



Shibuya Hoppmann

Model FS-40/50-RD Centrifugal Feeders

ANSI/Metric Installation & Maintenance Manual

**Refer all servicing to
qualified personnel.**

*This manual is written for qualified
mechanics and electricians
who must install or service the
FS-40-RD or FS-50-RD Feeder.*

**Use this manual for FS-40-RD &
FS-50-RD ANSI or Metric, cold
rolled or stainless steel model
feeders manufactured after 10/96.**



*Please copy this information
from the FS-40-RD or FS-50-RD
Feeder's serial plate.*

Model Number:

Serial Number/Date:

Inventory Number (Check One):

- | | |
|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> FS401RLDCA | <input type="checkbox"/> FS401RLACM |
| <input type="checkbox"/> FS401RLDSA | <input type="checkbox"/> FS401RLASM |
| <input type="checkbox"/> FS501RLDCA | <input type="checkbox"/> FS501RLACA |
| <input type="checkbox"/> FS501RLDSA | <input type="checkbox"/> FS501RLASA |



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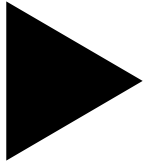
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Quick Start



About this Manual

Assumptions

This manual is written for qualified mechanics or electricians who install or service the FS-40-RD or FS-50-RD Centrifugal Feeder. All procedures in this manual should be performed by qualified personnel.

► References in this manual may not apply to your FS-40-RD or FS-50-RD 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-40-RD or FS-50-RD feeder (if any) have been changed, consult your direct supplier's documentation.

Models Covered

This manual covers eight models. If you are unsure which model you have, locate the inventory number on the serial plate of the feeder.

<i>Inventory No.</i>	<i>ANSI, CRS</i>	<i>Inventory No.</i>	<i>Metric, CRS</i>
FS401RLDCA	1 DC Motor	FS401RLACM	1 AC Motor
FS501RLDCA	1 DC Motor		
FS501RLACA	1 AC Motor		

<i>Inventory No.</i>	<i>ANSI, SS</i>	<i>Inventory No.</i>	<i>Metric, SS</i>
FS401RLDSA	1 DC Motor	FS401RLASM	1 AC Motor
FS501RLDSA	1 DC Motor		
FS501RLASA	1 AC Motor		

Caution Symbols & Messages

Caution symbols and messages in this manual call attention to hazardous voltages, moving parts and other hazardous conditions.



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.

Equipment Improvements & Document Revisions Notice

Shibuya Hoppmann 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 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.

03/07

As-Built Documentation This manual does not contain as-built documentation. Obtain as-built documentation from 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 The FS-40/50-RD feeders are offered in both ANSI and metric versions. 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.



Any part of the feeder that touches your product has been precision tooled to specifically match your product. Do not move tooling or change feeder settings except as directed in this manual, your System Operations Manual or by your direct supplier. Otherwise, you may void your warranty and negatively affect the performance of your feeder.

Terms and Definitions

<u>Term</u>	<u>Equivalent Terms, Definition or Abbreviation</u>
"FS"	FS model centrifugal feeders are scalloped rim feeders. Scalloped 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.
Scallop	Segments of polyurethane designed to fit the machined bowl of the centrifugal feeders, providing a unique system for orienting containers and miscellaneous cylindrical shaped objects.



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FS-40/50-RD Feeder Installation/Maintenance Manual

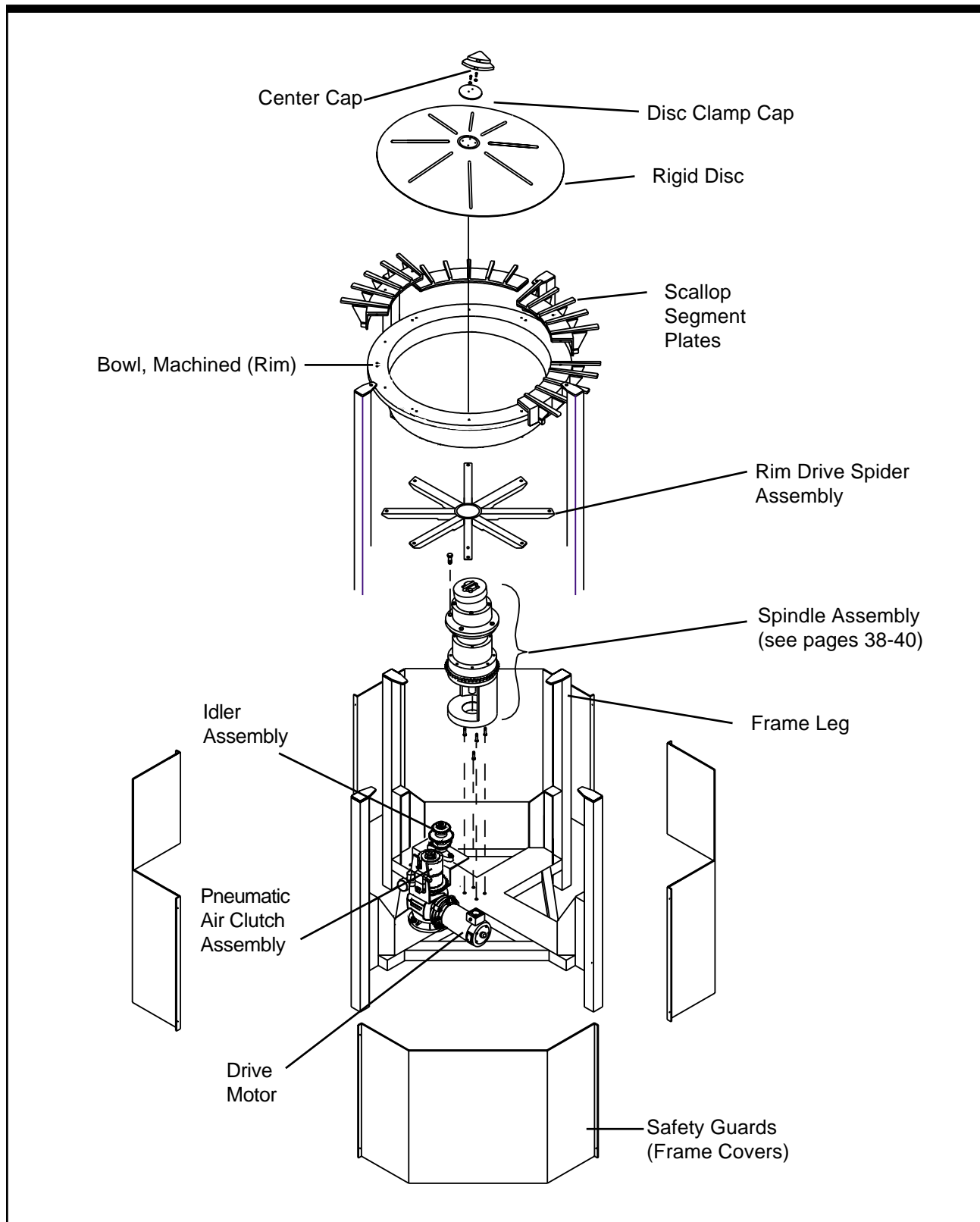


Figure 1-1. FS-40/50-RD Feeder: Overall Exploded View

Feeder Description & Specifications

1

The FS-40/50-RD Feeder: An Overview

Function The FS-40/50-RD feeders unscrambles, feeds, orients and delivers aligned parts. Every FS-40/50-RD feeder operates in the same basic way.

“System” Equipment The FS-40-RD and FS-50-RD centrifugal feeders are typically interfaced as a system. First, product is unscrambled from bulk. It is then placed in the proper discharge orientation and released onto an output conveyor. A typical “FS” system is shown in Figures 1-2. The following pieces of equipment usually comprise a typical scallop feeder system:

- ⇨ Bulk Prefeeder
- ⇨ Scallop Feeder
- ⇨ Tooling
- ⇨ Control System
- ⇨ Discharge Conveyor

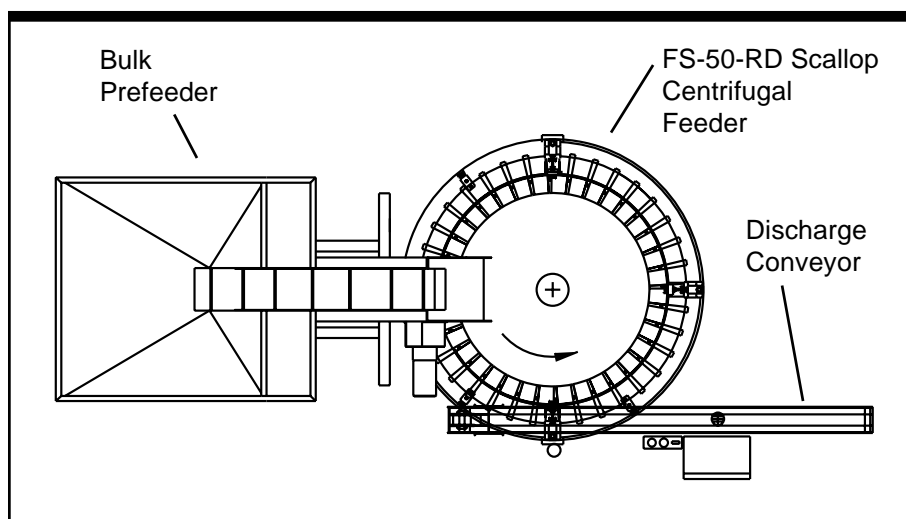


Figure 1-2. Typical FS-40/50-RD System - Top View



Operation Step 1—The FS-40/50-RD Feeder Accepts Your Parts. The FS-40/50-RD feeders accept parts from a separate bulk supply hopper or prefeeder. Parts drop randomly, a few at a time, onto a rigid disc.

► The FS-40/50-RD feeders run best when parts are not emptied, in bulk, directly onto the rigid disc, but instead, when parts are carefully metered into the FS-40/50-RD feeder a few parts at a time. The FS-40/50-RD feeders deliver parts almost immediately.

Step 2—The FS-40/50-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 are singulated between scallop fingers which help orient the parts (refer to Figure 1-3).

► 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-40/50-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 FS-40-RD or FS-50-RD feeder except as described in this manual, or you may void your warranty and negatively affect the performance of your FS-40-RD or FS-50-RD Feeder.**

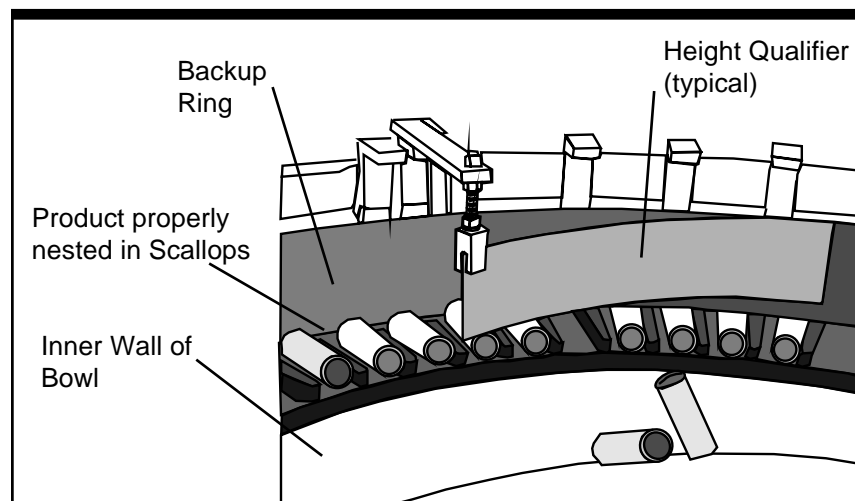


Figure 1-3. Qualifying Parts in the Scallops

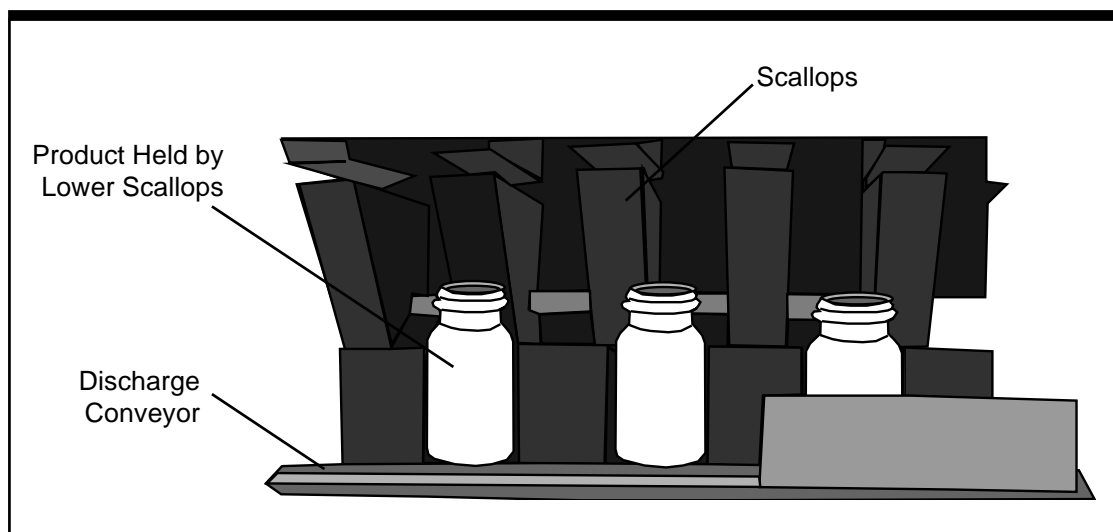


Figure 1-4. Exit in the Scallop Feeder

Step 3—The FS-40/50-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 1-4). 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-40-RD or FS-50-RD, in proper orientation, for delivery to downstream operations.

Output Feed Rate The FS-40/50-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-40/50-RD feeders are cast aluminum.

Scallops The standard scallops are made of cast polyurethane.



FS-40-RD Single Drive Specifications

Specifications - FS-40-RD	ANSI	Metric
Electrical Specifications		
Motor Size	1/2 HP	.37 KW
Motor Frame Size	NEMA 56 C	IEC 71D
Supply Voltage	Refer to Chapter 3 Wiring Diagrams	
Motor Voltage	Refer to Chapter 3 Wiring Diagrams	
Power Usage	6 amps	4 amps
Dimensional Specifications		
A. Outer Wall Diameter	65.00"	1651 mm
B. Overall Height	48.50"	1232 mm
C. Discharge Height	35.19"	894 mm
D. Bowl Outer Diameter	43.46"	1104 mm
E. Bowl Inner Diameter	36.25"	921 mm
F. Rim Width	3.61"	92 mm
G. Bowl Depth	5.95"	144 mm
H. Leveling Feet Height	4.63" ± 2"	118 mm ± 51
J. Scallop Length	7.95"	202 mm
Performance Specifications*		
Maximum Bowl Linear Speed** (@Rim ID)	56 feet/minute	17 meters/minute
Vertical Bowl Runout (Max)	0.020"	0.50 mm
Vertical Disc Runout (Max)	0.100"	2.50 mm
Rim-Disc Gap (Max)	0.060"	1.5 mm

**Your direct supplier may have changed some of these specifications during tooling to better match your application's requirements.*



*** Maximum speed is not the operating speed, it's provided as a reference value only.*

Table 1-1. FS-40-RD Single Drive Feeder Specifications

FS-40-RD Single Drive Specifications

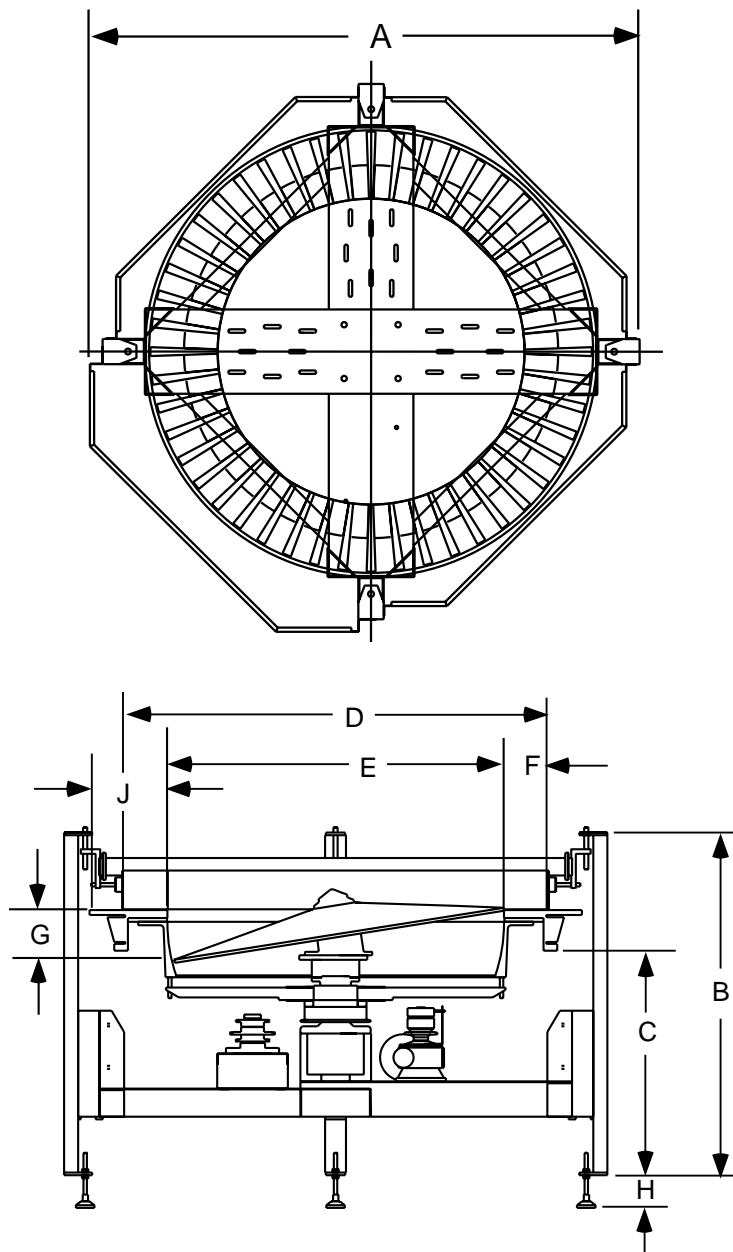


Figure 1-5. FS-40-RD Single Drive Feeder Specifications



FS-50-RD Single Drive Specifications

Specifications - FS-50-RD	ANSI	Metric
Electrical Specifications		
Motor Size	3/4 HP	370 W
Motor Frame Size	NEMA 56 C	IEC 71D
Supply Voltage	Refer to Chapter 3 Wiring Diagrams	
Motor Voltage	Refer to Chapter 3 Wiring Diagrams	
Power Usage	6 amps	4 amps
Dimensional Specifications		
A. Outer Wall Diameter	78.51"	1994 mm
B. Overall Height	48.50"	1232 mm
C. Discharge Height	35.88"	911 mm
D. Bowl Outer Diameter	56.00"	1422 mm
E. Bowl Inner Diameter	47.75"	1213 mm
F. Rim Width	4.13"	105 mm
G. Bowl Depth	7.05"	179 mm
H. Leveling Feet Height	4.63" ± 2"	118 mm ± 51 mm
J. Scallop Length	11.00"	279 mm
Performance Specifications*		
Maximum Bowl Linear Speed** (@Rim ID)	87 feet/minute	26 meters/minute
Vertical Bowl Runout (Max)	0.020"	0.50 mm
Vertical Disc Runout (Max)	0.100"	2.50 mm
Rim-Disc Gap (Max)	0.060"	1.5 mm

**Your direct supplier may have changed some of these specifications during tooling to better match your application's requirements.*



*** Maximum speed is not the operating speed, it's provided as a reference value only.*

Table 1-2. FS-50-RD Single Drive Feeder Specifications

FS-50-RD Single Drive Specifications

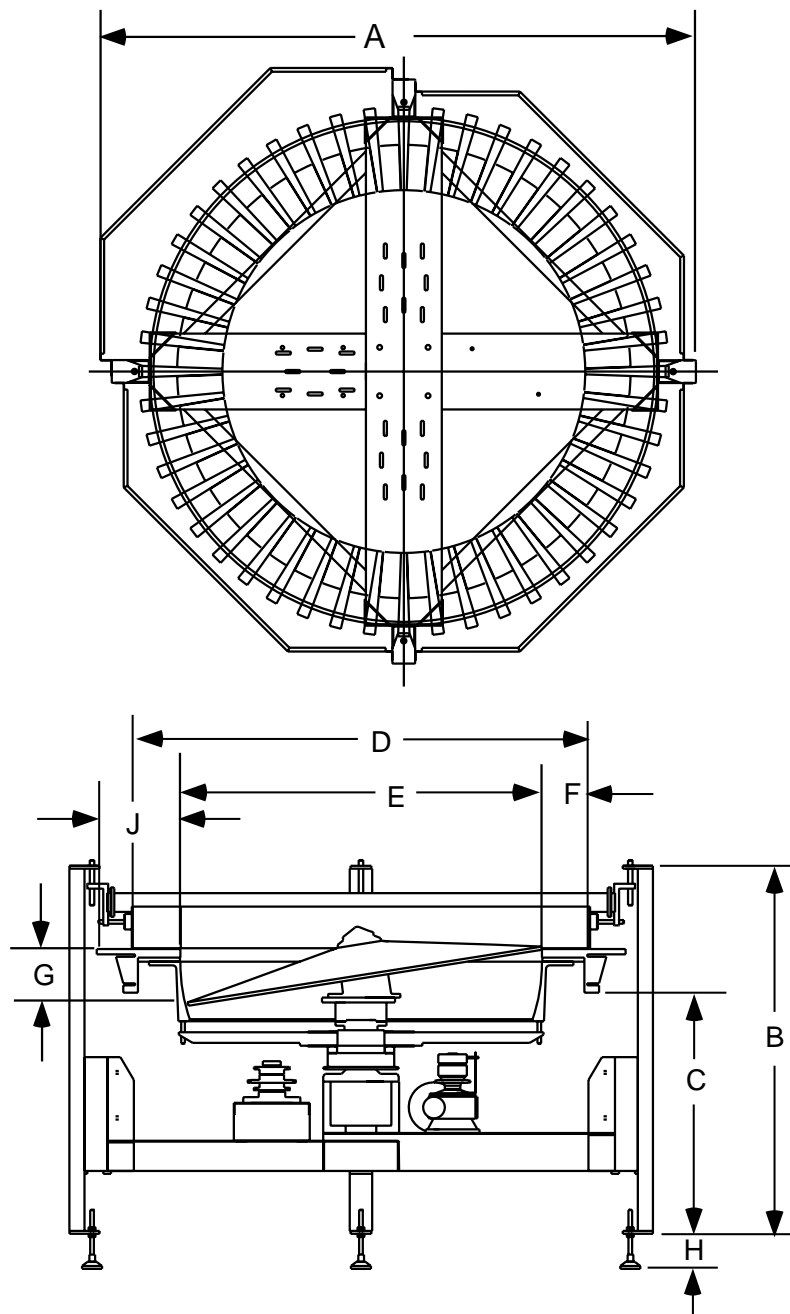


Figure 1-6. FS-50-RD Single Drive Feeder Specifications

Safety Precautions

2

Safety Precautions



Turn Off Power! Before servicing, make sure you have turned off compressed air and electrical power in a way which prevents accidental reactivation. Padlock and clearly tag the appropriate electrical and pneumatic disconnects. Lockout/tagout 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 eyewear when servicing the feeder. Never place hands or tools in the feeder when it is operating.



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 FS-40-RD or FS-50-RD Feeder include any guards installed by your direct supplier, as well as the guards (which protect the operator from the moving bowl spider, sprockets and chains). (Refer to Figure 1-1 for guard location).



Secure Safety Covers! Before feeder operation, secure all safety covers. Most safety covers are electrically interlocked, and will prevent the machine operation if disengaged.

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 must 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.

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.

Do Perform Preventive Maintenance. To keep the feeder running without unexpected repairs and resulting "down" time, 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 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.



Installation & Startup

3

Included in this Chapter

Follow, in order, each section of this chapter to install any tooled FS-40-RD or FS-50-RD feeder. For your convenience, Tables 1-2, 1-3, and Figures 3-2 through 3-5 show electrical specifications for your feeder and suggested wiring.

Unpacking, Inspection & 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 (also see Figure 6-1).

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 Discharge Conveyor. Check that product can move smoothly from the discharge of the feeder to your conveyor. Check that product will not jam or lose their orientation as they are discharged.



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 must discharge product to fall on the lowest side of the feeder's rigid disc, halfway between its center and its outside diameter. Take a handful of product and drop them from the snout of your prefeeder into the feeder. Avoid product bouncing up off the rigid disc onto the rim of the bowl, which could knock off product that are already loaded. Position the prefeeder again, if necessary, directing the prefeeder to feed product evenly, after the feeder is running.

Step 5—Connect Electrical Supply and Air. Connect your feeder to electrical supply and compressed air. Do not change the feeder's main air regulator; it should already be correct when you receive the feeder.

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

Step 3—Check for Rubbing Parts. Run the prefeeder, feeder and output device without product. In the unlikely event that you hear squeaks and squeals (there should be none), shut down immediately and check for any remaining packing, such as between the backup ring and the rim of the bowl.

How to Set Proper Bowl Speed

Ask your direct supplier for the actual linear feet per minute 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).

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

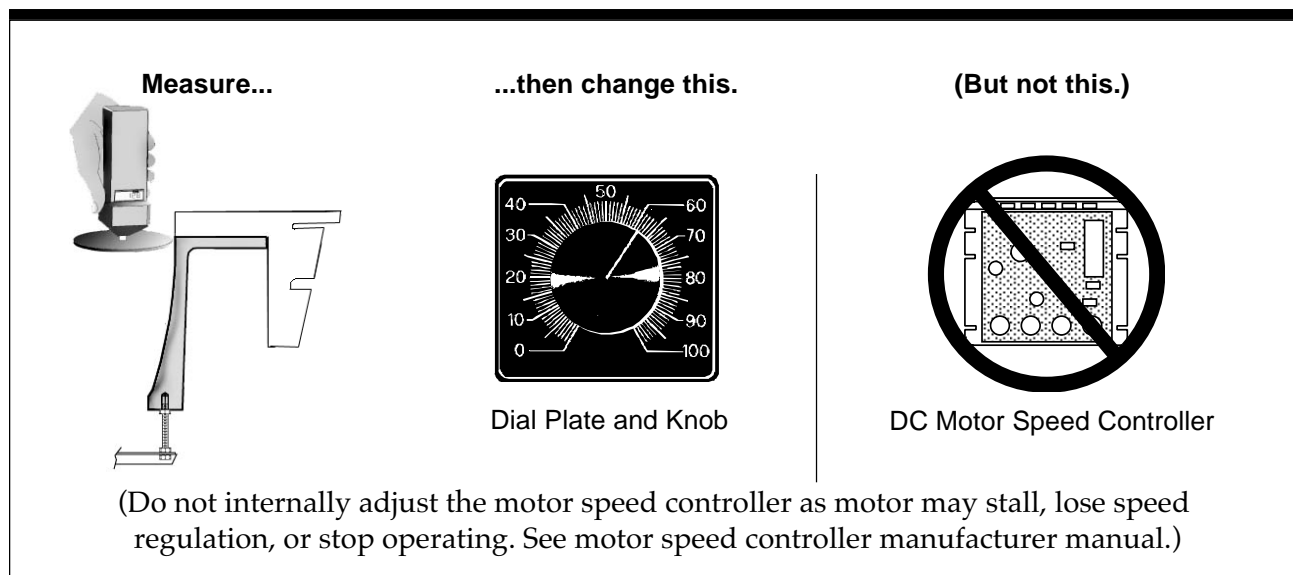


Figure 3-1. Measuring and Changing Bowl Speed



Running Product for the First Time

Step 1—Verify Changeover Setup. If your feeder is tooled to run multiple product, 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. Don't adjust the flow controls on any air jet.

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 product exits the feeder to keep the line running at the required rate.



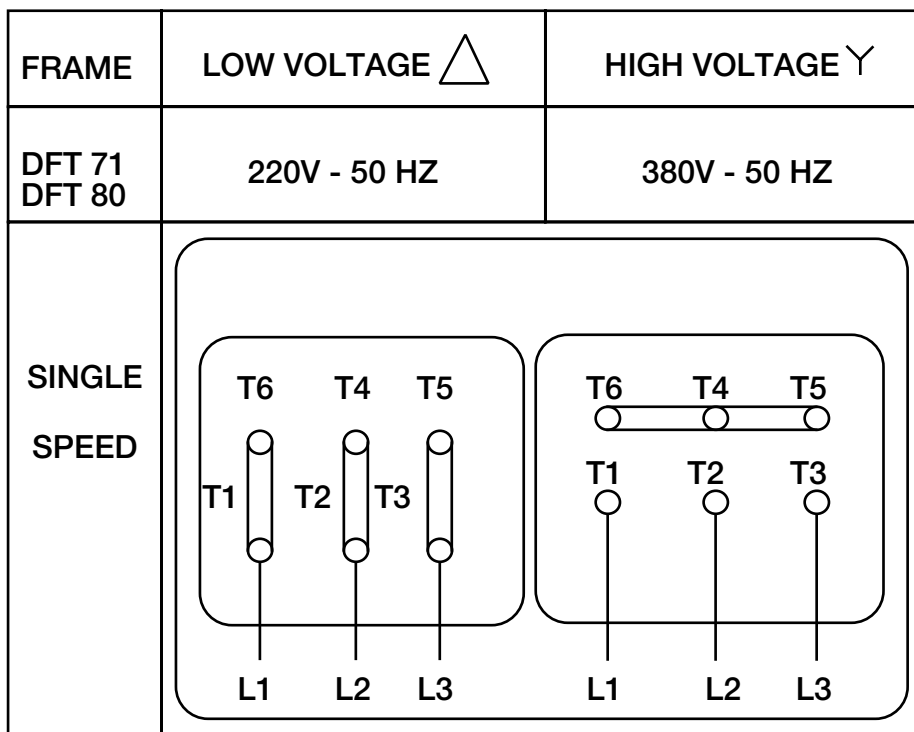
▶ Note: ***Excessive prefeeder output may overload the feeder and reduce its output.***

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 the 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.

FS-40-RD – AC Metric Single Drive – Wiring Diagram



Specifications

Model Inventory Number:	FS401RLACM, FS401RLASM
Motor	Drive Motor .37 KW 220/380 3PH 50 Hz AC Motor Shibuya Hoppmann P/N -MOTRMACO5Ø
Manufacturer	SEW Eurodrive
Mounting	IEC 71D Face Mounting
Protection Level	IP54 Protection Level
Inverter Option	AC Variable Speed Inverter option (not provided with unit). Contact Shibuya Hoppmann for inverter specifications and ordering instructions if desired.

Figure 3-2. FS-40-RD AC Metric Wiring Diagram (Single Drive)

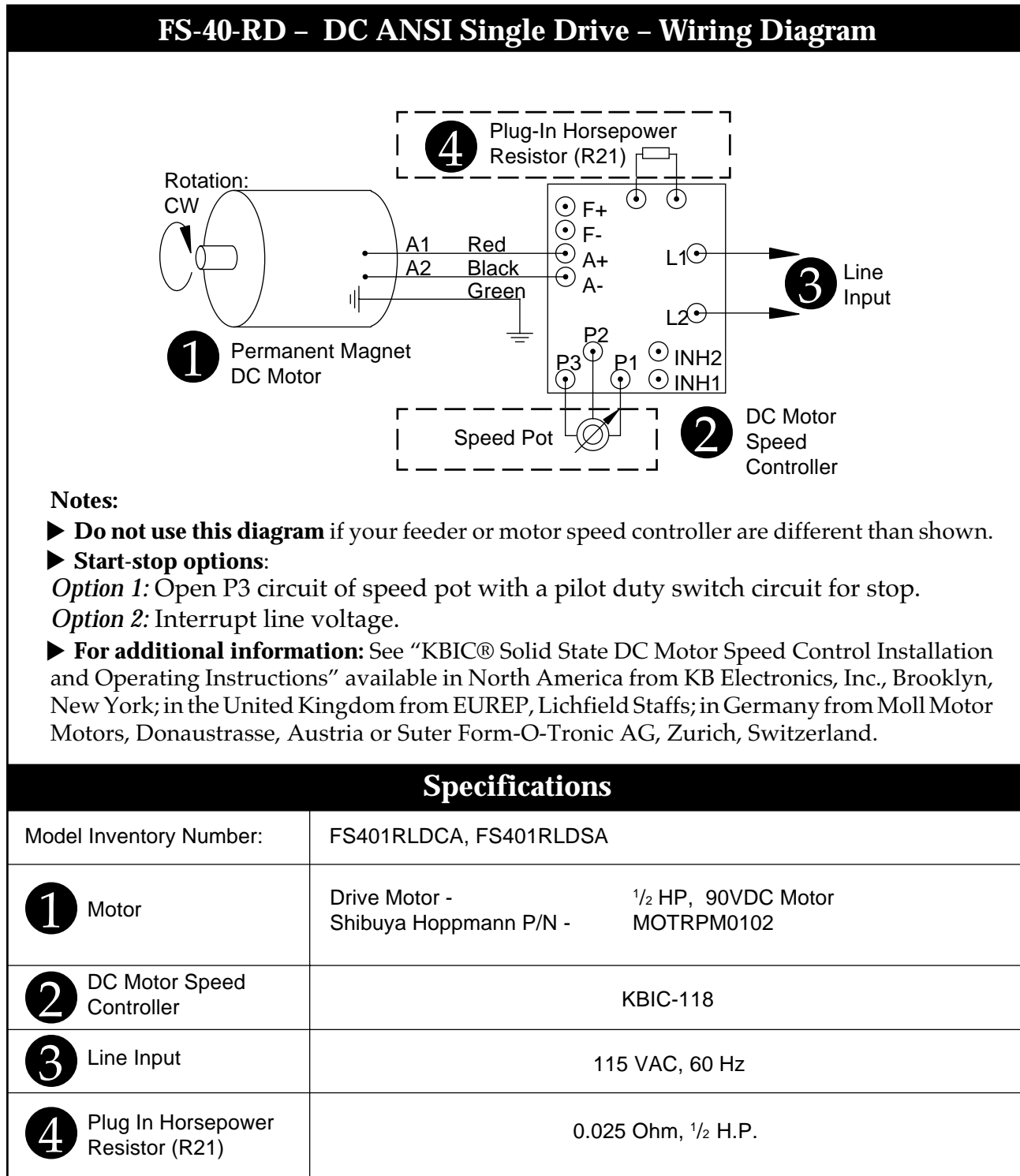
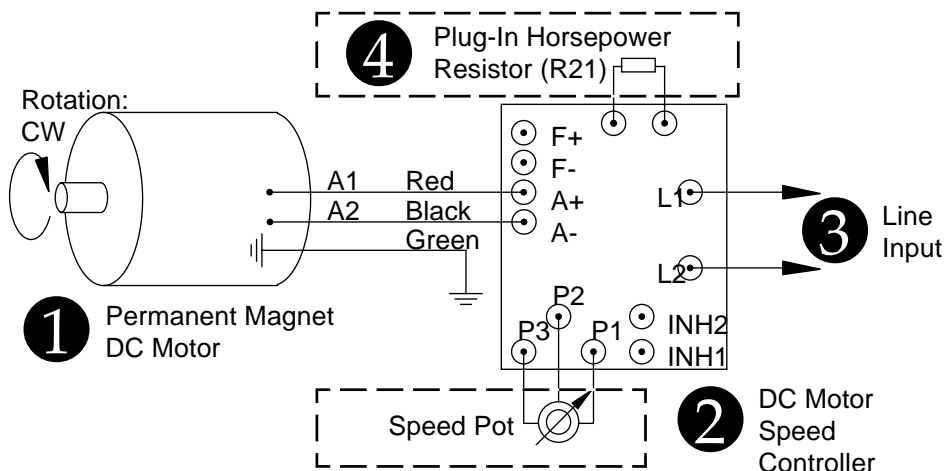


Figure 3-3. FS-40-RD DC ANSI Wiring Diagram (Single Drive)

FS-50-RD – DC ANSI Single Drive – Wiring Diagram



Notes:

- ▶ **Do not use this diagram** if your feeder or motor speed controller are different than shown.
- ▶ **Start-stop options:**
 - Option 1:* Open P3 circuit of speed pot with a pilot duty switch circuit for stop.
 - Option 2:* Interrupt line voltage.
- ▶ **For additional information:** See “KBIC® Solid State DC Motor Speed Control Installation and Operating Instructions” available in North America from KB Electronics, Inc., Brooklyn, New York; in the United Kingdom from EUREP, Lichfield Staffs; in Germany from Moll Motor Motors, Donaustrasse, Austria or Suter Form-O-Tronic AG, Zurich, Switzerland.

Specifications

Model Inventory Number:	FS501RLDCA, FS501RLDSA
1 Motor	Disc Drive Motor - 3/4 HP, 90 VDC Motor Shibuya Hoppmann P/N - MOTRPM0304
2 DC Motor Speed Controller	KBIC-118
3 Line Input	115 VAC, 60 Hz
4 Plug In Horsepower Resistor (R21)	0.015 Ohm, 3/4 H.P.

Figure 3-4. FS-50-RD DC ANSI Wiring Diagram (Single Drive)

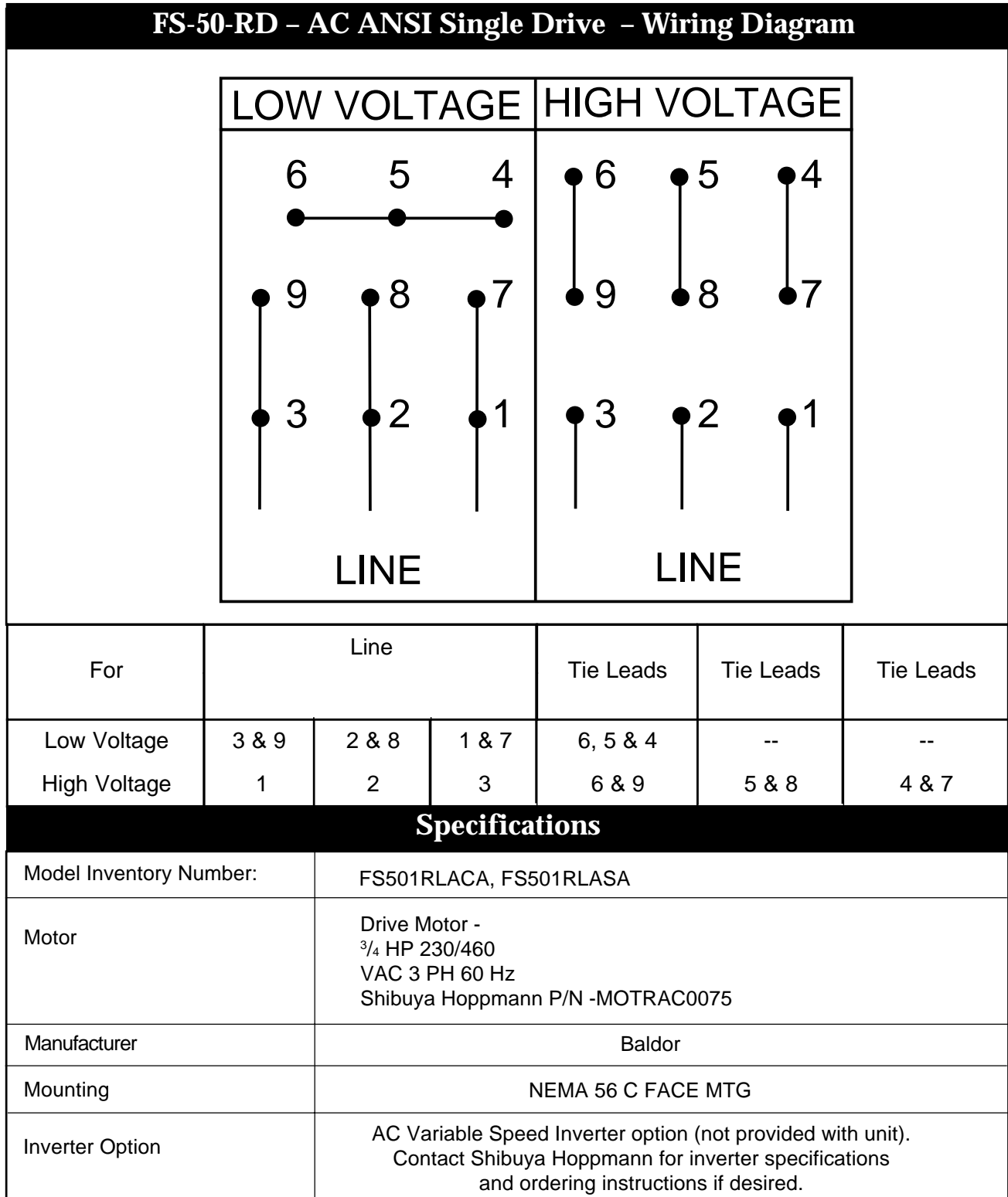


Figure 3-5. FS-50-RD AC ANSI Wiring Diagram (Single Drive)

Preventive Maintenance

4

General Cleaning

Outer Frame & Tooling

The Shibuya Hoppmann Model FS-40/50-RD Centrifugal Feeder is **not** intended for washdown use. If you need to clean the **outer frame**, the **bowl**, the **rigid disc**, **scallops** or **tooling**, use mild household cleaners.

Bowl & Rigid Disc: “Dusty” Applications

The bowl and disc are self-cleaning when handling most parts. However, if your parts generate dust or particulate when handled, clean the feeder as often as necessary. For such parts, remove dust from the top surface of the rim of the bowl and the rigid disc with a portable vacuum cleaner or dry compressed air.

Metric Speed Reducer—No Lubrication Required. The speed reducer used in the metric FS-40-RD or FS-50-RD feeder is lubricated for life with synthetic lubricant and requires no regular maintenance.

Chains and Sprocket Lubrication

On all FS-40-RD or FS-50-RD feeders, grease the disc and rim drive chains and sprockets every six months or 1000 operating hours, whichever comes first.

- ▶ Before beginning, disconnect power and air. Remove exit cover and exit support assembly to gain access. Lock and tag out the FS-40-RD or FS-50-RD feeder while you are lubricating the chain.
- ▶ Use standard Moly grease, Lubriplate #3000 (NLGI Grade 2) or equivalent. Turn bowl by hand to expose all links of bowl drive chains.



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.

Step 2—Inspect Drive Chain. Midway between sprockets, grasp each chain and wiggle it back and forth. You should be able to move it no more than a total of 1" (25 mm) as shown in Figure 4-4 (on the following page).

► If adjustment is needed, loosen the reducer mounting brackets from the nut plates. Move the reducer forward or back as necessary and then retighten.

Step 3—Check for Parallel Sprockets. Check that each set of sprockets is parallel to within $\frac{1}{32}$ " (0.8 mm). If not parallel, realign only the idler sprockets.

Step 4—Check for Vibration. Run the feeder. If vibration is evident, check chain tension for excessive tightness. Vibration may be reduced or eliminated by the realignment of sprockets and increase of total chain deflection from 1" (25 mm) to 1 $\frac{1}{4}$ " (32 mm).

Step 5—Replace Covers. Replace covers and connect power and air. Initial and date the Maintenance Log (page 48).

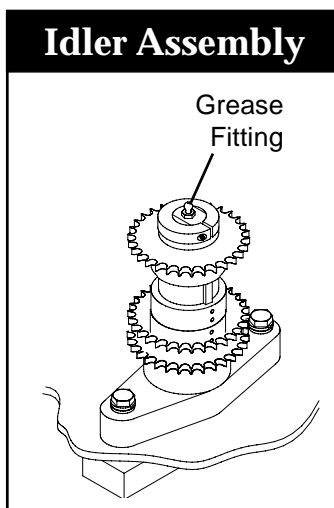


Figure 4-1. Assembled View

Idler Assembly Maintenance

It's recommended that you grease the idler assembly (refer to Figure 4-1), for both metric and ANSI models, every six (6) months after installation. Note the order of assembly (see Figure 5-3).

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.



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 4-2). 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.

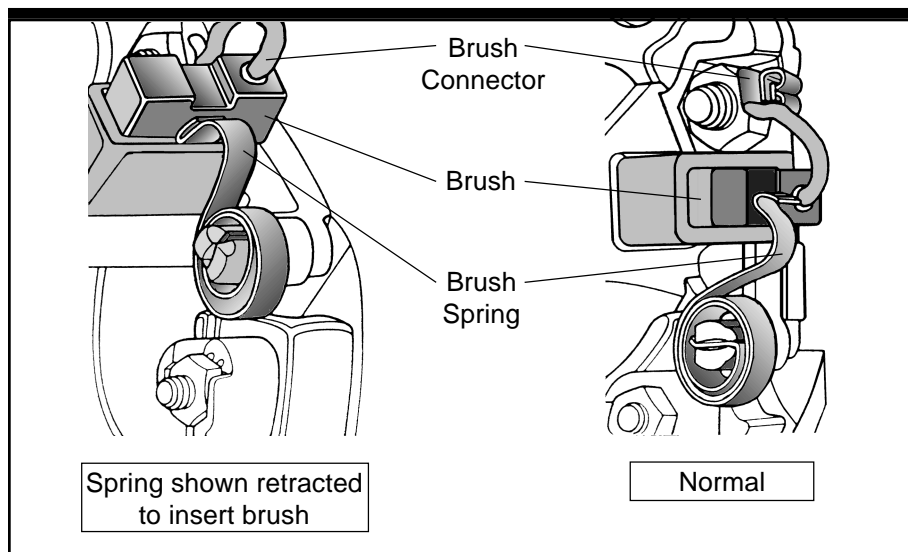


Figure 4-2. DC Motor Brushes (Gasketed Cover Removed)

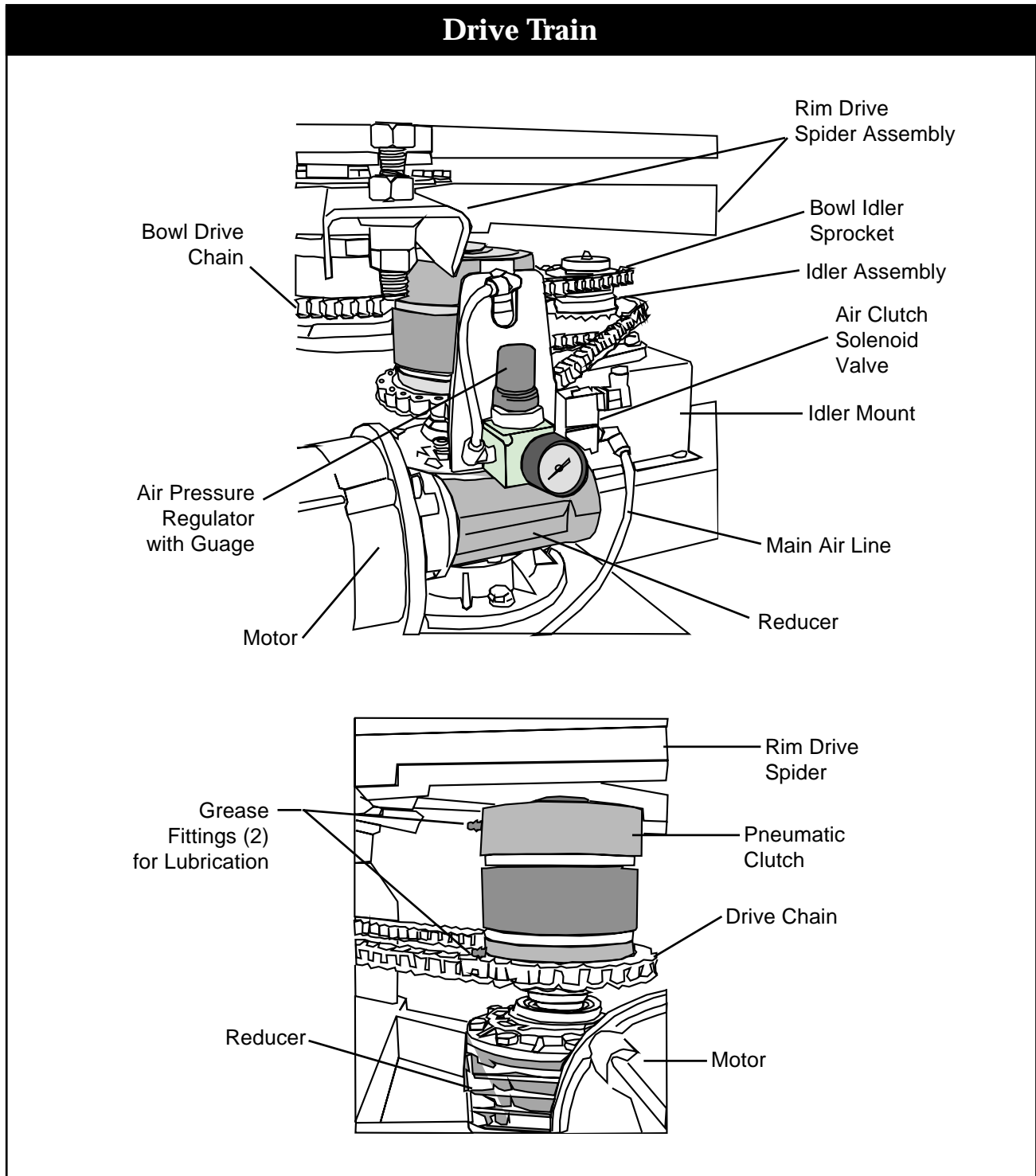


Figure 4-3. FS-40/50-RD Drive Train

Lubricate Clutch Assembly

Lubrication will be required after every four (4) weeks of operation. Use a lubricant such as Andersol 786 or equivalent. Two grease fittings are provided for this purpose (see Figure 4-3). After long periods of operation, it may be necessary to disassemble the clutch for cleaning and inspection.



The clutch is under spring tension. Use care when disassembling.

To disassemble the clutch, refer to the air clutch manufacturer's technical information (see Figure 4-4).

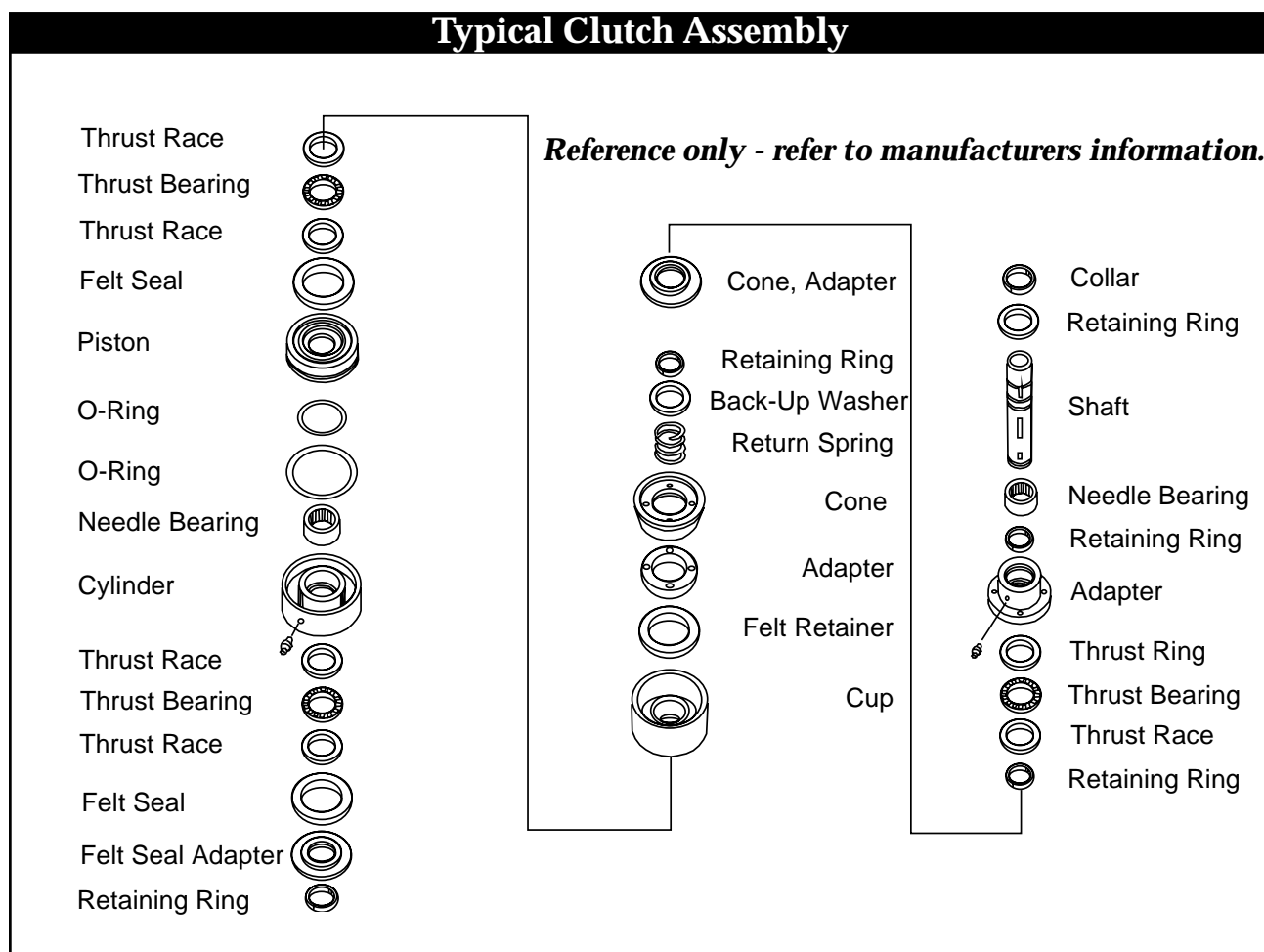


Figure 4-4. FS-40/50-RD Typical Clutch Assembly

Repair & Troubleshooting

5

Replacing or Refinishing a Damaged Bowl

If the bowl becomes damaged in a way that adversely affects the feeder performance, the bowl must be replaced or refinished.

- ▶ If the damage is slight, recoating with commercial hard coat by a professional metal finisher 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.

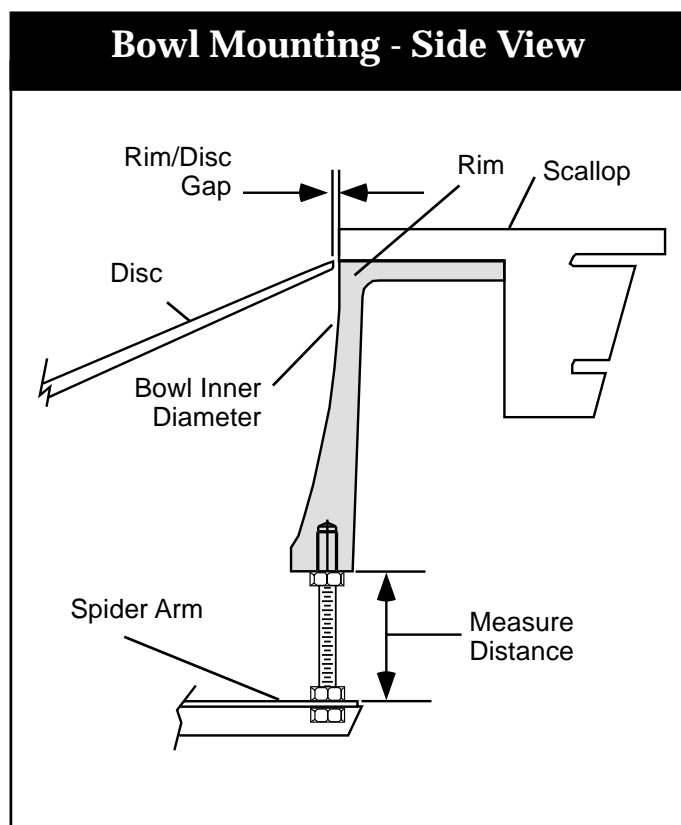


Figure 5-1. Side View - Bowl Mounting

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 - see 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 the section, "How to Set Bowl Runout" described in this chapter.

Step 4—Check Covers. Check that all covers are in place before running the feeder.



How to Set Bowl Runout

Bowl runout needs to be reset to the original specifications (outlined in Chapter 1) if the bowl has been removed. Adjust runout with the power off and bowl drive chain disengaged.

Step 1—Gain Access. Disconnect power and air. Remove any frame covers.

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, perpendicular to the rim of the bowl, up to $\frac{1}{4}$ " (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 (see Figure 5-1). 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, perpendicular to the inner wall of the bowl, up to $\frac{1}{4}$ " (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—Replace Chain & Covers. Install bowl drive chain. Inspect chain tension. Replace covers and re-connect power and air.

Metric Speed Reducer

Use the following steps to reuse the existing air clutch when replacing the metric 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).

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-40-RD or FS-50-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.

Step 6—Assemble Output Shaft/Air Clutch. 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 manufacturer's 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-40-RD or FS-50-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.

Step 8—Install Motor. Assemble the key to the motor shaft 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 9—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 10—Inspect After Installation. During the speed reducer's break-in 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 Assembly: 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.

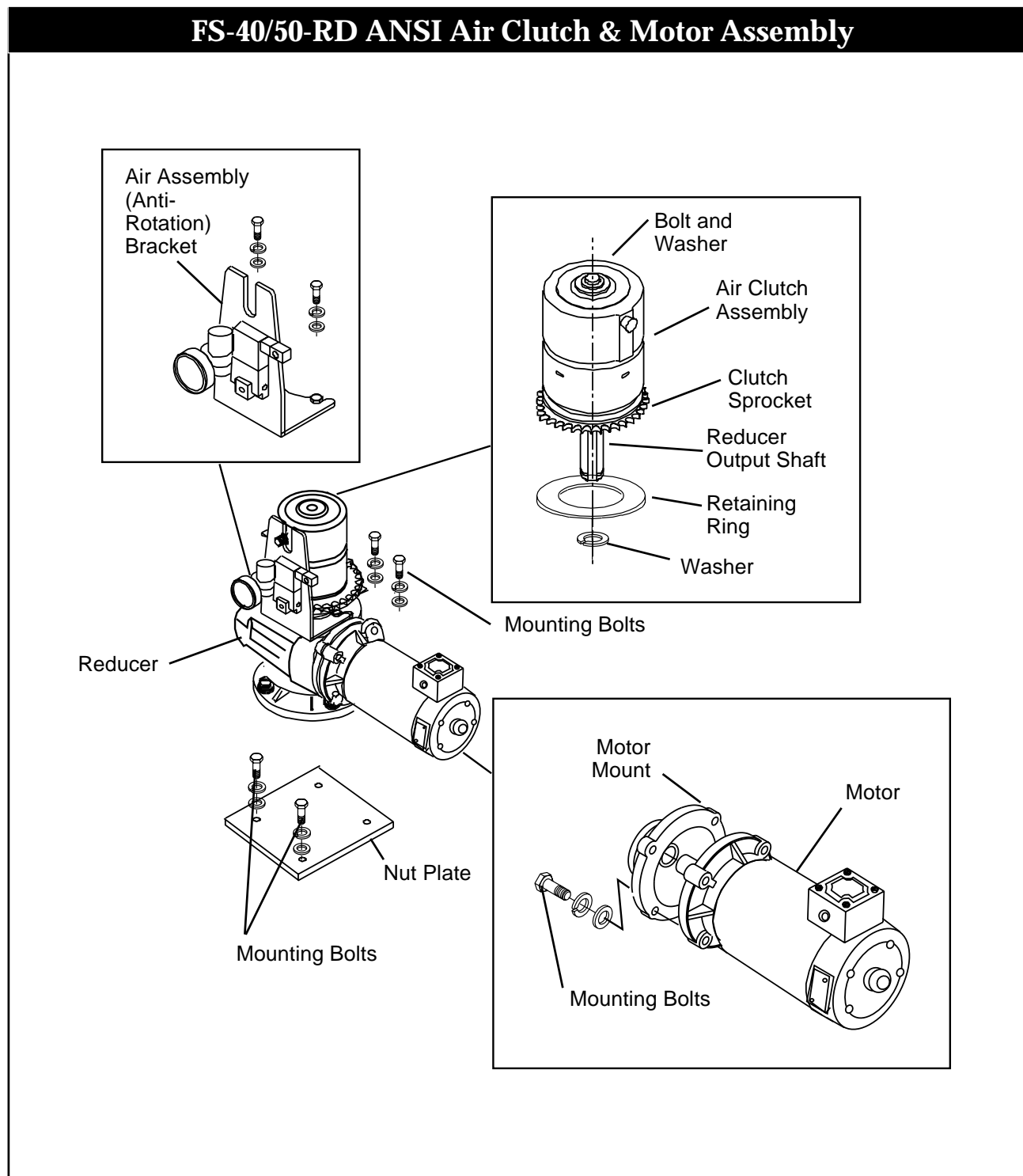


Figure 5-2. FS-40/50-RD Feeder Air Clutch & Motor Assembly Exploded View



Step 1—Disconnect Utilities. Turn off power and air and tagout/lockout the equipment for repair.

Step 2—Gain Access. Remove exit cover.

Step 3—Begin Air Clutch Replacement. Observe the order of components before replacing the unit (see Figure 5-2). 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.

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

Step 7—Reinstall Air Clutch Assembly. Reinstall air clutch assembly by reversing the order of removal.

Idler Assembly Component Replacement

The idler assembly installed in the FS-40-RD and the FS-50-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 5-3).

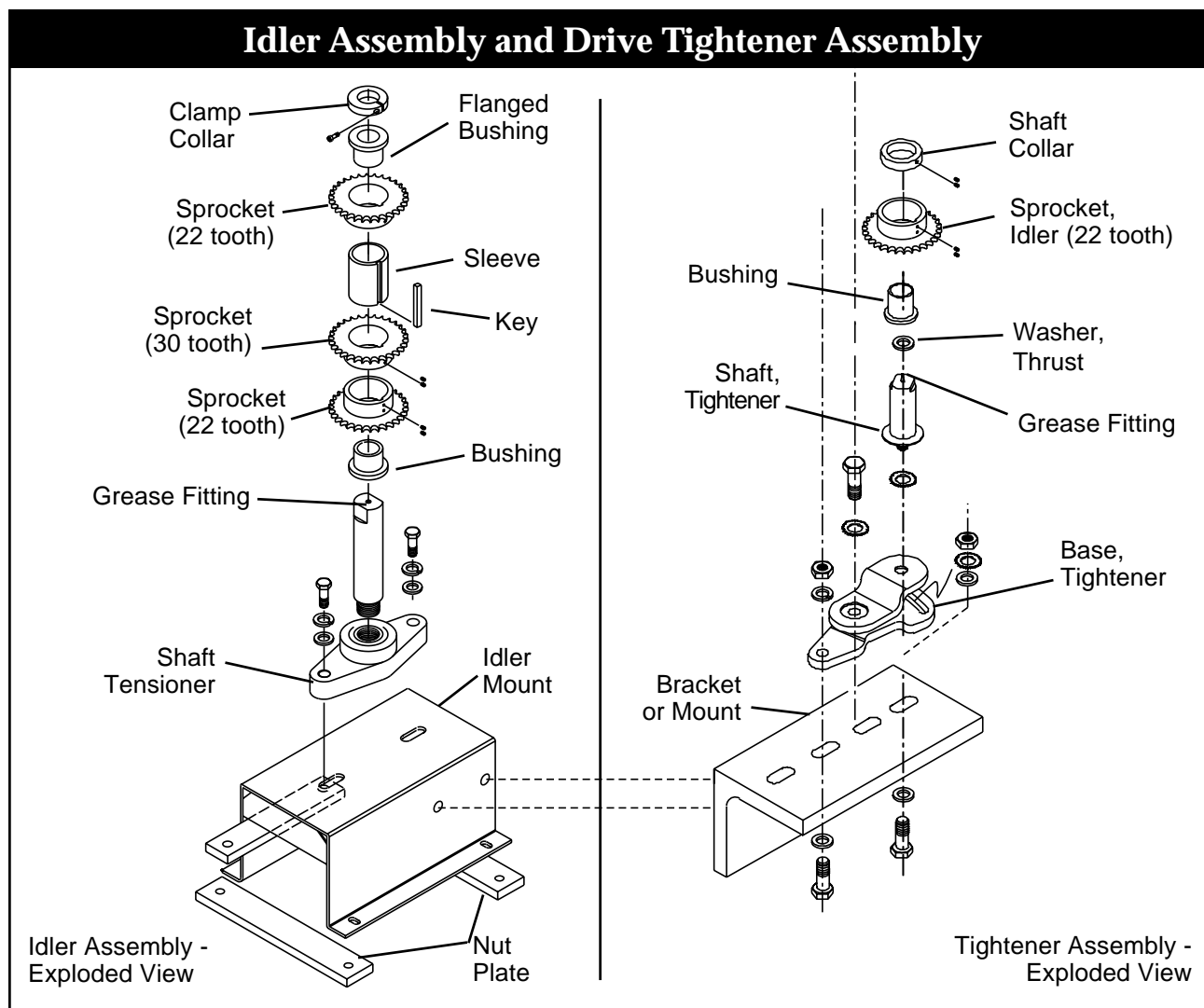


Figure 5-3. Idler Assembly left, Drive Tightener Assembly right



Major Bearing Replacement

Major bearings in the FS-40-RD or FS-50-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 FS-40-RD or FS-50-RD feeder are the upper and lower disc shaft spindle bearings, the upper and lower rim support spindle bearings and the disc support bearing (see *Figures 5-4 and 5-6*). All major bearings except the disc shaft spindle bearings are identical.

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.***

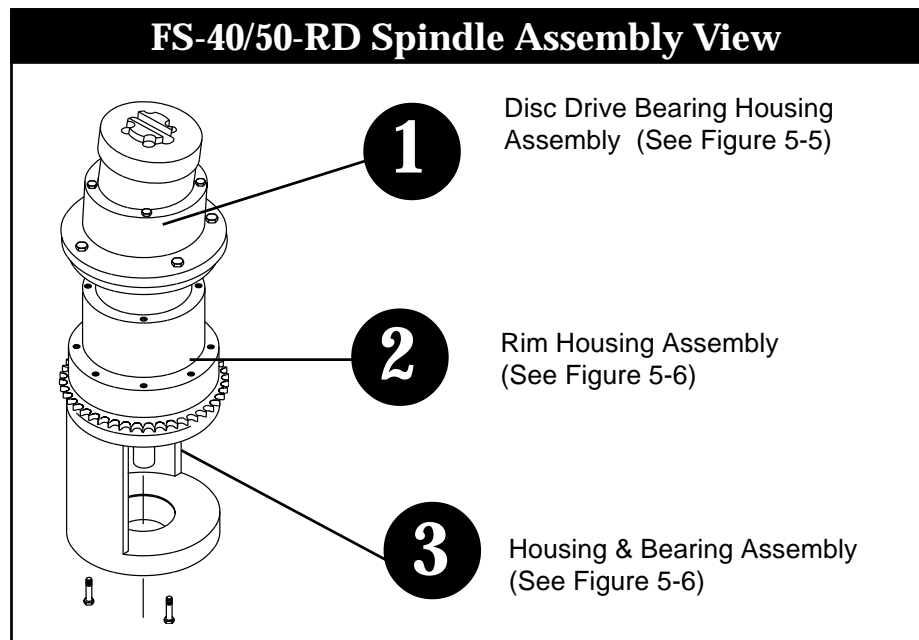


Figure 5-4. FS-40/50-RD Feeder Spindle Assembly

- ▶ Most major bearings in the FS-40-RD or FS-50-RD are preloaded 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.
- ▶ 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 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 feeder to another, as critical surfaces may have been custom-machined for zero play in the bowl.***

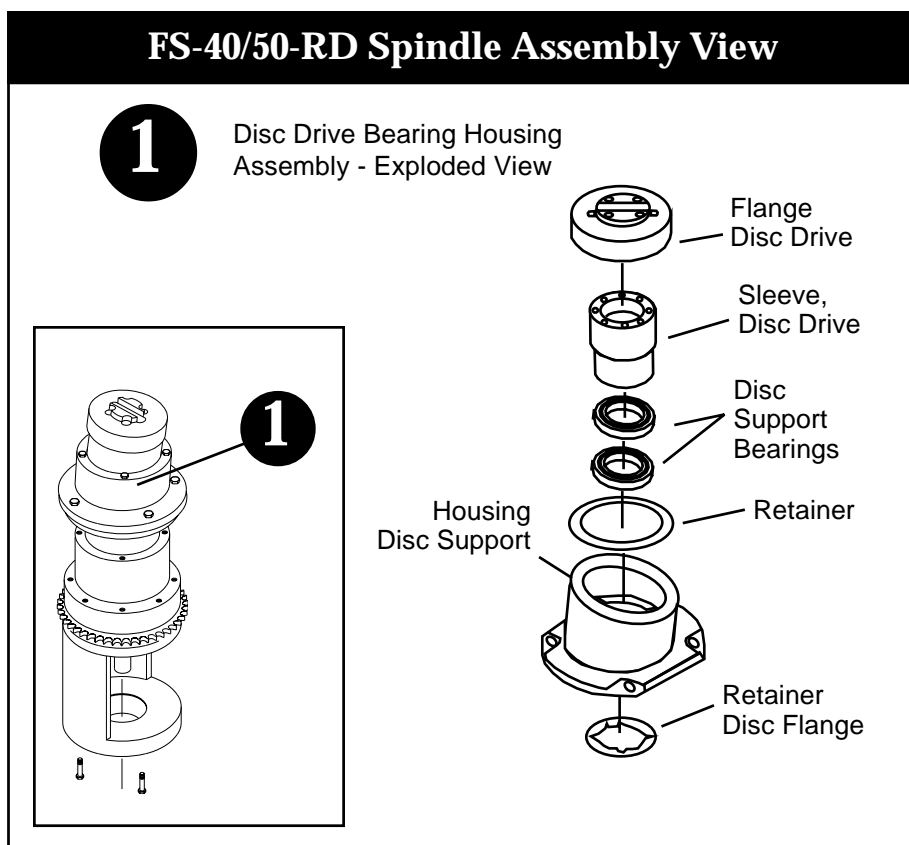
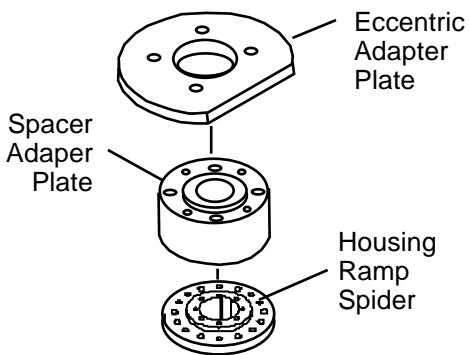


Figure 5-5. FS-40/50-RD Feeder Spindle Assembly



FS-40/50-RD Assembly Views

2 Rim Housing Assembly - Exploded View



3 Housing Bearing Assembly - Exploded View

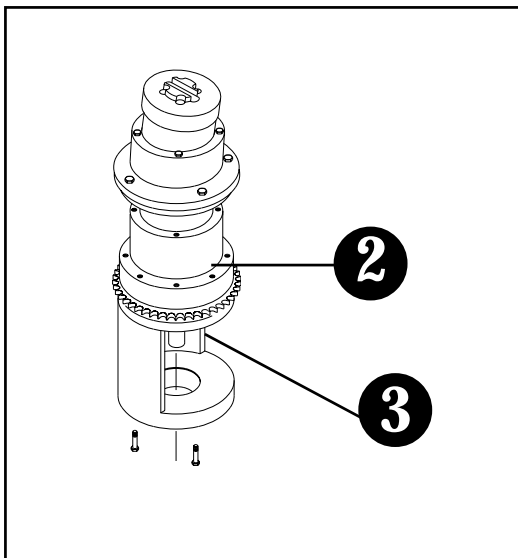
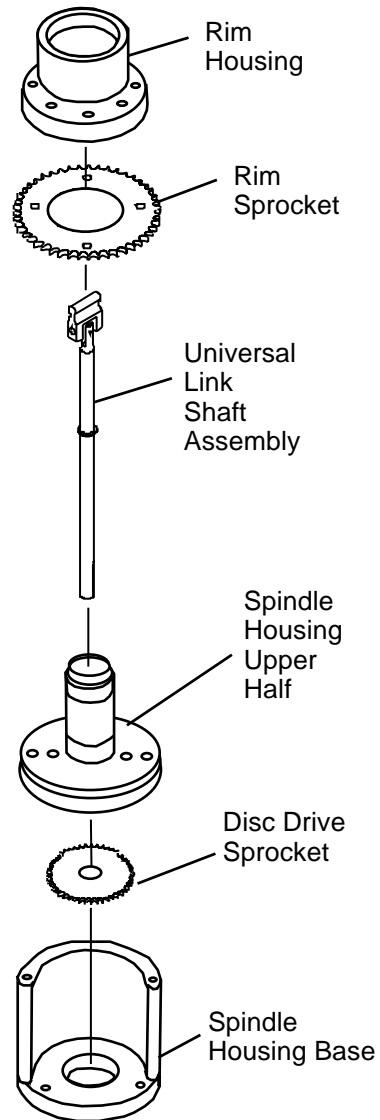


Figure 5-6. FS-40/50-RD Spindle Assembly - Exploded Views

If Product Jams: General Tips



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

- ▶ Is the prefeeder 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 following pages for troubleshooting charts detailing common problems and the possible solutions (Figures 5-7 & 5-8).



<i>Problem</i>	<i>Possible Cause</i>	<i>Solution</i>
Rate is too low. Parts exit feeder okay.	Feeder starved.	<i>Correctly set prefeeder rate.</i>
	Rim speed incorrect.	<i>Correctly set rim speed.</i>
Rim or disc does not turn.	Part jammed in feeder.	<i>Disconnect power; locate and remove part; then continue operation.</i>
	Air Clutch malfunction.	<i>Refer to electrical and pneumatic schematic.</i>
Feeder won't run at all.	Power off or disconnected.	<i>Turn on power.</i>
	Downstream machinery is completely full.	<i>Clear downstream machinery.</i>
	Motor controller defective or trim pot settings changed.	<i>Replace motor speed controller & "horsepower" resistor or recalibrate to motor speed controller mfg. 's instructions.</i>
	Defective motor.	<i>Replace motor.</i>
Rim jerks when moving.	Motor controller defective or trim pot settings changed.	<i>Replace motor speed controller or recalibrate to motor speed controller manufacturer's instructions.</i>
	Loose drive chain.	<i>Adjust chain drive tension.</i>
Surface of parts scuffed or dirty.	Particulate in feeder.	<i>Clean rim and disc.</i>
	Parts already scuffed.	<i>Check upstream machinery.</i>

Figure 5-7. FS-40-RD & FS-50-RD Feeder Troubleshooting

<i>Problem</i>	<i>Possible Cause</i>	<i>Solution</i>
Cannot adjust motor speed high enough.	Motor controller defective or trim pot settings changed.	<i>Replace motor speed controller or recalibrate to motor speed controller manufacturer's instructions.</i>
Rim and disc turn but parts don't exit properly. Parts jam.	Motor speeds incorrect.	<i>Correctly set rim speed and prefeeder rate.</i>
	Air off or incorrect.	<i>Check air pressure at main air pressure regulator. Check air flow.</i>
	Incorrect part.	<i>Verify that feeder is correctly set up to run this part.</i>
	Parts are different.	<i>Verify that feeder is tooled to run this part.</i>
	Tooling or air jets need adjustment.	<i>Refer to your System Operations Manual or contact your direct supplier.</i>

Figure 5-8. FS-40-RD & FS-50-RD Feeder Troubleshooting

Replacement Parts

6

Notice to Shibuya Hoppmann Customers:

Replacement part lists for the standard models are stapled in the rear cover of this manual. To ensure receiving the correct replacement part(s) specific to your system, consult your system operations manual.

If you did not receive a Shibuya Hoppmann customized system, or you do not have a copy of the systems operations manual, contact Shibuya Hoppmann. **Prior to contacting Shibuya Hoppmann, copy down the information from your system's serial plate(s).** This helps eliminate incorrect spare parts, and will assist us in making sure we have the correct parts for your tooled system. See Figure 6-1 for the two types of serial plate's that will be located on your system. **This information is necessary when ordering replacement parts or service.**



Shibuya Hoppmann's contact information is listed on the following page.

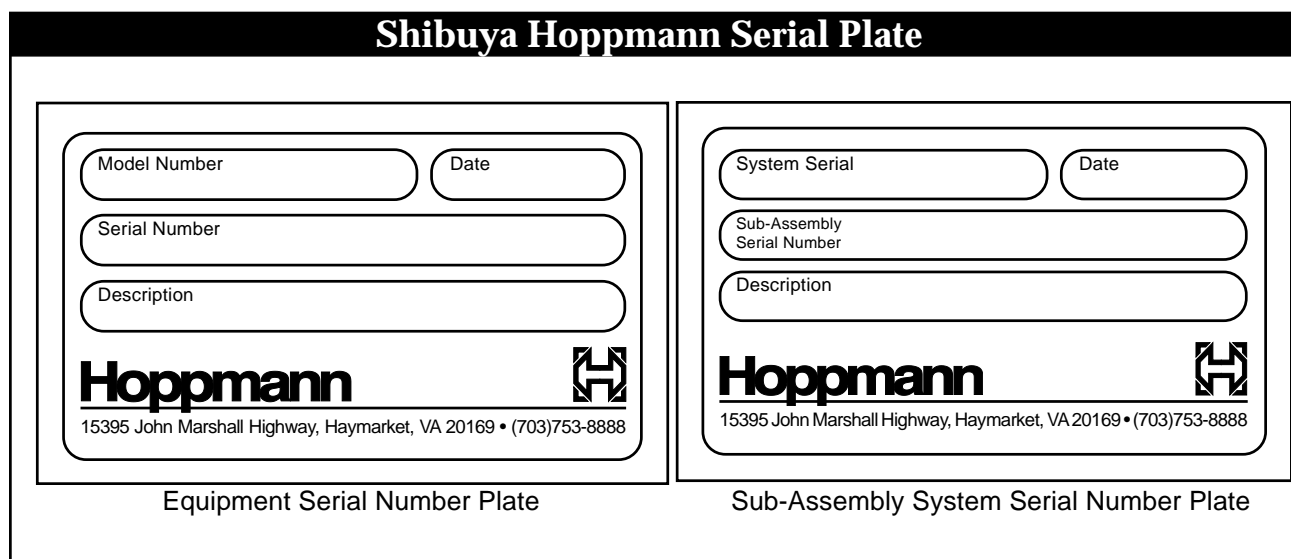


Figure 6-1. Serial Plate Layouts - Equipment and System