



Security Engineered Machinery Co., Inc

## **OPERATIONAL & MAINTENANCE MANUAL**

### **SEM Model 2, 3, 1012, 1012P, 15, 22 & 23 Disintegrator w/ Fan Systems**



Rev. 0  
As of April 1, 2008

Security Engineered Machinery Co., Inc

### **NATIONWIDE SERVICE**

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# **DISINTEGRATOR SAFETY RULES**

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1. **Learn and Obey Your Company's Safety Policy Regarding Disintegrating Equipment.**
2. **MOVING OR LIFTING THE DISINTEGRATOR:** Although our equipment is built and engineered for great ruggedness in operation, care must be taken when moving the machine along the floor or when lifting it. Damage may occur to sheet metal covers, electrical cabinets, or small brackets if pressure is applied to them when moving the disintegrator. When lifting the disintegrator, be certain of total machine weight and the capability of the lifting equipment (see the Disintegrator Specification Sheets - Section 11, for machine weights and dimensions).
3. **DISINTEGRATOR LOCATION:** Adequate area for routine maintenance should be provided in order to open the machine for knife, screen, or cleanout service. Proper service area clearances also allow people who are working on the machine to be clearly visible to others thereby reducing potential safety hazards.
4. **SAFE HOUSEKEEPING:** The work area should be kept clean and uncluttered to allow personnel safe movement around the disintegrator during periods of operation or maintenance. No hand or power tools should be left on or about the machine. Any tools or other metal objects which mistakenly fall into the hopper feed opening can cause severe damage to internal screen chamber and cutting chamber components.
5. **SAFETY GLASSES OR A FACE SHIELD MUST ALWAYS BE WORN** when operating or servicing the machine. Although our machines are designed for the maximum in flyback control, caution must be used when operating near the area of the hopper feed opening in order to guard against unexpected material flyback.
6. **EAR PROTECTION** may be required when operating the machine during granulation of very hard/noisy materials. The Occupational Safety and Health Act of 1970 have established guidelines for Permissible Noise Exposures (OSHA 1910.95) that should be followed.
7. **NEVER** attempt to operate the disintegrator unless it is fully assembled with all guards and interlocks in place and functional.
8. Observe all **DANGER, WARNING, CAUTION** and safety labels on the equipment.
9. Upon completion of any machine maintenance, be certain **ALL SAFETY GUARDS AND COVERS** are securely and properly fastened prior to resuming machine operation. All fasteners must be in place and properly tightened. **ANY SHORTCUTS MAY RESULT IN INJURY TO PERSONNEL AND EQUIPMENT.**
10. **NEVER** wear any loose fitting clothes, neckties, or dangling items such as earrings, belts, or shoestrings. Jewelry such as wristwatches, bracelets, or rings should **NEVER** be worn. Long hair must be tied back or placed within a tight fitting hairnet. **NEVER** lean against or rest hands/feet on the disintegrator when it is in operation or opened for maintenance. **NEVER** stand on the disintegrator when it is in operation.
11. **ROTATION OF MOTORS:** All rotating items in the disintegrator are clearly marked on the machine. Always check for proper rotation of motors.
12. **ELECTRICAL GROUNDING:** All electrical equipment on the disintegrator must be grounded in accordance to all local codes and Article 250 of the National Electric Code.
13. **Always Disconnect and Lockout the Main Electrical Power to the Disintegrator Before Performing any Service.**
14. **SAFETY INTERLOCKS MUST NOT BE BYPASSED.** The mechanical and electrical safety interlocks ensure the safety of personnel. They should never be tampered with or removed for ANY reason. They should be frequently checked by a qualified mechanic for proper operation.
15. **NEVER** modify the machine configuration or any individual component without written consent from the SEM Co., Inc.

SEM has long recognized the importance of safety and has designed and manufactured our equipment with operator safety as a prime consideration. As a user, we expect you will abide by the foregoing recommendations in order to make operator safety a reality.

# INTRODUCTION

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## SCOPE

This manual is intended to be used as a guide and reference for personnel who will be installing, operating, and maintaining the SEM Security Disintegrator. The purpose is to aid these individuals in applying efficient, proven techniques which will enhance equipment productivity.

This introduction includes a brief functional description, a physical description, and machine specifications for these disintegrators. Additional sections within the manual provide instructions for installation, pre-operational procedures, operation, preventative maintenance, and corrective maintenance.

Installation instructions include all required data for receiving, unpacking, inspecting, and setup of the disintegrator. Also included are illustrations which will aid in utilizing techniques to accomplish these tasks efficiently. We can provide the assistance of a factory trained technician, for a nominal charge, who will help in training your operator(s).

Pre-operational procedures include instructions, checks, and adjustments which should be followed before commencing with operation of the disintegrator. These instructions are intended to supplement standard shop procedures performed at shift, daily, and weekly intervals.

The operation section includes a description of electrical and mechanical controls. In addition to information for operating the disintegrator safely and efficiently.

The maintenance section is intended to serve both as a guide for identification and location of most common problems and as a source of detailed assembly and disassembly instructions for those areas of the equipment requiring service.

The spare parts section contains a partial list of recommended parts which may require replacement. Refer to this section for a listing of spares which can be purchased.

## GENERAL DESCRIPTION

SEM Security Disintegrators are designed to uniformly and consistently size reduce your product.

The disintegrators are portable units mounted on heavy duty bases fitted with four casters, two of which are lockable.

The rotor on which the cutting knives are mounted, is a fabricated, steel unit supported by bearings mounted outside the cutting chamber. The rotor is driven by a motor which is capable of producing high torque loads. The disintegrator is equipped with a magnetic starter that is protected by manually resettable overload heaters. The slanted rotor knives and counter slanted bed knives produce a scissors cutting action which reduces the possibility of feedstock jamming in the cutting chamber.

Motors are individually fused for maximum protection in compliance with the National Electric Code.

The control enclosure houses all of the necessary wiring, fuses, overload heaters, motor starter coils, along with the 115V control transformer and disintegrator operating controls. The control enclosure is built to meet NEC regulations.

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# INSTALLATION

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## SCOPE

This section contains all instructions required for experienced installation personnel to install the SEM Disintegrator and prepare it for production. It is essential to follow all instructions carefully and in the sequence presented. Be sure to observe all DANGER, WARNING, and CAUTION statements in order to prevent personal injury or machine damage and all NOTE statements which are designed to assist in the performance of procedures.

## GENERAL

The site selected for installation of the disintegrator should be prepared in advance. Be certain that the area to be occupied by the machine is clean, level, and free of obstructions. The site selected must have a floor rated to easily support the weight of the machine and a concrete floor of 4" minimum in thickness is recommended.

## SHIPPING

To prepare the disintegrator for shipment, it is mounted on wooden skids, then blocked and banded to prevent movement. All non-painted items subject to corrosion are coated with a quality rust preventative and the machine is then covered with heavy duty polyethylene to protect it from moisture and dirt.

SEM Disintegrators are normally shipped completely assembled unless the size of the machine or an agreement for special shipping arrangements causes partial disassembly.

## UNPACKING

**NOTE:** When the machine arrives at your plant, inspect it carefully for shipping damage **BEFORE** unpacking. Report any damage immediately to the transporting company that delivered it. Sign the freight bill - noting all damage.

If inspection revealed no shipping damage, unpack the unit by removing the polyethylene protective covering and banding. Attached to the machine is an envelope containing "Installation Instructions". The usual contents of this envelope are Parts List, Assembly Drawings, Electrical Diagrams, and a copy of this manual.

The machine may now be lifted from the skid. A fork lift is ideal for the purpose, but care must be taken to properly position the forks between the casters, from the front or side of the machine.

**CAUTION: DO NOT ATTEMPT TO LIFT THE DISINTEGRATOR BY MEANS OF ANY SHAFT OR PROTRUDING MEMBER, ESPECIALLY THE HOPPER.**

## SETUP

Make certain the floor is clean, level, and free of obstructions before placing the machine into position.

Visually inspect the hopper in-feed opening to ensure that no stray packing material or debris are present.

Open the machine by loosening the hex coupling nut(s) at the front of the machine enough to allow for rotation of the threaded swing bolts out of the clamp(s) - see page 20.

**NOTE:** It is never necessary to loosen the spring-block locknuts located on the front of the cutting chamber. The spring blocks are factory set and require no adjustment.

## **INSTALLATION Cont...**

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Apply a lifting pressure to the hopper in order to swing the machine up and back to the extreme open position. For machines equipped with hydraulic jacks: Utilizing the jack handle, ensure the jack needle valve is fully closed by turning it clockwise until fully seated. Insert the jack handle into the pump pivot and pump the jack piston until the cutting chamber is fully up and back to the extreme open position (refer to the instruction label on the machine base).

**NOTE:** In the extreme open position, the machine is designed to remain open without the use of any devices; however, a safety latch has been provided to prevent accidental closing of the machine. The safety latch is located on the right side of the cutting chamber and should always be checked to verify that it has fallen into position upon opening the machine.

**CAUTION:** The knives mounted on the rotor and also located at the edges of the cutting chamber are extremely sharp. Always wear heavy gloves and exercise care when working in the cutting chamber.

Remove the screen from the screen chamber and wipe it clean. The screen should then be placed aside and should always be positioned standing upright on its side. Wipe the inside of the screen chamber clean.

Carefully inspect the interior of the cutting chamber for foreign material or debris. Slowly turn the rotor by hand to verify that it freely rotates without obstruction or contact between rotor and bed knives. Wipe the inside of the cutting chamber clean. Before closing the machine check the chamber carefully to insure nothing has been left inside the machine.

Place the screen back into its original position before closing the machine.

Although the machine is designed to remain open without the use of the safety latch, you may find the cutting chamber resting on the latch. Application of lifting pressure to the hopper should swing the cutting chamber to its extreme open position. The safety latch pull cord, located on the right side of the machine, should now be pulled to disengage the safety latch. The cutting chamber can now be easily lowered to close the machine.

For machines equipped with hydraulic jacks: The safety latch pull cord, located on the right side of the machine, should be pulled to disengage the safety latch. Utilizing the jack handle, slowly turn the jack needle valve 1/8-1/4 turn CCW to slowly lower the cutting chamber. The closing speed of the cutting chamber can be regulated by turning the needle valve CW or CCW as needed (refer to the instruction label on the machine base).

Securely close the machine by rotating the threaded swing bolts up into the clamps and tightening the hex coupling nut(s) at the front of the machine.

Make certain all electrical connections are properly made and supported between accessories and the control enclosure (refer to the wiring diagram for wire and terminal connections).

Open the sheave guard(s) by removing the bolts attaching the cover. Check the belts for proper tension and alignment (refer to page 11). Upon completion, close the sheave guards by placing the cover back into position, insert all of the bolts originally removed, and tighten them fully.

### **ELECTRICAL SERVICE CONNECTIONS**

Carefully check the diagrams packed with the machine. All internal wiring has been done at the factory. All safety interlocks have been verified to be functional before shipment. It is only necessary to connect the electrical power source to the machine at the control enclosure.

**DANGER:** All equipment must be grounded in compliance with Article 250 of the National Electric code and all Local codes. The customers' disconnecting means and branch circuit protection must also be in compliance with the National Electric Code and all Local Codes.

# PRE-OPERATIONAL PROCEDURES

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## SCOPE

This section contains the information required to carry out pre-operational procedures, and the checklist of items which should always be reviewed prior to a production run.

**DANGER:** Before undertaking any machine repairs or maintenance, always make certain that the machine disconnect switch is turned to the “**OFF**” position or that the control enclosure is disconnected from the main power source. Lockout all sources of power including the main disconnect switch and follow all of your plant lockout procedures.

## ELECTRICAL TEST

Before applying power to the machine, check the incoming voltage from L1 to L2, L2 to L3, and L1 to L3 (see page for standard wiring diagram, or individual diagram for your specific equipment packed with the machine). The voltage should be the same as indicated on the silver tag in the control enclosure. If the voltage is not the same, contact the SEM Service Department for voltage modification instructions.

Once it has been determined that the voltages are proper, it is necessary to start the motors and check for the proper direction of rotation.

Turn the main disconnect switch to the “**ON**” position.

Press the Disintegrator Start push-button to power the Disintegrator motor. Visually compare the direction of motor shaft rotation to the rotation arrow label (CW when viewed from the shaft end). If the motor turns in opposite direction, reverse any two incoming power leads.

Once the rotation direction is correct, the remaining electrical controls need to be tested as follows:

Press the Disintegrator Stop pushbutton and allow the machine to stop.

For disintegrators equipped with conveyors, fans, etc., test their operation also by pressing the appropriate pushbutton. Check fan outlet for proper airflow.

For disintegrators with Emergency Stop pushbuttons, test the buttons to insure all motion stops.

Loosen the hex coupling nut on the threaded swing bolts at the front of the machine to verify the safety interlock switch shuts, the machine off - see page 19.

**NOTE:** If there is an access door on the hopper, (for inspection or clean-out purposes) that its limit switch interlocked, make certain that removal of the limit switch actuator bracket shuts the machine off.

## PRE-OPERATIONAL CHECKLIST

After all electrical and mechanical machine elements have been inspected and any defects corrected, the following pre-operational checklist should be used to ensure the disintegrator is ready for operation.

Have all installation and preparation instructions been read and followed?

Have the disintegrator operator and all other necessary personnel been fully trained on machine operation and all machine safety mechanisms?

Have sufficient location clearances been allowed?

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## **Pre-operational Procedures Cont.....**

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Has the equipment been grounded as required by local codes and/or Article 250 of the National Electric Code?

Have all motors been checked for rotation?

Have all machine controls, pushbuttons, and limit switch safeties been checked for proper functioning?

Have the cutting and screen chambers been checked for foreign matter?

Have the drive belts been checked for alignment and tension?

Is the machine properly closed with all visible fasteners tight?

Are all accessory components electrically and mechanically connected with proper support and with all fasteners tight?

Is the cyclonic air separator and filter bags empty? (Optional equipment)

Has the fan/cyclone been verified for proper rotation direction?

Are all electrical enclosure boxes tightly closed and clamped shut?

Are all personnel clear of the machine?

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# DISINTEGRATOR and FAN SYSTEM STARTER DIAGRAMS

FIGURE-1, DISINTEGRATOR STARTER

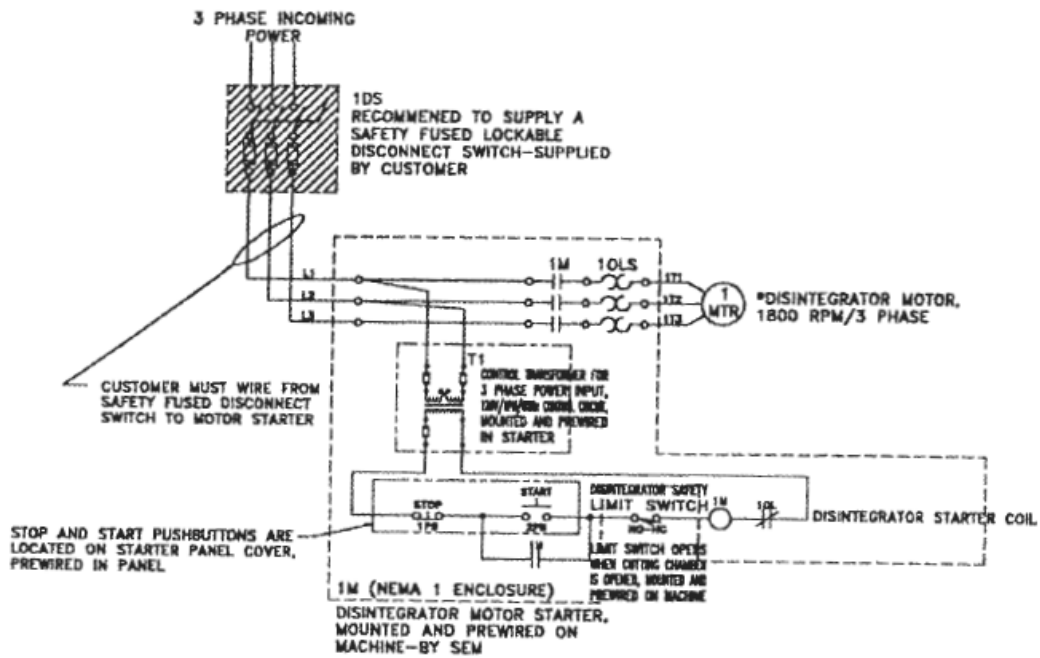
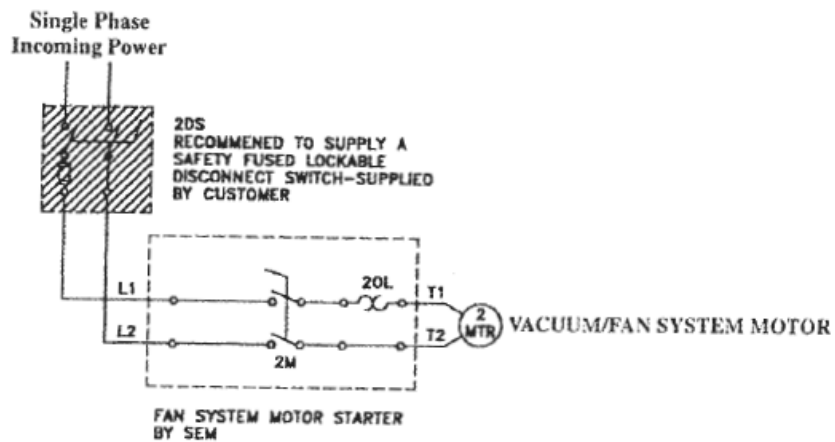


FIGURE-2, VACUUM/FAN SYSTEM STARTER @ 120 or 220V/1/60



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# ELECTRICAL SYSTEM NOTES

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## START-UP OR OPERATION PROBLEMS

Disintegrator will not start:

1. Check all fuses. If blown, check for a locked rotor, grounds or other reasons. Replace fuses with the size and type shown on the wiring diagram (located in the control enclosure).
2. Check disintegrator motor and fan overloads. If required, reset #1 MOL, #2 MOL.
3. Check for an open safety limit switch at the machine cutting chamber or at any limit switch interlocked hopper cleanout door.
4. Call the SEM Service Department for assistance if the machine still will not start. Have the machine serial number at hand (located on the serial number plate on the cutting chamber).

Fan motor will not start (optional):

1. Check overload elements (fuses, O.L. Heaters, etc.). Replace fuses with the size and type shown on the wiring diagram (located on page 8).

## OPERATING INSTRUCTIONS

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Machine ready - all doors, covers, guards, and limit switches are in place, securely fastened, and functional. All accessory components are properly connected.

Turn the main disconnect switch to the ON position.

Start the disintegrator and fan (optional) by pressing the appropriate pushbutton at the operator station. Load feedstock at a uniform rate that does not exceed the capacity of the machine.

Refer to Section "PROCEDURE TO OPEN/CLOSE THE DISINTEGRATOR" page 20 for instructions on how to open the disintegrator and obtain access to other machine areas for clean-out.

**NOTE:** If there is an access door on the hopper (for inspection or clean-out purposes) that is limit switch interlocked, make certain the limit switch actuator bracket is re-installed and is properly in contact with the limit switch or the machine will not start.

### **Temporary machine stops:**

When temporarily stopping the machine, allow all material to run out of the cutting chamber. **NEVER** try to restart the machine with material remaining inside the cutting chamber.

### **Final machine stops:**

When shutting the machine down, allow all material to pass through the fan (optional) and into the cyclonic air separator (optional) before pressing the Stop Disintegrator pushbutton.

### **Emergency stops:**

Feedstock must be cleaned out of the hopper and cutting chamber prior to restarting.

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# **TROUBLESHOOTING**

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## **INVESTIGATING SYMPTOMS**

- a) No particle.
- b) Excessive power required - blown fuses.
- c) Machine stalls.
- d) Bearings sound noisy or are hot.
- e) Belts slip or squeal.
- f) Motor will not start.
- g) Particle builds up in the transition or tubing.
- h) Feedstock hangs up in the hopper or cutting chamber.

## **SUGGESTED CAUSES**

- a. No particle:
  - 1. Feedstock may be hung up inside the hopper. Shut the machine down and check.
  - 2. Screens are plugged. Clean the screens.
  - 3. Fan line may be dogged. Clean as required.
- b. Excessive power required - blown fuses:
  - 1. Overloading of the machine. Reduce amount of feedstock put into the machine per unit of time.
  - 2. Knives are dull. Sharpen or replace knives and re-install.
  - 3. Knife gap is too large. Adjust knives to proper gap specification.
  - 4. Clearance between the rotor knives and screen is too small. Check that the screen is properly seated in the screen chamber.
- c. Machine stalls:
  - 1. Overloading of the machine. Reduce amount of feedstock put into the machine per unit of time.
  - 2. Pieces of feedstock jammed in the rotor. Clear the jammed material then visually inspect the rotor to ensure it is not damaged and that the knife gaps are correct.
  - 3. Machine has loose or thrown belts. Inspect, and if acceptable for use, re-install and tighten per maintenance instructions.
- d. Bearings sound noisy or are hot:
  - 1. Lack of lubrication. Lubricate per maintenance instructions.
  - 2. Overloading of the machine. Reduce amount of feedstock put into the machine per unit of time.
  - 3. Bearings have exceeded their rated life. Consult with the SEM Service Department for replacement instructions.
  - 4. Bearings are not properly installed or tightened. Consult with the SEM Service Department for installation instructions.
- e. Belts slip or squeal:
  - 1. Belts are too loose. Tighten per maintenance instructions.
  - 2. Overloading of the machine. Reduce amount of feedstock put into the machine per unit of time.
  - 3. Machine has thrown belts. Inspect, and if acceptable for use, re-install and tighten per maintenance instructions.
- f. Motor will not start:
  - 1. Fuses are blown. Replace fuses with the size and type shown on the wiring diagram (located in the control enclosure)
  - 2. A limit switch is open. Check the limit switches at the machine front doors and any hopper cleanout door. Ensure proper actuation and replace if required.
  - 3. Verify that the correct pushbuttons are being depressed and that the main disconnect switch is in the ON position.
- g. Particle builds up in the Transition or tubing:
  - 1. Fan is too small. Replace with larger unit or fan wheel.
  - 2. Transition or tubing is clogged. Clean as required.
  - 3. Return air vents are covered or too small. Ensure the vents are open.

## TROUBLESHOOTING Cont...

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4. Fan is not evacuating properly. Check for loose fan wheel on shaft, worn fan wheel, or loose fan drive belts.
- h. Feedstock hangs up in the hopper or cutting chamber:
  1. Material being placed into the machine for processing is too large for the hopper, cutting chamber, or rotor diameter. Reduce the initial size of the feedstock.
  2. Knives are dull. Sharpen or replace knives and re-install.
  3. Overloading of the machine. Regulate the in-feed of scrap to uniformly feed the machine over an extended time period.

## SERVICE INSTRUCTIONS

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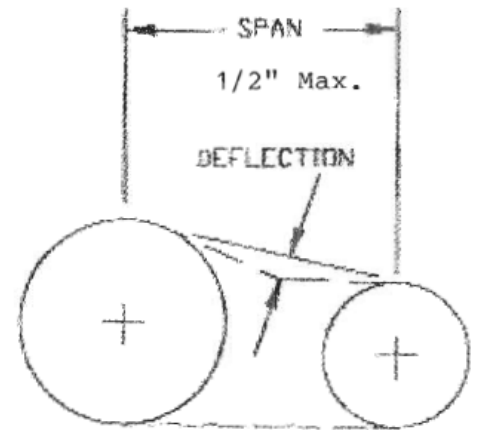
### PROCEDURE - BELTS

Prior to startup of this machine it is recommended that the drive belt tension be checked for proper "RUN IN" deflection force as shown in illustration

After the equipment has run between 24 and 48 hours, drive belt tension must again be checked for proper "OPERATIONAL" deflection.

A V-belt drive will successfully transmit its rated capacity if the belts are properly tensioned. The method of tensioning is explained here in detail for your information.

1. Verify that the alignment of the pulleys is correct. Utilizing a straightedge of sufficient length to span from one pulley to the other, place it along the sides of both pulleys. The entire edge of each pulley should fully contact the straightedge.
2. Measure the belt span (see figure on right)
3. Using a spring scale, apply a perpendicular force to any ONE of the belts at the mid point of the span.
4. Measure the force (lbs.) required to deflect any one of the belts  $\frac{1}{64}$ th of an inch for every inch of span. For example: the deflection for a 32 inch span would be  $\frac{1}{64}$ th of an inch times 32 or  $\frac{1}{2}$  of an inch.
5. The motor position should be adjusted until the actual deflection force matches the distance of deflection referenced in Line 4 above.
6. There will normally be a drop in belt tension during the first 24 to 48 hours of operation due to belt stretch and the belts seating themselves in the sheave grooves.
7. After this initial "RUN IN" period the machine should be stopped and the belts should be rechecked for tension. The motor position should be adjusted until the deflection force matches the values in column "B".
8. In no case should the belts be over tensioned as this can significantly reduce belt life and/or bearing life.



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# **KNIFE RECOMMENDATIONS and ADJUSTMENTS**

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**NOTE:** The rotor and bed knives are subjected to severe work and it is recommended that they be inspected periodically for sharpness. The sharper the knives are kept, the better the machine will operate and the better the quality of the particle being produced. Waiting until the knives have been severely rounded, chipped, or otherwise damaged will result in heavy shock loading during operation causing a subsequent reduction in knife life.

(For re-sharpening diagrams refer to Figure 4, page 14)

## **KNIFE REMOVAL AND ADJUSTMENT PROCEDURE**

1. Shut **OFF** and **lockout** all power including the main disconnect switch.

**DANGER:** Before undertaking any machine repairs or maintenance, always make certain that the machine disconnect switch is turned to the OFF position or that the control enclosure is disconnected from the main power source. Lockout all sources of power including the main disconnect switch and follow all of your plant lockout procedures.

2. Follow instructions on page 21 on opening the machine and screen chamber.
3. See sketch on page 14, for the General Cutting Chamber Drawing.
4. Remove the screen and stand it on edge to avoid damage.

## **ROTOR KNIFE REMOVAL**

1. Carefully block the rotor with a piece of wood to prevent it from turning.
2. Loosen the hex head rotor knife bolts and carefully remove all rotor knives.
3. Clean the rotor knife seats thoroughly with a scraper and/or emery paper to remove any foreign material or rust.
4. Inspect the knives and replace or re-sharpen as required.

## **BED KNIFE REMOVAL**

1. Loosen the socket cap screws holding the bed knives and clamps, working from the knife edges inward to the center. NOTE the relative position of each part before they are removed.
2. As the last screw is backed out, the knife clamp and knife will require support to prevent them from falling.
3. Clean the bed knife seats thoroughly with a scraper and/or emery paper to remove any foreign material and rust.
4. Inspect the components and replace or re-sharpen as required.

**CAUTION:** New or re-sharpened knives should be handled with extreme care. It is suggested that the sharp cutting edges be covered with tape to prevent damage to the knives or personnel during installation.

## **BED KNIFE INSTALLATION**

1. Install the new or re-sharpened bed knives and clamps in the reverse of removal.
2. Make sure the knives are fully back against the knife adjusting screws and loosen the adjusting screw checknuts slightly.
3. Do not torque the socket cap screws fully at this point - snug them down only.

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# **KNIFE RECOMMENDATION and ADJUSTMENTS Cont....**

## **ROTOR KNIFE INSTALLATION PROCEDURE**

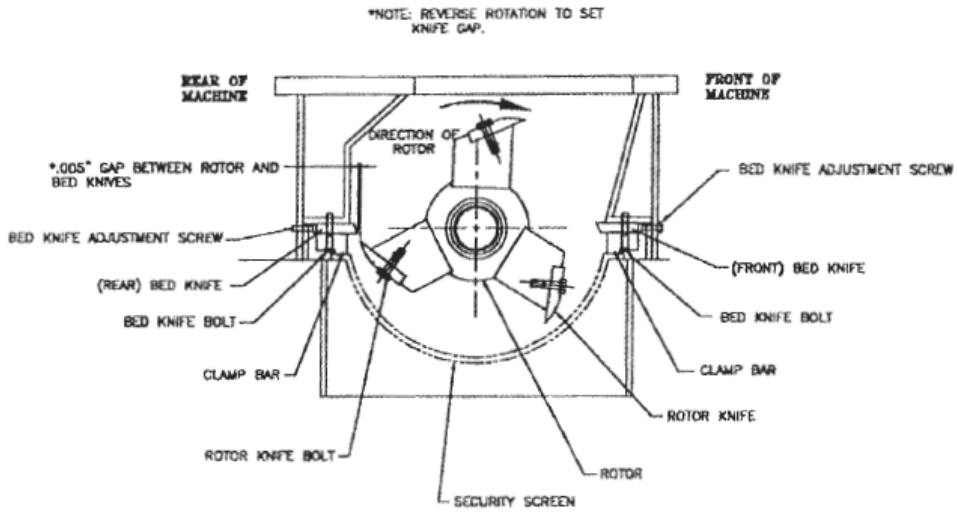
1. Carefully block the rotor with a piece of wood to prevent it from turning.
2. Re-install the rotor knives onto the rotor. Do not torque the hex head rotor knife bolts fully at this point - snug them down only.
3. Check that the heel of the rotor knife is tight up against the knife seat. Utilizing a .005 inch feeler gauge, try to insert it between the heel of the knife and the knife seat at both ends and across the rotor knife. If the feeler gauge will not go down between the heel of the knife and the knife seat, the knife is installed correctly.
4. Torque down the rotor bolts. Start from the center of the knife and torque down the bolts equally, working towards the ends of the knife. Refer to page 16 for the correct torque values based upon bolt sizes and thread pitch. After the bolts on each knife have been fully torque, recheck with a .005 inch feeler gauge between the knife and seat as noted above. Use the same procedure on all remaining rotor knives.

## **KNIFE SETTING PROCEDURE**

1. Align a rotor knife with a secondary bed knife on the disintegrator. With a .005 inch feeler gauge between the rotor and bed knife, start to adjust the bed knife into the rotor knife using the adjusting screw. During the movement of the bed knife, slowly rotate the rotor back and forth checking the clearance. The proper clearance will be established when a slight "drag" is felt on the feeler gauge as it is pulled between the knives. Once this clearance is established across the entire length of a knife, partially tighten the bed knife socket cap screws. Follow this procedure for all remaining bed knives.
2. If you find a "high" rotor knife, mark it and readjust to this knife.
3. Once knife adjustments are complete, equally and fully torque the bed knife socket cap screws, working from the center out towards the ends of the knife. Refer to page 16 for the correct torque values based upon bolt sizes and thread pitch.
4. Recheck the clearance once the bolts have been fully torque and reset if necessary.
5. Turn the rotor so that the knives are aligned with a primary bed knife on the disintegrator and continue with the same procedure used to setup the secondary bed knives.
6. After the clearance setting of both the secondary and primary bed knives is complete and has been checked, turn the rotor by hand to ensure that none of the rotor knives hit the bed knives.
7. Reinstall the screen into the screen chamber and close the machine (refer to Section "PROCEDURE TO OPEN/CLOSE THE DISINTEGRATOR", page 19).

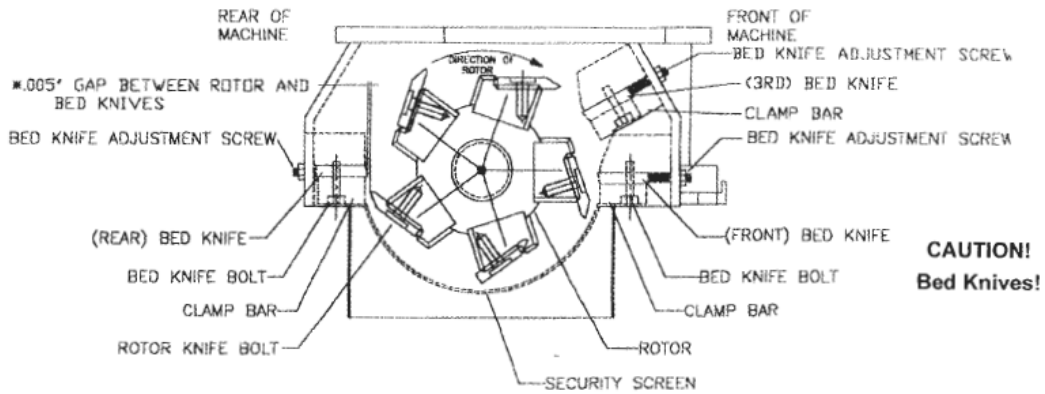
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# GENERAL CUTTING CHAMBER and KNIFE SETTINGS



Typical Standard Cutting Chamber Assembly

(3 Rotor and 2 Bed Knives)



Typical Cutting Chamber Assembly

(5 Bladed Rotor)

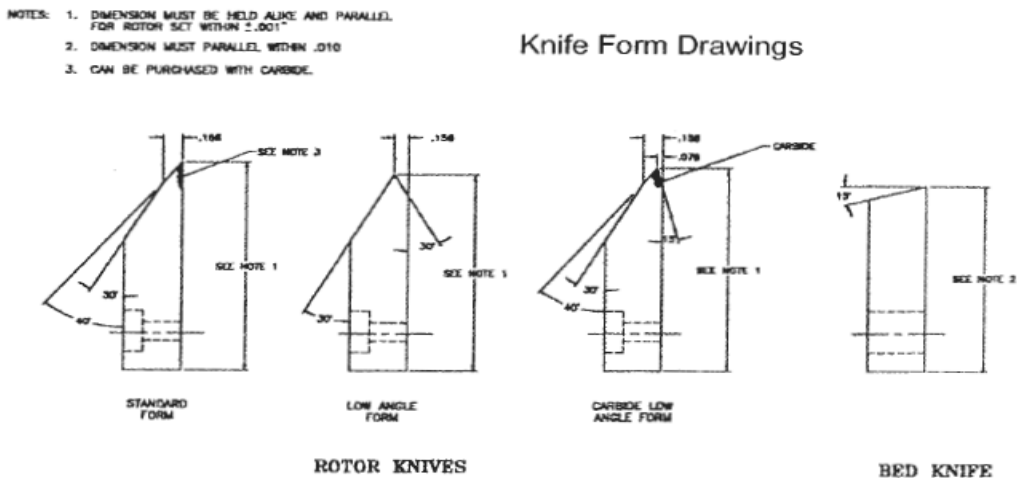
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# RECOMMENDED TORQUE for KNIFE BOLTS

**NOTE:** For normal rotor knife applications, use SEC Grade 8 hex head cap screws and for normal bed knife applications, use Series 1960 Grade 8 socket head cap screws.

DIAMETER AND THREAD SIZE	FT-LB TORQUE (DRY)
1/4 - 20	12
1/4 - 28	14
5/16 - 18	24
5/16 - 24	27
3/8 - 16	45
3/8 - 24	50
7/16 - 14	70
7/16 - 20	80
1/2 - 13	105
1/2 - 20	120
9/16 - 12	155
9/16 - 18	170
5/8 - 11	210
5/8 - 18	240
3/4 - 10	375
3/4 - 16	420
7/8 - 9	610
7/8 - 14	670
1 - 8	910
1 - 14	1015

The above listed torque values are standard specifications.



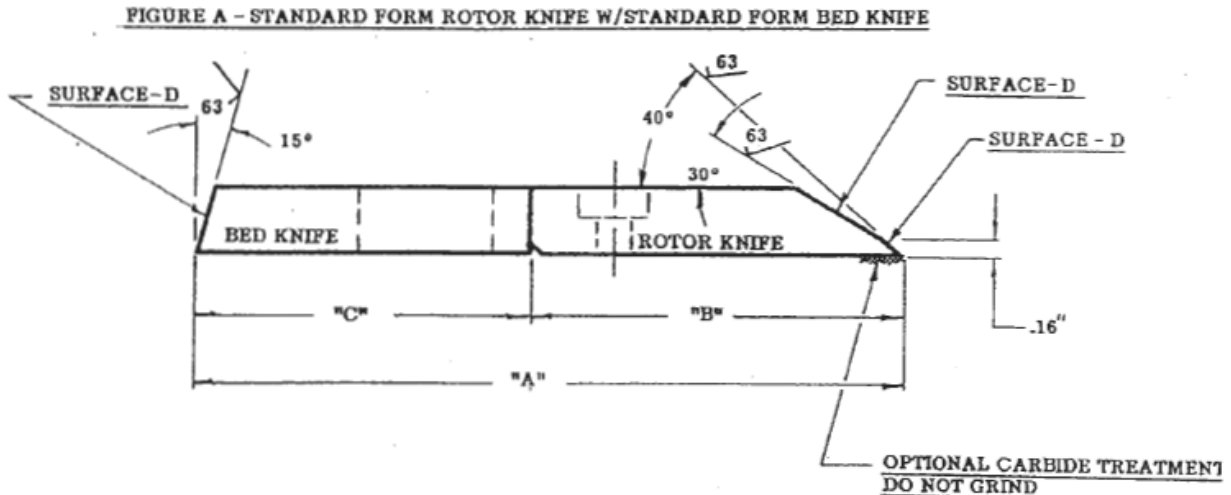
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# KNIFE GRINDING (SHARPENING)

When the disintegrator knife edges become dull, the cutting decreases. The knives may be sent to Security Engineered Machinery or they may be sharpened by a capable machine shop. It is important that when sharpening, the rotor knives and bed knives be sharpened **as a set** to maintain proper tolerances for effective knife settings.

If knives are badly nicked, the machine shop should not try to eliminate the entire nick so as to conserve the edge and prolong knife life. The knives will function very well with nicks after sharpening, as long as 75% of the cutting edge is effective. Reference below Figure A, Figure B and Figure C for the following rotor and bed knife set up **NOTE: Only grind surfaces marked "D"**.



## NOTES ON KNIFE GRINDING:

After regrinding a number of times, the knives must be checked to be sure that there will be adjustment left in the bed knives. The general rule is to place a rotor knife and bed knife back to back as shown on Figure A, B, C and measure the total distance' dimension "A".

Refer to "A" dimension chart per machine model no (below).

### Distance Dimension "A" – Minimum

Model 200	= 2-5/8"	Model 23	= 5-3/4"
Model 2	= 3-3/4"	Model 30	= 5-3/4"
Model 3	= 4-3/4"	Model 42	= 6-5/8"
Model 1012	= 4-3/4"	Model 1424	= 6-13/16"
Model 1012P	= 4-3/8"	Model 1454	= 6-13/16"
Model 15	= 5-3/4"	Model 2436	= 6-13/16"
Model 22 & 22 HDS	= 5-3/4"	Model 2238	= 6-7/8"
Model 1436	= 6-13/16"		

**Note:** If dimension "A" is close to minimum, a new set of knives should be ordered from Security Engineered Machinery. Please contact our Customer Service Department.

Dimension B: Bed knives tolerance must be held alike and parallel in sets within .010".

Dimension C: Rotor knives tolerance must be held alike and parallel in sets within .002"

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# **PPRACTICAL DESTRUCTION**

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## **Feed Rates Based on Using a 3 Blade Rotor and Fan System**

### **MODEL 2 DISINTEGRATOR**

Screen Size	Pounds Per Hour	Suggested Feed lots Every 10 Seconds
3/32"	85	1/16" or 15 Sheets
1/4"	100	3/32" or 25 Sheets
3/8"	150	5/32" or 40 Sheets
1/2"	200	1/4" or 65 Sheets

### **MODEL 1012 DISINTEGRATOR**

Screen Size	Pounds Per Hour	Suggested Feed lots Every 10 Seconds
3/32"	175	1/4" or 65 Sheets
1/4"	200	5/16" or 75 Sheets
3/8"	275	3/8" or 85 Sheets
1/2"	325	1/2" or 130 Sheets

### **MODEL 1012 PREMIER SERIES II DISINTEGRATOR**

Screen Size	Pounds Per Hour	Suggested Feed Lots Every 10 Seconds
3/32"	350	3/8" or 85 Sheets
1/4"	500	9/16" or 130 Sheets
3/8"	600	5/8" or 150 Sheets
1/2"	800	1" or 230 Sheets

### **MODEL 15 DISINTEGRATOR**

Screen Size	Pounds Per Hour	Suggested Feed Lots Every 10 Seconds
3/32"	250	1/4" or 55 Sheets
1/4"	350	3/8" or 85 Sheets
3/8"	450	1/2" or 110 Sheets
1/2"	600	5/8" or 150 Sheets

### **MODEL 22/22HDS DISINTEGRATOR**

Screen Size	Pounds Per Hour	Suggested Feed Lots Every 10 Seconds
3/32"	350	3/8" or 85 Sheets
1/4"	450	1/2" or 110 Sheets
3/8"	550	5/8" or 150 Sheets
1/2"	700	3/4" or 175 Sheets

### **MODEL 23 DISINTEGRATOR**

Screen Size	Pounds Per Hour	Suggested Feed Lots Every 10 Seconds
3/32"	450	1/2" or 110 Sheets
1/4"	550	5/8" or 150 Sheets
3/8"	650	3/4" or 175 Sheets
1/2"	800	1" or 230 Sheets

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# **ELECTRICAL CURRENT and TOOL REQUIREMENTS**

**Disintegrator - TABLE 1**

DISINTEGRATOR Model # / HP	FULL LOAD CURRENT THREE PHASE POWER			
	208V	230V	460V	575V
2 @ 5 HP	16.6	14.4	7.2	5.8
3 @ 7 ½ HP	24.7	21.5	10.7	8.5
2, 1012 @ 10 HP	30.8	26.8	13.4	10.7
1012, 15 @ 15 HP	44.2	40.0	20.0	16.0
15, 22 @ 20 HP	55.2	50.0	25.0	20.5
22, 22HDS @ 25 HP	70.7	64.0	32.0	25.6
23 @ 25 HP	70.7	64.0	32.0	25.6
22HDS @30 HP	87.0	75.5	38.0	30.2
23HDS @ 40 HP	118.0	106.0	53.0	42.0
30 HP Models	86.9	75.5	37.8	30.2
40 HP Models	118.0	106.0	53.0	42.0

**MATERIAL UNLOADING- TABLE 2**

VACUUM HEAD Model # / HP	SINGLE PHASE	
	115V	230V
DAK # 1505-2 = 1 HP	6.8	3.2
DAK # 3925 = 2-1/4 HP	11.2	4.9

FAN UNIT Model # / HP	SINGLE PHASE	
	115V	230V
F-13 – 1/3 HP	6.8	3.4
F-034 – 3/4 HP	9.6	4.8

**TOOL REQUIREMENT – TABLE 3**

TORQUE WRENCH			ALLEN HEAD	OPEN END			
MODEL	BED KNIVES	ROTOR KNIVES	BED KNIFE ADJUSTMENTS	MOTOR ADJUSTMENT BOLT	HOPPER	BELT GUARD	
						COVER	BRACKET
2	5/16	9/16	1/8	3/4	9/16	7/16	9/16
3	5/16	9/16	1/8	15/16	9/16	7/16	9/16
1012	5/16	9/16	1/8	15/16	9/16	7/16	9/16
15	1/2	15/16	3/16	15/16	3/4	7/16	9/16
222/22HDS	1/2	15/16	3/16	15/16	3/4	7/16	9/16
23	1/2	15/16	3/16	15/16	3/4	7/16	9/16

**NOTE:** .005- inch feeler gauge required for knife gap setting.

Rear bed knife adjustment bolts have square heads, a short stamped out open end wrench required.

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# **PROCEDURE TO OPEN/CLOSE THE DISINTEGRATOR**

## **PROCEDURE TO OPEN DISINTEGRATOR**

Allow all material to run out of the cutting chamber.

**Shut OFF and LOCKOUT** all power including the main disconnect switch.

Open the machine by loosening the hex coupling nut(s) at the front of the machine enough to allow for rotation of threaded swing bolts out of the clamp(s) - see page 20, Disintegrator - safety latch open.

**NOTE:** It is never necessary to loosen the spring-block locknuts located on the front of the cutting chamber. The spring blocks are factory set and require no adjustment.

Apply a lifting pressure to the hopper in order to swing the machine up and back to the extreme open position.

**For machines equipped with hydraulic jacks:** Utilizing the jack handle, ensure the jack needle valve is fully closed by turning it clockwise until fully seated. Insert the jack handle into the pump pivot and pump the jack piston until the cutting chamber is fully up and back to the extreme open position (refer to the instruction label on the machine base).

**NOTE:** In the extreme open position, the machine is designed to remain open without the use of any devices; however, a safety latch has been provided to prevent accidental closing of the machine. The safety latch is located on the right side of the cutting chamber and should always be checked to verify that it has fallen into position upon opening the machine.

**CAUTION:** The knives mounted on the rotor and also located at the edges of the cutting chamber are extremely sharp. Always wear heavy gloves and use extreme care when working in the cutting chamber.

## **PROCEDURE TO CLOSE THE DISINTEGRATOR**

Ensure that all tools, rags, screws etc. are removed from the inside of the cutting chamber and screen chamber.

If previously removed, place the screen back into its original position, ensuring it is fully seated within the cradle.

The machine is designed to remain open by way of the counter balance springs and safety latch. To close the chamber, apply hand pressure to the hopper to allow the safety latch to release, by way of the pull-cable mechanism. The cutting chamber can now be easily lowered to close the machine.

**For machines equipped with hydraulic jacks:** The safety latch pull cord, located on the right side of the machine, should be pulled to disengage the safety latch. Utilizing the jack handle, slowly turn the jack needle valve 1/8-1/4 turn CCW to slowly lower the cutting chamber.

The closing speed of the cutting chamber can be regulated by turning the needle valve CW or CCW as needed (refer to the instruction label on the machine base).

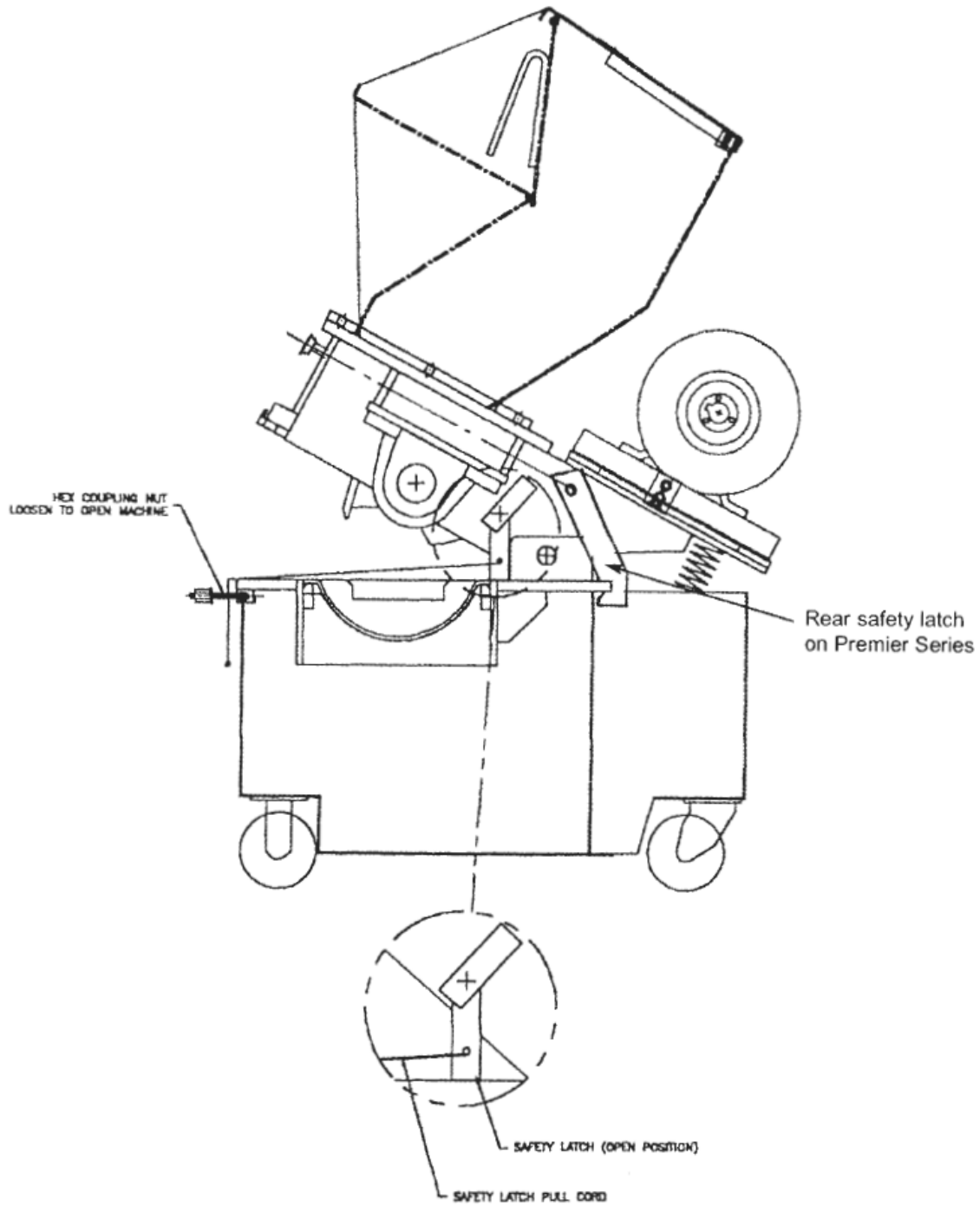
Securely close the machine by rotating the threaded swing bolts up into the clamps and tightening the hex coupling nut(s) at the front of the machine.

Recheck all components to ensure that they are properly fastened.

**For NATIONWIDE SERVICE Call 1(800)225-9293**

# STANDARD MACHINE SAFETY LATCH

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**For NATIONWIDE SERVICE Call 1(800)225-9293**

# **RECOMMENDED SPARE PARTS**

1 – Set of Rotor Knives and Screws

1 – Set of Bed Knives and Screws

1 – Screen or Set of Screens

1 – Set of Belts

1 – Set of Fuses

1 – Set of Motor Starters Heaters

1 – Fan/Cyclone Filter Bag (optional)

NOTE: Refer to part numbers when ordering replacement parts. Check the parts carefully as knives and screens generally have their numbers etched or stamped on them. The serial number of the machine will also be required when ordering parts from SEM. This listing of recommended parts does not include all parts which are available for purchase. The SEM Parts Department can be reached via a toll free number (1-800-225-9293) or [www.semshred.com](http://www.semshred.com).

**WARNING:** The use of replacement parts not manufactured or approved by SEM may void the products' warranty.

## **Recommended Spare Parts for Model 1012P – Disintegrator**

<b><i>ITEM</i></b>	<b><i>Part #</i></b>
Std. Angle Spare Set of Knives (5 Rotor / 2 Bed)	39910165K
Model 1012/5 Perforated Sizing Screen — select size ( 3/32", 1/4", 3/8", 1/2" )	3492218
Model 22 Disintegrator Maintenance Kit**	DMK1012
3-Mil Plastic Waste Bags ( 100 per box)	755BAG3MIL
V-Belts, 5/set	V3VX750/5

**For NATIONWIDE SERVICE Call 1(800)225-9293**

# **LUBRICATION SPECIFICATIONS**

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## **DESCRIPTION – BEARINGS**

All SEM Security Disintegrators and accessories are supplied with pillow block bearings which are pre-lubricated from the factory.

The external mounting of bearings on the SEM Security Disintegrators results in a trouble free, low maintenance, and long life bearing design.

The pillow block bearings used require a high quality, lithium based, EP (extreme pressure) type of grease which conforms to the NGLI Grade 2 consistency. This grease has been chosen due to its suitability for use in heavy duty applications under heavy shock loads. It also contains rust inhibitors, has high temperature stability, and exhibits good water resistance.

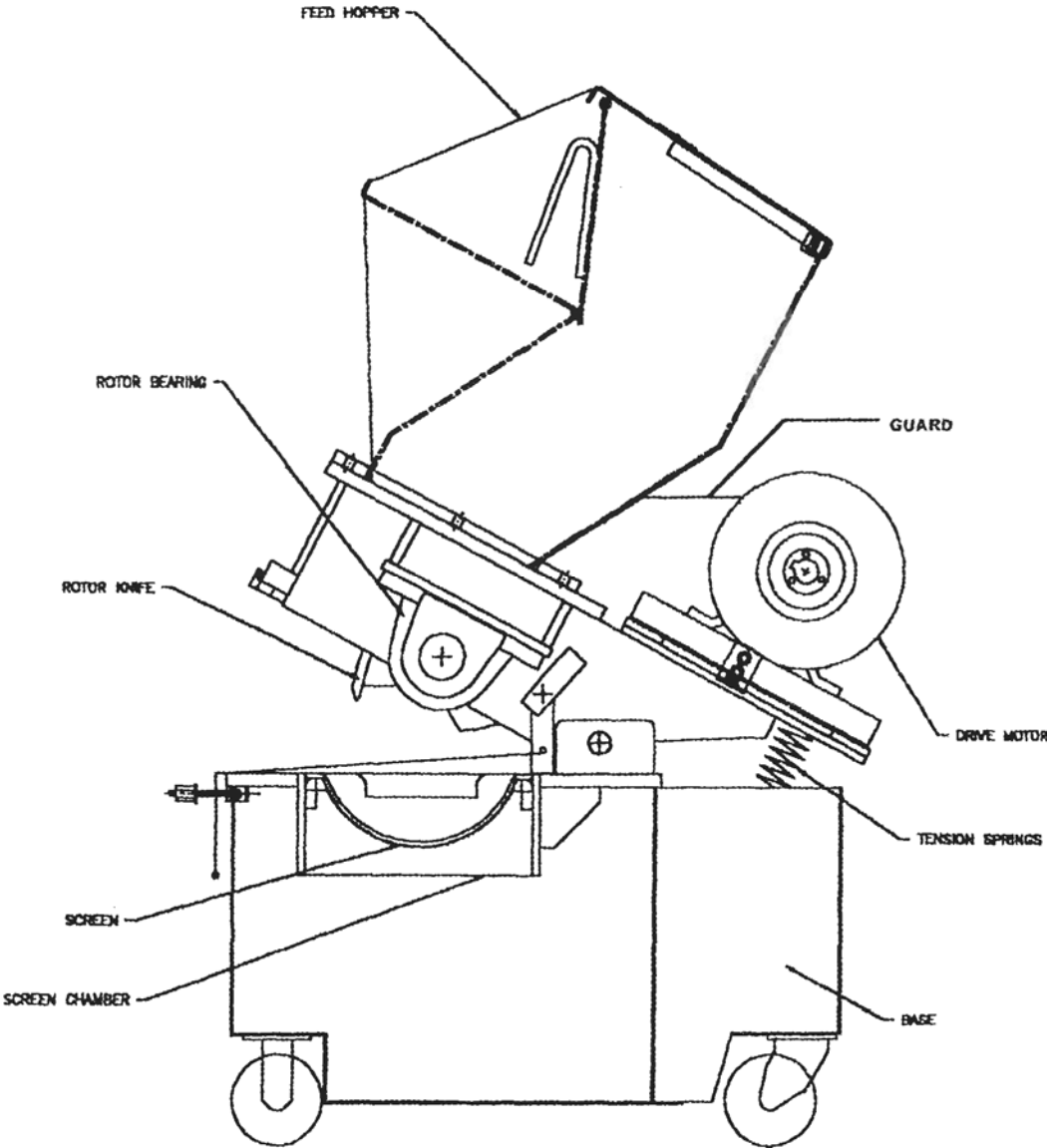
## **RECOMMENDED GREASE PRODUCT NAMES**

AMOCO	AMOLITH EP 2
CASTROL	EP2
EXXON	RONEX MP
GULF	CROWN #2
'OBIL	MOBILITH AW - 2
SHELL	ALVANIA EP LF #2
SUNOCO	SUNAPLEX #2
TEXACO	MULTIFAK EP 2

The pillow block bearings should be lubricated with care. Too much grease applied to the bearings at one time can rupture the bearing seals. Under normal operating conditions, a moderate amount of grease applied every 2000 hours should be adequate to ensure long life. Severe operating conditions will require more frequent lubrication intervals

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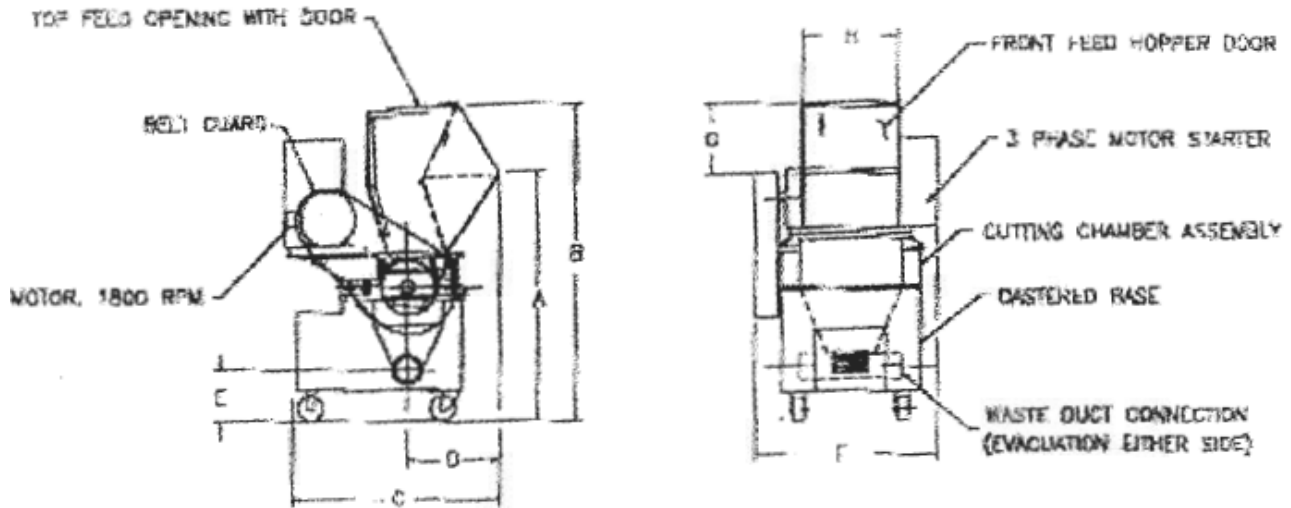
# CROSS SECTION OF A DISINTEGRATOR



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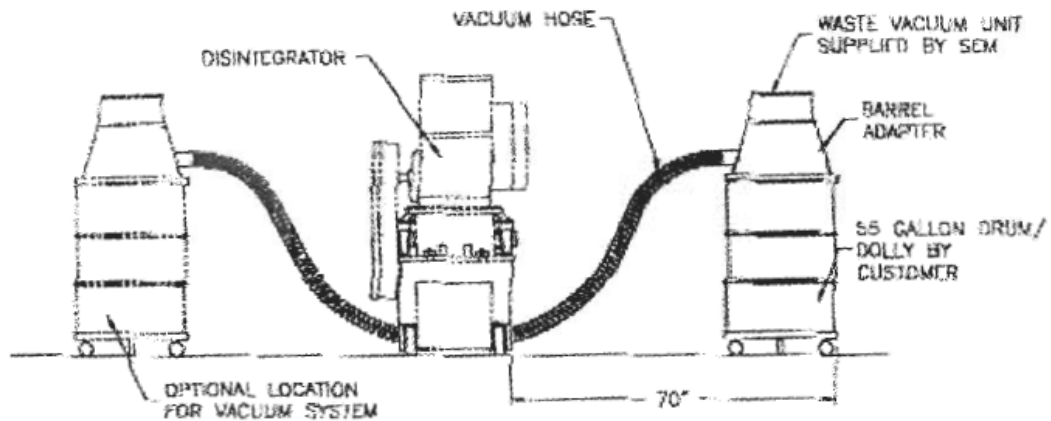
# DISINGRATOR DIMENSIONAL INFORMATION



MODEL	A	B	C	D	E	F	G	H
2	46.50" (1181 mm)	56" (1422mm)	31" (787MM)	13.50" (343mm)	6" (152mm)	23" (584mm)	2.75" (70mm)	10" (254mm)
3	50.50" (1283mm)	62" (1575mm)	42" (1067mm)	16" (406mm)	7.25" (184mm)	28.50" (724mm)	4.25" (108mm)	12" (305mm)
1012	50.50" (1283mm)	62" (1575mm)	42" (1067mm)	16" (406mm)	7.25" (184mm)	28.50" (724mm)	10" (254mm)	12" (305mm)
1012P.S II	55.50" (1410mm)	62" (1575mm)	48" (1219mm)	18" (457mm)	8" (203mm)	34" (864mm)	10" (254mm)	16" (406mm)
15	55.50" (1410mm)	69" (1753mm)	45" (1143mm)	19.75" (502mm)	12" (305mm)	38" (965mm)	12" (305mm)	15" (381mm)
22/22HDS	55.50" (1410mm)	69" (1753mm)	45" (1143mm)	19.75" (502mm)	12" (305mm)	38" (965mm)	12" (305mm)	20" (508mm)
23	55.50" (1410mm)	69" (1753mm)	48" (1219mm)	19.75" (502mm)	12" (305mm)	42" (1067mm)	12" (305mm)	24" (610mm)

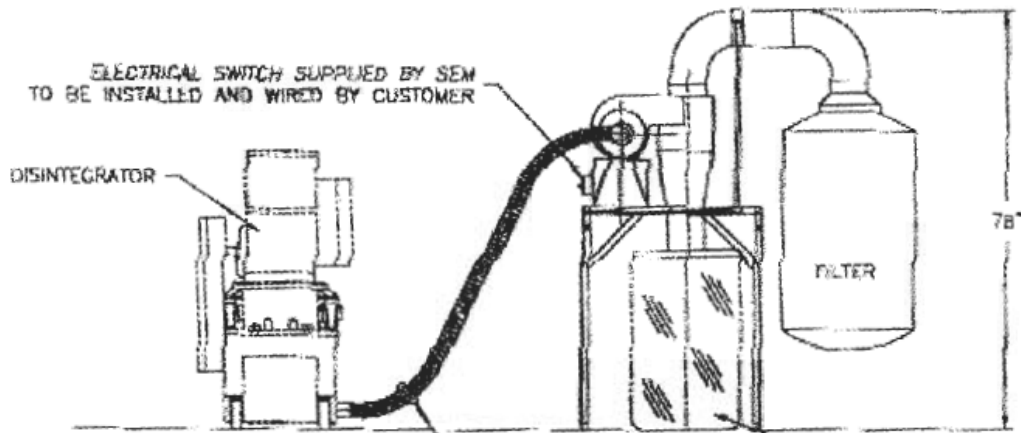
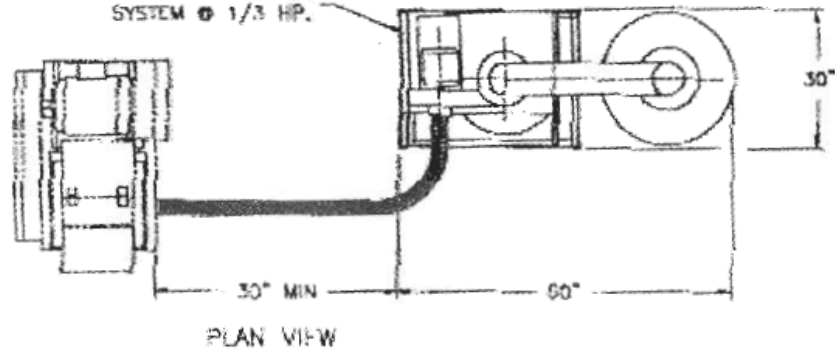
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# WASTE EVACUATION VACUUM or F-13 FAN UNIT



## F-13 FAN-WASTE EVACUATION SYSTEM WITH PLASTIC BAG

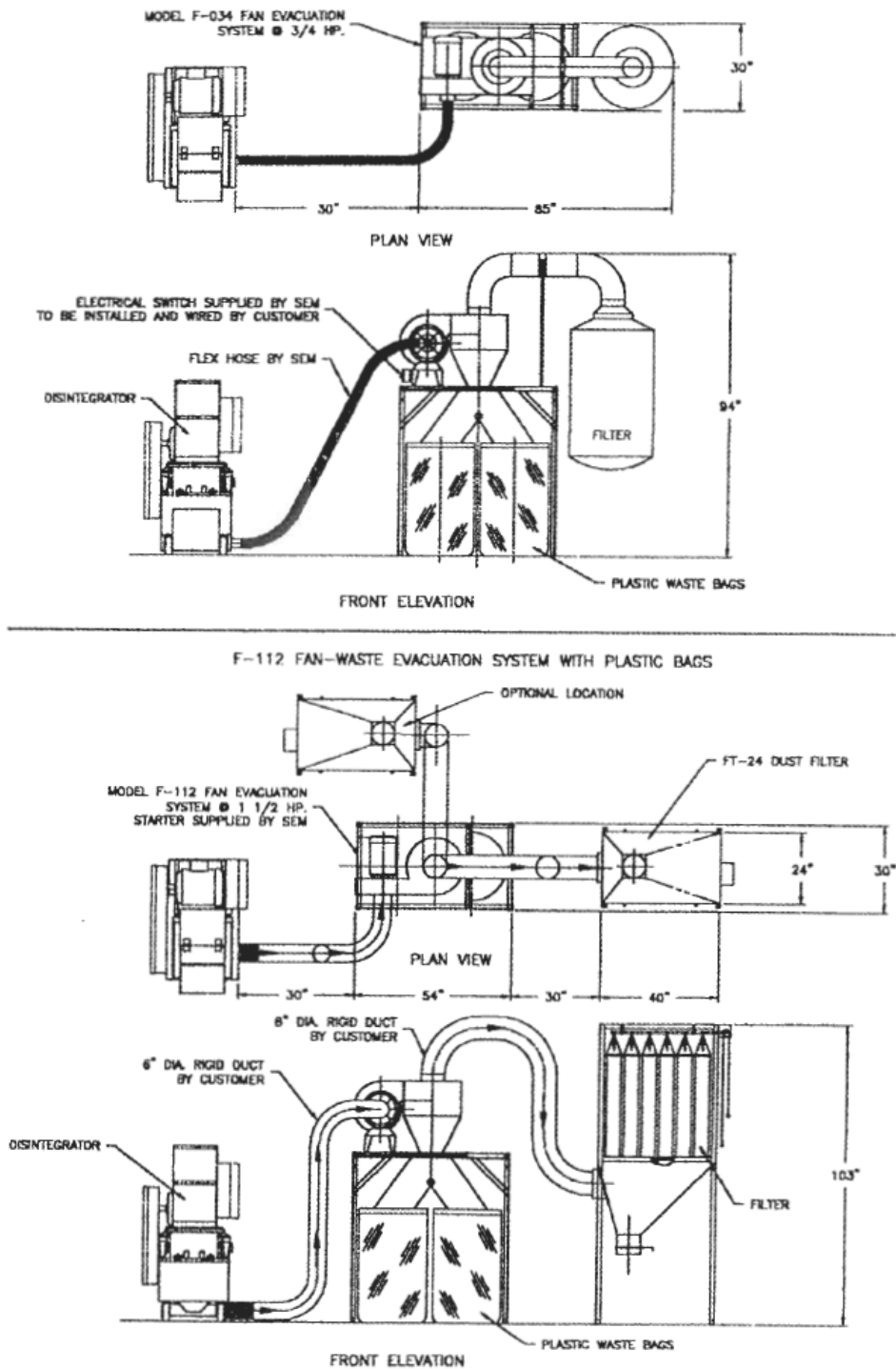
MODEL F-13 FAN EVACUATION SYSTEM @ 1/3 HP.



## WASTE EVACUATIONS - VACUUM OR F-13 FAN UNIT

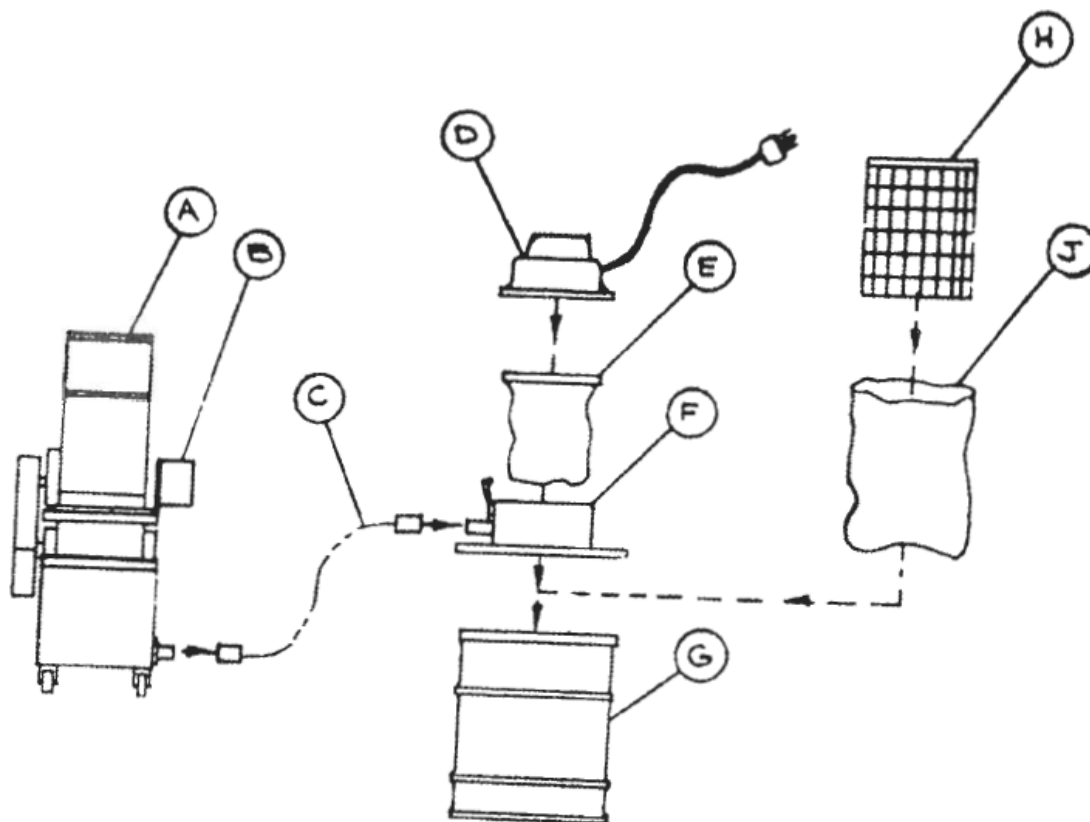
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# WASTE EVACUATION F-034 and F-112 FAN UNITS



**For NATIONWIDE SERVICE Call 1(800)225-9293**

## DIRECTIONS FOR VACUUM ON DRUM SET-UP



- A. Disintegrator
  - B. Motor Control Box
  - C. 5 Foot Vacuum Hose with Cuffs
  - D. Vacuum Motor head with Off-On Switch
  - E. Cloth Cage Primary Filter and Dacron Bag Secondary Filter
  - F. Drum Adapter
  - G. 55 Gallon Drum (Supplied by Customer)
  - H. Wire Bag Retainer (Only if Plastic Bags are to be used) NOTE: Retainer must be opened to full diameter. Plastic Bag *liner* - 55 Gallon Drum Size.
- NOTE:** (H) Must be used.

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# DIRECTIONS FOR CHANGING BAGS ON FAN UNITS

## 3 STEPS TO CHANGE PLASTIC BAGS FOR TYPICAL FAN EVACUATION SYSTEMS

