Tru<T>Lift Replacement of Screw and Gearbox in High Tower (96,120,144)

The following procedure walks through the changing out of a gearbox and screw in a TTL High Tower. High Towers (96,120,144) differ from regular height towers in that they have an additional stabilization system incorporated to aid in balancing the drive screw when the lift is in use. The Stabilization system is a free floating system that stabilizes the drive screw by means of channels on the main tower housing.

### Tools Required:
- Socket Wrench 3/8” Drive
- Sockets 3/8” Drive- 7/16”, 1/2”, 3/4”
- 6” Extension for Socket Wrench
- Multi-Bit Screwdriver
- Wrenches- 7/16”, 1/2”, 3/4”
- Tape Measure
- 30” 2x4- (Shoring Device)
- Cleaning Rags
- Jack
- 4’ Piece of Rope

- Clean all the grease from the entire drive screw using cleaning rags. Be sure to stop the machine and depress the stop button before cleaning the drive screw- not doing so could cause serious injury.
- Run the lift up 30” from the lower landing (hand crank or jack lift up if no power or drive available).
- Remove the power source.
- Remove front plastic panel and two plastic side panels, the side panels push out from behind.
- From underneath the platform loosen the set screw on the lower limit switch. 2 pictures are shown here- if your model is a serial number of TS13219 or lower Fig. 1 is relevant, for models TS13220 and higher Fig. 2 is relevant.
- If the lift does not have the drive nut safety bracket it must be added during this procedure, for the instructions refer to the document titled "Replacement of Drive Nuts in TTL".
- Loosen the lower limit switch set screw to allow the activation lever to slide back so it clears the drive nuts or slot in the drive nut safety bracket. (Fig.1 & 2)
- Back off the lower shear pin (10/32 x 1/2” Screw) (Fig.1 & 2)
- Remove the 8x center bolts from the upper and lower stabilization system (**Fig. 3a & 3b see arrows**)

**Fig. 3a- Top Stabilizer- remove 8 center bolts**

**Fig. 3b- Bottom Stabilizer- remove 8 center bolts**

- On each of the top and bottom stabilizer remove the 2x bolts mounting the stabilizer block to the stabilizer tubes (**Fig. 4 shows example in upper- see arrow**) Once removed take the stabilizer tubes out of the tower

**Fig. 4- Top & Bottom Stabilizer- remove bolt to the stabilizer tubes**
• On the right side of each of the top and bottom stabilizer block remove the stabilizer tab mounting bolts, once these are removed from one side the stabilizers can be removed completely from the tower (Fig 5 see arrows)

**Fig. 5- Remove one side of each stabilizer tab bolts**

• Remove the platform and any platform options from the unit

• Physically lift the guide frame off of the two drive nuts and prop it up using a 2x4 or shoring device (Fig.6) (Photo shows the lower stabilizer removed- this is not necessary but for clarity it is not shown in the picture. With the stabilizer in the tower you can still access the lower guide plate)

**Fig. 6- Guide Frame propped exposing drive nuts**
• Undo the lower guide plate from the bottom of the drive screw *(Fig. 7)*

• Once the guide frame is securely propped in the air, spin the 2 drive nuts down to the bottom of the drive screw (you won’t be able to remove them at this point) If your lift has a drive nut safety bracket this will spin with the lower drive nut. *(Fig. 8)*
Remove the nuts and washer or lag bolts on one side of the base frame that hold the assembled unit to the concrete pad. DO NOT undo the ½’ Flange nuts that mount the tower to the base frame.

Using a pry bar on the free side of the base frame lift the entire one side of the unit off of the ground to allow enough clearance to slide your 2x4 shoring device under the tower propping it up in the air on one side. (Fig. 9) This will allow enough clearance under the bottom of the drive screw to remove the drive nuts. Remove the drive nuts and drive nut safety bracket (if applicable from the drive screw) Be careful not to let the tower or propped guide frame fall, use an assistant at this point for extra support. The assistant can also use leverage and push from the top of the tower to allow the 2x4 to slide underneath.

Remove motor by undoing the (4X) 3/8 x ¾” Bolts. Use the piece of rope to tie the motor to top of the tower (Fig. 10)

Loosen off all fasteners that mount the gearbox to the top of the tower (Fig. 10)

Remove your shoring device or prop holding the guide frame up in the air and lower guide frame to ground level.

The drive screw and gearbox should be clear of the machine now- from the top of the tower remove the gearbox and screw completely.

Remount all hardware from the old screw and gearbox onto the new screw and gearbox.

Drop new screw down into the guide frame.
• Place the drive nut safety bracket over top of one of the drive nuts (Fig. 11)

![Fig. 11- Lower drive nut with safety bracket in place](image1)

• Smear the inside of the new drive nuts with a film of grease (Mobil SHC 460- Synthetic)
• Spin the drive nuts onto the drive screw- the drive nut with the safety bracket goes on last. (Fig. 12)

![Fig. 12- Spin the new drive nuts onto the drive screw](image2)

• Remove the prop from underneath the tower and tighten the (4X) ½” Flange Nuts, securing the tower to the base frame
• With the guide frame still securely propped in the air, spin the 2 drive nuts by hand up to the slotted channel on the guide frame where the nuts will finally sit.
• Using (2x) 10-32 x ½” Screws mount the drive nut safety bracket activation plate to the safety bracket housing. *(Fig.13)*
• Install Lower Guide Plate on bottom of drive screw (2X) ¼” x 1¾” Bolts. Do not tighten completely at this time

Fig. 13- Mounting the safety bracket activation plate

• Adjust the drive nuts to make sure they are spaced apart by ¾” and the flats on the nuts are in line to slide into the slotted channel *(Fig.14)*

Fig. 14- Drive nuts spaced properly and aligned to channel
• Remove the shoring device or prop on the guide frame and lower the frame over the drive nuts returning the drive nuts to their original position. *Keep hands clear of the slotted channel and drive nuts when the guide frame is lowered onto the drive nuts- injury can occur if this is ignored.*

• Readjust the lower limit switch so the activation lever (black rod) is penetrating the drive nut safety bracket by about 3/8” (*Fig. 15*)

• Replace the 10-32 x ½” shear pin (Pan head screw)

• Grease the drive screw (Mobil SHC 460-Synthetic)

• Restore power to the unit

• Test the function of the unit to make sure the lower limit switch is functioning properly and that the drive nuts remain in the channel when activating the lower limit switch. (*Fig. 16*)

• **Without tightening** any hardware put all components of the upper and lower stabilizer blocks back into the tower and around the drive screw- place hardware in same locations removed from earlier but do not tighten anything up more than finger tight (*Fig. 17*)
• On both the top and bottom stabilizer blocks tighten ONLY the stabilizer tube bolts. Be sure the tubes are at 90 degrees to the stabilizer blocks before doing so (Fig.18)

![Fig. 18- Tighten only the upper and lower stabilizer tube bolts](image)

• Run the lift to the top of its maximum travel. Doing this allows the guide frame to properly align the gearbox and screw to its operating position. Slightly tighten all (8) ¼"x⅜" bolts and the (2) 5/16" bolts. Do not tighten them completely at this point. (Fig.19)

![Fig. 19- Tightening the top gearbox into place](image)

• After tightening the top bolts slightly, run the guide frame to the bottom of the tower. Allow the lower limit switch to stop the lift to be sure it’s at the bottom of its travel. At this point no weight should be on the drive screw as the weight of the guide frame will be on the ground. Raise the guide frame 1” from the bottom so that the weight of the guide frame is on the bronze drive nuts and drive screw. This gives a better position of where the guide frame sits in relation to the screw. In this position tighten the bottom white nylon screw guide plate. Do not tighten completely though, only enough to hold it in place. (Fig.19)

![Fig. 19- Tightening the lower guide plate into place](image)
Repeat the above two steps 3 more times, tightening the fasteners more on each pass.

On the third and final pass tighten all of the bolts completely; the lower bolts should be tightened with the lift at the lowest position and the upper bolts tightened with the lift at the upper position. This is very important to allow the lift to find its own natural position within the tower.

Once the gear box and drive screw are tightened up the stabilizers can be set into their final stabilizing position. The purpose of the stabilizers is to stabilize the drive screw in the position set by the guide frame when using the alignment procedure in the 4 previous steps of this procedure.

Tighten the stabilizer tab mounting bolts on both the top and bottom stabilizer block—only enough to provide friction do not torque them down prohibiting movement of the stabilizer block unit (*Fig. 20*—see arrows).

With the bottom stabilizer block at the bottom of the drive screw tighten the 8 center bolts on the stabilizer block. This piece slides left and right to align properly to the position of the drive screw, be sure to tighten it in a position that does not work against the position of the drive screw (*Fig. 21*—see arrows).
• Manually crank the guide frame of the unit to the mid travel point of the tower

• Manually lift the stabilizer block system so the upper stabilizer block is directly underneath the gearbox. This now aligns the upper stabilizer block to the position of the drive screw at the top of the tower. Once there tighten the top 8 center bolts on the upper stabilizer block (Fig. 22- see arrows)

![Fig. 22- Tightening stabilizer center mounting bolts (x8)](image)

• Test the stabilizer block to make sure it does not hang up on the drive screw at any point in its travel- because it free floats off of the tower and drive screw it should only stabilize the screw and not pull against it at any point of its movement.

• Reinstall the lifting platform, plastic cover panels and any other options