

Model FS-60 Series Centrifugal Feeder

FS-60-RD ANSI/Metric Installation & Maintenance Manual

Refer all servicing to qualified personnel.

This manual is intended for use by qualified mechanics and electricians who install or service the Hoppmann FS-60-RD Centrifugal Feeders.

Record your serial plate information here for future reference



Model Number	Serial Number/Date

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Quick Start

About this Manual

Assumptions

This manual is written for qualified mechanics and electricians who install or service the Hoppmann FS-60-RD Centrifugal Feeders. All procedures in this manual should be performed by qualified personnel.

- References in this manual may not apply to your centrifugal feeder. In some cases, your direct supplier may have modified or replaced some of the standard components of the feeder on which these procedures are based. In such cases, you may need to slightly modify these procedures. If you are unsure which standard components of your FS-60-RD feeder (if any) have been changed, consult your direct supplier's documentation.

Models Covered

This manual covers all FS-60-RD models in ANSI or Metric, stainless steel, single drive. If you are unsure which model you have, locate the inventory number on the serial plate of the feeder.

Caution Symbols & Messages

Caution symbols and messages in this manual call attention to hazardous voltages, moving parts and other hazardous conditions. Please understand what the different warning labels and indicators refer to and how to avoid possible injury and/or damage to personnel and equipment.



The exclamation point caution symbol denotes possible personal injury and/or damage to the equipment.



The lightning bolt caution symbol denotes possible personal injury and/or damage to the equipment from electrical hazards.

Other Documentation

Other Documentation

Product specifications and vendor subcomponents are incorporated into this manual at the discretion of the manufacturer.

Equipment Improvements & Document Revisions Notice

Shibuya Hoppmann Corporation continually improves its products, and reserves the right to change or discontinue specifications and designs shown in this manual without notice and without incurring obligation. Shibuya Hoppmann Corporation has made every effort to verify the information contained in this manual, but reserves the right to correct any error at the time of the manual's next revision. 05.2017.

What to Do First

As-Built Documentation This manual does not contain as-built documentation. As-built documentation is provided by your direct supplier. If you purchased your tooled feeder directly from Shibuya Hoppmann, you will automatically receive this information in your System Operations Manual.

Tools You Will Need For maximum compatibility, ANSI units are classified as "soft ANSI" construction, meaning that metric threads and hardware are used throughout. Both metric and ANSI units require metric tools for repair or adjustment. If your direct supplier tooled your feeder with (SAE) hardware, you will need standard tools as well.



If the feeder has been tooled by your direct supplier, any part of the feeder that touches your product has been tooled for your product. Avoid making any adjustments to the tooling, moving the tooling could adversely affect the performance of your tooled feeder.

Terms and Definitions

<u>Term</u>	<u>Equivalent Term, Definition or Abbreviation</u>
Feeder	Centrifugal Feeder, Sorter, Bowl, Unscrambler, Orienter, Rotary
"FS"	Feeder Scallop. Scallop rim feeders are used when the parts being fed have a 1.5:1 or greater length-to-width ratio and require a final orientation that is side-by-side, or diameter-to-diameter.
Scallops	Segments of polyurethane designed to fit the machined bowl of the feeder, providing a unique system for orientating containers and other cylindrical shapes.
Tooling	Mechanical and optical devices used to help orient products in the feeder bowl. May include: sensors, height qualifiers, wipers, air jets, etc.

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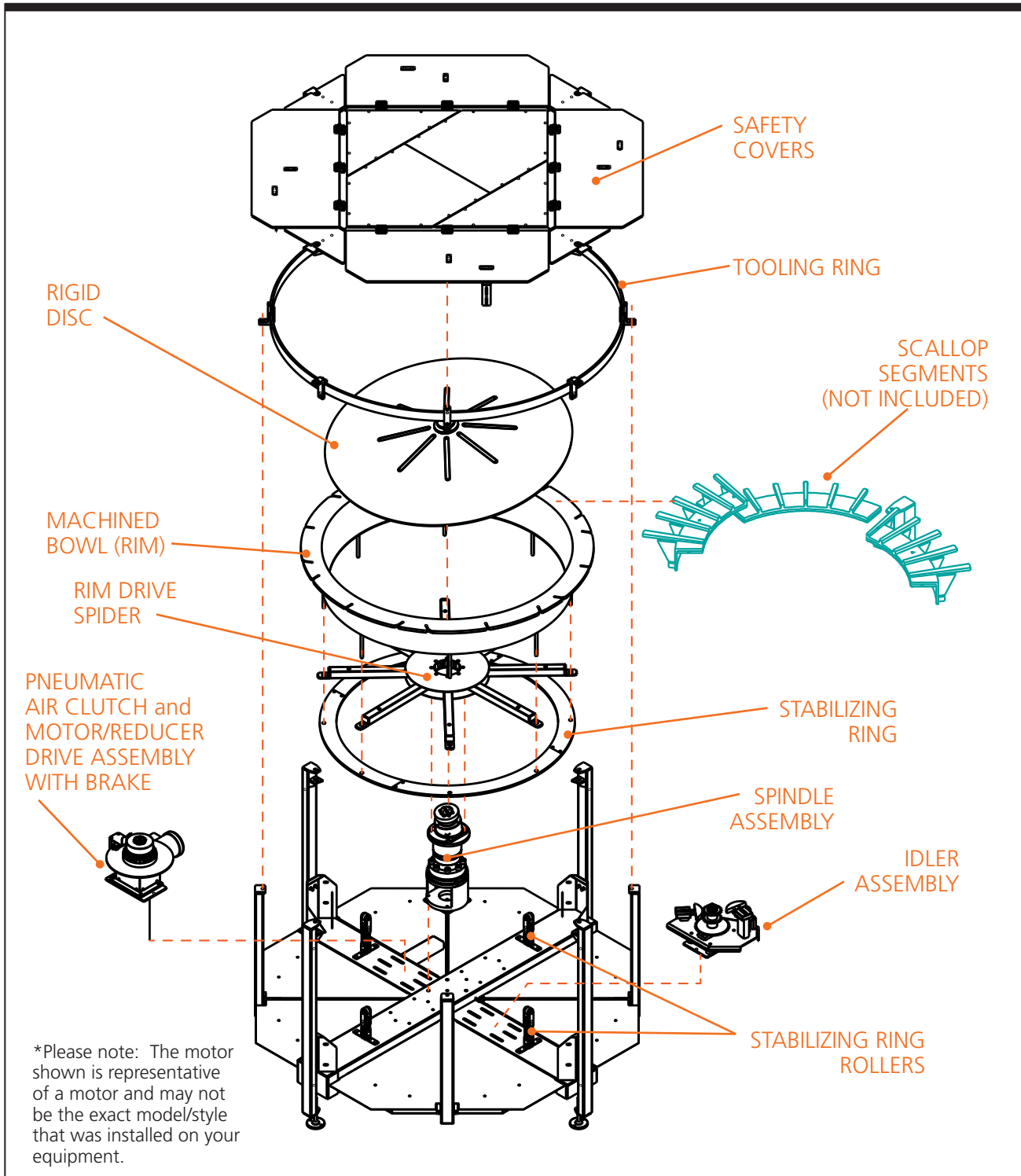


Figure 1-1. Typical FS-60 Centrifugal Feeder - Exploded View

Feeder Description & Specifications

1

Overview of the FS-60-RD Feeder

Thank you for purchasing a Hoppmann™ Centrifugal Feeder. Hoppmann™ feeders are easy to use, easy to maintain and easily handles your product quietly and rapidly.

Function The FS-60-RD feeder unscrambles, feeds, orients and delivers aligned parts. Every feeder operates in the same basic way.

System Equipment The FS-60-RD centrifugal feeder is typically interfaced with a system. First, product is unscrambled from bulk. It is then placed in the proper discharge orientation and released onto an output conveyor. The following pieces of equipment usually comprise a typical "FS" style scallop feeder system: Bulk prefeeder, scallop feeder with tooling, control system, and discharge (exit) conveyor.

Operation **Step 1—The Feeder Accepts Your Product.** Every feeder accepts product from a separate bulk supply hopper or prefeeder. Product drops randomly, a few at a time, onto a rigid disc.

- ➡ The FS-60-RD feeders run best when parts are not emptied, in bulk, directly into the bowl, but instead, when parts are carefully metered into the FS-60-RD feeder a few parts at a time. The FS-60-RD feeders deliver parts almost immediately.

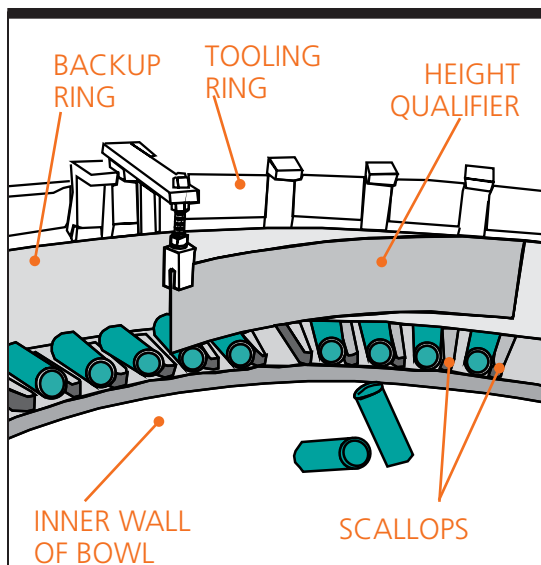


Figure 1-2. Qualifying Parts in Scallops

Step 2—The FS-60-RD Feeder Loads and Qualifies Your Parts. After dropping onto the rigid disc, parts load quickly onto the scalloped rim of a rotating bowl. The parts singulate between scallop fingers which help orient the parts (see Figure 1-2).

- ➡ The rim moves the parts past mechanical, pneumatic and/or optical qualifiers which reject parts that are not nested within the scallops. Improperly nested parts are returned to the bowl and recirculated.

- ➡ Any part of the FS-60-RD feeder that touches your parts has been precision tooled to specifically match your parts, and should be left alone unless absolutely necessary. Do not move tooling or change any settings on the feeder except as described in this manual, or you may void your warranty and negatively affect the performance of your FS-60-RD feeder.

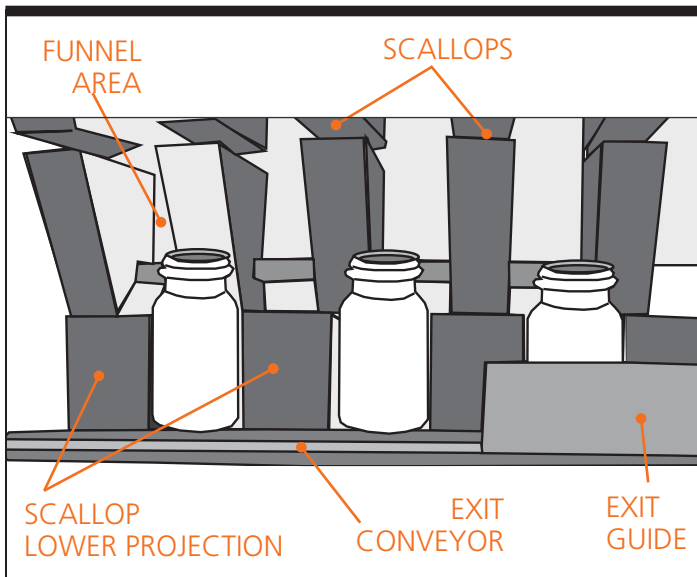


Figure 1-3. Exiting the Scallop Feeder

Step 3—The FS-60-RD Feeder Delivers Your Parts.

After the product has been properly qualified, it is guided to the drop zone where the product is oriented for discharge (see Figure 1-3). Each part is guided by the lower scallops, which hold the product in its final orientation, onto the conveyor. The discharge conveyor then moves product out of the FS-60-RD, in proper orientation, for delivery to downstream operations.

Output Feed Rate The FS-60-RD feeder typically handles parts at various output rates depending on your particular part's characteristics and your desired production speed will affect the output rate.

Bowl The standard bowl on the FS-60-RD feeders are machined cast aluminum.

Scallops The standard scallops are made of various plastic materials. (Refer to Figure 1-1 for an exploded view of the FS-60-RD feeder).

Specifications of the FS-60-RD

Standard Features The FS-60-RD is standard with stainless steel exterior construction, an FDA approved ABS vacuum formed disc, a Teflon® hard-coat anodized aluminum bowl, an air clutch, and integrated hinged polycarbonate covers with safety interlocks.

Optional Features The FS-60-RD feeder can be easily integrated with washdown motor, urethane scallop kit and a variety of controllers and operating systems.

Specifications Please refer to the tables below for FS-60-RD specifications:

Performance Specifications	ANSI	Metric
Maximum Bowl Linear Speed (@ Rim ID) ¹	≈ 125 fpm	≈ 38 m/min
(Low Speed Option: Bowl Linear Speed (@ Rim ID)	≈ 80 fpm	≈ 25 m/min
Vertical Bowl Runout (Maximum)	0.020"	0.5mm
Vertical Disc Runout (Maximum)	0.190"	5mm
Rim-Disc Gap (Maximum)	0.060"	1.5mm

Table 1-1. FS-60-RD Performance Specifications

Electrical Specifications	DC	AC
Motor Size	1hp	1hp
Motor Frame Size	56C	56C
Supply Voltage	90 VDC	208-230/460 ² VAC
RPM	1750 rpm	1750 rpm
Power Usage	10 Amps	3.7-3.4/1.7A

Table 1-2. FS-60-RD Electrical Specifications

¹ Maximum speed is not the operating speed. This is provided as a reference value only.

² 3 Phase, 60 Hertz supply voltage for AC motor.

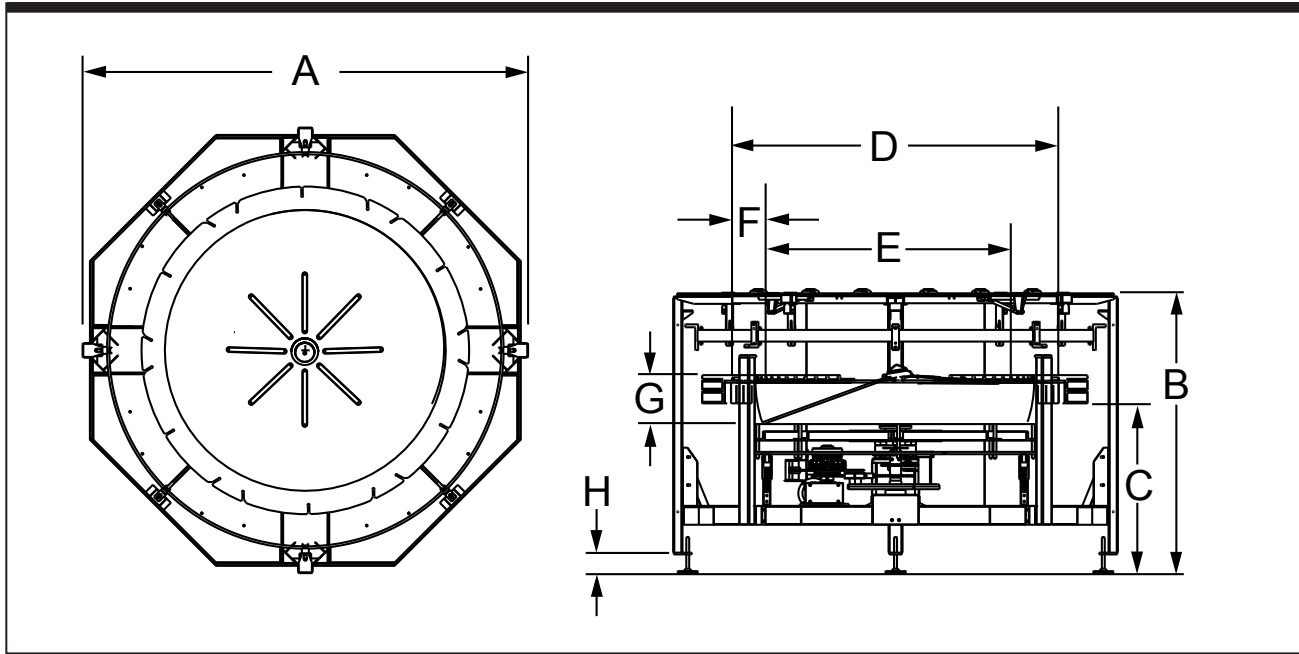


Figure 1-4. FS-60-RD Side and Top Views

Dimension Specifications		ANSI	Metric
A	Outer Frame Width	95.20"	2418mm
B	Overall Height	59.25"	1505mm
C	Bowl Rim Height	42.00" ± 2"	1067 ± 50mm
D	Bowl Outside Diameter	70"	1778mm
E	Bowl Inside Diameter	60"	1524mm
F	Rim Width	5"	127mm
G	Bowl Depth	9.13"	232mm
H	Level Foot Adjustment (Height)	4" ± 2"	100 ± 50mm
Disc Diameter		≈ 59.50"	≈ 1511mm
Disc-Bowl Gap (Maximum)		0.060"	1.5mm
Overall Weight (Untooled)		2500 lbs.	1136 kg

Table 1-3. FS-60-RD Dimension Specifications

Safety Precautions

2

Safety Precautions

Hoppmann Feeders are designed to be as safe as possible for operators. However, even well-built machines can be installed or operated in a hazardous manner. Safety precautions must be observed by users.



Turn Off Power and Air. Before performing maintenance on the machine, ensure that power and air cannot be accidentally turned back on. Padlock and clearly tag the main electrical and pneumatic disconnect(s) before adjusting or replacing changeover parts or performing maintenance. Lockout/tag-out procedures are covered in United States Code of Federal Regulation (CFR) Title 29 Part 1910.147, "The Control of Hazardous Energy."



Dress Appropriately! Reduce the risk of injury from moving parts by securing loose sleeves and other clothing. Do not wear loose jewelry or neckties near the feeder. Wear safety glasses or other protective eye wear when servicing the feeder.



Install Safety Guards! Make sure the feeder remains safe to operate. Be sure all safety guards have been installed before returning the feeder to normal operation. Safety guards on the Centrifugal Feeder include any guards (which protect the operator from the moving bowl spider, sprockets and chains). Before feeder operation, secure all safety covers. Most safety covers are electrically interlocked, and will prevent the machine operation if disengaged.



Avoid Moving Parts. Never place anything in the machine except the handled part(s) for which it was designed. Never put your hands, tools, or other objects into the machine.

Operating & Maintenance: Do's & Don'ts

Don't Give the Feeder Too Much Product. Do not overfill the feeder, because it may jam or lose rate. Bulk product should be metered into the feeder. Allow only enough product into the feeder to keep the line running at the required rate.

Don't Run the Feeder Too Fast. Do not run the bowl faster than the linear feet per minute recommended by your direct supplier. If you do, the orientation qualifiers can not do their job as efficiently, and the feeder may jam or lose rate.

Don't Adjust Air Jet Flow Controls. It is okay to adjust the main air regulator to its correct setting for your installation. However, air jets and their individual flow controls have all been carefully preset to work with your product; they should never need adjustment. If you move air jets or adjust their individual flow controls, the feeder may jam or lose rate.

Do Perform Preventive Maintenance. To keep the feeder running without unexpected repairs and resulting downtime, regularly perform the preventive maintenance procedures in Chapter 4.

Do Carefully Replace Any Tooling You Remove. To gain access for repairs, you may need to remove tooling. Because Shibuya Hoppmann and your dealer or OEM have no control over such activities, they can not be responsible for any tooling you remove.



Carefully document the position of any tooling before you begin. If you fail to replace all tooling exactly as it was, you may create difficult and time consuming problems.

Don't Operate the Feeder Near Flammable Gas, Vapor or Dust. Do not install a feeder in these conditions unless you install additional, approved explosion-proof or dust ignition-proof enclosures. Without such additional enclosures, normal sparking of the brushes inside the motor could ignite flammable gas, vapor or dust.

Installation & Start-Up

3

Included in this Chapter

Follow, in order, each section of this chapter to install any fully tooled FS-60-RD feeder. For your convenience, Table 1-2 and Table 1-4 in Chapter 1, show mechanical and electrical specifications for your feeder.

Unpacking, Inspection and Registration

Step 1— Inspect and Unpack the Crate. Remove packing materials from sensors, tooling and moving parts. Make a visual check to be sure parts have not come loose during shipping. If you find any concealed damage, call the shipping carrier and your direct supplier immediately. **Do not attempt to fix the problem yourself unless told to do so by your direct supplier.**



Step 2—Record Serial Numbers. For future reference and assistance in ordering parts, record on the front of this manual the feeder's model and serial number.

Physical Setup

You should refer to as-built drawings (not part of this manual) for electrical, pneumatic and equipment layout specifications.

Step 1—Position the Feeder. Place the feeder as shown on the equipment layout drawing provided by your direct supplier.

Step 2—Level the Feeder. Level the machine by adjusting the leveling feet. Tighten the locknuts on the leveling feet.

Step 3—Connect the Output Conveyor (Exit Conveyor) . Check that product can move smoothly from the exit of the feeder to your output conveyor. Check that product will not jam or lose their orientation as they move to the output device.

Step 4—Position the Prefeeder. Now place your bulk supply hopper, or prefeeder, into position. Follow the equipment layout drawing provided by your direct supplier, or the feeder may not operate correctly. *If you are providing and integrating a prefeeder, continue reading the step below. If your direct supplier is providing and integrating both your feeder and prefeeder, skip to Step 5.*

If you are supplying your own prefeeder, you are responsible for:

- ➔ Providing and installing the feeder's bowl level switch so it can control the flow of your prefeeder.
- ➔ Setting the timing delay for the feeder's bowl level switch.
- ➔ Correctly positioning the prefeeder. Generally, the prefeeder should discharge product to fall on the rigid disc, halfway between the center of the bowl and the outside diameter. Take a handful of product and drop them from the chute of your prefeeder into the feeder. Avoid dropping product so that it bounces up off the rigid disc onto the rim of the bowl, which could knock off product that are already loaded. You may need to position the prefeeder again, if necessary, once the feeder is running.

Step 5—Connect Electrical Supply and Air. Connect your feeder to electrical supply and compressed air (if applicable).

Starting the Feeder for the First Time

Step 1—Secure Safety Covers. Before turning on power and air, make sure safety covers are in place and that you are dressed appropriately for safety.

Step 2—Check for Rubbing Parts. Turn the feeder bowl by hand. In the unlikely event that you hear any unusual noises, discontinue immediately and check in and around the bowl for any foreign objects causing the noise (for example, check between the backup ring and the rim of the bowl.)

Step 3—Turn on Power and Air. Turn on the feeder's power. If applicable, turn on the feeder's main air regulator.

How to Set Proper Bowl Speed

Ask your direct supplier for the actual speed at which the bowl should rotate. For reliability, set the bowl to match that speed.

- ➔ You will need a hand-held tachometer (analog or digital) with a surface speed wheel indicator (see Figure 3-1).
- ➔ This procedure is performed with power on and the feeder operating. If your direct supplier has installed a cover over the bowl, you will need to open it before proceeding.

Step 1—Turn on Feeder. Turn on the feeder and run it without product.

Step 2—Set Bowl Speed. To set bowl speed, place hand-held tachometer (with surface speed indicator attachment) on the inner wall of the moving bowl, at its most upper inside diameter. Adjust bowl speed until bowl is moving at correct number of linear feet per minute (FPM).

- ➔ If you have only one drive motor installed (standard) you can ignore the rigid disc speed, which changes proportionally as the bowl speed changes.

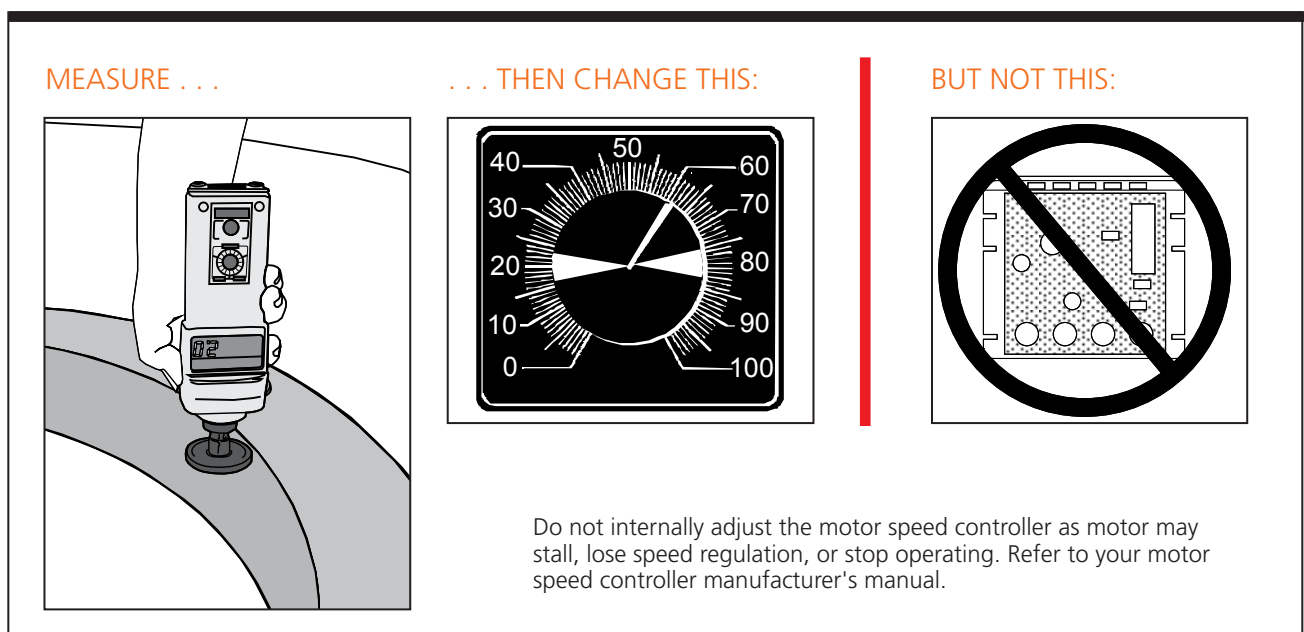


Figure 3-1. Measurement and Changes to Bowl Speed

Step 3—Record New Settings. Turn off the feeder. Mark dial plate with new setting and remove any old marks.

Running Product for the First Time

Step 1—Verify Changeover Setup. If your feeder is tooled to run multiple parts, ensure the feeder is set up for the product you want to run.

Step 2—Inspect Product at Exit. Inspect the exit of the feeder. If product is exiting the feeder properly oriented, at the required rate and without jamming, then installation is complete. Otherwise, continue with Step 3. Do not adjust the flow controls on air jets.

Step 3—Verify Prefeeder Speed. Normally this step is completed by your direct supplier. However, if you are separately providing and integrating the prefeeder, you will have to set the prefeeder's speed. To do this, turn the prefeeder's speed control all the way down, then turn on the feeder.

➡ Slowly (you may need to take several minutes) raise the prefeeder's speed control until enough parts exit the feeder to keep the line running at the required rate. **Excessive output may overload the feeder and reduce its output.**



General Tips

- ➡ After your feeder is set up and running, observe the flow of product at each transition point. Later, if a problem occurs, observe these transition points to help pinpoint the cause.
- ➡ Listen to the way the feeder sounds when it is running properly. If it suddenly sounds different, investigate why.

Preventive Maintenance

4

General Cleaning

Outer Frame & Tooling

The Shibuya Hoppmann Model FS-60-RD Centrifugal Feeder is not intended for wash down use. If you need to clean the outer frame, the rim of the bowl, the rigid disc, the scallops, or the tooling, use mild, non-abrasive household cleaners. Cycle the machine as necessary so that all areas are cleaned. Next, use a clean cloth dampened only with water. Immediately wipe any damp surface with a dry cloth.

Clean Safety Covers

If your feeder has any attached polycarbonate safety covers, we suggest using a clean cloth, lightly dampened, to clean the material. While polycarbonate is extremely strong, it scratches easily, and can be fogged even by mild non-abrasive cleansers.

Tip

To minimize scratches on polycarbonate safety covers, use a mild automobile polish and/or a microfiber cloth or chamois cloth.



Avoid using abrasive cleansers, strong cleaning solutions or industrial solvents on the outer frame, the rim of the bowl, the rigid disc, tooling or safety covers, as they may be permanently damaged.

"Dusty" Applications

If your parts generate dust or particulate when handled, you'll need to clean the feeder as often as necessary. For such parts, remove the dust from the top surface of the rim of the bowl, scallops and the disc with a portable vacuum cleaner or dry compressed air.

Speed Reducer Maintenance

The speed reducer comes with factory installed synthetic lubricants and is lubricated for life and it does not require regular venting. If you have installed a different reducer, please refer to that manufacturer's recommendations for lubrication.

Chains and Sprocket Lubrication

On all FS-60-RD feeders, grease the disc and rim drive chains and sprockets every six months, or every 1000 operating hours, whichever comes first.

- ➔ Before beginning, disconnect power and air. Remove the exit cover and exit support assembly to gain access to the feeder. Lock and tag out the feeder.
- ➔ Use standard Moly grease, Lubriplate #3000 (NLGI Grade 2) or the equivalent. Turn the bowl by hand to expose all the links of the bowl drive chains. Use a brush to apply grease to the sprockets and the chains.

Idler Assembly Maintenance

It is recommended that you grease the idler assembly (see Figure 4-1), for both metric and ANSI models, every six (6) months after installation. If you must disassemble the idler, please note the order of assembly in Figure 5-3, Chapter 5.

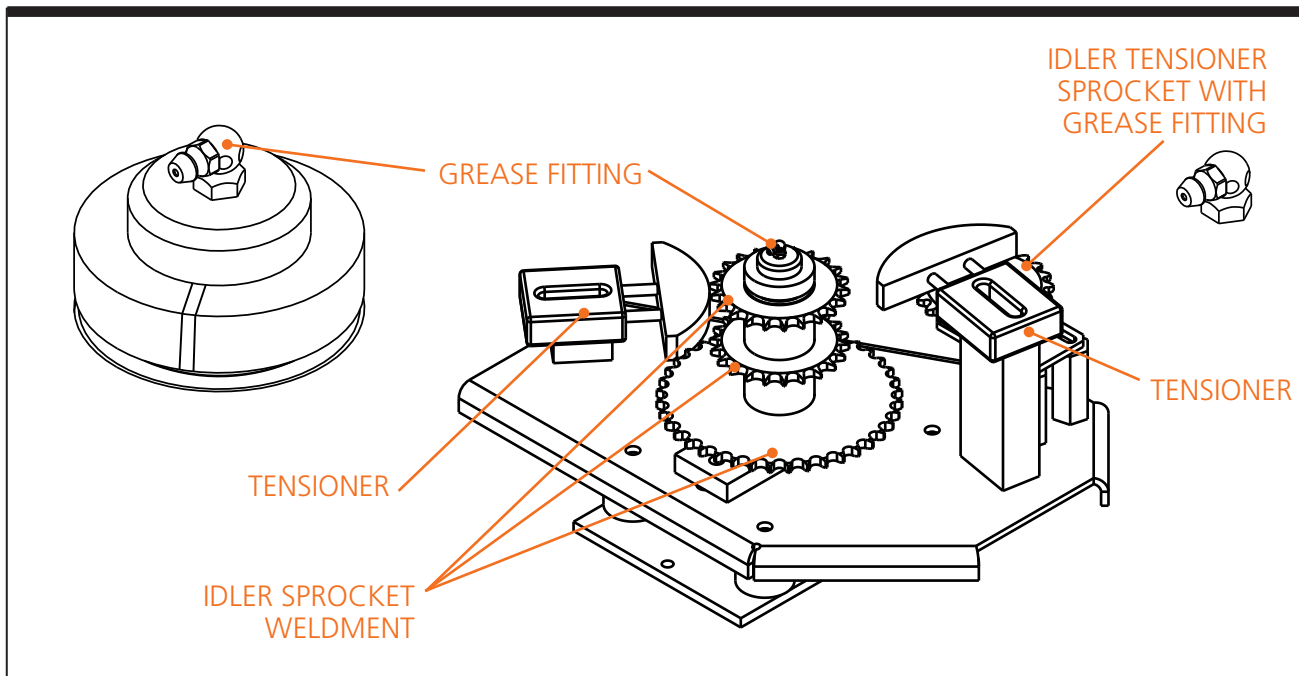


Figure 4-1. Assembled Idler

Inspect Chain Tension

Step 1—Gain Access. Improper chain tension wears out sprockets and chains. When lubricating or performing other maintenance tasks, inspect the tension of the chain. If you have not already done so, disconnect power and air, and remove the exit cover and the exit support assembly to gain access. Lock and tag out the feeder.

Step 2—Inspect Drive Chain. FS-60 Centrifugal Feeder chain drive utilizes spring loaded tensioners to maintain proper chain tension. The tensioners should be set to the maximum tension (pushed all the way in). Over time, these may be reset as normal drive from wear occurs.

Step 3—Check for Parallel Sprockets. Check that each set of sprockets is parallel to within 1/32" (0.8 mm). If not parallel, realign to within the above specification.

Step 4—Replace Guards and Covers. Replace guards and covers and connect power and air.

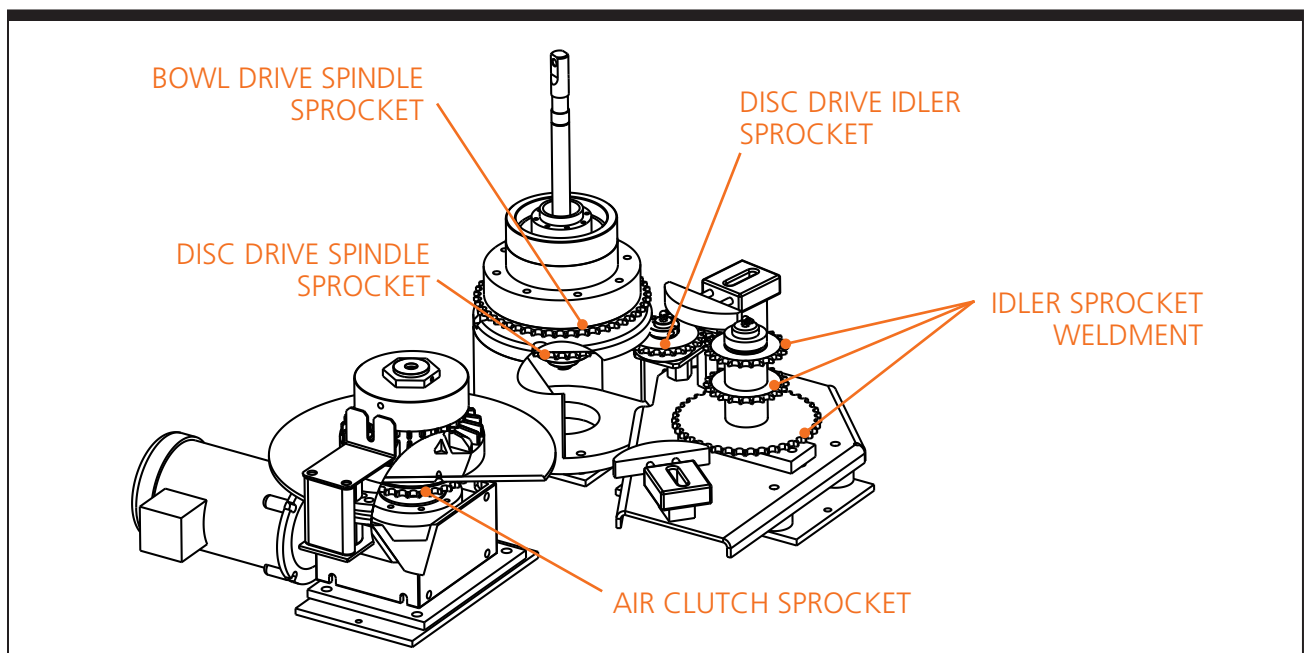


Figure 4-2. FS-60-RD Drive System Nomenclature

Step 5—Check for Vibration. Run the feeder. If vibration is evident, you will need to go back to **Step 1**, and re-check the chain tension for excessive tightness. Vibration may be reduced or eliminated by the realignment of sprockets and increase the total chain deflection from 1" (25mm) to 1 1/4" (32mm).

FS-60 Drive Nomenclature

Please refer to Table 4-1, Table 4-2, and Table 4-3 and Figure 4-2 on the previous page for a review of the FS-60 Scallop Feed Drive System.

Idler Sprocket Weldment Std. Speed	# of Sprocket Teeth	Sprocket Part Number
Disc Drive & Disc Drive Idler Sprocket	22 Teeth	FS600Z1001-01
Lower Idler Sprocket	32 Teeth	
Idler Sprocket Weldment Low Speed	# of Sprocket Teeth	Sprocket Part Number
Disc Drive & Disc Drive Idler Sprocket	22 Teeth	FS600Z1001-02
Lower Idler Sprocket	48 Teeth	

Table 4-1. FS-60-RD Idler Weldment Nomenclature (Standard Speed and Low Speed Variables)

Drive Particular	# of Sprocket Teeth	SHC Part Number
Air Clutch Sprocket	32 Teeth	FRS601200
Bowl Drive Spindle Sprocket	48 Teeth	FT500800
Disc Drive Spindle Sprocket	30 Teeth	SPKTMB5030
Disc Drive Idler Sprocket	22 Teeth	FS50DC0102

Table 4-2. FS-60-RD Drive Nomenclature (Sprockets)

Drive Chain Information	Length/Links	SHC Part Number
Bowl Drive Chain (#50)	56.88" L, 91 Links	CHANCS5091
Disc Drive Chain (#50)	39.375" L, 63 Links	CHANCS5063
Idler Chain (#50)	61.75" L, 99 Links	CHANCS5099

Table 4-3. FS-60-RD Drive Chain Nomenclature

Inspect/Replace Motor Brushes



The following procedure applies only to DC motors and should be performed only by qualified personnel.



Step 1—Record Brush Length. To prevent motor damage, brushes should be replaced when or before they reach half the original length. **Inspect brush length when equipment is new, and record new brush length. Indicate 1/2 that length as the replacement mark.**



Step 2—Gain Access. Disconnect power and air. Remove feeder covers as needed to gain access to the motor, then remove the motor brush access covers. Lock out and tag out the system.

Step 3—Clean the Motor. Clean the motor by blowing into the open access hole with compressed air. **Eye protection should be worn to prevent any particles from blowing into the eyes.**

Step 4—Replace Brushes. Lift the brush spring from the end of the brush (see Figure 4-3). Remove the brush connector, withdraw the brush and inspect the length. To prevent motor damage, brushes should be replaced when or before they reach the half way point. Reverse procedure to replace brush. Replace motor access and feeder covers. Connect power and air. Initial and date the Maintenance Log

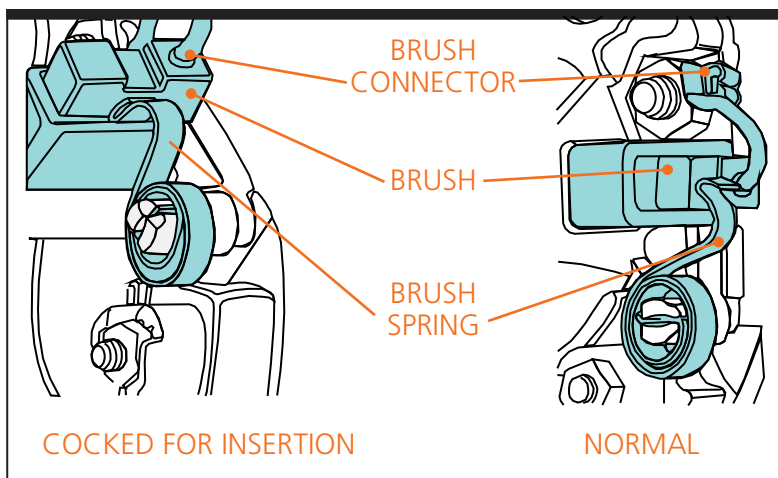


Figure 4-3. DC Motor Brushes with Gasketed Cover Removed

Notes

Repair and Troubleshooting

5

Refinishing, Replacing or Adjusting the Bowl

Before making substantial changes to your feeder (refinishing the bowl, removing or replacing the bowl, etc.), please check with your supplier or Shibuya Hoppmann Corporation. At times it may be necessary to remove parts of the system (tooling, air jets, safety covers, etc.), and you may need to document locations in order to put them back in their proper order for correct feeder function.

Refinishing a Standard Bowl

If the standard Teflon® hardcoat aluminium bowl becomes damaged in a way that adversely affects the feeder performance the bowl may be refinished.

- If the damage is slight, re-coating with commercial hard coat by a professional metal refinisher may correct the problem.
- Machining must be done in such a way that bowl runout is restored to original tolerances, or the feeder may not operate correctly. If machining is necessary, have the bowl refinished. Refinishing the bowl's surfaces retains the USDA/FDA approved (ultra-hard protective) product contact surface and corrosion resistance of the bowl.

- If machining enlarges the inner diameter of the bowl, you may need to replace the disc with a larger one (custom-sized) from your direct supplier. If you do not obtain a larger disc, the gap between the disc and the inner diameter of the bowl may pinch or snag product (see Figure 5-1).

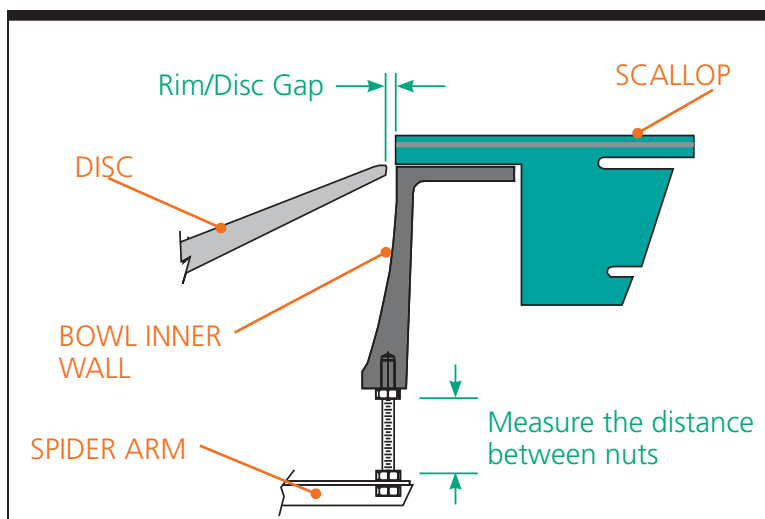


Figure 5-1. Measuring Bowl Gap When Replacing Standard Bowl

Replacing a Standard Bowl

To remove and replace the feeder bowl, follow the steps on the following pages.

- ➡ Before beginning, remove the prefeeder, the tooling and the disc of the feeder bowl.

Step 1—Measuring and Removing the Bowl. Measure the height between the bottom of the bowl, and the top of the spider arm (where the threaded rod connects the two parts - refer back to Figure 5-1). Loosen and remove the bottom nut on the spider arm (on each of the eight (8) arms) and remove the bowl - pulling it up and away from the feeder.

Step 2—Replacing the Bowl. Put the new or refinished bowl in place, then set it to the correct height, ± 0.03 " (0.8 mm) as you measured in Step 1.

Step 3—Bowl Runout. Refer to "To Set Bowl Runout" in the next section of this Chapter.

Step 4—Replace Disc and Check Covers. Replace the feeder disc and make sure all covers are in place before running the feeder.

How to Set Bowl Runout



Bowl runout needs to be reset if the bowl has been removed.

Adjust runout with power off and bowl drive chain disengaged.

Step 1—Gain Access. Disconnect power and air. Remove any frame covers. Lock out and tag out the feeder.

Step 2—Remove Bowl Drive Chain. Remove the master link. Disconnect the bowl drive chain from the bowl spindle sprocket.

Step 3—Adjust Vertical Runout. Attach a dial indicator to the inside of any upper frame support. Set the indicator contact point

vertical on the rim of the bowl, up to 1/4" (6 mm) from the bowl's upper inside diameter (ID). Loosen jam nuts and locknuts above and below each arm of the bowl spider one arm at a time. Repeat as often as necessary while checking runout. Do not tighten jam nuts until Step 4.

Step 4—Adjust Horizontal Runout. Move the indicator contact point horizontal on the rim of the bowl, up to 1/4" (6 mm) from the bowl's upper ID. Gently tap the bowl's ID with the palm of your hand or a rubber mallet. Tighten locknuts and jam nuts by hand firmly but not forcibly. Inspect vertical runout and adjust again if necessary. Continue alternating between horizontal and vertical runout until both are within specification.

Step 5—Check Exit. Ensure that proper relationship still exists at transition between rim of bowl and output device (deadplate, conveyor, gravity track, or powered rollers, etc.).

Step 6—Replace Chain & Covers. Install bowl drive chain. Inspect chain tension (refer to Chapter 4). Replace covers and re-connect power and air.

Speed Reducer: Replacement

Use the following steps to reuse the existing air clutch when replacing the speed reducer.

Step 1—Gain Access. Disconnect power and air. Remove the frame/safety guard giving best access to the motor and gear reducer. Loosen mounting bolts and slide air assembly bracket off (see Figure 5-2). Lock out and tag out the system.

Step 2—Remove Motor. Remove mounting bolts and then remove motor from the speed reducer, leaving wiring intact. Set motor off to the side on secure support mount.

Step 3—Detach Air Regulator. Detach air regulator bracket from reducer and disconnect airline from clutch. Set aside.

Step 4—Remove Old Speed Reducer/Clutch Assembly.

Remove the four mounting bolts on the nut plate at the bottom of the reducer mounting brackets. Slide the speed reducer/clutch assembly towards the center of the FS-60-RD feeder, and remove the chain. Completely remove the speed reducer assembly.

Step 5—Remove Air Clutch Assembly. Remove bolt located on the top of the Air Clutch (using a hex key, size 8mm) slide the clutch up and off reducer output shaft. **Note: The brake disc and drive sprocket are attached to the clutch body. When the unit is removed, it is removed as one assembly.**

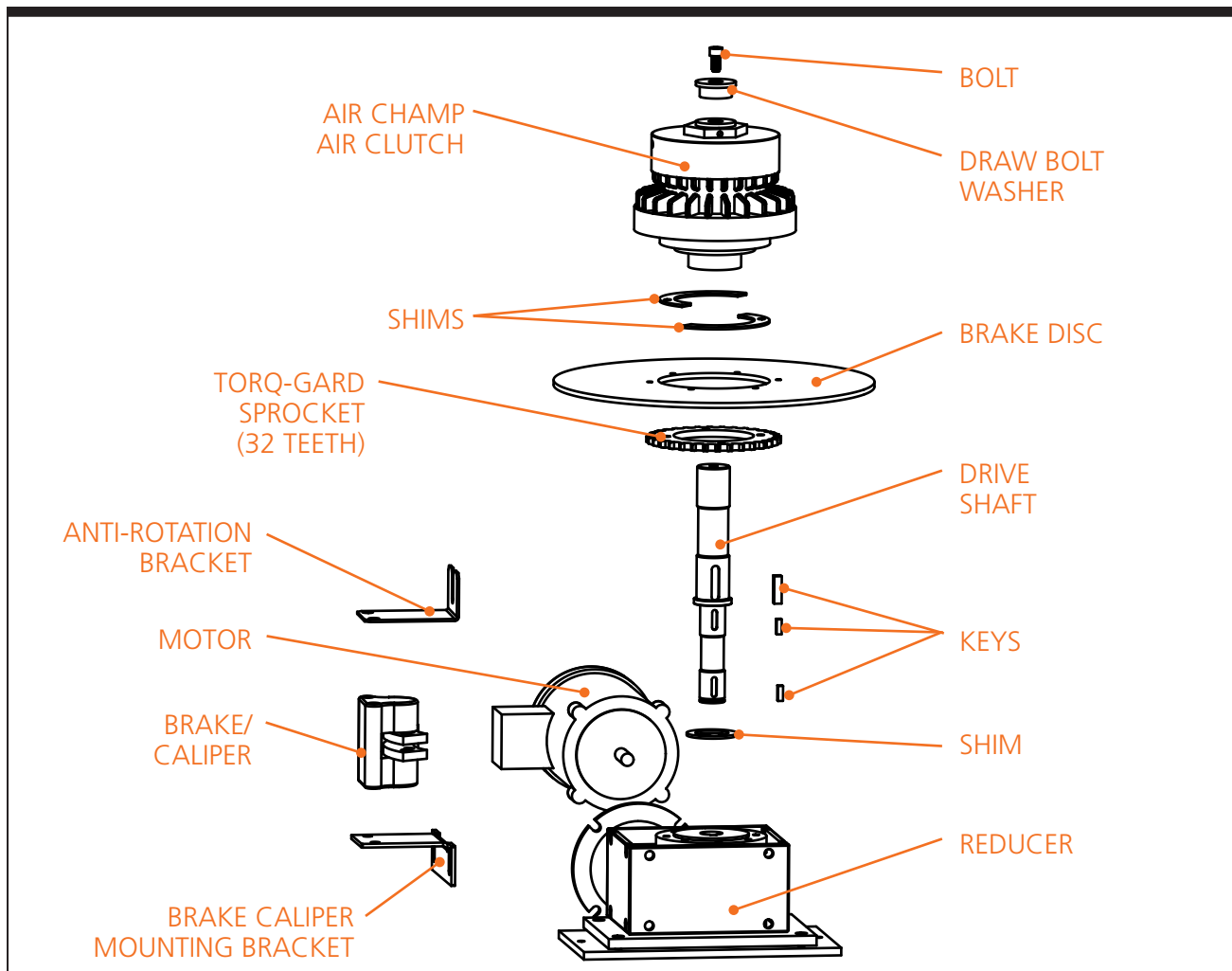


Figure 5-2. FS-60 Air Clutch and Drive Assembly

Step 6—Assemble Output Shaft/Air Clutch to the Speed Reducer.

The output shaft on the metric speed reducer is removable and is available as a separate kit. If replacement is required, clean both contact surfaces before assembly and apply any appropriate anti-seize compound to avoid oxidation (rust) and possible seizing of parts, refer to manufacturers technical information sheets that correspond with the output shaft. Slide the air clutch assembly down onto the reducer output shaft (see Figure 5-2) until it bottoms out against the shoulder. Tighten setscrew. The speed reducer used in the metric FS-60-RD feeder is lubricated for life with synthetic lubricant and requires no filling before use.

Step 7—Install New Speed Reducer. Install new reducer assembly back into the feeder and reattach the two nut plates, securing the assembly to the frame. Do not tighten the bolts yet. Re attach the air regulator bracket and reconnect airline to the air clutch.

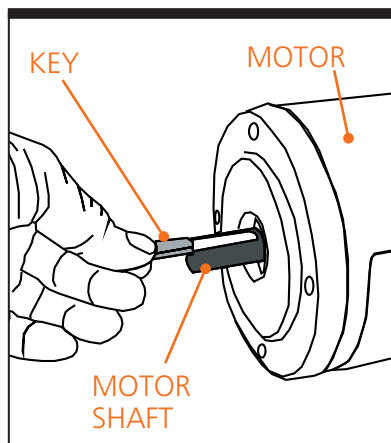


Figure 5-3. Motor Key/Shaft

Step 8—Reinstall Clutch Assembly. Slide the air clutch assembly (with brake disc and drive sprocket) over the reducer output shaft, making sure the shaft keys are in place (see Figure 5-2).

Step 9—Install Motor. Assemble the key to the motor shaft (see Figure 5-3) and coat the shaft with anti-seize compound. Insert the motor shaft into the speed reducer input shaft. Align the shafts accurately; improper alignment can result in failure. Rotate the motor to the correct position and firmly secure to flange with four hex-head cap screws. Do not allow the motor to "hang" unsupported before fully seated in the reducer to avoid damaging the reducer input seal. If the motor does not readily seat itself, check to see if the key has moved.

Step 10—Adjust. Reattach drive chain and re-tension, checking sprocket alignments and wiring to insure no damage has occurred. Tighten the nut plate bolts to the frame.



Step 11—Inspect After Installation. During the speed reducer's breaking period, it may run hotter than normal. **Nevertheless, for maximum life, do not allow the speed reducer to operate continuously above 225°F at the gear case (for AC motors used in Europe, it is customary to use 60°C maximum).** In the event of overheating, check for overloads or high ambient temperatures. Periodically inspect all bolts to make sure they are not loose.

Air Clutch/Brake Operations

The FS-60 air clutch has two solenoids: one to turn on the high pressure air supply, and one to turn on a low pressure air supply. When the feeder initially starts up, the high air pressure is used for the duration of the acceleration time. Once that level is met, the lower pressure is turned on to maintain the speed. This can happen because the inertia from the feeder rotating requires less pressure to drive the bowl.

When the feeder stops, the clutch stays on until the feeder completely stops rotating and the brake turns on for about the last second of the drive deceleration. This time can be adjusted to eliminate any rocking in the bowl. Once the feeder is stopped, air can be dumped from the main air disconnect.

Air Clutch: Adjustment/Replacement

The pneumatic air clutch assembly allows the drive sprocket to slip harmlessly in the event of a product jam. Lubricants or surface corrosion on the bushings or the drive sprocket may reduce the effectiveness of the air clutch assembly. The pneumatic clutch assembly should be inspected and/or adjusted if the rim is free wheeling.

Step 1—Disconnect Utilities. Turn off power and air and lock out and tag out the equipment.

Step 2—Gain Access. Remove exit cover.

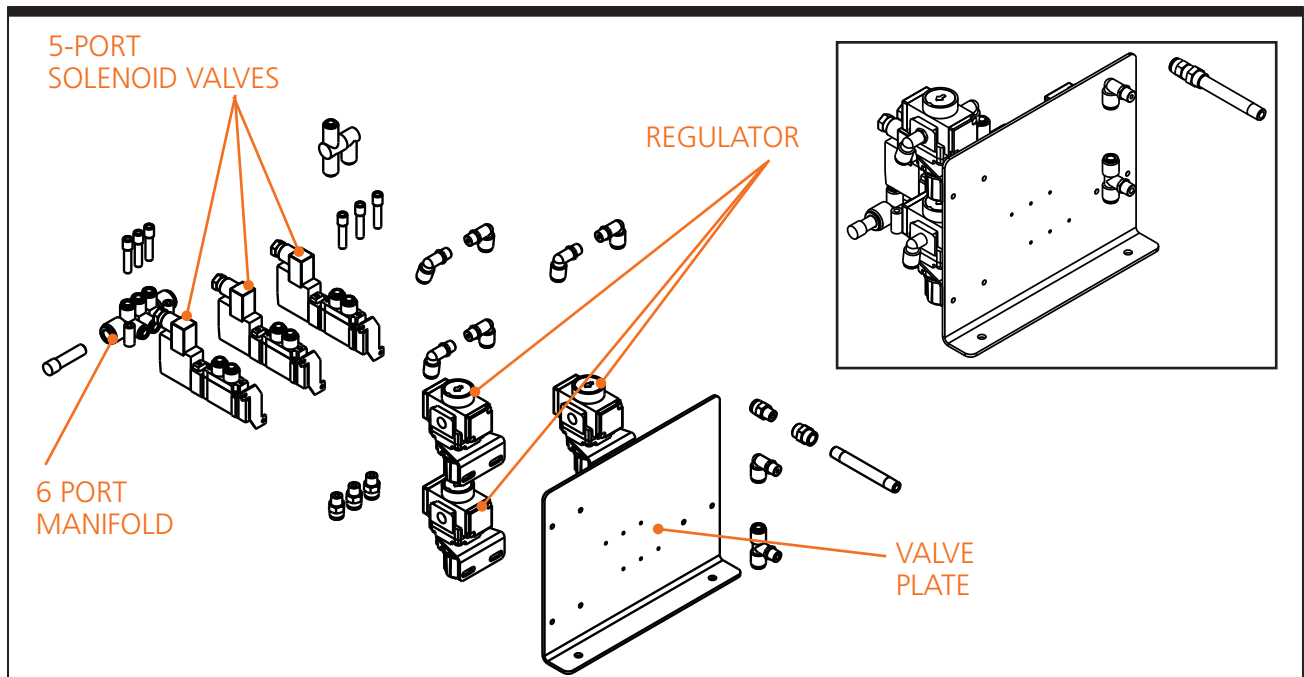


Figure 5-4. FS-60 Clutch-Brake Air Setup

Step 3—Begin Air Clutch Replacement. Observe the order of components before replacing the unit (see Figure 5-2 on the previous page). Disconnect air supply, anti-rotation bracket, shaft retaining bolt and setscrew.

Step 4—Remove Drive Chain. Remove rim drive chain. Inspect and replace any broken or worn parts.

Step 5—Remove Air Clutch from Reducer. Remove the air clutch assembly from the output shaft of the reducer. **Note: The brake disc and drive sprocket are attached to the clutch body. When the unit is removed, it is removed as one assembly.**

Step 6—Remove Drive Sprocket. Remove drive sprocket from air clutch assembly and install new clutch.

Step 7—Reinstall Air Clutch Assembly. Reassemble the air clutch by reversing the order of the removal. Then reinstall the air clutch assembly, complete with brake disc and sprocket.

Step 8—Adjust. Reattach drive chain and re-tension, checking sprocket alignments and wiring to insure no damage has occurred. Tighten the nut plate bolts to the frame.

Step 9—Inspect After Installation. During the speed reducer’s breaking period, it may run hotter than normal. **Nevertheless, for maximum life, do not allow the speed reducer to operate continuously above 225°F at the gear case (for AC motors used in Europe, it is customary to use 60°C maximum).** In the event of overheating, check for overloads or high ambient temperatures. Periodically inspect all bolts to make sure they are not loose.

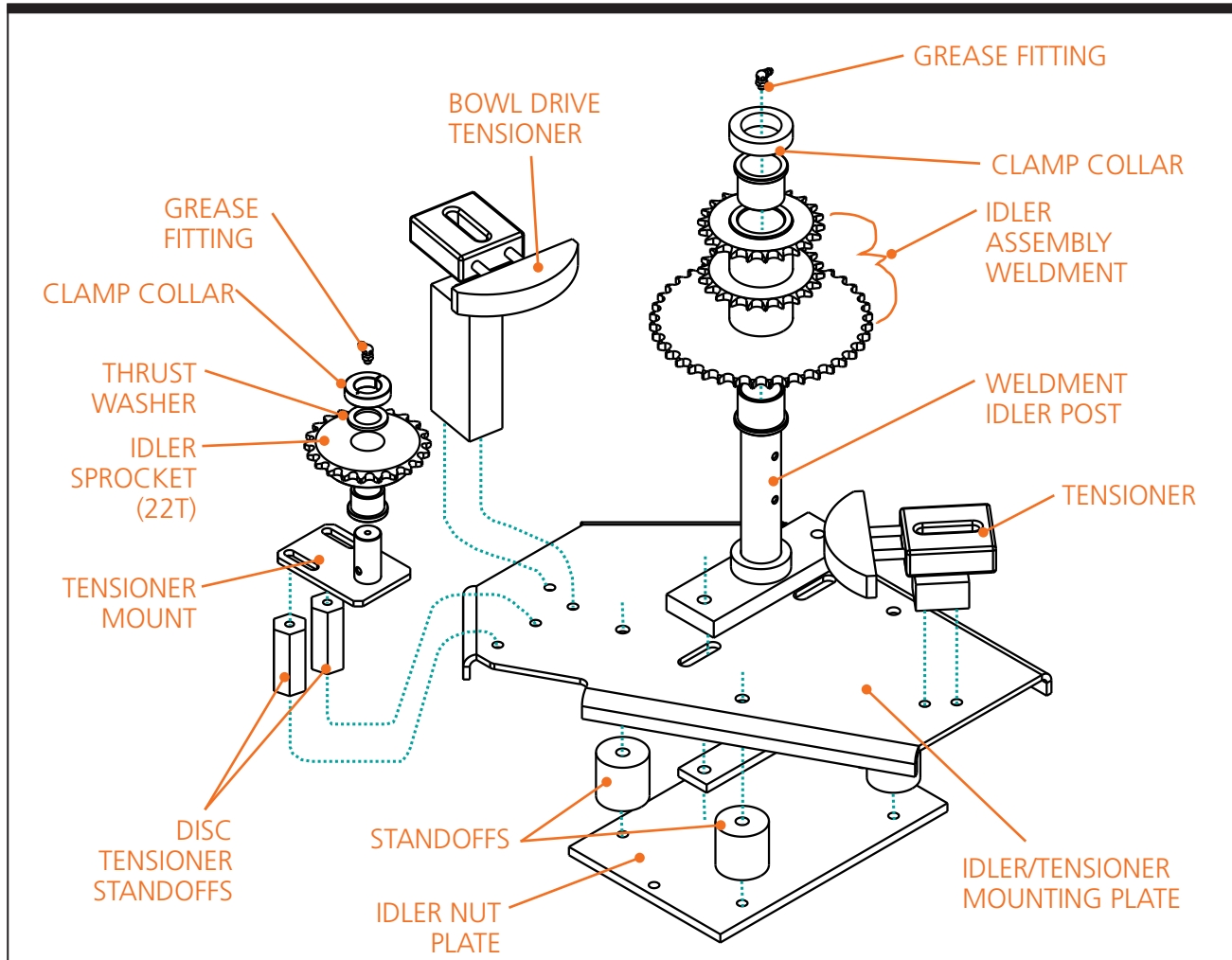


Figure 5-5. FS-60 Idler Assembly - Exploded View

Idler Assembly Component Replacement

The idler assembly installed in the FS-60-RD feeders are designed for maximum reliability. In the event that you experience problems related to the idler assembly, contact your direct supplier. If component replacement is necessary note the order of assembly in (Figure 5-5).

Major Bearing Replacement

Major bearings in the FS-60-RD feeder are designed for maximum reliability. They are lubricated for life and sealed. In the event that you hear abnormal noise, or if you observe excessive lateral play in the disc or bowl, you may need to replace your major bearings. If you experience any of these problems, contact your direct supplier.

Major bearings in the feeder are the upper and lower disc shaft spindle bearings, the upper and lower rim support spindle bearings and the disc support bearing. All major bearings except the disc shaft spindle bearings are identical.

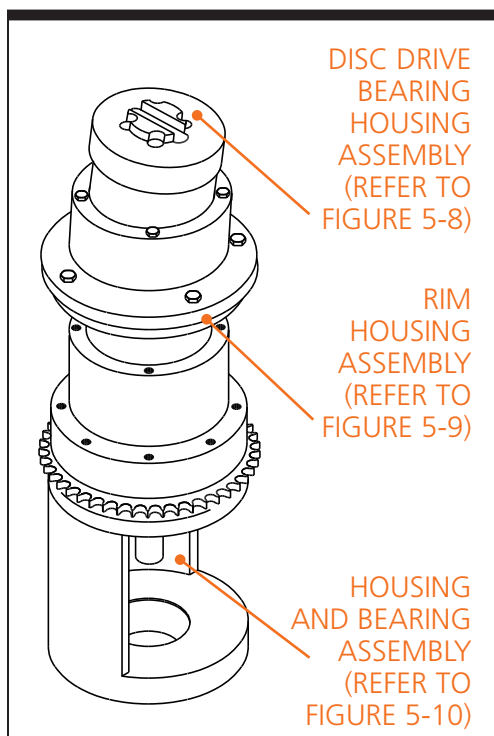


Figure 5-6. Typical Spindle Assembly

Major Bearing Replacement Cautions:

- Eliminate other possible problems before attempting bearing replacement, as substantial disassembly of the feeder is required. Carefully note position of any tooling you remove before you begin. Keep chains clean and dry after removal.
- Most major bearings in the feeders are pre-loaded to prevent play. To prevent binding or excessive free play in the bowl, ensure that all bearing housings and the bearings themselves are clean and free of external grease, dirt, nicks or burrs prior to reassembly. If you accidentally damage critical surfaces of the housings, you may need to replace the entire spindle assembly as a unit.

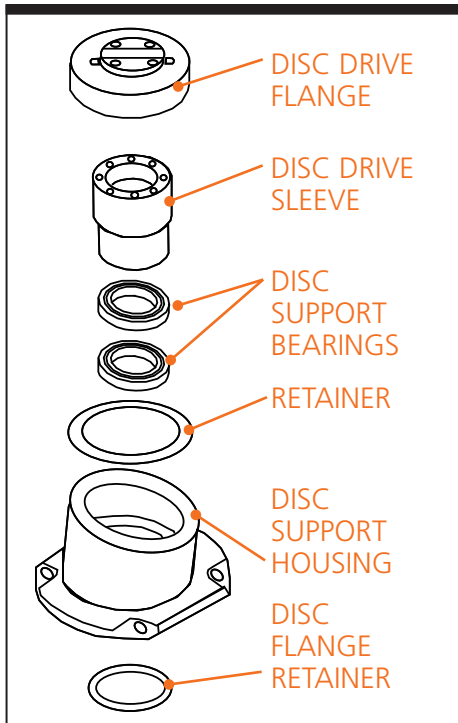


Figure 5-7. Disc Drive Bearing Housing Assembly – Exploded View

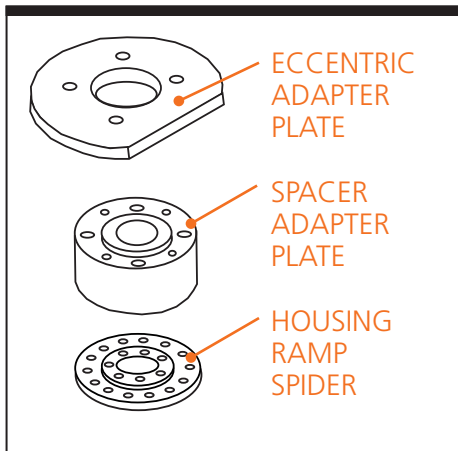


Figure 5-8. Rim Housing Assembly – Exploded View

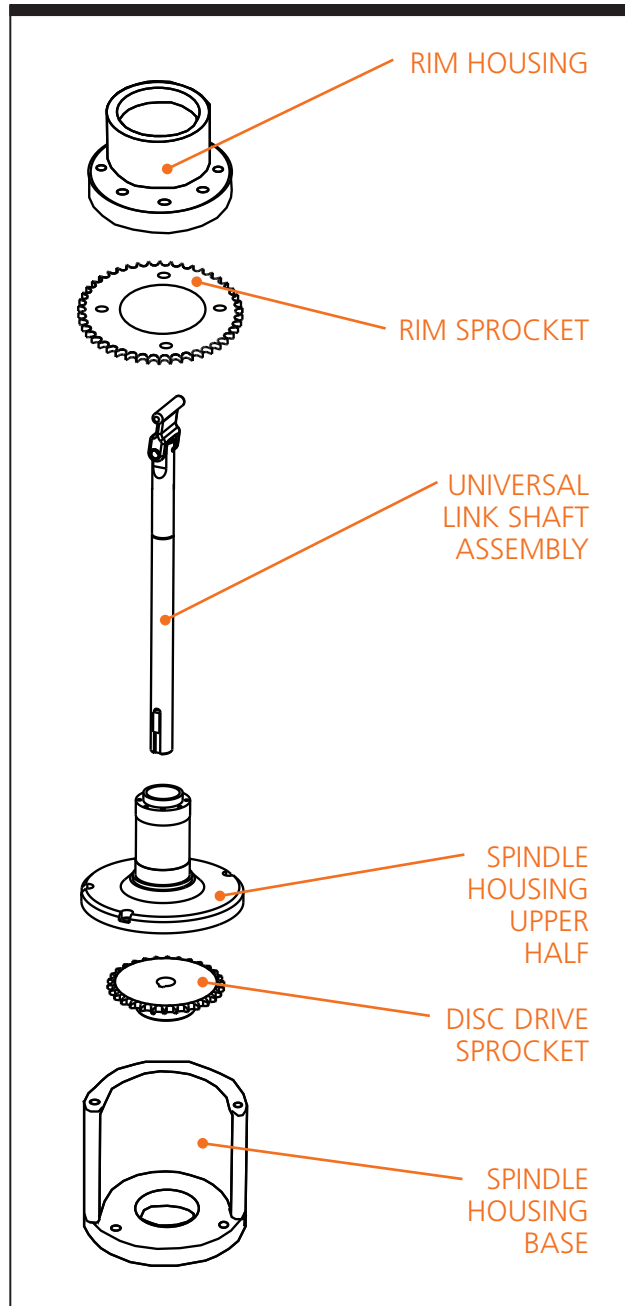


Figure 5-9. Housing and Bearing Assembly – Exploded View



- ➔ Install only 100% identical replacement bearings. In the unlikely event that the bowl will not turn, or that there is play in the bowl when you are done, you may need to replace the spindle assembly as a unit, or contact Shibuya Hoppmann Corporation for assistance.
- ➔ To maintain accuracy and prevent play in the bowl, replace both bearings of a pair at the same time. Do not replace only one.
- ➔ **Do not swap housings (such as the disc shaft spindle bearing housing) from one FS feeder to another, as critical surfaces may have been custom-machined for zero play in the bowl.**

If Product Jams: General Tips

Step 1—Inspect The Feeder. If product jams repeatedly, review the following:

- ➔ Is your prefeeder's delivery rate excessive? (The prefeeder should deliver only enough product to the feeder to keep the line running at the required rate.)
- ➔ Is the feeder's bowl speed set incorrectly?
- ➔ Is there a changeover procedure you have overlooked?
- ➔ Is the feeder's main air regulator set incorrectly?

Step 2—Inspect Your Product. After checking the feeder, check to see if your product has changed since the last batch:

- ➔ Are they larger? Smaller? A different shape? A different material? Different color? Different quality?
- ➔ If you are orienting freshly molded product, have you made a change in how they are released from the mold? (Are they hotter, drier or stickier, for example?)
- ➔ Finally, if your product has changed, or if you cannot isolate why your product is jamming, contact your direct supplier for assistance.

Troubleshooting Charts

Refer to the troubleshooting charts on the following pages which detailing common problems and possible solutions.

Troubleshooting		
Problem	Possible Cause	Solution/Action
Feeder won't run at all.	Power is off, or the feeder has been disconnected.	Turn the power on or reconnect power to the feeder.
	Downstream machinery is completely full.	Clear downstream machinery.
	Motor speed controller internal setting changed or defective.	Check the setting and/or replace the motor speed controller and the horsepower resistor.
	Trim pot settings have changed.	Re-calibrate to the motor speed controller manufacturer's specifications.
	Air clutch is not engaged.	Make sure the air clutch is properly engaged. Refer to Page 28 of this manual.
	Motor is defective.	Replace the motor. Refer to the Replacement Parts in Chapter 6.
Surface of the parts is scuffed up or dirty.	Particulate (dust, dirt, etc.) is in the feeder.	Clean the feeder (refer to Chapter 4, Preventive Maintenance, for routine cleaning).
	Parts are already scuffed.	Check upstream equipment.
Rate is too low – Parts exit the feeder correctly.	Feeder is "starved" for parts.	Correctly set the prefeeder rate. Make sure there are sufficient parts in the prefeeder hopper.
	Feeder is overloaded.	Check the prefeeders speed. Check the prefeeder's time delay relay. Check the bowl level sensor in the feeder.
	Feeder rim speed is incorrect.	Check that the rim speed is set correctly.

Troubleshooting		
Problem	Possible Cause	Solution/Action
Feeder rim or disc does not turn.	Parts jammed in the feeder.	Disconnect power. Locate and remove the jammed part(s). Restart the feeder.
	Motor speed controller internal setting changed or defective.	Check the setting and/or replace the motor speed controller and the horsepower resistor.
Rim, bowl and/or disc jerks when moving.	Trim pot settings have changed.	Re-calibrate to the motor speed controller manufacturer's specifications.
	The drive chain is too loose or too tight.	Adjust the drive chain tension. Refer to Chapter 4 for correct setting information.
Rim and disc turn, but parts do not exit properly. Parts continue to jam in the feeder.	The motor speeds are incorrectly set.	Correctly set the rim speed and prefeeder rate.
	Air is not on to the feeder.	Make sure there are sufficient parts in the prefeeder hopper.
	Incorrect (wrong) parts are being run.	Check the air pressure at the main air pressure regulator. Check to make certain the correct flow is set. Adjust as needed.
	Parts are different.	Verify that the feeder is correctly set up to run this specific part.
	Parts are different.	Check to make sure the feeder is tooled for this part. See if there are differences in the part (ie: stickier, hotter, etc.)
	Tooling or air jets need adjustment.	Refer to your Systems Operation manual or contact your direct supplier.

Troubleshooting		
Problem	Possible Cause	Solution/Action
Cannot adjust the motor speed high enough.	Motor speed controller internal setting changed or defective.	Check the setting and/or replace the motor speed controller and the horsepower resistor.
	Trim pot settings have changed.	Re-calibrate to the motor speed controller manufacturer's specs.
	The drive chain is too loose or too tight.	Adjust the drive chain tension. Refer to Chapter 4 for correct setting information.
The air clutch fails to engage. ¹	Air is not getting to the air clutch due to a control valve malfunction or low air pressure.	Check the control valve and air pressure setting.
	There are defective O-ring seals, causing air leaks.	Replace the O-ring seals.
	There is lack of lubrication on the hub spline or in the air chamber.	Lubricate the hub spline with a thin film of anti-seize compound, or check air line lubricator settings.
	Rigid pipe or tubing for the air line connections is used.	Use flexible pipe or tubing for all air line connections.
Air clutch fails to disengage. ¹	Friction lock due to the lack of lubrication on the hub spline or in the air chamber.	Lubricate the hub spline with a thin film of anti-seize compound, or check air line lubricator settings.
	There is a broken compression spring.	Install a new compression spring.
	There is un-exhausted air due to a control valve malfunction.	Check or replace the control valve.
There is excessive drag on the air line. ¹	The bearings are defective.	Replace the bearings in the air clutch.
	The air line is not properly supported.	Rest the air line against a support that is parallel to the centerline of the air clutch.

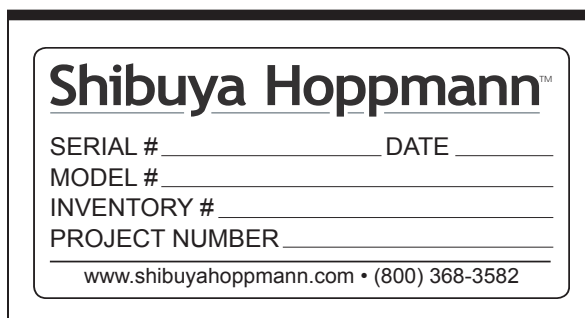
¹ For more information on the air clutch, refer to the specific manufacturer's documentation.

Replacement Parts

6

Replacement Parts

Replacement parts lists for the Hoppmann prefeeders are listed on the following pages. When ordering replacement parts, please reference the model name and number of your feeder located on the serial plate (see Figure 6-1). This helps in making sure you receive the correct replacement parts.



The image shows a rectangular serial plate with a black border. At the top, it reads "Shibuya Hoppmann™". Below this, there are four lines of text, each followed by a horizontal line for a value: "SERIAL # _____ DATE _____", "MODEL # _____", "INVENTORY # _____", and "PROJECT NUMBER _____". At the bottom of the plate, the website "www.shibuyahoppmann.com" and the phone number "(800) 368-3582" are printed.

Figure 6-1. Sample Serial Plate

If you received a customized Shibuya Hoppmann system, please refer to your system's Operation Manual when ordering spares, as your prefeeder may have been altered.

Having the serial number in addition to the part number you wish to order will help us to accurately assist you in getting the correct parts. You may order your prefeeder's spare parts directly from Shibuya Hoppmann by email, phone or fax (see the contact information listed below).

Shibuya Hoppmann Spares and Service Department

- ➔ **Email:** Spares@Hoppmann.com
- ➔ **Phone:** 434.929.4746 (1.800.543.0915)
- ➔ **Fax:** 434.929.4959
- ➔ **Mail:** Shibuya Hoppmann Corporation
Attn: Spares Department
291 Dillard Road, P.O. Box 879
Madison Heights, VA 24572 USA
www.ShibuyaHoppmann.com

Notes: Occasional product serial numbers will be preceded by a "V" or "C", which indicates the equipment has been customized for you specifically. When calling for parts, be sure to indicate if your equipment has this configuration (example: VFS601RLDSA or CFS601RLASA).

FS601RLDSA - FS-60 Centrifugal Feeder, DC Motor			
Critical	Part Number	Description	Qty.
X	NMRV750100	Speed Reducer, 100:1, 56C	1
X	CDP3445	1hp DC Motor, 90 VDC	1
	BRNGBALL16	Ball Bearing, with 2 Seals	8
	GSNI210080	Gas Spring, 80psi, 3.5 Stroke	4
	AZ1612ZVRKM20	Interlock Safety Switch, 3PDT	4
	BRNGASSY01	Bearing Insert, 25mm	3
	BRNGBALL07	Ball Bearing, with 2 Seals	4
	FT500800	Bowl Drive Sprocket	1
	SPKTMB5030	Disc Drive Sprocket	1
	FT300M9510	Drive Clevis Assembly	1
	FT500M9006	Flange, Disc Drive	1
X	TORQGARD04	Air Clutch, M800	1
	CHANC5063	#50 Chain, 63 Links, 39.38" Long	1
	CHANC5091	#50 Chain, 91 Links, 56.88" Long	1
	CHANC5099	#50 Chain, 99 Links, 61.75" Long	1
X	835000	Brake Caliper	1
X	835600	Replacement Pads (for Brake)	2
	FRS601200	Sprocket, Mod, Torq-Gard	1
	FS50DC0102	Disc Idler Sprocket	1
	FS600Z1001-01	Idler Weldment	1
	BUSHF24281	Bronze Bushing	2
X	F2115200502	Clutch and Brake Air Kit	1

FS601RLASA - FS-60 Centrifugal Feeder, AC Motor			
Critical	Part Number	Description	Qty.
X	NMRV750100	Speed Reducer, 100:1, 56C	1
X	MOTRAC0100-M	1hp AC Motor, 208-230/460, 3 Phase	1
	BRNGBALL16	Ball Bearing, with 2 Seals	8
	GSNI210080	Gas Spring, 80psi, 3.5 Stroke	4
	AZ1612ZVRKM20	Interlock Safety Switch, 3PDT	4
	BRNGASSY01	Bearing Insert, 25mm	3
	BRNGBALL07	Ball Bearing, with 2 Seals	4
	FT500800	Bowl Drive Sprocket	1
	SPKTMB5030	Disc Drive Sprocket	1
	FT300M9510	Drive Clevis Assembly	1
	FT500M9006	Flange, Disc Drive	1
X	TORQGARD04	Air Clutch, M800	1
	CHANCS5063	#50 Chain, 63 Links, 39.38" Long	1
	CHANCS5091	#50 Chain, 91 Links, 56.88" Long	1
	CHANCS5099	#50 Chain, 99 Links, 61.75" Long	1
X	835000	Brake Caliper	1
X	835600	Replacement Pads (for Brake)	2
	FRS601200	Sprocket, Mod, Torq-Gard	1
	FS50DC0102	Disc Idler Sprocket	1
	FS600Z1001-01	Idler Weldment	1
	BUSHF24281	Bronze Bushing	2
X	F2115200502	Clutch and Brake Air Kit	1

Notes

Warranty

7

Warranty

Shibuya Hoppmann Corporation warrants that each item of its own manufacture delivered hereunder shall, at the time of delivery and for a period of twelve (12) months thereafter, be free from defects in materials or workmanship; and if any such item shall prove to be defective in material or workmanship under normal intended usage and maintenance during the warranty period, upon examination by Shibuya Hoppmann Corporation, then Shibuya Hoppmann Corporation shall repair or replace, at its sole option, such defective item at its own expense; provided, however, that the owner shall be required to ship such defective item, freight prepaid, to Shibuya Hoppmann Corporation's plant in Virginia. The warranty on components not manufactured by Shibuya Hoppmann Corporation, but a part of the feeder, is limited to the warranty provided by the original manufacturer of said components to the extent, and only to the extent, that such original manufacturer actually honors such warranty.

ALL WARRANTIES HEREUNDER ARE EXPRESSLY LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE ITEMS AS SET FORTH HEREIN, AND IN NO EVENT SHALL SHIBUYA HOPPMANN CORPORATION BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES BY REASON OF ANY BREACH OF WARRANTY OR DEFECT IN MATERIAL OR WORKMANSHIP. SHIBUYA HOPPMANN CORPORATION SHALL NOT BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ITEMS WHICH HAVE BEEN SUBJECTED TO NEGLIGENCE, ACCIDENT OR IMPROPER USE, OR WHICH HAVE BEEN ALTERED BY OTHER THAN AUTHORIZED SHIBUYA HOPPMANN CORPORATION PERSONNEL.

THIS WARRANTY IS IN LIEU OF OTHER WARRANTIES, EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED.

Schedule Mechanical Maintenance

Every six (6) months, or as needed:

- ➔ Lubricate idler assembly
- ➔ Clean as needed
- ➔ Lubricate disc and rim drive chains
- ➔ Lubricate all sprockets
- ➔ Inspect chain tension

Performed By: (initial)	Date

Schedule Electrical Maintenance

Every six (6) months, or as needed:

- Inspect/replace motor brushes

Performed By: (initial)	Date

Shibuya Hoppmann™

Shibuya Hoppmann offers a wide selection of products:

- ➔ Prefeeder/Centrifugal Parts
- ➔ Feeders/Unscramblers
- ➔ Filler/Plugger/Capper Systems (CIP/SIP)
- ➔ Pharmaceutical/Beverage Filling Systems for:
 - Liquid
 - Powder
 - Aseptic
 - Non-Aseptic
- ➔ Multi Part Assembly Systems
 - Continuous Motion
 - Indexing/Intermittent
- ➔ Capping Systems – Servo or Mechanical
- ➔ Placement Systems
- ➔ Rotary/Inline Pressure Sensitive Labelers
- ➔ Print and Apply Labelers
- ➔ I.V. Bag Form/Fill/Seal Systems
- ➔ Pouch Fill/Cap/Seal Systems
- ➔ Collating Systems
- ➔ Puck Feed/Loading and Unloading Systems
- ➔ Syringe Filling/Assembly Systems
- ➔ Electron Beam Aseptic Filling Systems
- ➔ Line Integration/Validation Services
- ➔ PMMI Certified Training

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