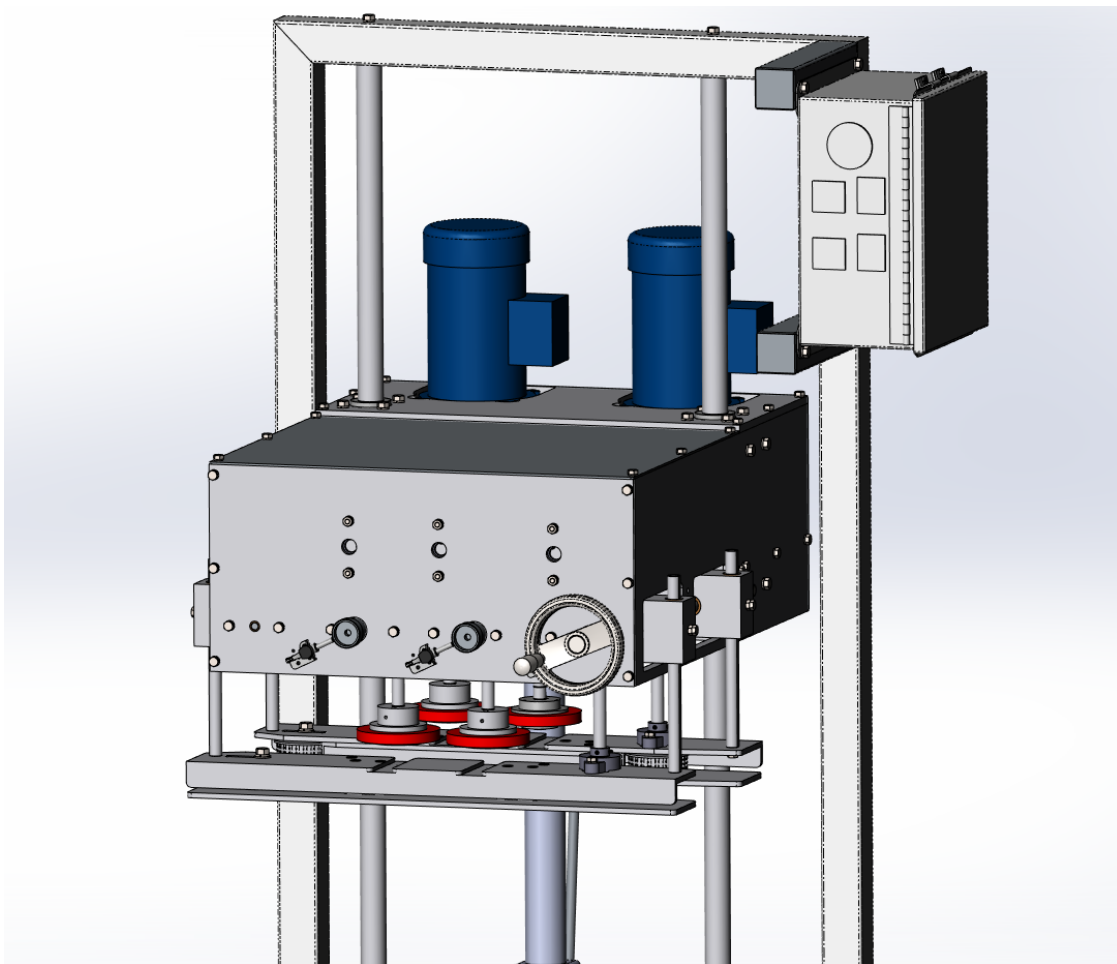


OPERATIONS MANUAL

2-STATION CAP TIGHTENER



2-STATION CAP TIGHTNER

Record the information below for servicing and maintenance throughout the life of the machine.

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SAFETY PRECAUTIONS AND WARNING SUMMARY

Listed below are general safety precautions, as well as a summary of Warnings found throughout this Manual. **READ AND UNDERSTAND ALL OF THEM PRIOR TO DOING ANYTHING WITH THIS EQUIPMENT.** Failure to read and understand all safety precautions and Warnings may risk injury to personnel or damage to the equipment.

Only individuals trained and qualified to work on this equipment may perform maintenance, troubleshooting, diagnostic, or repair work on it.

Never insert fingers into any part of machine.

Note the location of the EMERGENCY STOP (E-STOP) button on the top of the Operator Control Panel and advise all personnel as to its location. It is used to instantly stop the machine.

Never bypass any safety devices specifically designed for and built into the machine.

Do not operate or perform work on this machine with clothing that is too loose or hair that is too long.

Always perform all maintenance or repair work in accordance with your facility's Lock-Out / Tag-Out Procedures and in compliance with all applicable industry and government codes and guidelines.

Make sure all electrical equipment is properly grounded prior to operation.

Make sure machine power is off before opening the electrical box.

Make sure that any replacement parts installed in this machine meet all applicable industry and government standards and that they have been designed to meet the specific load and function for the intended application.

Always follow all established facility guidelines and applicable codes concerning the use of lifting and moving devices. Improper lifting or moving of equipment could cause injury to personnel or damage to the equipment.

Following any lubrication procedure, always clean off and remove all excess lubricant before returning machine to production. Failure to do so may compromise product integrity or machine performance.

Make sure all tasks are performed with enough personnel to safely perform them.

MACHINE SPECIFICATIONS AND FACILITY POWER REQUIREMENTS

Machine specifications for the 2-station cap tightener are listed below. Because not all applications are the same, it is always best to refer to the electrical schematic diagram that came with the machine. It can be found inside the electrical box. Always make sure machine power is off before opening the electrical box. Also refer to the information labels located on the machine itself.

SPECIFICATION	ENGLISH UNITS	METRIC UNITS
Typical processing speed	10 - 100 bottles per minute	
Typical bottle / cap sizes	1/2oz - 2.5 gallon 8 - 120mm	15ml - 10L 8 - 120mm
Power input	110 / 220VAC single phase 50 / 60Hz	
Power consumption	10 / 20 AMP	
Air pressure		
Air volume		
Machine dimensions: * Length Width Height * some customer installations may vary from these numbers	34 in 36 in 65 in	86.4 cm 91.4 cm 165.1 cm
Machine weight (with the crate)	~ 575 pounds	~ 260.8 Kg

GLOSSARY OF TERMS

Change-Over the process of changing from one product, bottle, or cap to another

Clutch the final set of spindles which tighten the caps to final torque based on customer specification

Gripper Belts	the looped belts which guide the bottles through the capper
Spindle Wheels	another name for the rubberized bearings on each spindle
Spindles	the long cylinders to which are attached either the bearings or the clutches

UNCRATING THE MACHINE



WARNING

Make sure all tasks are performed with enough personnel to safely perform them.

1. Remove top and sides of crate, but leave the machine attached to crate base.
2. Carefully lift crate base with machine still attached to it using a forklift and carefully move machine into desired position. Make sure forklift forks extend through the entire crate base or skid.



WARNING

Always follow all established facility guidelines and applicable codes concerning the use of lifting and moving devices. Improper lifting or moving of equipment could cause injury to personnel or damage to the equipment.

3. Once machine is in desired position, remove the banding straps and bolts securing the machine to the crate base or skid.
4. Carefully lift the machine again and remove the crate base or skid from under it.
5. Once the machine itself is on the floor in the desired position, complete the uncrating process by removing any tie wraps or guards securing moving machine parts during shipment.

INTRODUCTION AND THEORY OF OPERATION

The spindle capper receives bottles with caps and automatically tightens the caps. Gripper side belts and cap stabilizer hold caps and bottles in place while rubberized tightening discs (spindle wheels) contact the cap on opposite sides and spin the cap down. Clutches allow just the right torque on caps. Bottles do not stop during the continuous operation of tightening. Standard unit can take 1 to 2 tightening stations, Bottle sizes of from 1/2 an ounce to 2.5 gallons can be run.

Key machine features include:

- 1 to 2 cap tightening stations
- individual spindle adjustments
- hand gripper belt height adjustment
- can accommodate a huge range of cap types, including flat, tall, sport, Yorker, CRC, flip-top, pump sprayer, and trigger sprayer
- heavy-duty portable frame

Based on specific applications, machine options include:

- spindle clutches
- power height adjustment
- hazardous (NEMA 1) electrical
- NEMA 4 electrical

Suitable applications for this machine are

- pharmaceuticals
- cleaners
- bottled water
- juices
- foods
- chemicals

OPERATOR CONTROLS

Operator controls are explained below. Refer to Figures 1 through 6.

The Operator Control Panel is located on the right side of the machine. Refer to Figure

Figure 1. OPERATOR CONTROL PANEL.



OPERATOR CONTROLS (continued)

An Emergency Stop (E-STOP) button is located on the front of the machine. To activate it, press it in and the machine will shut down immediately. To release it and resume operations, pull it out. Refer to Figure 2.



Figure 2. EMERGENCY STOP (E-STOP) BUTTON.

The capper is turned on or off using the Capper Power Switch. Refer to Figure 3.

Figure 3. POWER HEIGHT SWITCH (optional)

The Power Height control adjusts the height of the capper housing. Refer to Figure 4. To raise or lower the capper power box, move the selector switch to the desired function (up or down), hold the selector switch until the capper power box is positioned as desired, then release the selector switch.



OPERATOR CONTROLS (continued)

Capper spindle power and speed are controlled using the Spindle Power Switch and Spindle Speed Control. Refer to Figure 5. To increase the speed of the spindles, rotate the speed control dial clockwise. To decrease spindle speed, rotate the speed control dial counterclockwise.

Figure 5. SPINDLE POWER AND SPEED CONTROLS



Gripper belt power and speed are controlled using the Belts Power Switch and Belts Speed Control. Refer to Figure 6. To increase the speed of the gripper belts, rotate the speed control dial clockwise. To decrease belt speed, rotate the speed control dial counterclockwise.

Figure 6. GRIPPER BELT POWER AND SPEED CONTROLS.



SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS

The information in this section is a guide for proper machine function. In general, there are several good practice set-up and adjustment tips that should be followed for reliable operation. These are listed below. It may also be useful to refer to the Troubleshooting section of this Manual, as the information in these 2 sections complement each other and both contribute to proper machine function. When changing from one bottle or cap to another, requiring a change to the settings of the adjustment control knobs based on those new requirements, see your Supervisor or a facility Maintenance representative.

1. Make sure the speed of the conveyor belt is the same as the speed of the gripper belts.
2. To ensure proper line performance during production, the conveyor belt must be level, the capper must be level with the conveyor belt, and the gripper belts must be level with the conveyor belt. Refer to the figures below for detailed views of machine leveling points.
- 3a. Place a level on the conveyor belt and verify that it is level. Refer to Figure 7.

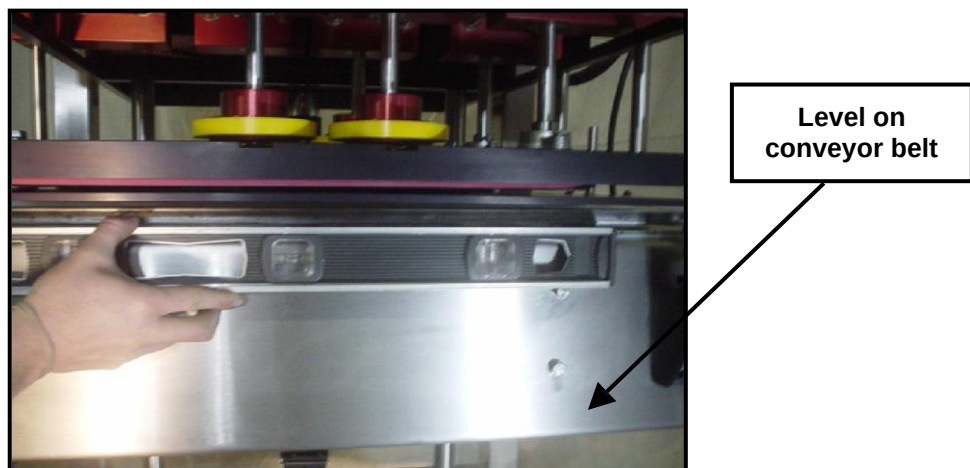


Figure 7. LEVEL THE CONVEYOR BELT.

SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS (continued)

- 3b.** Place a level across the front of the capter housing and verify that it is level from side to side. Refer to Figure 8.



Figure 8. LEVEL THE CAPPER HOUSING FROM SIDE TO SIDE.

SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS (continued)

- 3c.** Place a level from front to back under the capper housing to verify that the capper housing is level from front to back. Refer to Figure 9.

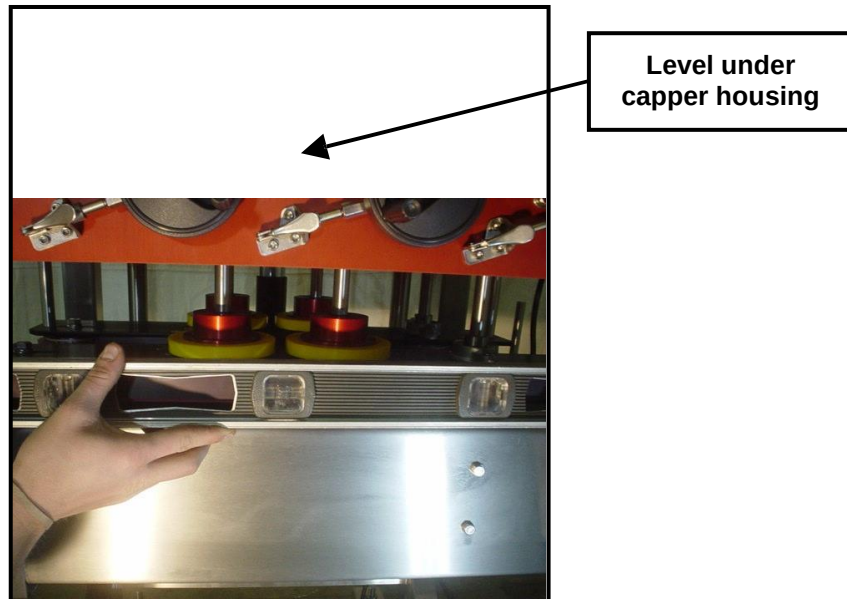


Figure 9. LEVEL THE CAPPER HOUSING FROM FRONT TO BACK.

- 3d.** Make sure the gripper belts are level from side to side by placing a level across the top of the gripper belt assembly. Refer to Figure 10.

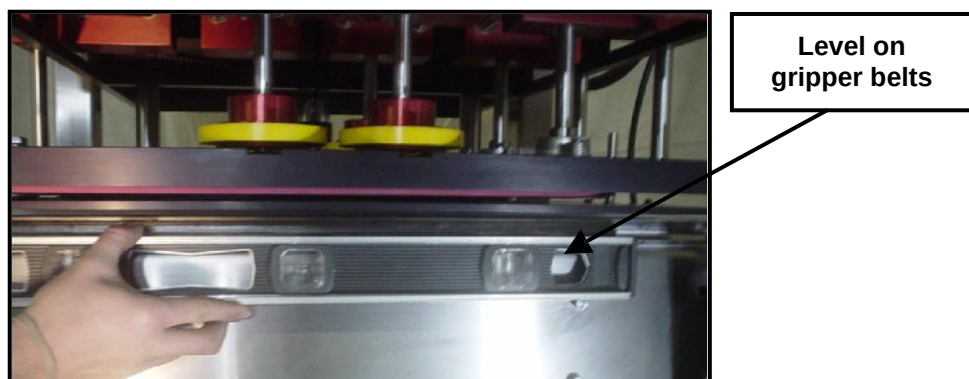


Figure 10. LEVEL THE GRIPPER BELTS FROM SIDE TO SIDE.

SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS (continued)

- 3e. Make sure the gripper belts are level from front to back by placing a level across the in-feed side of both sets of belts. Refer to Figure 11. of

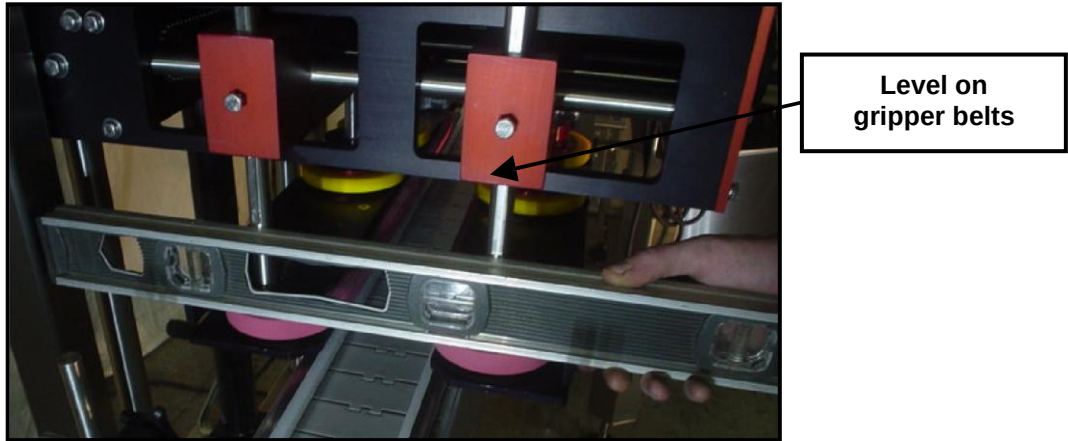


Figure 11. LEVEL THE GRIPPER BELTS FROM FRONT TO BACK

SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS (continued)

- 4a.** Spindle width adjustments are made with individual controls. Refer to Figure 12.



Figure 12. SPINDLE WIDTH ADJUSTMENT CONTROLS.

- 4b.** Both pairs of spindles should be level along the line. Refer to Figure 13. When running taller caps, however, it may be necessary to raise the first pair of spindles.

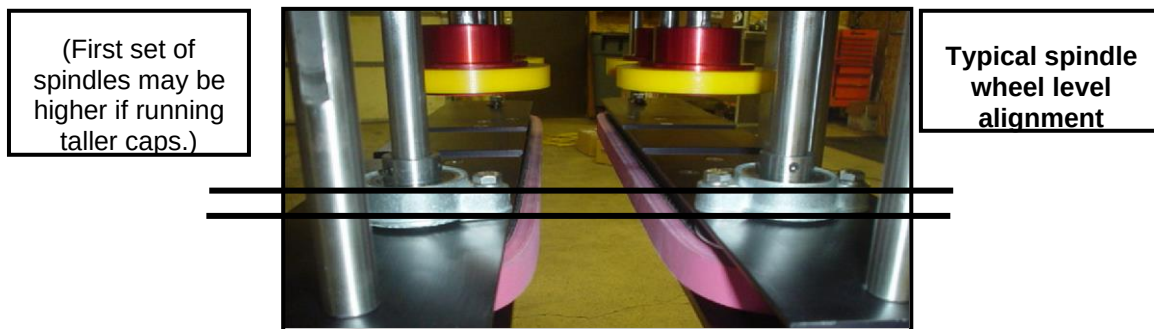


Figure 13. LEVEL SPINDLE ALIGNMENT.

- 4c.** Spindle wheels must support capped bottle. Refer to Figure 14.

SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS (continued)

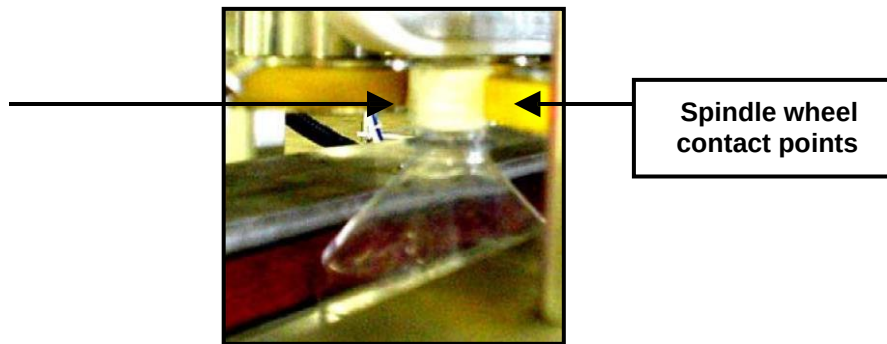


Figure 14. PROPER SPINDLE WHEEL CONTACT WITH CAP.

- 4d.** On the last set of spindles, (if equipped) set the clutch torque nut by turning it clockwise (CW) to tighten (plus torque) or counterclockwise (CCW) for less torque (minus torque). Refer to Figure 15.

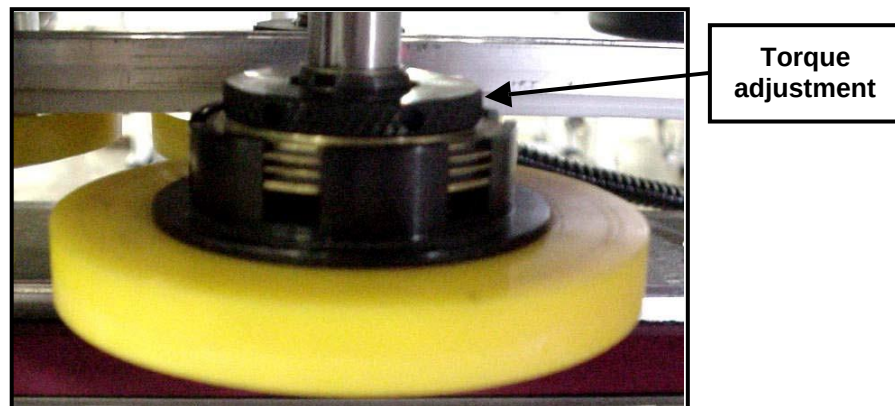


Figure 15. CLUTCH TORQUE NUT.

- 5.** The gripper belts function together to contact and support the stable part of the bottles passing between them. Make sure the gripper belts are set to the proper height and width to contact and support the stable part of the bottle. Refer to Figures 16, 17, and 18.
- 6a.** Gripper belts can be raised or lowered Independently by hand by loosening the bolts on the front and rear guide blocks. Refer to Figure 16.

SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS (continued)

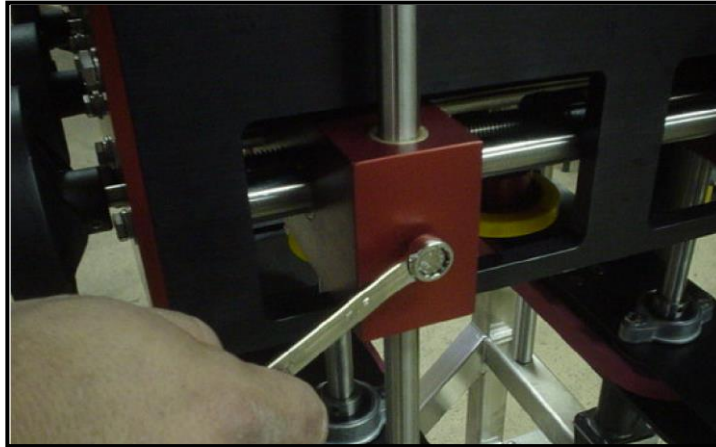


Figure 16. GRIPPER BELT HEIGHT CONTROL.

- 6b.** The distance between the gripper belts can be adjusted as needed. Refer to Figure 17.



Figure 17. GRIPPER BELT WIDTH CONTROL.

- 6c.** Set the gripper belts to contact and support the stable part of the bottle. Refer to Figure 18.

SET-UP, CHANGE-OVER, AND MACHINE ADJUSTMENTS (continued)

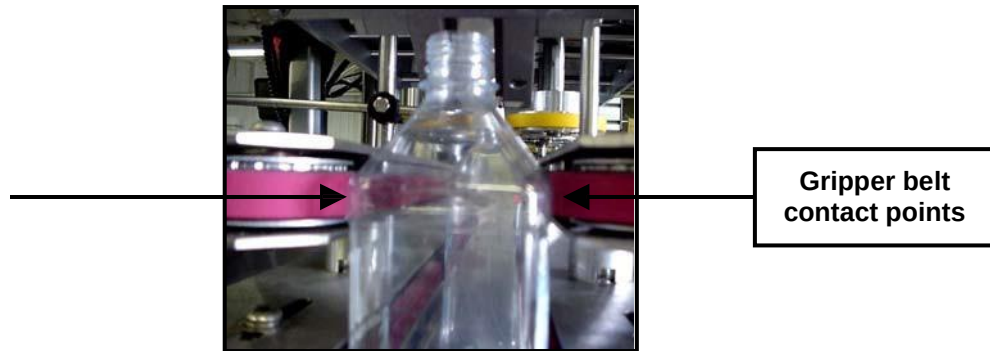


Figure 18. PROPER GRIPPER BELT CONTACT WITH BOTTLE.

NOTE

When a change-over has been implemented to run different product, bottles, or caps, or when any change has been made to the machine settings, it is useful to restore power to the line and perform a test run prior to resuming production to verify proper line speed and operation. Performing a pre-production test run will help identify and eliminate any unresolved concerns which could negatively impact your production run.

OPERATING INSTRUCTIONS AND SEQUENCE OF OPERATION

After setting up, adjusting, and testing the capper as described earlier in this Manual, perform the steps below to run production. Refer to the Operator Controls section of this Manual for photographs and descriptions of the operator control buttons.

NOTE

Make sure all settings have been made and verified as described in the Set-Up, Change-Over, and Machine Adjustments section of this Manual. If additional changes or adjustments are desired, see your Supervisor or facility Maintenance representative.

NOTE

1. Release the red Emergency Stop (E-STOP) button by pulling it out. The E-STOP is located at the top of the Operator Control Panel.
2. The spindles and gripper belts, have their own individual power switches. Turn all of these power switches to the ON position.
3. Once all of the individual component power switches have been placed in the ON position, as described above, the spindles and gripper belts begin to cycle. The capper is now ready to run production.
4. Capper machine operation is described below.
 - a. The first set of spindles begins the cap tightening process.
 - b. The last set of spindles, called clutches, completes the cap tightening process by achieving the desired cap torque or tightness in accordance with customer and product specification.
5. Operator should monitor line operation during production, check for ample cap and bottle supply, as well as proper machine and line function.

ROUTINE MAINTENANCE

Listed below are some common components found in a wide variety of liquid packaging machinery. Note that not all of these components are found in all machines. The purpose of this listing is to provide a general overview concerning good sense maintenance practices and some basic tips regarding how to prolong the useful life of the machine.

In all cases, following any lubrication procedure, always clean off and remove excess lubricant before resuming production.

ITEM	TASK	FREQUENCY	COMMENTS
Bearings	lubricate	semi-annually	multi-purpose or food-grade grease
Chains	lubricate	semi-annually	90-weight gear lube
Gear reducers	lubricate	semi-annually	90-weight gear oil (fill only to lower plug as over-filling will cause the excess to leak out the vent)
Guide shafts	lubricate	semi-annually	silicone spray

Following any lubrication procedure, remember to always clean off and remove all excess lubricant before resuming production. Failure to do so may compromise product integrity or machine performance.

GRIPPER BELT MAINTENANCE AND REPLACEMENT

To clean the gripper belts without damaging the texture of the belt, use a mild detergent with water for best results. A sponge or fine scotch-bright pad will also increase the cleaning effectiveness. Be sure belts are completely dry before resuming production. Never use any type of alcohol or other petroleum product to clean the urethane belts.

Replacing the belts is best performed by breaking the task into smaller sections. It is good practice, as well, to replace all of the gripper belts at one time. This procedure is written to reflect that. It is recommended to read the entire procedure before starting work.

NOTE

This process is best performed by two people working together to better support the various components during disassembly and re-assembly.

NOTE

It is best to perform this process from front to back during disassembly, then from back to front during re-assembly to better access the various components during the process.

GRIPPER BELT MAINTENANCE AND REPLACEMENT

Once the capper housing is all the way up, shut off all machine power.

- 1.** To remove the belts on the upper front and back gripper belt assemblies, perform Steps 2a through 2d below. Refer to Figures 19 and 20.
- 2a.** Loosen, but do not remove, the two idler pulley tension button head bolts. Refer to Figure 19.

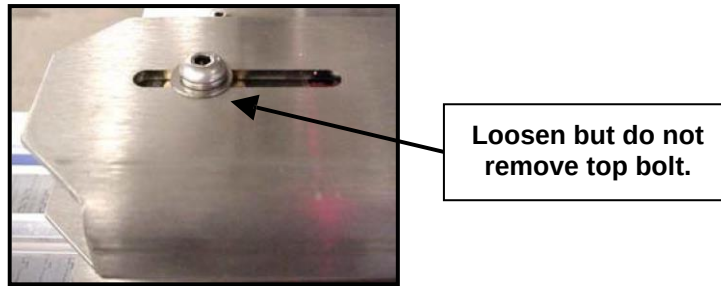


Figure 19. IDLER PULLEY TENSION BOLT.

- 2b.** From the underside of both assemblies, remove the bottom idler pulley bolt. Refer to Figure 20. Retain mounting hardware.

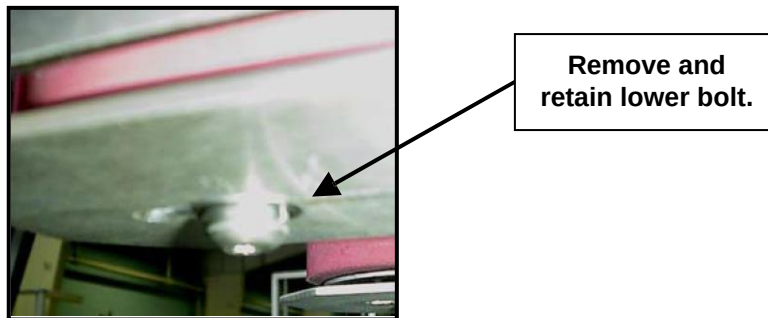


Figure 20. BOTTOM

IDLER PULLEY BOLT.

GRIPPER BELT MAINTENANCE AND REPLACEMENT

Your machine has only one pair of gripper belts, perform the steps below

1. Note and record the height of the capper housing using a graduated rule.
2. Raise the capper housing for better access to the work area, then shut off machine power.
3. Loosen, but do not remove, the two idler pulley tension button head bolts.
4. From the underside of both assemblies, remove the bottom idler pulley bolt. Retain mounting hardware.
5. Remove the small bolts securing the gripper belt assembly protective plate. Once these bolts are removed, the plate will come off. Retain all mounting hardware for re-use.
6. Once the protective plate is off, remove the existing belt.

7. To replace the gripper belts on the front and back gripper belt assemblies, perform Steps 8 through 13 below. Remember to re-assemble the back assembly first and then the front for full access to the work area.
8. Position the replacement belt as the old one had been.
9. Re-assemble the gripper belt assembly with the protective plate in place. Align mounting holes.
10. Re-install the small bolts through the plate that were removed in Step 5.
11. From the bottom, re-install the idler pulley bolt removed in Step 4 above.
12. Move the idler pulley tension bolt loosened in Step 3 to the full out position, then tighten it. To prolong the life of the new belt, there should be approximately 1/2 an inch of slack in the belt so it isn't too tight. Adjust idler pulley tensions bolt(s) as needed.
13. Restore machine power, lower capper housing to its original height as noted in Step 1 of this section. Perform a test run to ensure proper function and alignment before resuming production.

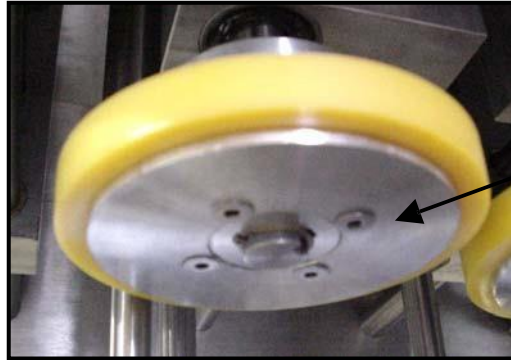
SPINDLE WHEEL REPLACEMENT

Depending on production volume, it will be necessary to replace the spindle wheels located at the ends of each spindle. It is recommended to replace all of them at one time. The process is slightly different for the spindles with the clutch assemblies. Both are covered in this section.

To replace the spindle wheels, perform the steps below.

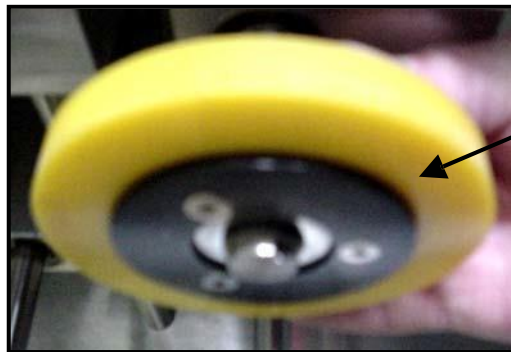
1. Note the height of the capper housing using the graduated rule on the side of the housing assembly.
2. Raise the capper housing box to its full height to permit sufficient work clearance.
3. Turn off all machine power.

4. Raise and brace each spindle and remove the flathead screws securing the lower spindle plate to the bottom of the spindle shaft. Refer to Figures 21 and 22. Use an 1/8-inch Allen wrench. Retain the screws for re-use. With the screws removed, the lower plate will come off. Retain the plate for re-use.



Remove
four bolts
and plate.

Figure 21. SPINDLE WITHOUT CLUTCH.



Remove
three bolts
and plate.

Figure 22. SPINDLE WITH CLUTCH.

SPINDLE WHEEL REPLACEMENT (continued)

5. After the lower spindle plate is removed, work the wheel off the spindle shaft.
6. Insert the replacement disk up onto the spindle shaft, positioned as the original wheel had been.
7. Position the lower spindle plate onto the bottom of the spindle shaft and align mounting holes.
8. Reinstall the flathead screws removed in Step 4.
9. Return the spindles to their normal down position.
10. Restore machine power.
11. Lower the caper housing back down to its original height.
12. Perform a test run before resuming production. Make sure that when they are rotating, the spindle wheels all appear “flat” from all angles and not wobbling or wavy. It is important for all the spindle wheels to be level to ensure equal contact with and equal pressure on each capped bottle passing between them.

TROUBLESHOOTING

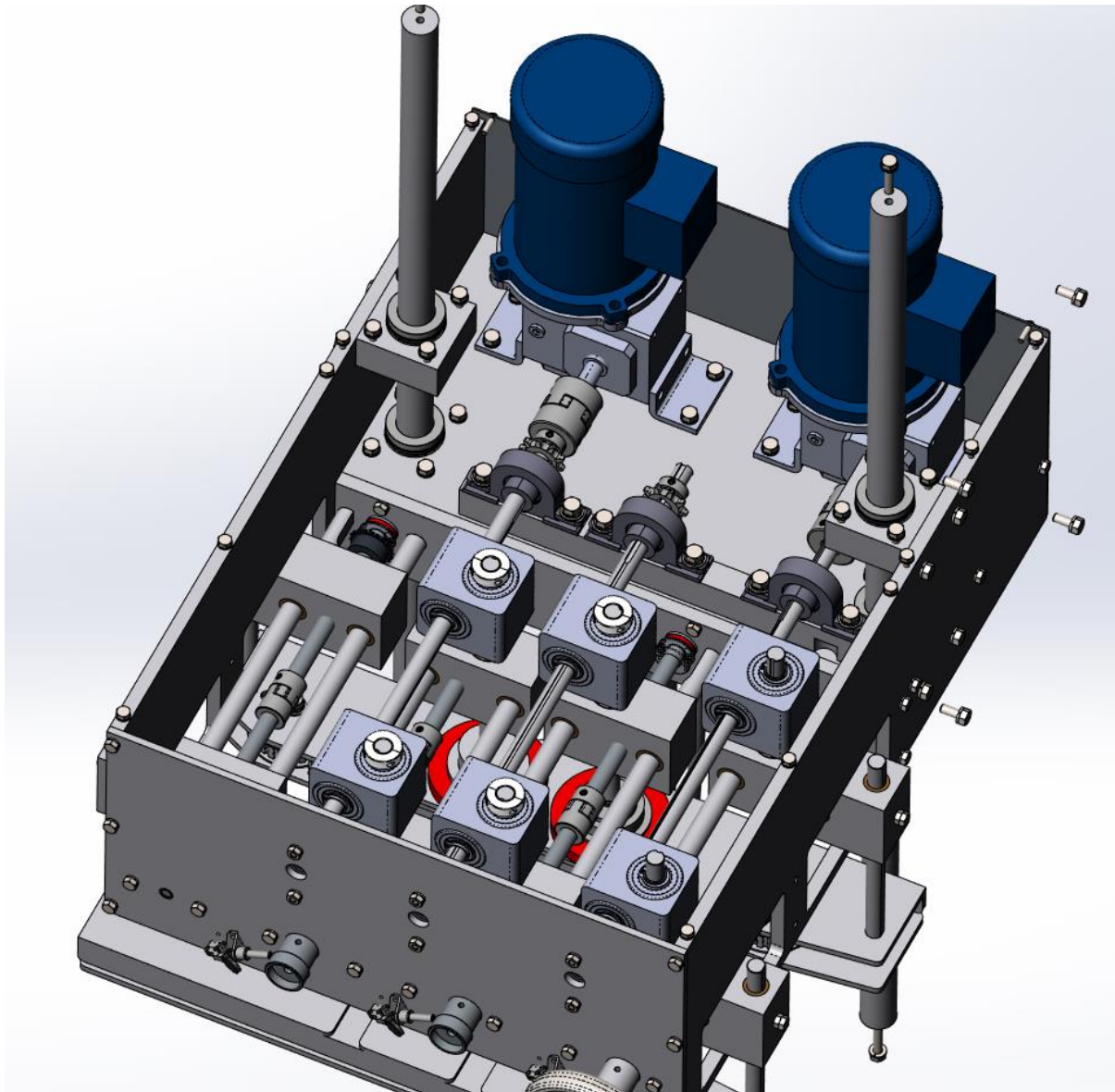
Listed below are some common situations that may occur over the life of the capper. Each symptom is followed by some possible causes.

It may also be useful to refer to the Set-Up, Change-Over, and Machine Adjustments section of this Manual, as the information in these 2 sections complement each other and contribute to proper machine function.

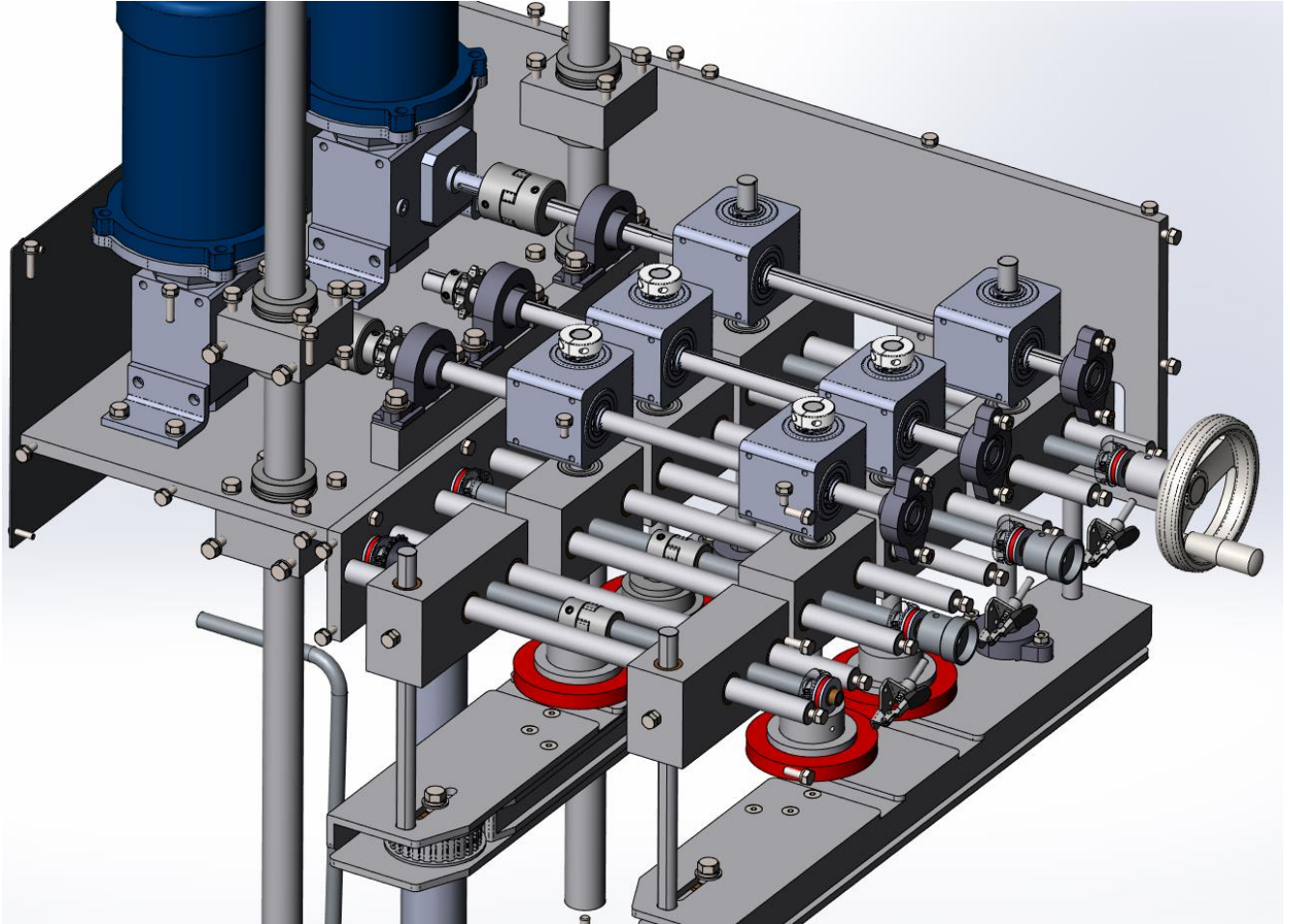
SYMPTOM	COMMENTS
Loose cap on bottle.	Check both 2 spindle stages for proper function.
	Check spindle alignment.
	Check spindle clutch for proper function.
	Check for damaged or worn spindle wheels.
	Check that spindle wheels contact the stable part of the cap.
Destroyed cap on bottle.	Check spindles to ensure proper position for bottles and caps being run.
	Wheels could be too tight or too fast.
Bottle tipping.	Make sure bottle enters gripper straight and that gripper belts aren't squeezing bottle.
	Check alignment of spindle wheels.
	Check bottle travel path through capper for obstructions.
	Check that gripper belts and conveyor belt are traveling at the same speed.
	Check tightness of gripper belts on bottle.
	Make sure the spindle wheels are centered on the cap and that both have the same amount of torque.

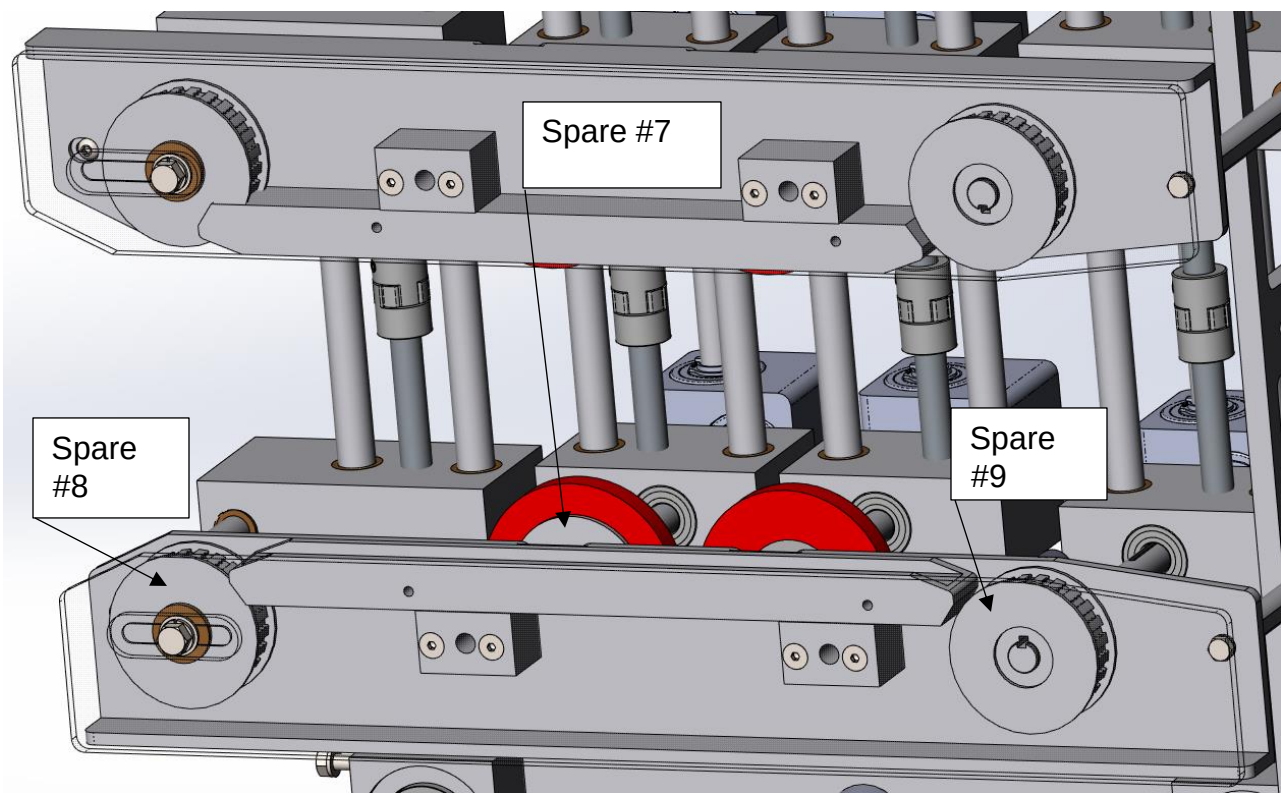
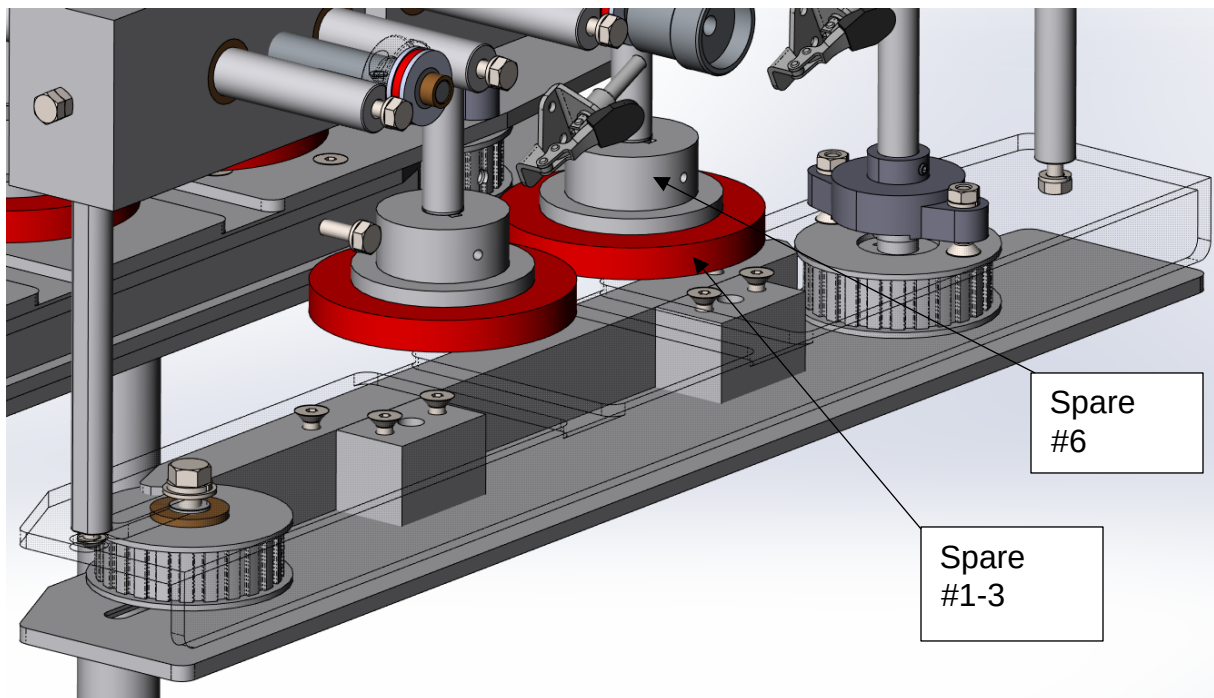
ASSEMBLY DRAWINGS

On the following pages are the assembly drawings for the 2-station cap tightener. Use them to verify assembly and for confirmation of part numbers, spare parts ordering, and related information.

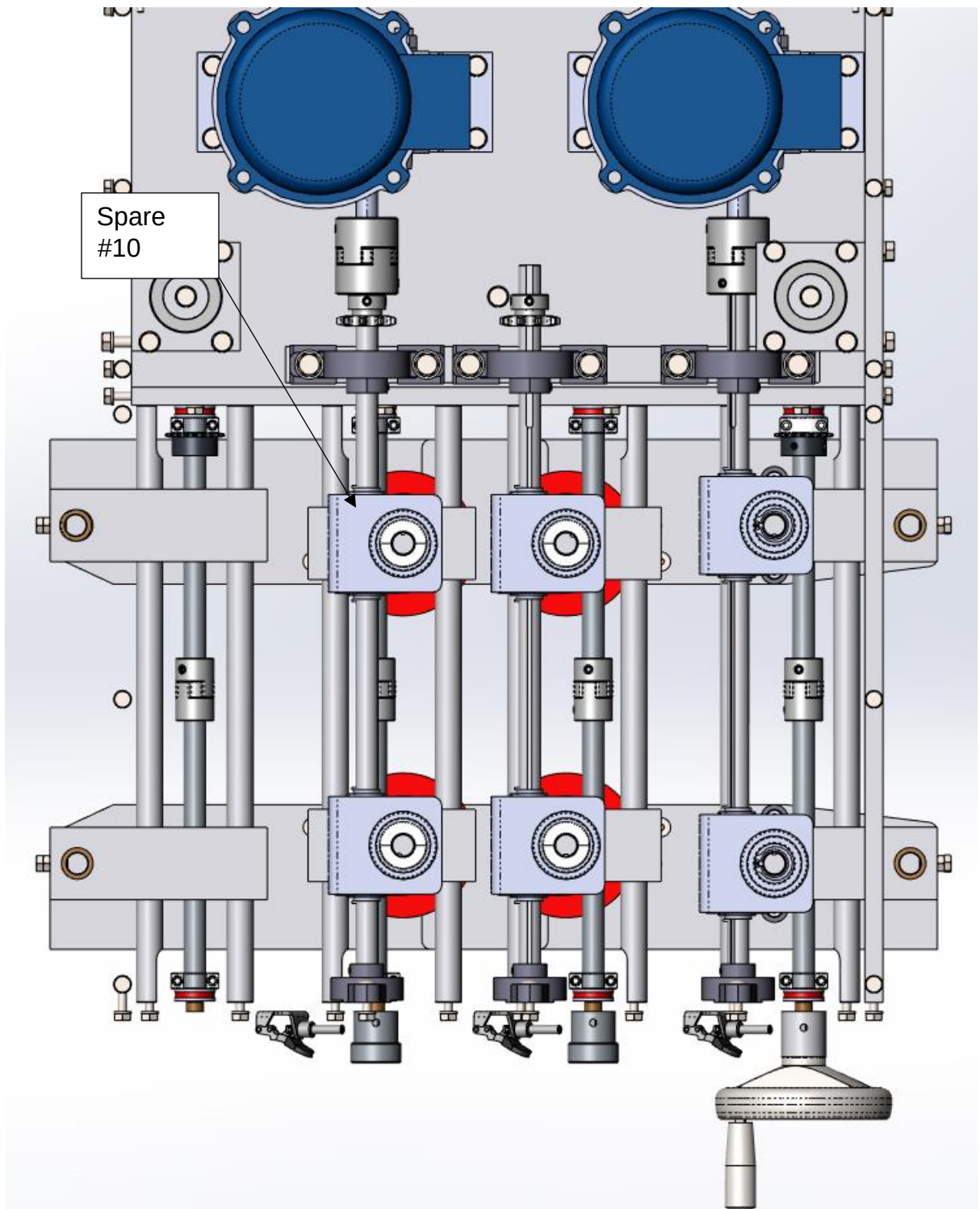


CABINET ASSEMBLY





GRIPPER ASEMBLY



Inner Housing Assembly

SPARE PARTS KIT

The spare parts listed below are available from and should be purchased directly through Apex Filling Systems to ensure proper form, fit, and function to satisfy customer-specific applications. The part numbers shown for the items below are assigned by Apex Filling Systems and do not necessarily correspond to any part numbers assigned by the manufacturer. Apex Filling Systems cannot guarantee the usability or suitability of any spare parts not purchased directly from Apex.

Common Spare Parts:

1. Red Spindle Wheel Durometer 53, PN: 10510-00013
2. Grey Spindle Wheel Durometer 70, PN: 10510-00016
3. Tan Spindle Wheel Durometer 70, PN: 10510-00017
4. Gripper Belt, PN: 10508-00005

Uncommon Spare Parts:

5. Spindle Clutch, PN: 10510-00001
6. Spindle Wheel Hub, PN: 11608-00038
7. Spindle Hub Retaining Ring, PN: 11604-00025
8. Idle Pulley, PN: 10502-00012
9. Drive Pulley, PN: 10502-00013
10. Right Hand Gearbox, PN: 10506-00006