



HOSOKAWA BEPEX DIVISION

Rietz

Strong-Scott

Schugi

K-G

P.O. Box 880 • Santa Rosa, California 95402 • (707) 586-6000 • TELEX 34-700 BEPEX SARO • FAX (707) 585-2325

INSTALLATION, OPERATION & MAINTENANCE MANUAL

DISINTEGRATOR

MODEL NO: RP-18-K133

SERIAL NO: RP-2001012633A & B

PRAIRIE LAND PACKING

CUSTOMER ORDER NO: 909865

WARNING

FOLLOW THESE SAFETY RULES

DO NOT OPERATE THIS MACHINE UNTIL ALL LOCAL SAFETY RULES HAVE BEEN MET. ELECTRICAL AND MECHANICAL CONTROLS MUST BE SELECTED, LOCATED AND INSTALLED IN COMPLIANCE WITH ALL LOCAL ELECTRICAL AND SAFETY CODES.

DO NOT OPERATE UNLESS GUARDS AND SAFETY DEVICES ARE IN PLACE AND WORKING.

DO NOT REACH INTO A RUNNING MACHINE.

DO NOT REACH INTO A STOPPED MACHINE UNLESS THE POWER IS DISCONNECTED AND LOCKED OUT.

DO NOT STAND OR WORK ABOVE OR ALONG SIDE THE MACHINE INLET.

DO NOT OPERATE THIS MACHINE IN A CARELESS MANNER.

DO NOT OVERLOAD THIS MACHINE.

FOR CLEAN UP IT IS RECOMMENDED THAT A STEAM OR HOT WATER BLAST BE USED. IF IT IS NECESSARY TO CLEAN MANUALLY, THE POWER MUST BE DISCONNECTED AND LOCKED OUT.

**READ OPERATING INSTRUCTIONS CAREFULLY
BEFORE OPERATING MACHINE**

AFTERMARKET SERVICES

Thank you for choosing Hosokawa Bepex Corporation as your supplier of process equipment.

Hosokawa Bepex has integrated its extensive Product Engineering, Field Service and Parts Departments to provide our customers with a focused approach to system optimization by providing a comprehensive suite of aftermarket services.

For technical assistance, please call the Aftermarket Services Dept. at 612-331-4370.

For direct parts replacement orders , please call our Parts Dept. at 707-586-6000.

PRODUCT MANAGEMENT

The Product Management department consists of engineers who are experts in selected fields of powder processing technology. This department offers

- **System optimization**
- **Process troubleshooting**
- **Technical seminars**
- **Installation consultation**
- **System upgrades**

SPARE PARTS

The staff in this department have an excellent knowledge of machine parts and components. They work with you to assure promptness and accuracy of parts orders and inquires. Their extensive customer and parts database helps them perform these tasks. The services this department offers are:

- **Direct part replacement orders**
- **Blanket parts orders**
- **In house factory repair**
- **In house rebuilds/refurbishing**

MECHANICAL FIELD SERVICE

The service department personnel have numerous of hours of field experience and are well prepared to resolve any mechanical situation you may have. They have the necessary equipment to fully assess and resolve most every situation. The Service department offers:

- **Mechanical start-up**
- **Mechanical repair**
- **Maintenance seminars**
- **Mechanical inspections**
- **Mechanical evaluations**

ELECTRICAL/CONTROLS

This department designs all of our equipment and systems controls from basic relay logic to automated PLC based controls. These can have pushbuttons, computer color graphics, or touch screen as a user interface. This department provides:

- **Electrical start-up assistance**
- **Electrical repair**
- **Electrical Engineering Service**
- **Electrical upgrades**

INDEX

INSTALLATION INSTRUCTIONS	<u>R-M 14</u>
ASSEMBLY & REASSEMBLY INSTRUCTIONS	<u>R-M 57</u>
MISC. INSTALLATION INSTRUCTIONS	<u>R-M 26, R-M 33, R-M 83</u>
MAINTENANCE INSTRUCTIONS	<u>R-M 10, A-M 15</u>
ORDERING OF PARTS	<u>R-M 12</u>
DRIVE AND WIRING SPECIFICATION	<u>A-M 4, A-M 13</u>
PARTS LIST	
DIMENSION SHEET	
PARTS ASSEMBLY DRAWINGS	
MOTOR INFORMATION	
MISC. VENDOR INFORMATION	

INSTALLATION OF MODEL RA AND RP DISINTEGRATOR

MOUNTING

The Disintegrator is provided with four holes in the base for fastening the unit to the floor or to a stand. Since the Disintegrator operates with no appreciable vibration, it can be operated with or without bolting to a foundation. The foundation needs only to be strong enough to support the weight of this unit.

Some method of bringing the material to the inlet of the Disintegrator is required. This may be in the form of a pipe line or a hopper attached to the inlet connection above the Disintegrator rotor.

The outlet connection for the primary product is on the lower portion of the bowl surrounding the rotor. Some models of this Disintegrator may also be equipped with a second outlet connection underneath the rotor which is used to remove material which will not pass through the screens. This is called the secondary discharge.

Careful alignment at the inlet and outlet connections is important. These connections should be made in a way that will avoid any stress on the Disintegrator bowl.

CAUTION

A standard RA or RP model Disintegrator with the cover held on by a Vee band clamp has a maximum internal pressure rating of 4 psig. If the pressure exceeds this, the cover may bow and the top of the screen will be unsupported. To avoid the possibility of excessive internal pressure building up, the Disintegrator should discharge into a vented tank or vented pipe line.

ROTATION AND WIRING

The Disintegrator is designed to run counter clockwise as viewed from the inlet end of the rotor. The standard hammers in a disintegrator are designed to run in one direction only and if the rotation is incorrect, the locknut at the top of the shaft which secures the hammers to the shaft may unscrew. Also, because of the shape of the hammers, the user may obtain undesirable results or lowered capacities if the rotation is incorrect.

When the Disintegrator motor is being wired, the electrician should be sure to check for correct rotation. The motor can be jogged to check for rotation since it will not harm the Disintegrator if it runs backwards for a few revolutions.

National Electrical Code and any local codes should be conformed with in every detail to prevent motor burnout and to get the most efficient motor operation. Full rated voltage must be delivered to the motor while under load to prevent the motor from overheating. Adequate wiring and adequate power source are required to accomplish this. Do not install heaters in magnetic starters with a rating in excess of that recommended by the electrical manufacturers.

PLACING IN OPERATION

Adjust belts for proper tension. V-belt and flat belt drives should be adjusted tight enough to prevent belt slippage while transmitting the maximum rated horsepower of the motor. Timing belt drives should be adjusted so that all slack is taken up, but they should not have initial tension in the belts. A detailed discussion of the adjustment of V-belts or timing belts, if they have been supplied with the machine, will be found in another section of this manual.

If a flat belt is used on the machine, it should be checked to see that the belt tracks straight and runs near the center of the pulley face. If there is a tendency for the belt to run to one side of the pulley face, the condition can be corrected by loosening the motor mount clockwise to bring the belt down and counter clockwise to bring the belt up.

Model RP Disintegrators have the rotor mounted directly on the motor shaft extension and do not have belt drives.

The bearings of the Disintegrator are normally grease lubricated and, if so, they have already been packed with grease at the factory and are ready to operate. If the Disintegrator is oil lubricated the oilers will have to be connected, filled and started before the Disintegrator is put into operation.

On machines furnished with a packing gland shaft seal, cooling with water or other circulating liquids may be necessary. In this case supply lines will lead to and from the gland. The user will need to connect to these lines and make sure that a proper flow of coolant is coming into the packing gland before operation. Proper adjustment of the packing is important for long life and a further discussion of this is to be found in the section on Installation and Maintenance of Packing Glands.

It is important to check all of the bolts and connections of the Disintegrator to make sure they are tight before operation. The cover should also be removed so that the hammers and screens can be checked to see that the screens are the proper size and the hammers are tight.

Make sure that the shaft rotates freely and that the Disintegrator chamber is free of input material. If the screens have been changed or if the Disintegrator has been idle for some time, jog the shaft electrically to be sure that the hammers do not hit the screens. The Disintegrator is now ready to start. During acceleration the operator should listen for any clicking sounds which would indicate that the hammers are hitting the screens. If any clicking is heard, the screens need to be re-adjusted as discussed in the section on the screens for Disintegrators.

ASSEMBLY INSTRUCTIONS FOR RA & RP DISINTEGRATORS

Please refer to the Parts Assembly drawing provided in this manual to supplement the following step by step procedure for installing the bowl and shaft mounted parts onto the motor.

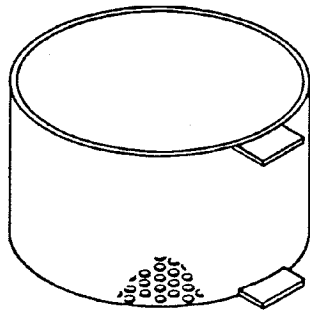
1. Lift the bowl and adaptor (one weldment) down over the shaft, making sure that the "fit" in the adaptor engages the projection on the motor. This "fit" is 8-1/2" or 10-1/2" diameter on small motors and 12-1/2" on larger motors.
2. Attach the adaptor to the motor securely. For the 8-1/2" and 10-1/2" diameter fit, use (4) capscrews 1/2"-13NC x 1" long. For the 12-1/2" diameter fit, use (4) capscrews 5/8"-11NC x 1-1/4 long.
3. Slide the sleeve over the shaft as far as it will go. The upper end of the sleeve should be above the inside surface of the bowl; lay a straight edge across the sleeve to check.
4. Install the key in the shaft. File the sides of the key as required to fit, but the key should be snug. Grind the top of the key down at the last 1/4" of length nearest the sleeve, as required to assemble the key into the sleeve.
5. Press the seal by hand into position as shown, after greasing lightly with grease (edible, if for food product).
6. Install the slinger.
7. Install the hammers and spacers as shown. Start with the lifter hammer if one is supplied or if not, start with a middle hammer. Each successive hammer is placed 90° from the previous one with a spacer between each hammer. The

bore and keyway are a close fit, and the key may have to be filed slightly and the bore sanded lightly to assemble.

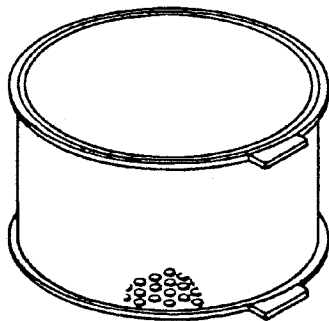
NOTE: The motor shaft rotates counter clockwise when looking at the end of the shaft, so that the hammer with a bevel face that is forcing the product down into the other hammers is a feeder hammer.

8. Install the feeder hammer, then screw on the rotor nut. This may be a nut, or a nut with blades attached (auxiliary rotor nut). All of the parts on the shaft are held tightly on the shaft by this rotor nut. Please be sure that it is tightened properly and that it hasn't "bottomed out" on the shaft or end of key instead of clamping the hammers. Spacers can be added or removed as required.
9. Install the screen.
10. Push the upper clamp ring into the screen.
11. Install the o-ring into the groove of the bowl flange.
12. Place the cover in position and install the cover clamp (V-band type).
13. Jog the motor and listen to hear if any hammers are hitting the screen. If they are, correct the problem; perhaps the screen has a dent or has not been properly installed.

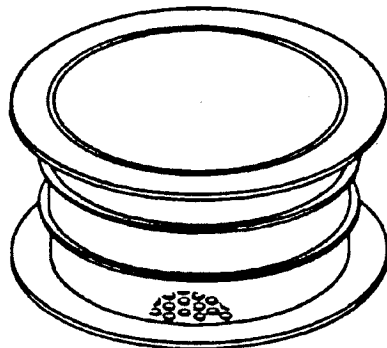
TYPES OF RA-RP DISINTEGRATOR SCREENS



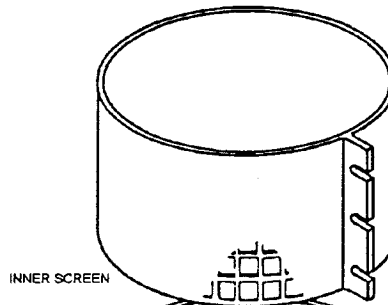
FULL CIRCLE
WELDED SCREEN



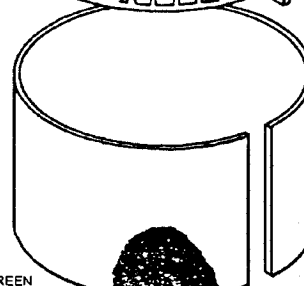
FULL CIRCLE
WELDED SCREEN WITH
2 REINFORCING BANDS



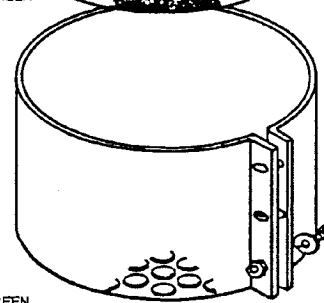
FULL CIRCLE WELDED SCREEN
WITH HEAVY DUTY REINFORCING
BANDS AND FLANGES



INNER SCREEN



MIDDLE SCREEN

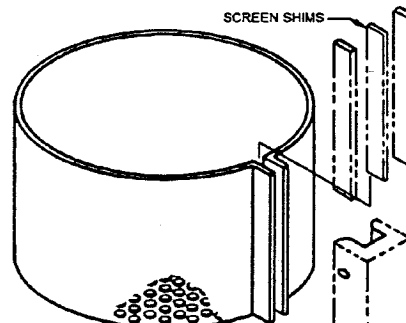


OUTER SCREEN

FULL CIRCLE SCREEN
WITH FLANGES FOR BOLTING



SCREEN
SHIMS



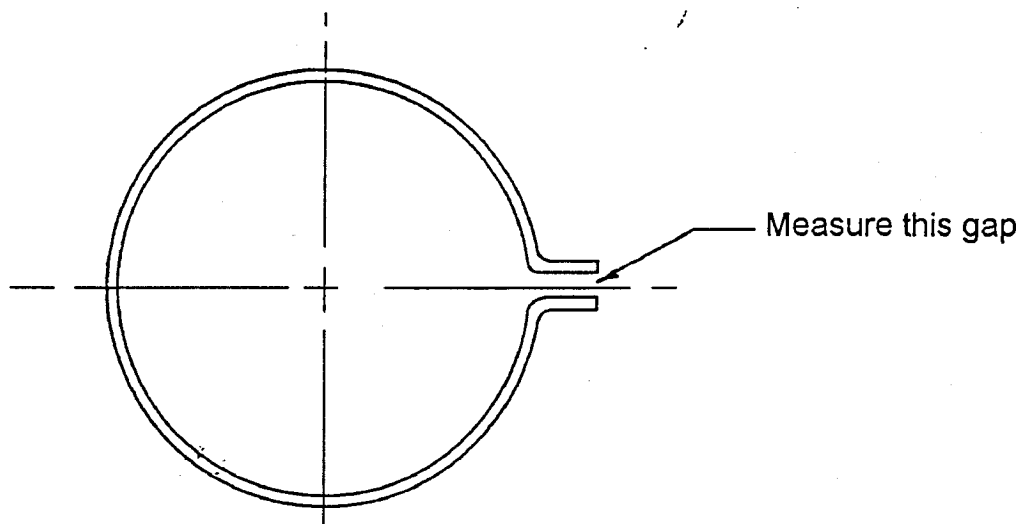
SCREEN SHIMS

FULL CIRCLE SCREEN WITH
FLANGE FOR CLAMPING

INSTALLATION & SHIMMING ONE PIECE SCREENS IN DISINTEGRATOR

SINGLE SET SCREENS - SELF SUPPORTING

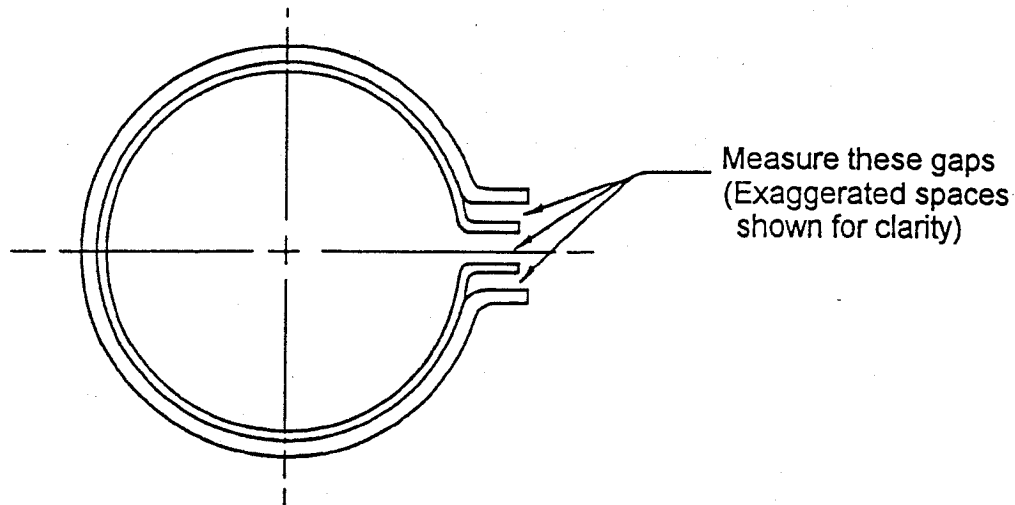
Thickness of single set screens ranges from approximately $3/32$ to $3/8$ inches. They must be heavy enough to hold up in service without being pushed away from the hammers, or a backing screen should be used as described in next method.



Fill the gap with shims whose thickness is slightly less than space. Shims should be slightly less than space so there will be clamping action.

THIN SCREENS - SUPPORTED OUTSIDE

When thin screens (such as with $.020$ to $.047$ perforations) are used it is advisable to reinforce the screen with an outer screen. Outer screens may have holes as small as $3/16$ " round up to as large as 1 " square, depending on the hole size and strength of the inner screen. Outer screens must be thick enough and the holes must be small enough to adequately support the inner screen.

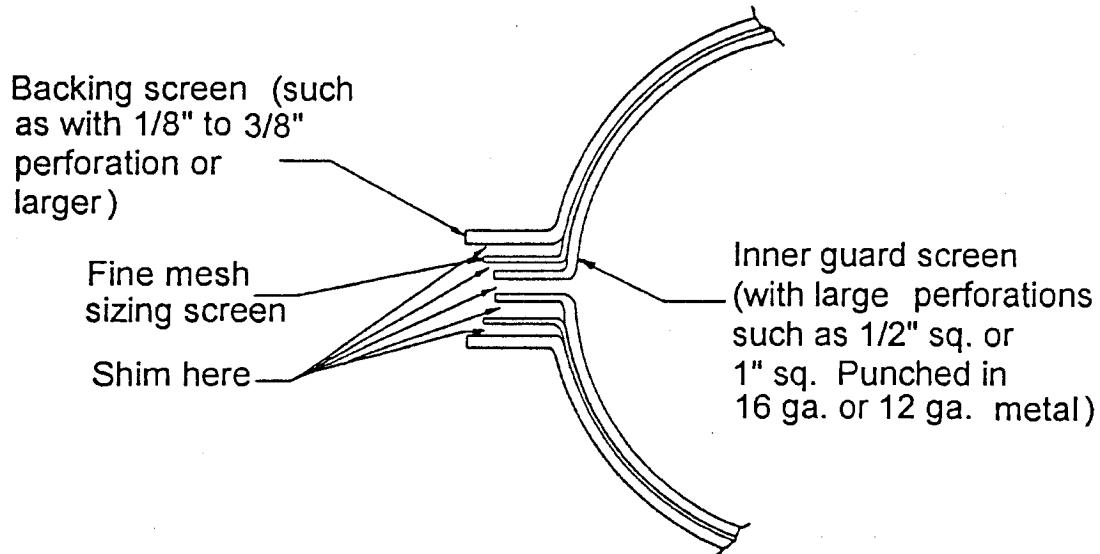


Measure the 3 gaps existing between the flanges. Be sure screens are seated against the upper and lower clamp rings and against each other. Use slightly less shimming than the amount measured to make the screens clamp tight against each other and against the upper and lower clamp rings.

NOTE: Check to be sure rotor spins freely before starting

THIN SCREENS - SANDWICH ASSEMBLY

When very thin screens such as 50 mesh or finer or thin perforated screens are used, it sometimes becomes advisable to provide an internal protective screen (called a "scuff" or "guard" screen) as well as to provide an outer screen for rigidity. This arrangement is called a sandwich assembly.



With outside flanges of screens held tight together measure gaps existing between various flanges. Be sure screens are seated against upper and lower clamp rings and against each other.

Use slightly less shimming than the amount measured to make the screens clamp tight against each other and against the upper and lower clamp rings.

GENERAL NOTES

Tighten up the screen clamp setscrews progressively until the wrench pressure is uniform. Each screw should bear solidly against the screen flange but should not be excessively tight to the point of shearing off the screws or breaking the screen clamp.

The cup at the end of the setscrew should be sharp enough to dig into the screen flange to get a good hold. If the ends get too flat or smooth the screws should be replaced.

Make sure the hammers clear the screens before running. Give the motor a jog and listen for any clicking sounds. Add another shim if hammers hit screens or straighten screens if they are distorted.

ONE PIECE CIRCULAR SCREENS FOR RIETZ DISINTEGRATORS

These screens are a continuous cylinder designed for extreme simplicity in mounting. Screens are usually equipped with a stop on both the top and bottom so that they can be mounted either way. This allows maximum use of the screen because wear can be distributed evenly. Some special type screens such as "conidure" can only be used in one direction and in this case only one screen stop is provided.

Normally the screens are just a little bit out of round which helps to hold them in place when they are pushed over the fixed clamp ring. This is usually enough to hold the screen while the removable clamp ring is pressed into the other end of the screen. The screen and removable clamp ring should be pressed firmly into place just before the cover is clamped in place. This will help assure correct alignment of the screens.

Normally a one piece circular screen is used without an inner or outer screen. If it is desirable to use an inner screen or a backing screen, special combination screens are available from the factory.

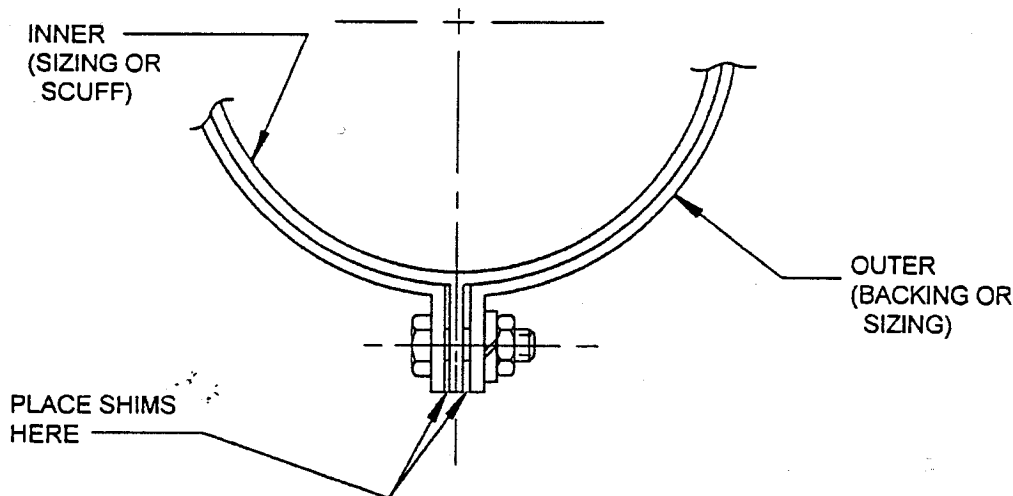
After screens have been replaced in the Disintegrator the shaft should be turned by jogging the motor. If there are any clicking sounds, the hammers are hitting the screens and they should be checked to eliminate the interference.

Screens are available from stock in a large variety of perforations, gauges and materials. When ordering screens, refer to the instructions in the Manual on the subject of ordering parts for Disintegrators so that sufficient information is furnished.

INSTALLING & SHIMMING BOLTED SCREENS IN RA/RP DISINTEGRATOR

THIN SCREENS - 2 PIECE ASSEMBLY (SUPPORTED OUTSIDE)

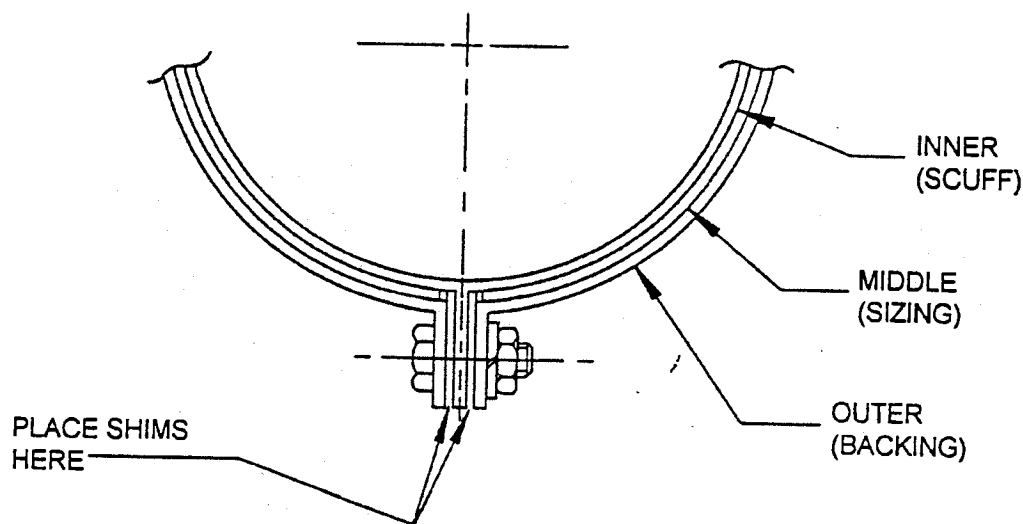
When thin screens (such as with .020 to .047 perforations) are used it is advisable to reinforce the screen with an outer screen. Outer screens may have holes as small as 3/16" round up to as large as 1" square, depending on the hole size and strength of the inner screen. Outer screens must be thick enough and the holes must be small enough to adequately support the inner screen.



Measure the 2 gaps existing between the flanges. Be sure screens are seated against the upper and lower clamp rings and against each other. Use slightly less shimming than the amount measured to make the screens clamp tight against each other and against the upper and lower clamp rings.

THIN SCREENS - 3 PIECE ASSEMBLY (SANDWICH)

When very thin screens such as 50 mesh or finer or thin perforated screens are used, it sometimes becomes advisable to provide an internal protective screen (called a "scuff" or "guard" screen) as well as to provide an outer screen for rigidity. This arrangement is called a 3 piece screen (sandwich) assembly.



With outside flanges of screens held tight together measure gaps existing between various flanges. Be sure screens are seated against upper and lower clamp rings and against each other.

Use slightly less shimming than the amount measured to make the screens clamp tight against each other and against the upper and lower clamp rings.

GENERAL NOTES

Tighten up the capscrews progressively until the wrench pressure is uniform..

Make sure the hammers clear the screens before running. With the cover on, give the motor a jog and listen for any clicking sounds. Add another shim if hammers hit screens or straighten screens if they are distorted.

hammer length can be checked with either a jig, described in the Disintegrator manual, or it can be checked in the Disintegrator by installing it and checking the clearance between the tip and a straight edge held vertically between the upper and lower clamp rings. Normal hammer to screen clearance is 1/16".

It is not advisable to build up the hardfacing to too great a thickness. A thickness of 3/16" is maximum for hardfacing materials similar to Stellite #6 or McKay #58. For Tungsten carbide granular type hardfacing materials, the thickness should be held to 1/16" or less. If too thick a layer is applied, it may crack and chip off. If the hammers have worn down to the point where it is necessary to exceed the maximum allowable hardfacing thickness, the hammer head should be built up with either mild or stainless steel before the hardfacing is applied.

A 1/16" clearance between hammer tip and screen is used for all general services. For some services, it is desirable to have closer clearance; however, it is not practical to allow less than 1/32" clearance. If the clearance is too close, it is difficult to avoid interference between the hammers and screen. A simple jig for checking the hammer length can be made by the maintenance department or can be purchased from the factory.

To minimize shut-down time where the Disintegrator is in continuous service, a full set of hammers should be kept on hand to interchange while retipping.

ROTOR BALANCE

To maintain a smooth-running machine, the rotor should be balanced after the hammers have been retipped.

After retipping laminated rotor hammers, each individual hammer should be statically balanced before assembling to the Disintegrator shaft.

After retipping demountable hammers, they should be divided into four equal groups and weighed. Each group should be made to weigh the same within 1/2 oz. This can be accomplished by moving hammers around from group to group. When matching is

HAMMER MAINTENANCE FOR DISINTEGRATORS

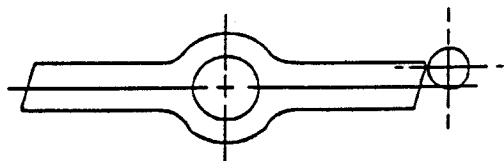
BUILDING UP WORN HAMMERS WITH HARDFACING

When the nose of the hammer is worn down approximately $\frac{3}{16}$ of an inch from its original contour, the hammers should be removed and retipped. Retipping the hammers before excessive wear has taken place will result in maximum product output as well as uniformity of grind and longer hammer life.

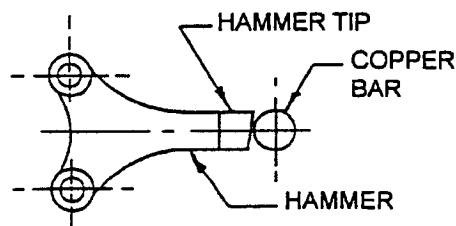
Stainless steel hammers can be retipped using either the metallic arc process or acetylene gas welding. Haynes Stellite #6 or equivalent has proved to be an excellent material for use in wet or corrosive services. Excess hardfacing is built up on the tip of the hammer followed by grinding the end to control length and shape.

For carbon steel hammers in non-corrosive service, but subjected to considerable abrasion, use materials equivalent to McKay #55 on new hammers or McKay #58 when rebuilding used hammer. For very abrasive services, tube electrodes containing tungsten carbide granules are effective. An ideal hardfacing material for Disintegrator hammers combines maximum wear resistance with good ductility to resist chipping. The most convenient method for applying hardfacing to a steel hammer is with the manual metallic arc process as follows:

1. Use a 1-1/2" or 2" diameter round copper bar at the end of the hammer to back up the deposit at the tip during rehardfacing. This copper bar can be held in a bench vise so that the hammer can be held by hand against it. The relation of the hammer and copper bar is indicated in the following sketch.



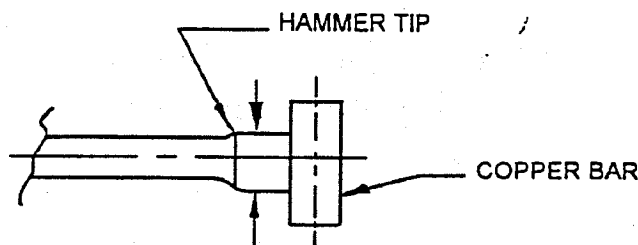
LAMINATED HAMMER



DEMOUNTABLE HAMMER

The exact relationship between the top of the hammer and the round bar can best be determined by trial. The copper back-up bar allows better control and more build-up of the hardfacing deposit at the tip of the hammer.

2. The welding machine should be set with the electrode positive (reverse polarity). The current setting will range between 125 and 150 amperes when using the 3/16" diameter electrodes.
3. Start with the deposit at the tip first because this is the hardest part to build up and it is desirable to have the hammer as cool as possible at this point for maximum build-up. Several short, fast passes should be made half-way across the hammer at the tip starting at the outside and moving toward the centerline as indicated in the sketch below. Keep the arc close.



4. After the first 1/4" of the hammer has been covered, the remainder can be hardfaced by weaving the electrode back and forth to cover the hammer for a distance of 1" from the tip. Apply to the full face for severe abrasive conditions. A single pass is all that is usually necessary although it may be desirable at times to apply a second pass. Unless the hardfacing is quite ductile, it is not possible to build up a heavy hardfacing deposit without danger of it chipping or cracking.
5. After several hammers have been hardfaced, the copper bar will begin to get hot. It should be quenched periodically to keep it cool so that it can take away as much heat as possible while building up the tip.

After hardfacing, the sides of the hammer can be dressed for appearance and the tip of the hammer should be ground back for proper screen clearance. The

hammer length can be checked with either a jig, described in the Disintegrator manual, or it can be checked in the Disintegrator by installing it and checking the clearance between the tip and a straight edge held vertically between the upper and lower clamp rings. Normal hammer to screen clearance is 1/16".

It is not advisable to build up the hardfacing to too great a thickness. A thickness of 3/16" is maximum for hardfacing materials similar to Stellite #6 or McKay #58. For Tungsten carbide granular type hardfacing materials, the thickness should be held to 1/16" or less. If too thick a layer is applied, it may crack and chip off. If the hammers have worn down to the point where it is necessary to exceed the maximum allowable hardfacing thickness, the hammer head should be built up with either mild or stainless steel before the hardfacing is applied.

A 1/16" clearance between hammer tip and screen is used for all general services. For some services, it is desirable to have closer clearance; however, it is not practical to allow less than 1/32" clearance. If the clearance is too close, it is difficult to avoid interference between the hammers and screen. A simple jig for checking the hammer length can be made by the maintenance department or can be purchased from the factory.

To minimize shut-down time where the Disintegrator is in continuous service, a full set of hammers should be kept on hand to interchange while retipping.

ROTOR BALANCE

To maintain a smooth-running machine, the rotor should be balanced after the hammers have been retipped.

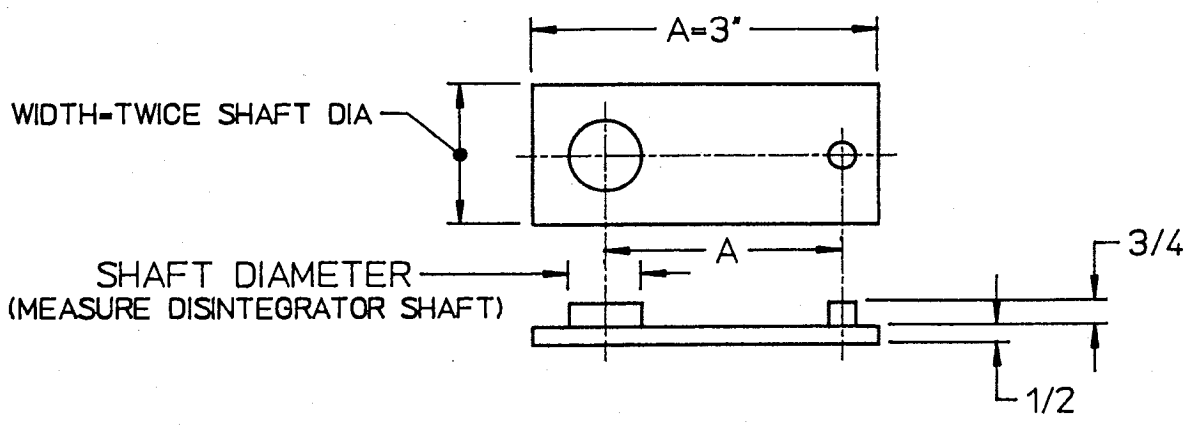
After retipping laminated rotor hammers, each individual hammer should be statically balanced before assembling to the Disintegrator shaft.

After retipping demountable hammers, they should be divided into four equal groups and weighed. Each group should be made to weigh the same within 1/2 oz. This can be accomplished by moving hammers around from group to group. When matching is

completed, each group should be mounted in a vertical row in the machine. The opposing groups should be arranged so that opposite hammers in the same slot are the same weight. If the above procedure is followed, each vertical row of hammers will balance the opposite row of hammers and the machine will run with little or no vibration.

Effective 7/23/70
Retyped 7/16/93

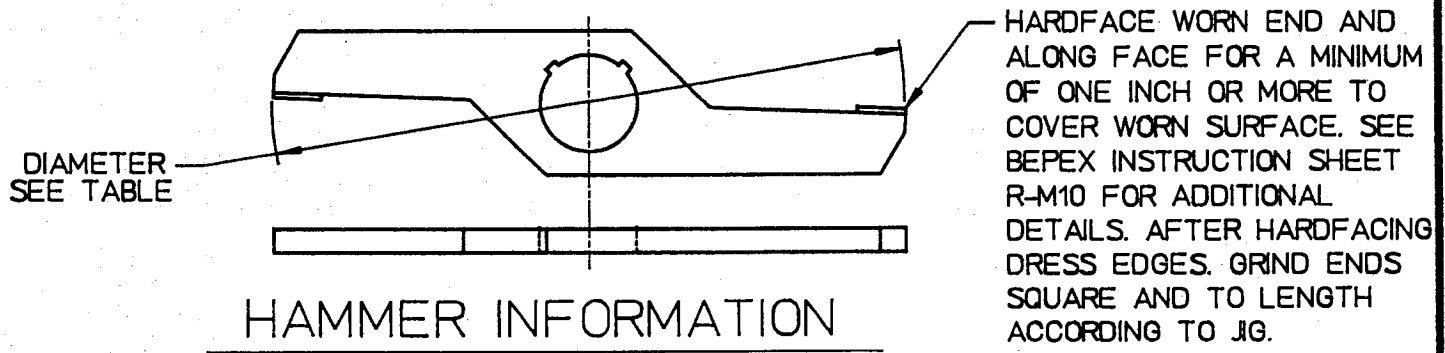
TEM	QTY	MAT'L	PART NO.	DESCRIPTION
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JIG FOR CHECKING HAMMER DIAMETER

NOMIAL ROTOR DIAMETER	HAMMER DIAMETER		JIG DIMENSION 'A'	
	CLOSE 1/64 CLEARANCE	STD 1/16 CLEARANCE	CLOSE 1/64 CLEARANCE	STD 1/16 CLEARANCE
4	3 31/32	3 7/8	2.234	2.187
6	5 31/32	5 7/8	3.234	3.187
8	7 31/32	7 7/8	4.234	4.187
12	11 31/32	11 7/8	6.234	6.187
18	17 31/32	17 7/8	9.234	9.187

NOTE: HAMMERS CLEARING JIG FROM .000 TO .010 ARE ACCEPTABLE LENGTH.



HAMMER INFORMATION

A	080692	REDRAWN	PW	ah	
REV	DATE	ECN. NO.	DESCRIPTION	DR	CHK

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TOLERANCES UNLESS OTHERWISE SPECIFIED		ISO 128 METHOD A 	TITLE LAMINATED HAMMER			
FRACTIONS	*		MACH. FIN. UNLESS NOTED 	APP	SCALE	NONE
DECIMALS	.XX*	CHK		DRAWING NO	REV	
ANGLES	*	DR	H.D. MINER	011066		
HOLES	+.010, -.005	USED ON	DISINTEGRATOR	NEXT ASSY		
PART NO. 8729		SIM. TO		ORIG. JOB NO.	SHEET 1 OF 1	

CLEANING STAINLESS STEEL

The widespread use of stainless steel equipment in the food and other processing industries is largely due to its resistance to corrosion, which keeps it sanitary, bright, easy to clean, and long lasting. However, these well-known properties cannot just be taken for granted. Proper maintenance care is required to keep stainless in good condition.

CORROSION: CAUSE AND CURES

The reason why stainless steel is "stainless" is that a protective, transparent oxide coating forms on its surface in the presence of air, passivating the metal. This protects it against the destructive surface action that would otherwise take place, resulting in pitting and corrosion, especially in the presence of moisture. Since the oxide film forms only on the bare metal itself and only in the presence of air, any deposit on the surface, of whatever nature, interferes with the formation or retention of the protective oxide coating. The metal becomes literally "oxygen starved". Thus soils, product residues or mineral deposits left on stainless steel over a period of time may result in surface deterioration.

Long, trouble-free service from stainless steel equipment is assured by: (1) effective cleaning; (2) periodic conditioning; (3) good maintenance practices.

CLEANING STAINLESS STEEL EQUIPMENT

Stainless steel processing equipment is subject to every kind of food deposit. Fats, oils, vegetable residues, syrups, metal products, cereal products, dairy products - the list is long. To add to the variety, there are burned-on soils and mineral soils; local hard water conditions; choices of cleaning by mechanized or manual means. How does one deal with so many different situations?

ORDERING PARTS FOR DISINTEGRATORS

SCREENS

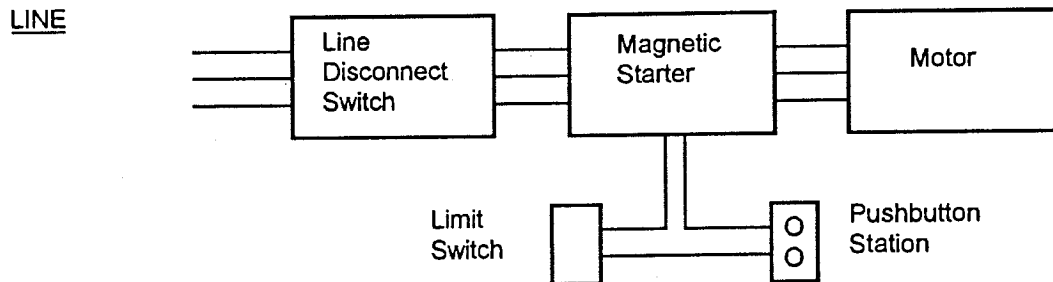
When ordering replacement screens, specify:

1. Model and Serial number of Disintegrator. This information is on the nameplate of the unit. If the nameplate is missing, give the inside diameter and height of screen as measured from old screen.
2. Perforation opening size.
3. Perforation type: round or square.
4. Thickness of metal.
5. Material: carbon steel or stainless steel. Type 304 stainless steel is standard. Monel or other stainless steel types available on special order.
6. Type of construction, whether bolted or welded and, if a multiple screen assembly, whether an inner, middle or outer screen.

DISINTEGRATOR PARTS

When ordering replacement Disintegrator parts, refer to the assembly drawing and parts list contained in this manual. Specify the part name from the manual and the Disintegrator Model and Serial Number from the nameplate.

WIRING DIAGRAM

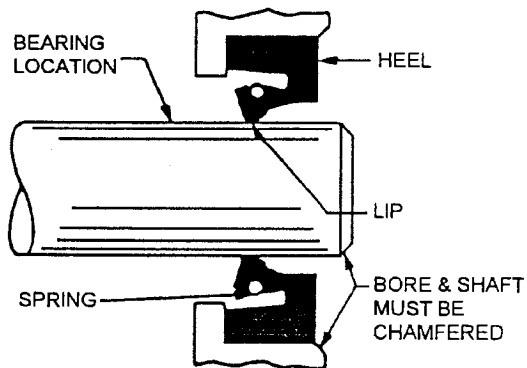


MOTOR CONNECTIONS ARE ON A PLATE ATTACHED TO MOTOR

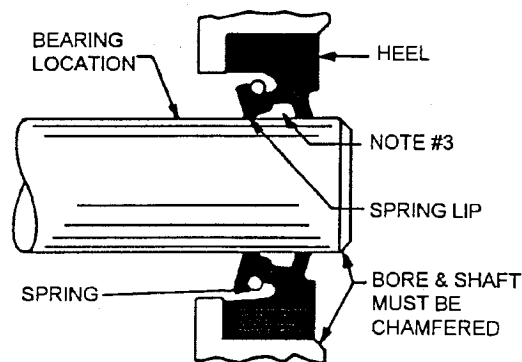
National Electrical Code and any local codes should be conformed with in every detail to prevent motor burnout and to get the most efficient motor operation. Full rated voltage must be delivered to the motor while under load to prevent the motor from overheating. Adequate wiring and an adequate power source are required to accomplish this. Do not install heaters in magnetic starters with a rating in excess of that recommended by the electrical manufacturers.

Effective 3/24/88
Supersedes 7/25/66
Retyped 7/21/93

DIRECTIONS FOR INSTALLATION OF JOHNS-MANVILLE CLIPPER OIL SEALS



SINGLE LIP SEAL



DOUBLE LIP SEAL

SOLID SEALS

1. Thoroughly clean cavity and shaft.
2. lubricate shaft and lip of seal with lubricating oil.
3. Fill void on double lip seal with light lubricating grease.
4. Mount seal on shaft with lip facing toward medium to be sealed.
5. It is suggested that care be exercised in the installation of all types of seals. The lip section, being a very flexible member, tends to distort if forced abruptly over a shaft. We recommend that the shaft and the lip of the seal be well coated with oil or light grease and a rotary screw motion be used during its application over the shaft. This will allow the lip to adjust itself. Thimbles should be used over keyways.
6. To install seals, enter evenly into the cavity, as permitted by the chamfer. The seal is then tapped in evenly around the circumference. Small diameter seals can often be started into the box by finger pressure, and then tapped into position.
7. To assemble larger seals, 8" and up, enter slightly around as much of the periphery as possible, with the excess protruding at a convenient point. The seal is tapped lightly on the protruding portion, working up both sides until it enters the cavity. Then tap evenly into space.

SPLIT SEALS

8. Split seals should be applied by separating seal ends and positioning seal around shaft carefully with butt joint at top of cavity.
9. Lubricate spring and install around shaft. Connect ends and insert spring in lip groove with spring end 90° away from butt joint.
10. Align seal ends, starting butt joint into cavity first and proceed as in step 6 above.

HOOK AND EYE TYPE SPRING

We supply this type of spring with all split seals, for ease of assembly.

NOTES

Never cut solid seals or trim ends of split seals. They are made to provide a tight fit in the cavity.

In ordering split seals, always furnish the seal number and the cut-down size required. Identification of cut-down size, where only seal number is specified, cannot be accomplished by the Johns-Manville factory.

PART NUMBER	DESCRIPTION OF PART	QUANTITY	
		REC. SPARES	PER MACH
324688	BASE		1
335859	BOWL		1
321290	CLAMP, COVER		1
335060	COVER, BOWL		1
321301	GASKET, COVER O-RING	2	1
321460	HAMMER, FEEDER	1	1
321461	HAMMER, MIDDLE	6	6
321540	RING, UPPER CLAMP	1	1
321514	NUT, ROTOR		1
	SCREEN (CUSTOMER TO SPECIFY)	1	1
108281	SEAL, SHAFT	2	1
322004	SIGN, SAFETY	1	1
321561	SLEEVE, SHAFT	1	1
321570	SLINGER, SEAL	1	1
190125	SWITCH, LIMIT	1	1
352099	MOTOR, RP		1
321608	TOOL, ROTOR REMOVAL		1
349317	WRENCH, ROTOR		1
322881	DISC, BLOWOUT		4
335061	ELBOW, PRESSURE RELIEF		2
335529	KEY		1



HOSOKAWA BEPEX CORPORATION

PARTS LIST

RP-18-K133 DISINTEGRATOR

SIGNATURE

DATE

DRAWING NO.

REV.

APP.

BY C. WILSON

4/13/01

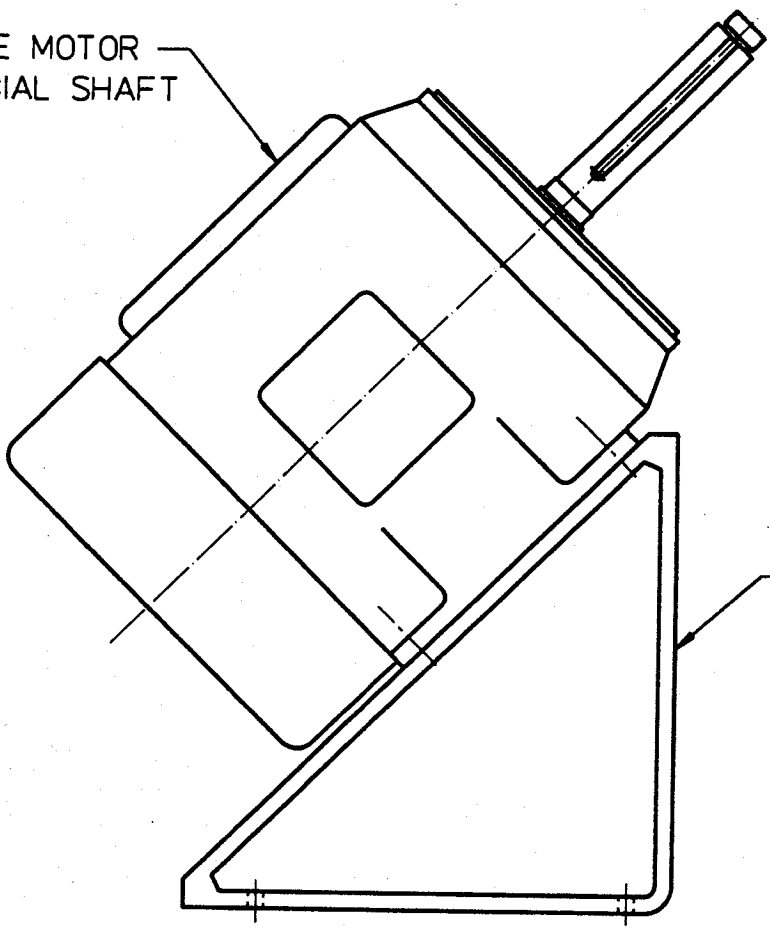
A 352304

ORIGINAL JOB NO. 2001012633A,B

SHEET 1 OF 1

ITEM	QTY	MAT'L	PART NO.	DESCRIPTION
------	-----	-------	----------	-------------

"C" FACE MOTOR
w/ SPECIAL SHAFT



BASE

B	062196	S0803	REDRAWN	PW	AH
REV.	DATE	ECN NO	DESCRIPTION	DR	CHK

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HOSOKAWA BEPEX CORPORATION

TOLERANCES: UNLESS OTHERWISE SPECIFIED		ISO 128 METHOD A 	TITLE RP DISINTEGRATOR		
FRACTIONS ±	MACH. FIN. UNLESS NOTED ✓		ASSEMBLY, PARTS (LOWER)		
DECIMALS .XX ± .XXX ±		APP	SCALE NONE		REV
ANGLES ±	CHK A. HALASZ 030874	DRAWING NO.			
ES +.010, -.005	DR PEH 030857	A 3947		B	
USED ON RP	NEXT ASS'Y		SHEET 1 OF 1		
PART NO.	SIM. TO	ORIG. JOB NO.			

DRIVE SPECIFICATIONS DISINTEGRATOR MODEL RP-18-K133

CUSTOMER PRAIRIE LAND PACKING CUST. P.O. 909865

BEPEX JOB NO. 12633 SERIAL NO. RP-2001012633A & B

MOTOR: Make BALDOR Frame 405TCZ
Horsepower 100 RPM 3600
Shaft Material: Mfg. Standard 303 SS SPECIAL Other _____

GEAR REDUCER Make _____ Size _____ Ratio _____
Input RPM _____ Output RPM _____

COUPLING Make _____ Size _____
Bore, Drive End _____ Bore, Driven End _____

VEE BELT DRIVE Driven Speed _____
Drive Centers: _____
Belt Size: _____
Drive Pulley Dia: _____
Bore: _____
Bushing: _____
Driven Pulley Dia: _____
Bore: _____
Bushing _____
Pulley: No. of Grooves _____ Dyn. Bal. _____ Mat'l _____
Belt Quantity: _____

ROLLER CHAIN DRIVE: _____
Driven Speed _____
Drive Centers: _____
Chain Size _____
Chain Length _____
Drive Sprocket: Teeth _____ Bore _____ Teeth _____ Bore _____
Driven Sprocket: Teeth _____ Bore _____ Teeth _____ Bore _____

BALDOR[®]
MOTORS AND DRIVES

**Integral Horsepower
AC Induction Motors
ODP Enclosure
TEFC Enclosure
Explosion Proof**

Installation & Operating Manual

Table of Contents

Section 1

General Information	1-1
Overview	1-1
Limited Warranty	1-1
Safety Notice	1-2
Receiving	1-2
Storage	1-2
Unpacking	1-4
Handling	1-4

Section 2

Installation & Operation	2-1
Overview	2-1
Location	2-1
Mounting	2-1
Alignment	2-1
Doweling & Bolting	2-2
Power Connection	2-2
Conduit Box	2-2
AC Power	2-2
First Time Start Up	2-4
Coupled Start Up	2-4
Jogging and Repeated Starts	2-4

Section 3

Maintenance & Troubleshooting	3-1
General Inspection	3-1
Lubrication & Bearings	3-1
Type of Grease	3-1
Lubrication Intervals	3-1
Lubrication Procedure	3-3
Accessories	3-4
Troubleshooting Chart	3-5

Section 1

General Information

Overview

This manual contains general procedures that apply to Baldor Motor products. Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements. A Warning statement indicates a possible unsafe condition that can cause harm to personnel. A Caution statement indicates a condition that can cause damage to equipment.

Important:

This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by Baldor. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed. Please contact your Baldor distributor for more information or clarification.

Before you install, operate or perform maintenance, become familiar with the following:

- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
- The National Electrical Code
- Local codes and Practices

Limited Warranty

1. Baldor Electric motors are warranted for a period of one (1) year, from date of shipment from the factory or factory warehouse against defects in material and workmanship. To allow for stocking and/or fabrication period and to provide one year of actual service, the warranty period is extended for an additional period of six (6) months for a total of eighteen (18) months from the original date of shipment from the factory or factory warehouse stock. In no case will the warranty period be extended for a longer period. Baldor extends this limited warranty to each buyer of the electric motor for the purpose of resale and to the original purchaser for use.
2. Baldor will, at its option repair or replace a motor which fails due to defects in material or workmanship during the warranty period if:
 - a. the purchaser presents the defective motor at or ships it prepaid to, the Baldor plant in Fort Smith, Arkansas or one of the Baldor Authorized Service Centers and
 - b. the purchaser gives written notification concerning the motor and the claimed defect including the date purchased, the task performed by the Baldor motor and the problem encountered.
3. Baldor will not pay the cost of removal of any electric motor from any equipment, the cost of delivery to Fort Smith, Arkansas or a Baldor Authorized Service Center, or the cost of any incidental or consequential damages resulting from the claimed defects. (Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.) Any implied warranty given by laws shall be limited to the duration of the warranty period hereunder. (Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.)
4. Baldor Authorized Service Centers, when convinced to their satisfaction that a Baldor motor developed defects in material or workmanship within the warranty period, are authorized to proceed with the required repairs to fulfill Baldor's warranty when the cost of such repairs to be paid by Baldor does not exceed Baldor's warranty repair allowance. Baldor will not pay overtime premium repair charges without prior written authorization.
5. The cost of warranty repairs made by centers other than Baldor Authorized Service Centers **WILL NOT** be paid unless first authorized in writing by Baldor.
6. Claims by a purchaser that a motor is defective even when a failure results within one hour after being placed into service are not always justified. Therefore, Baldor Authorized Service Centers must determine from the condition of the motor as delivered to the center whether or not the motor is defective. If in the opinion of a Baldor Authorized Service Center, a motor did not fail as a result of defects in material or workmanship, the center is to proceed with repairs only if the purchaser agrees to pay for such repairs. If the decision is in dispute, the purchaser should still pay for the repairs and submit the paid invoice and the Authorized Service Center's signed service report to Baldor for further consideration.
7. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Note that **Baldor Super-E® Premium Efficiency** electric motors are warranted for a period of three (3) years. All other terms and conditions of the Limited Warranty statement apply.

ety Notice:

This equipment contains high voltage! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt installation, operation and maintenance of electrical equipment.

Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and generators, the National Electrical Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury. National Electrical Code and Local codes must be carefully followed.

WARNING: Avoid extended exposure to machinery with high noise levels. Be sure to wear ear protective devices to reduce harmful effects to your hearing.

WARNING: This equipment may be connected to other machinery that has rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt to install operate or maintain this equipment.

WARNING: Do not by-pass or disable protective devices or safety guards. Safety features are designed to prevent damage to personnel or equipment. These devices can only provide protection if they remain operative.

WARNING: Avoid the use of automatic reset devices if the automatic restarting of equipment can be hazardous to personnel or equipment.

WARNING: Be sure the load is properly coupled to the motor shaft before applying power. The shaft key must be fully captive by the load device. Improper coupling can cause harm to personnel or equipment if the load decouples from the shaft during operation.

WARNING: Use proper care and procedures that are safe during handling, lifting, installing, operating and maintaining operations. Improper methods may cause muscle strain or other harm.

WARNING: Before performing any motor maintenance procedure, be sure that the equipment connected to the motor shaft cannot cause shaft rotation. If the load can cause shaft rotation, disconnect the load from the motor shaft before maintenance is performed. Unexpected mechanical rotation of the motor parts can cause injury or motor damage.

WARNING: Disconnect all electrical power from the motor windings and accessory devices before disassembly of the motor. Electrical shock can cause serious or fatal injury.

WARNING: Do not use these motors in the presence of flammable or combustible vapors or dust. These motors are not designed for atmospheric conditions that require explosion proof operation.

Safety Notice Continued

- WARNING:** Motors that are to be used in flammable and/or explosive atmospheres must display the UL label on the nameplate.
- Specific service conditions for these motors are defined in NEC 70-599.
- WARNING:** UL rated motors must only be serviced by authorized Baldor Service Centers if these motors are to be returned to a flammable and/or explosive atmosphere.
- Caution:** To prevent premature equipment failure or damage, only qualified maintenance personnel should perform maintenance.
- Caution:** Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load from the motor shaft before moving the motor.
- Caution:** If eye bolts are used for lifting a motor, be sure they are securely tightened. The lifting direction should not exceed a 20° angle from the shank of the eye bolt or lifting lug. Excessive lifting angles can cause damage.
- Caution:** To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.
- Caution:** If a HI POT test (High Potential Insulation test) must be performed, follow the precautions and procedure in NEMA MG-1 and MG-2 standards to avoid equipment damage.

If you have any questions or are uncertain about any statement or procedure, or if you require additional information please contact your Baldor distributor or an Authorized Baldor Service Center.

Receiving

Each Baldor Electric Motor is thoroughly tested at the factory and carefully packaged for shipment. When you receive your motor, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your motor.
2. Verify that the part number of the motor you received is the same as the part number listed on your purchase order.

Storage

If the motor is not put into service immediately, the motor must be stored in a clean, dry and warm location. Several precautionary steps must be performed to avoid motor damage during storage.

1. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
2. Do not lubricate bearings during storage. Motor bearings are packed with grease at the factory. Excessive grease can damage insulation quality.
3. Rotate motor shaft at least 10 turns every two months during storage (more frequently if possible). This will prevent bearing damage due to storage.
4. If the storage location is damp or humid, the motor windings must be protected from moisture. This can be done by applying power to the motors' space heater (if available) while the motor is in storage.

Unpacking

Each Baldor motor is packaged for ease of handling and to prevent entry of contaminants.

1. To avoid condensation inside the motor, do not unpack until the motor has reached room temperature. (Room temperature is the temperature of the room in which it will be installed). The packing provides insulation from temperature changes during transportation.
2. When the motor has reached room temperature, remove all protective wrapping material from the motor.

Handling

The motor should be lifted using the lifting lugs or eye bolts provided.

1. Use the lugs or eye bolts provided to lift the motor. Never attempt to lift the motor and additional equipment connected to the motor by this method. The lugs or eye bolts provided are designed to lift only the motor. Never lift the motor by the motor shaft.
2. If the motor must be mounted to a plate with the driven equipment such as pump, compressor etc., it may not be possible to lift the motor alone. For this case, the assembly should be lifted by a sling around the mounting base. The entire assembly can be lifted as an assembly for installation. Do not lift using the motor lugs or eye bolts provided.

If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting.

Section 2 Installation & Operation

Overview

Installation should conform to the National Electrical Code as well as local codes and practices. When other devices are coupled to the motor shaft, be sure to install protective devices to prevent future accidents. Some protective devices include, coupling, belt guard, chain guard, shaft covers etc. These protect against accidental contact with moving parts. Machinery that is accessible to personnel should provide further protection in the form of guard rails, screening, warning signs etc.

Location

The motor should be installed in an area that is protected from direct sunlight, corrosives, harmful gases or liquids, dust, metallic particles, and vibration. Exposure to these can reduce the operating life and degrade performance. Be sure to allow clearance for ventilation and access for cleaning, repair, service and inspections. Ventilation is extremely important. Be sure the area for ventilation is not obstructed. Obstructions will limit the free passage of air. Motors get warm and the heat must be dissipated to prevent damage.

These motors are not designed for atmospheric conditions that require explosion proof operation. They must **NOT** be used in the presence of flammable or combustible vapors or dust.

1. ODP motors are suitable only for indoor applications.
2. TEFC motors are suitable for indoor or outdoor standard service applications.

Mounting

The motor must be securely installed to a rigid foundation or mounting surface to minimize vibration and maintain alignment between the motor and shaft load. Failure to provide a proper mounting surface may cause vibration, misalignment and bearing damage.

Foundation caps and sole plates are designed to act as spacers for the equipment they support. If these devices are used, be sure that they are evenly supported by the foundation or mounting surface.

After installation is complete and accurate alignment of the motor and load is accomplished, the base should be grouted to the foundation to maintain this alignment.

The standard motor base is designed for horizontal or vertical mounting. Adjustable or sliding rails are designed for horizontal mounting only. Consult your Baldor distributor or authorized Baldor Service Center for further information.

Alignment

Accurate alignment of the motor with the driven equipment is extremely important.

1. **Direct Coupling**

For direct drive, use flexible couplings if possible. Consult the drive or equipment manufacturer for more information. Mechanical vibration and roughness during operation may indicate poor alignment. Use dial indicators to check alignment. The space between coupling hubs should be maintained as recommended by the coupling manufacturer.

2. **End-Play Adjustment**

The axial position of the motor frame with respect to its load is also extremely important. The motor bearings are not designed for excessive external axial thrust loads. Improper adjustment will cause failure.

3. **Pulley Ratio**

The pulley ratio should not exceed 8:1.

4. **Belt Drive**

Align sheaves carefully to minimize belt wear and axial bearing loads (see End-Play Adjustment). Belt tension should be sufficient to prevent belt slippage at rated speed and load. However, belt slippage may occur during starting.

Caution: Do not over tension belts.

Doweling & Bolting

After proper alignment is verified, dowel pins should be inserted through the motor feet into the foundation. This will maintain the correct motor position should motor removal be required. (Baldor motors are designed for doweling.)

1. Drill dowel holes in diagonally opposite motor feet in the locations provided.
2. Drill corresponding holes in the foundation.
3. Ream all holes.
4. Install proper fitting dowels.
5. Mounting bolts must be carefully tightened to prevent changes in alignment. Use a flat washer and lock washer under each nut or bolt head to hold the motor feet secure. Flanged nuts or bolts may be used as an alternative to washers.

Power Connection

Motor and control wiring, overload protection, disconnects, accessories and grounding should conform to the National Electrical Code and local codes and practices.

Conduit Box

For ease of making connections, an oversize conduit box is provided. The box can be rotated 360° in 90° increments. Auxiliary conduit boxes are provided on some motors for accessories such as space heaters, RTD's etc.

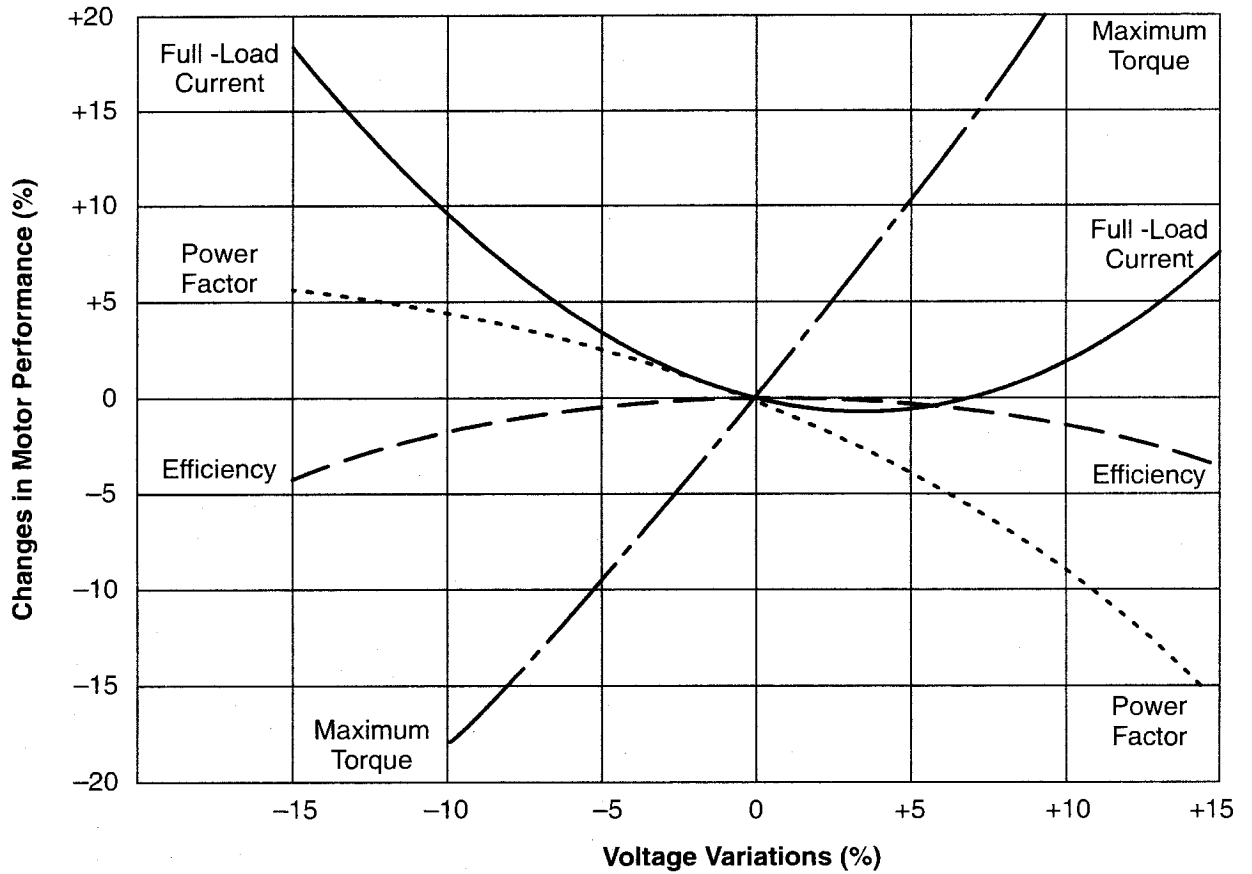
AC Power

Connect the motor leads as shown on the connection diagram located on the name plate or inside the cover on the conduit box. Be sure the following guidelines are met:

1. AC power is within $\pm 10\%$ of rated voltage with rated frequency. (See motor name plate for ratings).
OR
2. AC power is within $\pm 5\%$ of rated frequency with rated voltage.
OR
3. A combined variation in voltage and frequency of $\pm 10\%$ (sum of absolute values) of rated values, provided the frequency variation does not exceed $\pm 5\%$ of rated frequency.

Performance within these voltage and frequency variations are shown in Figure 2-1.

Figure 2-1 Motor Performance VS Voltage Variations



First Time Start Up

Be sure that all power to motor and accessories is off. Be sure the motor shaft is disconnected from the load and will not cause mechanical rotation of the motor shaft.

1. Make sure that the mechanical installation is secure. All bolts and nuts are tightened etc.
2. If motor has been in storage or idle for some time, check winding insulation integrity with a Megger.
3. Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity.
4. Be sure all shipping materials and braces (if used) are removed from motor shaft.
5. Manually rotate the motor shaft to ensure that it rotates freely.
6. Replace all panels and covers that were removed during installation.
7. Momentarily apply power and check the direction of rotation of the motor shaft.
8. If motor rotation is wrong, be sure power is off and change the motor lead connections. Verify rotation direction before you continue.
9. Start the motor and ensure operation is smooth without excessive vibration or noise. If so, run the motor for 1 hour with no load connected.
10. After 1 hour of operation, disconnect power and connect the load to the motor shaft. Verify all coupling guards and protective devices are installed. Ensure motor is properly ventilated.

Coupled Start Up

This procedure assumes a coupled start up. Also, that the first time start up procedure was successful.

1. Check the coupling and ensure that all guards and protective devices are installed.
2. Check that the coupling is properly aligned and not binding.
3. The first coupled start up should be with no load. Apply power and verify that the load is not transmitting excessive vibration back to the motor through the coupling or the foundation. Vibration should be at an acceptable level.
4. Run for approximately 1 hour with the driven equipment in an unloaded condition.

The equipment can now be loaded and operated within specified limits. Do not exceed the name plate ratings for amperes for steady continuous loads.

Jogging and Repeated Starts Repeated starts and/or jogs of induction motors generally reduce the life of the motor winding insulation. A much greater amount of heat is produced by each acceleration or jog than by the same motor under full load. If it is necessary to repeatedly start or jog the motor, it is advisable to check the application with your local Baldor distributor or Baldor Service Center.

Heating - Duty rating and maximum ambient temperature are stated on the motor name plate. Do not exceed these values. If there is any question regarding safe operation, contact your local Baldor distributor or Baldor Service Center.

Section 3 Maintenance & Troubleshooting

WARNING: UL rated motors must only be serviced by authorized Baldor Service Centers if these motors are to be returned to a flammable and/or explosive atmosphere.

General Inspection

Inspect the motor at regular intervals, approximately every 500 hours of operation or every 3 months, whichever occurs first. Keep the motor clean and the ventilation openings clear. The following steps should be performed at each inspection:

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

1. Check that the motor is clean. Check that the interior and exterior of the motor is free of dirt, oil, grease, water, etc. Oily vapor, paper pulp, textile lint, etc. can accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause early motor failure.
2. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
3. Check all electrical connectors to be sure that they are tight.

Lubrication & Bearings

Bearing grease will lose its lubricating ability over time, not suddenly. The lubricating ability of a grease (over time) depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. Good results can be obtained if the following recommendations are used in your maintenance program.

Type of Grease

A high grade ball or roller bearing grease should be used. Recommended grease for standard service conditions is Polyrex EM (Exxon Mobil).

Equivalent and compatible greases include:

Texaco Polystar, Rykon Premium #2, Pennzoil Pen 2 Lube and Chevron SRI.

- Maximum operating temperature for standard motors = 110° C.
- Shut-down temperature in case of a malfunction = 115° C.

Lubrication Intervals

Recommended lubrication intervals are shown in Table 3-1. It is important to realize that the recommended intervals of Table 3-1 are based on average use.

Refer to additional information contained in Tables 3-2 and 3-3.

Table 3-1 Lubrication Intervals *

NEMA / (IEC) Frame Size	Rated Speed - RPM					
	10000	6000	3600	1800	1200	900
Up to 210 incl. (132)	**	2700 Hrs.	5500 Hrs.	12000 Hrs.	18000 Hrs.	22000 Hrs.
Over 210 to 280 incl. (180)			3600 Hrs.	9500 Hrs.	15000 Hrs.	18000 Hrs.
Over 280 to 360 incl. (225)			* 2200 Hrs.	7400 Hrs.	12000 Hrs.	15000 Hrs.
Over 360 to 5800 incl. (300)			*2200 Hrs.	3500 Hrs.	7400 Hrs.	10500 Hrs.

* Lubrication intervals are for ball bearings. For roller bearings, divide the listed lubrication interval by 2.

** For 6205 and 6806 bearings. For 6807 bearings, consult oil mist lubrication (MN401).
Relubrication interval for 6205 bearing bearing is 1550Hrs. (using grease lubrication).
Relubrication interval for 6806 bearing bearing is 720Hrs. (using grease lubrication).

Table 3-2 Service Conditions

Severity of Service	Ambient Temperature Maximum	Atmospheric Contamination	Type of Bearing
Standard	40° C	Clean, Little Corrosion	Deep Groove Ball Bearing
Severe	50° C	Moderate dirt, Corrosion	Ball Thrust, Roller
Extreme	>50° C* or Class H Insulation	Severe dirt, Abrasive dust, Corrosion	All Bearings
Low Temperature	<-30° C **		

* Special high temperature grease is recommended (Darmex 707). Note that Darmex 707 grease does not mix with other grease types. Thoroughly clean bearing & cavity before adding grease.

** Special low temperature grease is recommended (Aeroshell 7).

Table 3-3 Lubrication Interval Multiplier

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1
Low Temperature	1.0

Table 3-4 Bearings Sizes and Types

Frame Size NEMA (IEC)	Bearing Description (These are the "Large" bearings (Shaft End) in each frame size)					
	Bearing	OD D mm	Width B mm	Weight of Grease to add * oz (Grams)	Volume of grease to be added	
					in ³	tea- spoon
Up to 210 incl. (132)	6307	80	21	0.30 (8.4)	0.6	2.0
Over 210 to 280 incl. (180)	6311	120	29	0.61 (17)	1.2	3.9
Over 280 to 360 incl. (225)	6313	140	33	0.81 (23)	1.5	5.2
Over 360 to 449 incl. (280)	NU319	200	45	2.12 (60)	4.1	13.4
Over 5000 to 5800 incl. (355)	NU328	300	62	4.70 (130)	9.2	30.0
Spindle Motors						
76 Frame	6207	72	17	0.22 (6.1)	0.44	1.4
77 Frame	6210	90	20	0.32 (9.0)	0.64	2.1
80 Frame	6213	120	23	0.49 (14.0)	0.99	3.3

* Weight in grams = .005 DB

Lubrication Procedure

Be sure that the grease you are adding to the motor is compatible with the grease already in the motor. Consult your Baldor distributor or an authorized service center if a grease other than the recommended type is to be used.

Caution: To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your Baldor distributor or an authorized Baldor Service Center for additional information.

With Grease Outlet Plug

1. Clean all grease fittings.
2. Remove grease outlet plug.
3. If motor is stopped, add the recommended amount of grease.

If motor is to be greased while running, a slightly greater quantity of grease will have to be added. Add grease slowly until new grease appears at shaft hole in the endplate or purge outlet plug.

4. Re-install grease outlet plug.

Without Grease Outlet Plug

1. Disassemble motor.
2. Add recommended amount of grease to bearing and bearing cavity. (Bearing should be about 1/3 full of grease and outboard bearing cavity should be about 1/2 full of grease.)

Note: Bearing is 1/3 full when only one side of bearing is completely full of grease.

3. Assemble motor.

Sample Lubrication Determination

Assume - NEMA 286T (IEC 180), 1750 RPM motor driving an exhaust fan in an ambient temperature of 43° C and the atmosphere is moderately corrosive.

1. Table 3-1 list 9500 hours for standard conditions.
2. Table 3-2 classifies severity of service as "Severe".
3. Table 3-3 lists a multiplier value of 0.5 for Severe conditions.
4. Table 3-4 shows that 1.2 in³ or 3.9 teaspoon of grease is to be added.

Note: Smaller bearings in size category may require reduced amounts of grease.

Accessories

The following is a partial list of accessories available from Baldor.
Contact your Baldor distributor for availability and pricing information.

Note: Space heaters and RTD's are standard on some motors.

Bearing RTD

RTD (Resistance Temperature Detector) devices are used to measure or monitor the temperature of the motor bearing during operation.

Bearing Thermocouples

Used to measure or monitor bearing temperatures.

Bearing Thermostat

Temperature device that activates when bearing temperatures are excessive. Used with an external circuit to warn of excessive bearing temperature or to shut down a motor.

Conduit Boxes

Optional conduit boxes are available in various sizes to accommodate accessory devices.

Cord & Plug Assembly

Adds a line cord and plug for portable applications.

Drains and Breathers

Stainless steel drains with separate breathers are available.

Drip Covers

Designed for use when motor is mounted in a vertical position. Contact your Baldor distributor to confirm that the motor is designed for vertical mounting.

Fan Cover & Lint Screen

To prevent build-up of debris on the cooling fan.

Nameplate

Additional stainless steel nameplates are available.

Roller Bearings

Recommended for belt drive applications with a speed of 1800 RPM or less.

Rotation Arrow Labels

Rotation arrows are supplied on motors designed to operate in one direction only. Additional rotation arrows are available.

Space Heater

Added to prevent condensation of moisture within the motor enclosure during periods of shut down or storage.

Stainless Hardware

Stainless steel hardware is available. Standard hardware is corrosion resistant zinc plated steel.

Winding RTD

RTD (Resistance Temperature Detector) devices are used to measure or monitor the temperature of the motor winding during operation.

Winding Thermocouples

Used to measure or monitor winding temperatures.

Winding Thermostat

Temperature device that activates when winding temperatures are excessive. Used with an external circuit to warn of excessive winding temperature or to shut down a motor.

Note: On some motors, leads for accessory devices are brought out to a separate conduit box located on the side of the motor housing (unless otherwise specified).

Table 3-5 Troubleshooting Chart

Symptom	Possible Causes	Possible Solutions
Motor will not start	Usually caused by line trouble, such as, single phasing at the starter.	Check source of power. Check overloads, fuses, controls, etc.
Excessive humming	High Voltage.	Check input line connections.
	Eccentric air gap.	Have motor serviced at local Baldor service center.
Motor Over Heating	Overload. Compare actual amps (measured) with nameplate rating.	Locate and remove source of excessive friction in motor or load. Reduce load or replace with motor of greater capacity.
	Single Phasing.	Check current at all phases (should be approximately equal) to isolate and correct the problem.
	Improper ventilation.	Check external cooling fan to be sure air is moving properly across cooling fins. Excessive dirt build-up on motor. Clean motor.
	Unbalanced voltage.	Check voltage at all phases (should be approximately equal) to isolate and correct the problem.
	Rotor rubbing on stator.	Check air gap clearance and bearings. Tighten "Thru Bolts".
	Over voltage or under voltage.	Check input voltage at each phase to motor.
	Open stator winding.	Check stator resistance at all three phases for balance.
	Grounded winding.	Perform dielectric test and repair as required.
	Improper connections.	Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity. Refer to motor lead connection diagram.
	Bearing Over Heating	Misalignment.
Excessive belt tension.		Reduce belt tension to proper point for load.
Excessive end thrust.		Reduce the end thrust from driven machine.
Excessive grease in bearing.		Remove grease until cavity is approximately $\frac{3}{4}$ filled.
Insufficient grease in bearing.		Add grease until cavity is approximately $\frac{3}{4}$ filled.
Dirt in bearing.		Clean bearing cavity and bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.
Vibration	Misalignment.	Check and align motor and driven equipment.
	Rubbing between rotating parts and stationary parts.	Isolate and eliminate cause of rubbing.
	Rotor out of balance.	Have rotor balance checked and repaired at your Baldor Service Center.
	Resonance.	Tune system or contact your Baldor Service Center for assistance.
Noise	Foreign material in air gap or ventilation openings.	Remove rotor and foreign material. Reinstall rotor. Check insulation integrity. Clean ventilation openings.
Growling or whining	Bad bearing.	Replace bearing. Clean all grease from cavity and new bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.

BALDOR[®]
MOTORS AND DRIVES

BALDOR ELECTRIC COMPANY
P.O. Box 2400
Ft. Smith, AR 72902-2400
(501) 646-4711
Fax (501) 648-5792

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