ELPO Pendulum System - Maintenance & Service Procedures

This section will describe service procedures for major mechanical elements of your system.

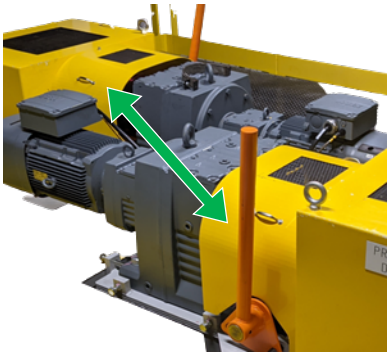
⚠ WARNING ⚠

Only qualified and trained personnel should perform the disassembly and assembly of electrical and mechanical components.

How to Switch Main Gearmotor Caterpillar Drive to Standby Gearmotor

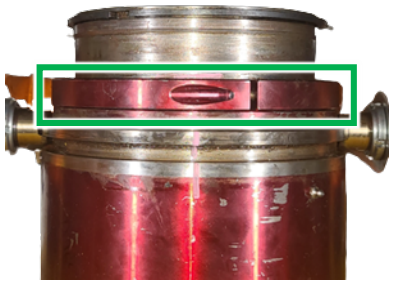
1 Lock out power to the pendulum system per your plant's procedure.

2 Remove the covers for both motor couplers.



3 Remove the fan covers from the rear of the electric motors.

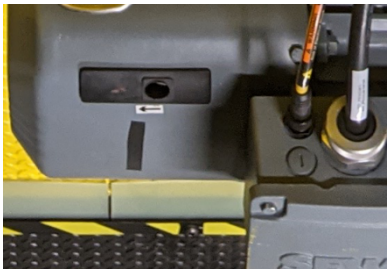
4 Remove the locking collar that is mounted on the coupler for the Main gearmotor.



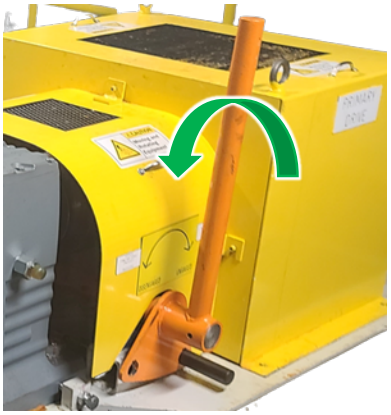
5 Remove the lever pin that holds the lever for the Main gearmotor coupler in the engaged position.

6 Manually release the brake on the Main gearmotor.

This releases any remaining tension on the conveyor chains.



7 Pull this lever towards the gearmotor to disengage the coupler.

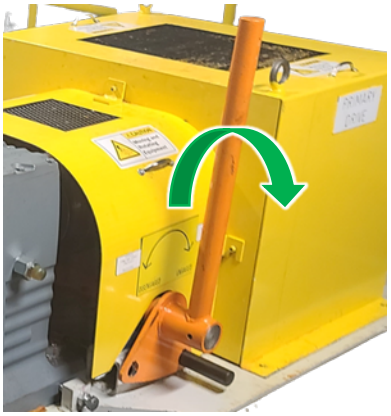


8 Insert the lever pin to hold this lever in the disengaged position.

This lever should angle towards the gearmotor and the lever pin is in the left slot.

9 Remove the lever pin that holds the lever for the Standby gearmotor coupler in the disengaged position.

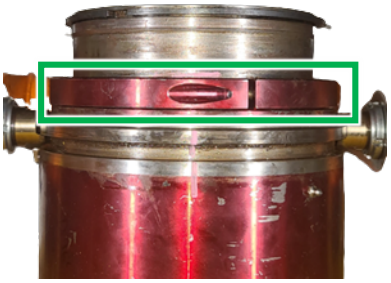
10 Pull this lever away from the gearmotor to engage the coupler.



11 Insert the lever pin to hold this lever in the engaged position.

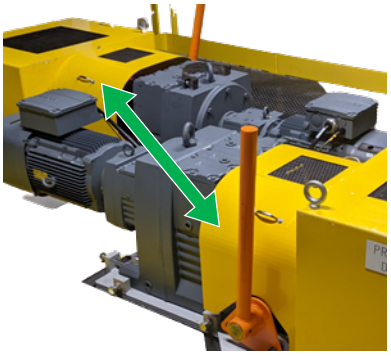
This lever should be vertical and the lever pin in the right slot.

12 Install the locking collar onto the coupler.



13 Reassemble the fan cover on the rear of the motor and make sure the end coder is not loose.

14 Install the covers for the motor couplers.



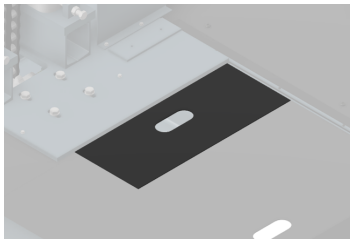
15 Perform the necessary functions at the HMI to inform the system controls that the Standby gearmotor is functional.

16 Power up and run the system in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the Pendulum Conveyor to service.

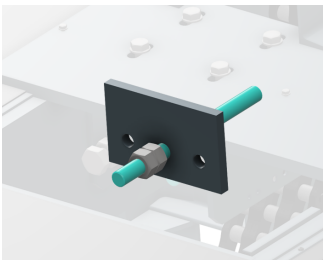
Pendulum Drive Triple Chain Inspection & Tension Procedure

Pendulum Drive Triple Chain Inspection

1 Remove the hatch plate adjacent to the drive chain guard to gain access to the triple chain tension assembly.



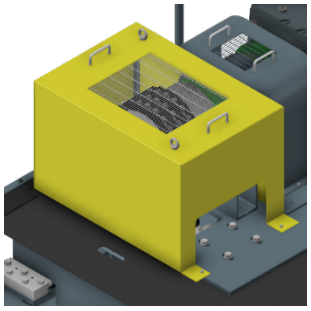
2 Observe the gap between the triple chain tension plate and jam nut. If the gap is 5mm or less, schedule a PM task to monitor the chain tension and evaluate if tensioning is necessary. If there is no gap, the chain must be tensioned.



Pendulum Drive Triple Chain Tension

3 Return the hatch plate. Lock out power to the pendulum system per your plant's procedure.

4 Identify the proper chain to be tensioned and remove the drive chain guard from the upper platform by removing the M8 bolts (4).

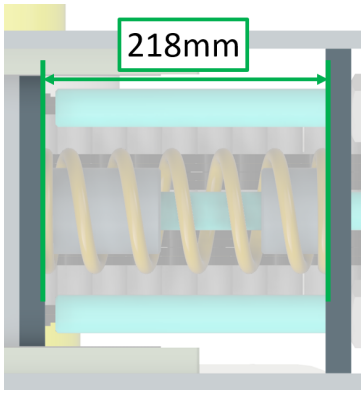


4 Loosen the M20 mounting bolts (4).

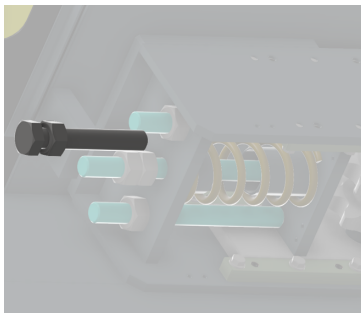
5 Remove the safety gate to gain access to the lower platform.

6 Measure the gap between the plates on either end of the spring. The gap length should be 218mm.

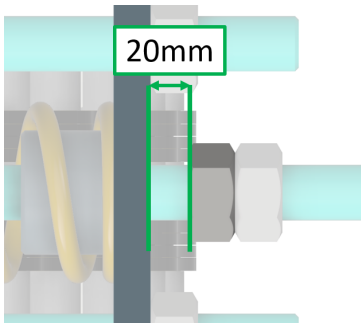
NOTE *This dimension is critical in maintaining proper tension. If 218mm is not achieved, adjustments should be made accordingly.*



7 Use the jackbolt on the back of the triple chain tension assembly to make necessary adjustments.

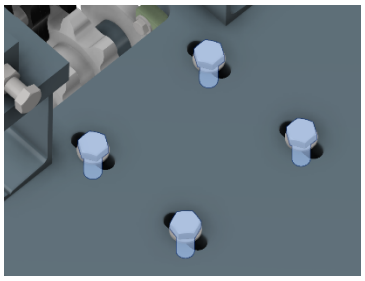


8 The set dimension for the jam nut gap is 20mm and should be returned after plate dimension is achieved from step 6.

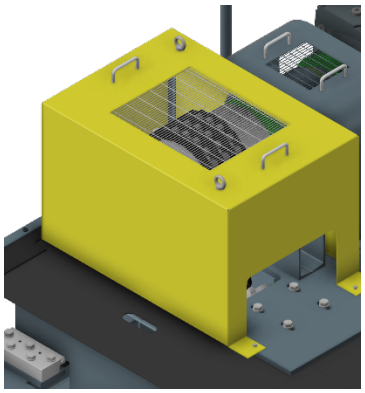


9 Return the safety gate to the lower platform.

10 Tighten the M20 mounting bolts (4).



11 Return the drive chain guard and access hatch from the upper platform and tighten the M8 bolts (4).

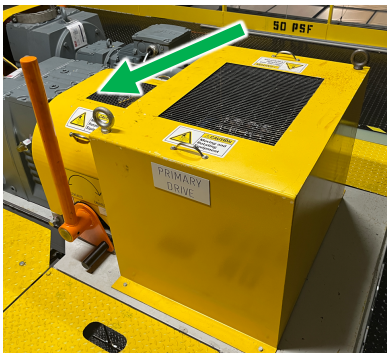


12 Return power to the system and run the drive to observe proper orientation and function. Repeat as necessary.

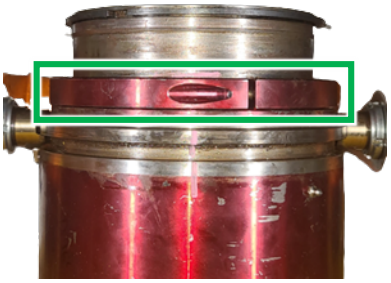
How to Complete an Overload Torque Test & Adjustment

1 Lock out power to the pendulum system per your plant's procedure.

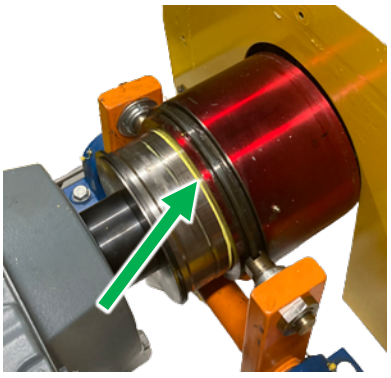
2 Remove the cover over the drive coupler on the Primary (Main) Drive.



3 Remove the retaining collar from the drive coupler.

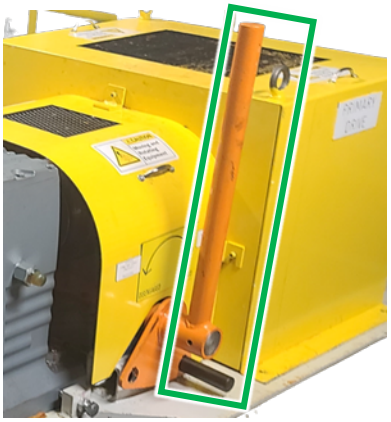


4 With the coupler collar removed, use a paint marker to mark the coupler location when the sleeve is in the engaged position.



5 Remove the fan cover from the rear of the electric motor.

6 Locate the orange disengagement lever and black locking pin at the base of the lever.

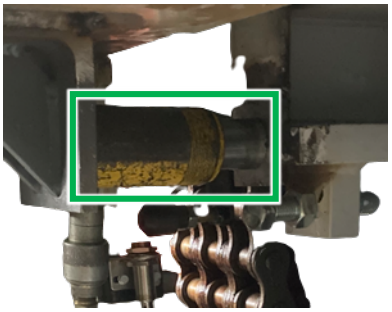


7 Remove black locking pin and pull the orange lever to release the coupler. If the coupler does not easily release, use your hand to manually turn the fan and relieve pressure from the coupler.

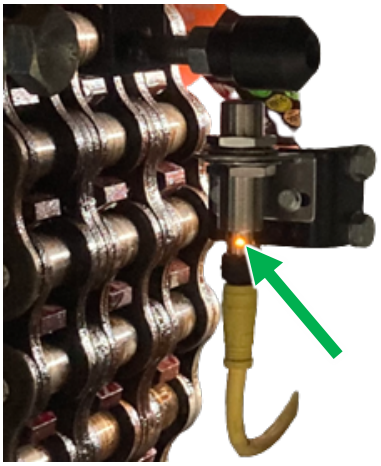
8 Put the black locking pin through the base of orange lever in the uncoupled position.

9 On the lower platform of the drive unit, open the guard in front of the cardan shaft.

10 Place 10-Ton hydraulic ram between the push pads on the fixed and floating frame on the primary (main) drive side.

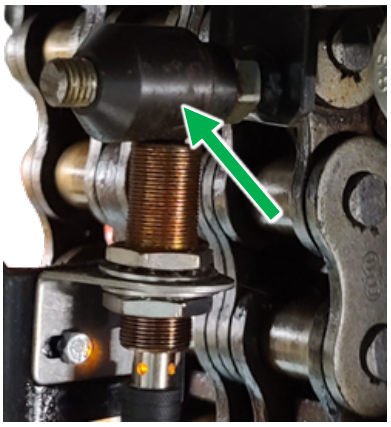


11 When the system is in normal running or stopped position, the prox. light will be turned on as shown.



12 Pump the hydraulic ram to **7250 PSI (14,500 Ft/Lbs.)**, at this point, the prox. light is to turn off.

13 If prox. light does not turn off, adjust the black flag above the prox. so that it turns off at this exact location.



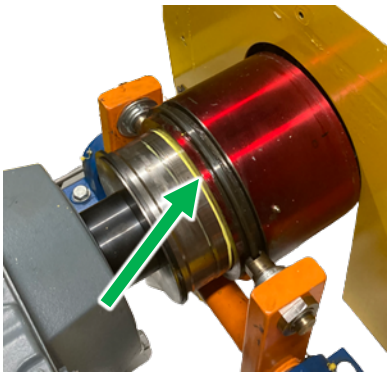
14 Relieve pressure from hydraulic ram and pump it back up to **7250 PSI** to confirm prox. turns off at the correct pressure.

15 Repeat procedure steps 10-14 for the second unit.

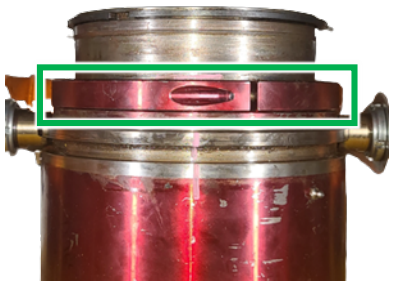
16 Close/secure the guard in front of the cardan shaft. Go to the upper platform of the drive unit.

17 Remove the black locking pin and pull the orange lever to engage the coupler. When the coupler does not easily engage, use your hand to turn the fan on the motor to line-up the coupler.

18 Make sure the coupler is fully engaged. Use the paint marker line to confirm the coupler is fully engaged.



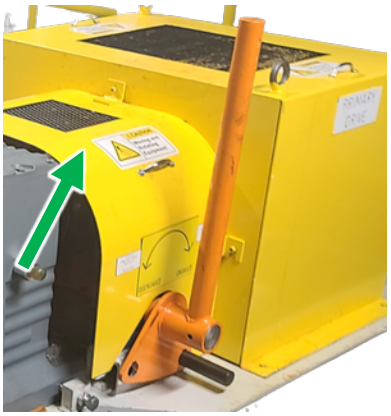
19 Reassemble the coupler retaining collar.



20 Reinstall the black lockout pin thru the orange lever in the engaged (running) position.

21 Reassemble the fan cover on the rear of the motor and make sure the end coder is not loose.

22 Reinstall the drive coupler guard.

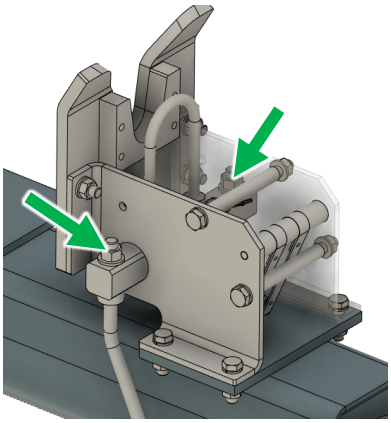


23 Power up and run the system in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the Pendulum Conveyor to service.

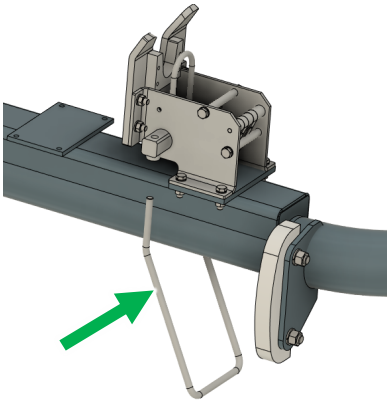
Replacing the Skid Locking Device Assembly

1 Lock out power to the pendulum system per your plant's procedure.

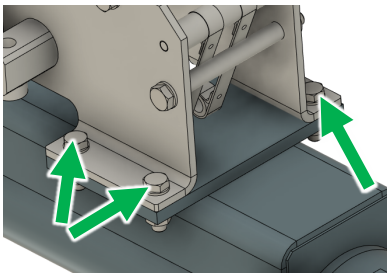
2 Remove the M12 hexagon nuts holding the lever in place.



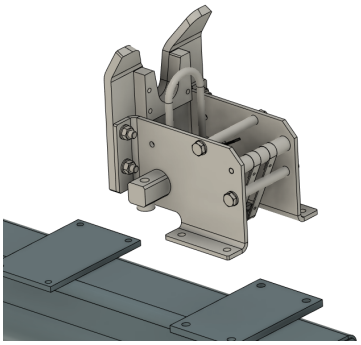
3 Remove the lever and set aside.



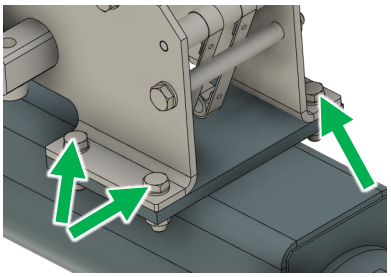
4 Remove the four M10 bolts at the base of the locking device.



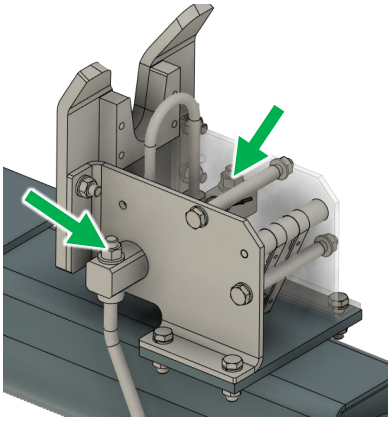
5 Take out the worn assembly and replace with new.



6 Return the M10 bolts at the base of the locking device.



7 Return the lever and M12 hexagon nuts.



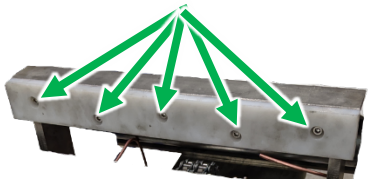
8 Power up and run the system in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the pendulum to service.

Replacing the Skid Stop Wear Bar

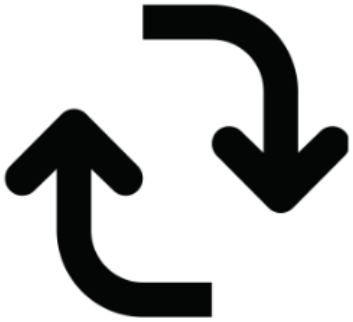
1 Lock out power to the pendulum system per your plant's procedure.

2 Place the skid stop in an upright and accessible position.

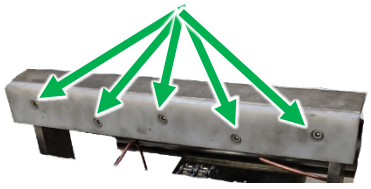
3 Remove the M6 set screws and set aside.



4 Remove the worn UHMW wear bar and replace with new one.



5 Return the set screws.



6 Power up and run the system in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the Pendulum Conveyor to service.

Resetting the Pendulum Diving Board

⚠ WARNING ⚠

This area is a tie-off zone and must be completed prior to continuing the procedure. Failure to do so could result in personal injury from potential fall to the lower floor between the diving board and outlet table.

1. Lock out power to the pendulum system per your plant's procedure.

2. Wearing a safety hardness, tie-off at appropriate location(s).

3. Enter the pendulum exit area and check the diving board and surrounding area to be clear and free from items. If Pendul is resting on the diving board, the Pendul will need to be jogged into a non-contact position.

4. Once the area is clear, manually lift the board in the up position resetting the spring.

5 Should the board not remain in the up position the spring may need to be replaced.

6 After resetting the diving board, reset the fault from HMI following reset procedures.

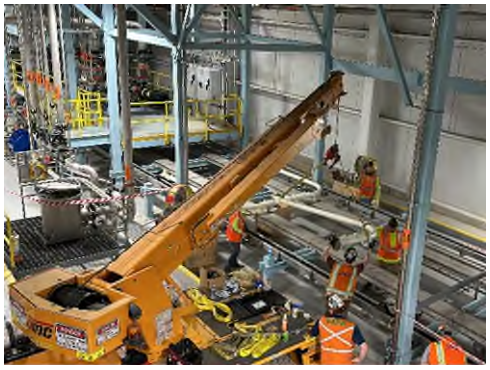
7 Power up and run the system in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the Pendulum Conveyor to service.

Pendul Installation Instructions

The following outlines the instructions for installing new Penduls into your Pendulum Conveyor System. These steps can also be used when having to replace any damaged Penduls, once they are removed.

1 Lock out the power to the Pendulum Conveyor System per your plant's procedure.

2 Using a Broderson (or maintenance service rail if installed), begin to position one half of the Pendul into the system. The Pendul will eventually lay flat with the top end pointing towards the direction of travel.



3 Insert the king-pin shaft of Pendul into Conveyor Chain Attachment while the Pendul is raised and then lay flat. Remove the lifting straps.

4 Install locking collar on end of shaft to secure to chain.

5 Position the second half of the Pendul into the system.

6 Insert the king-pin shaft of Pendul into Conveyor Chain Attachment while the Pendul is raised and then lay flat. Remove the lifting straps.

7 Install the locking collar on end of shaft to secure to chain. Add lubrication to grease zerks in chain where both shafts are located.

8 Connect the lower section of the Penduls starting with bolts.

9 Continue securing lower Pendul connection by tapping pins through holes.

10 Attach Current Collectors on both top sections of Pendul (Electro-Coating Dip only).

11 Ensure Current Collectors are installed properly for both left and right sides. Image to the left shows one properly installed on left side.

12 After ensuring Pendul Conveyor line is clear, jog chain forward to position chain for the next Pendul to be installed.

20 Once all Penduls are installed, test operation accordingly.

Pendul Locking Device Spring Replacement

During regularly scheduled preventive maintenance for your Pendulum System, the pendul locking devices should be closely inspected for proper function. If during inspection the springs are worn or damaged, they should be replaced using the instructions outlined within this document.

Spring Comparison	*New Spring Set*
	
	FATA Part #
	Leaf Spring – 6002199-A

Tools

- Power Drill
- Torque wrench
- Adjustable pliers
- Diagonal cutting pliers
- M10 wrench
- Bronze Hammer

⚠ CAUTION ⚠

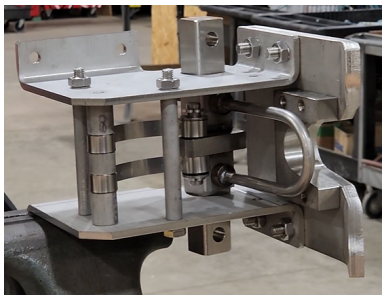
A bronze hammer is recommended to be used during this procedure. Failure to do may result in unintended damage to components.

Locking Device Spring Replacement

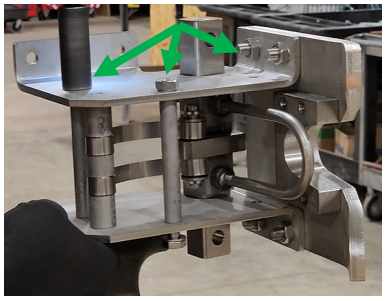
1 Lock out power to the pendulum system per your plant's procedure.

The procedure outlined below assumes that the locking device has been successfully removed and is ready for work at a workbench.

2 Secure the locking device in the workbench vice.



3 Loosen the four (4) M10 bolts to remove one of the side plates.

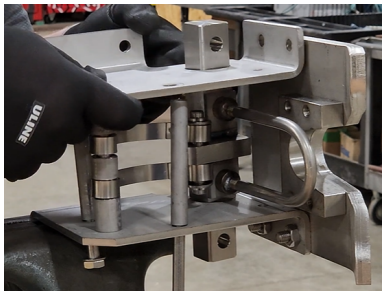


4 Remove the bolts with spacers and set aside for later use.

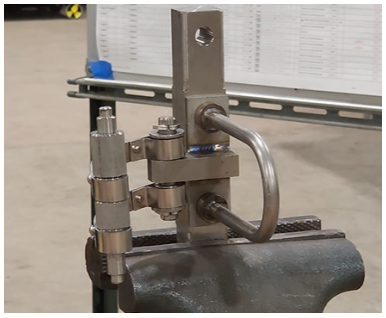
Take off the side plate to free the inner locking assembly with the springs.

⚠ CAUTION ⚠

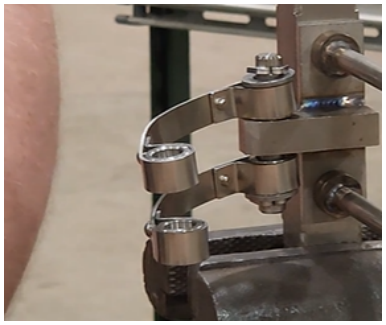
When removing the side plate, there may be tension present.



5 Secure the inner locking assembly in the vice.



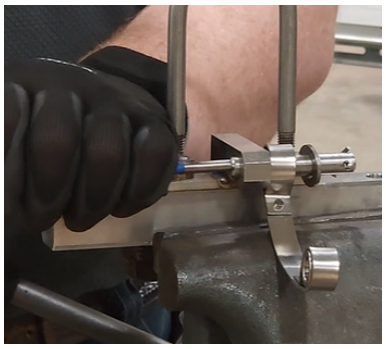
6 Remove the pin from the spring end. Keep all three (3) spacers for use later.



7 Remove the cotter pin from one end of the spring.

8 Remove the spring and washer from the removed cotter pin side.

9 Gently tap the pin to remove the second spring and washer.



10 Gently remove the bushings and set aside.

11 Remove all buildup from parts being reused.

12 Gently tap the reused bushings into the new springs.

Set the pin through washers and the bushings on the new springs.

Gently tap the pin through the weldment.

13

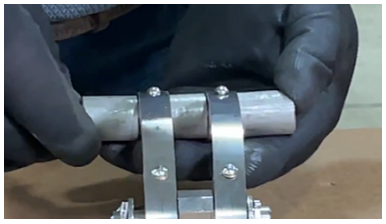
⚠ CAUTION ⚠

Use of a bronze hammer is recommended to avoid flanging the end of the pin.

14 After the springs are set, secure with a new cotter pin.

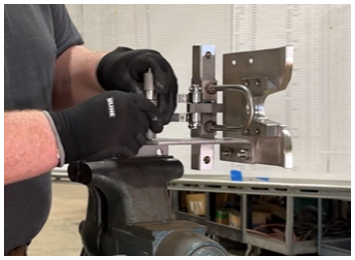
15 Place the secondary pin through the spring bushings and spacers.

The larger spacers should sit on the outside locations to ensure correct spacing.

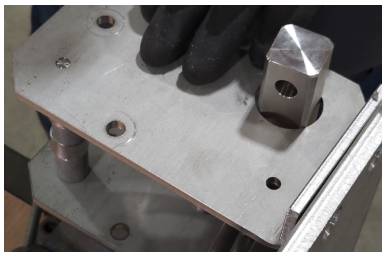


16 Return the locking device assembly to the vice and set the inner locking assembly into position.

Note: *The pin ends should be seated appropriately to ensure a secure fit.*

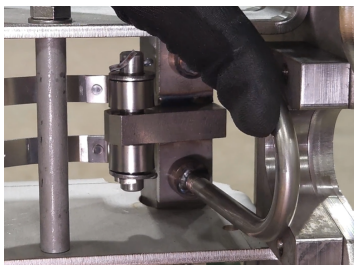


17 Return the side plate to its original location. You may need to apply some force.



18 Set the bolts into place and torque to 46 Nm.

19 Check setup drawing to confirm and verify proper locking function.



Return the locking device to the appropriate pendul.

20 Restore power to the pendulum system per your plant's procedure.

Inlet Table – Maintenance & Service

This section will describe service procedures for major mechanical elements of the Inlet Table.

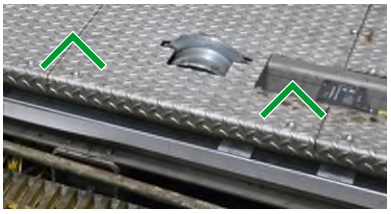
⚠ WARNING ⚠

- Only qualified and trained personnel should perform the disassembly and assembly of electrical and mechanical components.
- Before attempting any maintenance on this equipment all involved personnel should follow plant internal regulations along with any state, federal, or province regulations. Do not begin any repair procedure until the proper shutdown procedures and the appropriate power lockout procedures have been applied.

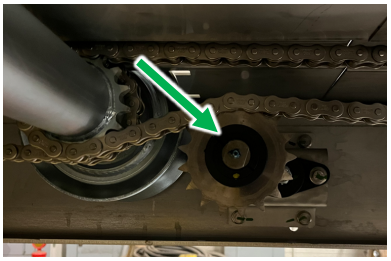
How to Replace a Chain

1 Remove and lock out power to the Inlet Table using your plant's procedures.

2 Remove the covers.



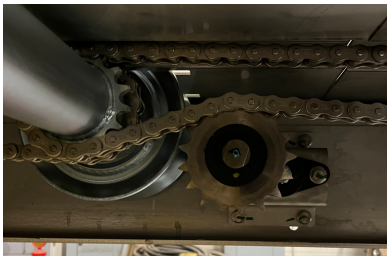
3 Adjust the tensioner to loosen the chain.



4 Open the master link of the chain on both sides of the roller.

5 Reinstall the new chain with the master link.

6 Install the tensioner to a sufficient chain tension.



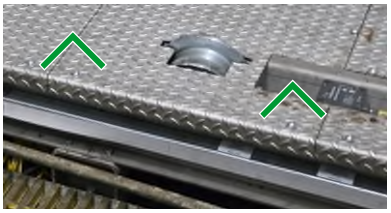
9 Place the covers back on the Inlet Table and tighten the screws.

10 Power up and run the table in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the Inlet Table to service.

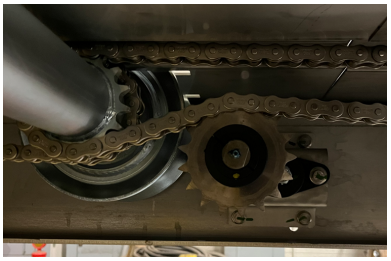
How to Replace a Roller

1 Remove and lock out power to the Inlet Table using your plant's procedures.

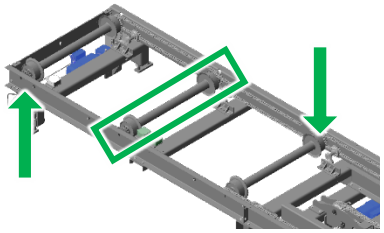
2 Remove the necessary covers.



3 Remove the tensioner to relieve tension on the chain.

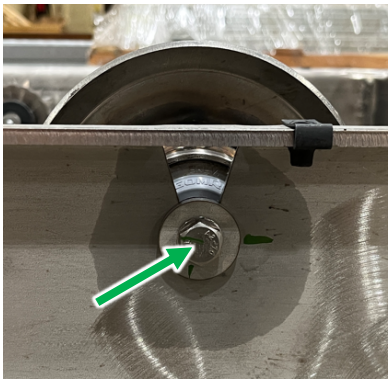


4 In order to replace a roller, all adjacent rollers must be disassembled that are mounted at the respective gearmotor side.



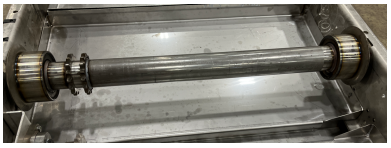
5 Open the master link of the chain on both sides of the roller.

6 Remove the M10 screws holding the flanges on both sides of the worn roller.



7 Turn around flanged bearings 90°, to get them through the cut-out of side frames. If they are clamped between side frames, you must loosen screws of drive shaft and pull bearings slightly apart, so that the carrying roller can be withdrawn upwards.

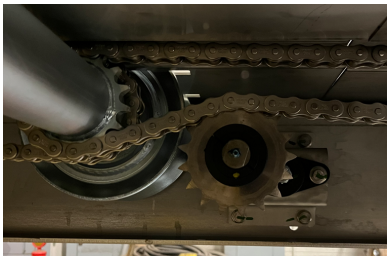
8 Replace the roller.



9 Turn the flange horizontal and install their hex-head screws

10 Retighten all M10 bolts firmly. Take great care that there is contact between the flange and the side frames.

11 Reinstall the tensioner with screws.



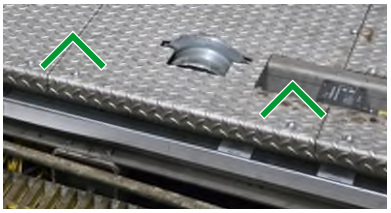
12 Place cover back on Inlet Table and tighten the screws.

9 Power up and run the table in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the Inlet Table to service.

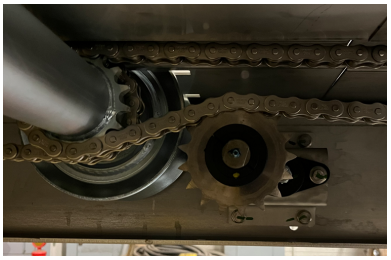
How to Replace a Gearmotor

1 Remove and lock out power to the Inlet Table using your plant's procedures.

2 Remove any necessary covers.



3 Adjust the tensioner to loosen the chain.



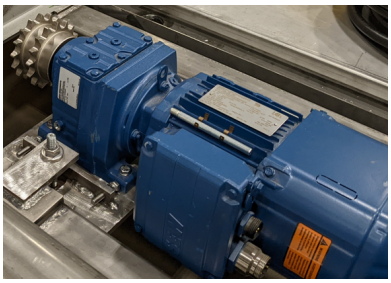
4 Open the master link of the chain on both sides of the drive gear.

5 Loosen the screws at one side of the motor and then proceed to remove the mounting bolts.

6 Hoist the existing gearmotor then remove the washer/pin assembly and screw.

7 Remove the drive gear from the original gearmotor and mount at the new gearmotor.

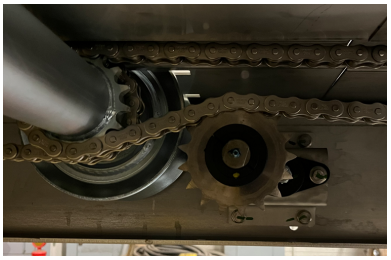
Install the drive gear with the original washer/pin assembly.



8 Retighten the hex-head screws and tighten down the gearmotor. Take care that motor is exactly at the right angle with the drive gear.

9 Reinstall the chain with the master link.

10 Install the tensioner and adjust the chain tension appropriately.



11 Place any covers back on the Inlet Table and tighten screws.

12 Power up and run the table in maintenance mode (slow speed) to verify proper operation. When complete, power up and restore the Inlet Table to service.