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ITW GEMA
INDUSTRIAL POWDER COATING SYSTEMS

USERS MANUALS
FOR A
GEMA ROTARY SIEVE

MANUAL PART #128888
DATE: FEBRUARY 7, 2000

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SECTION 1
INTRODUCTION

This section provides an overview of the manual and indicates safety procedures to be followed when installing and operating the ITW Gema Rotary Sieve.

1.1 Manual Overview

This manual describes the installation requirements, procedures and routine maintenance of the ITW Gema Rotary Sieve. Refer to this manual before and during installation. Keep this manual available for future reference. Exploded illustrations are located throughout the manual and should be referred to while following the procedures. Reliable operation, personnel safety, and long service life of this equipment depends on three important considerations:

1) The care exercised during installation.
2) The quality and frequency of maintenance and periodic inspections.
3) A common sense approach to its operation.

To keep operating costs down and profits up, carefully follow the instructions listed for installation, operation, safety, and maintenance.

1.2 Receiving the Unit

When your system arrives, thoroughly inspect the Rotary Sieve and all related equipment. In the event of shipping damage, note the problem on the freight bill and make sure you obtain the drivers signature for a possible claim against the delivery carrier.

NOTE: It is not the receiver's obligation to file claims for shipping damage.

1.3 Before Installation

Be sure the installation crew are aware of the installation requirements. If they have any questions or are unsure of proper procedures, clarify the matter to avoid improper installation. Section 2 of this manual covers important steps to ensure safe, vibration-free installation. Personnel responsible for installation should be familiar with these procedures.

1.4 Before Operation

Make sure operating personnel are well trained in procedures for operating and maintaining the Rotary Sieve. In particular, make sure they understand the essential safety precautions described in section 1.6.

1.5 Safety Notes

Basic safety must be considered through all facets of operation and maintenance on any mechanical device. Using proper tools and methods will help prevent accidents and serious injury to you and your coworkers. Proper operating procedures and safety precautions are listed throughout this manual. Study them carefully and follow instructions; insist that those working with you do the same. Almost all accidents are caused by someone's carelessness or negligence. Examples of the two types of safety notices in this manual follow:

WARNING

Indicates a situation in which personal injury may occur.

CAUTION

Indicates a situation in which damage to equipment or material may occur.

1.6 Safety Precautions
CAUTION

Operators must be instructed not to put hands, fingers or other foreign objects in the machine, and not to remove any cover, door or other protective device. These items are placed on this machine for the safety of the operator. Any attempt to defeat these devices could result in serious injury.

WARNING

Electrical service to the machine must be locked out while any repairs or adjustments are being made or while any cover, door, hatch or other protective device is not in place.

The precautions listed in this manual may not be all-inclusive and others may occur to you that are peculiar to your operation. In addition nearly all employers are now subject to the Federal Occupational Safety and Health Act of 1970, as amended, which requires that an employer be kept abreast of the myriad of regulations that will continue to be issued under its authority. The Rotary Sieve must always be operated in accordance with the instruction and precaution in this manual and on the caution plates attached to the equipment. Only

workers completely familiar with the instructions and precautions in this manual should be permitted to operate the unit. The operator should thoroughly understand these instructions and precaution before attempting to operate this equipment. Illustration 1-1 is a checklist of safety precautions and proper operating procedures. Failure to observe and follow the precautions may result in serious personal injury or property damage.

SAFETY CHECKLIST

- **ALWAYS** follow the operating instructions included in the manual.
- **DO NOT** open any doors or covers during operation.
- **DO NOT** use the Rotary Sieve for processing of material other than the specific application for which it was designed.
- **AVOID** poking or prodding into unit opening with a bar or stick.
- **ALWAYS** have a clear view of all safety devices.
- **KEEP** area around unit, drive, and control station free of debris and obstacles.
- **NEVER** operate unit without covers, guards and all safety devices in position and functioning.
- **ALWAYS** allow unit to stop naturally. DO NOT attempt to artificially brake or slow the motion of the unit.
- **NEVER** work on unit and related components unless electric power and motor drive have been locked out and tagged.

Illustration 1-1

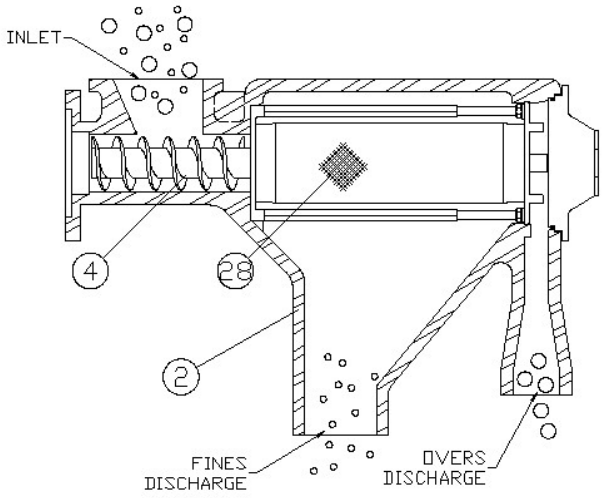
1.7 Operating Principle

During operation , powder is fed into the inlet section of the sieve body (2). The auger section of the rotor (4) then transports the material from the inlet into the screen assembly. At this point, the helical blades of the rotor propel the powder against the Nitex screen (28). Fine product passes through the screen into the primary discharge. Material too coarse to pass through is retained within the screen, where the helical blades move this waste material to the oversize discharge. During operation the rotor creates a slight positive pressure within the housing. It is recommended that the oversize discharge to an oversize bag be sealed air tight with proper hose clamp. This will minimize the amount of fine powder that may be blown from the screen area into the scrap bag.

The Rotary Sieve centrifugal screening action allows greater throughput capacity per unit of

screening area by the high level of centrifugal force, which helps the product pass through the screen efficiently, and the speeding action of the rotor, which distributes the product around the entire screen perimeter.

The centrifugal force of the product being thrown against the screen causes it to flex, therefore cleaning itself. This eliminates the need for an additional cleaning media, which may contaminate the product and also reduces down time caused by screen blinding.



SECTION 2
INSTALLATION

This section covers installation procedures to insure
safe and efficient operation of the ITW Gema Rotary Sieve.

2.1 Introduction

Proper installation of the ITW Gema Rotary Sieve is critical for efficient and productive operation. The proper site preparation and placement of the sieve and related equipment will ensure that equipment will operate safely and to its fullest capability.

The following are important considerations for proper sieve installation.

1. Location
2. Vibration

2.2 Location

There needs to be sufficient open space in all directions around the Rotary Sieve to allow access for changing screens and maintenance operations. Excessive weight should not be supported by the inlet.

2.3 Vibration

The Rotary Sieve is constructed to operate with minimal vibration. Excessive vibration indicates a problem that must be identified and corrected immediately. There are several conditions that can lead to excessive vibration, including:

- Uneven base
- Loose motor fasteners
- Defective motor or sieve bearings
- Broken helical rotor blade
- Other equipment transferring vibration through the sieve

2.4 Feeding

It is essential that the feed be controlled to the Sieve in order to prevent overfeed, or uncontrolled pulsation's which can overload the Sieve. Over loading the Sieve may result in fines flowing into the oversize discharge.

2.5 Primary Discharge

The primary discharge should be made dust tight by securing the Sieve to the hopper lid. It is necessary that a gasket be properly positioned below the Sieve to eliminate any product leakage. Caution should be taken to ensure that there is no air blowing back into the primary discharge from the discharge hopper. Air blowing back through the screen can cause excessive carry over. A slight suction on the primary discharge is beneficial as long as the oversize discharge outlet or container is properly sealed.

2.6 Oversize Discharge

The oversize discharge outlet should be installed so that air will not flow back through the Sieve and interfere with proper product flow. This is accomplished by discharging the rejects into an air-tight bag.

2.7 Air Purge Port

The Sieve has been supplied with two air fittings (1/4" NPT) that connect to 1/4" O.D. tubing. It is necessary that air be supplied to both ends of the Sieve at a purge pressure of 4 to 5 psig. To disconnect the tubing from the fitting, apply pressure to the push-sleeve then remove the tubing. To connect the tubing simply insert the tube until it bottoms out in the fitting.

2.8 Electrical Requirements

Install connections to meet all national and local electric codes.

NOTE: The National Electrical Code requires a manually operable disconnect switch located within sight of the motor, or a controller disconnecting means capable of being locked if not within sight of the motor.

The Rotary Sieve may be started "across the line" if such a procedure is acceptable to your local power company.

2.9 Electrical Interlocking

As a general guide, the last piece of process equipment is started first with subsequent starts working up the line.

SECTION 3
OPERATION

This section describes machine operation and procedures to follow before starting the ITW Gema Rotary Sieve.

3.1 Introduction

Pre-run inspections and safety checks throughout this section insure that the Rotary Sieve is in proper operating condition. Start-up and shutdown sequences are also covered in this section.

3.2 Pre-Run Inspection

Before starting the Rotary Sieve, check the following.

- Ø The inside of the Sieve for foreign material, i.e., nuts, bolts, wire.
- Ø That all doors are closed and locked.
- Ø That all electrical equipment, meters, disconnect switches, and other control devices are clearly visible and readily accessible to the operator.
- Ø That the screen is properly tensioned, and the screen frame and rotor are properly installed.
- Ø Rotor rotation is clockwise when looking from the discharge end.

3.3 Start-Up Sequence

This start-up sequence is intended as a general guide. As a general guide to electrical interlocking, you turn on equipment in reverse order from product flow.

Here is a start-up checklist:

1. Start each piece of equipment in proper start-up sequence.
2. Check each motor as it starts for proper rotation and proper amperage.
3. Check interlocks to make sure they are working in the proper sequence.
4. Begin product feed into the system.

WARNING

DO NOT OPEN SIEVE OR ATTEMPT ANY FORM OF INSPECTION UNTIL THE ROTOR HAS COME TO A COMPLETE STOP AND THE ELECTRICAL DISCONNECT HAS BEEN LOCKED INTO THE OPEN POSITION.

3.4 Shut-Down

For a typical Rotary Sieve operation, the shut-down sequence will be the reverse of the

start -up sequence. Check that you do not have special considerations in your installation that require different procedures.

SECTION 4
MAINTENANCE

This section describes the general maintenance and replacement procedures for the ITW Gema Rotary Sieve.

4.1 Introduction

The Rotary Sieve is designed to operate with little maintenance. Routine inspections and regular maintenance will identify any worn or broken parts before they become a problem. When operated without vibration or excessive foreign materials entering the screen frame, only those parts subject to the heaviest wear, i.e., screens and lip seals will require maintenance.

WARNING

DO NOT OPEN THE SIEVE OR ATTEMPT ANY FORM OF INSPECTION UNTIL THE ROTOR HAS COME TO A COMPLETE STOP AND ELECTRICAL DISCONNECT HAS BEEN LOCKED IN THE OPEN POSITION.

4.2 Routine Inspection

Regular inspections are required to give advance warning of a problem. The simple, yet rugged, design of the Rotary Sieve provides easy access for maintenance cleaning, and service.
To decrease down-time, regularly inspect the machine and output. The output of the Rotary Sieve will determine when screens should be replaced, as well as give advanced notice of a problem. Maintain an inventory of standard wear items such as screens and lip seals.

4.3 Screens

The screens control the particle size of the powder. Screens are available in 20, 40, 60, 80, 100 and 120 mesh. Screens smaller than 60 mesh may result in a slight decrease in capacity.
Inspect the screens frequently to maintain the desired output. The screens may require replacement if they are showing signs of wear.

4.3.1 Screen Frame Removal

1. Turn off the Rotary Sieve and allow the rotor to come to a complete stop.
2. Lock out electrical power to the Rotary Sieve.
3. Open end door (7) by loosening swing away handles (6,10). Slide the door off the end of the rotor and place to the side.
4. Grasp the handles of the discharge screen ring (24) and rotate the assembly counter clockwise so the notch of the end ring will pass the locking block.

5. Gently pull the screen frame straight out from the housing.

4.3.2 Screen Removal and Replacement

1. Loosen hex nuts (25) until tension in screen (28) is gone.
2. Loosen both screen clamps (27) and remove screen.
3. Replace with undamaged screen.
4. Position clamps (27) on screen (28).
5. Slide the screen as far as it will go on the end ring flanges. Slide the clamps as far as they will go and tighten with a socket.

NOTE: The seam of the screen must be mounted at the top of the assembly

6. Tighten hex nuts evenly to tension the screens. Continue to tighten the screen until the end of the screen frame rods (23) are flush with the face of the outer screen ring (24)
7. (Inner ring face to outer ring face should measure 11-21/32" or 11.6563").

NOTE: The screen may slide a bit when adjusting the tension. This is normal, but allow no more than 1/8" slip at each end.

4.3.3 Screen Frame Installation

1. Gently slide the screen frame assembly into the housing. The inner screen ring must be inserted first over the rotor blades. The outer screen ring must allow the outer hex to extend through its center opening.
2. Allow the notch of the outer screen ring to pass the locking block, then rotate the screen assembly clockwise into position.

4.4 Rotor

The rotor is the internal moving part of the sieve unit. It provides the means by which the product is fed into the sieve and propelled to the screen.

4.4.1 Rotor Removal

1. Disconnect power from the unit.
2. Make sure the sieve has come to a full stop. Open the door assembly by releasing the knobs (6, 10) and sliding the door off the rotor assembly (4).
3. Rotate screen frame assembly counterclockwise and gently remove it from the housing.
4. Grasp hex end of the rotor and remove rotor from the housing (2).

4.4.2 Rotor Installation

1. Disconnect power to the unit.
2. Fit the end of the rotor (4) over the motor shaft. Slowly rotate the rotor until the key pins line up with the motor shaft keyways. Then slide the rotor

fully into position on the motor shaft.
3. Install screen frame assembly over the rotor inside the housing. Making sure to secure the frame behind the locking block.
4. Make sure the o-ring (29) is undamaged and correctly installed on the end door.
5. Slide the end of the rotor into the bearing in the end door. Locate the end door assembly on the housing and clamp it into place with the swinging handles (6,10). Make sure the limit switch (5) is engaged.

4.5 Motor

The standard motor supplied is a 1/2 HP, 1 phase, 60 cycle, 56c flange mounted, TEFC motor. Optional motors are available to meet various voltage requirements. All the optional motors will operate similar to the standard motor for both replacement purposes and throughput ratings.

4.5.1 Motor Removal

1. Isolate sieve unit from all power supplies.
2. Remove the screen frame and rotor assemblies (See 4.3.1, 4.4.1)
3. Support the motor and remove the mounting screws (20) washers (21).
4. Carefully pull the motor straight out of the housing and motor insert taking care not to damage the seal (12) or lantern ring (13).

4.5.2 Motor Installation

1. Clean and inspect the Lantern ring and seal, replace them if they are damaged (See 4.7).
2. Carefully slide the motor shaft through the lip seal and lantern ring assembly.
3. Position the washers (21) and screws (20) through the slotted motor flange holes. Tighten all screws evenly.

4.6 Bearings

To keep the Rotary Sieve as simple as possible there is only one bearing (30) that requires maintenance. The end door (7) houses the hex bearing that locates the rotor for the discharge end. Because the rotor (4) is cantilevered from the motor shaft, when the door is removed it is recommended that the rotor be removed when not in operation for extended periods of time.
The rear hex bearing has been factory lubricated and sealed so it requires no maintenance when the air purge seals are properly maintained. Bearing replacement is necessary when the hex bearing has been damaged. See section 5.

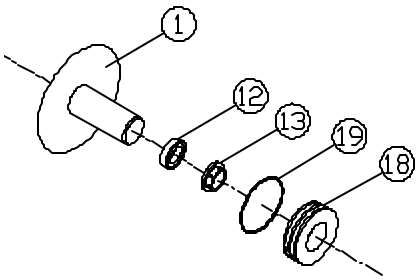
4.6.1 Bearing Removal

1. Remove the two screws (32) that position the end bearing cap (31).
2. Remove the bearing carefully and examine it for signs of contamination or excessive wear. Replace if any damage is observed.

4.6.2 Bearing Installation

The end door has been machined to accept the bearing with little difficulty. **NOTE:** The outer surface of the bearing and the inner surface of the bearing housing must be wiped clean.

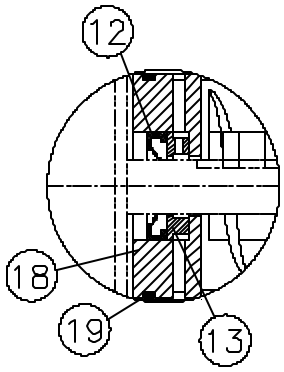
1. Center the bearing over the bore. Gently press the bearing evenly into position.
2. Replace the end bearing cover and the screws. **Note:** the screws must be tight to



properly secure the bearing.

4.7 Seals, Lantern Rings, and Motor Insert

The specially designed seals and lantern rings are essential in eliminating contamination of the motor and the hex bearing. When proper care is taken during motor and end door installation, these items will only need replacing when worn or damaged. These items are removed and installed the same way for both the motor and discharge end. The lantern ring is nearest the product environment, flanged side out. The seals are then installed as shown below.



Motor End

Discharge End

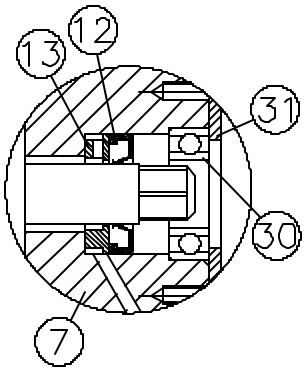
4.7.1 Seal, Lantern Ring, and Motor Insert Removal

1. Disconnect power from the sieve unit and allow rotor to come to a complete stop.
2. Remove the screen frame and rotor (See 4.3.1, 4.4.1).
3. Support the motor and remove the mounting screws (20) and washers (21). Carefully pull the motor straight out of the housing and motor insert until the shaft is clear.

4. Remove the lip seal (12) and lantern ring (13) from the motor insert.
5. If the motor insert is damaged, loosen the set screw (37) on the side of the housing and pull the motor insert straight out of the housing to remove it.

4.7.2 Seal, Lantern Ring, and Motor Insert Installation

1. Clean and inspect the lip seal (12) and lantern ring (13). Replace them if they are damaged.
2. Clean the motor insert bore and housing flange.
3. Replace the motor insert (18) if it is damaged.
    a. Install the o-ring (19) on the outside of the motor insert.
    b. Install the assembled motor insert into the housing bore with the lantern ring and lip seal bore facing outward until it is fully bottomed in the housing bore.
    c. Tighten the set screw
4. Install the lantern ring in the bore of the motor insert. Make sure the flanged end of the ring is facing out.
5. Install the lip seal in the motor insert bore with the grooved side facing inwards.



SECTION 5
TROUBLESHOOTING

This section covers the more common day-to-day operating problems for the ITW Gema Rotary Sieve. Possible causes are listed along with their suggested solutions.

5.1 Introduction

This section is offered as a general guide to analyzing problems. If after reviewing you have not identified the problem, contact an ITW Gema representative for further assistance.

5.2 Start-Up Problems

ITW Gema Equipment is made of high quality materials and assembled by skilled workers, who take pride in their work. However, even on the best equipment there can still be start-up or operational difficulties.

If trouble occurs, please check the following:

1. Did the unit receive any damage during shipment or installation? Sometimes there is hidden damage or internals can shift due to a sudden jar, thus causing misalignment or parts rubbing internally.

2. Check the hopper where unit is installed to be sure it is level and provides a vibration-free foundation.

3. Check to see that material to be handled can flow freely to and from the unit.

4. Be sure the unit is running in the correct direction, clockwise

when looking from the discharge end.

5. To avoid electrical problems, a qualified electrician should verify that the proper power source is connected and correctly wired to the motor being used.

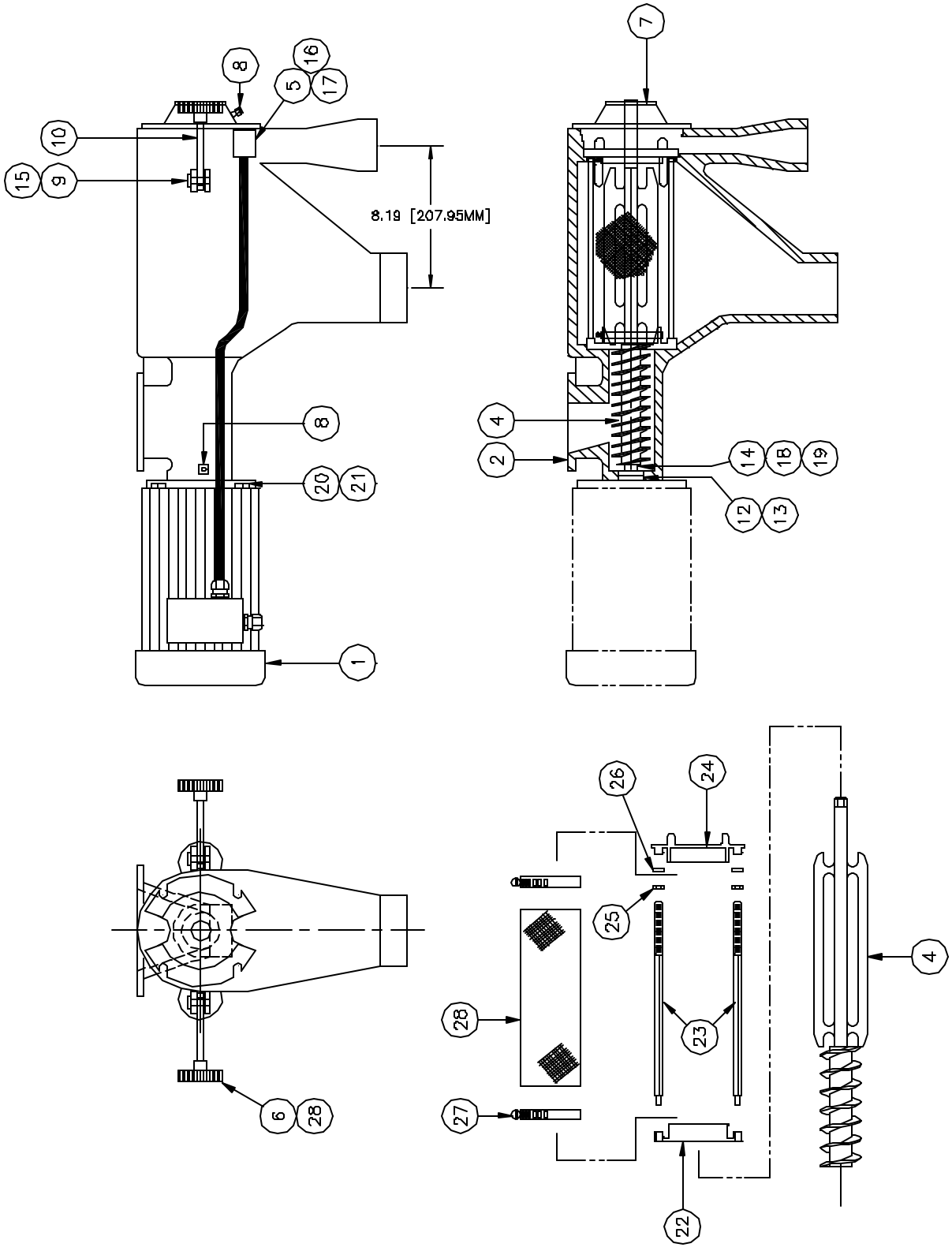
Symptom	Possible Cause	Suggested Solution
Excessive screen wear or breakage	1. Loose screens.	Retension screens to correct tension.
	2. Excessive feed rate.	Reduce feed rate.
	3. Foreign material such as hard lumps, stones, bolts, ect. in the product.	clean coarse material ahead of unit.
	4. Erratic or heavy pulsating feed. Causes excess pressure on screens over-stressing screen fibers.	Add proper feeding device or check existing feeder for operation.
	5. Highly abrasive material.	Reduce speed of rotor as much as possible until unit capacity begins to drop. Speed change installation of variable speed drive.
Screen Blinding	1. Screens loose.	Retension screens to proper tension.
	2. Centrifugal force not sufficient to overcome product stickiness or static attraction.	Increase rotor speed, monitor capacity and amperage to establish maximum speed.
Product feed backing up	1. Feed rate too high.	Reduce feed to proper rate.
	2. Rotor running in reverse.	Reverse motor connections. Rotor should be moving CCW when facing drive.
Fines carry over with oversize product.	1. Excessive feed. Loading beyond capability of screen area.	Reduce feed rate.
	2. Erratic or pulsing feed. Heavy feed surges may exceed capability of screen area.	Check feeding device. Feed to Rotary Sieve must be uniform.
	3. Too much oversize material	Check producing system to

	in feed product. Feed should be limited to a maximum 15% oversize.	cause of excessive oversize material.
	4. Undersize screen.	Check screen aperture.
	5. Loose screens.	Check and retension screens.
	6. Screen blind.	1. Check product for excess moisture, ect. 2. Inspect and clean screens more frequently.
	7. Unit not level. Discharge end pitched down.	Level unit.

Symptom	**Possible Cause**	**Suggested Solution**
lower than normal	1. Unit not level. Discharge end pitched up.	Level unit.
	2. Loose screens.	Check and retension screens.
Vibration	1. Loose rotor lock screw.	Tighten set screw.
	2. Damaged rotor assembly.	Replace rotor assembly.
	3. Bad discharge hex bearing.	Replace bearing.
	4. End door not seated properly.	Tighten hand knobs.
End door not seating properly	Rotor not fully seated on hex adapter.	Inspect and replace the rotor if necessary.
Screen frame assembly not seating properly	1. Screen frame assembly length too long.	Screen should be tensioned until end of screen frame are flush with face of outer screen ring (inner ring face outer ring face should measure 11-21/32".
	2. Damaged screen frame assembly.	Replace damaged screen
	3. Inner screen mounting surface not clean.	Inspect and wipe down mounting surface.
Motor overloading	1. Motor starter overloads under sized	Install correctly sized overloads
	2. Plugged outlets.	Clean unit and outlets.
	3. Plugged screens.	Clean screen and look for reason for plugging.
	4. Seized hex bearing.	Replace the hex bearing.

Parts Description (RS-13)

Item	Part #	Description	Qty	ID #
	122422	SIEVE, ROTARY, 120 VAC, GEMA		
	123287	SIEVE, ROTARY, 230/460 VAC, GEMA		
	123289	SIEVE, ROTARY, 575 VAC, GEMA		
1	123011	MOTOR, SIEVE, 120 VAC, 1/2 HP	1	1-992-0005-9
	123299	MOTOR, SIEVE, 230/460 VAC, 1/2 HP	1	1-992-0005-8
2	123012	BODY, ALUMINUM, GREY, GEMA	1	3RS-0050-3A
4	123014	ROTOR ASSEMBLY	1	5RS-0115-01
5	123018	LIMIT SWITCH 3 FT CABLE/ 110V	1	1-354-0914-2
		15 FOOT CABLE 230/460V 575 V	1	1-354-0914-3
6	123015	KNOB, FLUTED PLASTIC, 3/8-16 THRD, #DK-850	2	1-481-0850-0
7	123000	END DOOR, GREY, GEMA	1	3RS-0028-3A
8	123138	CONNECTOR, MALE, 1/4" OD TUBE X 1/4 NPT	2	1-500-0006-1
9	123016	BOLT, SOC HD SHLD, #90298A624, 3/8 DIA X 1"	2	461-0006-08
10	123017	BOLT, SWING, 3/8-16 x 4" LG, #6251K15	2	1-481-6251-3
12	123004	SEAL, FURON, #504285768	2	1-600-5042-0
13	123003	LANTERN RING, BRASS	2	3RS-0139-01
15	123137	INSERT, THR'D, SS, 5/16-18 X 1/2-13	2	1-481-9024-7
16	123136	SCREW, MACH, PHIL PAN, 8-32 X 5/8" LG, 410	2	478-0832-05
17	123135	WASHER, LOCK, EXTERNAL TOOTH, #8, #91114A009	2	1-481-9111-4
18	132786	INSERT, MOTOR	1	3RS-0065-01
19	132787	O-RING, BUNA-N, #9452K149, 2-7/16" X 2-5/8"	1	1-704-0143-0
20	123142	HEX HEAD CAP SCREW, 0.375-16UNC x 1-1/4 lg.	4	400-1316-10
21	123143	FLAT WASHER, 0.375	4	1-440-0106-0
22	123110	SCREEN RING, INNER	1	3RS-0056-01
23	123111	SCREEN ROD	3	3RS-0100-03
24	123112	SCREEN RING, DISCHARGE	1	3RS-0058-01
25	123140	NUT, HEX, 3/8-16	3	1-424-0106-3
26	123141	WASHER, FLAT, NYLON	3	1-440-0106-2
27	123113	CLAMP, HOSE	2	1-481-5415-0
28	123013	SCREEN, 60 MESH NITEX	1	3RA-1047-00
29	123002	O-RING, 1/8" DIA. X 5-1/4" ID, BUNA #252	1	1-600-0252-1
30	123005	BEARING, 202KRR3, 9/16" HEX, FAFNIR	1	1-101-0202-0
31	123001	BEARING CAP, GREY, GEMA	1	3RS-0064-01
32	107307	SCREW, MACH, PHIL PAN, 10-24 X 1/2" LG, 410	2	477-0924-04
33	123417	WASHER, NYLON, .75"OD X .39"ID X .062"	2	1-481-9029-5
34		NAMEPLATE, GEMA	1	3RS-0052-01
35		WIRE CLIP, ADHESIVE BACKED, #7565K47	1	1-481-7565-0
36		INSERT, THR'D, SS, 1/4-20 X 7/16-14	4	1-481-9024-0
37		SCREW, HEX HEAD CAP, 1/4-20 X 3/8" LG, 18-8	1	401-1120-03
		OPTIONAL SCREENS (NOT A WHOLE ASSEMBLY)		
	123148	20 MESH NITEX SCREEN		3RA-1020-00
	123147	40 MESH NITEX SCREEN		3RA-1033-00
	123013	60 MESH NITEX SCREEN		3RA-1047-00
	123146	80 MESH NITEX SCREEN		3RA-1071-00
	123145	100 MESH NITEX SCREEN		3RA-1074-00
	123149	120 MESH NITEX SCREEN		3RA-1094-00
	125626	170 MESH NITEX SCREEN		3RA-1111-00
	125627	200 MESH NITEX SCREEN		3RA-1122-00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