	Glass Equipment Development, Inc. 9280 Dutton Drive Twinsburg, Oh 44087	Document No.: APN-0085 Revision: A	Date: 7/24/03

Description:	**Bottom Nozzle Head Rebuild Procedure for GED Smart Extruders**
Written By:	Ken Collier
Approved By:	

Revision History:	Release No.	Changed By	Date
A - Original release	ER03265	Ken Collier	7/24/03

1. Purpose:

This procedure provides the step by step instructions for rebuilding the bottom nozzle head for the GED Linear Smart Extruders.

2. Scope:

This procedure applies to the following GED Extruders:

MSMEXT410000E Smart Extruder*

MSMEXT420000E Smart Co-Extruder*

*Rebuild kit K500-7620-SMART is required for these procedures.

3. Applicable Documents

GED Drawing 1-15208 & 2-15210 (MSMEXT410000E)

GED Drawing 1-15654 & 2-15686 (MSMEXT420000E)

CAUTION:

Nozzle head assemblies, plate assembly and butyl/PIB are very hot and can cause severe burns! Wear appropriate safety equipment and exercise extreme caution when performing maintenance on the extruder. If hot melt butyl or PIB gets in your eyes or on your skin, flush immediately with cold water!

4. GED Bottom Nozzle Head Rebuild Procedure

4.1 Tools and Materials

7/16” wrench
3/4” wrench
3/32” hex wrench
1/4” hex wrench
9/16” hex wrench
9/64” hex wrench
5/32” hex wrench
Soft-faced hammer (or arbor press)
GED spanner wrench T00023
Snap ring pliers
Bench vise with soft jaws
Channel-Lock® pliers

Multi-Purpose Synthetic Lubricant (provided with K500-7620-SMART)
Solvent, mineral spirits (or equivalent)
Never-Seez® lubricant (GED P/N 150-3144)
Loctite® (blue, medium strength, removable)

4.2 Nozzle Head Work Instructions

4.2.1 Bottom Nozzle Head Removal

NOTE:

Bottom nozzle head removal must be performed while the extruder is warm. Heat the extruder to operating temperature prior to disassembly.

1. Turn off and lock out the main air supply to material pump and Smart Extruder.
2. Bleed the pressure off of the heads by opening the ball valve on the bottom of the material manifold. The pressures may be viewed from the *Remake Screen* on the HMI.
3. Turn off the main electrical disconnect and lock out.
4. Remove applicable guards to gain access to the bottom head.
5. Remove the air lines, quick exhaust valves and air fittings at the bottom nozzle head.

NOTE:

Mark the location of the air lines for reinstallation.

6. Remove the four 1/4”-20 bolts used to hold the assembly together.
7. Remove the air cylinder stop housing (3-14070).
8. Loosen the jam nut on the air cylinder stop housing and remove the setscrew.
9. Remove the nozzle adapter (2-15350), with attached air cylinder assembly, from the heater plate.

   TECHNIQUE: Twist and pull adapter downward.
10. Unthread the two #10-24 setscrews and one 5/16”-24 setscrew from the air cylinder shaft.
11. Remove and discard the valve stem (3-15263) from the air cylinder shaft and nozzle adapter.
12. Remove and discard the snap ring (150-5846) which keeps the stem seal retaining spacer (3-15351) and stem seal (150-7175).
13. Remove the stem seal retaining spacer.
14. Remove and discard the stem seal.
15. Remove and discard the O-ring (250-0338) from the nozzle adapter.
16. Remove the insulation plate (3-15212).

17. Unthread the two #10-24 setscrews and one 5/16”-24 setscrew from the air cylinder shaft.
18. Remove and discard the valve stem from the air cylinder.

4.2.2 Side Nozzle Head removal

This must be done to access bottom nozzle. (Reference APN-0086 for Side Head Rebuild Instructions)

1. Turn off the main air supply to material pump and Smart Extruder.
2. Bleed the pressure off of the heads by opening the ball valve on the bottom of the material manifold. The pressures may be viewed from the Remake Screen on the HMI.
3. Turn off the main disconnect and lock out.
4. Remove the air lines and air fittings at the nozzle heads.

NOTE:

Mark the location of the air lines for reinstallation.

5. Remove the guards on the non-operator side of the extruder to gain access to the jackscrew plates and the gib for the non-operator side head.
6. Remove the four 1/4”-20 x 3” cap screws which secure the two side head assemblies to the ball screw assembly.
7. Remove the six 1/4" hex screws that secure the two jackscrew plates.

NOTE:

Do not remove or loosen the jackscrews.

8. Remove the four 5/16”-18 x 1 1/4" cap screws which secure the two adjustable gibs.
9. Disconnect the side head power cables from the side of the extruder main electrical cabinet.
10. Remove the side heads from the heater block and discard the O-ring (150-5881).

4.3 Disassembly Procedure

4.3.1 Bottom Nozzle Head Disassembly Procedure

1. Remove the four 10-32 x 1/2” cap screws which secure the bottom nozzle to the heater plate and remove the bottom nozzle from the heater plate.
2. Remove and discard the O-ring (250-0338) from the bottom nozzle adapter.

3. Remove the 6-32 x 1/2” setscrew which secures the bushing (3-6359) to the bottom nozzle.
4. Mount the bottom nozzle in a soft jawed vise with the bushing facing up. Grasp the bushing with a pair of Channel-Lock® pliers and remove it from the bottom nozzle.

   TECHNIQUE: Twist and pull upward.

CAUTION:

Be careful not to damage the O-ring seat or sealing area of the bottom nozzle.

5. Discard the bushing.

4.3.2 Air Cylinder Disassembly Procedure

1. Mount air cylinder in a soft jawed vise with the shaft pointing up and, at least 1/2” of the air cylinder on top of the vise.

CAUTION:

Do not over tighten the vise to prevent deformation of the air cylinder.

2. Use GED spanner wrench (T00023) to turn gold endcap clockwise. The keeper ring will start to come out of the small hole in the side of the air cylinder. Continue turning clockwise until the keeper ring is free from the gold endcap. See Figure 1.
3. Push the gold endcap inwards until it is possible to remove the keeper ring.
4. Remove the keeper ring by feeding the ring back through the hole counterclockwise.
5. Invert the air cylinder in the vise and repeat steps 2 through 4.

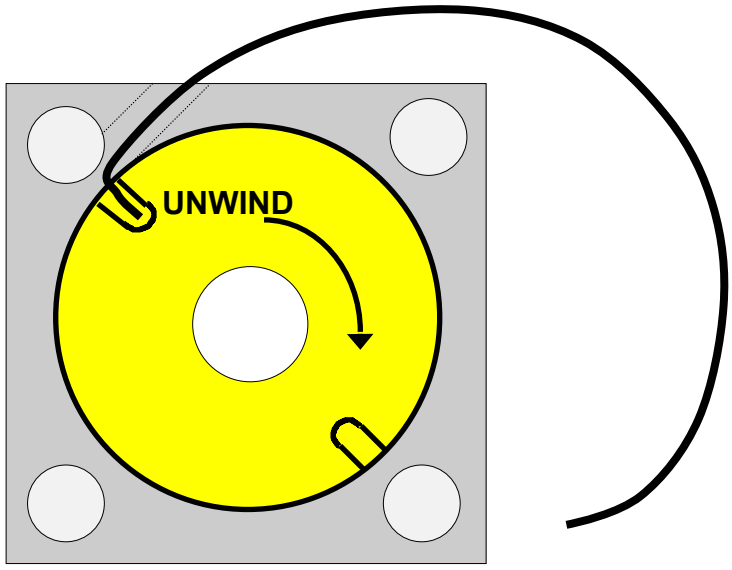


Figure 1

6. Remove the two gold endcaps, piston rod, and piston from the air cylinder.
7. Remove the two gold endcaps from the piston rod.
8. Remove and discard the two snap rings using snap ring pliers.

9. Slide the piston off the piston rod.
10. Remove and discard all O-rings from the piston rod, piston, and gold endcaps.

4.3.3 Parts Cleaning

1. Remove the majority of the butyl while it is still warm.
2. Clean parts in solvent. An air bubbler in the solvent tank expedites the process.
3. Dry parts and lay them out on a clean surface.

4.4 Assembly Procedure

4.4.1 Air Cylinder Assembly Procedure

Figure 2 can be used to help identify O-rings on the air cylinder.

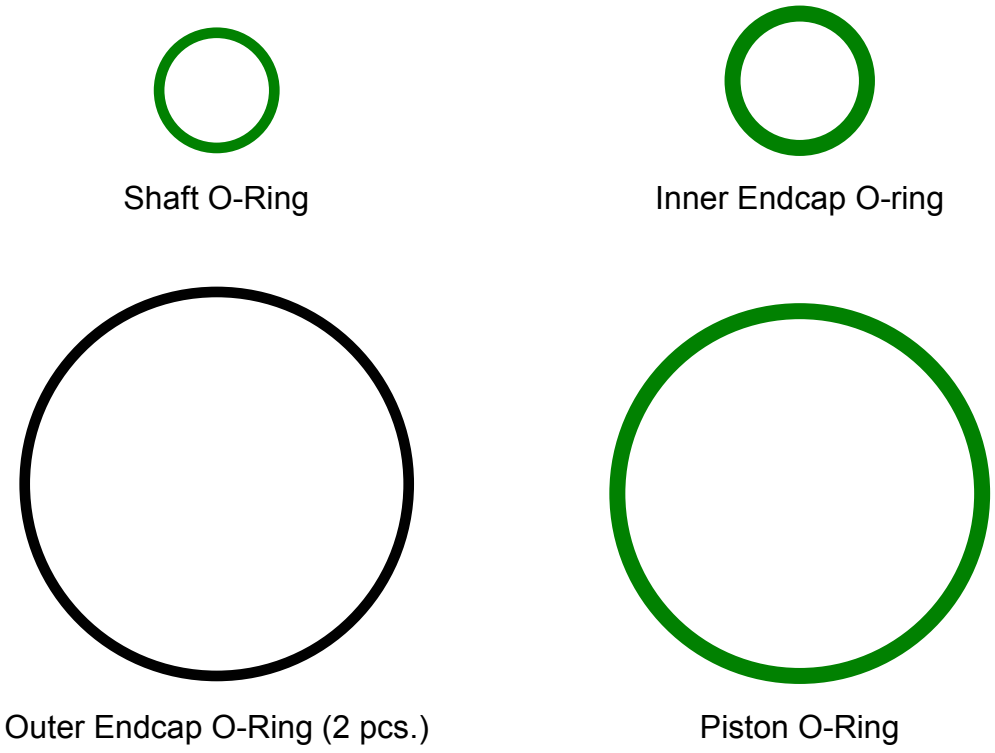


Figure 2

NOTE:

When grease is called for in the air cylinder assembly procedure, use the multi-purpose synthetic lubricant with Teflon (#82340) that is supplied in the air cylinder rebuild kit.

1. Grease the shaft and the shaft O-ring.

2. Slide the shaft O-ring over the shaft until it seats into the deepest groove.
3. Work the O-ring with your thumb and forefinger to insure the O-ring is not twisted.
4. Slide the piston over the shaft until it comes in contact with the O-ring. Rock the piston back and forth and apply a little pressure until the piston is over the O-ring. Caution must be taken as not to cut the O-ring.
5. Fasten the piston in position with two new snap rings. The snap rings have a bevel on one side due to the way they were manufactured. Make sure the beveled side is facing the piston. See Figure 3.

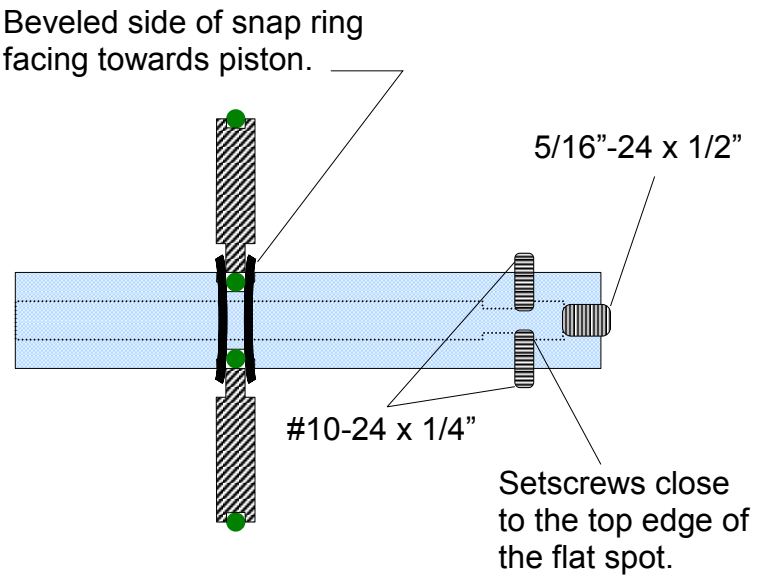


Figure 3

6. Grease the piston O-ring.
7. Install the piston O-ring over the piston.
8. Grease one inner endcap O-ring.
9. Install one inner endcap O-ring as shown in Figure 4.
10. Grease the outer endcap O-ring.
11. Install the outer endcap O-ring into the endcap O-ring groove.

    TECHNIQUE: Do not roll the O-ring over the endcap. Lay one side of the O-ring in the groove and stretch the O-ring into position by applying

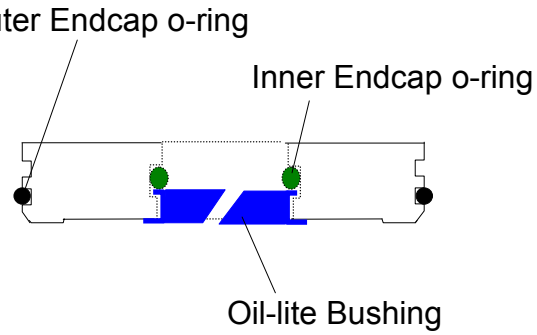


Figure 4

pressure with your thumb and forefinger. This will keep the O-ring from being twisted in the groove.

12. Repeat steps 8 thru 11 for the other endcap.
13. Grease the inner bore of the cylinder.
14. Mount the air cylinder in a soft jawed vise with the top pointing up. The Outside surface with the retaining ring groove closest to it is considered the top side. See Figure 5.

CAUTION:

Do not overtighten the vise to prevent deformation of the air cylinder.

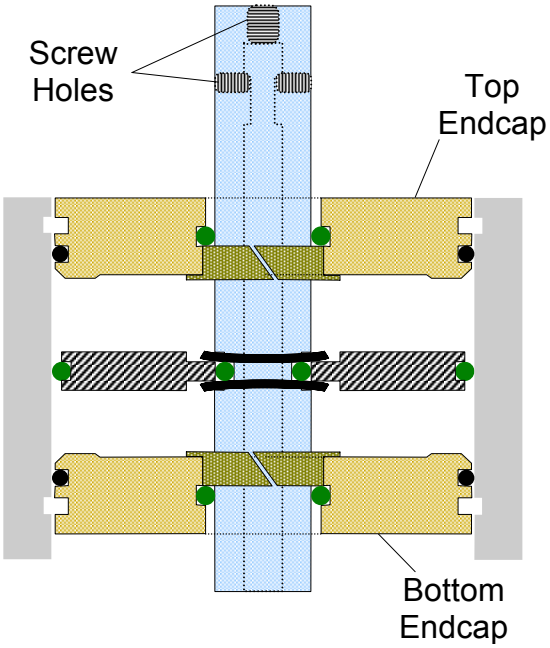


Figure 5

15. Slide the piston assembly into the cylinder with the setscrew holes on the top side.
16. Slide one endcap over the shaft with the retaining ring notches on the top side.
17. Align a retaining ring notch with the hole for the retaining ring in the air cylinder.

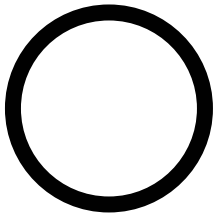
CAUTION:

Do not rotate the endcap to align it with the retaining ring hole, because the outer endcap O-ring will be damaged by the air inlet hole.

18. Push the endcap into the air cylinder just until there is room to slide the retaining ring into the hole.
19. Apply Never-Seez® lubricant (150-3144) to one retaining ring.
20. Slide a retaining ring into the hole until the hooked end falls into the notch.
21. Push on the shaft from the bottom until the endcap is flush with the top surface.
22. Using the spanner wrench (T00023), turn the endcap 360 deg. counterclockwise. It may be necessary to rotate the endcap back and forth a little to align the grooves.
23. Invert the air cylinder in the vise and repeat steps 16 thru 22.

4.4.2 Bottom Nozzle Head Assembly Procedure

Figure 6 can be used to help identify O-rings in the side head kit (K500-7619-SMART).



O-ring 250-0338

Figure 6

1. Apply Loctite (blue) to the bushing (3-6359), align the slot in the bushing with the slot in the bottom nozzle, and press the bushing into the bottom nozzle until it seats.

NOTE:

An alternate method of installing the bushing (3-6359) is to install it with the slot in the bushing (3-6359) offset 45° to the slot in the bottom nozzle. This is helpful in controlling butyl/PIB which flows up the sides of the spacer from the bottom.

2. Install and tighten the 6-32 x 1/2” setscrew which secures the bushing to the bottom nozzle.
3. Grease the nozzle adapter O-ring (250-0338).
4. Install the nozzle adapter O-ring in the bottom nozzle O-ring groove.
5. Install stem cup seal (150-7175), stem seal retainer (3-15351) and snap ring (150-5846) into the nozzle adapter (2-15350).
6. Install the nozzle adapter into the air cylinder assembly with one of the sight holes facing out (same direction as the air line inlet/outlet).
7. Insert the valve stem (3-15263) through the nozzle adaptor and the air cylinder shaft. Attach the valve stem to the cylinder shaft using two 10-24 and one 5/16”-

24 setscrews with blue Loctite on the threads. The setscrews should be to the top edge of the flat spot. See Figure 3.

8. Install the air fittings and quick exhaust valves on the air cylinder in their proper locations as marked at disassembly.
9. Apply Never-Seez® lubricant to the nozzle adapter as shown in Figure 7.
10. Install the bottom nozzle assembly to the heater plate with the four 10-32 x 1/2" cap screws temporarily leaving the screw loose enough that the assembly can move around.
11. Slide the nozzle adapter into the heater plate until there is no gap between the nozzle adapter and the heater plate. Rotate the nozzle adapter until the sight hole and air cylinder air inlet/outlet holes are facing out towards the front of the extruder.

NOTE:

Do not tighten the screws at this time.

12. While pushing up on the air cylinder shaft, tighten the four 10-32 x 1/2" cap screw securing the bottom nozzle assembly to the heater plate. This will also aligning the bushing to the valve stem.
13. Set the air cylinder stop housing (3-14070) on the air cylinder. NOTE: Back the setscrew in the air cylinder stop housing out to prevent damage to the valve stem.
14. Apply Never-Seez® to the threads of the four 1/4"-20 x 5 1/2" hex screws.
15. Screw the 1/4"-20 x 5 1/2" hex screws into the heater plate and tighten equally.
16. Thread the 1/2"-13 setscrew into the air cylinder stop housing until it stops on the air cylinder shaft. Back it off 2 1/2 turns.

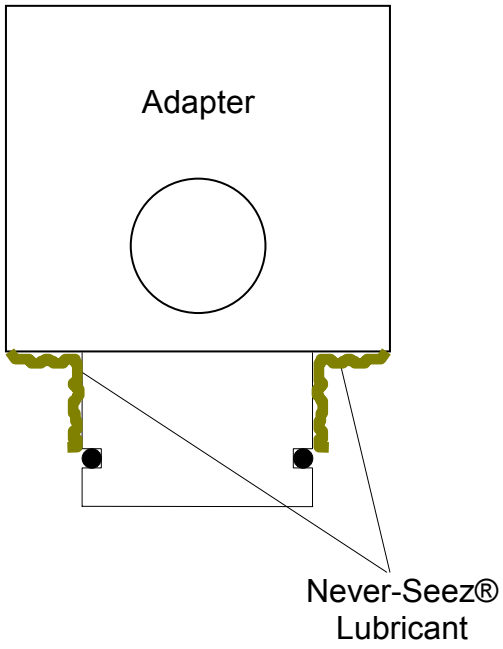


Figure 7

NOTE:

This is the preliminary setting; final adjustment must be made for specific application by running steps 3 & 4 of the Calibration Wizard in the WinExtrude Software.

17. Thread the 1/2"-13 nut onto the setscrew and tighten the nut while holding the setscrew in place.

4.4.3 Side Nozzle Head Installation

CAUTION:

Do not install the nozzle blocks to the heater plate with the nozzle tips installed to the nozzle blocks.

1. Clean the top of the material block.
2. Inspect the bottom of the side head and the top of the material block for burrs, sharp edges or galling. Lightly hone these deformities to prevent damage to the bottom seal.
3. Install seal (150-5881) in the bottom of the head housing.
4. Lubricate the bottom and way areas of the head with a thin coat of Never-Seez®.
5. Place side head assembly on heater block. Slide under the fixed (pinned) gib and align with the ball screw assembly and insulating plate. Make sure the bottom seal (150-5881) stays in the head housing seal groove.
6. Apply Never-Seez® to the cap screws and install the adjustable gib leaving the cap screw loose enough that the gib can be adjusted.
7. Install the jackscrew plate with the three 1/4" – 20 hex head bolts.
8. Push the adjustable gib against the side head and adjust the jackscrews until they just touch the adjustable gib.
9. Tighten the jam nuts while holding the jackscrews.
10. Apply Never-Seez® to the two 1/4" – 20 x 3” cap screws and secure the side head assembly to the ball screw assembly. These screws must be tight!
11. Repeat these steps for the opposite side head.
12. Turn on the extruder main electrical power and warm to operating temperature.
13. Disable conveyor width drive motor via the touch screen.
14. Apply sealant pressure to the side heads. Verify, in the Remake Screen, that there is at least 500 PSI outlet pressure on the
15. Using a wrench on the flats of the operator side end of the ballscrew, turn the ballscrew back and forth while watching the tracking of the side heads. If the side heads wobble side to side, bind or one lags behind the other when changing direction, then adjust the jackscrew to correct these condition. The gibs should be snug against the sides of the heads but not binding.
16. Tighten the cap screws securing the gibs. Also tighten the jam nuts on the jackscrews. Verify that the heads still move freely with minimal wobble and no binding.

4.4.4 Nozzle tip installation

1. Install nozzle heads to the heater block as outlined in section 4.4.
2. With the extruder on and Master Start activated, press the Move to Max button located in the Conveyor Width screen of WinExtrude.
3. Verify that there is pressure on the side heads. Pressures can be viewed from the Remake Screen.
4. Install nozzle tips with three 8-32 x 1/2" socket head cap screws.

   TECHNIQUE: Push down on nozzle tips with a blunt object and tighten the cap screws as downward pressure is maintained.
5. Install Intercept™ spacer hold-down blocks with one 8-32 x 1/2" socket head cap screw (if applicable).