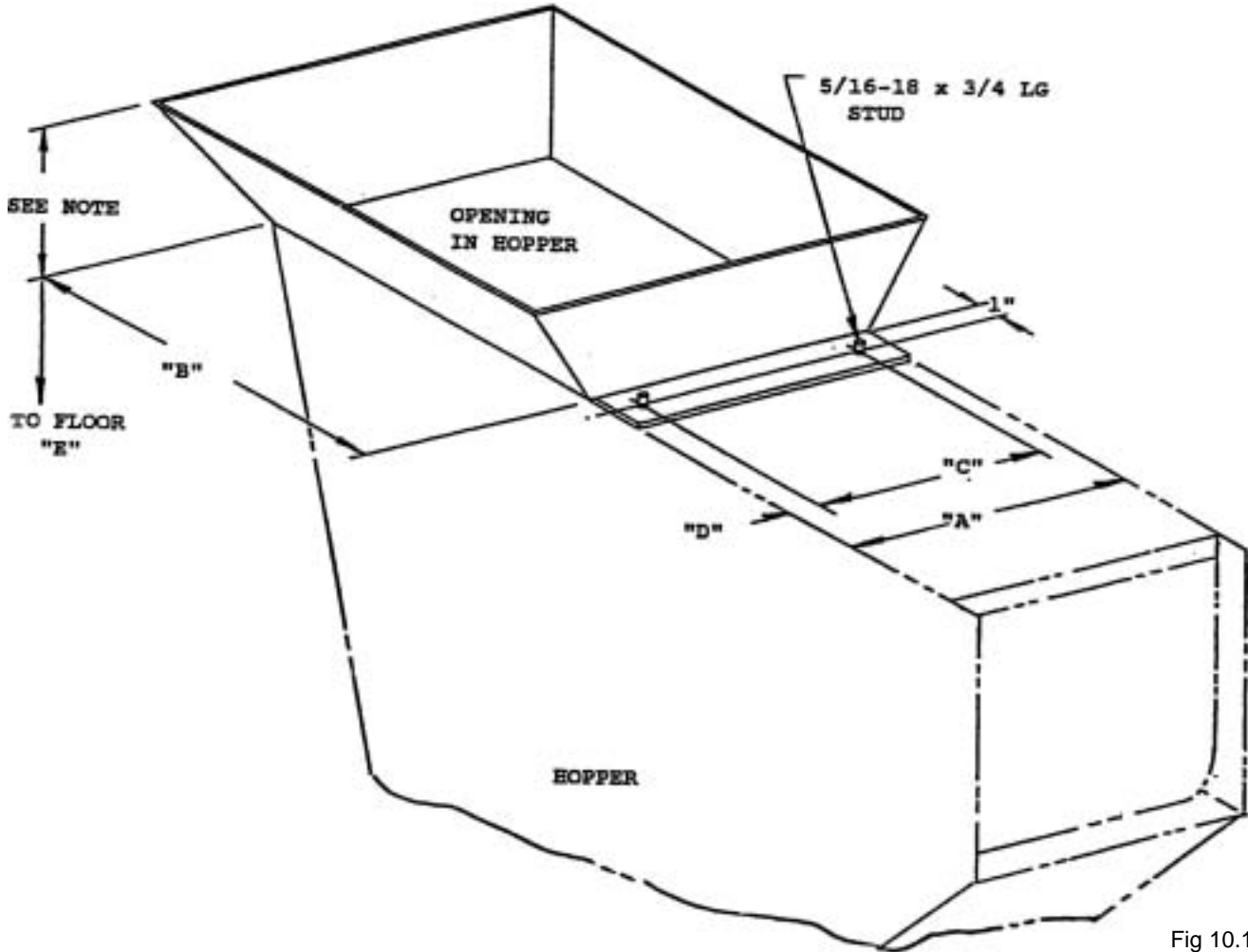


Fig 10.1

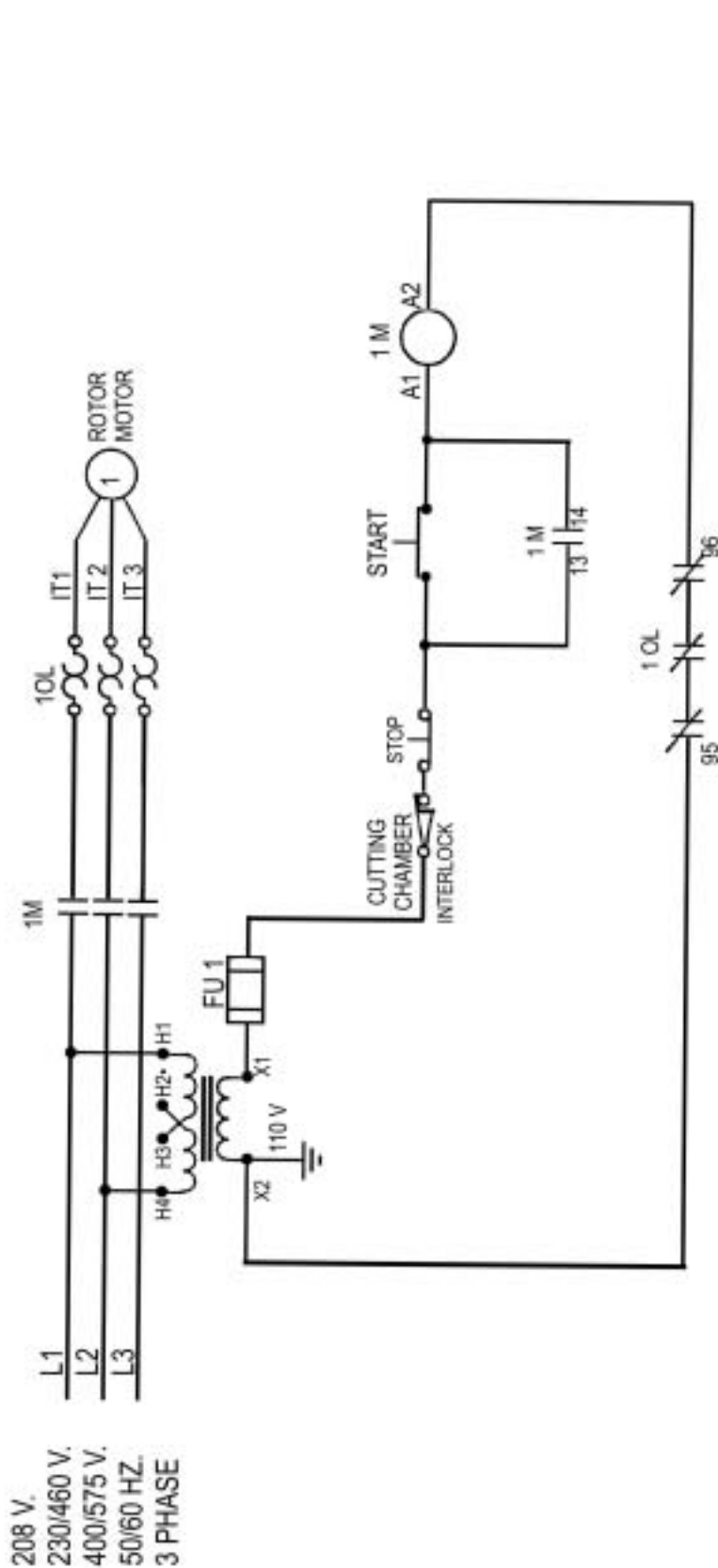
DIMENSIONS						
Inside Dim.						
MACH MODEL	A	B	C	D	E	
88EM	8"	12"	6"	1"	57"	
1010EM	10"	13"	8"	1"	64"	
1216EM	16"	15"	12"	2"	72"	
1420EM	20"	16-3/8"	16"	1"	73-7/8"	

11.0 ELECTRICAL DIAGRAMS

- 11.1 EM SERIES W/ 115V CONTROL
- 11.2 EM SERIES 1420



11.1 EM SERIES W/ 115V CONTROL

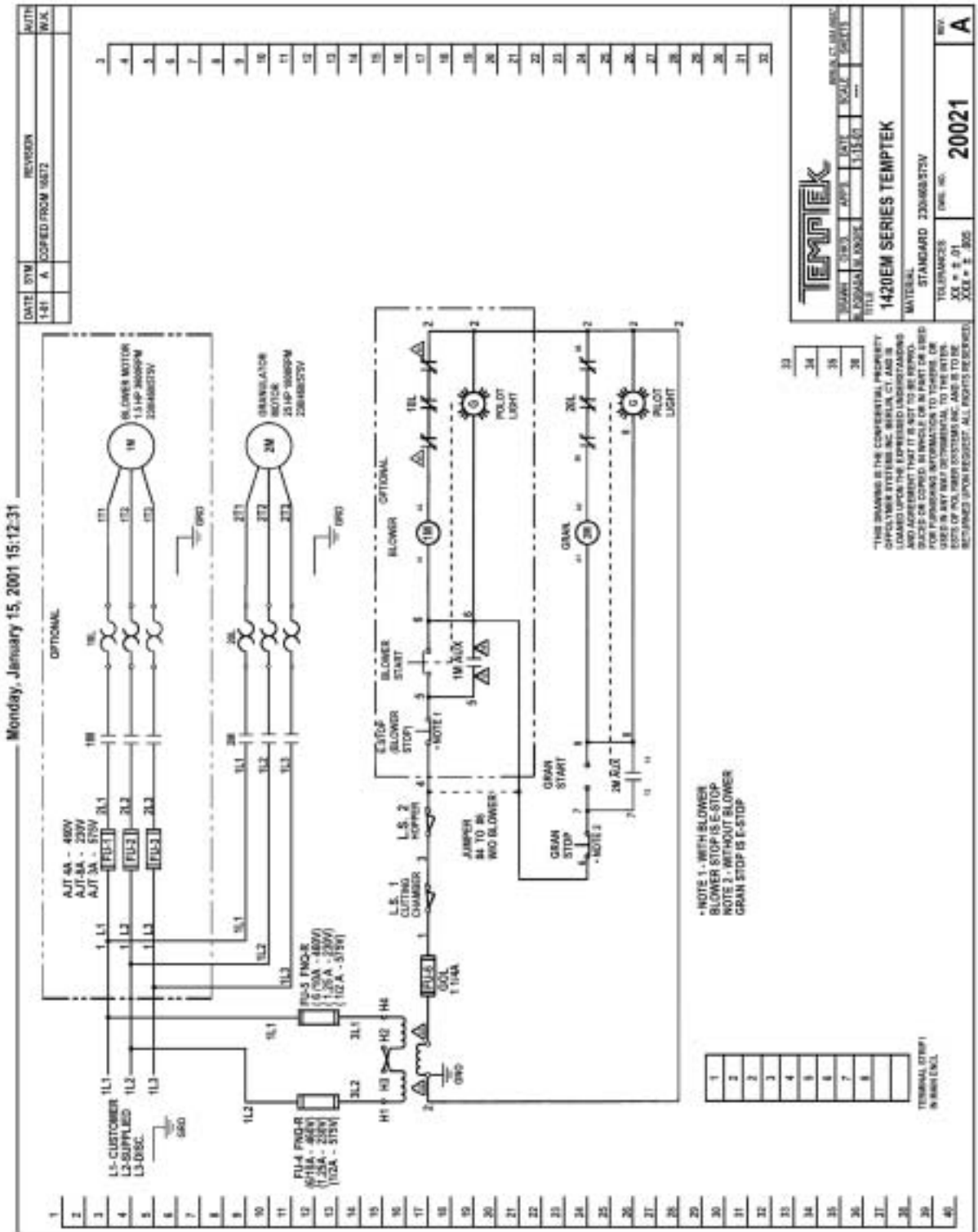


TEMPTEK		GREENWOOD, IN. 46143	
		DATE	SCALE
DRAWN	CHK'D	APPR.	SHEETS
W. KNOPE			1-12-93
TITLE			
EM SERIES W/115V CONTROL			
MATERIAL			
TOLERANCES		DWG. NO.	REV.
FRACTIONS		12823-B	B
+ .005		* 1/64	

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11.2 EM SERIES 1420



END

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