

# PTED Pendulum System – Maintenance and Service Procedures

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

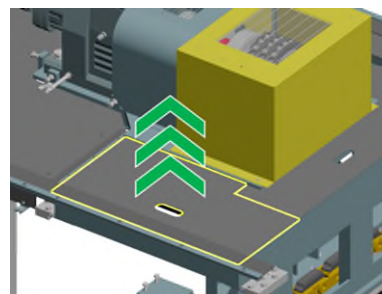
## ⚠ WARNING ⚠

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

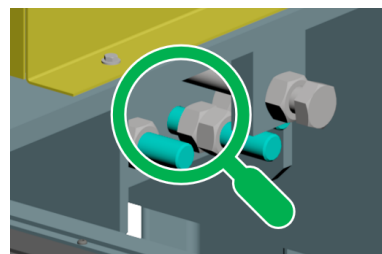
### Pendulum Drive Triple Chain Inspection & Tension Procedure

#### 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.

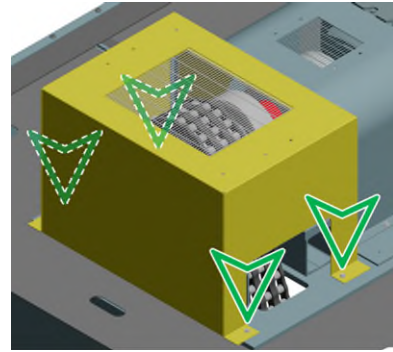


#### Pendulum Drive Triple Chain Inspection

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



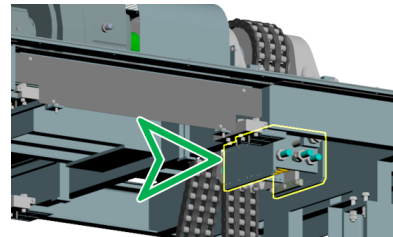
- 2 Remove the drive chain guard and access hatch from the upper platform by removing the M8 bolts (4).



- 3 Remove the safety gate to gain access to the lower platform.

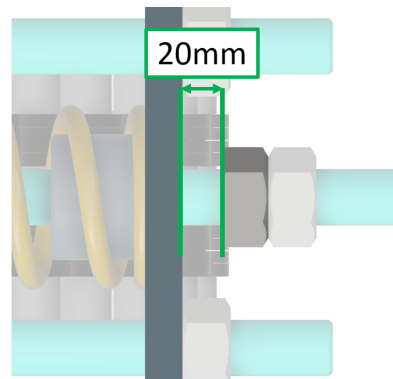


- 4 Locate the chain tensioning device.



- 5 On the chain tensioning device, measure the gap between the jam nut and the plate backing. There should be a gap of **20mm** present.

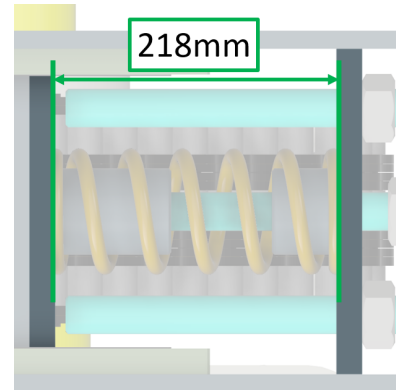
**\*NOTE\*** This nut should not be adjusted. This gap is to provide a visual cue during inspection on the remaining life of the chain.



6

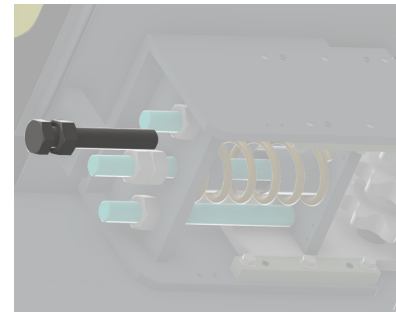
Measure the gap between the plates on either end of the spring. The gap length should be **218mm**.

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



7

Use the jackbolt to make the necessary adjustments to achieve the **218mm** gap as indicated by step 6.



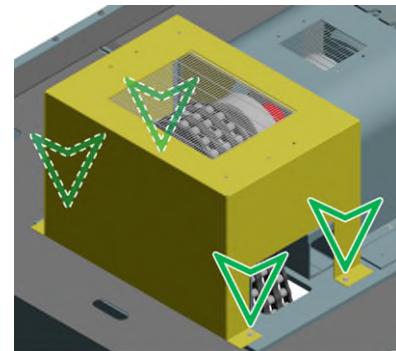
8

Return the safety gate to the lower platform.



9

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



- 10 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 safety pins from their storage location.



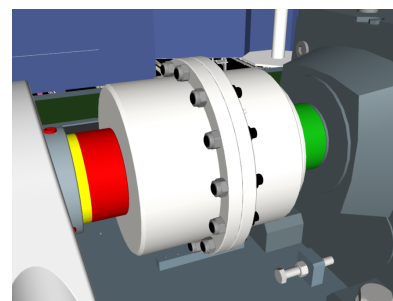
- 3 Insert the pins fully into the slots underneath the take-up weight.  
*The take-up is now mechanically secured.*



- 4 Remove the cover over the drive coupler on the target drive.



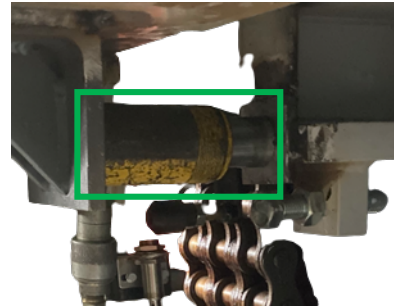
- 5 Remove the bolts on the coupler between the motor and the driveshaft.



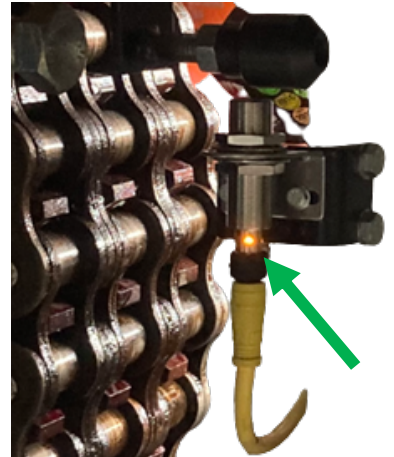
- 6 On the lower platform of the drive unit, open the guard in front of the cardan shaft.



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



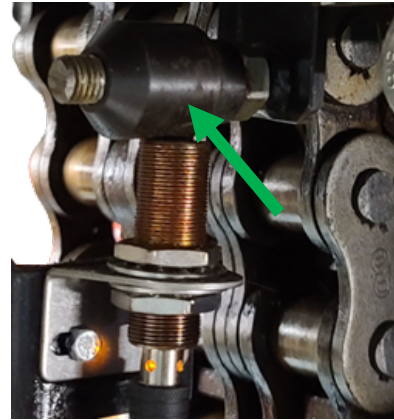
- 8 When the system is in normal running or stopped position, the prox. light will be turned on as shown.



- 9 Pump the hydraulic ram to **7250 PSI** (14,500 Ft/Lbs.).  
At this point, the prox. light will turn off.



- 10** If **prox. light does not turn off**, adjust the black flag above the prox. until the light turns off.



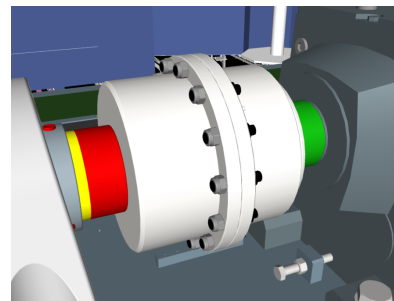
- 11** Relieve pressure from hydraulic ram and pump it back up to **7250 PSI** to confirm prox. turns off at the correct pressure.



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



- 13** Reassemble the drive shaft coupler.



- 14** Reinstall the drive coupler guard.



- 15** Remove the safety pins from where they are slotted underneath the take-up weight.



- 16** Stow the safety pins in their storage location.



- 17** Reverse the lockout procedure, walk the system for a safety check and start the conveyor.

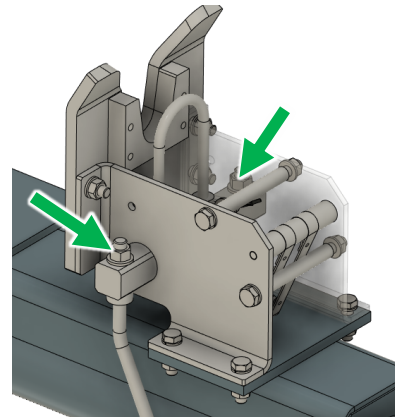


## Replacing the Skid Locking Device Assembly

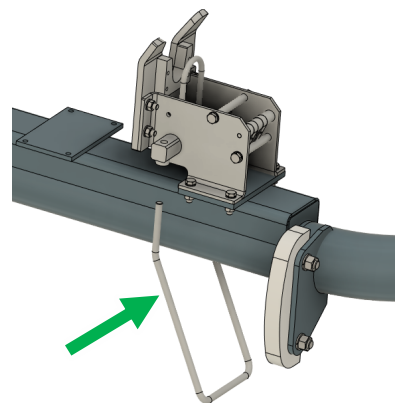
- 1 Lock out power to the Pendulum system per your plant's procedure.



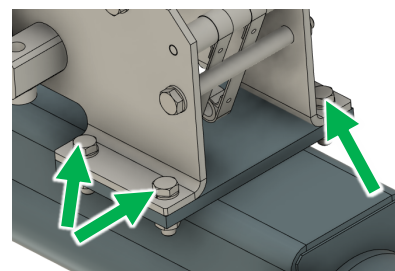
- 2 Remove the M12 hexagon nuts holding the lever in place.



- 3 Remove the lever and set aside.

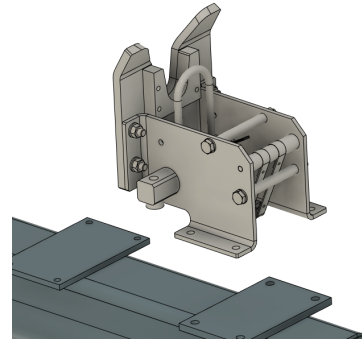


- 4 Remove the four M10 bolts at the base of the locking device.

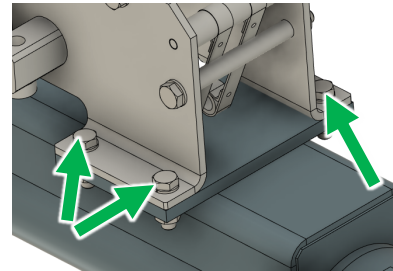




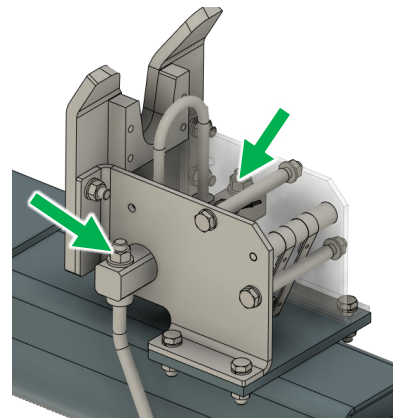
- 5 Take out the worn assembly and replace with new unit.



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



- 7 Return the lever and M12 hexagon nuts.



- 8 Restore power to the Pendulum system per your plant's procedure.



## Pendul Locking Device Spring Inspection

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                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------|
|  <div data-bbox="191 793 386 871">New Spring</div> <div data-bbox="487 793 734 871">Damaged Spring</div> |  |  |
|                                                                                                                                                                                           |  | FATA Part #                                                                        |
|                                                                                                                                                                                           |  | Leaf Spring – 6002199-A                                                            |

| Tools                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>• Power Drill</li> <li>• Torque wrench</li> <li>• Adjustable pliers</li> <li>• Diagonal cutting pliers</li> <li>• M10 wrench</li> <li>• Bronze Hammer</li> </ul> <div>  <b>CAUTION</b>  </div> <p><i>A bronze hammer is recommended to be used during this procedure. Failure to do so may result in unintended damage to components.</i></p> |



## Pendul 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.



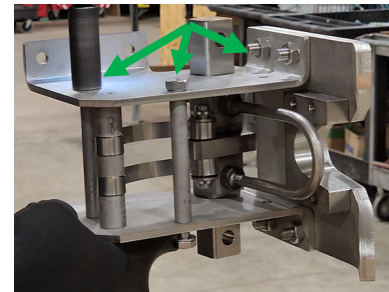
2

Secure the locking device in the workbench vice.



3

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



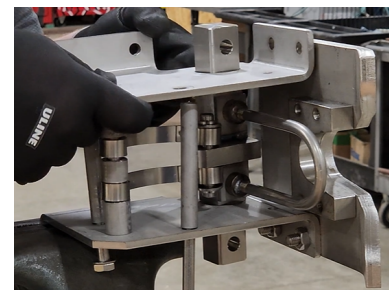
Remove the bolts with spacers and set aside for later use.

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

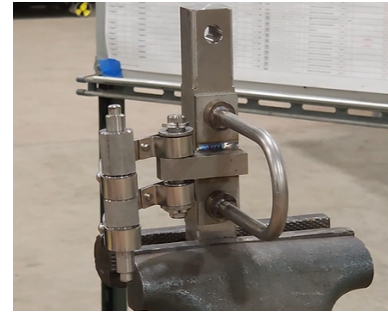
4

**⚠ CAUTION ⚠**

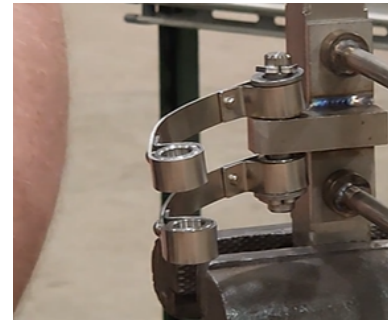
*When removing the side plate, there may be tension present.*



- 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.



Place the secondary pin through the spring bushings and spacers.

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



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

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



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

- 17**



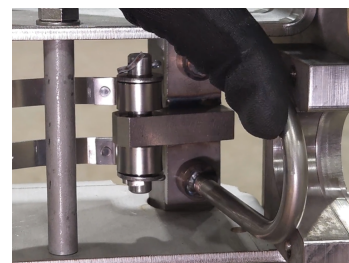
Set the bolts into place and torque to 46 Nm.

- 18**



Check setup drawing to confirm and verify proper locking function.

- 19**



Return the locking device to the appropriate Pendul.

**20**

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



## 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 Remove the safety pins from their storage location.



- 3 Insert the pins fully into the slots underneath the take-up weight.  
*The take-up is now mechanically secured.*



- 4 Wearing a safety harness, tie-off at appropriate location(s).





- 5 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.



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



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



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



- 9 Remove the safety pins from where they are slotted underneath the take-up weight.



- 10** Stow the safety pins in their storage location.



- 11** Restore power to the Pendulum system per your plant's procedure.



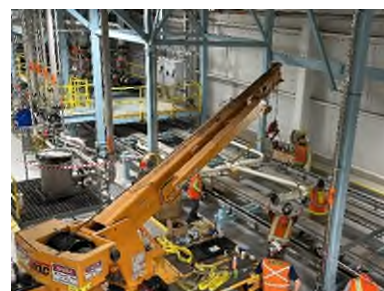
## Pendul Installation Instructions

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.

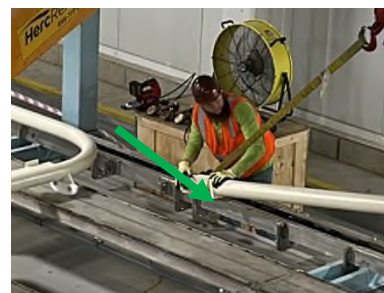
- 1 Lock out the power to the Pendulum Conveyor System per your plant's procedure.



- 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 shows one properly installed on left side.  
*\*(Electro-Coating Dip only)*



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



- 13** Once all Penduls are installed, test operation accordingly.





# Inlet & Outlet Table – Maintenance & Service

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

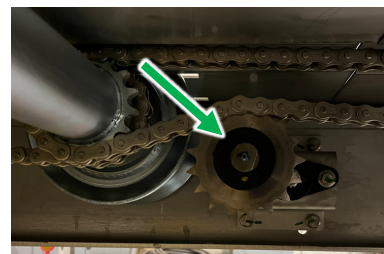
- 1 Remove and lock out power to the Table using your plant's procedures.



- 2 Remove the safety covers.



- 3 Adjust the tensioner to loosen the chain.





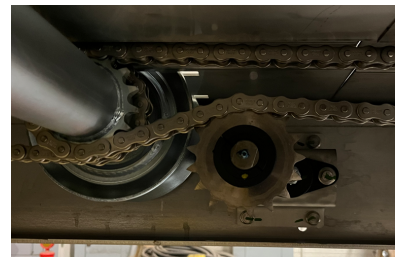
- 4 Open the master link of the chain on both sides of the roller.



- 5 Reinstall the new chain with the master link.



- 6 Install the tensioner to a sufficient chain tension.



- 7 Restore power to the system. Run the Table to observe that the chains are tracking straight and that the Table is functioning normally. Correct if necessary.



- 8 Lock Out the system again to return safety covers then operate as normal.



## Replacing the Skid Stop Wear Bar

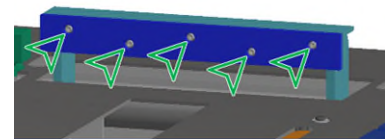
- 1 Lock out power to the Pendulum system per your plant's procedure.



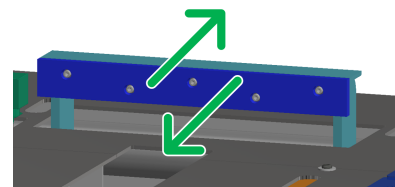
- 2 Place the skid stop in an upright and accessible position.



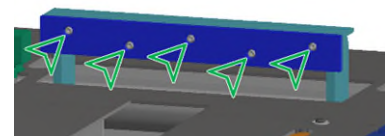
- 3 Remove the M6 set screws and set aside.



- 4 Remove the worn UHMW wear bar and replace it with the new unit.



- 5 Return the set screws.



- 6 Restore power to the Pendulum system per your plant's procedure.

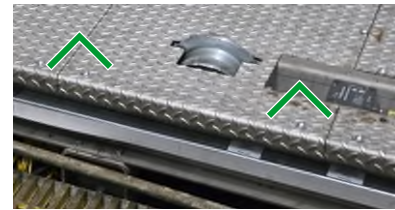


## How to Replace a Roller

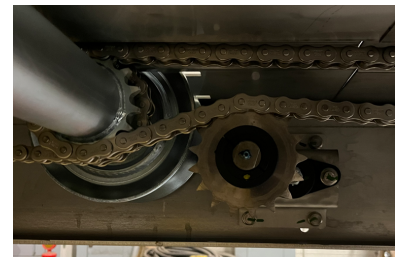
- 1 Remove and lock out power to the Table using your plant's procedures.



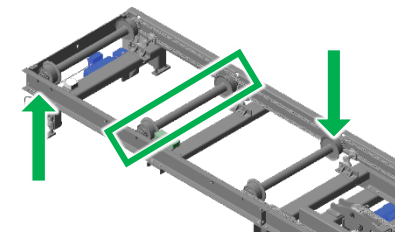
- 2 Remove the necessary covers.



- 3 Remove the tensioner to relieve tension on the chain.



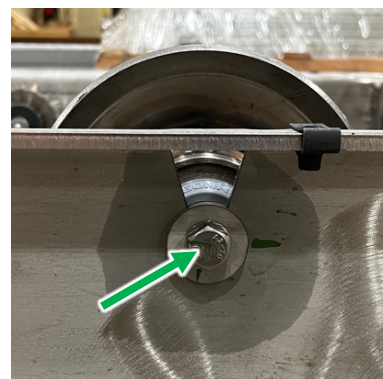
- 4 To replace a roller, all adjacent rollers that share a chain must also be disassembled.



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



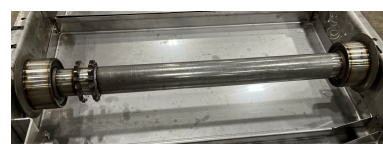
- 6 Remove the M10 screws holding the flanges on both sides of the worn roller.



- 7 Turn around flange 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.



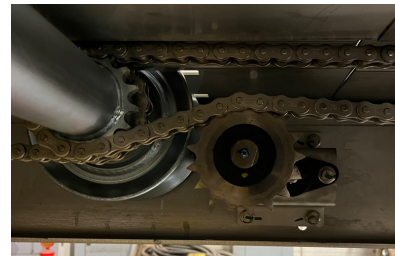
- 9 Turn the flange horizontal and install their hex-head screws



- 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** Restore power to the system. Run the Table to observe that the chains are tracking straight and that the Table is functioning normally. Correct if necessary.



- 13** Lock Out the system again to return safety covers then operate as normal.



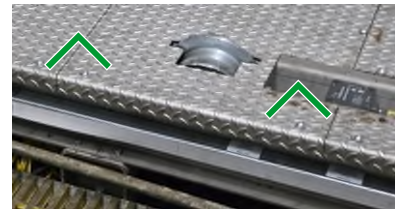


## How to Replace a Gearmotor

- 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.



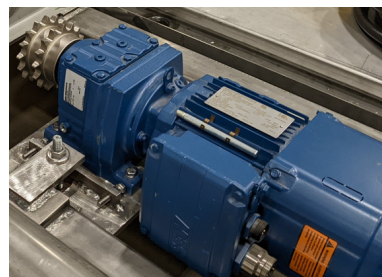


- 6 Hoist the existing gearmotor then remove the washer/pin assembly and screw.



- 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.



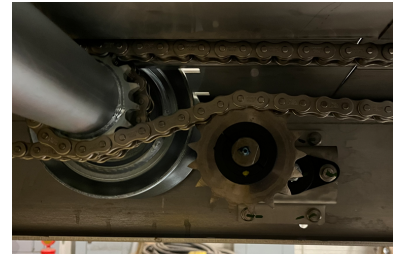
- 8 Retighten the hex-head screws and tighten down the gearmotor. Take care that motor is exactly at the right angle with the drive gear.



- 9 Reinstall the chain with the master link.



- 10** Install the tensioner and adjust the chain tension appropriately.



- 11** Restore power to the system. Run the Table to observe that the chains are tracking straight and that the Table is functioning normally. Correct if necessary.



- 12** Lock Out the system again to return safety covers then operate as normal.

