

Vertical Drop Lifter Maintenance & Service

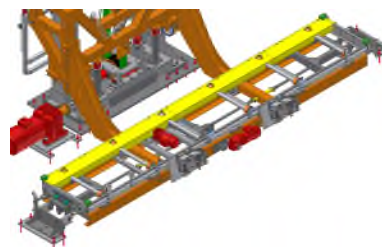
This section will describe service procedures for major mechanical elements of your system.

⚠ WARNING ⚠

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

Replacing the Lifting Belts

- 1 Remove any load on the lift carriage.



- 2 Jog the lift carriage down until it is sitting on the bumpers.



- 3 Mechanically secure the VDL per the procedure in Safety.
Shutdown and lockout the VDL according to your plant's lockout procedures.



- 4 Remove the drive belt tension by loosening the ring nut at the top of the tension spring with a 2" spanner wrench.



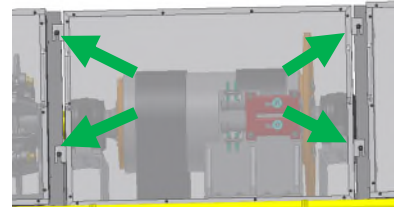
- 5 Wear and secure the appropriate anti-fall PPE as required per your plant safety policies.



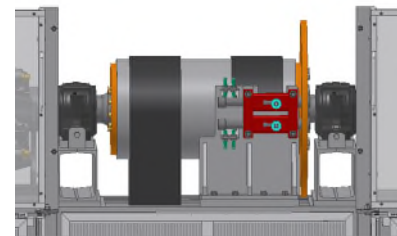
⚠ WARNING ⚠

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

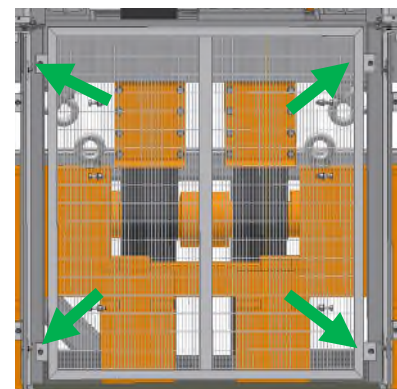
- 6 At the maintenance platform, loosen the four bolts holding the polycarbonate panel assembly using the 13mm combination and socket wrenches.



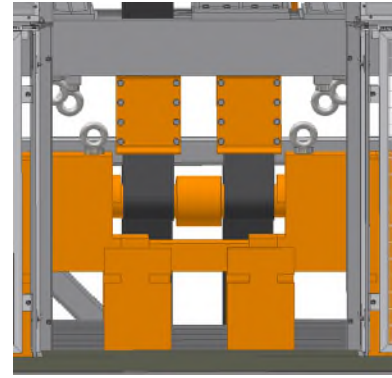
- 7 Lift the polycarbonate panel assembly off the bolts and stow in a safe location.



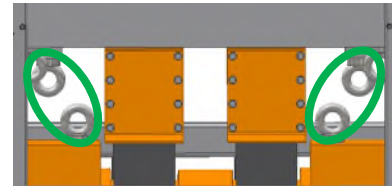
- 8 Loosen and remove the four bolts holding the counterweight safety panel using the 13mm combination and socket wrenches.



- 9 Remove and stow the counterweight safety panel in a safe location.

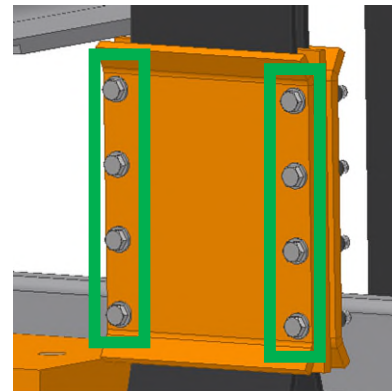


- 10 Secure the counterweight so it will not move by attaching a strap or similar from the eyebolts on top of the counterweight to the eyebolts on the VDL frame.

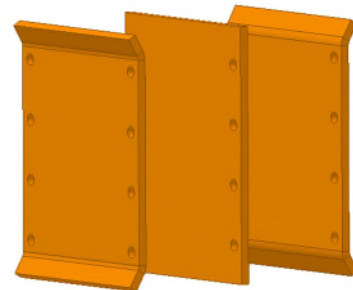


COUNTERWEIGHT BELTS REMOVAL

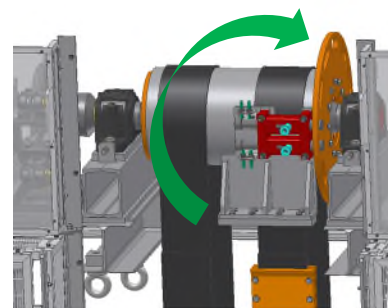
- 11 Loosen and remove the bolts that hold the counterweight belt clamping plates together using the 19mm combination and socket wrenches at a belt while a colleague is holding the plates.



- 12 Discard the torque nuts but keep the bolts and washers.
Stow the clamping plates in a safe location.



- 13** Pull the belt off the drum and toss it over to the floor opposite the maintenance platform.

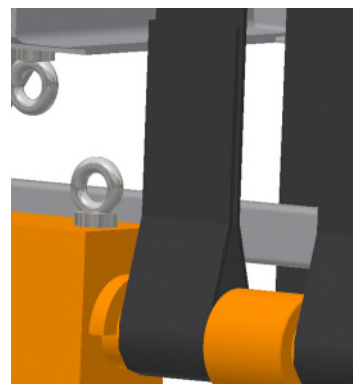


- 14** Repeat steps 11-13 for the second belt.

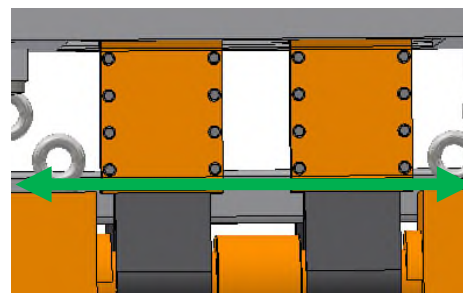


COUNTERWEIGHT BELTS REMOVAL

- 15** Wrap one end of a belt around the top of the counterweight.



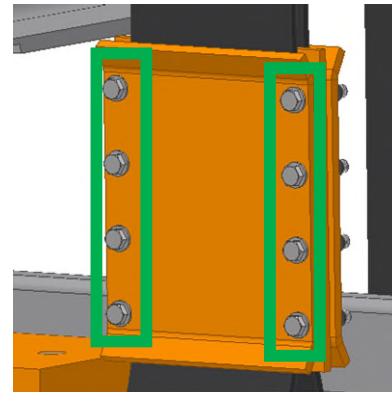
- 16** Place the clamping plates ensuring the bottom of the clamp plates is even with the top of the counterweight.



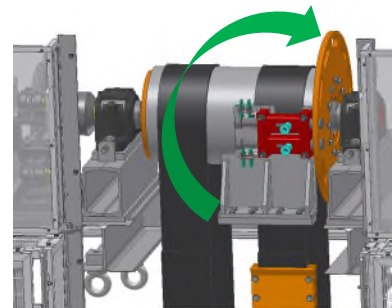
Insert the bolts, washers, and new torque nuts to hold the clamping plates together.

- 17** Alternately tighten them in steps up to 89Nm (65 ft-lbs) with the torque wrench.

Paint witness marks on the bolts to the clamping plates when completed.



- 18** Wrap the new belt onto the top of the lifting drum and lower the remainder down the other side of the VDL.

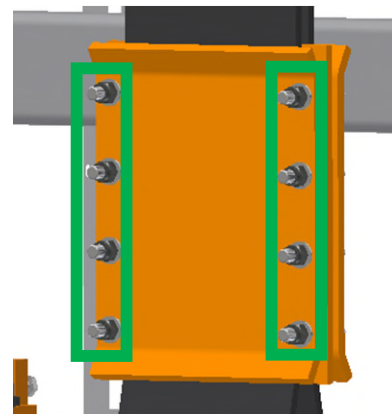


- 19** Repeat steps 15-18 for the second belt.



CARRIAGE BELTS REMOVAL

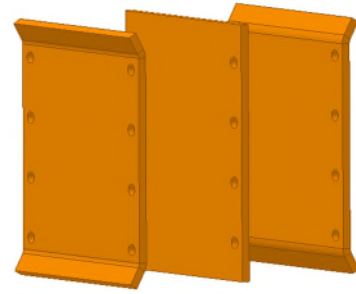
- 20** At the top of the lift carriage, loosen and remove the bolts, washers, and torque nuts that hold the belt clamping plates together using the M19 combination and socket wrenches at the belts while a colleague is holding the plates.



Discard the torque nuts but keep the bolts and washers.

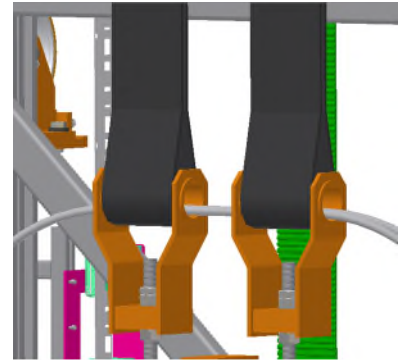
21

Stow the clamping plates in a safe location.



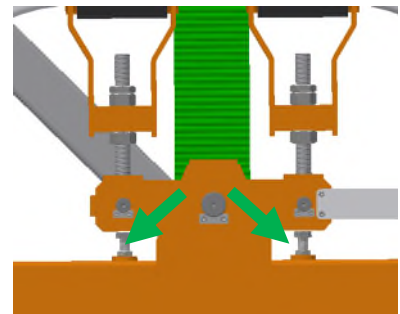
22

Pull the old belts off their turnbuckles and discard responsibly.



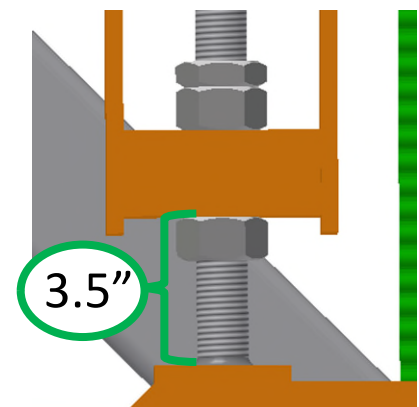
23

Raise the support bolts underneath the slack belt actuator lever using the 30mm wrench until they hold it level.



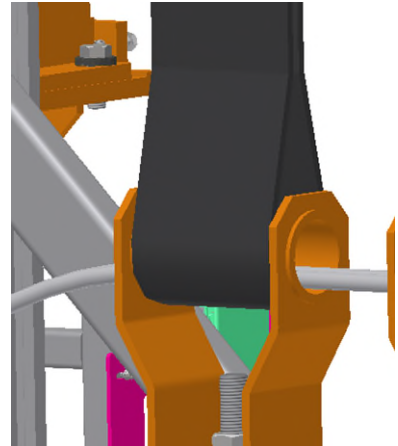
24

Reposition the turnbuckles' height above the lever to a setup value of 3.5 inches using the 46mm wrench as necessary on the locking and adjusting nuts.

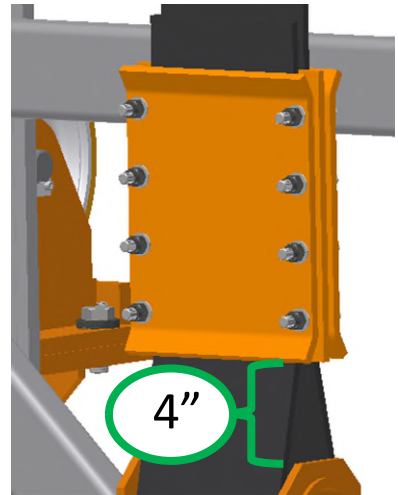


CARRIAGE BELTS INSTALLATION

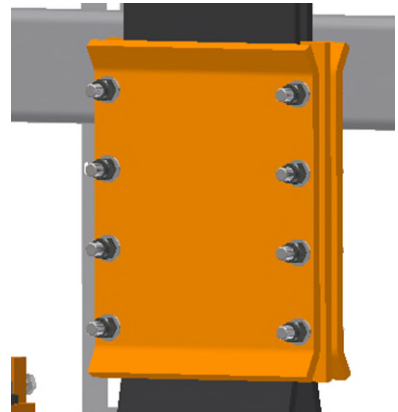
- 25** Wrap one end of a belt around the turnbuckle



- 26** Place the clamping plates with the bottom of the clamp plates four (4) inches above the top of the turnbuckle.



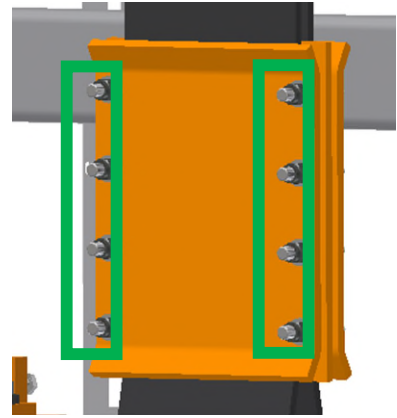
- 27** Insert and hand tighten the bolts, washers, and new torque nuts to hold the clamping plates together.



Make the lifting belt as taut as possible as it hangs from the lifting drum and around the turnbuckle.

- 28** Tighten the clamping plates nuts and bolts in steps up to 89Nm (65 ft-lbs) with the torque wrench.

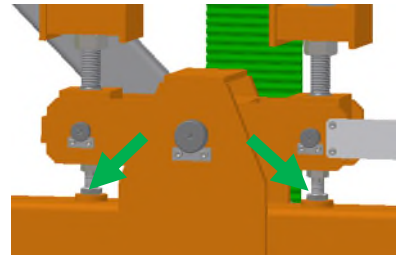
Paint witness marks on the bolts to the clamping plates when completed.



- 29** Repeat steps 25-28 for the second belt.



- 30** Lower the support bolts into the lift carriage frame.



⚠ WARNING ⚠

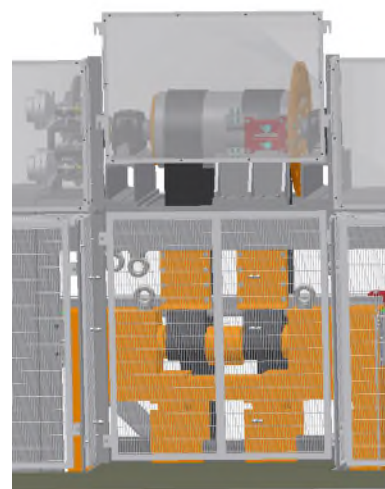
Not lowering these support bolts will prevent the slack/broken belt sensor from working properly.

- 31** Remove the straps that are holding the counterweight to the top of the VDL frame.

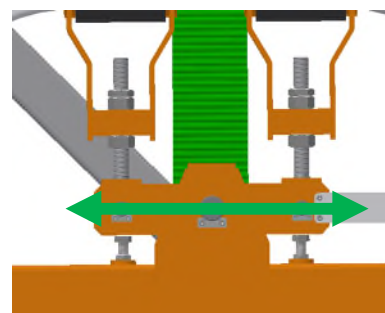
Note: There should be load tension on the lifting belts now.



- 32** Install the counterweight safety panel and the polycarbonate panel assembly that were removed earlier.



- 33** Check that the slack/broken belt lever is level. If not, adjust a turnbuckle as necessary to level the lever.

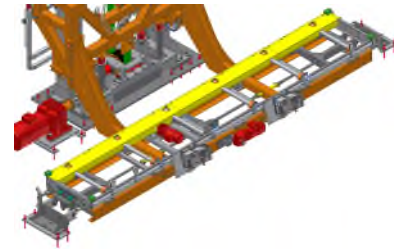


- 34** Check and adjust the tension using the Existing Drive Belt Tension Check procedure.

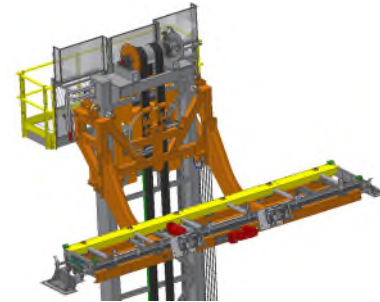


Replacing the Drive Belt

- 1 Remove any load on the lift carriage.



- 2 Raise the lift carriage to the full up position.



Mechanically secure the VDL per the procedure in Safety.

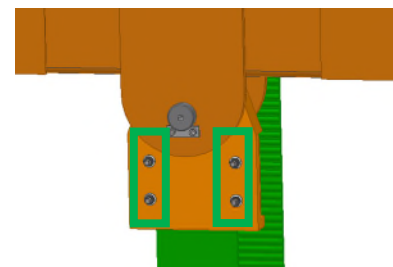
- 3 Shutdown and lockout the VDL according to your plant's lockout procedures.



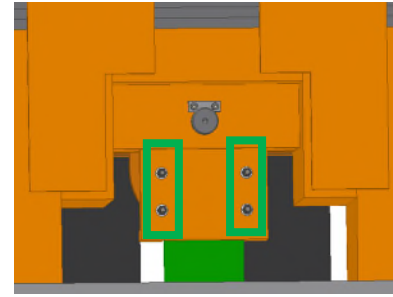
- 4 Turn the Belt Tensioning Ring-nut counter-clockwise to completely relieve the spring tension on the drive belt using the 2" spanner wrench.



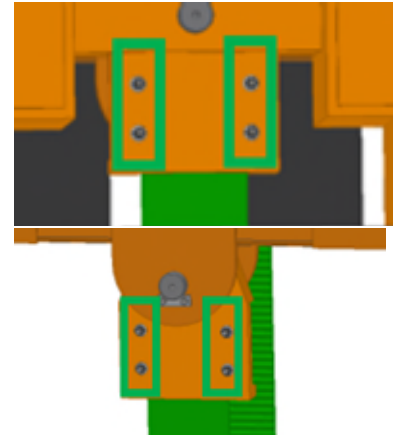
- 5 Remove the bolts from the belt connections below the carriage using the 17mm wrenches.



- 6 Remove the bolts from the belt connections the counterweight using the 17mm wrenches.



- 7 Remove and discard the torque nuts and original drive belt.
- Install new drive belt and the bolts, washers, and new torque nuts at the belt connection points.

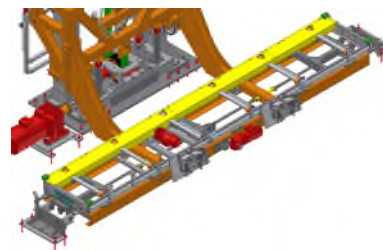


- 8 Check and adjust the tension using the New Drive Belt Tension Check procedure.

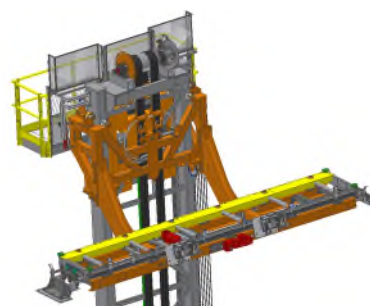


New Drive Belt Tensioning

- 1 Remove any load on the lift carriage.



- 2 Raise the lift carriage to the full up position.

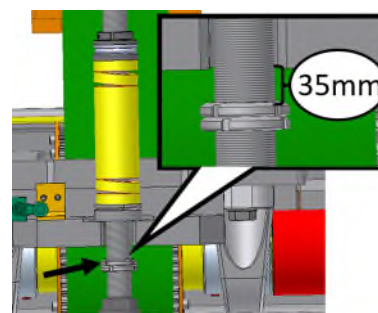


Mechanically secure the VDL per the procedure in Safety.

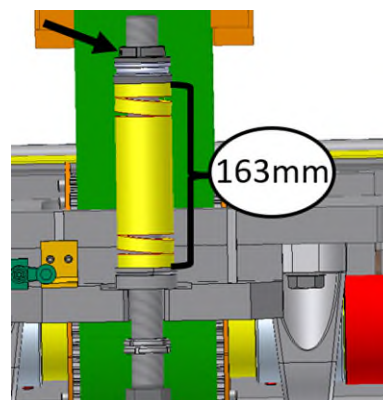
- 3 Shutdown and lockout the VDL according to your plant's lockout procedures.



- 4 Release the tensioning plate by turning the support ring-nut clockwise until there is at least 35mm or more of clearance from the plate and the washer.

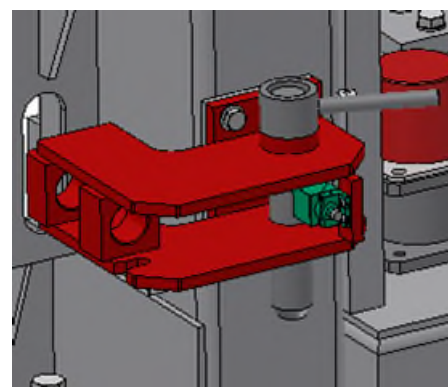


- 5 Turn the belt tensioning ring-nut clockwise with the 2" spanner wrench to compress the spring until it reaches the preset working height of 163mm.

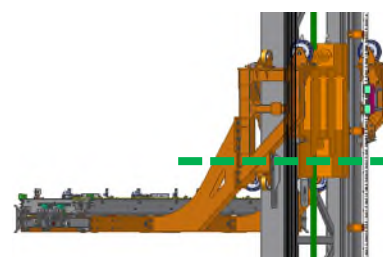


- 6 Stow the safety pins and remove any straps/chains that secure the lift carriage and counterweight to allow VDL function.

Restore power to the VDL.



- 7 Position the lift carriage and counterweight so that their drive belt connections are at the same level.

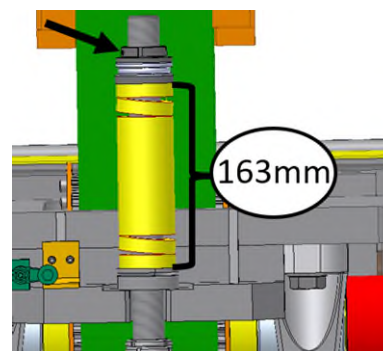


- 8 Engage the safety brake and safety shot pin via the HMI.
Shutdown and lockout power to the VDL according to plant lockout procedures.



Manually release the lift gearmotor brake momentarily to even the tension on both sides of the drive belt.

- 9** Check to see if the working height of the spring has changed. If yes, adjust the Belt Tensioning Ring-Nut as necessary to reset the working height to 163mm.



- 10** Repeat steps 7-9 for a few lifting and lowering cycles verifying the working height of the tension spring each cycle.

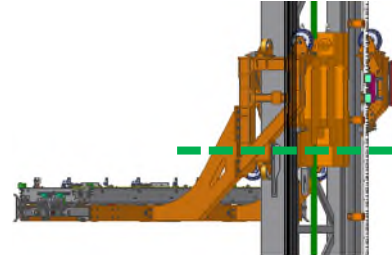


- 11** Install any safety guards removed and return to normal function.



Existing Drive Belt Tension Check

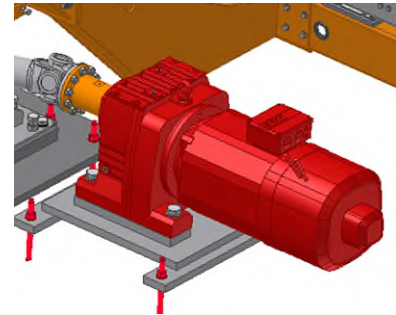
- 1 Position the lift carriage and counterweight so that their drive belt connections are at the same level.



- 2 Engage the safety brake and safety shot pin via the HMI. Shutdown and lockout power to the VDL according to plant lockout procedures.



- 3 Manually release the lift gearmotor brake momentarily to even the tension on both sides of the drive belt.



- 4 Place the sensor of the sonic tension meter close to the belt. Tap or flick the belt with your finger while simultaneously monitoring the sonic tension meter display.



VDL Stroke	Belt Tension (Hz)
1981mm	26.7 ±1.9
2000mm	26.7 ±1.9
2591mm	22.1 ±1.5
3810mm	16.2 ±1.1
4420mm	14.4 ±1.0
5791mm	11.4 ±0.8
6401mm	10.4±0.7
10211mm	6.8±0.5

- 5 Note the reading and compare it to the table.

- 6 If the reading is out of the acceptable range Turn the Belt Tensioning Ring-Nut using the 2" spanner wrench a quarter turn.
- clockwise to increase the belt tension
 - counterclockwise to reduce belt tension



- 7 Check the drive belt tension with the sonic tension meter.
- Repeat until the drive belt is within specification.

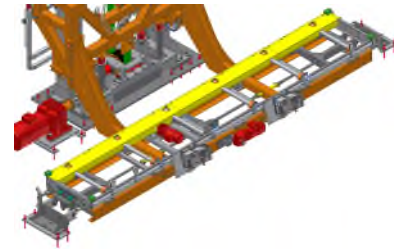


- 8 Power up and restore the VDL to service.



Safety Brake Pad Adjustment

- 1 Lower the lift carriage to the down position.



- 2 Mechanically secure the VDL per the procedure in Safety.



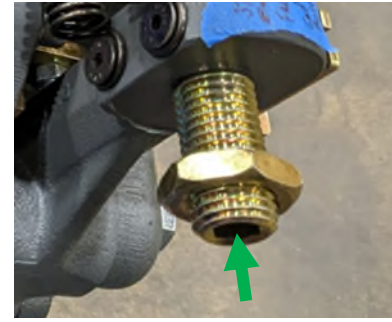
- 3 Release the safety brake via the HMI. Ensure that the safety brake is disengaged.
Note: If the brake is engaged, there is an E-Stop condition that needs to be resolved first.



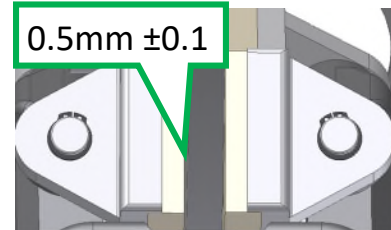
- 4 Loosen the caliper locking nut with the 36mm combination wrench.



- 5 Tighten the caliper adjustment screw using the 12mm hex key wrench until both pads comes into contact with the brake disc.



- 6 Loosen the caliper adjustment screw until there is a $0.5\text{mm} \pm 0.1$ gap between the pads and disc as measured by the feeler gauge.



- 7 Tighten the caliper locking nut when the correct clearance has been set to lock the caliper adjustment screw.



- 8 Repeat steps 4-7 for the other caliper.

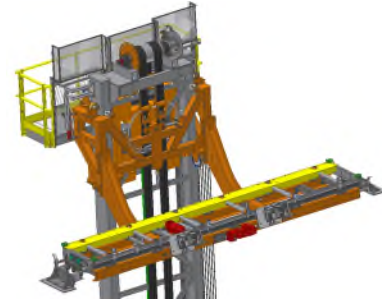


- 9 Engage the safety brake via the HMI.
Power up and restore the VDL to service.



Replacing a Side Guide Roller

- 1 Raise the lift carriage to the full up position.

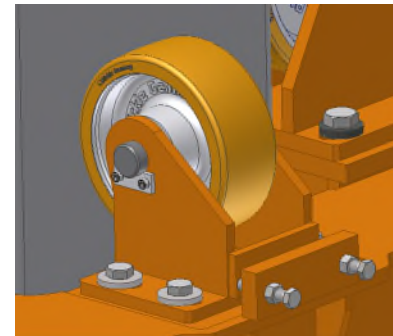


Mechanically secure the VDL per the procedure in Safety.

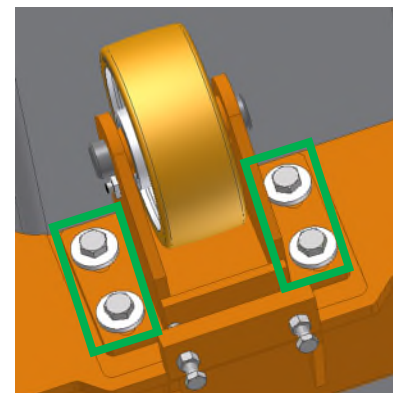
- 2 Shutdown and lockout the VDL according to your plant's lockout procedures.



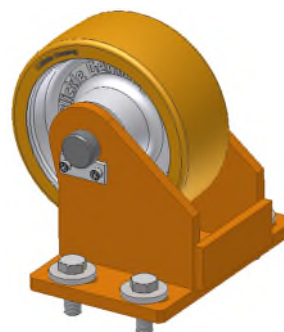
- 3 Locate the side guide roller to be serviced on the carriage.



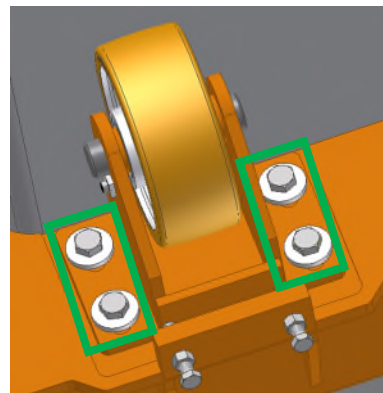
- 4 Loosen and remove the M16 bolts (4) securing the side guide roller assembly to the carriage frame.



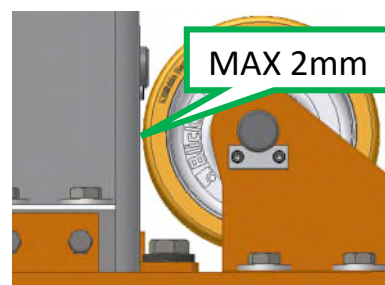
- 5 Remove the original side guide roller assembly and replace with the new one.



- 6 Tighten the M16 bolts (4) securing the side guide roller assembly to the carriage frame.



- 7 Verify that there is a gap between the roller and frame with a maximum of 2mm.

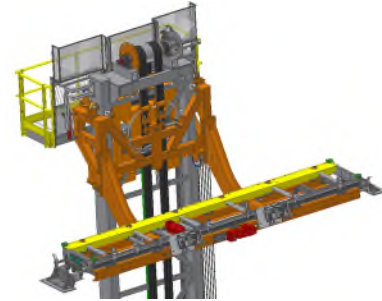


- 8 Power up and restore the VDL to service.



Replacing a Guide Wheel

- 1 Raise the lift carriage to the full up position.

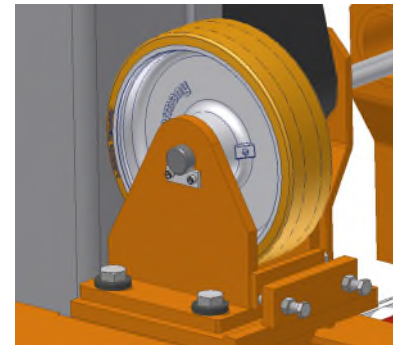


Mechanically secure the VDL per the procedure in Safety.

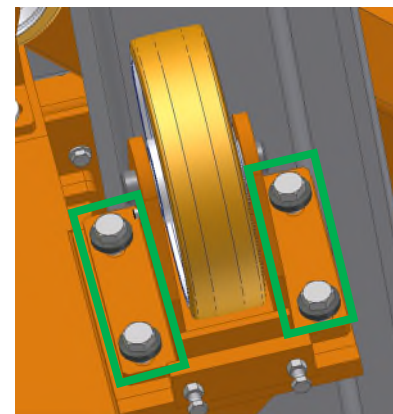
- 2 Shutdown and lockout the VDL according to your plant's lockout procedures.



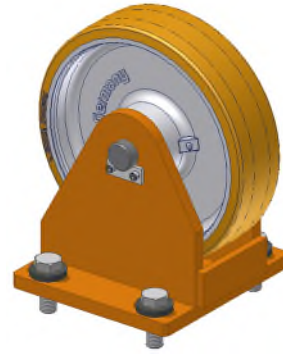
- 3 Locate the guide wheel to be serviced on the carriage.



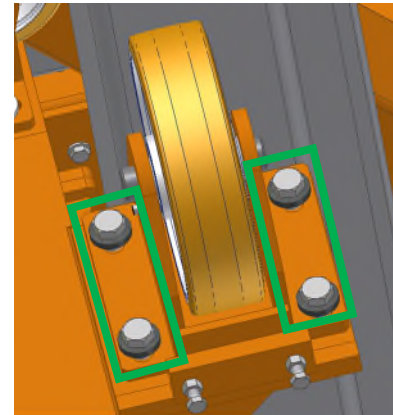
- 4 Loosen and remove the M20 bolts (4) securing the guide wheel assembly to the carriage frame.



- 5 Remove the original side guide roller assembly and replace with the new one.



- 6 Tighten the M20 bolts (4) securing the guide wheel assembly to the carriage frame.

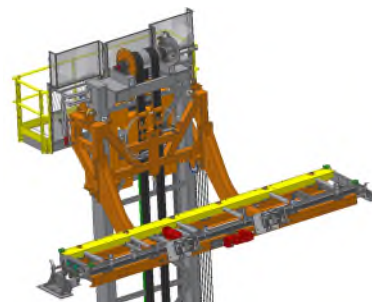


- 7 Power up and restore the VDL to service.



How to Replace the Gearmotor

- 1 Raise the lift carriage to the full up position.

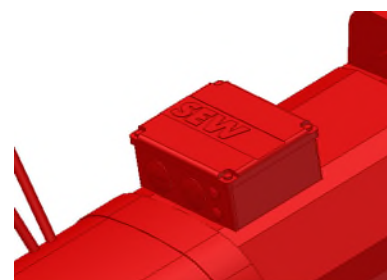


Mechanically secure the VDL per the procedure in Safety.

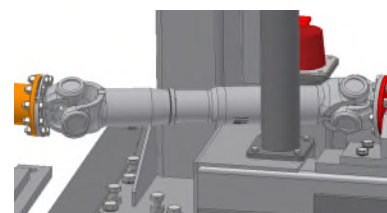
- 2 Shutdown and lockout the VDL according to your plant's lockout procedures.



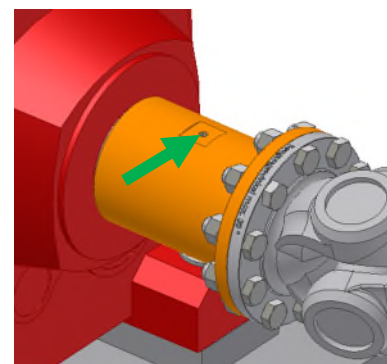
- 3 Disconnect the cables from the gearmotor.



- 4 Support the cardan shaft.

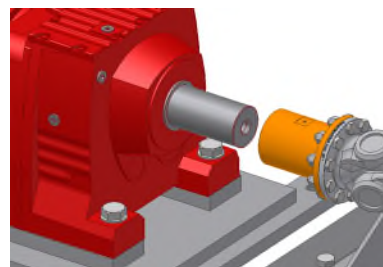


- 5 Loosen the set screw for the companion flange.

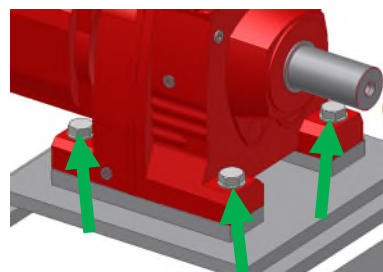


- 6** Pull the cardan shafts away from the gearmotor to free the companion flange from the gearmotor shaft.

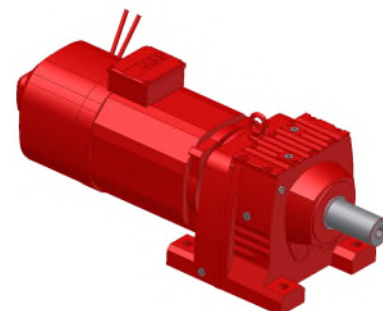
Note: Retain the shaft key for reuse if in good condition.



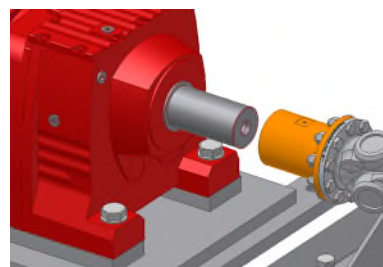
- 7** Loosen and remove the M30 bolts (4) securing the gearmotor to the base plate.



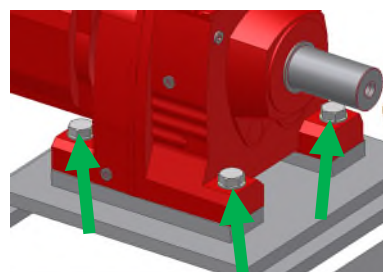
- 8** Remove the original gearmotor and replace with the new one.



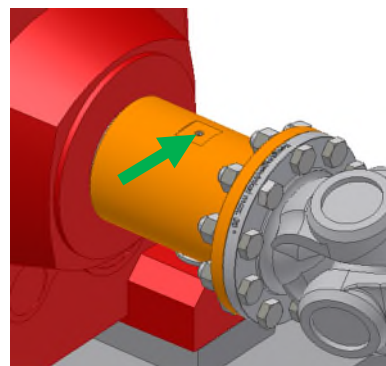
- 9** Set the companion flange on the gearmotor shaft with the key.



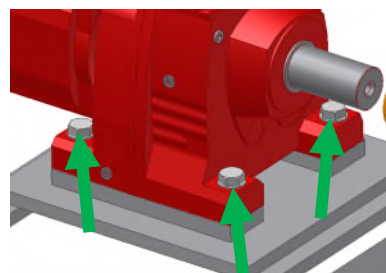
- 10** Hand-tighten the M30 bolts (4) at the gearmotor base.



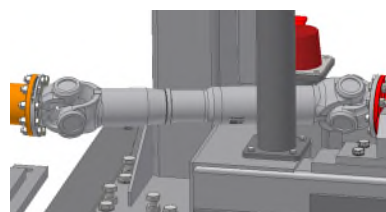
- 11** Tighten the set screw for the companion flange.



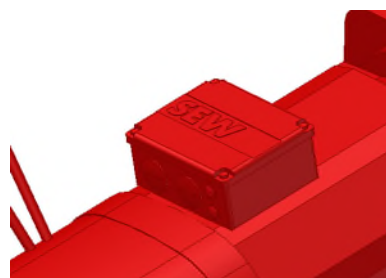
- 12** Torque the M30 bolts (4) securing the gearmotor to the base plate.



- 13** Remove the support for the cardan shaft.



- 13** Reconnect the cables from the gearmotor.

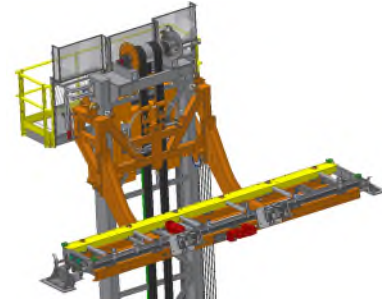


- 14** Power up and restore the VDL to service.



How to Replace the Cardan Shaft

- 1 Raise the lift carriage to the full up position.

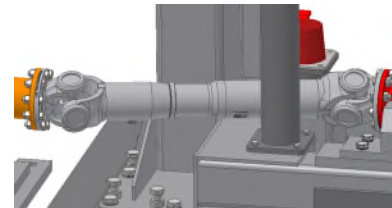


Mechanically secure the VDL per the procedure in Safety.

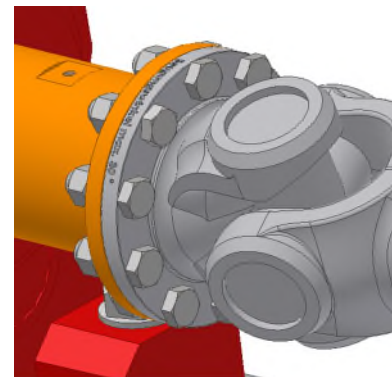
- 2 Shutdown and lockout the VDL according to your plant's lockout procedures.



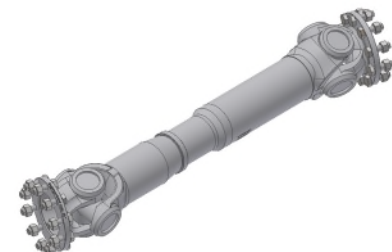
- 3 Support the cardan shaft.



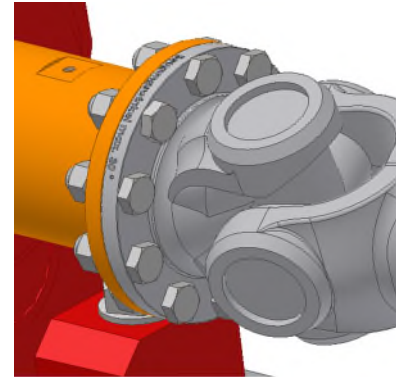
- 4 Remove the M16 bolts (10) securing the cardan shaft to the companion flanges on both ends.



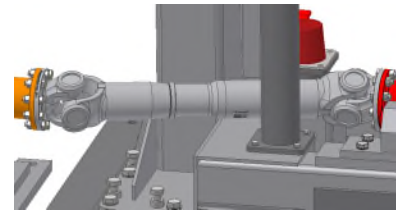
- 5 Remove and replace the cardan shaft.



- 6 Return and tighten the M16 bolts (10) securing the cardan shaft to the companion flanges on both ends.



- 7 Remove the support for the cardan shaft.



- 8 Power up and restore the VDL to service.

