

DO NOT REMOVE THIS NOTICE

WARNING: This machine is potentially dangerous and could cause serious injury or death.

- Read, obey, and understand operating and safety instructions.
- Wear eye protection and other appropriate safety items.
- Never climb, walk or stand on machine.
- Inspect machine before operating, making sure all guards are in place and in good condition.
- Operate within rated machine capacity.
- Do not remove hopper or guards while machine is in operation.
- Keep clear of all moving parts.
- Never try to clear hopper with stick or other tools while machine is on.
- Do not put hands or other body parts inside machine or any moving part or pinch point.
- Use extreme caution when around machine and controls.
- Keep machine clean and properly maintained.
- Stop machine immediately at any sign of malfunction or danger.
- Use electrical lockouts when servicing and/or when machine is not in use.
- Only authorized personnel should operate this machine.

WARNING: This machine is potentially dangerous and could cause serious injury or death.

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JORDAN STANDARD SHREDDER

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*O.E.M SUCCESSORS TO MITTS AND MERRILL
MATERIAL PROCESSING AND SIZE REDUCTION EQUIPMENT*



SPECIAL SAFETY WARNING!

You Jordan Reduction Solutions Shredder is built to the highest quality and standards and equipped with several safety features to prevent injury to personnel and significant damage to the equipment. Such safety mechanisms built into the JRS shredders are as follows:

1. **PLC Current Monitoring:** The PLC will continuously monitor the current and amperage of the drive system. If any sustained amperage load is read by the PLC, the shredder will automatically stop and reverse itself to clear the blade of any material that may be causing the overload. This process can occur and repeat to the maximum number and time of three (3) reversals in three (3) minutes. If the PLC senses three reversals in three minutes, the PLC will initiate an **EMERGENCY SHUT DOWN PROCEDURE**.
2. **Overload/Catastrophic Event Limit:** Your JRS shredder is equipped with a mechanical limit switch located at the reducer torque arm bracket. Should your shredder encounter a foreign material it was not designed to shred in such a way as to immediately stop the knives or put excessive torque into the reducer, this limit switch will be tripped and the PLC will initiate an **EMERGENCY SHUT DOWN PROCEDURE**.

*** WARNING ***

If the PLC does initiate an **EMERGENCY STOP CONDITION - DO NOT RESTART THE MACHINE** without taking the following actions:

1. Remove all un-shred material from the hopper so that all blades can be inspected
2. Inspect the un-shred material for any foreign matter such as motors, shafting, tramp metal, etc... or any other item that should not be in your material stream that may damage the shredder.
3. Inspect all knives, spacers and other components for damage.
4. Remove any foreign matter and all un-shred material **PRIOR TO RESTARTING THE SHREDDER**.
5. Reset the PLC and start the shredder with a **NO LOAD** condition (no material in hopper)
6. Assure shredder is properly operating prior to resuming normal shredding operations.

Failure to comply with the above guidelines can result in catastrophic failures and void all warranties.



355 Clow Lane Birmingham, AL 35217
Ph: 205-849-5050 / Toll Free: 1-888-733-8248

SHREDDER WARRANTY

GUARANTEE Unless otherwise stated in the Company’s proposal, the Company guarantees the equipment pursuant to these contractual conditions for a period of one year (single shift operation; maximum 2080 hrs per year) from date of start-up or 18 months from date of shipment, which ever occurs first, to the extent that the Company will replace any defective material caused by faulty design, workmanship or material furnished by the Company of which the Company is notified during the guarantee period, subject to the following conditions:

a. This guarantee covers equipment, accessories and parts not manufactured by the Company only to the extent of liability to the Company on the part of the manufacturer thereof, but any guaranty obtained by the Company from any such manufacturer shall be deemed to have been obtained for the benefit of the Purchaser. Warranty for the items listed below are covered by the original manufacturer's warranty provisions only:

- Gear Reducers
- Air Clutch
- Diesel Engines
- Power Take Off Units
- Electrical Components
- Grease/Oil Seals
- Bearings
- Electrical Motors
- Conveyors
- Hydraulic Components
- Generator Set
- Blower Systems

b. This guarantee does not cover attack on the materials due to damaging service conditions encountered, including but not limited to abrasive actions, electrolytic/chemical attack, or what may be considered as standard wear items. Standard wear items include, but are not necessarily limited to the following items:

- Lights/Light Fixtures
- Tires/Rims
- Seals
- Drive Belts/Sheaves
- Conveyor Belts/Rollers
- Main Bearings
- Drive Chains/Sprockets
- Cutter Knives/Spacers/Fingers /Screens

c. The foregoing guaranty and the remedy contained therein are exclusive and in lieu of all other guaranties, remedies, and warranties whether statutory, express, or implied. Any warranties of fitness for a particular purpose or of merchantability are expressly excluded. The Company shall not be liable for any special, indirect, incidental, or consequential loss or damage whatsoever.

d. This guarantee shall be voided and rendered invalid if the purchaser fails to properly maintain the machinery as outlined in the service manual. This includes changing knives when they become dull or damaged.

e. During the warranty period only the parts supplied by the Company shall be used. This includes knives, spacers or any wear item. **Installation of NON OEM parts during the warranty period of this equipment shall automatically void this warranty.**

**O.E.M SUCCESSORS TO MITTS AND MERRILL
MATERIAL PROCESSING AND SIZE REDUCTION EQUIPMENT**



SHEET C

ORDERING PARTS

Shredder repair parts can be ordered from Jordan Reduction Solutions, Birmingham, Alabama. Some wear parts are in stock and available for fast delivery. However, please do not count on obtaining major shredder components on short notice since they may not be stock items. Special customer requests which require overtime work or express shipments can be expected to result in premium charges. When ordering parts, please furnish:

1. Serial Number
2. Item number, name, and part number of item required.
3. Quantity of each.
4. How to ship parts (freight, rail, truck, parcel post, or rail express, etc.)
5. Where to ship (physical mailing address).
6. Purchase order number, if your company requires one.
7. Method of payment: Purchase Order (with approved account set up) prepayment, C.O.D.

ORDER BY MAIL, PHONE, FAX OR EMAIL FROM:

Jordan Reduction Solutions

P.O. Box 170339
355 Clow Lane
Birmingham, Alabama 35217

PHONE: 205-849-0178

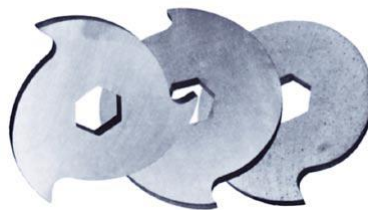
PHONE: 888-733-8248

FAX: 205.849-5075

Sales: sales@jordanreductionsolutions.com

Parts: parts@jordanreductionsolutions.com

HOURS: 8 a.m. to 4:30 p.m. Central time, Monday-Friday



O.E.M SUCCESSORS TO MITTS AND MERRILL
MATERIAL PROCESSING AND SIZE REDUCTION EQUIPMENT



Mitts & Merrill
Quality Since 1854

JRS Mitts and Merrill Shredder Application Guidelines							
Model Number	MS-1714	MS-2817	MS-4220	MS-4526	MS-5028	MS-5040	MS-6040
Aluminum Turnings	Green	Green	Yellow	Red	Red	Red	Red
Aluminum Cans	Green	Green	Green	Green	Green	Red	Red
Carpet	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Cosmetics	Green	Green	Red	Red	Red	Red	Red
Computer: Electronics (small)	Red	Green	Green	Red	Red	Red	Red
Computer: Plastics / CRT	Red	Red	Green	Green	Red	Red	Red
Computer: Hard Drives	Red	Red	Green	Green	Red	Red	Red
General Refuse	Red	Red	Green	Green	Green	Green	Green
Glass: Bottles	Red	Green	Green	Red	Red	Red	Red
Glass: General	Green	Green	Green	Red	Red	Red	Red
Medical Waste	Red	Red	Green	Red	Red	Red	Red
Paper: CPO / Loose	Green	Green	Green	Green	Red	Red	Red
Paper: Periodicals / Magazines	Red	Red	Red	Yellow	Yellow	Yellow	Red
Paper: General	Green	Green	Green	Yellow	Yellow	Yellow	Red
Paper: Books - Binders	Red	Red	Red	Yellow	Yellow	Yellow	Red
Pharmaceuticals	Green	Green	Green	Red	Red	Red	Red
Plastics - General	Green	Green	Green	Green	Green	Green	Red
Plastics - Pallets, etc...	Red	Red	Green	Green	Green	Green	Green
Plastic Purgings (Small-Med))	Red	Red	Red	Yellow	Yellow	Yellow	Yellow
Plastic Purgings (Large)	Red	Red	Red	Green	Green	Green	Green
Steel Turnings	Green	Green	Green	Yellow	Yellow	Yellow	Yellow
Tires: Passenger / Light PU	Red	Red	Red	Green	Green	Green	Green
Tires: Truck	Red	Red	Red	Red	Green	Green	Green
Wood Pallets	Red	Red	Green	Green	Green	Green	Green
Wood Slabs	Red	Red	Red	Green	Green	Green	Green
Color Key -							
Recommended Application	Green						
Consult Factory	Yellow						
Not Recommended	Red						
Recommendations are based on average testing of type and quantity of material. Your shredder requirements / application may vary according to your specific needs.							

**O.E.M SUCCESSORS TO MITTS AND MERRILL
MATERIAL PROCESSING AND SIZE REDUCTION EQUIPMENT**





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**SHEET D
 SECTION 1
 INSTALLATION**

Carefully remove all crating from your shredder and be sure to examine the cutting chamber to see that nothing has fallen into it that can cause damage on start-up.

Careful thought should be given to the location of your shredder to aid the material handling process.

The shredder should be placed on a concrete slab. Anchoring the shredder is required. A minimum slab thickness of 7" is recommended with reinforcement of two mats of bars (one top, one bottom), each of #4 bars @ 12" c/c each way. The first layer of reinforcement should be 2" up from the bottom of the slab, and the second layer 2" below the top of the slab. Most industrial plants will already have floors that meet the above-recommended foundation.

NOTE: All bolts (especially in tail end nuts) should be checked for proper torque as vibration in shipping could have caused loosening of some bolts.

APPROXIMATE WEIGHT OF STANDARD SHREDDER				
MS-1714	MS-2817	MS-4220	MS-4526	MS-5028
1,950 LBS	4,500 LBS	10,000 LBS	12,000 LBS	18,000 LBS

**O.E.M SUCCESSORS TO MITTS AND MERRILL
 MATERIAL PROCESSING AND SIZE REDUCTION EQUIPMENT**



SECTION 2-A ELECTRICAL

After the shredder has been moved to the installation site, it should be electrically connected by a qualified electrician. All wiring should be done in accordance with local ordinances, national electric code, and plant specifications.

A fused disconnect or circuit breaker must be supplied by the factory or the customer for each shredder electrical panel.

* GUIDE TO ELECTRICAL WIRE SIZE AND FUSE BOX

HP	VOLTAGE **	AVERAGE FULL LOAD CURRENT AMPS	MAX. FUSE CLIP SIZE ***	MIN. LEAD WIRE SIZE (THHN)
10	230	26	30	8
	460	13	30	12
20	230	50	60	4
	460	25	30	8
50	230	120	200	0
	460	60	100	4
75	230	192	200	000
	460	96	100	3
150	230	360	600	400 mcm
	460	180	300	00

* Consult an electrical engineer or a qualified electrician.

** Average voltage supplies. Voltage in your area may vary as well as the voltage of your motor supplied (Consult nameplate on motor).

*** All fuses should be dual element fuses.

NOTE: ALL EMERGENCY STOPS, GUARD INTERLOCKS IF APPLICABLE AND ALL LIMIT SWITCHES MUST BE WIRED ACCORDING TO ELECTRICAL SCHEMATICS PROVIDED. FAILURE TO DO SO COULD SEVERELY DAMAGE YOUR MACHINE AND VOID ALL WARRANTY. IF YOU FEEL YOU NEED ASSISTANCE IN WIRING UP CONTROL POWER AND ELECTRICAL COMPONENTS, PLEASE CONTACT THE FACTORY AT 1-888-733-8248.

SECTION 2-B ELECTRICAL

ELECTRICAL OPTION TERMINOLOGY

REVERSE CYCLE COUNTER - An adjustable counter that counts the number of shaft reversals and shuts the machine down when the preset count has been reached.

REVERSE CYCLE COUNTER/TIMER - An adjustable timer and counter that counts the number of shaft reversals in a given period of time. If the number of reversals are exceeded within the given period of time, the machine automatically shuts down. If the number of shaft reversals are not exceeded in the given period of time, the counter will automatically reset to zero.

ELECTRIC EYE - The shredder starts automatically when material reaches a predetermined level in the feed hopper and remains on for a timed interval after the electric eye can no longer see the material.

SONAC - An ultrasonic sensing device that works on the principle of sonar. The shredder starts automatically when material in the feed hopper reaches a predetermined level and remains on for a timed interval after the Sonac no longer receives a sound wave indicating the material is absent at the high level point in the hopper.

OFF TIMER - The shredder runs for a predetermined time after starting, and then automatically stops. The time interval is controlled by an adjustable timer.

KEY START SWITCH - A key operated selector switch wired in series with a standard push button to start the shredder. Both switches must be made at the same time to start the shredder. If power is lost, the shredder will not automatically restart when the power comes back on.

IMPULSE LIMIT – A mechanical limit switch located normally near the torque arm of the shredder reducer unit and designed to trip under severe load to protect the unit from damage. The impulse limit works in like manner as an e-stop, shutting down al

l control power and normally requiring a system reset.

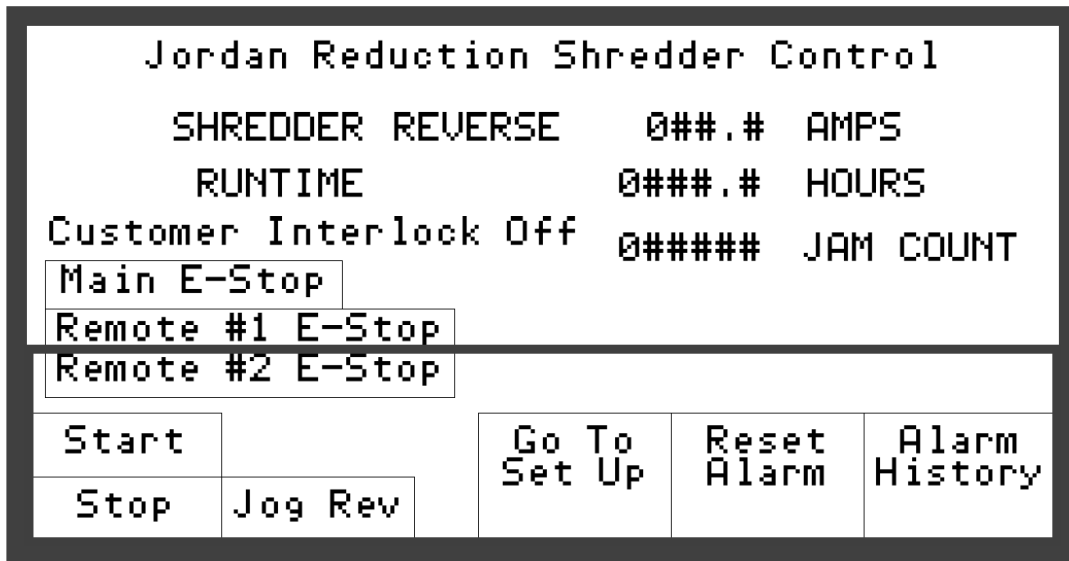
SECTION 2-C

BASIC ELECTRICAL DIAGRAM

Reference Electrical Schematics in Drawings Section of this manual

Basis Shredder HMI Operation

1. Shredder Main Screen: When the control panel is first energized, the first screen to display on the HMI is the main shredder control screen as shown below:



Not all of the display commands shown above appear when the panel is energized. The E-stop displays shown above only display if an E-Stop is depressed:

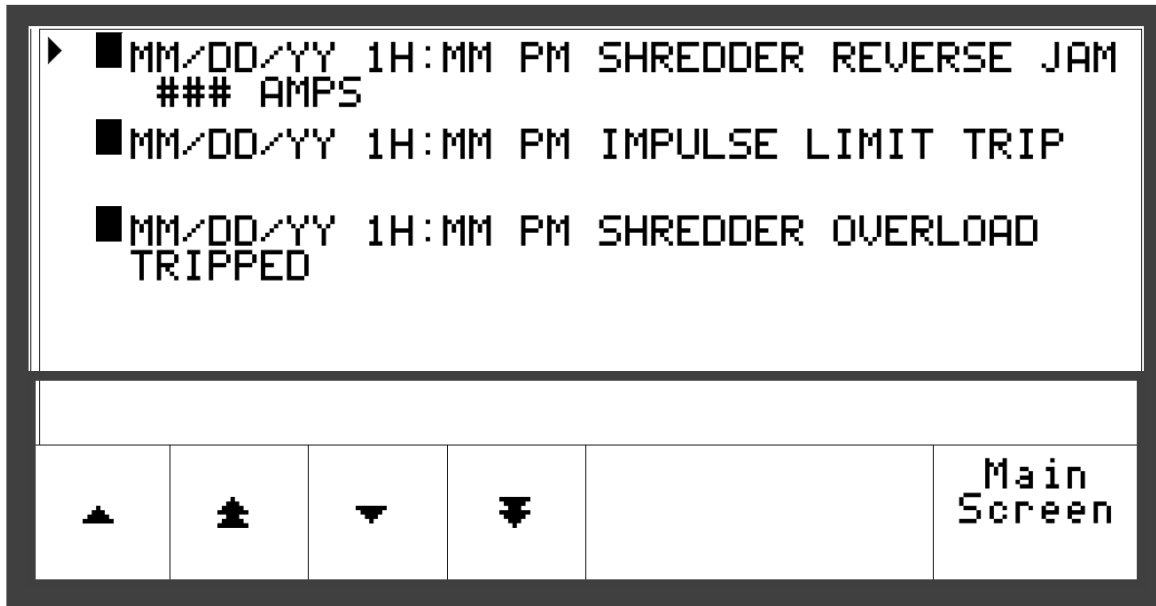
From this screen you will run the main operation of your system. Pressing the START button will start the system beginning with the granulator, conveyor and then the shredder. The JOG REVERSE button is included in the main screen should the shredder trip the main overload for any reason. An overload trip will shut the shredder down and allow you to manually reverse it if needed to unjam any materials. PLEASE NOTE: it is normal in operation for the shredder to reverse itself and start forward again if it encounters something that would cause an overload.

The stop button, once pressed will perform a system stop beginning with the shredder, then the conveyor

and finally shutting down the granulator after assuring that all material is ground.

ALARM RESETS: If an alarm occurs that causes the shredder to shut down, these alarms can be reset by pressing the RESET ALARM button. **WARNING –** If the alarm is tripped, please be sure there are no foreign materials in the shredder such as tramp metals, etc... that could be causing the trip.

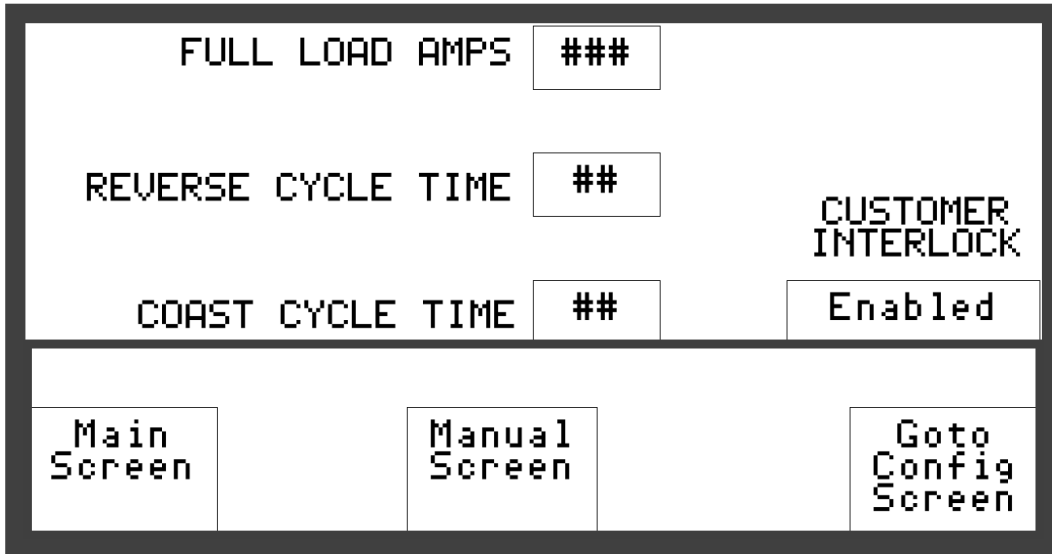
Alarm History: You can access the alarm history screen by pressing the alarm history button shown above. The alarm history screen is shown on the following page.



Alarm History is shown in this screen. Use the arrow keys to page through the alarms. This screen cannot be cleared.

2. SET UP SCREEN: The set up screen can be accessed from the main screen by pressing the GO TO SET UP button. PLEASE NOTE: Setting in this screen are factory set to our recommendations and should not need adjustment at installation.

To access the set up screen, the password is: 9112001 The set up screen configuration is as follows:



MAIN SCREEN: This button takes you back to the main shredder operational screen

MANUAL SCREEN: This button takes you to the manual operation screen where you can run each piece of equipment separately for maintenance requirements.

FULL LOAD AMPS: Factory preset – do not change

REVERSE CYCLE TIME: Factory preset – do not change

COAST CYCLE TIME: Factory Preset – do not change

CUSTOMER INTERLOCK: This must remain enabled for normal operation. Disable only in the need of maintenance where individual machine operation is needed.

SECTION 3 DRIVE TRAIN PROTECTION

- A. This machine is designed to reverse on heavy feeds to prevent jamming and damage. There is a magnetic current relay in the panel, preset at the factory, which will start the reverse sequence.
- B. The torque arm attached to the reducer is designed to protect the knives and other moving parts in the drive train by use of springs which will absorb the shock of instantaneous peak loads.
- C. The impulse switch located by the torque arm is set to shut off the machine when a very high instantaneous load is put on the machine, causing the springs to compress enough so that the bolt attached to the torque arm bracket trips the impulse limit switch (The impulse limit switch is standard equipment on the MS-1714 and the MS-2817 Shredders).
- D. To adjust the impulse limit switch, set the screw above the trip lever to desired height, but not exceeding maximum dimension shown, and tighten jam nuts in place.
- E. The total travel of the springs to reach solid height is .58". Subtracting the travel of the trip lever to operate the contacts in the impulse limit switch leaves .25" height dimension between the trip lever and the screw, at which point the springs will reach solid height. An allowance of .06" is needed to keep the springs from reaching solid height and resulting in shock loading being transmitted back through the drive train. Therefore, the maximum height that the screw should be set above the impulse switch level is .19"

SECTION 4-A

SAFETY

- A. Do not operate machine if guards are not in place (See sketch below).
- B. Do not reach into the cutting area unless shredder is electrically disconnected.
- C. The operator should wear safety goggles to provide protection against "fly-out" during shredder operation.
- D. If gloves are worn, it is suggested they be of loose type. **DO NOT WEAR A GAUNTLET GLOVE!**
- E. Do not open the electrical panel. If a problem arises, call a qualified electrician.
- F. Do not climb, walk or stand on machine.
- G. Read and understand machine operating instructions.

SECTION 4-B SAFETY

- A. Use extreme caution when around machine and controls.
- B. Check general machine condition.
- C. Check condition of machine guards.
- D. Operate within rated machine capacity.
- E. Wear appropriate personal safety items.
- F. Stop machine immediately at any sign of malfunction or danger.
- G. Keep clear of all moving parts.
- H. Do not put hands or other body parts inside machine.

SECTION 5 START-UP

Before starting your shredder, check the following:

- A. Check the oil level in the shredder gearbox, the shaft-mounted reducer, and reversing transmission. They have been filled at the factory, but during transit some oil may have been lost. If oil is needed, refer to Section 6 for recommended oils to use for each one.
- B. Make sure no water has been introduced into the gear box during transit. If it has, drain the gear box and replace with new oil.
- C. Check carefully to see that no damage has occurred during shipment or installation.
- D. Make sure that all screws and nuts are securely tightened. (see torque note below)
- E. Check the belts to see if they are tensioned properly. Refer to Section 9 on belt care and tensioning.
- F. Be sure the cutting chamber is clear of any nuts, bolts, wrenches, or other foreign materials.
- G. Start the shredder. A timer will delay the start of the motors for approximately five seconds. The knives of the cutting chamber should first rotate in reverse (see sketch), stop, and then rotate forward. If the knives rotate opposite of this pattern, have a qualified electrician reverse any two (2) of the incoming leads until you obtain the correct rotation.
- H. If your shredder is in an unheated area, it should be run for several minutes every time it is started up before feeding any material into the cutting chamber.
- I. Begin to feed your material into the hopper after the machine has stopped its reverse cycle and starts in its forward rotation. If it stops, check to see if some solid object has been overlooked.
- J. This shredder is designed to reverse on heavy feeds to prevent jamming and damage. If your shredder stops and reverses frequently, you may be jamming the machine by feeding the material too fast. If correcting this feed still does not prevent frequent stopping and reversing, then call the Jordan Reduction Solutions Service Department.

Torque Notes:

- 1. All new shredder installations may experience loosening of bolt torque due to vibration in shipping. All bolts should be checked for proper torque.
- 2. Shredder tail end nuts should be checked and re-torqued weekly during the first 30 days of operation.

SECTION 6-A

OIL

There are two different types of oil required- one type for the shredder gearbox and one for the shaft-mounted reducer.

- A. Check oil level in shredder gearbox frequently (at least every 40 hours of operation). Drain oil when it becomes contaminated or every 750 hours of operation, and replace.

RECOMMENDED OILS FOR SHREDDER GEAR BOX
GADUS S2V 220 (00) AMOCO MINE LUBRICANT # 00

*THESE OILS ARE NOT TO BE USED IN THE SHAFT MOUNTED REDUCER.

OIL CAPACITY OF SHREDDER GEAR BOX	
MODEL	CAPACITY
MS-1714	3 Gallons
MS-2817	3 Gallons
MS-4220	5 Gallons
MS-4526	12 Gallons
MS-5028	18 Gallons
MS-5040 / MS-6040	26 Gallons

SECTION 6-B

OIL

BROWNING / DODGE SHAFT-MOUNTED REDUCER

- B. Check oil level in the reducer regularly (At least every 80 hours of operation).
- C. Under average industrial operating conditions, the lubricant should be changed every 1,000 hours of operation or every 6 months, whichever occurs first. Drain reducer and flush with kerosene, clean magnetic drain plug, and refill to proper level with new lubricant. CAUTION: Too much oil will cause overheating, and too little will result in gear failure.
- D. Under extreme operating conditions, such as rapid rise and fall in temperature, dust, dirt, chemical particles, chemical fumes or oil sum temperatures above 200° F., the oil should be changed every one to three months, depending on severity of conditions.

OIL VOLUMES

SHREDDER SIZE REF.	REDUCER SIZE	VOLUME OF OIL REQUIRED TO FILL REDUCER TO OIL LEVEL PLUG
ALL	ALL SIZES	FILL REDUCER UNTIL OIL SPILLS FROM MIDDLE PLUG

RECOMMENDED OIL FOR SHAFT MOUNTED REDUCERS

ROOM TEMPERATURE FAHRENHEIT	OIL
0° - 100° 101° - 180°	ISO GRADE 320

SECTION 7 GREASE

- A. The bearings in the end plate of the shredder should be greased at regular intervals. There are two grease fittings on the end plate by which they can be greased (The bearings on the MS-1714 shredder are permanently sealed and do not need greasing).

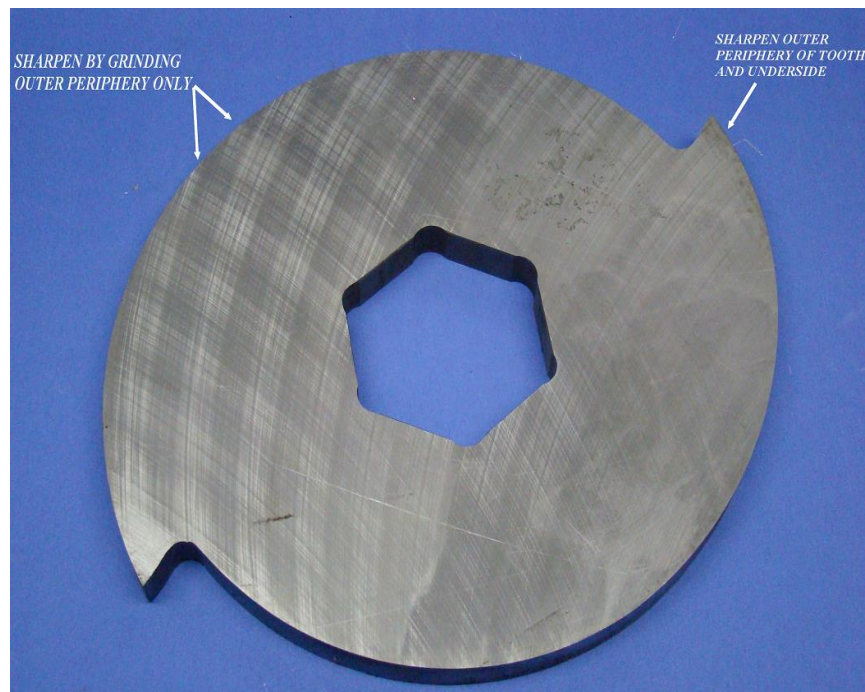
Recommended lubricants for normal application conditions include Shell Alvania #2, Amolith #2, Mobil-Lux #2, or equivalent. It is essential to use grease that is free of acid, alkali, abrasive fillers or dirt. When equipment will be idle for some time, addition of fresh grease before shutting down will ensure maximum protection to the bearing races. Refer to chart below for frequency and amount of grease needed to re-lubricate bearings in end plate of shredder.

SHREDDER	GREASE REQUIRED OZ. PER BEARING	*RECOMMENDED NUMBER OF MONTHS BETWEEN RELUBRICATION (BASED ON 40 HR. WEEK)
MS-1714	-----	SEE FIRST PARAGRAPH
MS-2817	0.2	<i>SEE VENDOR LITERATURE SECTION FOR MANUFACTURER'S RECOMMENDATIONS</i>
MS-4220	0.6	
MS-4526	2	
MS-5028		
MS-5040		
MS-6040		

- * Re-lubrication amounts and frequencies shown in table are based on housing temperatures of 150° F. or less. Lubrication practices indicate that the re-lubrication frequency should be doubled for every 20° F. increase above that level.
- B. All of the Dodge reducer bearings are lubricated from the oil inside the reducer and therefore do not need greasing.
- C. Your motor is equipped with double-shield ball bearings having sufficient grease to last indefinitely under normal service. Where the motor is used constantly in dirty, wet, or corrosive atmospheres, it is advisable to add one quarter ounce of grease per bearing every three months. Use a good quality rust inhibited polyuria based grease, such as Chevron SRI.
- D. When greasing the bearings, keep all dirt out of area. Wipe the fittings completely clean and use clean equipment. More bearing failures are caused by dirt introduced during greasing than from insufficient grease.

SECTION 8 GENERAL MAINTENANCE

- A. All nuts and bolts should be checked monthly to see that they are not vibrating loose.
- B. Daily inspection of the underside of the cutting chamber is required for certain types of shredding operations. Any build-up in this area should be removed immediately to prevent undue wear to the shredder. **NOTE: Always have the machine disconnected electrically when working on the cutting chamber area.**
- C. Periodically clean out any build-up of residue on the knives, side fingers, hopper, and other parts of the cutting chamber. If you use a steam cleaner, do not direct it at the bearings on the end of the shafts because water will be forced into the gear box.
- D. Periodically clean the outside of the control panel to prevent contamination of the electrical controls within.
- E. Check the sharpness of the knives at least every two (2) weeks. Grinding for sharpening should be done on outer periphery. Do not grind thickness – Grind outside periphery only!



SECTION 9-A BELT CARE AND TENSIONING

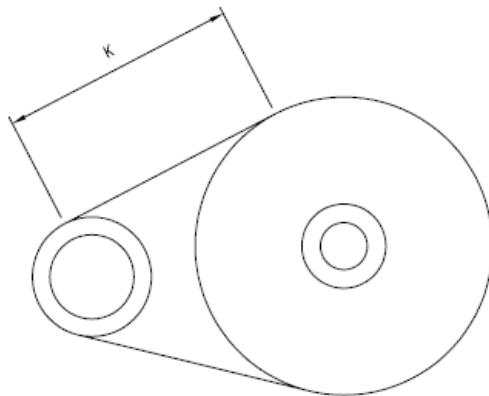
TENSIONING A DRIVE

General Rules of Tensioning:

- A. Ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
- B. Check tension after sixteen (16) hours and again after fifty (50) hours of initial operation.
- C. Over-tensioning shortens belt and bearing life.
- D. Keep belts free from foreign material which may cause slip.
- E. Make V-drive inspection on a periodic basis. Tension when slipping. Never apply belt dressing as this will damage the belt and cause early failure.

TENSIONING PROCEDURE

- A. Measure the span length, K. Center to Center of Pulley



- B. At the center of the span (K) apply a force (perpendicular to the span), large enough to deflect the belt 1/64" for every inch of span length.

EXAMPLE: The deflection of a 34-inch span would be 34/64 or 17/32 inch.

A V-belt tension tester is a good tool to have for easy checking of belt tension. Scales are provided for reading both the required force and the distance of belt deflection.

O.E.M SUCCESSORS TO MITTS AND MERRILL
MATERIAL PROCESSING AND SIZE REDUCTION EQUIPMENT



Mitts & Merrill
Quality Since 1854

SECTION 9-B

BELT CARE AND TENSIONING

- C. Compare the force you have applied with the values given in the table below. If the force is between these values and gives the proper deflection, then the drive tension should be satisfactory. If the force is outside these values, then the belts are either too loose or too tight and needs to be tensioned accordingly.

SHREDDER SIZE	DEFLECTION FORCE
MS-1714	3.6 TO 5.2
MS-2817 – MS-4220	9.6 TO 14.4
MS-4526 – MS-5028	9.6 TO 14.4

INSTALLING A NEW SET OF BELTS

- A. Before installing a new set of V-belts, check the condition of the sheaves. Dirty or rusty sheaves impair the drive's efficiency and abrade the belts, which results in premature failure.
- B. Worn sheaves can shorten belt life as much as 50%. If the grooves are worn to where the belt bottoms, slippage may result and burn the belts. If the sidewalls are "dished out", the bottom shoulder ruins the belt prematurely by wearing off the bottom corners.
- C. If the sheaves need replacing, make sure that the new sheaves are in alignment. Check the alignment by placing a straight edge or tight cord across the sheave faces so that it touches all four points of contact. Ordinarily, a misalignment of more than one-half of one degree (one-eighth inch in one foot) will adversely affect belt life. Improper sheave alignment produces uneven wear on one side of the belt, causes the belt to roll over in the sheave, stretching or breaking the cords on that side.
- D. When installing belts, always replace V-belts with a complete new matched set of belts.
- E. When placing belts on sheaves, shorten the center distance of the drive until the belts can be put on the sheaves without forcing. Forcing the belts can cause internal injury to the belts.
- F. After the proper operating tension has been applied to the belts, a double check should be made of the following:
1. Parallel position of the sheave shafts.
 2. Correct alignment of sheaves.

SECTION 10-A SHREDDER KNIFE ARRANGEMENTS

- A. Knife arrangements are identified as 1 + 1 + 1, 2 + 2 + 1 + 1, etc.
1. Only the SLOW (Driven) shaft is considered.
 2. Knives and spacers are counted off consecutively starting with a knife at the gear box end of the cutting chamber.
 3. Numbers are listed in order until they begin to repeat. Example:
$$2 + 2 + 1 + 1 + 2 + 2 + 1 + 1 \text{ ----}$$
- B. Knives will always be assembled on shaft in a spiral pattern unless otherwise instructed.
1. If pattern is other than spiraled, it will be written on the shop order.
- C. When two knives are assembled together:
1. Single hooked knives will have one hook up and one hook down.
 2. Multiple hooked knives will be spiraled with respect to one another.
 3. Knives will never be assembled with hooks together unless instructed by order or special cutting group assembly drawing.



355 Clow Lane Birmingham, AL 35217
Ph: 205-849-5050 / Toll Free: 1-888-733-8248

SECTION 11

SHARPENING KNIVES

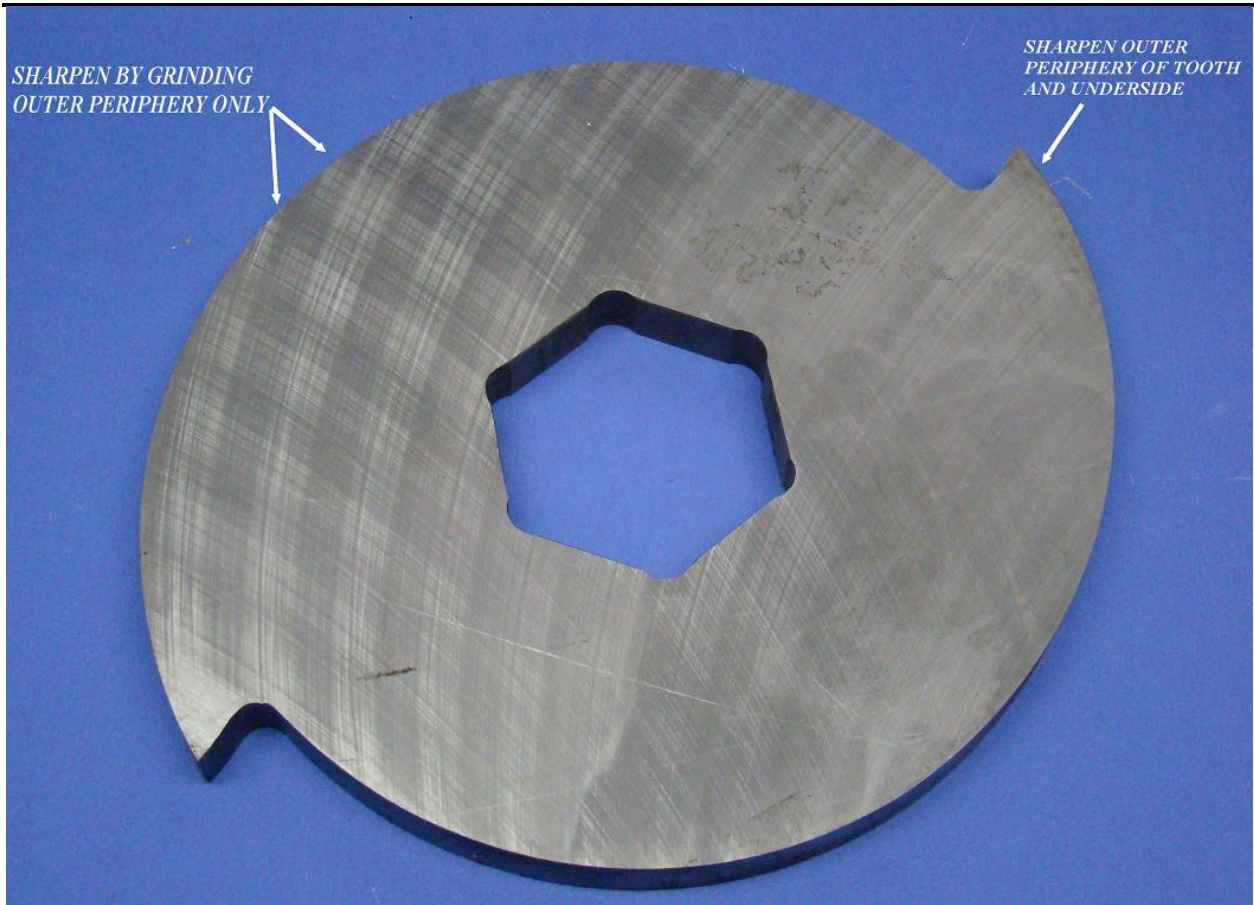
The knives in your shredder are case hardened and depending on the application, they may need to be sharpened when the rip and tear action stops giving satisfactory shred size.

The knives can be sharpened with a hand grinder while in the machine. Care should be taken to touch up only the inner face of the knife hook, as indicated in the drawing. Do not grind the knife on its outer diameter or its side surfaces. The shredder with its rip and tear action does not require a sharp knife point, so a light touch up with a grinder should be sufficient. **CAUTION: Always have the shredder disconnected electrically when working in the cutting chamber area.**

After several such sharpening procedures, your shredder will require a new set of knives.

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SECTION 12-A

CHANGING KNIVES

If the knives are broken or can no longer be sharpened, you should install a new set of knives (replacing spacers at this time is optional, depending on their condition). To change knives, proceed as follows:

- A. Move the disconnect switch to the "OFF" position.
- B. Remove the hopper and any other equipment from the top of the cutting chamber.
- C. Remove the guard from the end plate and then remove the nuts from the ends of the shafts.
- D. Remove bolts and dowel pins from the end plate and carefully remove so that the bearings will not be harmed.
- E. Carefully remove bearings from the shafts and then remove the dirt rings.
- F. Remove the screws and clamp plates holding the fingers and finger spacers in place against the side plates of the cutting chamber.
- G. Refer to the cutting group assembly drawing which shows your knife and finger arrangement. Next, observe carefully the way that your knives are assembled on the shaft. They may be assembled spiraled; that is, with each knife hook rotated 60 ° from one next to it. They may be assembled with one hook up and one hook down. There are different ways they can be arranged, so observe carefully.
- H. Next, remove the knives, knife spacers, fingers and finger spacers (for some arrangements, the finger spacers will be part of the fingers). These should all come off easily if the machine has been maintained properly. On older machines, the hex may be distorted and you may have to rotate each part slightly to remove it from the area where the shaft is distorted.
- I. Clean up cutting chamber and parts so that upon reassembly, proper fits can be maintained.
- J. Refer to cutting group assembly drawing and begin to reassemble your machine with new set of knives (and new spacers if necessary).

SECTION 12-B CHANGING KNIVES

- K. After installing all the knives, knife spacers, fingers, and finger spacers in their proper place, put the end plate back in position using the dowel pins, and then secure in place using screws.
- L. Next, place the dirt ring with the left hand threads on the drive shaft, and the dirt ring with the right hand threads on the driven shaft.
- M. Carefully reinstall the bearings and put washers and shaft nuts in place. Tighten nuts on the shafts so all knives and spacers are securely fastened. To prevent the machine shafts from turning while tightening, place a solid bar between the shafts or between the shaft and side plate.
- N. Now put the clamp plate in place and install the screws in the fingers and finger spacers. Adjust them so that they are centered between the knives and spacers and there is no slop between the fingers and finger spacers. Tighten the screws in the clamp plate so that the fingers and finger spacers are securely clamped against the side of the finger mounting plate.
- O. Remove the bar from the cutting area and turn the shafts without power to see that the clearances are correct and there is no binding. If reassembly has been performed correctly, the shafts should turn without any drag. After checking to see that the cutting chamber is clear of any nuts, bolts, wrenches, or other material, run the shredder for two (2) minutes and then tighten shaft nuts again.
- P. Replace the guard on the end plate.
- Q. Install the feed hopper and any other equipment on the cutting chamber.
- R. Make a final check to see that the cutting chamber is clear of any nuts, bolts, wrenches, or other material before starting up the shredder.

SECTION 13-B

TROUBLESHOOTING

<u>ITEM</u>	<u>INDICATION</u>	<u>RECOMMENDED ACTION</u>
4.	Motor runs but one or both shafts will not turn.	a. Call Jordan Reduction Solutions Service Department.
5.	Stalls but won't reverse.	a. Check to see shredder is connected to proper voltage.
6.	Machine makes unusual loud noises.	a. Inspect the underside of the cutting chamber and remove any shredded material that may be trapped between the knives or side fingers. CAUTION: Always lock disconnect switch before clearing chamber of any material. b. Check for broken knives or broken spacers that would allow knives to hit each other. <u>CAUTION: IF A SPACER OR KNIFE IS BROKEN, DO NOT RUN SHREDDER.</u> c. If the loud noises continue, contact Jordan Reduction Solutions Service Department.
7.	Machine makes a loud screech, comes to a sudden stop and does not go into reverse cycle.	Call Jordan Reduction Solutions Service Department.
8.	Loud screech under belt guards.	a. Tighten "V" belts.

SECTION 14 OPERATING COSTS ON TYPICAL SHREDDER

The operating costs for electrical power for any induction motor may be calculated as follows:

$$C = \frac{.7465 \times \text{HP} \times \text{HO} \times \text{R}}{\text{E}/100}$$

- C = Operating cost in dollars
- HP = Horsepower
- HO = Hours of operation
- R = Dollars/KWH
- E = Motor efficiency (usually about 90%)

EXAMPLE:

The MS-5028 Shredder equipped with a 125-HP motor, operating at 460 Volts primary. Full load current is approximately 147 amps. Assuming the Shredder is operating at full load and the power company charges 6 cents/KWH, how much are the power costs to operate the Shredder one hour?

$$C = \frac{.7465 \times 125 \text{ HP} \times 1 \text{ HR} \times \$0.06}{90\% \text{ EFF}/100}$$

SECTION 15

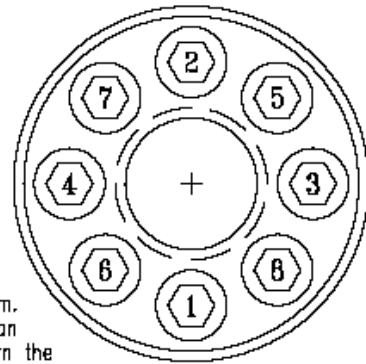
NUTS & BOLTS TIGHTENING INSTRUCTIONS

Check all fasteners for tightness torque as follows:

1/2" DIA. (3/4" Hex Head)	55 FT.-LBS.	75 NM
5/8" DIA. (15/16" Hex Head)	110 FT.-LBS.	150 NM
3/4" DIA. (1-1/8" Hex Head)	130 FT.-LBS.	176 NM
7/8" DIA. (1-5/16" Hex Head)	190 FT.-LBS.	260 NM
1" DIA. (1-1/2" Hex Head)	280 FT.-LBS.	380 NM

TIGHTENING PROCEDURE – SUPER BOLT

- Make sure SUPERBOLT® product is backed up by a hardened surface washer, and all jackbolts are flush with the bottom of the nut or bolt.
- Spin internal threads so that nut or bolt is hand-tight. To ease the installation, clear the threads of any chips or dirt that may have accumulated.
- Snug jackbolts up to 25% of the final torque values to seat the thread and eliminate clearances.
- Tighten the jackbolts in a star pattern as indicated in the accompanying diagram. The best way to speed up the fastening process is initially to use 10% more than the final torque desired. (NOTE: Long bolts will stretch, so by the time you return the first jackbolt it will be loose. The star pattern must be repeated until all jackbolts are torqued down to a constant value. Do not exceed recommended torque values.)
- Speed method (use of an impact wrench)—A properly sized impact wrench can be used to tighten SUPERBOLT® products. A skilled operator can feel on the impact wrench when the jackbolts are tight. To verify torque values, a torque wrench should be used.



APPENDI X B SUPER BOLT - TIGHTENING INSTRUCTIONS

INSTALLATION NOTES:

1. TORQUE 5/8-18 (5/8 HEX) SPECIAL SHOULDER BOLTS TO 75 FT-LBS
ACCORDING TO THE TIGHTENING PROCEDURE LISTED BELOW:

TIGHTENING PROCEDURE

1. Make sure the SUPER BOLT product is backed up by a hardened surface washer and all jackbolts are flush with the bottom of the nut or bolt
2. Spin internal threads so the nut or bolt is hand-tight. To ease the installation clear the threads of any chips or dirt that may have accumulated.
3. Snug jackbolts up to 25% of the final torque values to seat the thread.
4. Tighten the jackbolts in a star pattern. The best way to speed up the fastening process is initially to use 10% more than the final torque desired. NOTE: Long bolts will stretch, so by the time you return to the first jackbolt, it will be loose. The star pattern must be repeated until all jackbolts are torqued down to a constant value. Do not exceed recommended torque value.
5. Speed Method (Use of an impact wrench) - A properly sized impact wrench can be used to tighten SUPER BOLT products. A skilled operator can feel on the impact wrench when the jackbolts are tight. To verify torque values, a torque wrench must be used.

