

## Screwfeeder Troubleshooting Guide

Symptom	General Cause	Specific Cause	Solution	Illustration
No Screws are being fed to the screwdriver	Screw jam in screw delivery tubing	Insufficient Screw Blast to deliver screw	Adjust Screw Blast Inline Flow Control to increase Air Blast	Screw Blast Adjustment
			Adjust Screw Blast Timer in the control program	None
	Screw Lift Plate doesn't lift any screws	Ran out of screws in the hopper	Refill Screw Hopper	Hopper Fill Level
		Hopper was overfilled with screws so the screws don't feed onto the Screw Lift Plate	Reduce quantity of Screws in hopper until they are below fill line & push the screws forward so they are in contact with the front of the hopper	Hopper Fill Level
	Screw Lift Plate does not raise or lower	The Screw Lift Bearings are Dirty	Clean the dirt build-up off of the bearings using a cloth & alcohol	Screw Lift Bearing Cleaning
		The pressure regulator on the Screw Lift Valve is set too low	Adjust pressure regulator on valve bank to an acceptable level	Screw Lift Force Adjustment
		The compressed air supply has been disconnected	Restore compressed air supply (check main machine, shut-off valve & main Regulator)	None
		Screw Lift Proxes are incorrectly adjusted or malfunctioning	Verify That the lower Prox light turns on when the Screw Lift Plate is down (within 1/8") and off at any other point. Verify that the upper Prox light is on except when the Screw Lift Plate is in the up position (within 1/8")	Screw Lift Adjustments
	Screw Lift Plate retracts before screws fall onto Screw Slide	Insufficient time in control program to complete the function	Reduce the time required for the Screw Lift Plate to cycle by adjusting the Air Cylinder Flow Controls	Screw Lift Adjustments
			Increase the timer setting in the control program	None

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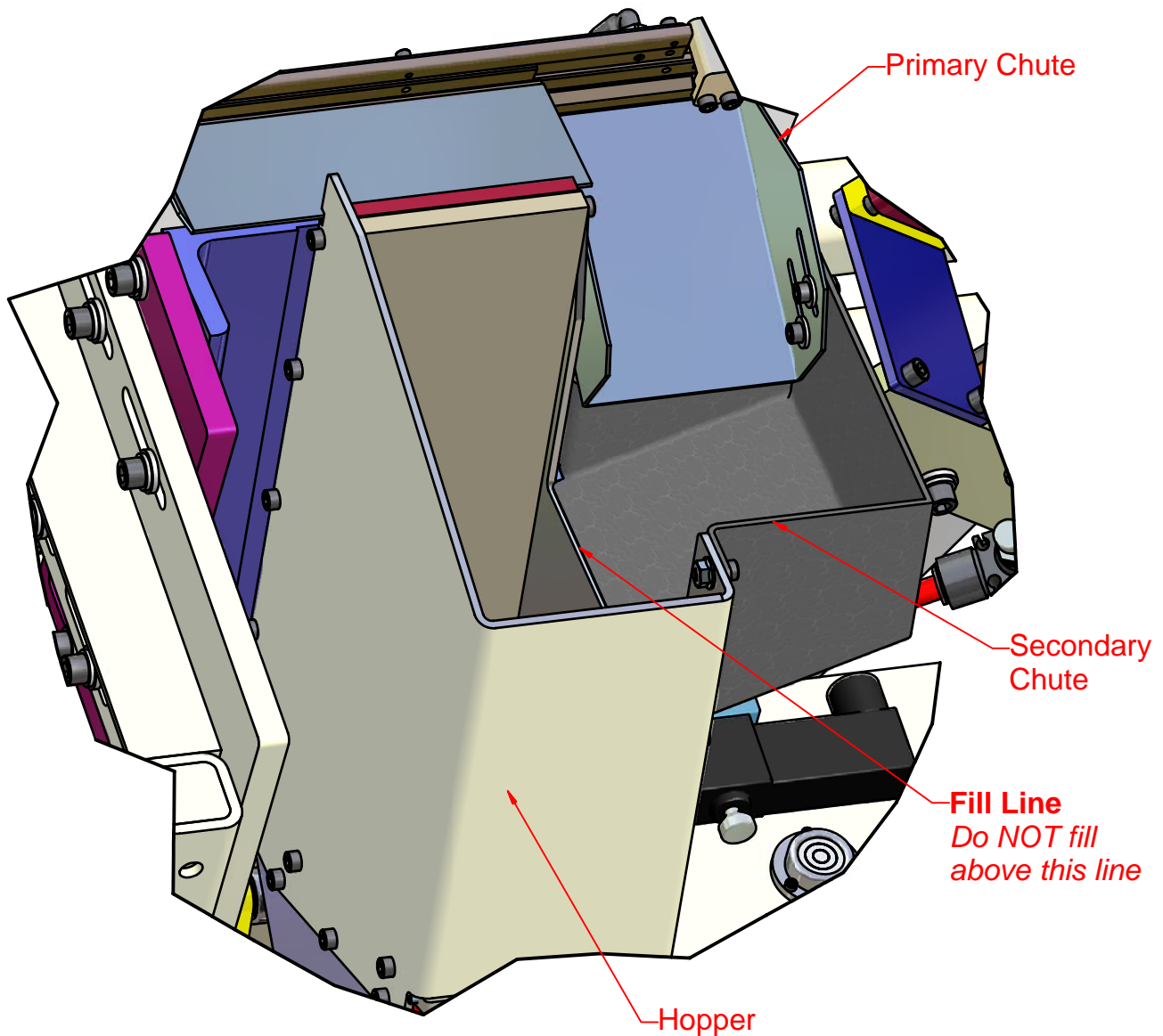
Symptom	General Cause	Specific Cause	Solution	Illustration
No Screws are being fed to the screwdriver	Screws don't travel down the Vibratory Track	Screw Jam in Vibratory Track	Clear jam in Vibratory Track	None
		Dirty rails	Clean rails using Alcohol & soft cloth	Cleaning The Rails
		Vibrator is not on	Verify that Vibrator is plugged into Controller	None
			Verify that switch on Vibrator Controller is on (lit up)	None
			Verify that controller has power	None
			Verify that fuse in controller is not blown	None
	Vibratory Track Controller is set too low	Verify that the dial setting hasn't been changed. If needed, increase the Vibratory Speed Using the Knob on the Vibratory Track Controller. Make sure you mark the starting position so you can return to the initial state if this doesn't improve operation.	None	
	Vibrator out of tune	Ensure that Counterweight on Vibrator & Dial on the Controller are at the factory (marked) settings. Consult Erdman Automation if more adjustment is needed.	None	
Screws don't go through diverter	Diverter is jammed	Drop the air to the screwfeeder, then remove the diverter from the mounting bracket, note the positions of the air lines prior to removal. Inspect & clear any obstructions in the diverter. Re-assemble once the diverter moves freely again.	None	

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Symptom	General Cause	Specific Cause	Solution	Illustration
The Escapement Shuttle doesn't grab a screw	Screws don't slide down the rails	Dirty rails	Clean rails using Alcohol & soft cloth	Cleaning the Rails
		Screw Hold-Down Rail is out of adjustment	Adjust Screw Hold-Down Rail for proper clearance & angle	Screw Hold-Down Adjustment
		Vibratory Track isn't vibrating	See section covering " screws don't travel down vibratory track"	None
Escapement Shuttle Jams	Escapement Shuttle moves too fast	Escapement Shuttle Cylinder Flow Controls out of adjustment	Adjust Flow Controls so the shuttle moves slowly, but fast enough to allow the screw to reliably fall into Escapement Shuttle Slot & finish its stroke before the Screw Eject Cylinder fires	Escapement Shuttle Speed
	Excessive Back Pressure. The screws should only build up until the end of the escapement rails (see illustration Proper Screw Back Pressure)	Rail Prox is incorrectly adjusted or malfunctioning	Verify that Rail Prox senses the screws as they slide past it. The LED on the sensor should remain on when a screw is in front of it, but turn off when the screw is past it.	Proper Screw Back Pressure
		Screw Lift Plate cycles too many times before screws reaches the Rail Prox	Adjust Flow Controls on lift cylinder to reduce the speed of the lift and/or adjust the dwell timers in the control program	Screw Lift Adjustments
		Vibratory Track is moving screws too fast	Adjust Dial on Vibratory Track Controller to a slower setting, but fast enough to keep screws from piling up on the screw	None
		Screw Hold-Down Rail is out of adjustment	Adjust Screw Hold-Down Rail for proper clearance & angle	Screw Hold-Down Adjustment
		Screw Lift Plate brings up too many screws at a time.	Adjust the angle of the hopper to reduce the quantity of screws being picked up. (This should be done as a last resort as the hopper will have to be re-aligned to the screw rail system.)	None
		Bent Screw in Shuttle	Bent Screw in Shuttle	Remove defective screw

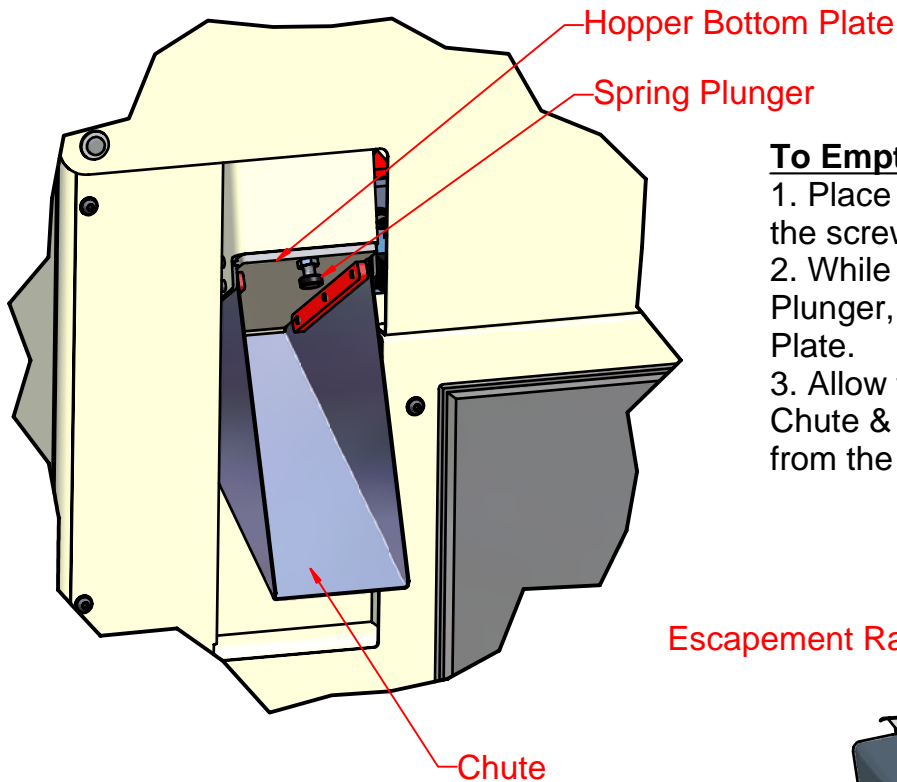
# Hopper Fill Level

The quantity of screws that can be held in the hopper varies based on the size, type, and length of the screw being used. The screw level must not be above the lower edge of the Secondary Chute (as shown below) or the screws may not feed forward properly.



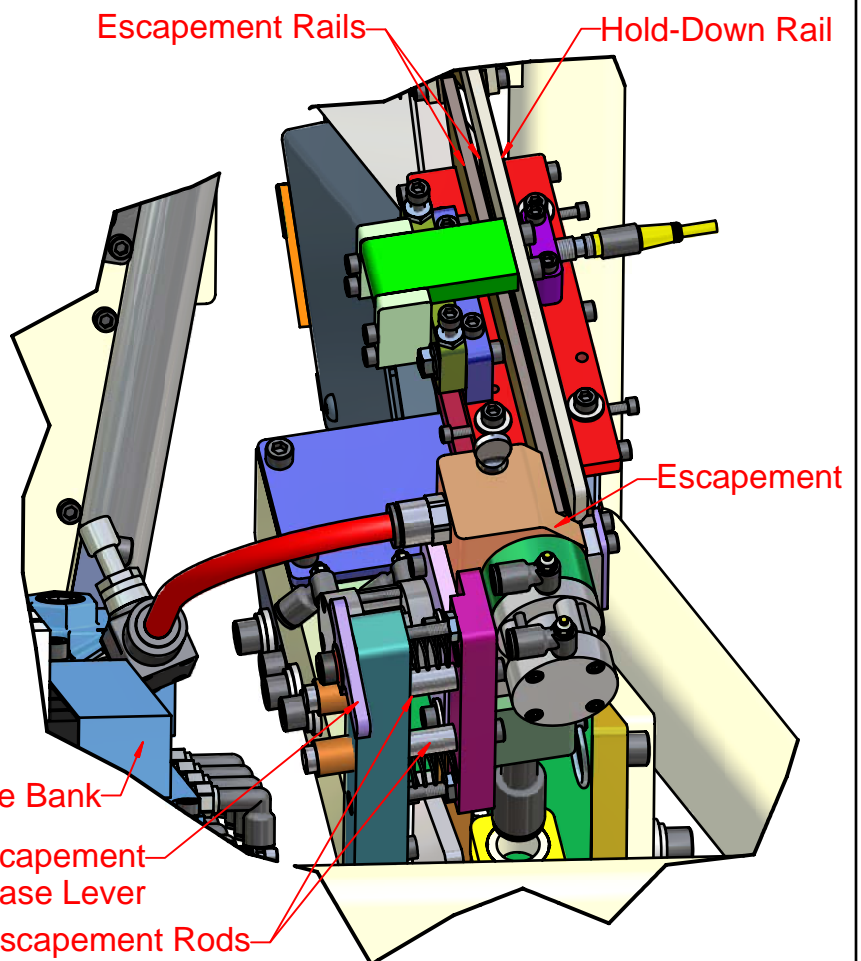
# Quick Clean-Out

This Screwfeeder is equipped with features that allow you to quickly remove the screws from the unit for quick & easy color changes or maintenance



## To Empty the Hopper

1. Place a box under the Chute to catch the screws as they fall out.
2. While pulling down on the Spring Plunger, slide out the Hopper Bottom Plate.
3. Allow the screws to slide down the Chute & remove any remaining screws from the Screw Lift Plate.



## To Remove Screws from the Track

1. Put a box under the Escapement Rails, (or hold a hand under them) to catch the screws as they fall out.
2. Rotate the Escapement Release Lever to allow the Escapement to slide.
3. Carefully slide the Escapement along the Escapement Rods towards the Valve Bank to release the screws.
4. Collect the Screws.
5. Slide the Escapement back to its original position.
6. Rotate the Escapement Release Lever to lock the Escapement in its operating position.

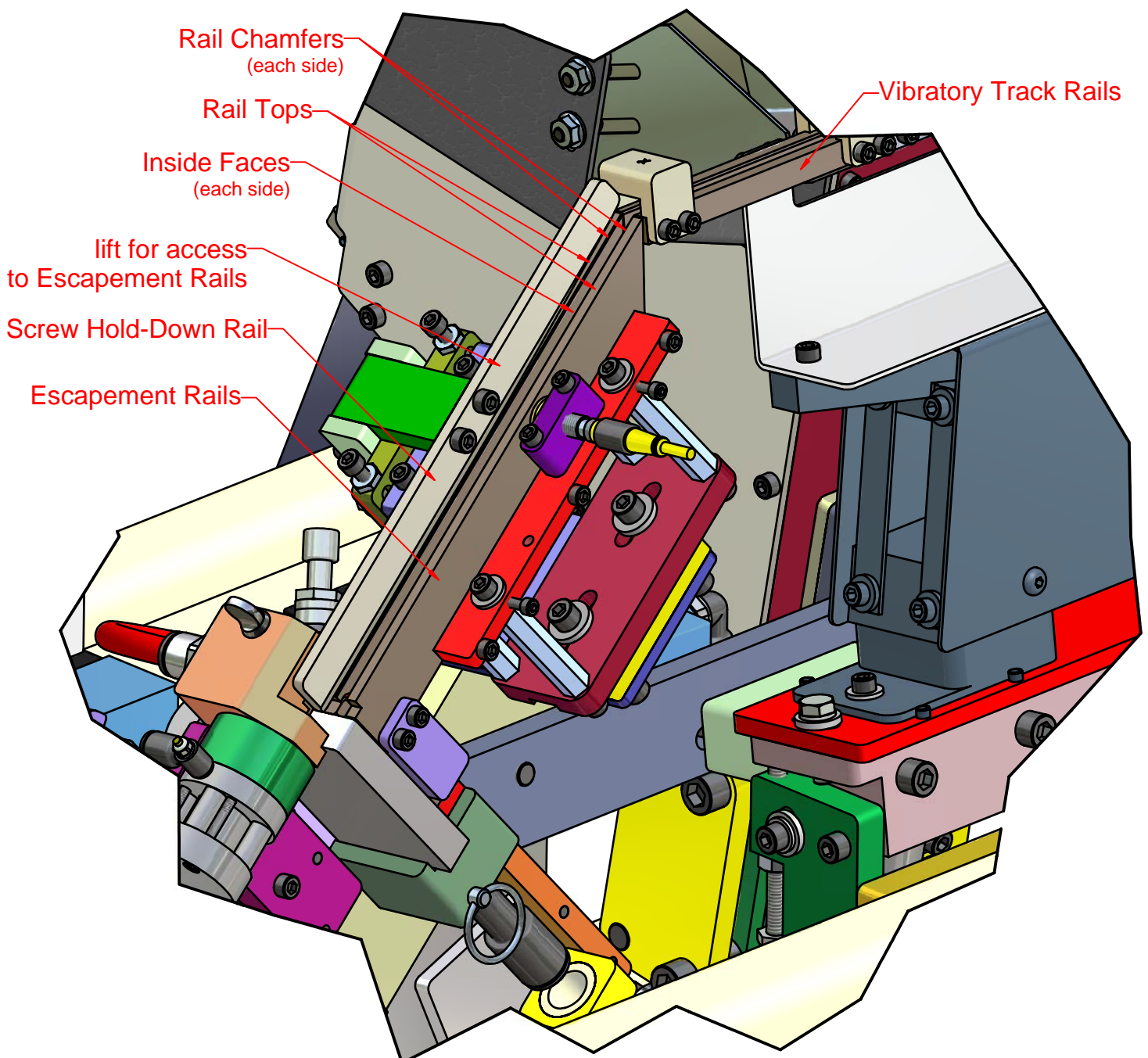
← Slide Escapement this way to release screws

# Cleaning the Rails

Due to the dust & dirt commonly found in boxes of screws and manufacturing facilities, the rails that the screws ride in have a tendency to get dirty & require periodic cleaning. Alcohol & a soft cloth should be used to remove any dirt or debris build-up on the rails. Be careful not to scratch the rails or shift them out of adjustment while cleaning. For proper operation, the tops, chamfers, & inside faces of the Vibratory Track Rails & Escapement Rails need to be clean (see below). Lift the Screw Hold-Down Rail for access to the Escapement Rails.

Clean the contact surfaces of the Screw Hold-Down Rail as well.

*To reduce dirt & debris build-up, the screwfeeder must be supplied with clean, dry air.*



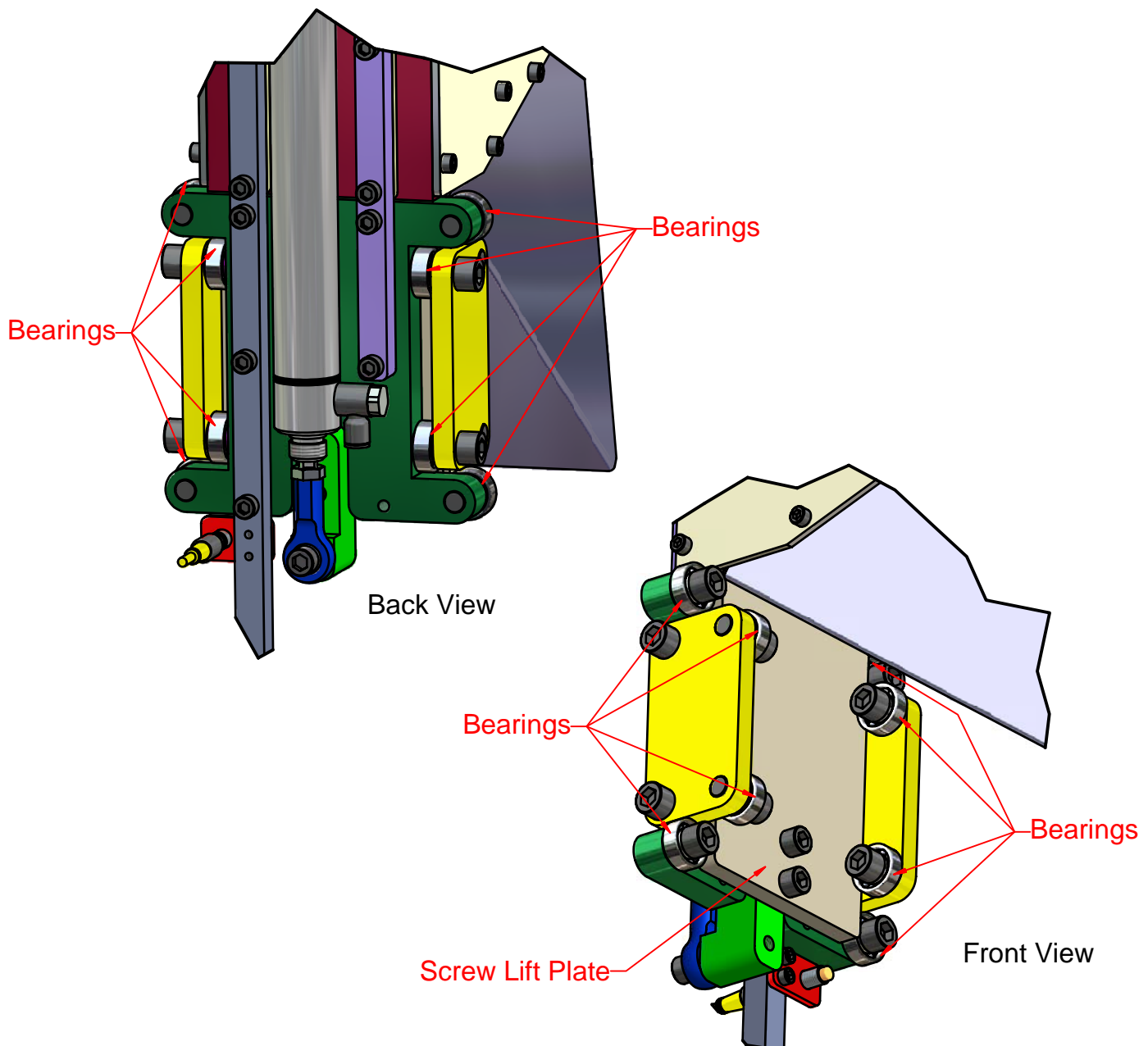
# Screw Lift Bearing Cleaning

Although the Hopper is designed to let dirt and debris fall through it harmlessly, the amount of debris and dirt that is common in screws and manufacturing plants will eventually build-up on the bearings. This must periodically be removed for long bearings life and proper machine function.

It is time to clean the bearings when the Screw Lift Plate no longer moves smoothly throughout its range of motion.

This is a relatively simple process with the guards off of the machine and should be done as a part of your regular maintenance routine.

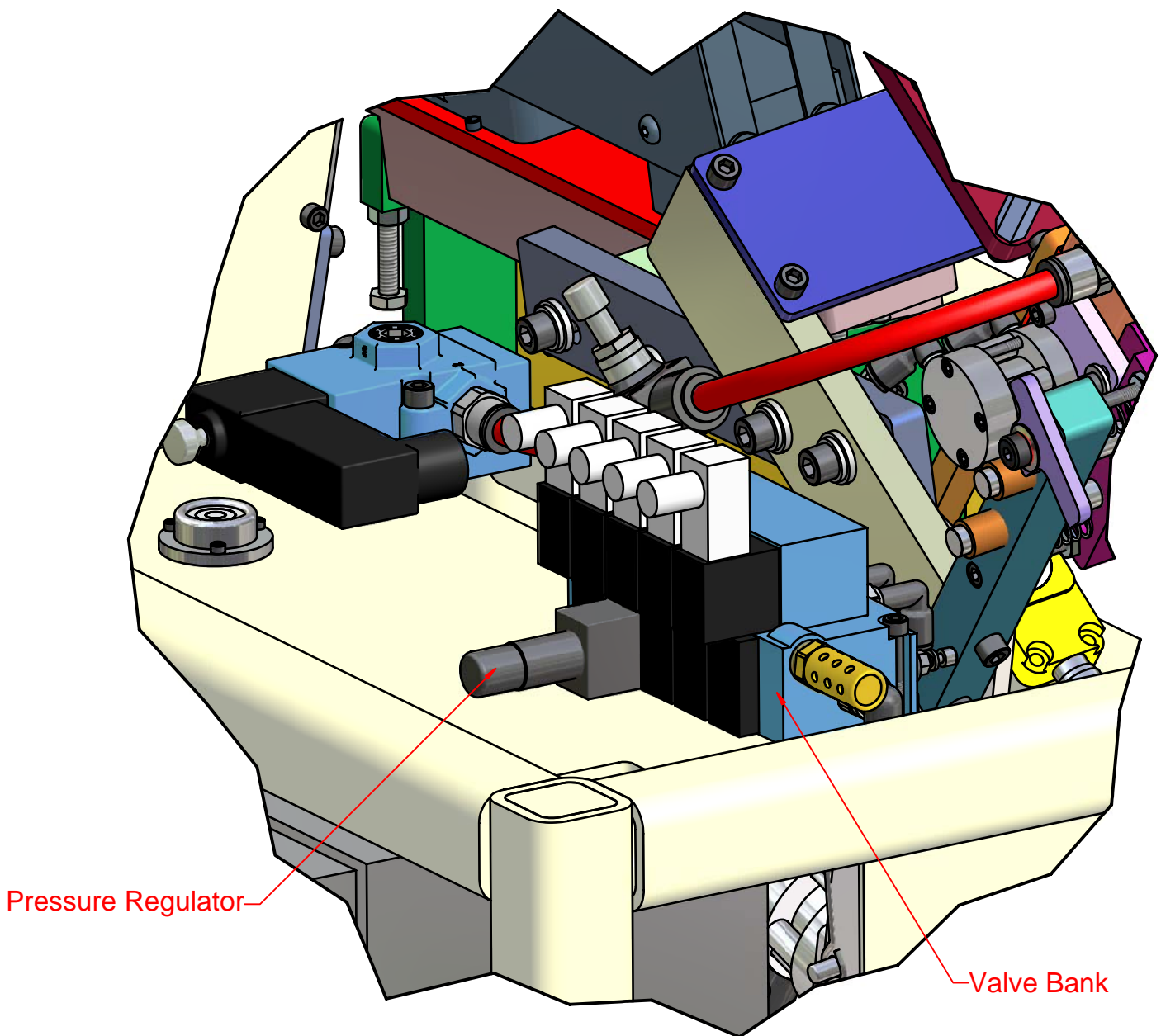
Alcohol and a shop cloth will usually remove the build-up easily with a minimum of hassle.



# Screw Lift Force Adjustment

The Screw Lift air pressure should be adjusted to minimize the lifting force of the Screw Lift Cylinder.

This can be adjusted using the Pressure Regulator mounted on the Valve Bank





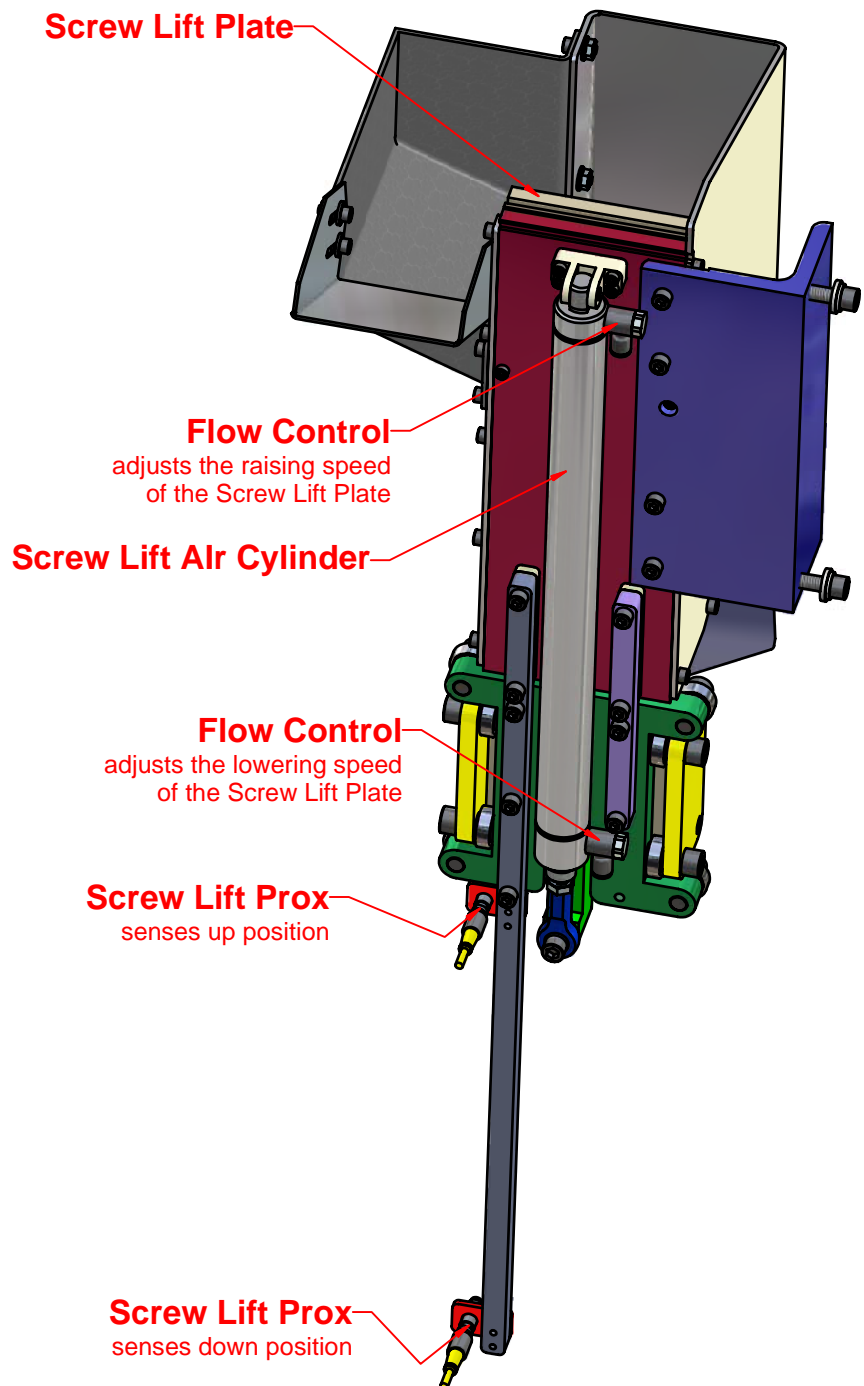
# Screw Lift Adjustment

The Screw Lift speed is determined by adjusting the Flow Controls. The Flow Controls should be set to a speed that fully lifts & lowers the Screw Lift Plate in the time allotted by the controls program. The slower it can move, the longer the parts will last while minimizing noise and vibration.

The Screw Lift Plate is sensed with Proxes at both the raised and lowered positions. The Proxes should be adjusted so the Screw Lift Plate is sensed within the last 1/8" of travel in each direction.

Verify that the proxes are functioning properly by the LED built into the body of the Prox. The Upper Prox LED should remain lit except for when the Screw Lift Plate is in its raised position. The Lower Prox LED should be lit only when the Screw Lift Plate is in its lowered position.

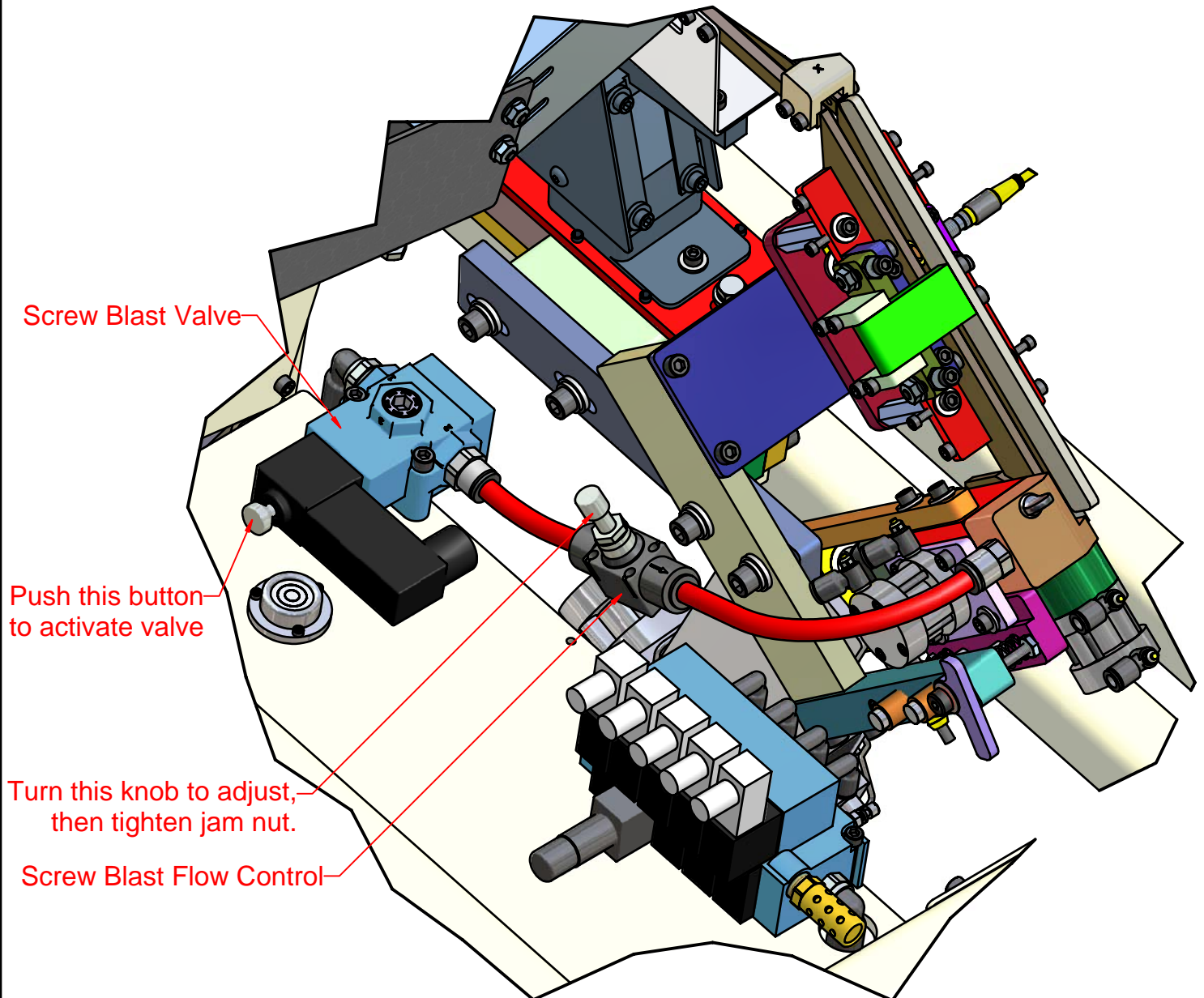
Check to make sure the Proxes can't contact the Screw Lift Plate at any point.



# Screw Blast Adjustment

The Screw Blast sends the Screw from the Escapement, Through the Diverter, and to the Screwdriver Jaw via Tubing.

Although the Screw Blast was adjusted while setting up your machinery, it may need to be adjusted to get the Screws to the Screwdriver reliably.



## **To adjust the duration of the screw blast**

Adjust the program settings on the PLC controlling the screwfeeder.

## **To adjust the volume (force) of the screw blast**

-Adjust the flow control located on the air line going to the escapement. (turn the knob clockwise to reduce the flow, counterclockwise to increase the flow.)

-If it doesn't function appropriately, verify that the arrow on the flow control points to the escapement (as shown).

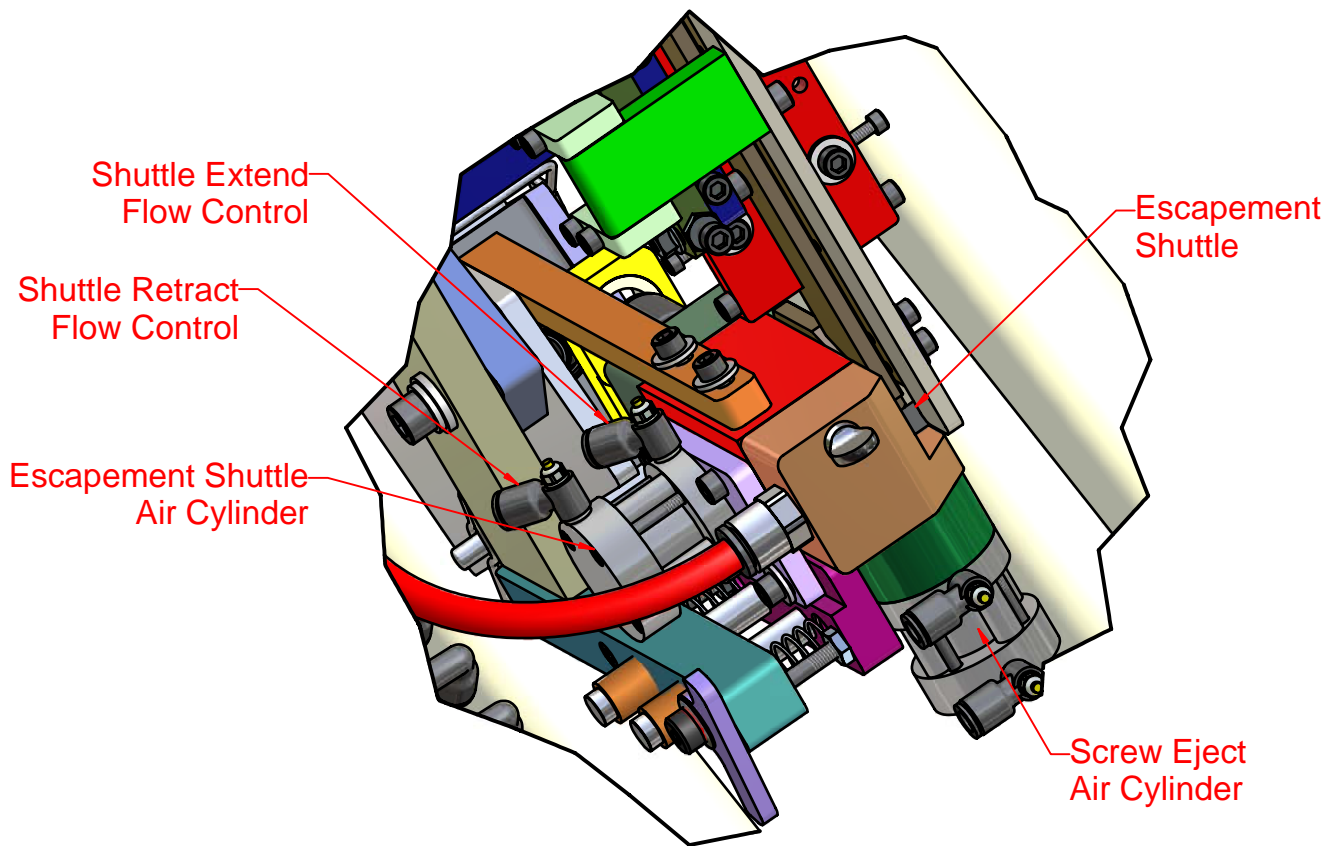
- To test the screw blast, activate the solenoid on the valve indicated above.

# Escapement Shuttle Speed

The Flow Controls on the Escapement Shuttle Air Cylinder need to be properly adjusted.

The Shuttle Retract Flow Control should be set so the shuttle moves slow enough that the screw remains stable in the shuttle, but fast enough to be ejected by the Screw Eject Air Cylinder.

The Shuttle Extend Flow Control should move at the appropriate speed for your particular screw. It needs to move fast enough for the screw to fall into the screw slot, but not so slow that the screw doesn't have the time to get into the screw slot.

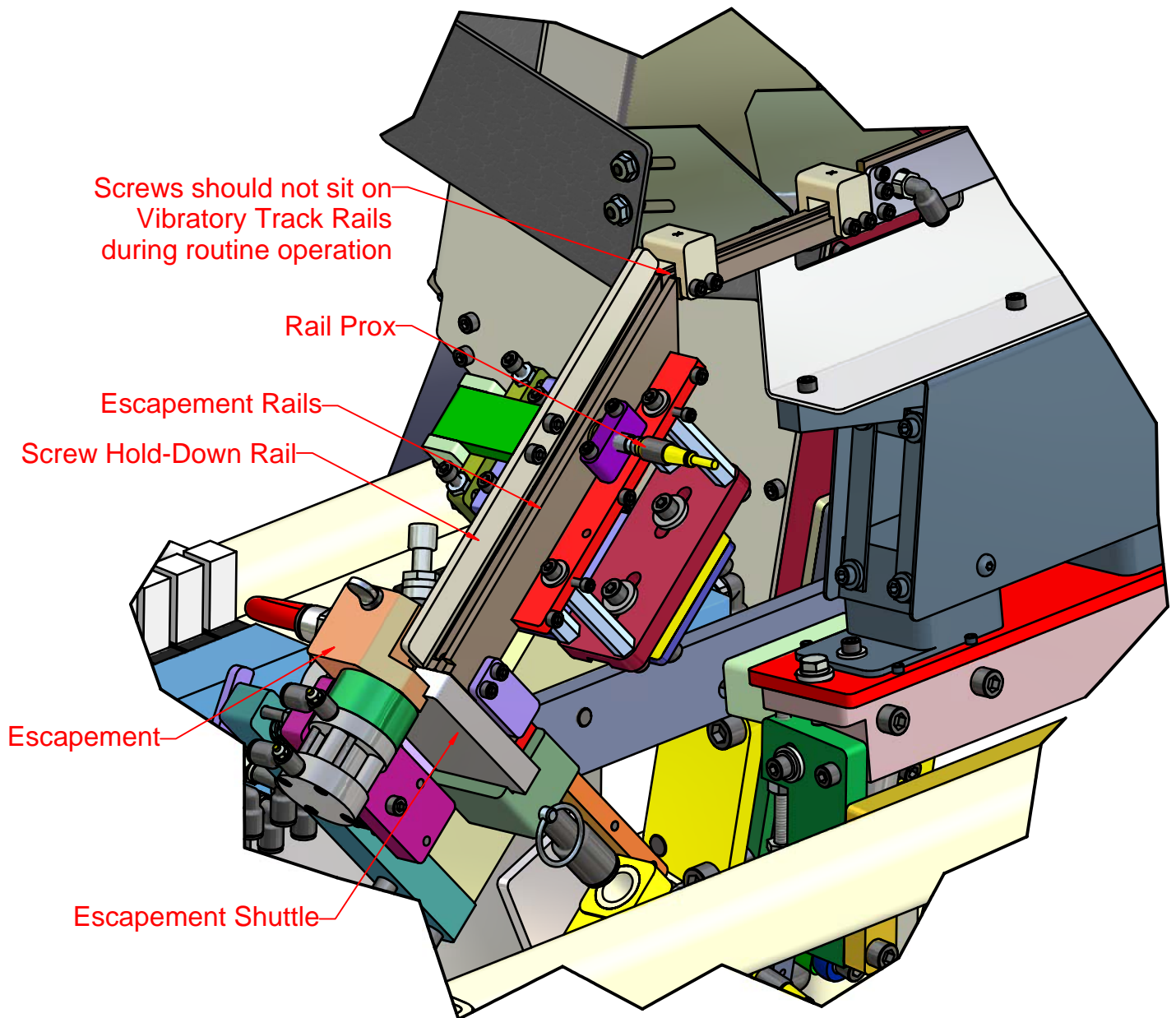


# Proper Screw Back Pressure

Proper back pressure is critical to reliable screwfeeder operation. Although the amount of back pressure varies per application, a general rule is that the screws should not back up until they sit on the Vibratory Track Rails during standard operation. This generates a lot of noise, extra wear and is generally an indicator that the screwfeeder is generating too much back pressure.

The Rail Prox regulates the Screw Lift. The Screw Lift should not cycle continuously during regular operation.

Proper screw back pressure will reliably push the screw into the Escapement Shuttle's screw slot, but will not force the screw to tip out of the screw slot.



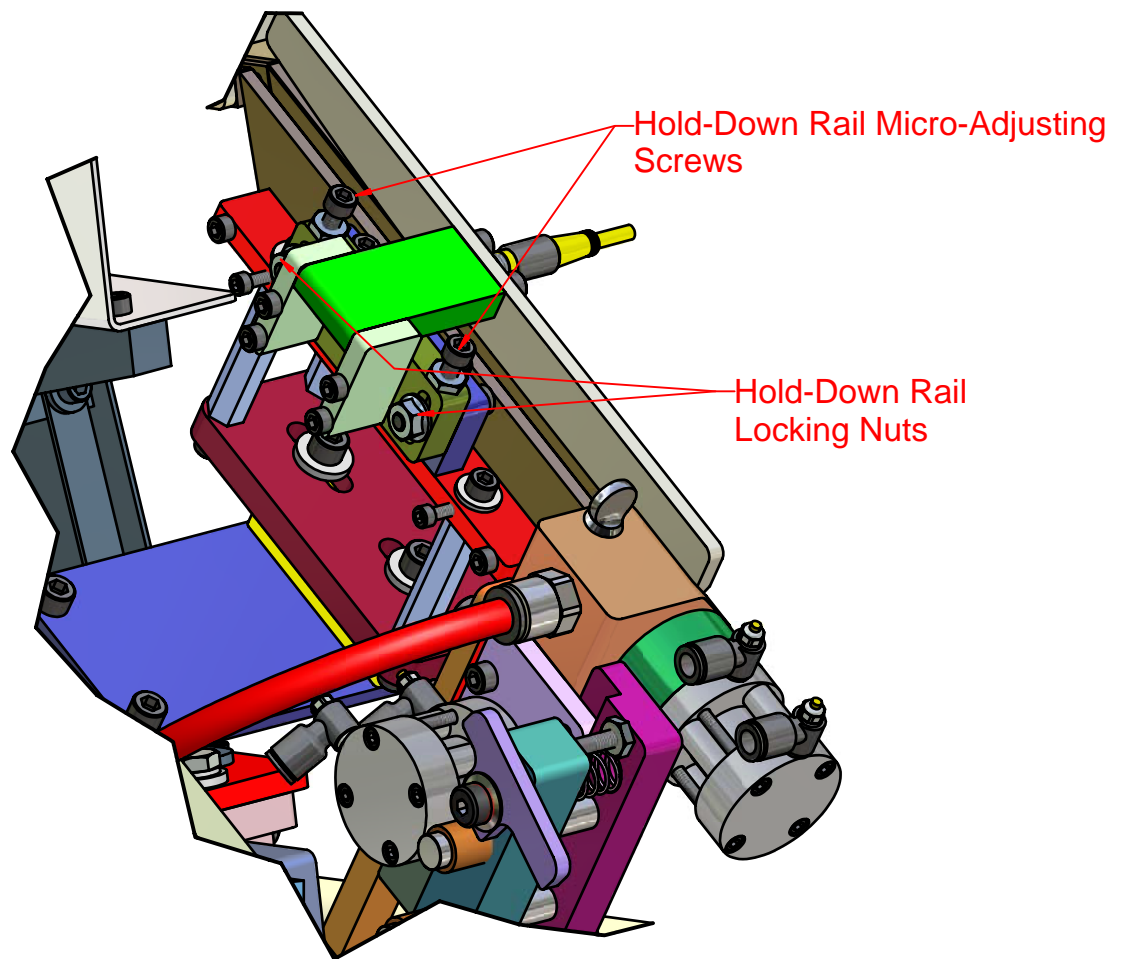
# Screw Hold-Down Adjustment

One of the most critical adjustments on the screwfeeder is the Hold-Down Rail. It is set to match the feed characteristics of your particular screw & feeder set-up. *Adjustments should only be made after the rails are properly cleaned to ensure that adjustment is actually warranted.*

If the screws don't slide down the escapement rails uniformly, the rails should be raised slightly to allow the screws to slide properly.

If the screw tips out of the Escapement Shuttle screw slot. The Hold-Down Rail may need to be lowered to reduce Back Pressure.

**Before any Adjustments are made, The current settings must be noted to ensure that you can return to existing settings should it prove necessary.**



## TROUBLESHOOTING

If your Staco, Energy Products Co. Variable Transformer fails to function properly check the following:

### A. ROCKER SWITCH NOT LIGHTED

Power is not getting to the unit.

1. Is the switch turned on?
2. Is the plug properly seated into a socket?
3. Is the socket turned on (has a fuse or circuit breaker opened)?

### B. ROCKER SWITCH LIGHTED

Power is getting to the unit.

1. Is the load properly connected to the unit?
  2. Is the fuse in the Variable Transformer functional?
  3. Is the load functional?
  4. If there is no output under this condition, check the brush and replace if necessary.
- C. If the above procedures fail to isolate the source of trouble, refer the problem to a qualified repair technician.

## MAINTENANCE

No regular maintenance is required on Staco Energy Products Co. Variable Transformers as long as the ratings of the unit are not exceeded. Normally, the brush may be expected to last the life of the unit. Occasionally, brushes may need replacement. Should this become necessary, it is essential that a new or reinstalled brush be properly seated. With power off, insert a piece of fine garnet paper or crocus cloth between the brush and the commutator surface with the abrasive side toward the brush. A few swings of the brush across the abrasive will mate the surfaces. Remove the paper or cloth and blow away loose particles of brush or abrasive before applying power.

Consult table for replacement brush assemblies.



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## INSPECTION

Prior to installation we recommend the following:

1. Check the nameplate to verify that the unit received matches the rating specified in your order.
2. Verify that the line frequency, current and voltage rating are suitable for your application.
3. Inspect the unit for visible signs of shipping damage.
4. Make sure that the knob rotates freely and that a functional fuse is properly installed in the fuse holder.
5. Report missing or damaged parts to the factory.

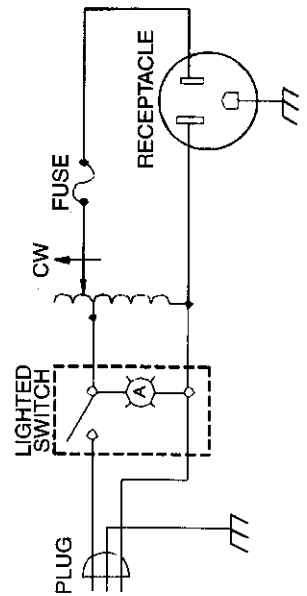
### PRECAUTIONS

1. Be absolutely sure that the voltage and frequency to be used match the ratings of the unit before applying power.
2. The unit is provided with a 3-conductor grounded cord and plug, it is recommended that it be connected to a corresponding grounded receptacle. If an adapter must be used, be sure to ground the green neutral wire. **DO NOT CUT OFF THE GROUNDING PIN OF THE PLUG!**
3. The current drawn by the load must be within the current rating of the Staco Variable Transformer.

## INSTALLATION

Installation consists of inserting the plug on the line cord of the variable transformer into a suitable power line receptacle and similarly connecting the load to the receptacle provided on the unit. Most models provide for permanent mounting to a bench or wall surface by means of screws. This is optional, so screws are not provided; but standard wood or machine screws of the proper diameter to fit the holes are recommended. L series models have a slot at the top rear of the case to allow for wall mounting. All units are connected for clockwise voltage increase.

### TYPICAL SCHEMATIC



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## AUTOTRANSFORMER MODELS

TYPE	INPUT		VOLTS	OUTPUT			Replacement Brush Part No.	FUSE TYPE	AC METER	
	NOMINAL VOLTS	LINE HZ		Constant Load		Constant Impedance Load				
				MAX AMPS	MAX KVA					MAX AMPS*
L221B	120	60	0-132	1.75	0.23	—	—	—	ABC-3	—
3PN221B	120	60	0-132	2.50	0.33	—	—	—	ABC-3	—
L501B	120	50/60	0-140	4.5	0.63	—	—	—	MTH-5	—
3PN501B	120	50/60	0-140	5.0	0.70	—	—	—	MTH-5	—
L1010B										
L1010BVA										
3PN1010B	120	50/60	0-140	10	1.4	—	—	—	ABC-12	—
3PN1010BV										
3PN1010BA										
3PN1020B										
3PN1020BV	240	50/60	0-280	3.5	0.98	—	—	—	MTH-4	0-300V
3PN1020BA										0-5A
3PN1210B	120	60	0-120	12	1.44	1.5*	1.80	—	ABC-12	—
3PN1220B	240	60	0-240	5.0	1.2	7.0*	1.68	—	3AG-6-1/4	—
3PN1510B										
3PN1510BV	120	50/60	0-140	15	2.1	—	—	—	ABC-15	0-150V
3PN1510BA										0-15A
3PN1520B										
3PN1520BV	240	50/60	0-280	9.5	2.66	—	—	—	ABC-10	0-300V
3PN1520BA										0-10A
3PN2210B	120	50/60	0-140	2.2	3.08	—	—	—	FLM-25	—
3PN2520B	240	50/60	0-280	10	2.8	—	—	—	ABC-10	—

## ISOLATION TRANSFORMER MODELS

3PN201B											
3PN201BV	120	50/60	0-140	2.0	0.28	—	—	—	AGC-2	0-150V	—
3PN201BA										0-5A	—
3PN401B											
3PN401BV	120	50/60	0-140	4.0	0.56	—	—	—	MTH-4	0-150V	—
3PN401BA										0-5A	—

\*All units come from the factory fused for the maximum constant current load.  
 ++ 0-150V voltmeter and 0-10A ammeter.