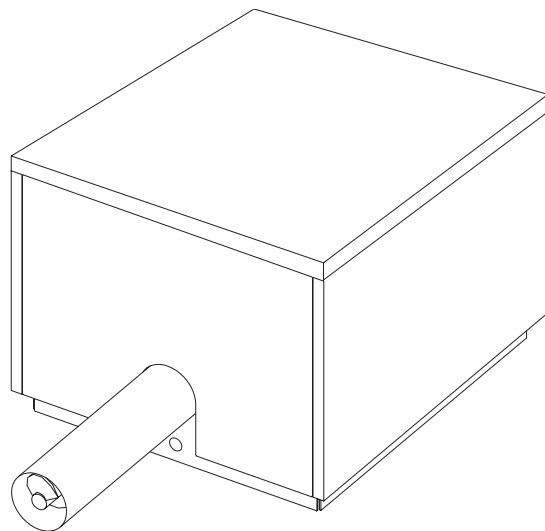




600 Feeder

Instruction Manual



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Safety Information

The following section describes the safety information contained in this manual. Please read **ALL** of the safety labels to avoid **DEATH, PERSONAL INJURY, or DAMAGE TO THE MACHINE.**

DANGER

The presence of this symbol indicates that the operation, procedure, or item being described has the potential to cause **SEVERE INJURY or DEATH.** Use **EXTREME** caution and follow all safety guidelines when encountering this symbol.

WARNING

The presence of this symbol indicates that the operation, procedure, or item being described has the potential to cause **SEVERE INJURY.** Use **EXTREME** caution and follow all safety guidelines when encountering this symbol.

CAUTION

The presence of this symbol indicates that the procedure or item being described may cause damage to the machine and/or loss of product. Follow all instructions to prevent this from occurring.

NOTE: The presence of this symbol indicates a precaution to be taken during an operation or procedure. It may also point out helpful hints to make an operation easier to complete.

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Reference Information

- EQUIPMENT SERIAL NO _____

- DATE OF START-UP _____

- START-UP BY _____

Congratulations on your purchase of a quality built AccuRate feeder!

AccuRate feeders are designed to feed dry materials in a manner that allows for the measurement of the material being fed. The feeder is intended to be a component of your larger system and process.

Please take a few moments to read this manual. It contains information that will be helpful in the installation, operation, and maintenance of your feeder. To enable us to fill your parts orders promptly and correctly, please take a moment to fill in the above information. When ordering replacement parts, order by the part number and description shown in the parts list located at the end of this manual. Also, have the above information ready to give to the Customer Service Representative.

NOTE: This manual is divided into two main sections. The first section contains the instructions for installation, calibration, operation, and maintenance to your feeder. The

second section contains the parts list for the model feeder you purchased. If the parts list does not match the machine that you purchased, contact your Customer Service Representative. See page 5 for details.

To locate your equipment serial number, remove the front cover panel assembly, see “Disassembly of Panels, Helix and Hopper” on page 29. As you are facing the material discharge side of the feeder, the equipment serial number is stamped on the plate, located on the lower right hand corner post of the feeder frame.

Your feeder was shipped with a sprocket layout which is shown in Figure 1 on page 3. For more information regarding installation, operation, maintenance and service, **please contact your Customer Service Representative. See page 5 for details.**

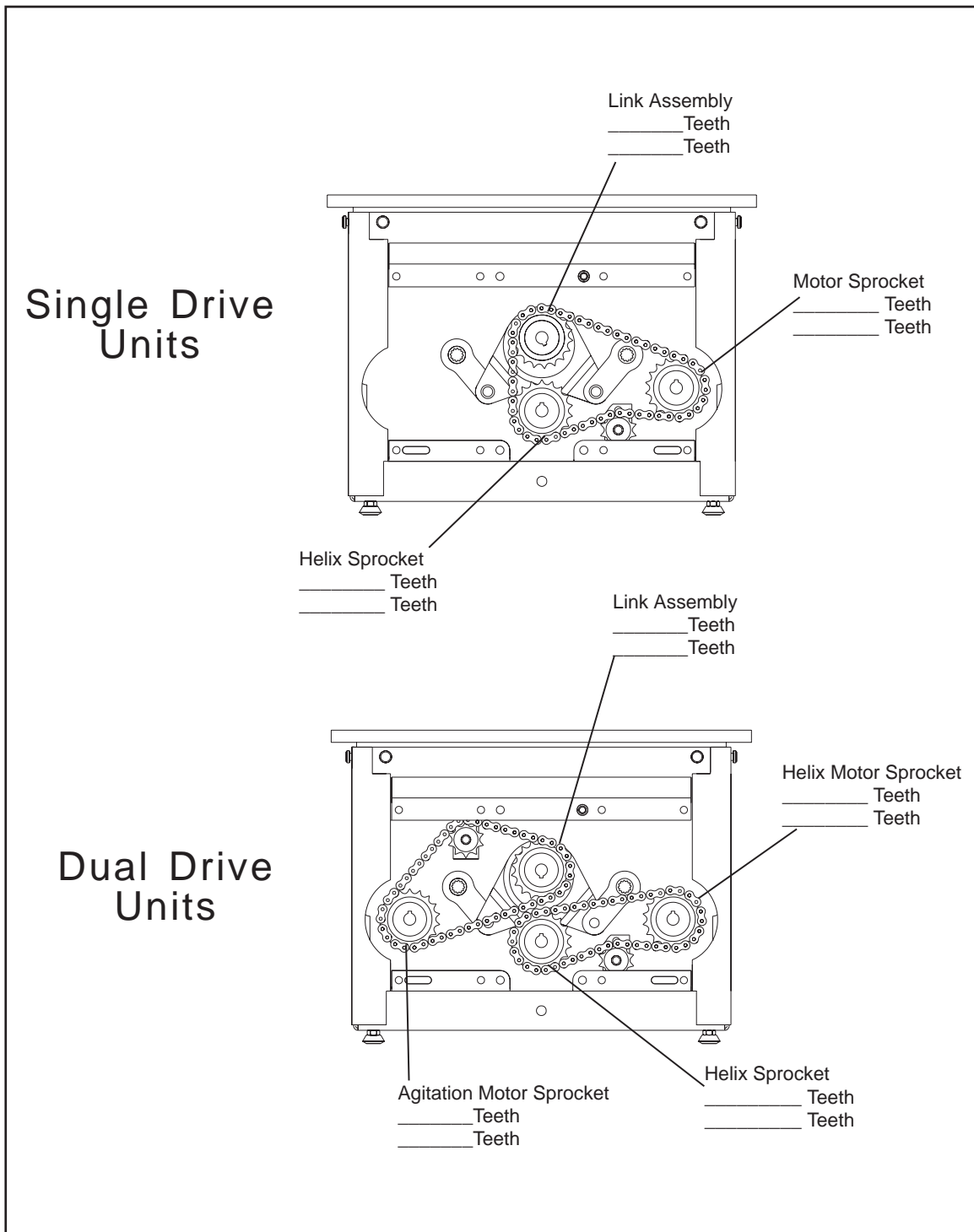


Figure 1. Sprocket Configuration

Safe Handling and Transit

The AccuRate feeder should be transported on or attached to a shipping pallet whenever possible.

When a pallet is not available, it is necessary to partially disassemble the feeder to properly attach the lifting straps or chains. To transport the feeder without a pallet, the feeder hopper must be removed. Refer to the “Disassembly of Panels, Helix and Hopper”, page 29. See Figure 4.

Use a forklift or overhead crane to lift and move feeder at all times. See Figures 3 and 4.

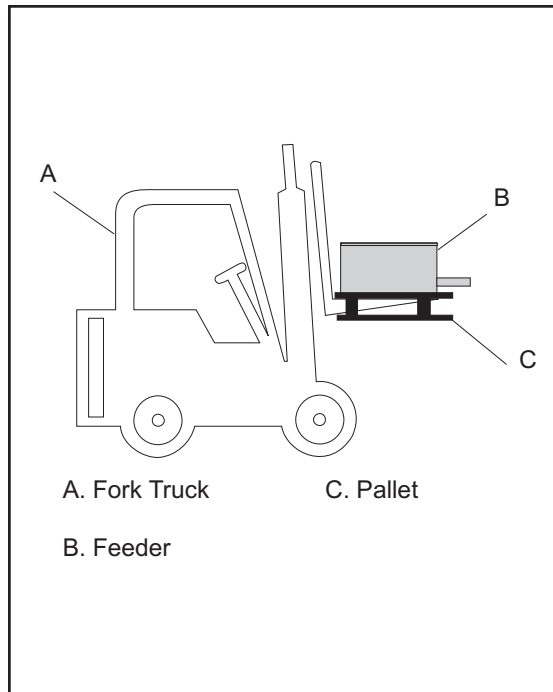


Figure 3. Transit Using a Fork Truck

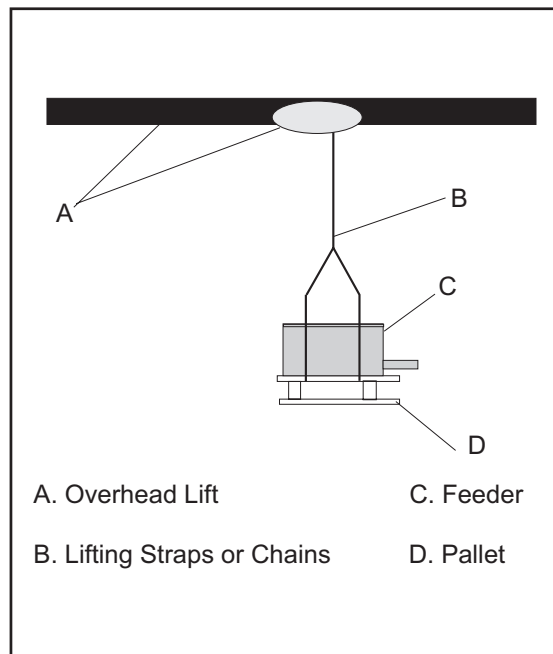


Figure 4. Transit Using an Overhead Lift

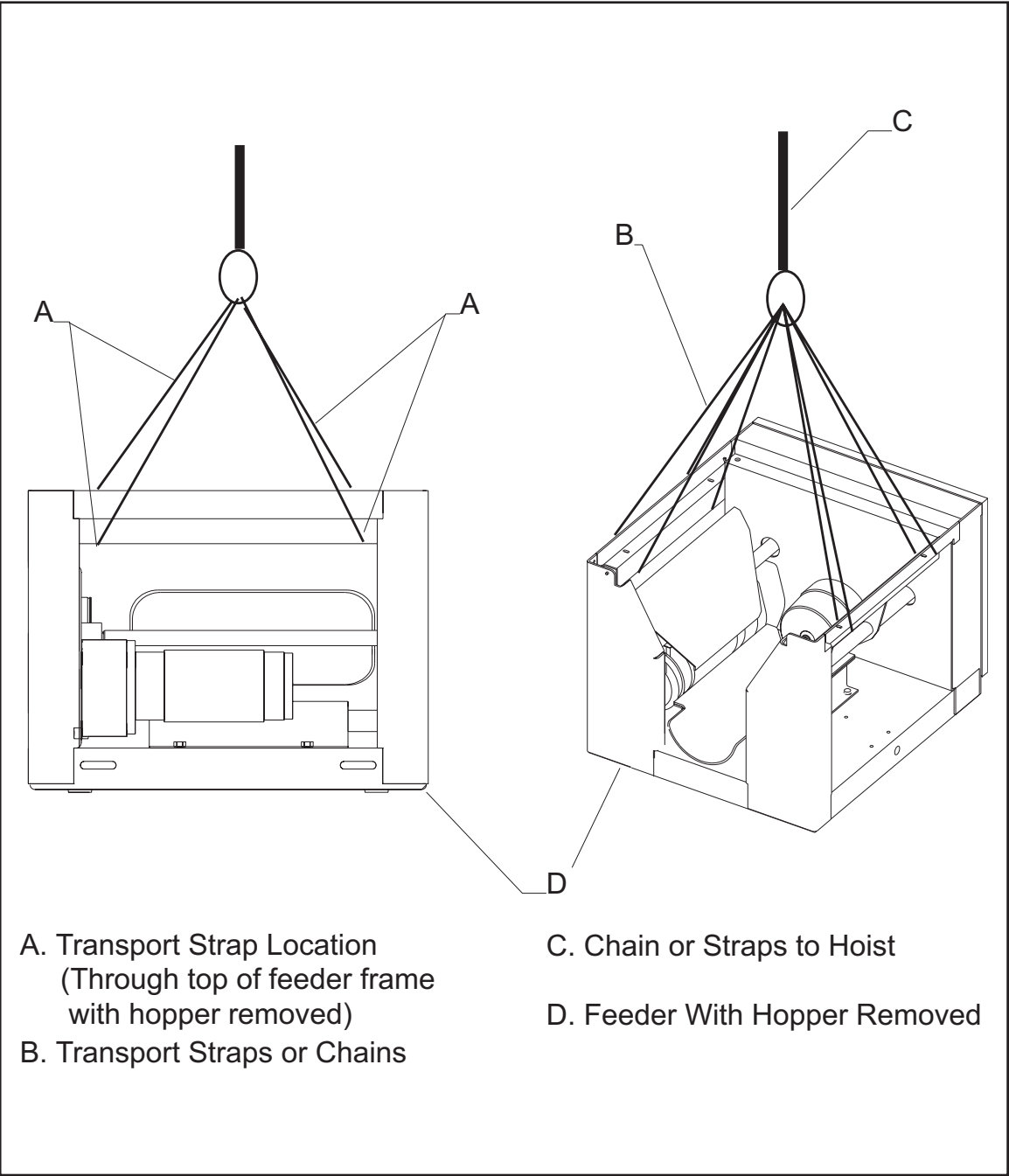


Figure 5. Transit Without a Pallet

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Installation

The contents of this manual should be thoroughly reviewed and understood prior to installing and operating the equipment.

Unpacking Instructions

Immediately after removing the feeder from the carton, check for any damage that might have occurred during shipment. If damage has occurred, promptly file a claim with the delivery carrier. Whenever possible, unpack the equipment at the installation site.

Support Structure

The support structure for the feeder must be rigid, flat and have a surface area equal to, or larger than the feeder base. Four adjustable feet are supplied with each feeder and should be threaded into the corners of the feeder base. The feeder should then be leveled into its permanent position. Allow adequate clearance around the feeder for inspection and servicing.

In some applications, a hopper extension or another piece of equipment is attached to the top of the feeder. To attach the equipment, a slight modification is necessary:

1. Remove the hopper and locate the four marks, or “dimples” in the bottom of the hopper. (The steps for hopper removal can be found on page 31.) See Figure below for the location of the marks.
2. Drill four holes of the required size in the hopper at the marks.

NOTE: This is the ONLY place the hopper should be drilled. Do not drill or puncture the hopper in any other location. Doing so voids all warranties.

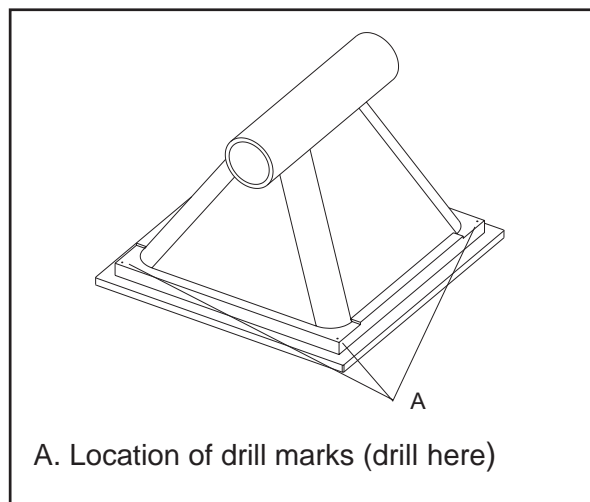


Figure 6. Location of Marks to Drill Hopper

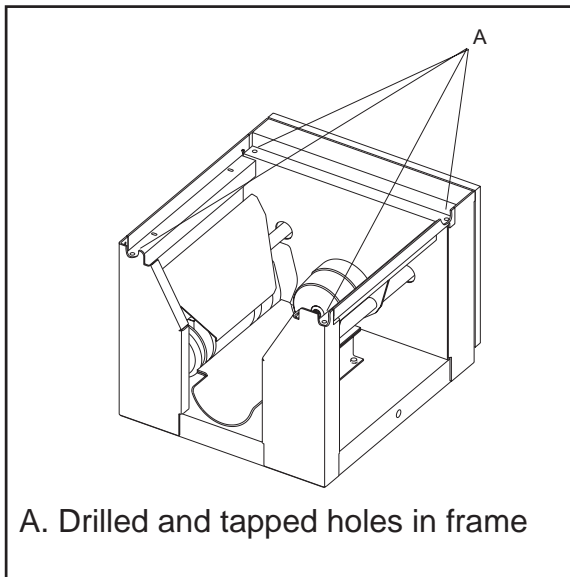


Figure 7. Location of Mounting Holes in Frame

3. When the drilled hopper is installed, the holes line up with tapped holes in the frame. See Figure 7.
4. Other equipment may now be attached to the feeder using four bolts.

WARNING

DO NOT support the feeder by the four bolts. The feeder is not designed to be supported in this location. Contact your Customer Service Representative if you have any questions. See page 5 for details.

Electrical Connections

DANGER

All electrical connections must be made by a qualified electrician. SEVERE INJURY or DEATH may result if the machine is wired incorrectly. All wiring must conform to local electrical codes.

The following electrical connections need to be made:

- Controller
- Motor(s)

See the wiring schematic supplied with this manual for correct wiring location and proper AC input voltage. If you have any questions concerning the wiring of your feeder, **contact your Customer Service Representative. See page 5 for details.**

Grounding the System

Introduction

Some systems produce excessive static that may cause problems in feeding material properly. The following is the recommended procedure for properly grounding the components of the system.

Procedure

Materials Needed

#10 wire with ring lugs cut to sizes measured in step 1.

1. Measure the following distances and cut sections of wire accordingly:

- From a stud on the hopper extension to an attachment point

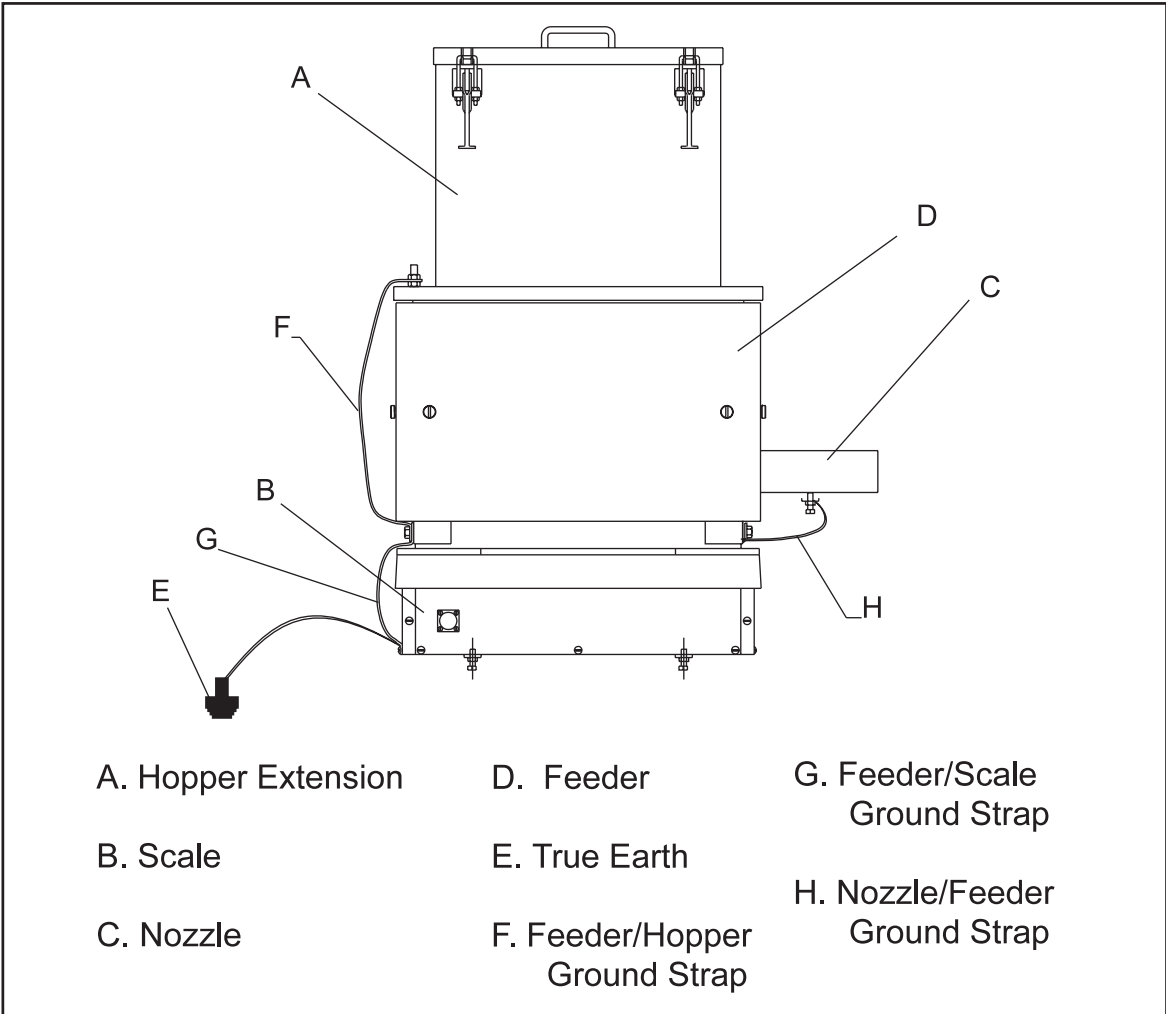


Figure 8. Attachment of Ground Wires

on the main frame of the feeder (Item F, Figure 8).

- From one side panel mounting screw on the scale to the attachment point on the feeder frame (the same point on feeder frame can be used to attach all three ground wires) (Item G, Figure 8).
 - From the nozzle to a stud on the feeder frame (Item H, Figure 8).
2. Attach one end of a wire from a stud on the hopper extension to a stud on the main frame of the feeder.
 3. Attach a wire from one side panel mounting screw on the scale to a stud on the main frame of the feeder (use the same feeder stud used in step two).
 4. Attach a ground wire from True Earth to the same mounting screw used in step three.
 5. Attach a ground wire from the nozzle to a stud on the feeder frame.

NOTE: This ground must be attached to True Earth in accordance with National Electrical Code Specifications.

Assembly of Leveling Feet

A large plastic bag containing four leveling foot assemblies, one handle with mounting screws, and one instruction manual is included with your feeder. Also included is a helix and a nozzle.

If you have not received all of these items, please **contact your Customer Service Representative. See page 5 for details.**

1. Locate the four threaded holes in the bottom corners of the feeder frame.
2. Turn the lock nut on the leveling foot until it stops in a position as close to the black rubber pad as possible. See Figure 9.
3. Next, thread these leveling foot assemblies clockwise into the threaded holes in the bottom corners of the feeder frame. See Figure 10.
4. Turn these foot assemblies until desired height for the feeder is achieved.
5. Place a level on the feeder.
6. Adjust feet until feeder is level and tighten the lock nuts against the feeder base.

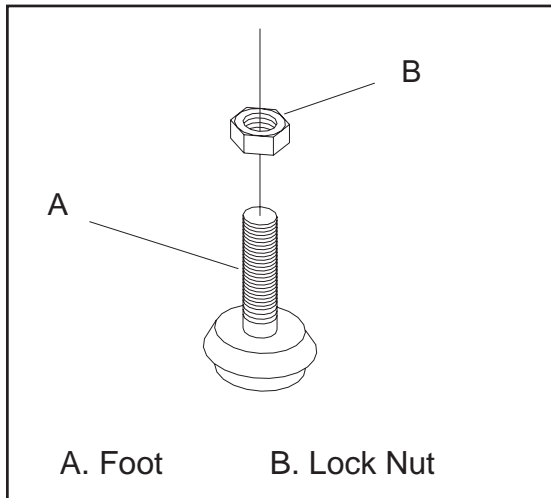


Figure 9. Foot Assembly

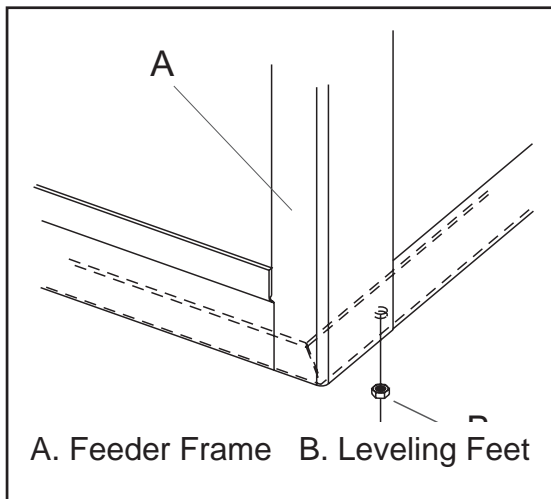


Figure 10. Installing Foot Assembly to Frame

Cleaning Feeder Prior To Use

The feeder should be completely wiped down prior to use. Use a damp cloth to wipe out any residue left in the hopper or on the panels.

WARNING

NEVER use a hose to wash down the unit. This could cause damage to the machine and increase the possibility of electrical shock and SEVERE INJURY. Contact your Customer Service Representative if you have any questions. See page 5 for details.

Initial Starting Procedures

To start the feeder:

1. Make sure the power has been connected to the correct AC input voltage (see wiring schematic in the back of this manual for correct voltage specifications for your feeder).
2. Start the feeder following the directions outlined in the "Operation" section on page 15.
3. To change the speed of the helix, use the arrow keys on the speed control potentiometer labeled Feed Rate. For more information on setting the potentiometer. See page 15.
4. Before placing dry material into the hopper, run the feeder for a short period of time to become familiar with its operation. While the feeder is running, check the helix rotation. The helix should be rotating counterclockwise when viewed from the discharge end of the feeder.

See Figure 11. If the helix is not rotating counter-clockwise, the motor has been wired incorrectly. If you have any questions, **please have your serial number ready and contact your Customer Service Representative. See page 5 for details.**

5. After running the feeder for the first eight hours, check the chain tension. The chain may stretch slightly in the first eight hours of use and may need additional adjustment. For chain adjustment instructions, see the “Sprockets and Chains” section on page 33.
6. The last item needed to complete the installation is to calibrate the feeder. This can be done by following the instructions in the “Calibration” section starting on page 17.

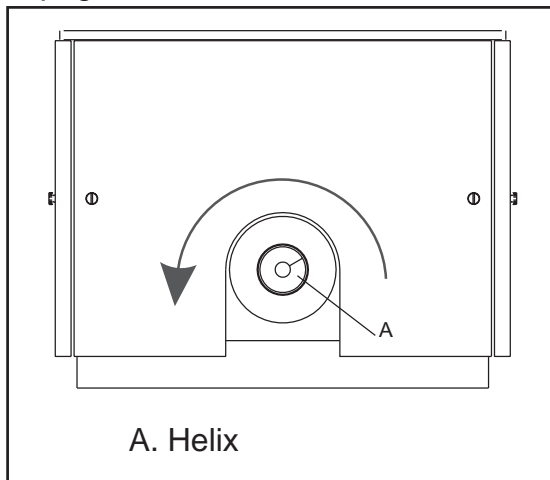


Figure 11. Correct Helix Rotation.

Operation

WARNING

Keep hands and loose clothing away from moving helix. Helix could cause SEVERE injury.

NOTE: If your feeder has been ordered with AC motors, refer to the AC Motor Control manual for correct operation.

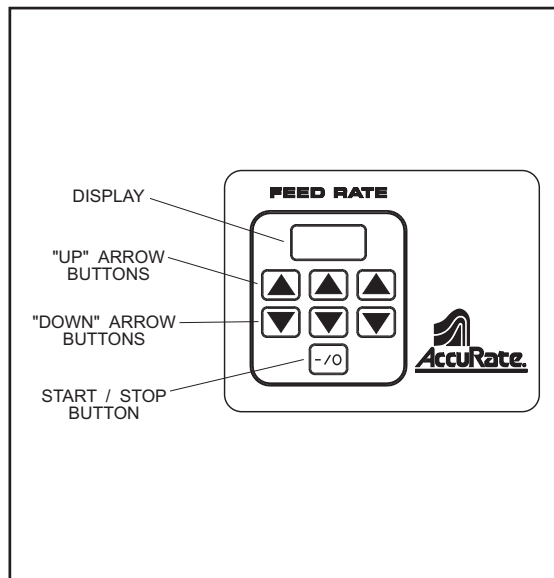


Figure 12. Touchpad Potentiometer

Setting the Potentiometer

The potentiometer allows the operator to set the motor RPM associated with either the agitation or the helix.

To set the Touchpad Potentiometer, see the following control descriptions:

DISPLAY - This shows the present setting of the potentiometer. The value shown in the display is the percentage of the feeder's capacity. For example, if 750 is displayed, the potentiometer is set at 75% capacity.

NOTE: The decimal point will appear when the feeder is started.

“UP” ↑ ARROW BUTTONS - These three buttons raise the number value in the display. The button on the right raises the “ones” digit, the button in the center raises the “tens” digit, and the button on the left raises the “hundreds” digit.

“DOWN” ↓ ARROW BUTTON - These three buttons are similar to the “Up” arrow buttons, but pressing one of these buttons causes the corresponding digit to decrease.

START/STOP BUTTON - This button toggles between the start or running mode and the stop mode of the motor. When power is being supplied to the motor, a decimal point is lit up between the center and the right decimal position.

Starting the Feeder

Once the desired potentiometer setting(s) is obtained, fill the hopper with the desired material and start the feeder:

1. For units with one motor for the helix and agitation, press the START/STOP button (or ON/OFF switch) to begin operation.

DANGER

NEVER operate the feeder with ANY of the panels removed. The panels protect the operator from moving parts and electrical connections that could cause SEVERE INJURY or DEATH to the operator.

2. For units with separate helix and agitation motors, start each of the motors by pressing the corresponding START/STOP buttons (or ON/OFF switches) to begin operation. While the feeder is in operation, check the discharge occasionally to make sure that it is clear, also check that the hopper is full of material.

Stopping the Feeder

To stop the feeder, simply press the START/STOP button (ON/OFF switch).

WARNING

ALWAYS STOP the feeder and disconnect the power whenever performing any maintenance to the unit, or to free any objects that may have become lodged in the helix. The helix could cause SEVERE INJURY if contact is made while it is in operation.

Calibration

The correct feed rate is determined by the speed, bulk density of the material, and size of the helix in the feeder. Calibration of the feeder must be done with the actual material that will be used. The following equipment is needed:

- An empty container large enough to catch all the material when the feeder is run at potentiometer setting of 900 for one minute.
- A scale to weigh the container and material.
- A stop watch.

Calibrating the System Using the Touchpad Settings

This procedure will establish a manual feed rate graph. To begin the calibration process:

1. Run the feeder empty for approximately five minutes prior to calibration to allow the DC motor to warm up.
2. Weigh an empty container and record the weight here.
EMPTY CONTAINER WEIGHT _____
3. Fill feeder with the material that is to be processed.
4. With the manual/auto switch in manual, turn the feeder ON and run until the discharge nozzle is full of material.
5. Set the feed rate potentiometer at the 100 setting (10% of maximum speed). For information on setting the potentiometer, see "Setting the Potentiometer" on page 15.
6. Using the empty container weighed in step 2, collect 10 one-minute samples using a stopwatch. Weigh and record each **Sample Weight** on the Calibration Data Chart found in Figure 15 on page 25. Determine the **Net Weight** of each sample by subtracting the empty container's weight (the value in step 2) from the sample weight see Equation #1, Figure 13. Record each **Net Weight** on the Calibration Data Chart found in Figure 15 on page 25.
7. Obtain the **Average Net Weight** of these samples by adding the 10 recorded Net Weights and dividing by 10. See Equation #2 and #3, Figure 13. Record **Average Net Weight** on the Calibration Data Chart found in Figure 15 on page 25.
8. If you wish to show the feed rate in lbs/hr or kg/hr, multiply the **Average**

- Net Weight** by 60. See Equation #4, Figure 13. Record each of these values on the Calibration Data Chart found in Figure 15 on page 25.
9. Turn to the Calibration Graph found in Figure 17 on page 27. On the bottom of this graph are 10 boxes numbered 1 through 10.
 10. Place the **Averaged Net Weight** arrived at in step 7 in the box numbered 1 (at 100 setting).
 11. Repeat this procedure (steps 6 and 7 using the data chart on page 26) at the 900 setting on the feed rate potentiometer (90% of maximum).
 12. Turn to the Calibration Graph found in Figure 17 on page 27. On the bottom of this graph are 10 boxes numbered 1 through 10.

<p>EQUATION #1</p> <p>Sample Weight - Container Weight (from step 2) = Net Weight</p> <p>EQUATION #2</p> <p>(S = Net Weight) S1+S2+S3+S4+S5+S6+S7+S8+S9+S10 = Total Net Weight</p> <p>EQUATION #3</p> $\frac{\text{Total Net Weight}}{10} = \text{Average of Net Weight (enter value on graph in box 9)}$ <p>EQUATION #4</p> <p>Average Net Weight x 60 = Average Net Weight (in lbs per hour or kg per hour)</p> <p>EQUATION #5</p> $\frac{(\text{Value in box 9} - \text{Value in Box 1})}{8} = \text{Interval Value}$ <p>EQUATION #6</p> <p>Box Number x Interval Value = Feed Rate value in box above number</p>
--

Figure 13. Equations for Feeder Calibration

13. Place the **Averaged Net Weight** arrived at in step 11 in the box numbered 9 (at 900 setting).
14. Subtract the value in box one from the value in box 9. This value is the **Span Value**. Divide the **Span Value by 8**. This new **value is the Interval Value**. See Equation #5, Figure 13.
15. Determine the value for each remaining box:
 - Multiply the **Interval Value** by the number in each box (in Figure 17) to derive the **Feed Rate Value** for that box. Enter this value in the blank box above the number. See Figure 13, Equation # 6.
16. Establish the value of the smaller graph divisions by dividing the interval value by 10. This value is the incremental value for each individual small box.

NOTE: The graph line can be extended to show values greater than 90% (900 potentiometer setting) or less than 10% (100 potentiometer setting).

The feed rate at any one setting may now be determined from the graph or from actual testing. You may want to repeat steps 2 through 8 at a 500 setting (50% of speed) to make sure your 50% feed rate falls on the plotted line.

Remember that various feed rates are reached by using different size helix and sprocket combinations. If your desired

feed rate is not being obtained in normal settings, **contact your Customer Service Representative. See page 5 for details.**

Calibrating the System Using an Auto Input Signal

The following procedure is used to calibrate a system that uses a 0 V to 10 V input signal or a 4mA to 20mA signal to control the feed rate.

There are two methods that can be used to calibrate a system that uses an input signal to regulate the feed rate. Method one creates its own unique feed rate graph. Method two uses the manual calibration graph as a base line and adjusts the signal isolator board potentiometers so that the input signal feed rate graph matches the manual feed rate graph.

Method One

The following is a description of calibration of your volumetric feeder using an input signal. This method will establish an input signal feed rate graph separate from the manual feed rate graph.

1. Wire the input signal (4mA to 20mA or 0V to 10V) to the terminals listed in the drawing for the auto input.
2. Switch the auto/manual switch to auto.
3. Force the input signal to its 10% of maximum value (1V or 5.6mA).

4. Run the feeder empty for approximately five minutes prior to calibration to allow the DC motor to warm up.
5. Weigh an empty container and record the weight here.
EMPTY CONTAINER WEIGHT _____
6. Fill feeder with the material that is to be processed.
7. Turn the feeder ON and run until the discharge nozzle is full of material.
8. Using the empty container weighed in step 5, collect 10 one-minute samples using a stopwatch. Weigh and record each **Sample Weight** on the Calibration Data Chart found in Figure 15 on page 25. Determine the **Net Weight** of each sample by subtracting the empty container's weight (the value in step 5) from the sample weight. See Equation #1, Figure 13. Record each **Net Weight** on the Calibration Data Chart found in Figure 15 on page 25.
9. Obtain the **Average Net Weight** of these samples by adding the 10 recorded Net Weights and dividing by 10. See Equation #2 and #3, Figure 13. Record **Average Net Weight** on the Calibration Data Chart found in Figure 15 on page 25.
10. If you wish to show the feed rate in lbs/hr or kg/hr, multiply the **Average Net Weight** by 60. See Equation #4, Figure 13. Record each of these values on the Calibration Data Chart found in Figure 15 on page 25.
11. Turn to the Calibration Graph found in Figure 17 on page 27. On the bottom of this graph are 10 boxes numbered 1 through 10.
12. Place the **Averaged Net Weight** arrived at in step 10 in the box numbered 1 (at 10% setting).
13. Repeat this procedure (steps 8 through 10 using the data chart on page 24) with the input signal forced to 90% of the maximum input value.
14. Turn to the Calibration Graph found in Figure 17 on page 27. On the bottom of this graph are 10 boxes numbered 1 through 10.
15. Place the **Averaged Net Weight** arrived at in step 13 in the box numbered 9 (at 90% of the maximum input value).
16. Subtract the value in box 1 from the value in box 9. This value is the **Span Value**. Divide the **Span Value by 8**. This new value is the **Interval Value**. See Equation #5, Figure 13.
17. Determine the value for each remaining box:
 - Multiply the **Interval Value** by the number in each box (in Figure 17) to derive the **Feed Rate Value** for that box. Enter this value in the blank box above the number. See Figure 13, Equation # 6.

18. Establish the value of the smaller graph divisions by dividing the interval value by 10. This value is the incremental value for each individual small box.

NOTE: The graph line can be extended to show values greater than 90% or less than 10% of the maximum input value.

The feed rate at any one setting may now be determined from the graph or from actual testing. You may want to repeat steps 2 through 5 at a 500 setting (50% of speed) to make sure your 50% feed rate falls on the plotted line.

Remember that various feed rates are reached by using different size helix and sprocket combinations. If your desired feed rate is not being obtained in normal settings, **contact your Customer Service Representative. See page 5 for details.**

Method Two

The following is a description of calibration of your volumetric feeder using an input signal. This method uses the manual calibration graph as a base line and adjusts the signal isolator board potentiometers so the input signal feed rate graph matches the manual feed rate graph.

1. Wire the input signal (4mA to 20mA or 0V to 10V) to the terminals listed in the drawing for the auto input.

2. Calibrate your system using the “Calibrating the System Using the Touchpad Settings” procedure starting on page 17.
3. Once a manual feed rate graph is established, switch the touchpad auto/manual switch to auto.
4. Force the input signal to 10% of its maximum value (1V or 5.6mA).
5. Run the feeder empty for approximately five minutes prior to calibration to allow the DC motor to warm up.
6. Weigh an empty container and record the weight here.
EMPTY CONTAINER WEIGHT _____
7. Fill feeder with the material that is to be processed.
8. Turn the feeder ON and run until the discharge nozzle is full of material.
9. Using the empty container weighed in step 6, collect 10 one-minute samples using a stopwatch. Weigh and record each **Sample Weight** on the Calibration Data Chart found in Figure 15 on page 25. Determine the **Net Weight** of each sample by subtracting the empty container’s weight (the value in step 6) from the sample weight. See Equation #1, Figure 13. Record each **Net Weight** on the Calibration Data Chart found in Figure 15 on page 25.
10. Obtain the **Average Net Weight** of these samples by adding the 10

recorded Net Weights and dividing by 10. See Equation #2 and #3, Figure 13. Record **Average Net Weight** on the Calibration Data Chart found in Figure 15, page 25.

11. If you wish to show the feed rate in lbs/hr or kg/hr, multiply the **Average Net Weight** by 60. See Equation #4, Figure 13. Record each of these values on the Calibration Data Chart found in Figure 15 on page 25.
12. Repeat this procedure (steps 9 through 11 using the data chart on page 26) with the input signal forced to 90% maximum value.

NOTE: Steps 13 and 14 are used to adjust the input feed rate to match the manual calibration feed rate.

13. Using the manual setting feed rate graph as a base line, compare the input signal feed rate values.
14. Using the zero and span potentiometers on the signal isolator board, adjust the output signals in the direction needed to match the values recorded in box 1 and box 9 on the manual feed rate graph.
15. Repeat steps 13 and 14 until the input feed rate chart matches the manual feed rate chart.

The feed rate at any one setting may now be determined from the graph or from actual testing. You may want to repeat steps 9 through 11 at a 12mA or 5V setting (50% of speed) to make sure

your 50% feed rate falls on the plotted line.

Remember that various feed rates are reached by using different size helix and sprocket combinations. If your desired feed rate is not being obtained in normal settings, **contact your Customer Service Representative. See page 5 for details.**

Accuracy

Here are terms that are commonly used when talking about accuracy:

Mean

This is the average of the samples or measurements taken.

Where:

n = number of samples

x_i = sample measurements

\bar{X} = mean

Standard Deviation

Standard Deviation is the amount the item being measured deviates from the mean. In this case, the weight of material being fed.

Sigma (s)

Sigma is a unit of standard deviation.

Normal Distribution

If the frequency of the weights of the samples taken were plotted on a graph, the graph would form a *bell curve*. See

Figure 14. The bell curve illustrates how the samples fall around the mean.

Most often, deviation, rather than accuracy, is considered and used interchangeably. As an example, a volumetric feeder traditionally deviates from the mean $\pm 2\%$. Loss-In-Weight feeders deviate approximately $\pm 0.5\%$.

Deviation for material feeding equipment is generally stated at 2 Sigma or two standard deviations. After 30 one-minute tests (minimum), the mean and standard deviation are calculated. Standard deviation describes how the 30 samples are distributed around the mean. While only 68.3% of the sample population will fall within one standard deviation of the mean, 95.5% will fall within two standard deviations and 99.7% will fall within three standard deviations.

When comparing tests between feeders, it is important to compare all feeders at the same standard range of deviation.

We hope this helps you understand the deviation (accuracy) statements typically made with this type of equipment. For more detailed information **contact, your Customer Service Representative. See page 5 for details.**

Calculating Standard Deviation

The following steps are used to calculate the standard deviation:

1. Take 30 one minute samples from your feeder in the same manner used in calibrating the machine (Step 1 through 7 on page 17).
2. Add these numbers together and divide by the number of samples. This is the **MEAN**.

NOTE: The examples in the following steps show how the percent of accuracy is derived.

3. Next, subtract the **MEAN** found in step 2 from each of the sample weights and square the difference. Follow these steps for each of the sample weights.

Example:

Mean = 110, Sample weight = 111
 $111 - 110 = 1, 1^2 = 1$

4. Total the results of all of the calculations done in step 3.

Example:

Numbers found in step 3 = 1.5, 1, .5, and .25

$$1.5 + 1 + .5 + .25 = 3.25$$

5. Subtract 1 from the number of samples.

Example:

Number of samples = 4
 $4 - 1 = 3$

6. Divide the number found in step 4 by the number found in step 5.

Example:

$$\frac{3.25}{3} = 1.08$$

7. The square root of the number found in step 6 is the standard deviation.

Example:

$$\sqrt{1.08} = 1.04$$

8. Multiply the standard deviation by 2 to get two standard deviations.

Example:

$$1.04 \times 2 = 2.08$$

9. Divide the calculated standard deviation figure by the mean and multiply by 100. This will give you the percent error of your system.

Example:

$$\frac{2.08}{110} = .0189$$

$$.0189 \times 100 = 1.89\%$$

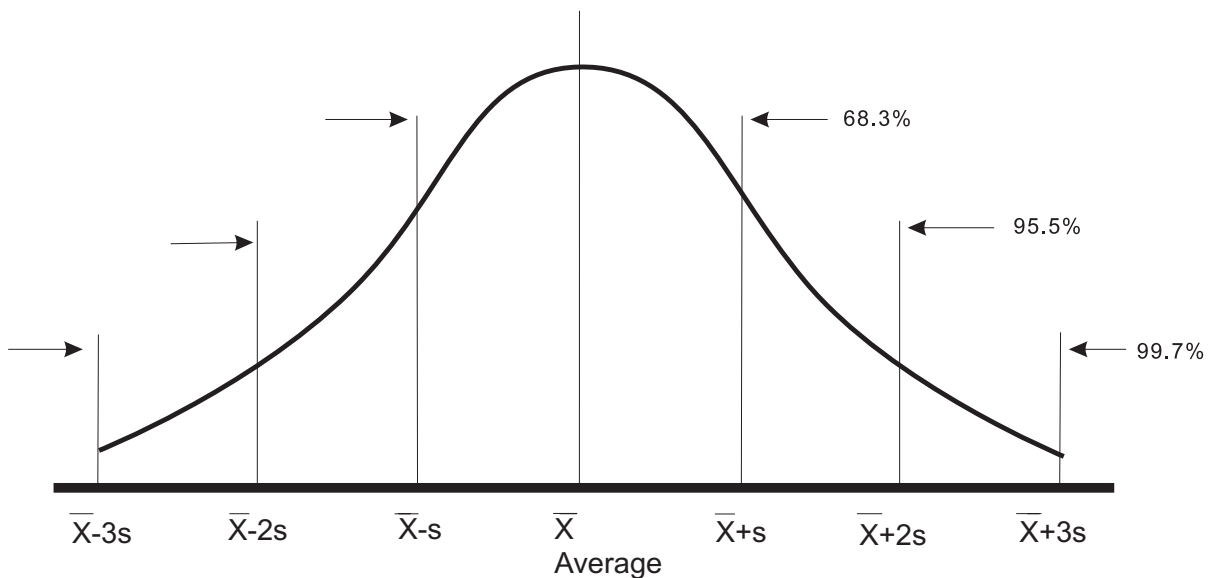


Figure 14. Standard Deviation Curve

Speed Potentio- meter Setting 100	One Minute Sample Number	Sample Weight	Container Weight	Net Weight
	1	_____	_____	_____
		-	-	-
	2	_____	_____	_____
		-	-	-
	3	_____	_____	_____
		-	-	-
	4	_____	_____	_____
		-	-	-
	5	_____	_____	_____
		-	-	-
	6	_____	_____	_____
		-	-	-
	7	_____	_____	_____
		-	-	-
	8	_____	_____	_____
		-	-	-
	9	_____	_____	_____
		-	-	-
	10	_____	_____	_____
		-	-	-
				_____ Total Net Weight
				-
				_____ Average Net Weight
				-

Figure 15. Calibration Data for 100 Setting

Speed Potentio- meter Setting 900	One Minute Sample Number	Sample Weight	Container Weight	Net Weight
1		_____	_____	_____
		-	-	-
2		_____	_____	_____
		-	-	-
3		_____	_____	_____
		-	-	-
4		_____	_____	_____
		-	-	-
5		_____	_____	_____
		-	-	-
6		_____	_____	_____
		-	-	-
7		_____	_____	_____
		-	-	-
8		_____	_____	_____
		-	-	-
9		_____	_____	_____
		-	-	-
10		_____	_____	_____
		-	-	-
				_____ Total Net Weight
				-
				_____ Average Net Weight
				-

Figure 16. Calibration Data for 900 Setting

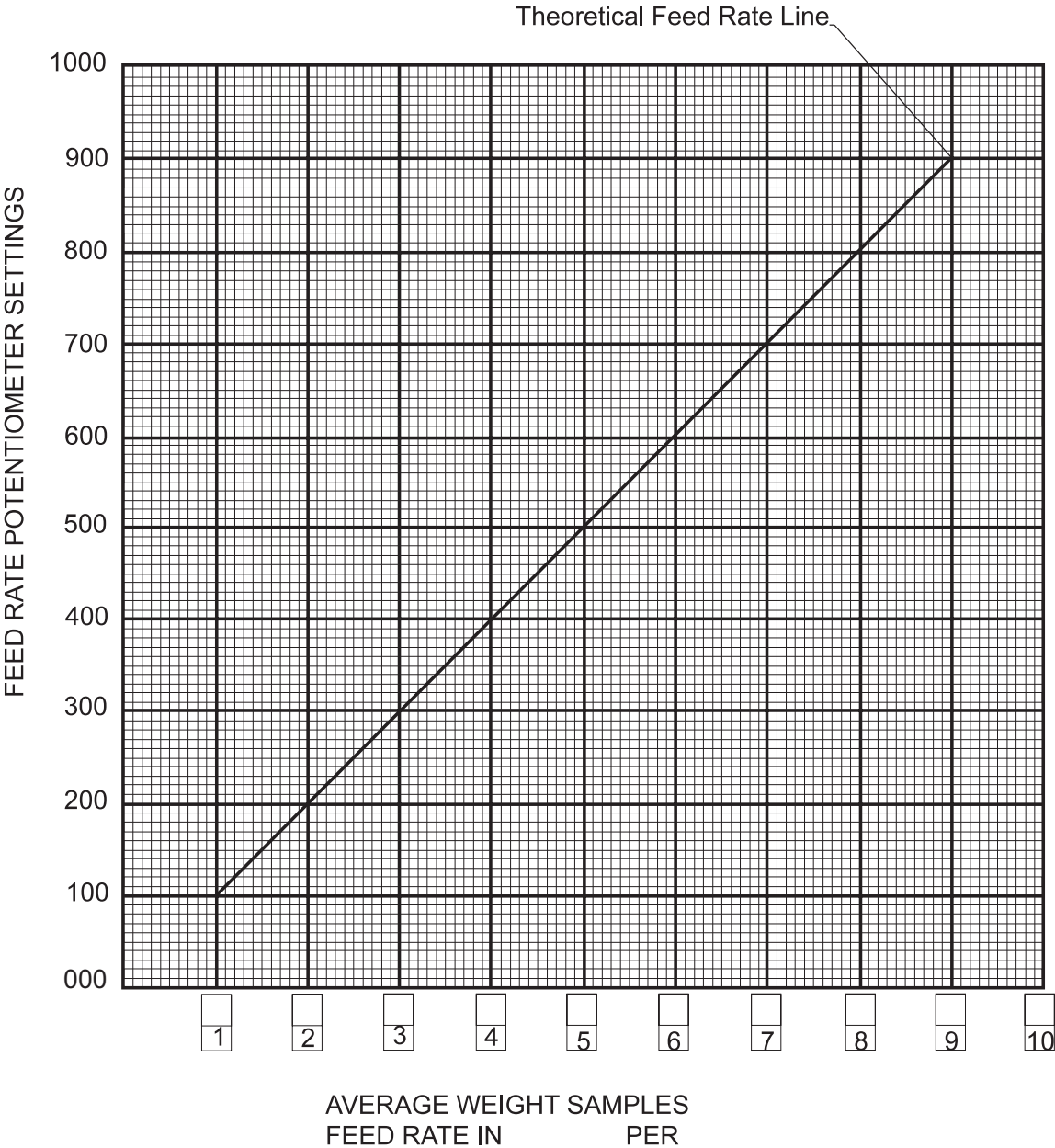


Figure 17. Calibration Graph

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Maintenance

DANGER

If not handled properly this machine could cause **SEVERE INJURY** or **DEATH**. Maintenance should only be conducted by trained, authorized personnel. No changes or repairs should be made while feeder is in operation. Disconnect and lock out power before making changes or repairs.

To easily locate parts mentioned in this section, refer to the drawing for your model in the “Parts Lists” section, page 53.

Disassembly of Panels, Helix and Hopper

Panels must be removed for most maintenance. Some maintenance may require removal of helix and/or hopper. The following instructions outline these procedures:

Panel Removal

1. Loosen screws and remove panel.
See Figure 18.

NOTE: Remove cable (unscrew) from touchpad when removing side panel with touchpad potentiometer.

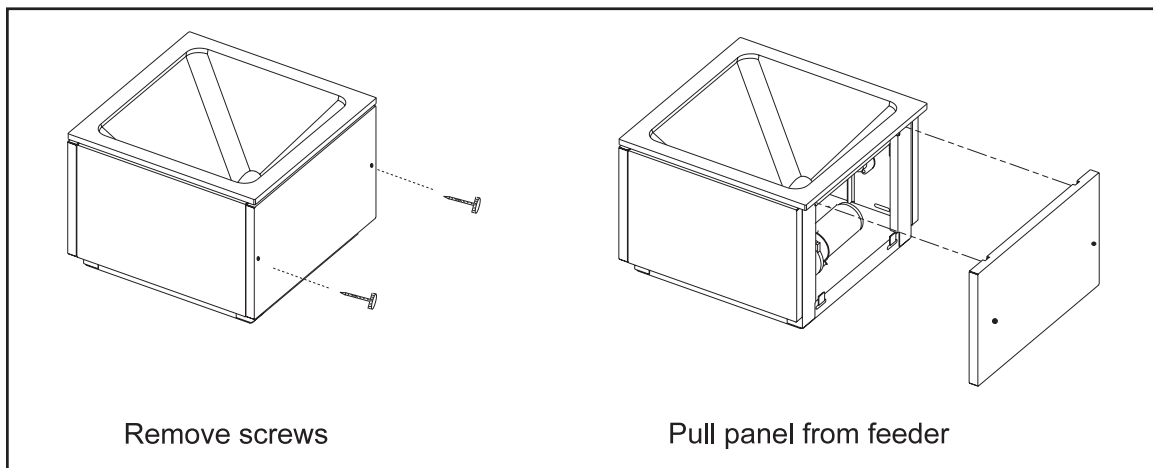
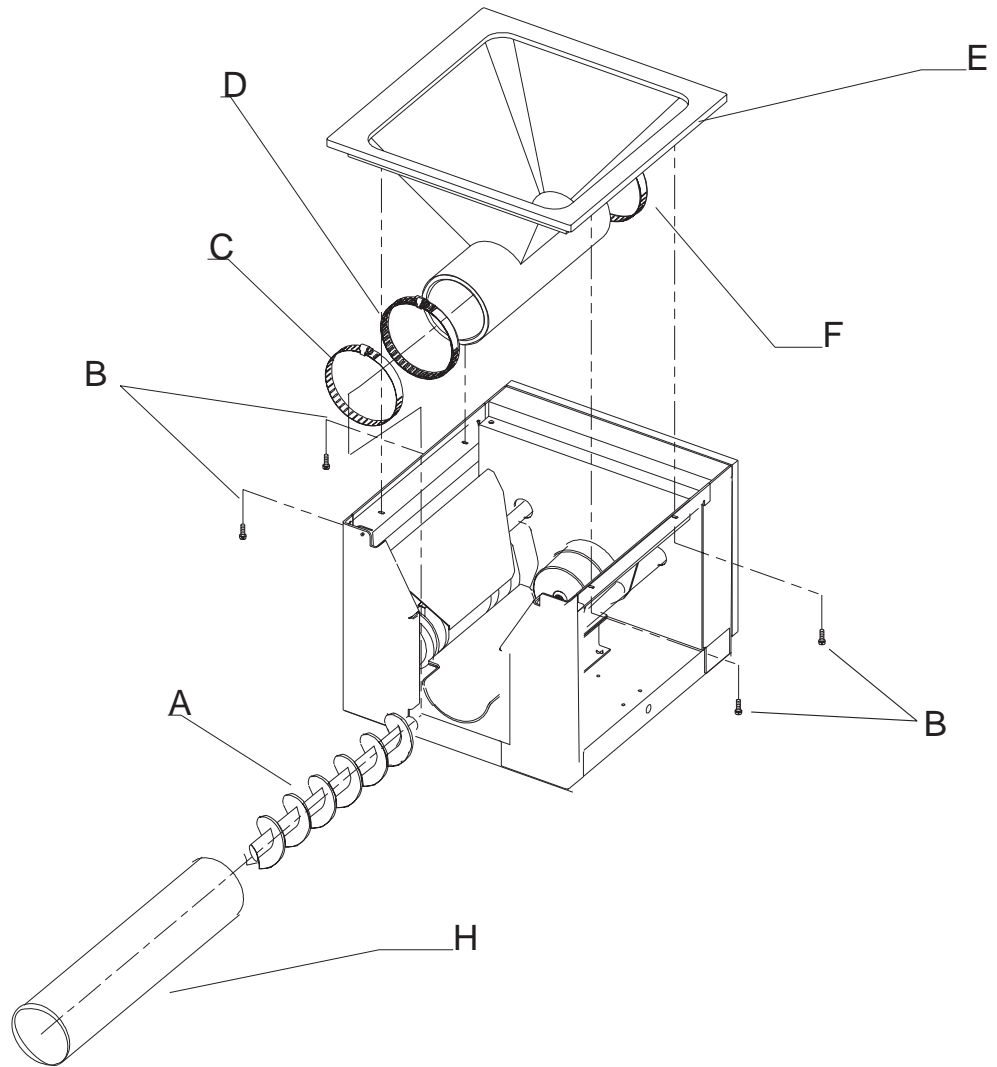


Figure 18. Removing Panels



A. Helix

D. Inside Clamp

F. Rear Clamp

. Hopper Bolts (4)

E. Hopper

H. Nozzle

C. Outside Clamp

Hopper Removal

To remove the hopper, refer to Figure 19 and do the following:

1. Empty material from hopper.
Remove front and side panels.
2. Loosen front inside and outside hose clamps (items C and D Figure 19). Remove nozzle.
3. Remove helix by turning it counterclockwise when looking at it from the nozzle side.
4. Remove four bolts located under the left and right side of frame lip. See Figure 19.
5. Loosen rear hose clamp and lift hopper from frame.

To install, reverse procedure.

See Helix and Nozzle Replacement, page 31, for proper installation of nozzle and helix.

Helix and Nozzle Changes

NOTE: When helix size changes, the nozzle must also change.

To replace the helix and/or nozzle:

1. Loosen front inside and outside hose clamps. Remove nozzle.
2. Remove helix by turning it counterclockwise when looking at it from the nozzle side.

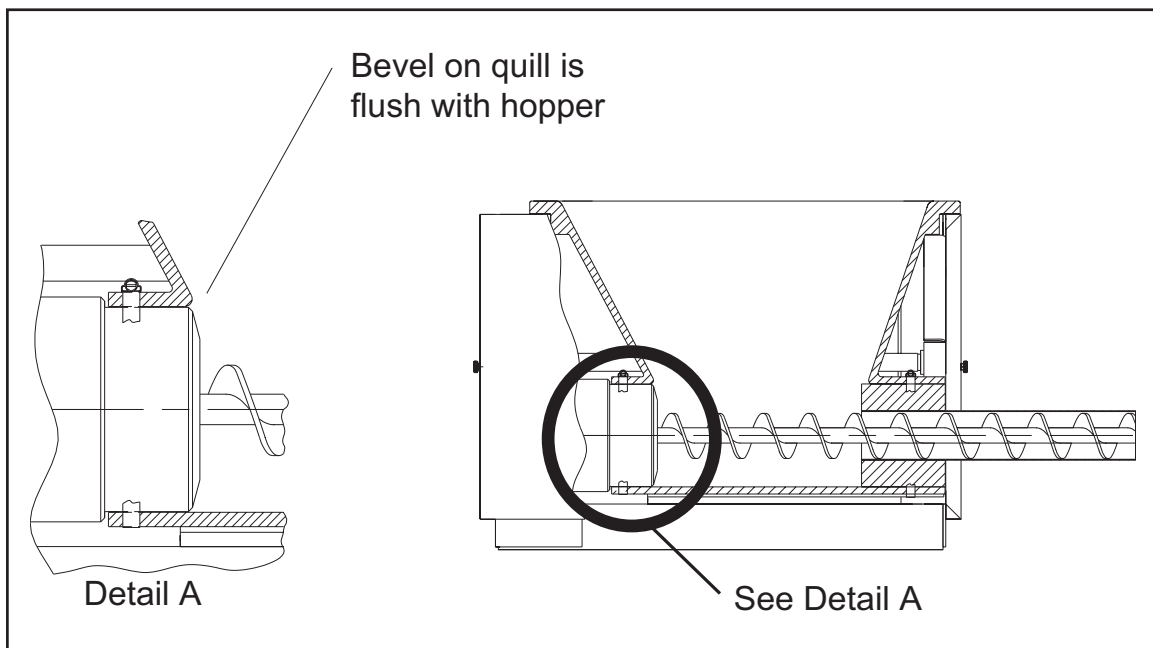


Figure 20. Cross Section of Feeder Showing Quill

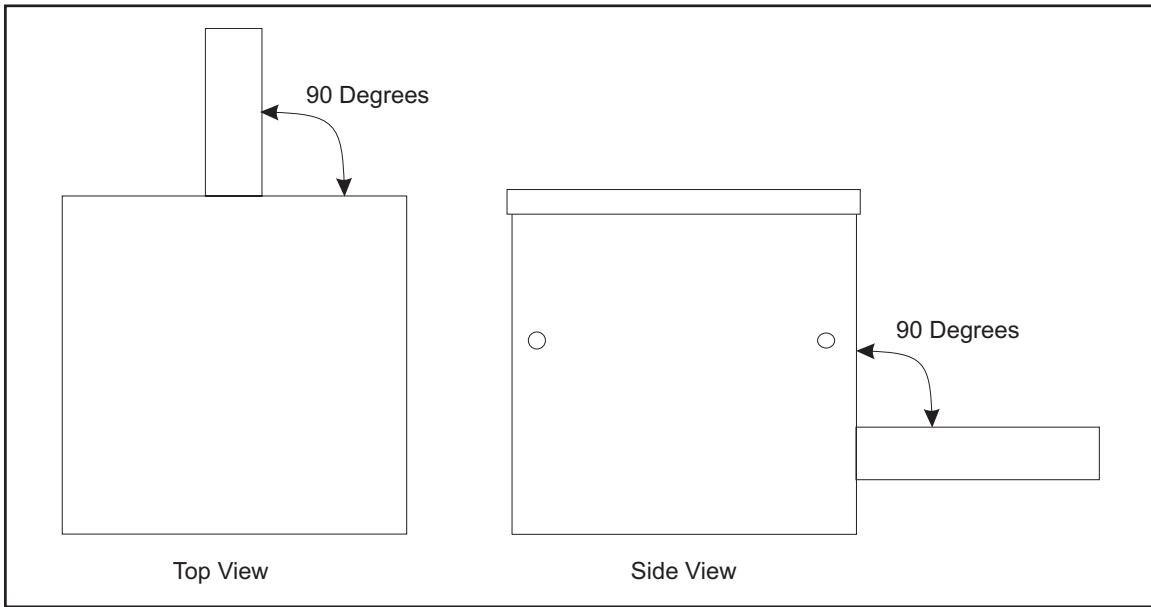


Figure 21. Proper Installation of Nozzle

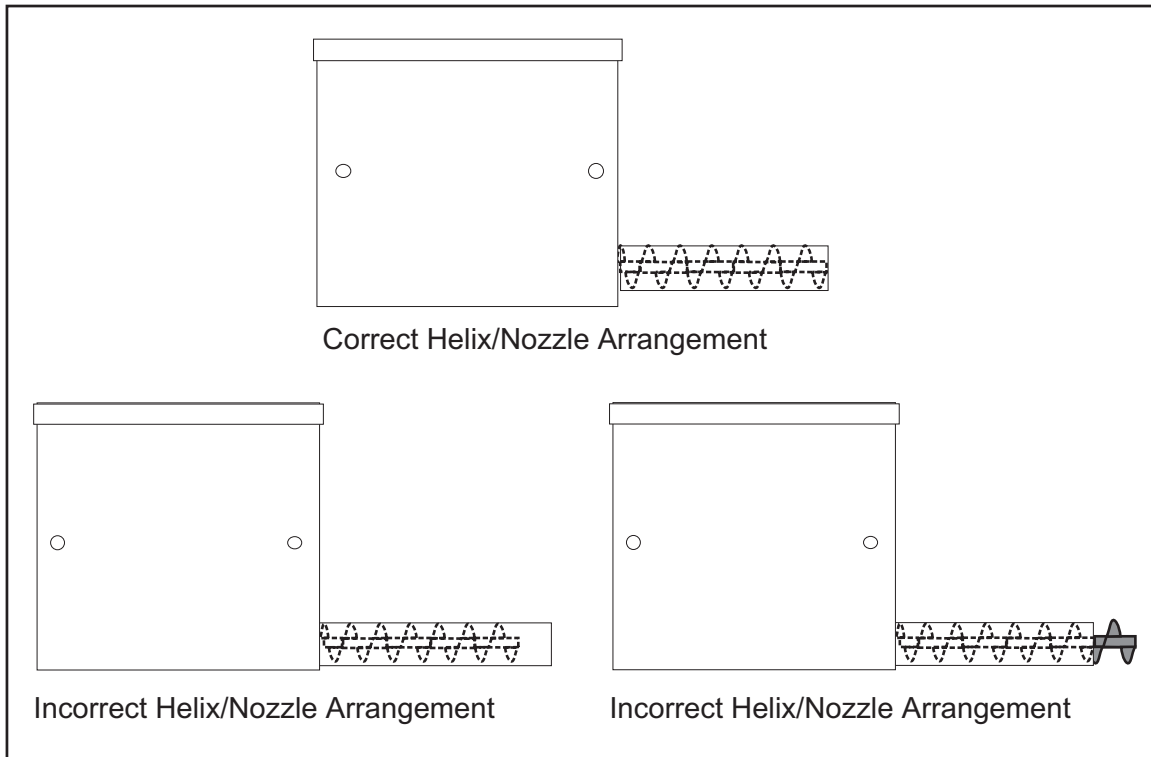


Figure 22. Proper Helix Installation

3. Position helix on drive shaft and turn it clockwise.
4. Install nozzle, making it flush with end of helix.
5. Install and secure inside and outside clamps.

When installing the nozzle on the feeder, it is absolutely necessary that the nozzle is square to the feeder (see Figure 21) for proper alignment. If the nozzle is not installed properly, excessive wear will occur to moving components.

When installed, the helix should not extend past the end of the nozzle and should remain flush with the end of the nozzle. See Figure 22.

CAUTION

Inside clamp must be around the nozzle and hopper to seal this area. Outside clamp must go over nozzle, making sure it is also secured under metal saddle and tighten.

CAUTION

Make sure the rear clamp is over vinyl protrusion on lower rear of hopper. Hopper should be over quill. Inner portion of hopper should be flush with bevel of quill. See Figure 20.

Sprockets and Chains

Occasionally, sprockets and chains need to be replaced due to wear or when changing the gear ratio is necessary.

WARNING

While in operation, the chain and sprockets will form a pinch point. They could cause SEVERE INJURY if a hand or piece of clothing should become caught in them. Disconnect power source before performing maintenance to chain and sprockets.

WARNING

Worn sprockets are very sharp and could cause SEVERE INJURY. Use extreme caution whenever removing sprockets. Use protective gloves to prevent injury.

WARNING

When removing the master link clip, ALWAYS wear eye protection. The clip may cause SEVERE INJURY if it were to hit the eyes.

Chain Removal

1. Disconnect power.
2. Remove rear panel assembly.
3. Remove chain cover panel.
4. Loosen idler shoulder bolt.
5. Locate “master” link in chain. This link is identified by a clip which holds it in place. The clip, shown in Figure 23, may be removed by

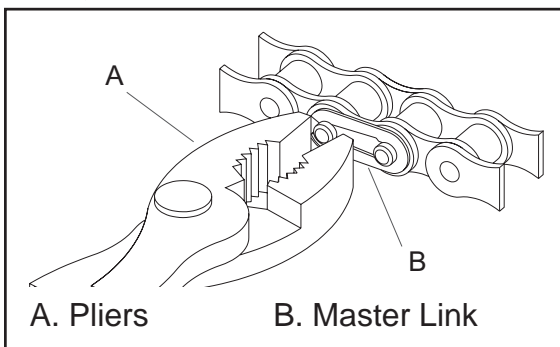


Figure 23. Removal of Master Link Clip

placing a pliers over the open end of clip and link pin. Apply pressure to clip to release it from the chain.

6. The chain will now pull apart easily. Apply a small amount of oil to the master link area if the chain is corroded or hard to remove.

Sprocket Replacement

When sprockets become worn or damaged, they must be replaced. The following outlines this procedure.

NOTE: Note location and

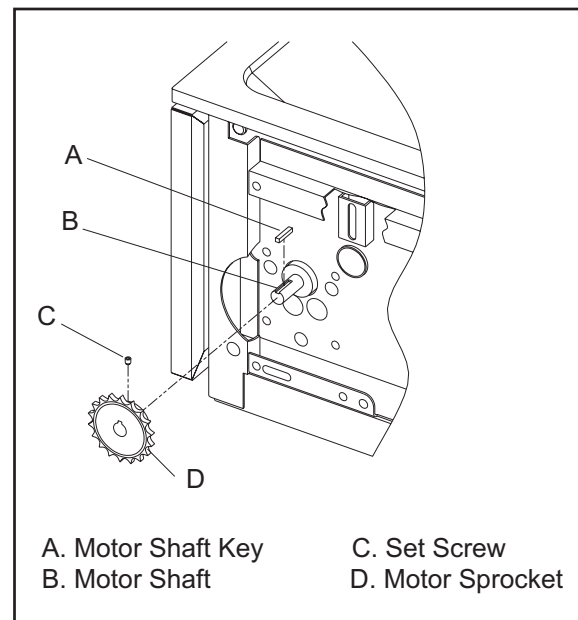


Figure 24. Motor Sprocket Assembly

orientation of sprockets to their shafts. They must be returned to the same position.

Motor Sprocket

1. Loosen set screw. See Figure 24.
2. Apply small amount of oil to shaft.
3. Pull sprocket from shaft.

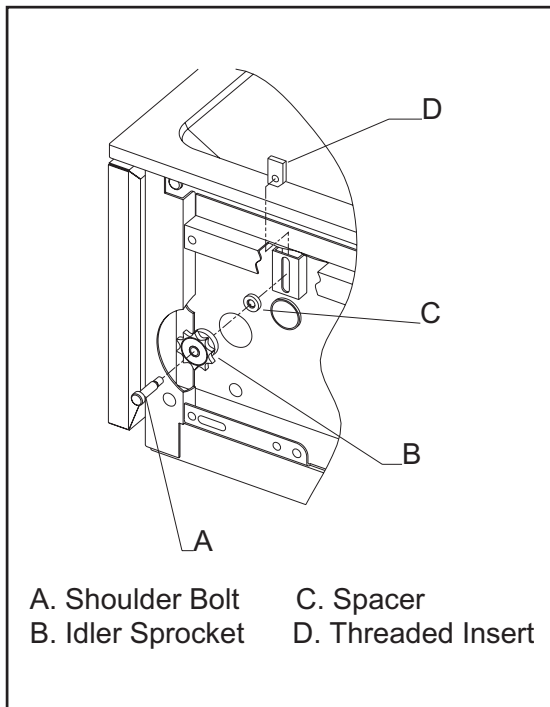


Figure 25. Idler Sprocket Assembly

Idler Sprocket

1. Loosen shoulder bolt. See Figure 25.
2. Remove shoulder bolt, idler sprocket, spacer, and threaded insert.

NOTE: When replacing the idler sprocket, the threaded insert may need to be held in place with a flat screwdriver.

Link Assembly Sprocket

If any looseness is noticed in the link, the sprocket, the shaft or the key, they must be replaced. See Figure 26. To remove the Link Sprocket Assembly:

1. Remove the rear panel, cover plate, and bearing support.
2. Loosen set screw and remove sprocket from shaft.
3. Inspect shaft and key for signs of wear. Replace the key and/or shaft if any looseness is noticed.
4. Inspect the set screw and key for each sprocket. Replace set screw and key if there are any signs of damage.
5. Align sprocket key slot with shaft key and install sprocket.
6. Align sprockets using a straight edge. See Figure 27.

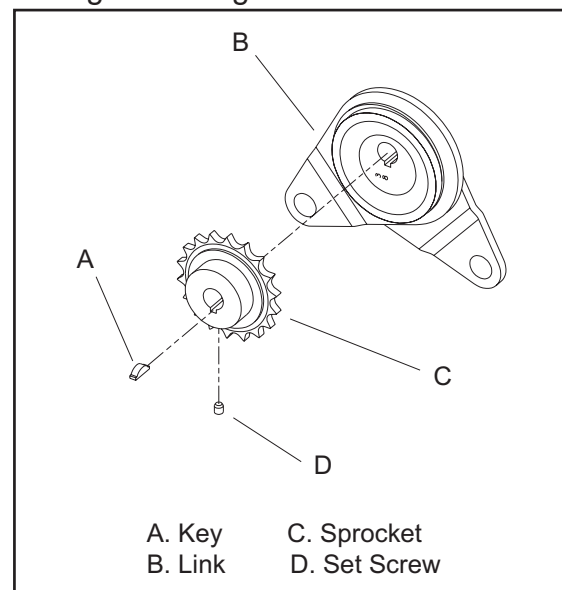


Figure 26. Removing the Link Sprocket

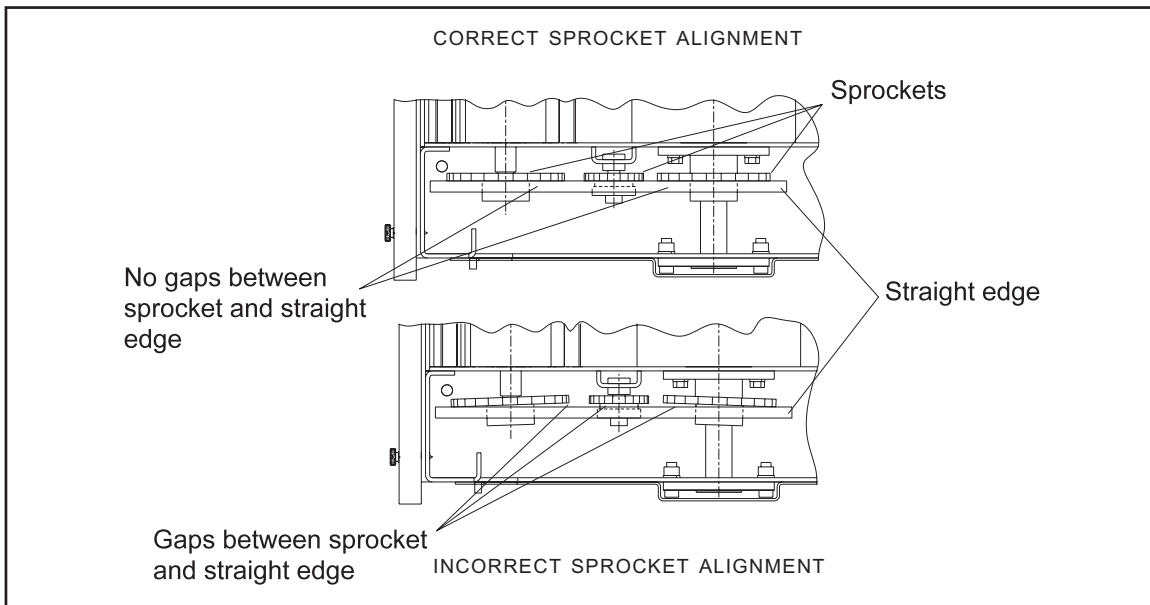


Figure 27. Checking for Proper Sprocket Alignment

CAUTION

Improper sprocket alignment will cause irreparable damage to sprockets and chain. Use a straight edge (such as a metal rule) to align the sprockets.

7. Tighten set screws.
8. Install chains. See “Chain Installation/Adjustment” on this page.

NOTE: Do not tighten idler sprocket completely. Idler sprocket must be loose to adjust chain tension.

Chain Installation/Adjustment

1. Inspect chain for wear and/or damage. Replace chain as necessary.
2. Thread chain over proper sprockets.

NOTE: Chain may need to have a few links removed to obtain proper length.

NOTE: Paint master link clip a bright color prior to installing it. This will help to locate it in the future. Always use a new clip when re-assembling chain.

3. Replace the master link and clip.

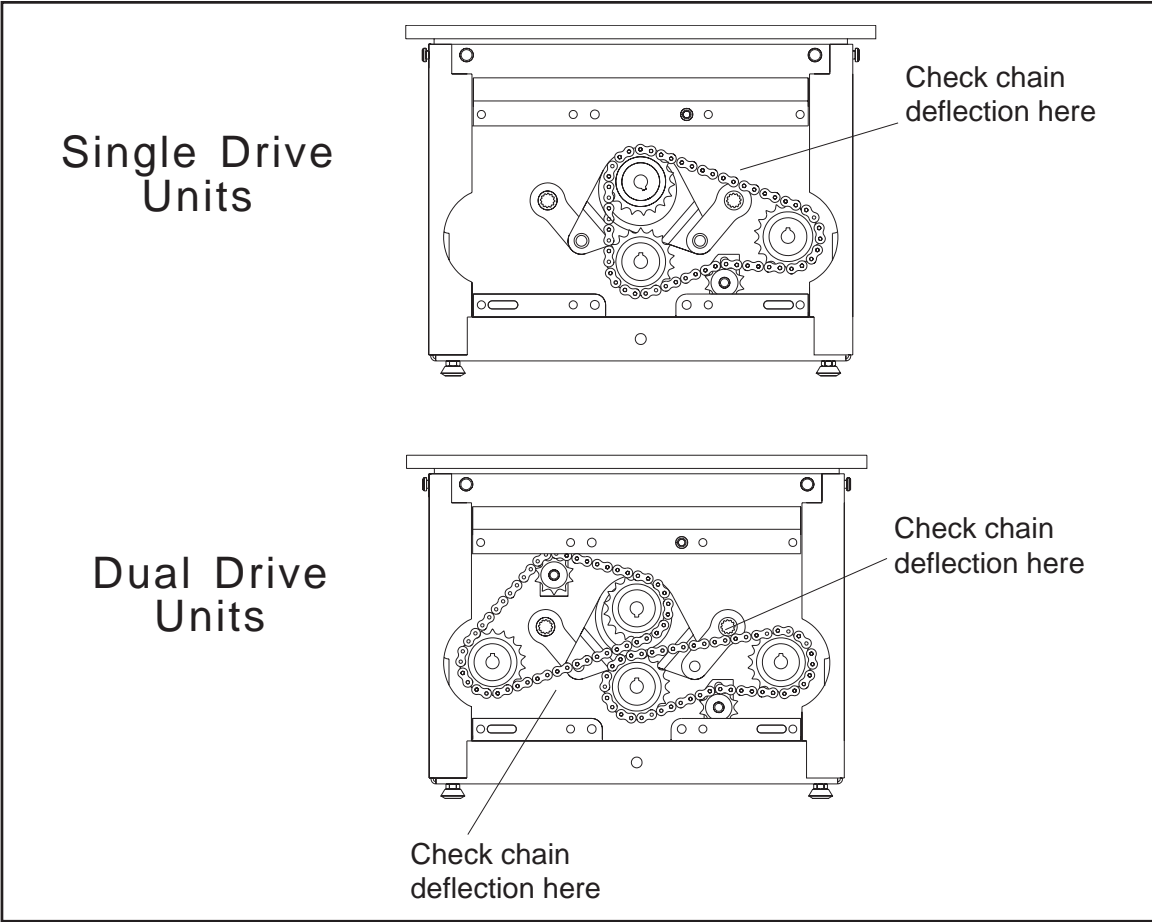


Figure 28. Location to Check Chain Deflection

CAUTION
Make sure clip is **COMPLETELY** seated on master link pins. If clip comes off, chain may come apart, possibly causing damage to machine and loss of product caused by machine malfunction.

4. Adjust chain tension by moving idler sprocket. The chain should deflect about **.25 inches (6.35mm)** at points shown in Figure 278.

- 5. Tighten idler sprocket.
- 6. Install outer bearing support, cover, and rear panel.

Link Assembly

Located at rear of feeder is the link assembly which activates the agitator paddles. The link assembly must be disassembled for most maintenance, to drive systems, or when installing a different eccentric. To disassemble or remove link assembly, do the following:

1. Remove rear panel, cover panel, and outer bearing support.
2. Remove the two retaining clips that hold the link assembly to paddle shaft levers.
3. Remove chain from link sprocket assembly.

NOTE: During disassembly, be sure to note location of spacers on the link assembly shaft. When reassembling the link assembly, the spacers must be placed in the same location or the drive chain will not be properly aligned.

4. Remove link assembly sprocket as described in “Link Assembly Sprocket”, page 35.
5. Pull link assembly and shaft off levers.

NOTE: Changing eccentric in link assembly requires a large press. For more details on types of eccentrics available and the size of press needed, contact your Customer Service Representative (see page 5 for details).

To install link assembly:

1. Slide link assembly and shaft through bearing.
2. Place link arm assembly over paddle shaft levers as assembly is being slid toward frame and install **NEW** retaining clips.

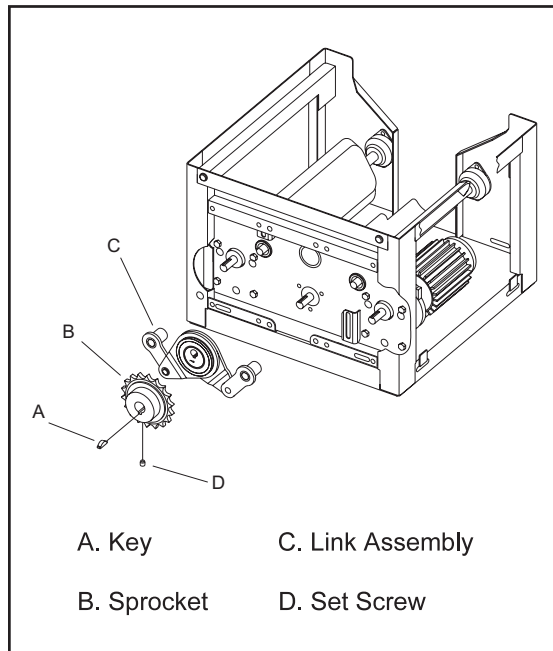


Figure 29. Removing Link Assembly

3. Install link assembly sprocket as described in “Link Assembly Sprocket”, page 35.
4. Put chain on sprocket and adjust chain as outlined in “Sprockets and Chains”, page 33.
5. Install bearing support, cover panel, and rear panel. Tighten idler sprocket.

Eccentric Changes

NOTE: Changing eccentric in link assembly requires a large press. For more details on types of eccentrics available and the size of press needed, contact your Customer Service Representative (see page 5 for details).

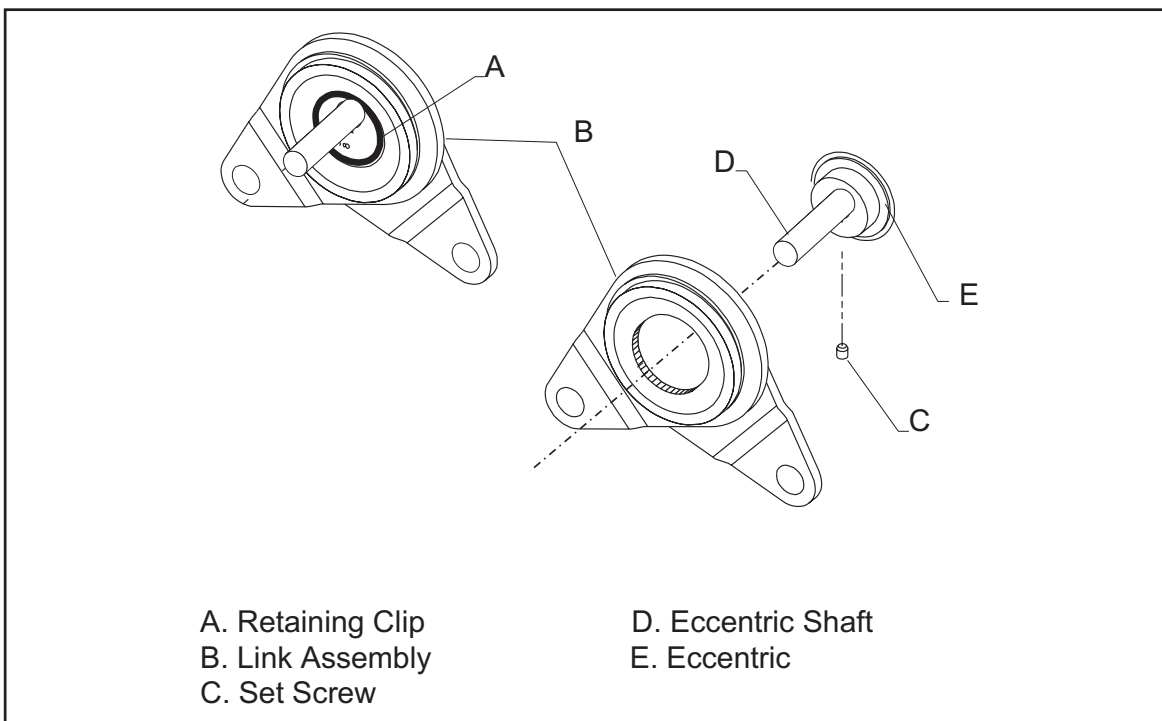


Figure 30. Replacing Eccentric

Changing the eccentrics, may increase or decrease the agitation of the vinyl hopper. To change the eccentrics do the following:

1. Remove the link assembly. See Link Assembly, page 37.
2. Remove retaining clip (Item A, Figure 30).
3. Remove eccentric from link assembly.
4. Loosen set screw in eccentric and remove eccentric shaft from eccentric. See Figure 30.
5. Install eccentric shaft in new eccentric and tighten set screw. See Figure 30.
6. Reverse procedure to install eccentric in link assembly and install link assembly on feeder.

Agitation Paddles

The following procedure details agitation paddle removal:

1. Remove cover, side panels, helix and hopper, as described in “Panels, Helix and Hopper”, page 29.
2. Remove cover plate and outer bearing support.
3. Remove link assembly as described in, “Link Assembly”, page 37.
4. Mark orientation of paddle ends to lever assemblies.

NOTE: Right and left paddles are not the same. Each paddle has an “R” or an “L” on the back. This refers to the right or left as you face the feeder, from the nozzle side.

5. Remove lever assemblies.
6. Slide paddle toward rear bearing until shaft clears front bearing. Remove paddle assembly. Remove second paddle in the same fashion.

The following procedure details agitation paddle installation:

1. Slide proper paddle through opening of rear bearing. Position front of paddle shaft in front bearing.

Position second paddle in similar fashion.

2. Install levers on paddle shaft ends. Make sure marks on levers align with those on shafts.

CAUTION

Paddles must be properly aligned or damage may result. If paddles are not aligned properly, they may hit motors causing damage to paddles and/or motors.

3. Install link assembly as described in “Link Assembly”, page 37.

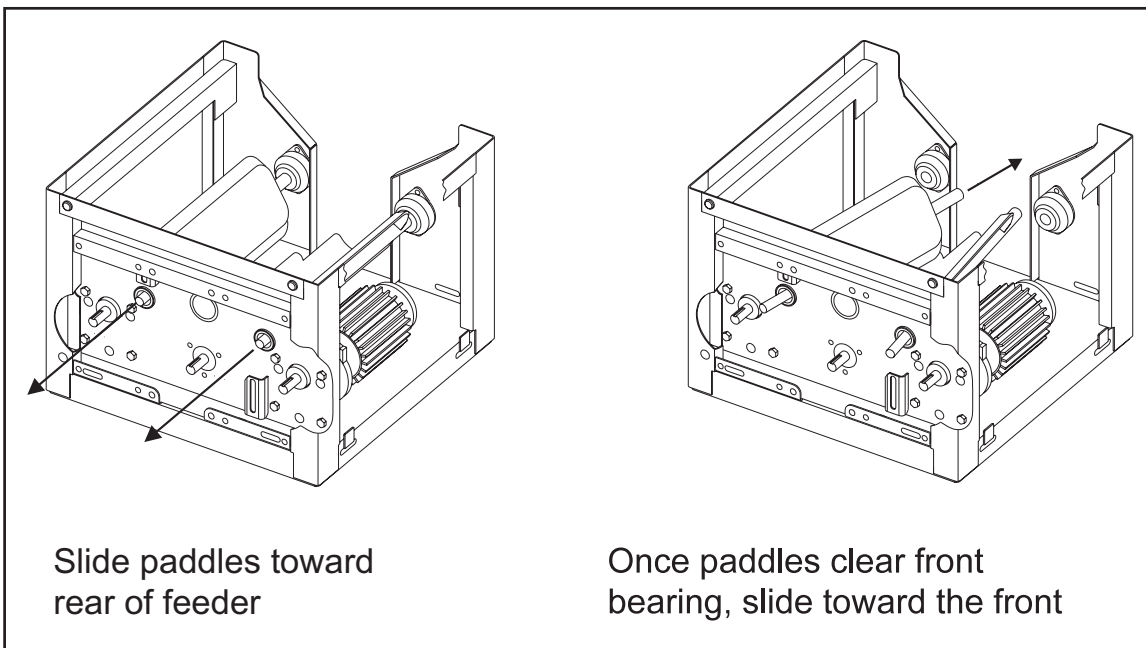


Figure 31. Removal of Agitation Paddles

4. Install outer bearing support and cover plate. Secure with proper hardware.
5. Install hopper, helix, side panels, and cover as described in "Panels, Helix and Hopper", page 29.

should arise with a motor or a gear reducer, the motor must be replaced. For details on a replacement motor or reducer **contact your Customer Service Representative (see page 5 for details).**

Motor and Gear Reducer

DANGER

In 601 Series feeders, **DO NOT** use any organic based solutions on or near the feeder. The use of organic solutions may cause explosions and fire.

DANGER

Disconnect ALL power to feeder before performing maintenance to motor. This is a HIGH VOLTAGE area and could cause SEVERE INJURY or DEATH. Maintenance should only be conducted by authorized, trained personnel.

The motor brushes are the only motor service parts available for the motor. If a problem (other than worn brushes)

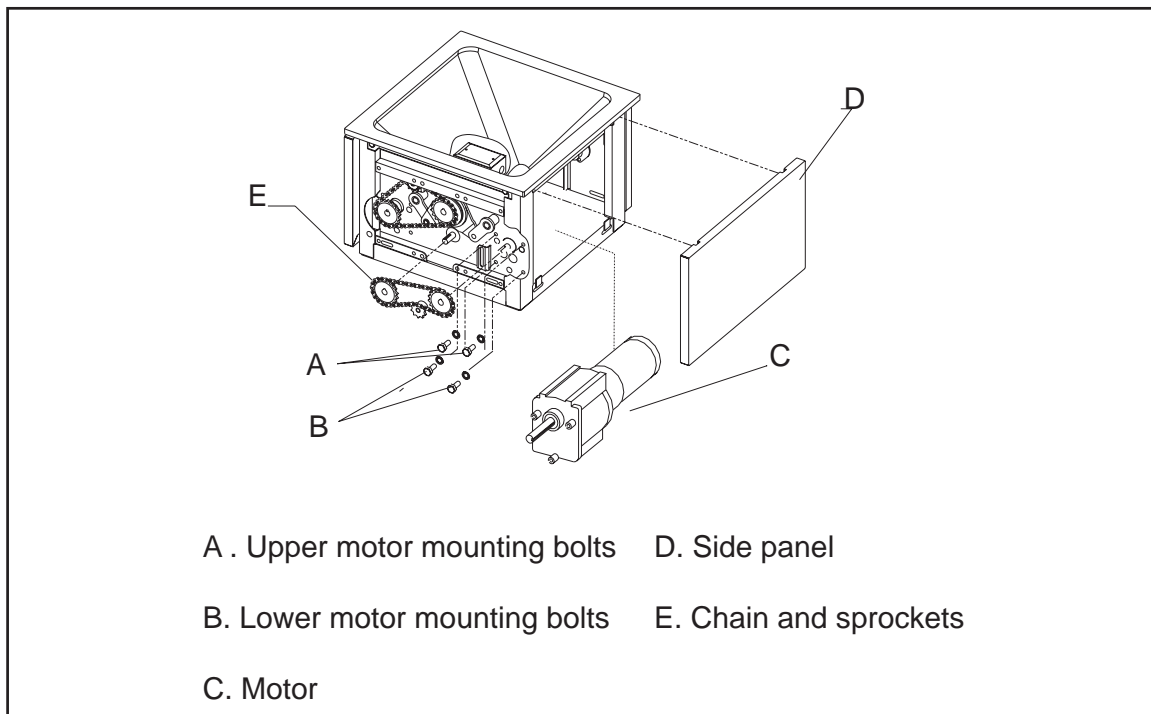


Figure 32. Removing the Motor and Reducer

Removal and Installation

1. Remove rear panel and side panel (next to motor).
2. Remove the nozzle, helix, and hopper described in “Panels, Helix and Hopper”, page 29.
3. Remove chain and drive sprocket from gear reducer shaft. For information on chain and drive sprocket, see “Sprockets and Chains”, page 33.
4. Remove the paddle next to the motor.
5. Disconnect motor power cord from the junction box.

NOTE: The junction box is located under the feeder frame. The feeder must be placed on its side to gain access to the box. Remove screws from top of box. Locate connection for motor and remove wire nuts. Slide wire out of junction box.

NOTE: Note wire routing through frame to junction box.

6. When servicing feeders with **Dual Drives**, it may be necessary to remove the junction box before removing the right side motor.
7. Remove the two bolts securing the gear reducer to back of feeder frame. See Figure 30.
8. Slide motor forward until shaft clears hole in feeder frame.

NOTE: The front paddle bearing may have to be removed if it interferes with the motor removal. Simply remove the two mounting bolts.

The motor can now be removed from the frame.

Reverse procedure to install the motor and gear reducer.

Motor Brush Replacement

1. Disconnect power to motor.
2. Remove hopper to gain access to motor.

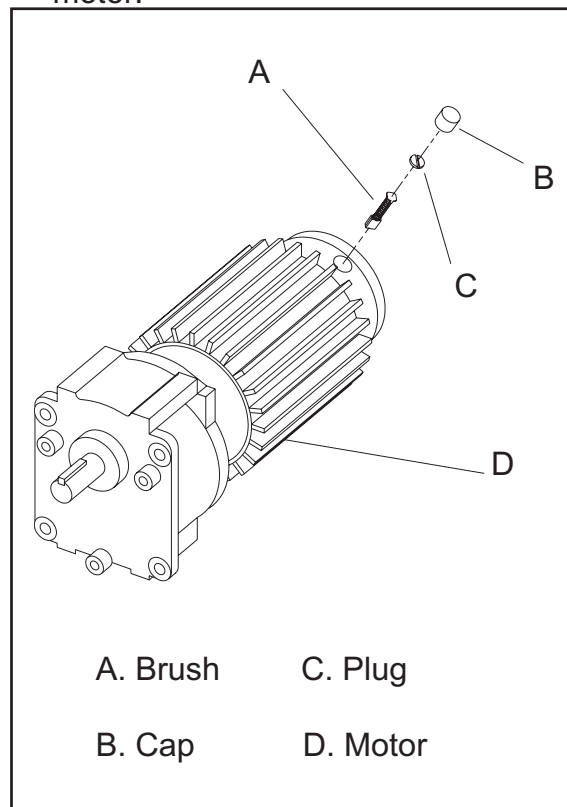


Figure 33. Replacing the Motor Brushes

3. Remove cap and plug with a large screwdriver.
4. Replace brush, see Figure 33.
5. Install plug and cap.
6. Repeat procedure for remaining brush.
7. Install hopper and reconnect power to motor.
3. Move jumper to desired location.
4. Close cover and tighten the four screws.

Touchpad Potentiometer

DANGER

Disconnect power to controller before performing any maintenance. Controller contains items of HIGH VOLTAGE. These items can cause SEVERE INJURY or DEATH. Only trained and authorized personnel should attempt maintenance to controller.

Setup Jumper

The setup jumper maintains potentiometer mode when power is turned off. If jumper is in “ON” position, motor remains off when unit is powered up requiring the operator to manually enable operation. If jumper is in the “LAST” position, the unit will be in the last setting unit was in when the power was turned off. See Figure 34.

To change jumper setting:

1. Disconnect all power to controller.
2. Loosen the four screws and open cover.

CAUTION

Make sure cover gasket is properly sealed when cover is tightened down. Any moisture in box could damage components inside.

Chip Switch and Fuse

It is strongly recommended that the **AccuRate Customer Service Department** (see page 5 for details) be contacted before any service to the chip switch (Part # W-3800) or fuse is performed.

Lubrication

DANGER

DO NOT use any organic based solutions or lubricants on or near 601 Series feeders used to feed Potassium Permanganate (K_2MnO_4). Potassium Permanganate is highly reactive with organic solutions and may cause explosions and fire.

Lubrication is important in keeping your feeder running smoothly. Refer to “Preventive Maintenance Schedule”, page 47, for lubrication schedule.

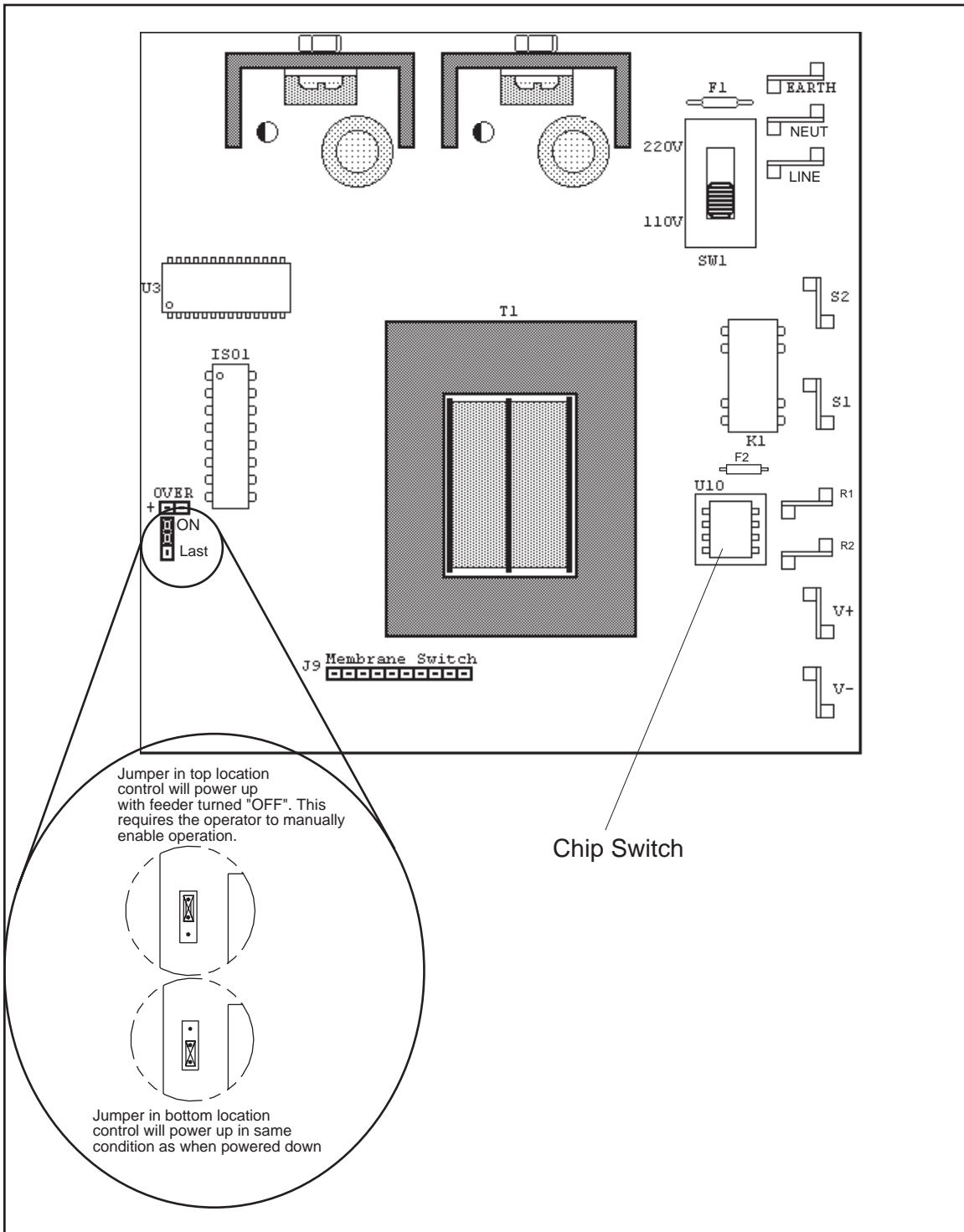


Figure 34. Changing the Setup Jumper

WARNING

ALWAYS disconnect power to feeder before lubricating feeder components. The areas where lubrication is being performed contain items that could cause **SEVERE INJURY. NEVER** perform lubrication when feeder is running.

DANGER

The use of water and/or cleaning solutions increases the risk of electrical shock. Disconnect and lock out all power sources to unit prior to cleaning.

A typical cleaning and sanitizing procedure is usually done in the following order:

- RINSE - Remove any product residual.
- CLEAN - Use a detergent solution to clean all surfaces of unit.
- RINSE - Remove all detergent solution.
- SANITIZE - Use a sanitizing solution to sanitize unit.

Chains

To lubricate chain:

1. Remove rear panel and cover plate.
2. Lightly oil entire chain. **DO NOT** use organic based oils on 601 Series feeders.
3. Install cover plate and rear panel.

Cleaning and Sanitizing

If your feeder is used in a food or dairy application, the unit must be cleaned and sanitized regularly. Frequency of cleaning and sanitizing depends on product and local laws and regulations.

NOTE: These instructions are only guidelines. Contact your local health inspector for specific laws and regulations for your area and process.

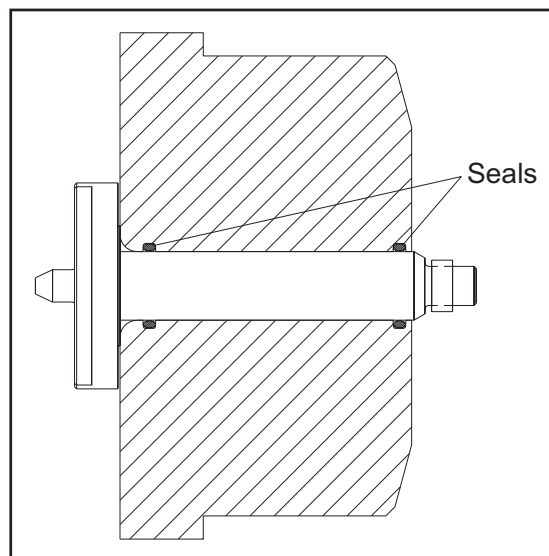


Figure 35. Quill and Drive Shaft Seals

The following information explains the previous mentioned steps.

Rinsing

Use water to completely remove any product that may have built up in hopper or exterior of the unit. The unit must also be rinsed of all detergent solutions prior to sanitizing.

Cleaning

DANGER

DO NOT use any organic based solutions or lubricants on or near 601 Series feeders used to feed Potassium Permanganate (K_2MnO_4). Potassium Permanganate is highly reactive with organic solutions and may cause explosions and fire.

To clean your feeder, remove helix, nozzle and hopper as outlined in “Disassembly of Panels, Helix and Hopper”, page 29.

After the hopper has been removed, do the following:

- The hopper, helix, and nozzle must only be cleaned with mild soap and water. Limited use of mineral sprits is approved. **DO NOT uses mineral sprits on 601 Series feeders.**

- The seals must be removed from the quill and cleaned. If seals show any signs of wear, replace them. See Figure 35 for location of seals.
- Wipe down remainder of unit with cleaning solution.

Sanitizing

While unit is disassembled, sanitize all parts using an approved sanitizing solution. Contact your local health authority for information on suitable sanitizing agents.

CAUTION

Sanitizing agents may be corrosive to hopper and/or seals. Select a sanitizing agent that is compatible with these materials. Limit exposure of these items to reduce effects agents may have.

Preventive Maintenance Schedule

The following table outlines the maintenance schedule that you should follow to keep your feeder in proper working order.

The numbers in the table represent different tasks. For a complete description of the task, refer to the “Maintenance” section of this manual starting on page 29.

DANGER

DO NOT use any organic based solutions or lubricants on or near 601 Series feeders used to feed Potassium Permanganate (K_2MnO_4). Potassium Permanganate is highly reactive with organic solutions and may cause explosions and fire.

<u>Number</u>	<u>Task</u>
1	Adjust
2	Lubricate (see “Lubrication” section on page 43 for instructions)
3	Inspect for wear or other signs of malfunction
4	Replace

Item	Daily	Weekly	Monthly	3 Months	6 Months	Annually
Chain			1, 2, & 3			
Sprockets			1 & 3			
Motor				3		
Gear Reducer			3			
Helix				3		

Item	Daily	Weekly	Monthly	3 Months	6 Months	Annually
Nozzle				1 & 3		
Hopper				3		
Hopper Extension Filter		3			4	
Drive Shaft				3		
Seals			3		4	
Quill			3			
Bearings & Bushings			3			
Nuts & Bolts			1 & 3			
Keyways				3		
Eccentric Shaft				3		

Troubleshooting

This is a guide to check problems that might arise under normal operation. Consult the manual for instructions regarding the action to be taken. **FOLLOW ALL SAFETY GUIDELINES LISTED IN THIS MANUAL.**

Problem	Cause	Solution
Feeder doesn't run	Blown fuse - AC line	Replace the fuse
	Poor wiring connections of amphenols or terminal block	Tighten connections & resolder leads if necessary
	Incorrect wiring	Check schematic & rewire if necessary
	Improper analog input	Correct source signal

Problem	Cause	Solution
Feeder runs, but not correctly	Runs backwards	Switch motor armature leads at the terminal block or motor
	Runs wide open	Check the potentiometer leads position
		Maximum speed potentiometer blown - replace the board
		Improper analog input - bad 4-20mA or 0-10VDC signal coming from your process controller
	Partial potentiometer adjustment	* Bad potentiometer - check resistance through full range 0-5000 ohms, replace if it fails the test
	Motor surges	AC line voltage varies - install line conditioner
* DC output voltage too high $\pm 10\%$ adjust max trimpot		
Motor brushes are bad - replace		
Feeder stalls	Flow restrictions	Remove restrictions from nozzle adapter

* Contact your **Customer Service Department** for assistance. See page 5 for details.

Problem	Cause	Solution
Feeder stalls (continued)	Helix and nozzle not flush at the discharge end	Reposition the helix and the nozzle until they are flush
	Foreign objects lodged in helix	Turn off power and remove the foreign objects then restart the feeder
	Pellets jammed in helix	* Increase the nozzle diameter or decrease the helix diameter to provide more clearance and eliminate the pinch point
	Product buildup inside the nozzle	* Review helix and nozzle combination for your application change if needed

* Contact your **Customer Service Department** for assistance. See page 5 for details.

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Parts Lists

The pages following the index contain the information you need to order replacement parts. Locate the part you need to order and its **part number**.

Then **contact your Customer Service Representative to place your order. See page 5 for details.**

NOTE: Some items may have a minimum order quantity. These items are marked by an asterisk (*).
