VLF Shaft Encoder

Upgrade Procedure

Document Number
05-0195-AP01

2001-10-01

Creo
3700 Gilmore Way
Burnaby, BC
Canada V5G 4M1
(604) 451-2700

Copyright 2001 Creo Products Inc. All rights reserved.

Revision History

Revision	Date	Author	Comments
	June 15, 2001	Marek Zgrych	Initial release
	Oct 01, 2001	Marek Zgrych	Minor addition to scope
	Nov. 1, 2002	Marek Zgrych	Added automatic option for upgrading firmware parameters

creo

VLF
Shaft Encoder Upgrade Procedure

CONTENTS

Revision History i

1. Scope 1
   - 1.1 Notes 1
   - 1.2 Terminal Conventions 1

2. Parts, Tools, And Supplies Required 2

3. Procedure 5
   - 3.1 Checking Machine Operation 5
   - 3.2 Obtain a test Plot 6
   - 3.3 Prepare the machine for the upgrade 10
   - 3.4 Assemble the drum pin, EDA, and install tool 12
   - 3.5 Support drum and Remove the existing drum pin 14
   - 3.6 Installing the new drum pin with the EDA 18
   - 3.7 Expanding the EDA 20
   - 3.8 Installing the encoder adapter plate 22
   - 3.9 Installing and aligning the encoder 23
   - 3.10 Updating Firmware Parameters 31
   - 3.11 Check Leading Edge Position and BDO alignment 33
   - 3.12 Adjusting for Encoder Misalignment 34

   Appendix A: How to use the Plate Edge to Image Gauge 38
   Appendix B: Trouble shooting 43
   Appendix C: BDO Adjustment 43
   Appendix D: Upgrading a machine that is hard down 43

1. SCOPE

This procedure outlines the steps involved in upgrading the external glass encoder with the Heidenhain shaft encoder. This upgrade is intended for all VLF machines and involves the following tasks:

- Image five plates (if you are using positive plates, for example: Agfa, Fuji, PDI, set 'media # invert 0'.
- Perform the Heidenhain encoder upgrade.
- Upgrade the firmware.
- Perform the GC correction.

1.1 Notes

- This procedure should take one person approximately 7 hours.
- All tools should be contained in the UK 518 Case provided.
- The plate edge to image gauge may not be included in kit, but must be added before it is shipped to the upgrade site.
- A Scientific Calculator is required.
- If the machine is hard down and it is not possible to get the drum to hold accurately at the zero position, follow the directions in Appendix D.

1.2 Terminal Conventions

This procedure uses three conventions for keyboard entry to the terminal. They are as follows:

1. If the instructions call for a single key press, the key to press will be shown inside a pair of brackets in italics. For example: < *spacebar* >.
2. A combination key press, such as alt key and function key F5 is shown in italics with a hyphen joining the combination key press. For example: < *alt-F5* >
3. A terminal command to be entered at the prompt is shown in brackets in `Courier New` font. For example: `< list version >`

2. PARTS, TOOLS, AND SUPPLIES REQUIRED

a.	Expanding drive anchor Assy. (EDA)	50-2294A	1
b.	Heidenhain encoder	32-4130A	1
c.	Encoder adapter board	10-4314A	1
d.	Encoder adapter bracket	57-8806A	1
e.	Adapter plate with Bearing	50-2312A	1
f.	Dampener Assy.	50-2134A	1
g.	Drum pin	50-2295A	1
h.	Warning Sticker	74-3316A	1
	Expense Parts	**Part Number**	**Quantity**
i.	SCRW,M3*8,SOCK-CAP,S-PLATED	52-4458	6
j.	WASH,M3,FLT,S-PLATED	52-3057	6
h.	WASH,M3,BEL,HDS,S-PLATED	52-4262	6
i.	SCRW,M4*16,SOCK-CAP,S-PLATED	52-4460	4
j.	WASH,M4,BEL,HDS,4.3*9*1,S-PLATED	52-4261	4
k.	SCRW,M6*35,SOCK-CAP,S-PLATED	52-3245	2
	WASH,M6,BEL	52-4031	2
	Tools Required	**Part Number**	**Quantity**
l.	EDA install tool	50-2296A	1
m.	Encoder alignment tool with 9V battery	92-0147C	1
n.	Drum support	92-0081A	1
o.	0.625"*1"*0.045" spring	59-3827	1
p.	12mm coupling	55-1145	1
q.	Foam padding	N/A	1 set
r.	Metric Allen key set	N/A	1 set
u.	M10 Shoulder bolt	N/A	1
v.	1.5mm flat end hex key	N/A	1
x.	Wedge	N/A	1
y.	Flat head screwdriver (small)	N/A	1
z.	CD containing Grid1 and Grid2	N/A	1
aa.	2.5mm long arm T-handle hex key	N/A	1
bb.	3mm long arm T-handle hex key	N/A	1
cc.	Torque Wrench	N/A	1
dd.	6mm hex fitting for torque wrench	N/A	1
ee.	Plate Edge to Image Gauge	N/A	1
	Drum 5080/5880-bracing block	N/A	1

Supplies Required

ff.	Microlube grease (or substitue)	89-0091
gg.	Loctite 242	89-0053
hh.	alcohol	N/A
ii.	lint free towel	89-0029

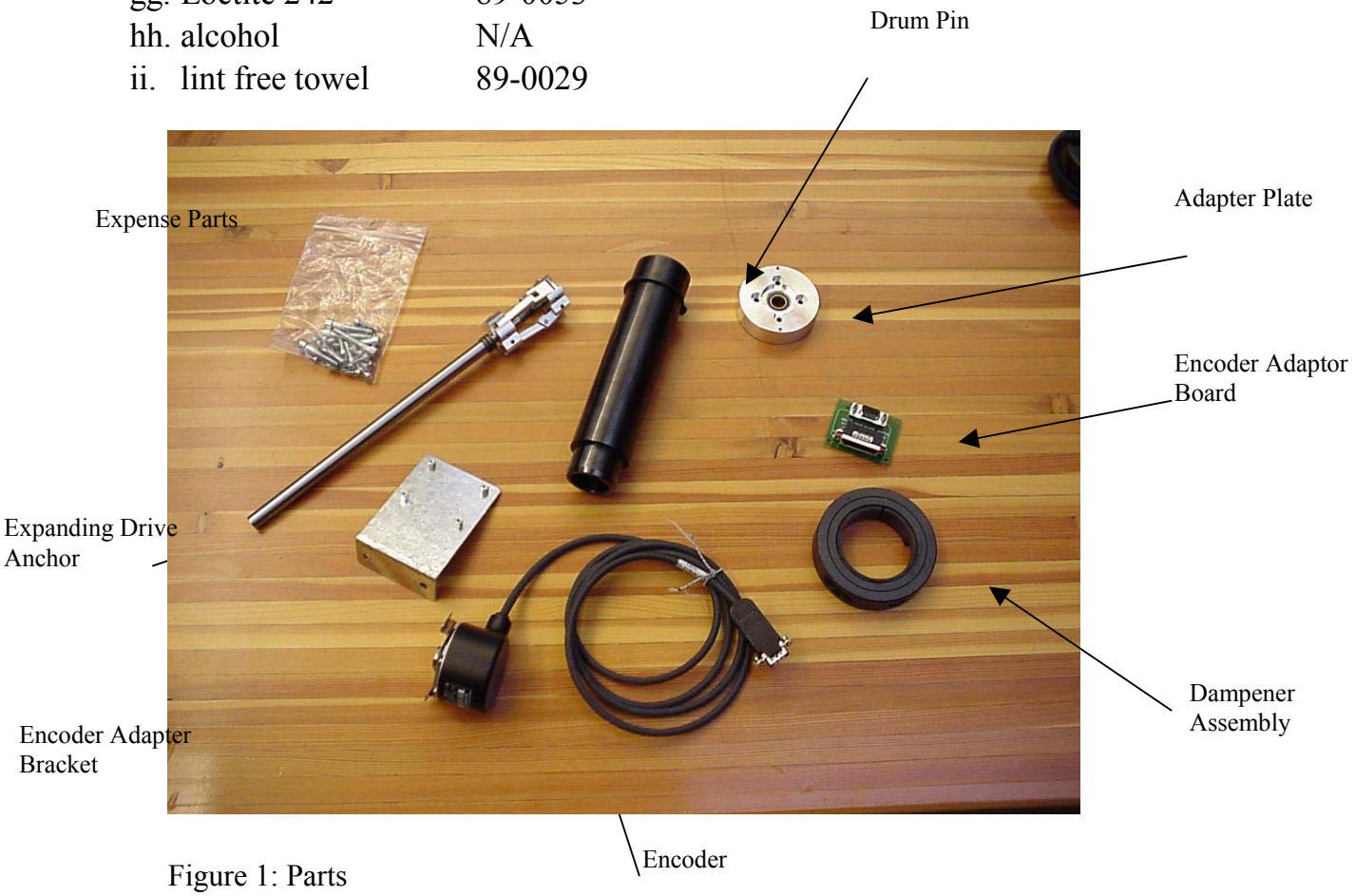


Figure 1: Parts

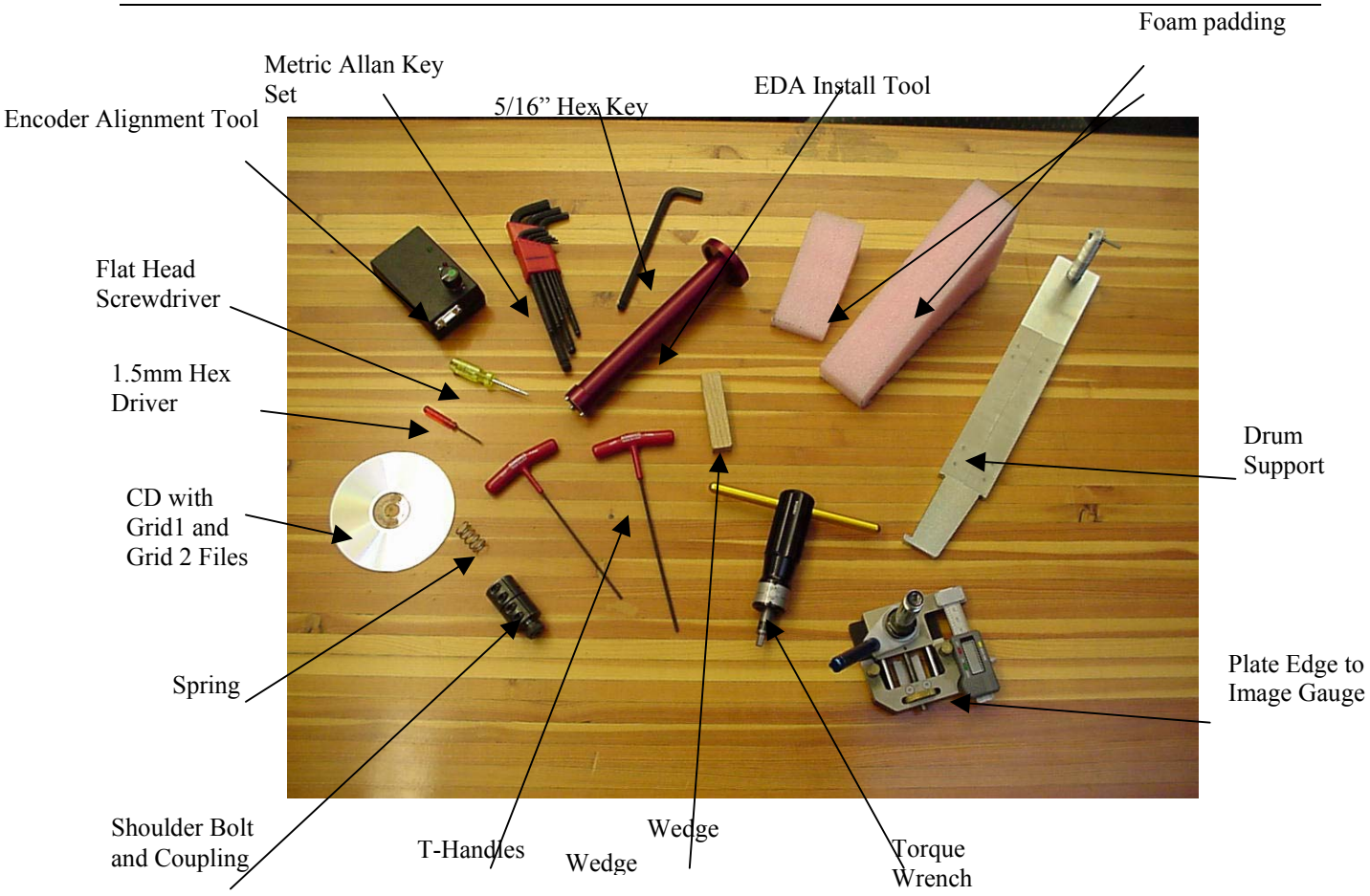


Figure 2: Tools

3. PROCEDURE

3.1 Checking Machine Operation

1. Check the general machine operation to ensure that settings are correct and the machine is operational.
2. Disable the power to the write laser using the following commands:

   `<set head wenable 0>`

   `<nvs save head>`
3. Turn the safety key switch to the Laser Hazards position.
4. Enter the following commands:

   `<set al>` (find leading edge clamp value)

   `<tec off>`

   `<drum move (enter lec position) h>` (moves the drum to the leading edge clamp position)

   `<drum idle>`
5. For Trendsetter VLFs or Trendsetter VLF Autoloaders, type:

   `<lec on>`
6. Remove the solenoid cover.
7. Gently actuate the solenoid for the trailing edge clamp (TEC) by pressing the solenoid button.

Note: For VLF Platesetter actuate the leading edge clamp (LEC) solenoid.

WARNING: If the machine is misaligned and the clamp is dropped onto the drum with full force the machine may be damaged.

8. Check to ensure that the leading edge Push Bar is in the center of the dimple in the LEC when **it first makes contact**. See Figure 3.

Note: It is important that the Push Bar is in the center of the dimple when it first makes contact.

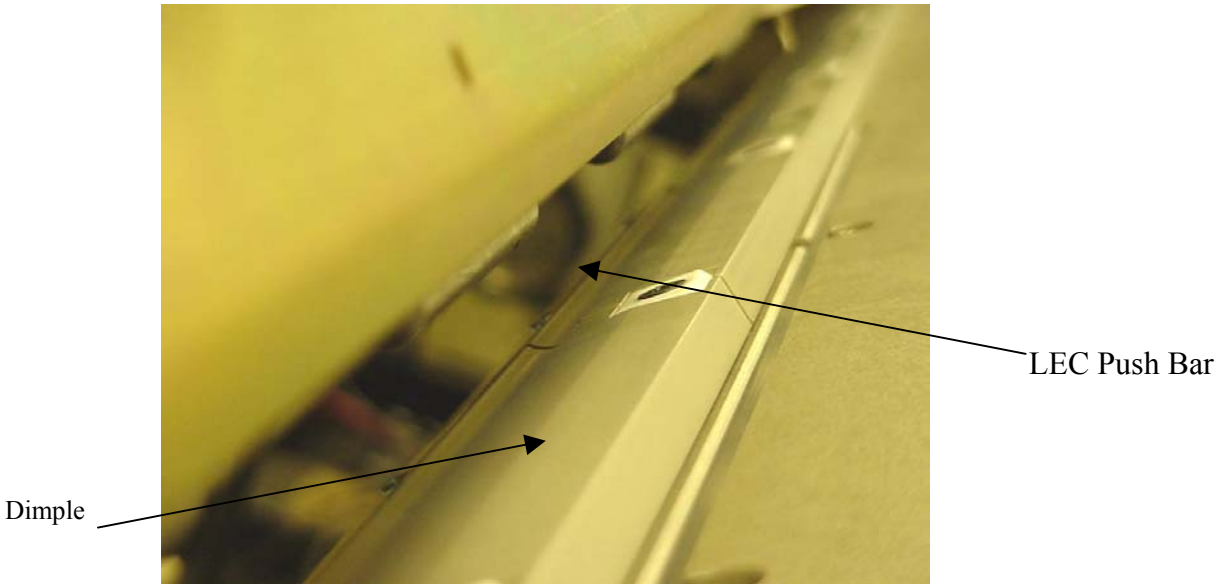


Figure 3: LEC Push Bar

9. If the push bar does not sit in the center of the dimple on the LEC when contact is first made, adjust the LECPOS value (25 tach tick =1 mm).
10. Check the BDO alignment. See appendix C. Adjust as necessary.
11. Close the machine and turn the safety key switch to the Normal Operation mode.
12. Type the following commands:

```
<set head wenable 1>
<nvs save head>
```

3.2 Obtain a test Plot

Note: Steps one, two and three may be ignored for the Platesetter.

1. Pick a size of plate (recommended 32”x44” or bigger) to do all test plots with, place this plate on the load table and center it. See Figure 4.



Figure 4: Loading a plate

2. Using masking tape and a marker, mark the location of the starting edge of the plate. Use this mark to place all following plates on the table in the same location. See Figure 5.

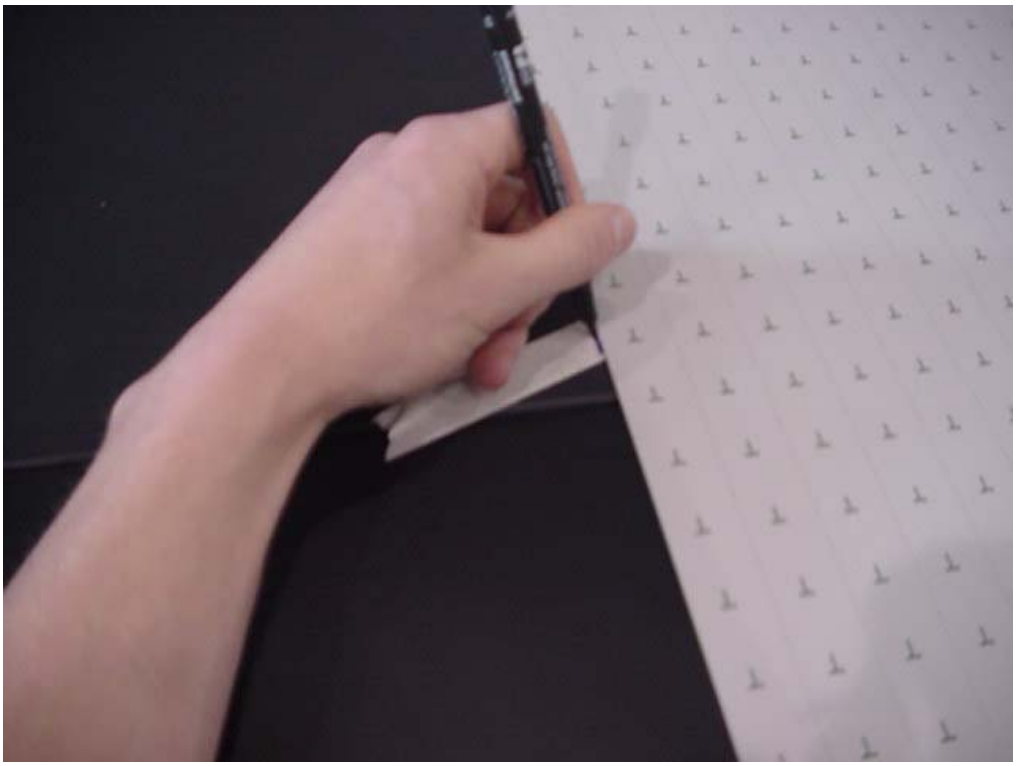


Figure 5: Marking the plate starting edge

3. Determine the location of the 1st registration pin in reference to the starting edge of the plate, this will be measurement point (2) when using the plate edge to image gauge. The registration 1st pin is located approximately 1010mm (40”) measured from the left edge of the table. See Figure 6.

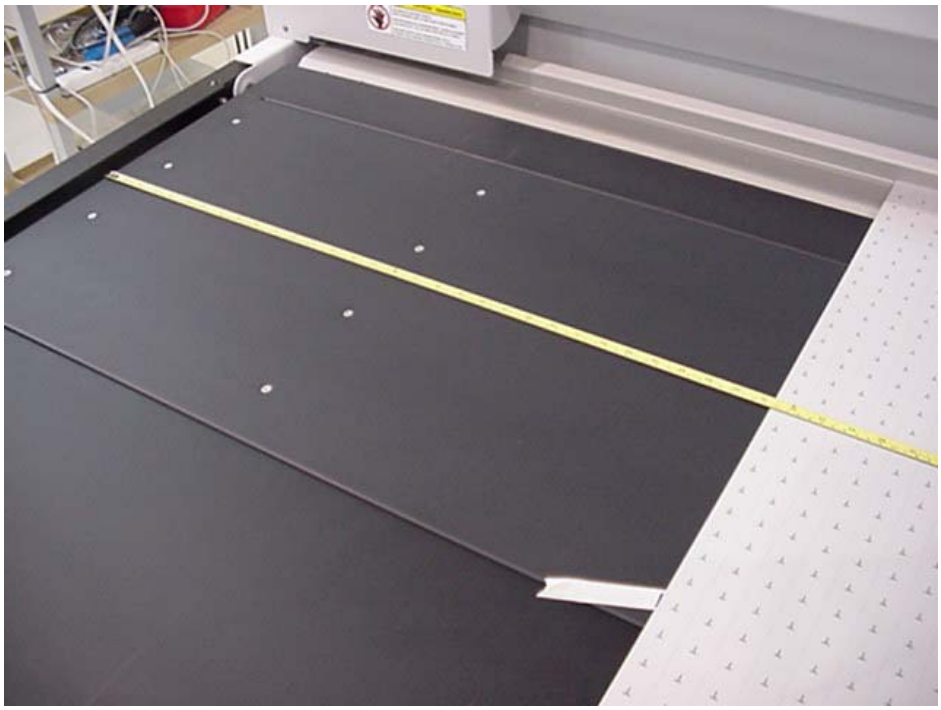


Figure 6: Registration pin

4. Image 5 plates with a grid 1 plot. If you are using positive plates (for example: Agfa, Fuji, PDI), set '`media # invert 0`'. **Do not process the plates and preserved them in a dark place.** The plot should have the pattern shown in Figure 7.

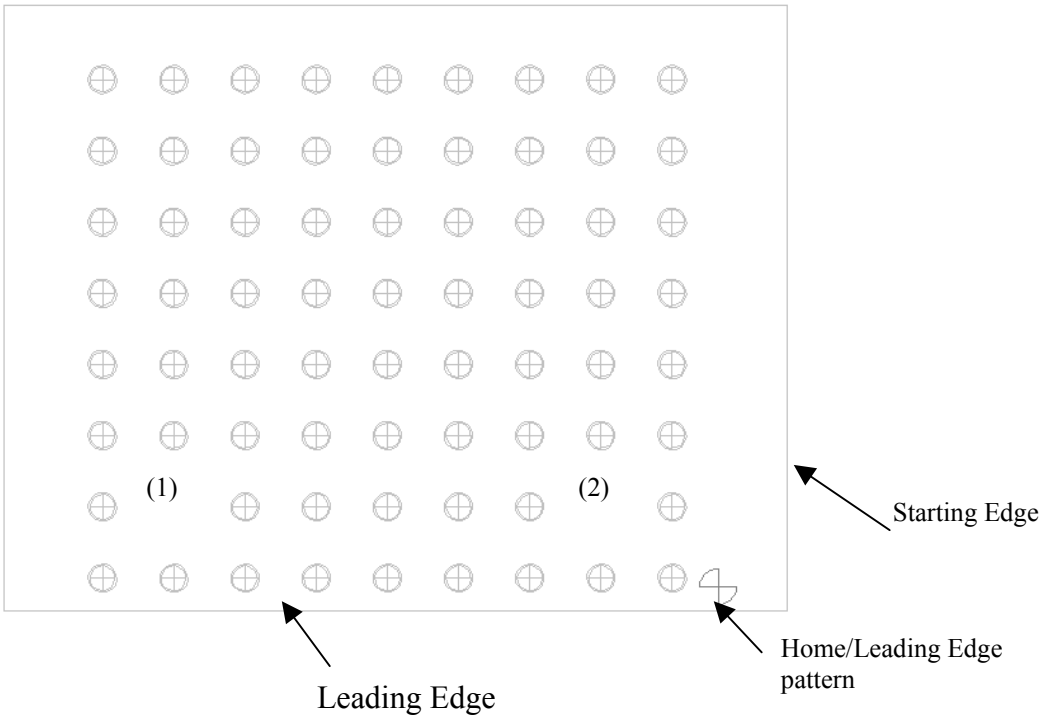


Figure 7: Grid 1 test plot

Note: Take note of the orientation that the plate as it is essential to orientate the plate in the same way for the second imaging.

Note: For positive media, change invert to "0" before imaging plates with a grid 1 or grid 2 plot.

Type `<set media (n) inv 0>`

For media information see Technical Library at:
http://internet.creo.com/support/html/media/medialist.htm

5. Backup all NVS values using the following commands:

```
<fsave all>

<nvs dump>

<nvs dump diff>
```

3.3 Prepare the machine for the upgrade

1. Disable the power to the write laser using the following commands:

   ```
   <set head wenable 0>
   ```

   ```
   <nvs save head>
   ```

2. Turn the safety key switch to the Laser Hazards position.

3. If the head is close to the encoder end, enter the following commands to move it a safe distance away. See Figure 8.

   ```
   <carriage moveto 41000>
   ```

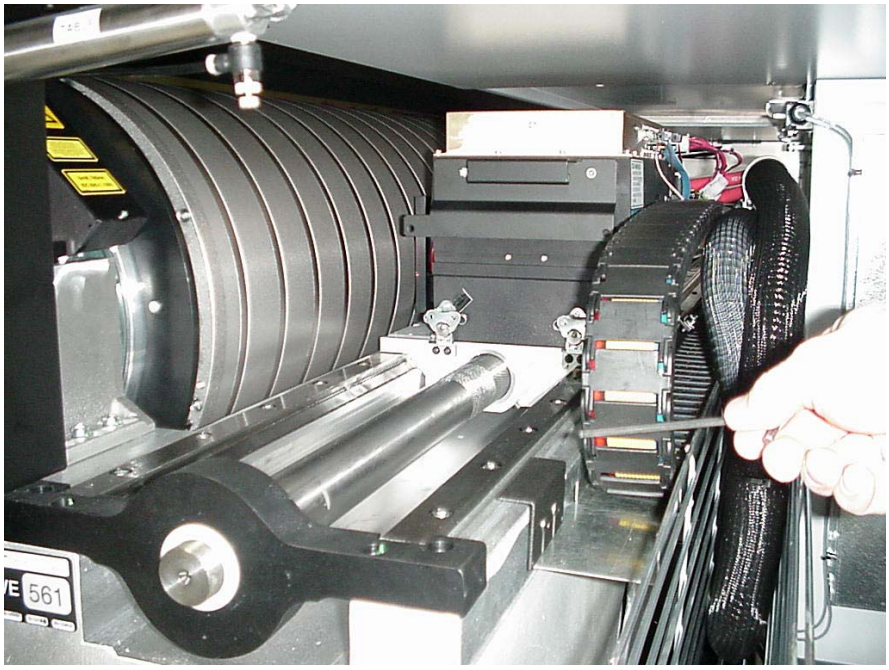


Figure 8: Moving the carriage

Note: On the VLF Platesetter, ignore instructions 4 through 9. Instead, open the rear panel and the encoder side panel.

4. Open the Pdoor and let the table idle by using the following commands:

   ```
   <Pdoor open ↵>
   ```

   ```
   <Table idle ↵>
   ```

Note: On the Trendsetter VLF Autoloader, you will either need to remove the conveyor or the slipsheet basket from the encoder side of the machine, depending on the configuration.

5. Open the side panel (encoder side).

6. Remove the rear panels (if possible).

7. Open the hood.

8. Remove the long laser protection panel. See Figure 9

Note: On the 5880 there are set of brackets on each side of the panel that can fall into the machine if caution is not exercised.



Figure 9: Removing the laser protection panel

9. Remove the pivot cover (fastened with 4 screws). See Figure 10.

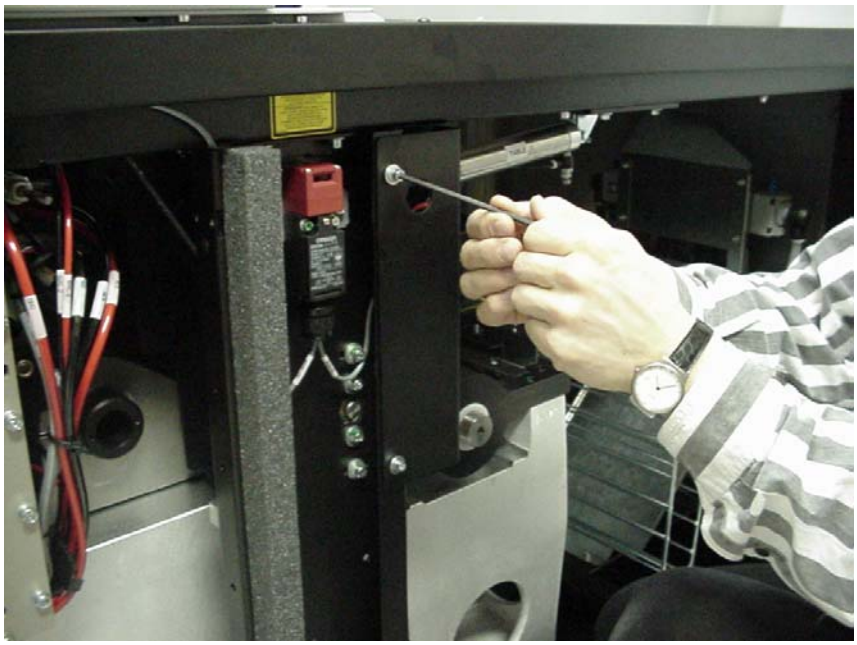


Figure 10: Removing the pivot cover

10. Turn the main power to the machine off.

3.4 Assemble the drum pin, EDA, and install tool

1. Insert the install tool into the outboard end of the drum pin; fasten (finger tight) to the drum pin using 2 M4x16 (52-4460) screws. See Figure 11.

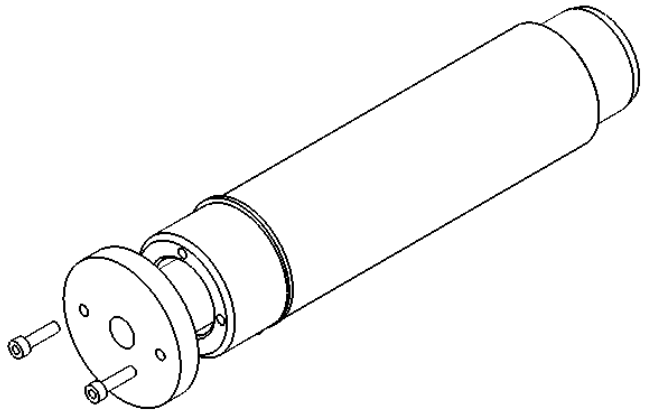


Figure 11: Drum pin assembly

2. Fully collapse the Expanding Drive Anchor (EDA) by turning the shaft counterclockwise.
3. Insert the EDA into the inboard end of the new drum pin.
   The EDA should contact the front of the install tool. Make sure the dowel pins of the install tool are positioned in the slots of the EDA. See Figure 12.

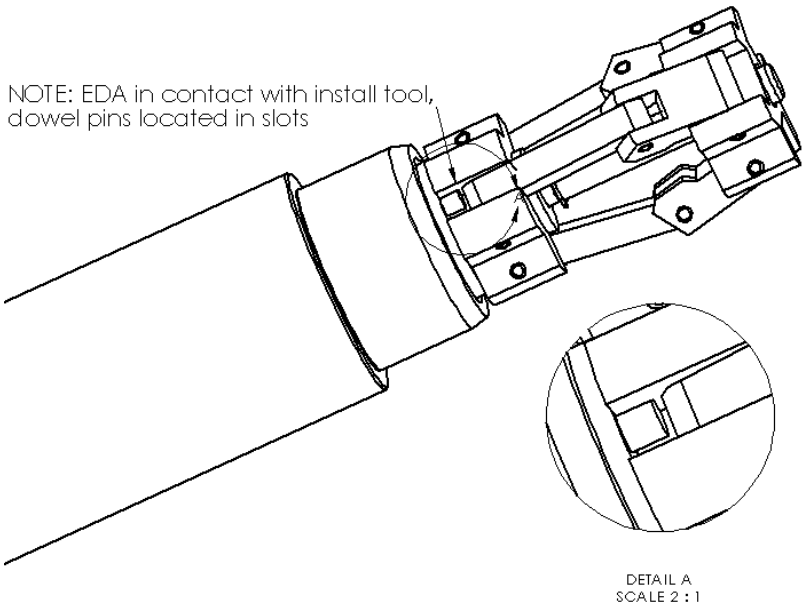


Figure 12: Attaching the Expanding Drive Anchor

4. Place the spring over the encoder shaft.

5. Place the coupling shoulder bolt assembly over the encoder shaft. The coupling should compress the spring 5-10mm. See Figure 13 and Figure 14.



Figure 13: Coupling shoulder bolt assembly to encoder shaft

6. Tighten the coupling to the encoder shaft. See Figure 14.

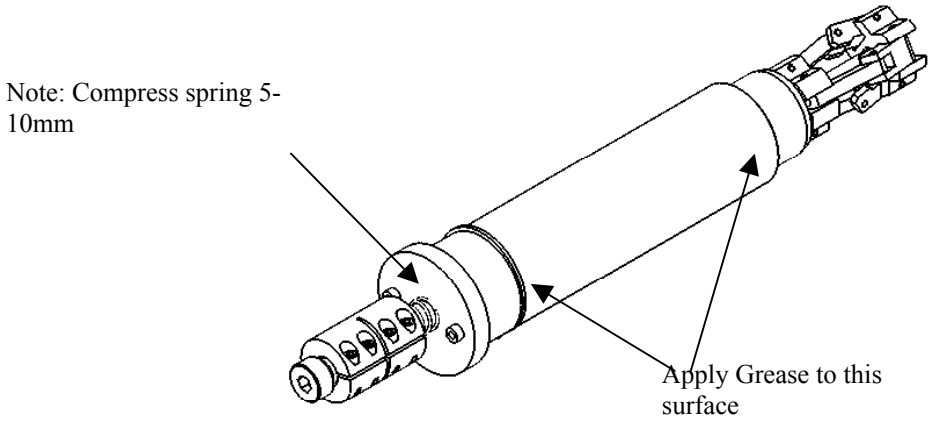


Figure 14: Coupling shoulder bolt assembly

7. Clean the Drum Pin with Alcohol.

8. Apply a **light** coating of Microlube grease (other grease may be used as a substitute) to the outer diameter of the drum pin (between the bearing shoulder and the retaining clip).

3.5 Support drum and Remove the existing drum pin

1. Position the drum so any features that could be damaged by the drum lift (such as the LEC) are located away from the area that the drum lift presses against. See Figure 15.

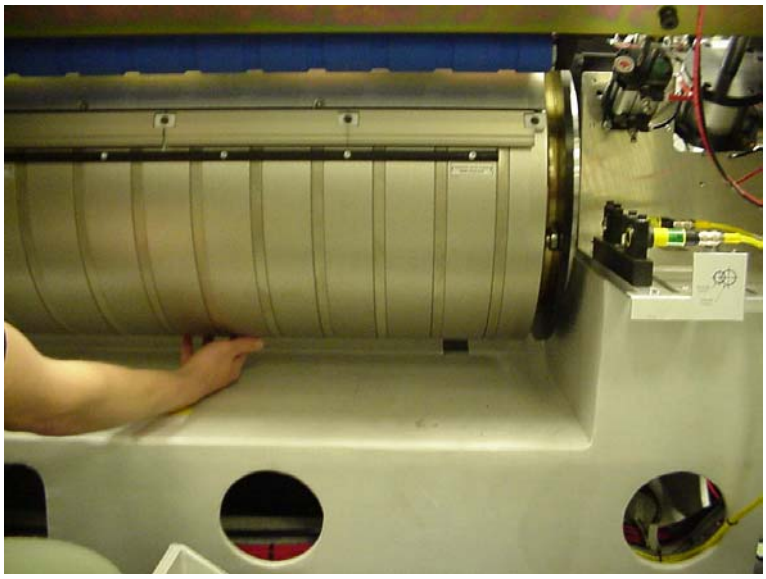


Figure 15: Preparing Drum for removal (1)

2. While holding the Drum in position, brace the drum with the supplied foam between the drum and the engine frame. This ensures that the drum remains static when the pin is removed. See Figure 16 and Figure 17.

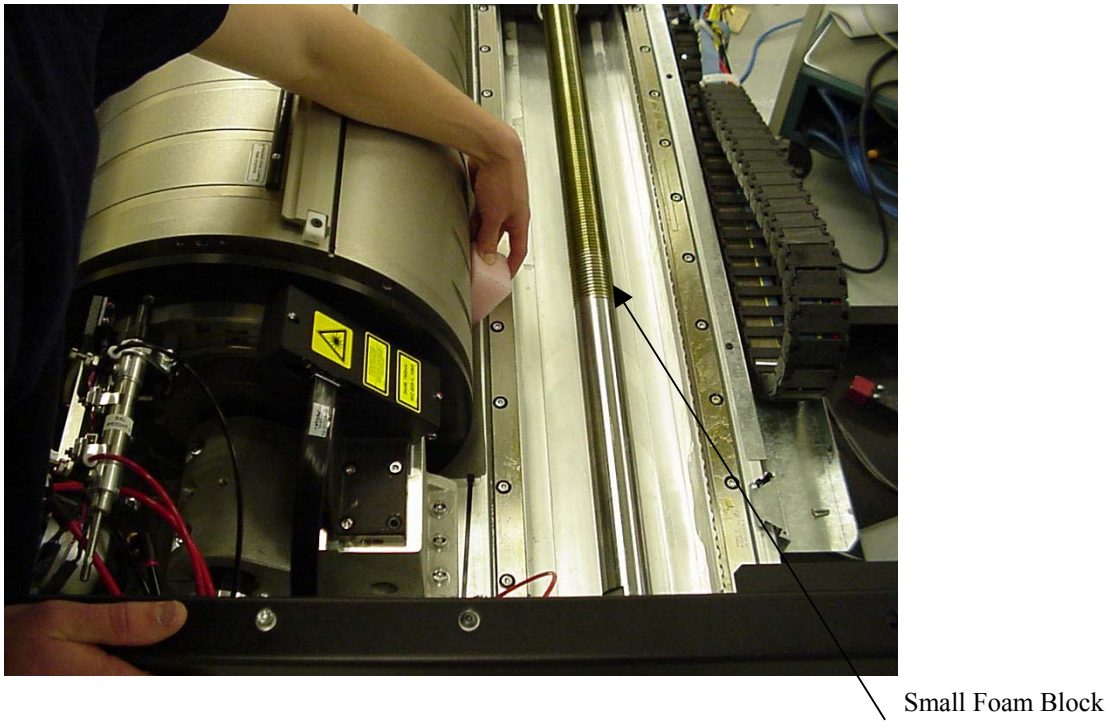


Figure 16: Preparing Drum for removal (2)

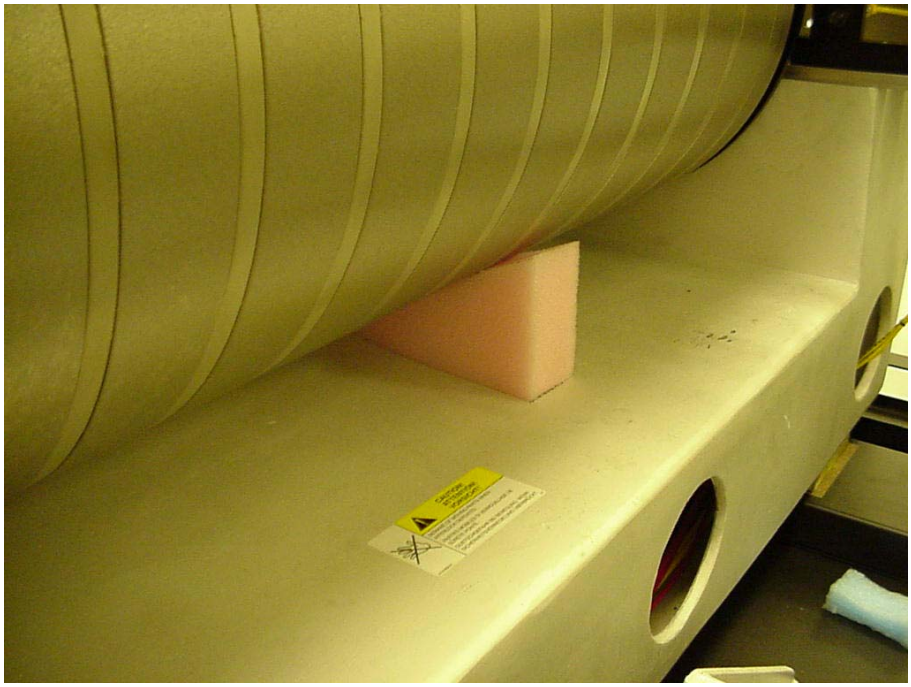


Figure 17: Preparing Drum for removal (3)

3. Place drum support under the drum on the encoder side. The drum support is designed to sit on the machined slots on the engine frame. See Figure 18 and Figure 19.

Note: The upper slot is for 5080 drums, and the lower is for 5880 drums.

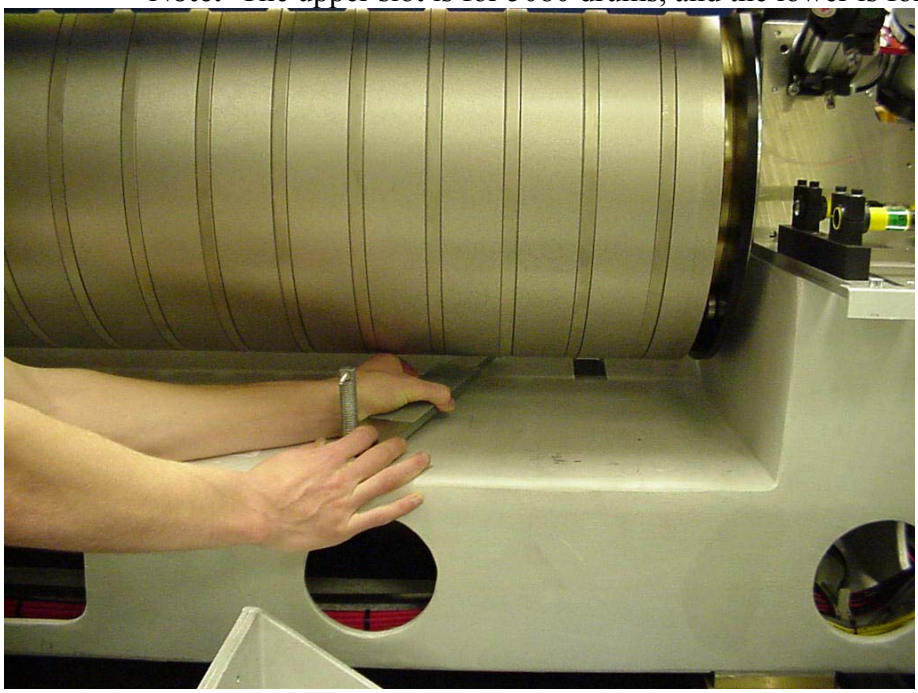


Figure 18: Slots in Casting



Figure 19: Lift and Foam Support

4. Place the wooden wedge between the end-bell of the drum and the pillow block. See Figure 20.

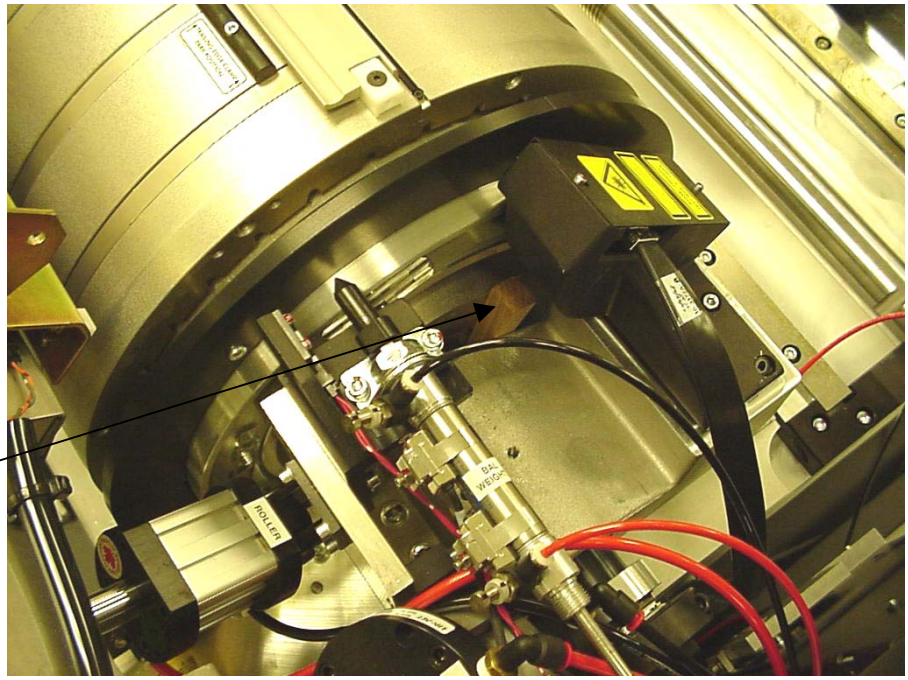


Figure 20: Placing wedge between drum end bell and the pillow block

5. Loosen the two M8 screws on the pillow block. Move 1 screw to the middle hole and use it as a jackscrew to open the pillow block. See Figure 21.

Note: Take care not to lose the Belleville washers.

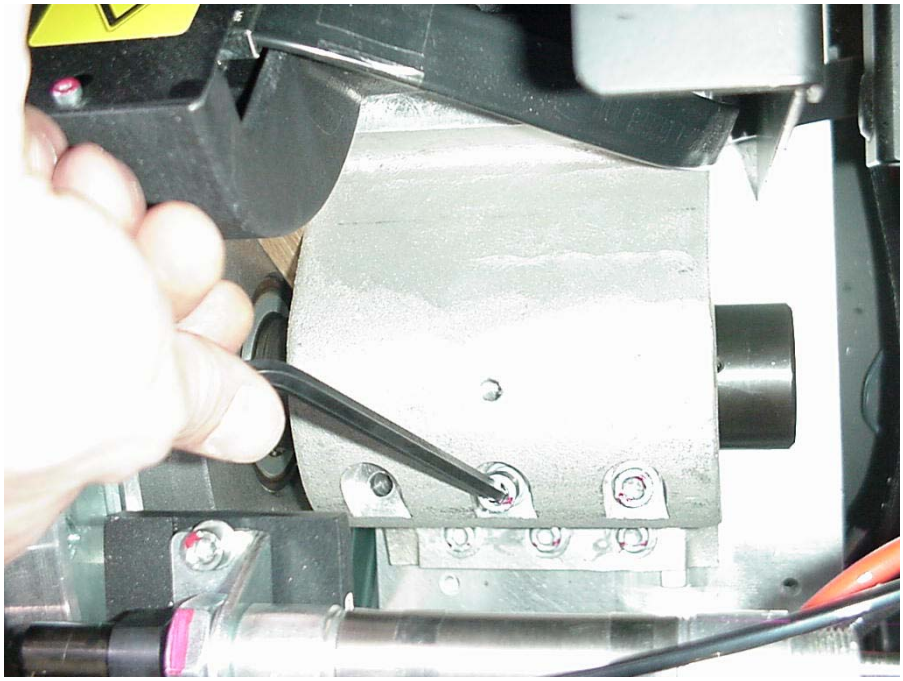


Figure 21: Opening the pillow block

6. With one hand slowly raise the drum support by turning the jackscrew. Turn the jackscrew until you can freely spin the drum pin with the other hand. See Figure 22.

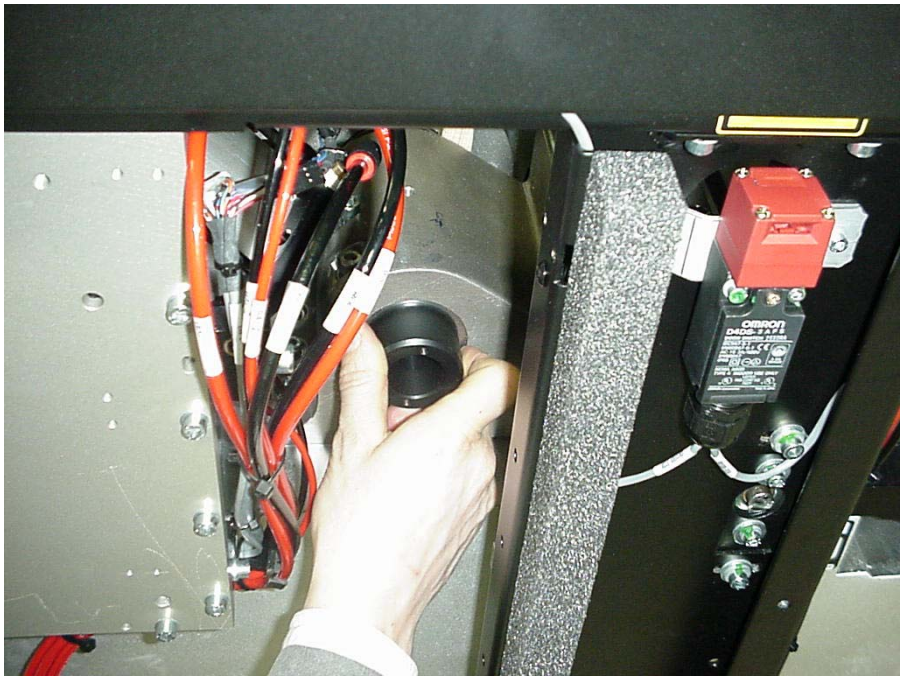


Figure 22: Raising the drum support

3.6 Installing the new drum pin with the EDA

1. Slowly pull the pin out of the drum.

WARNING: Make sure the drum is completely secure before removing the pin! Try pulling the pin out and then reinserting to ensure the drum is not moving as the pin is removed.

2. Insert the drum pin with EDA and install tool into the pillow block.

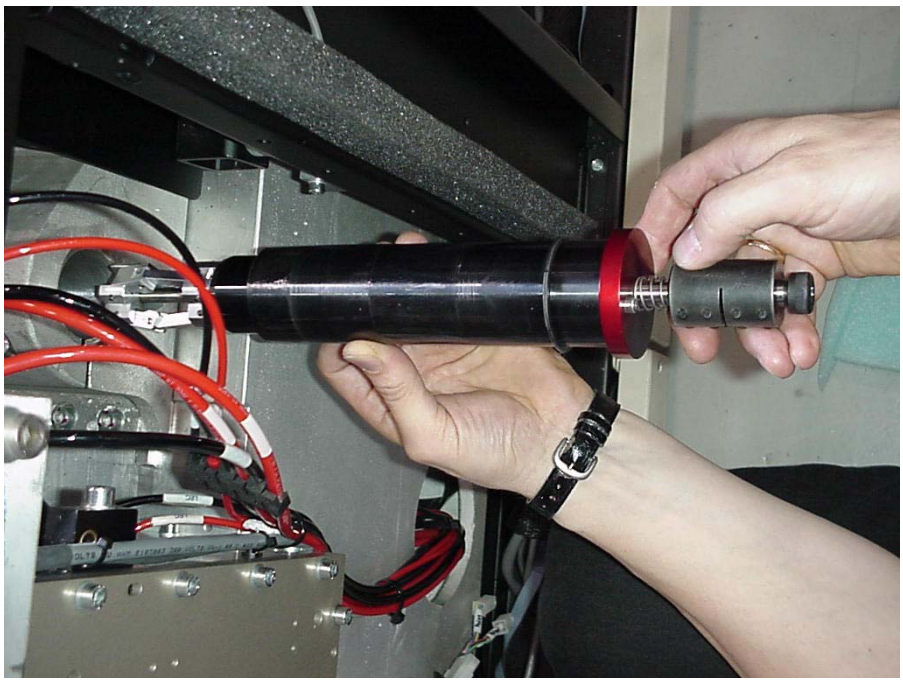


Figure 23: Installing the drum pin

3. The drum pin should press against the face of the bearing. The retaining clip should be contacting the spot face on the pillow block (within 0.5 mm).

4. Orientate the drum pin as shown in Figure 24.

Note: Orientation of the drum pin will be important for alignment of the new shaft encoder.

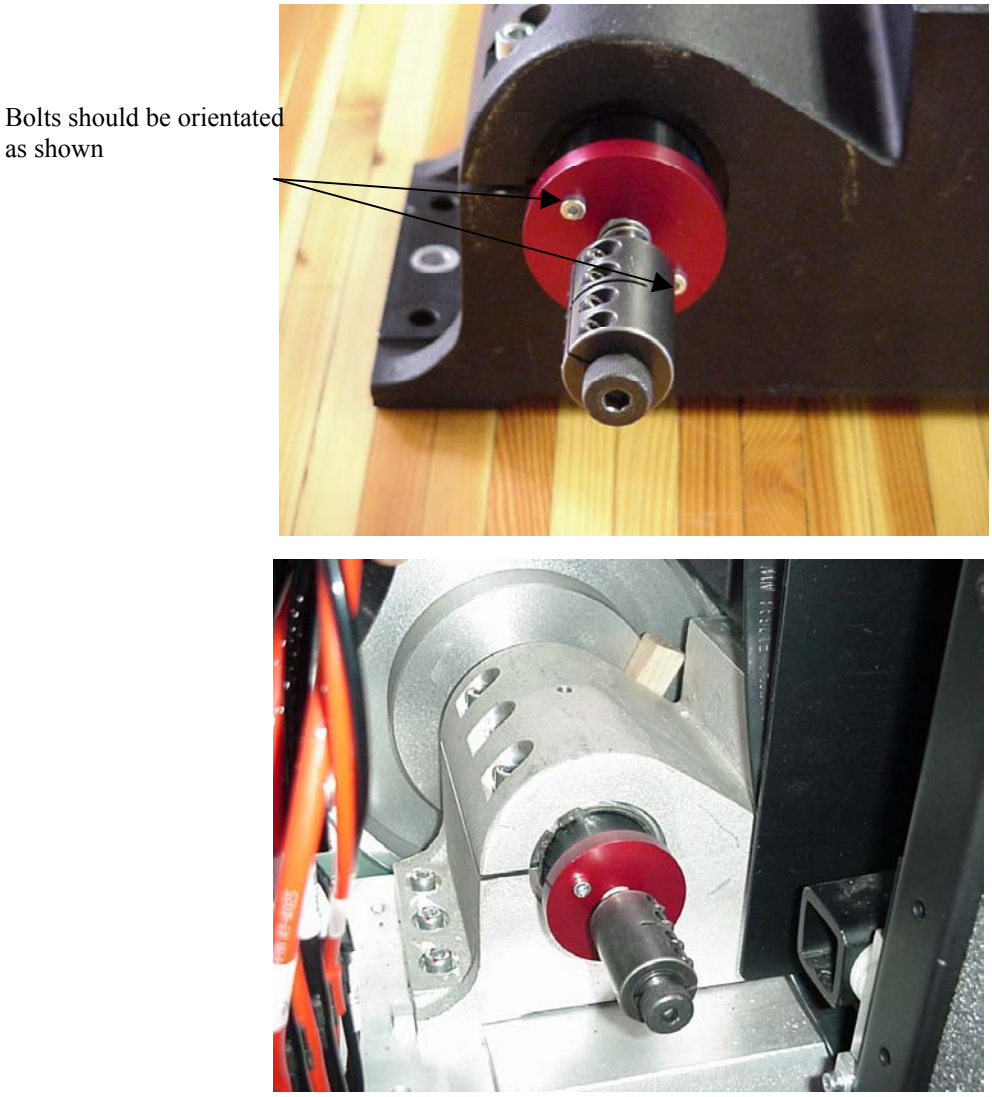


Figure 24: Orientating the drum pin

5. Move the M8 screw back to its original hole and gently snug down both pillow block screws.
6. Lower the Drum Lift.
7. Tighten the pillow block screws down (long handle torque). See Figure 25.

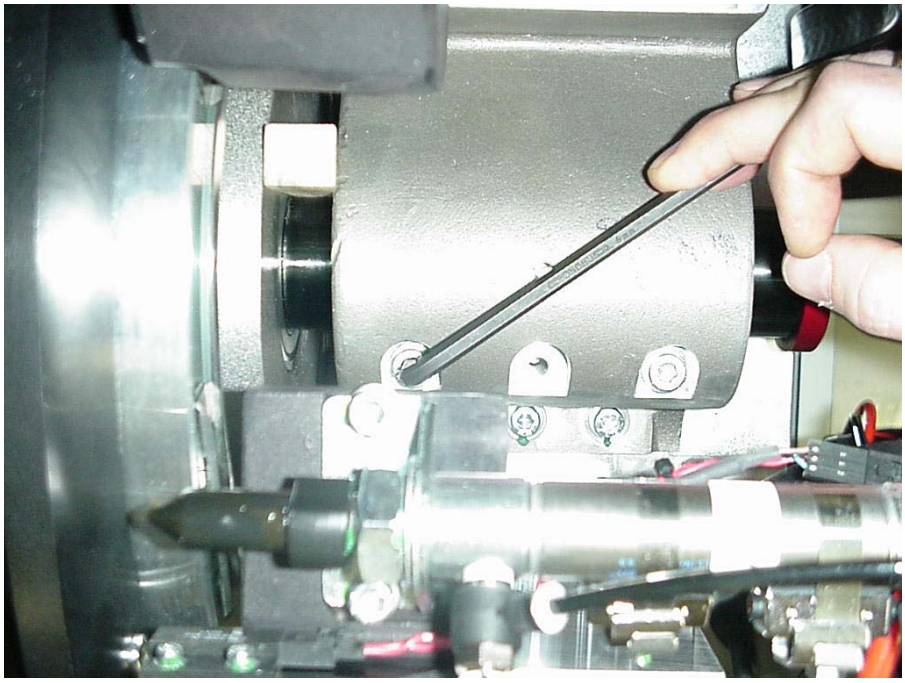


Figure 25: Tightening the pillow block screws

8. Raise the Drum Lift ¼ turn past contact with the drum to prevent the drum from rotating.
9. Remove the Wedge.

3.7 Expanding the EDA

1. Holding the coupling to prevent the EDA from being pushed out of position, expand (turning clockwise) the EDA using a 6mm short end of Allen Key until contact is made with the drum. See Figure 26

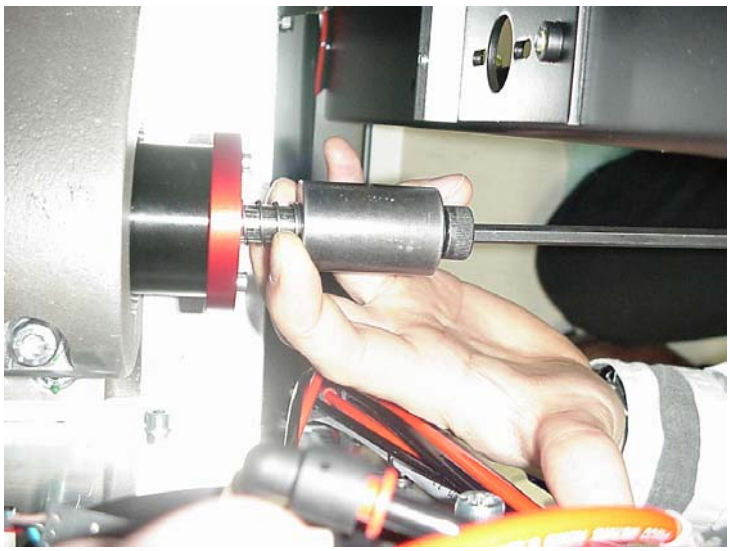


Figure 26: Expanding the EDA (1)

Note: The expansion will feel stiff because of a locking threaded insert.

2. Finish expanding the EDA using a torque wrench set to 12 Nm. See Figure 27.

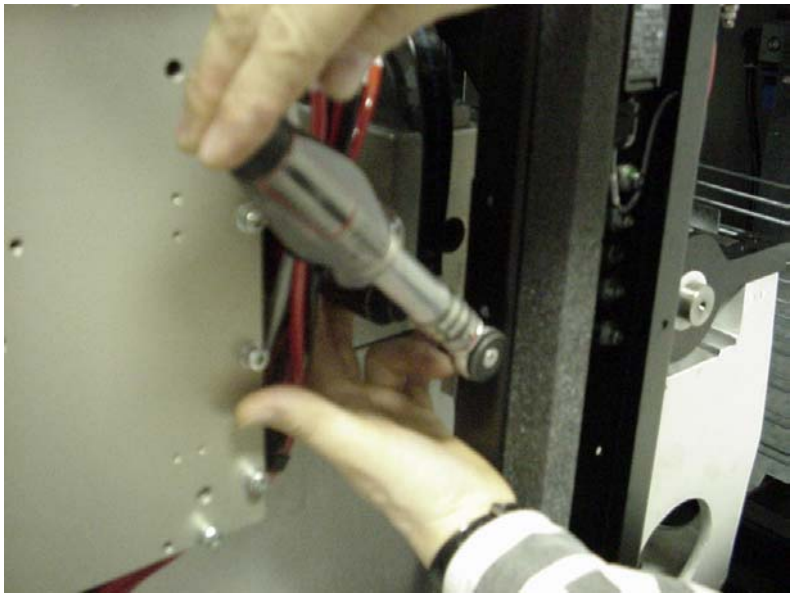


Figure 27: Expanding the EDA (2)

3. After expansion remove the coupling and spring.
4. Remove the install tool. See Figure 28.

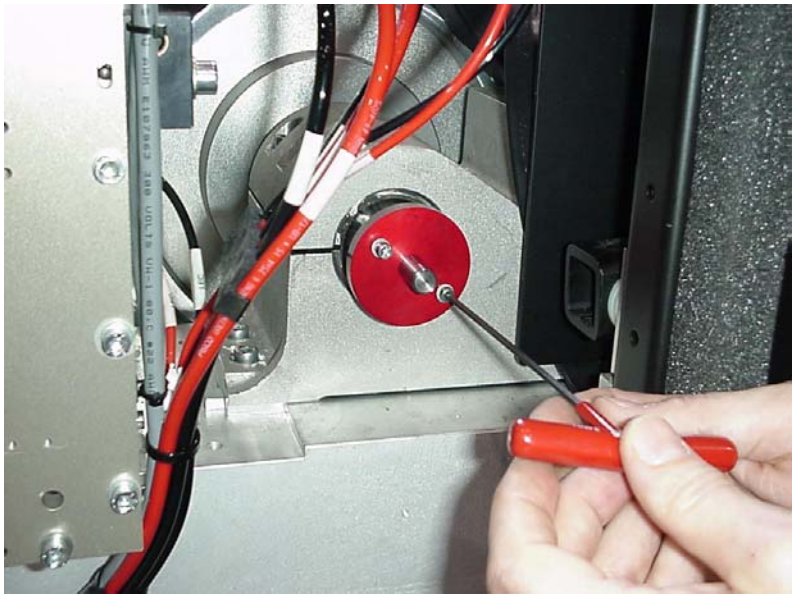


Figure 28: Removing the install tool

5. Remove the drum support.
6. Remove all the foam bracing.
7. Make sure the encoder shaft feels secure.

8. Spin the Drum by hand to ensure there is no interference.

Drum Pin should be orientated as shown

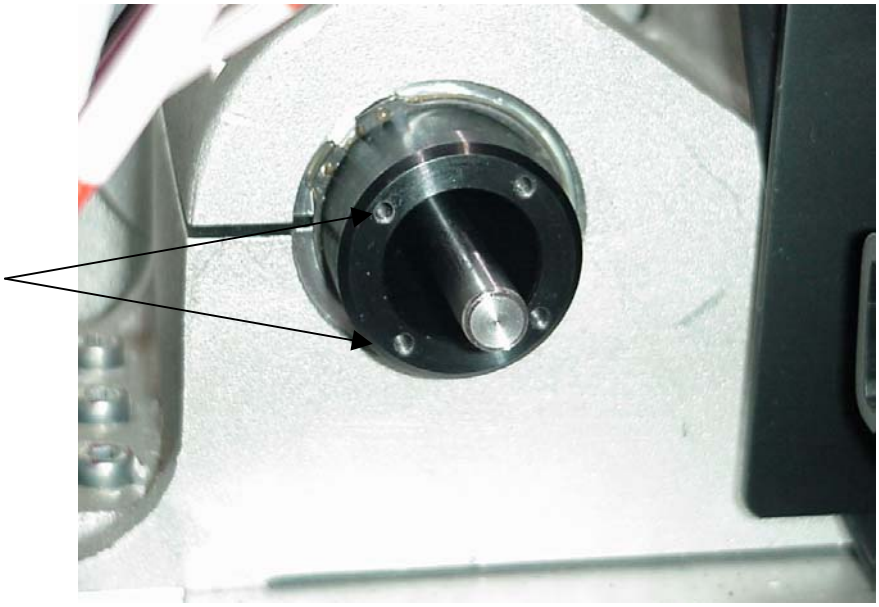


Figure 29: Orientating the drum pin

3.8 Installing the encoder adapter plate

1. Carefully slide (do not force) the adapter plate assembly over the encoder shaft (use the Albida EP2 grease supplied for easier assembly). See Figure 30.

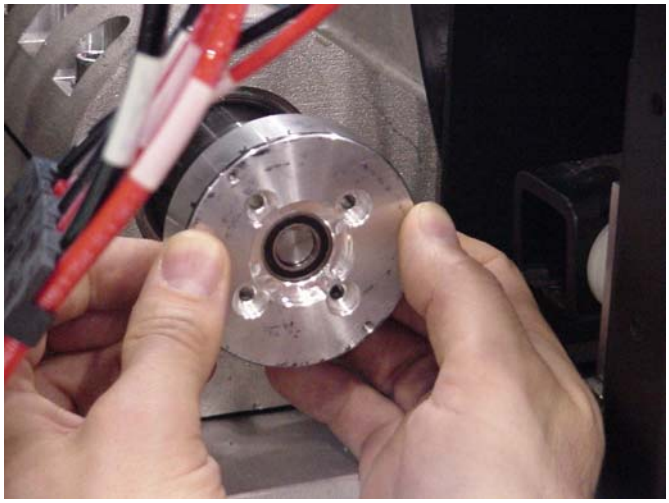


Figure 30: Installing the encoder adapter plate

2. Bolt the assembly to the drum pin using 4 M4x16 (52-4460) screws and Belleville (52-4261) washers and loctite 242. Note the orientation of the adapter plate from Figure 31.

Note: If the plate does not fit easily on the end of the drum pin and there is substantial run out, uninstall and then reinstall the EDA.

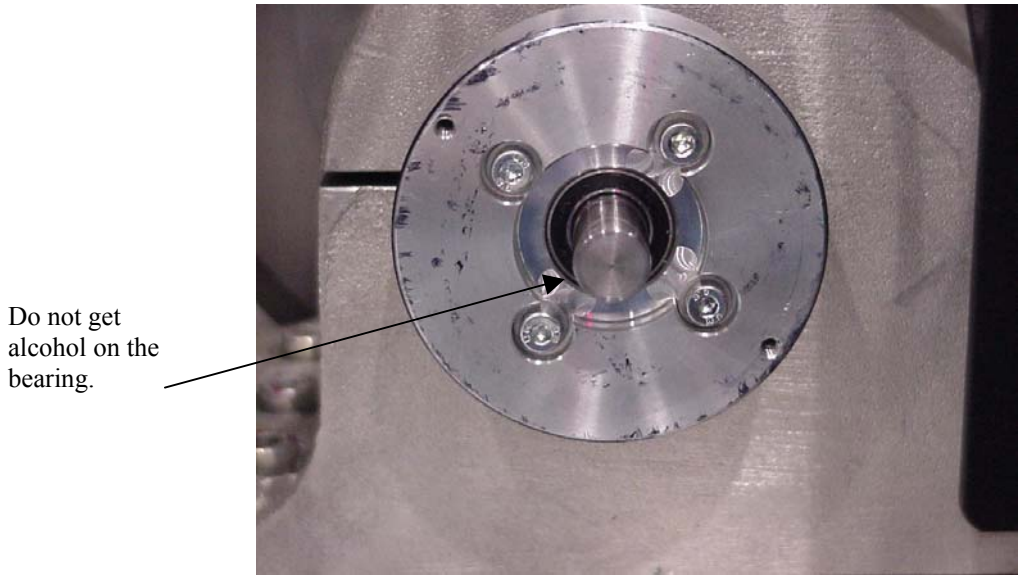


Figure 31: Adapter plate orientation

3. Clean the end of the encoder shaft with a small amount of alcohol.

Note: Do not get alcohol on the bearing.

3.9 Installing and aligning the encoder

1. Turn on the power to the machine.
2. On the computer terminal enter the following to disable power to the write laser:

```
<set head wenable 0>
<nvs save head>
```

`<laser>` (If set to 0 laser is disabled)

3. Open the front panel on the power box side, and switch the safety switch to Laser Hazards mode. This will allow you to operate the machine with the panels open.
4. Connect the encoder to the alignment tool; find the index position by rotating the encoder collar until the alignment tool beeps and both green LEDs remain on. See Figure 32.

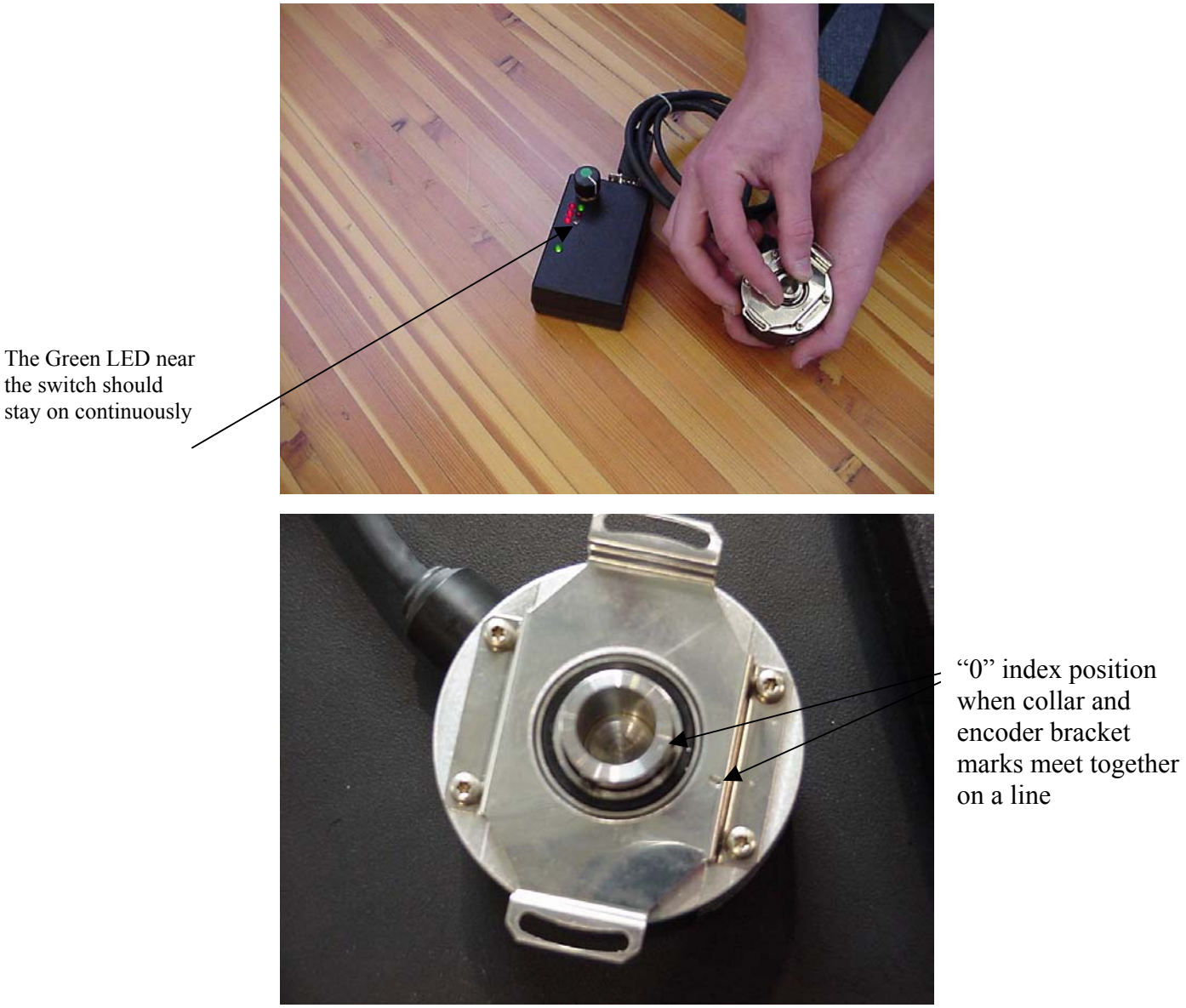


Figure 32: Connecting the alignment tool

5. On the computer terminal enter the following:

   `< tec off>`

   `< drum move 0 h>` (moves the drum to position 0 and holds)

Note: Do not turn or spin the drum while it is held in position, as this will damage the drum motor.

6. Check set-screws on encoder collar if they are not on the way of shaft. Carefully mount the encoder on the encoder shaft while keeping the encoder in the index position (LED and buzzer should stay ON but it might be slightly OFF). **The slots in the encoder feet should be centered over the taped holes on the adapter plate. The encoder cable should point down and to the left.** See Figure 33.



Figure 33: Mounting the encoder (1)

7. Use M3x8 (52-4458) screws, with Belleville (52-4262) and flat (52-3057) washers and loctite 242, to attach the encoder bracket feet to the adapter plate. Tighten the mounting screws and keep the screws in the center of the slots. The flat washers should go against encoder bracket feet. See Figure 33 and Figure 34.



Figure 34: Mounting the encoder (2)

8. Insert the 1.5 mm hex driver to one of the set-screws on the encoder collar. Rotate the encoder collar carefully by using a hex driver to realign the index position. **This is a final index alignment. When LED and buzzer stay ON tighten the set-screw.** It might take a few minutes to realign the index position. See Figure 35. **Do not push on the encoder.**

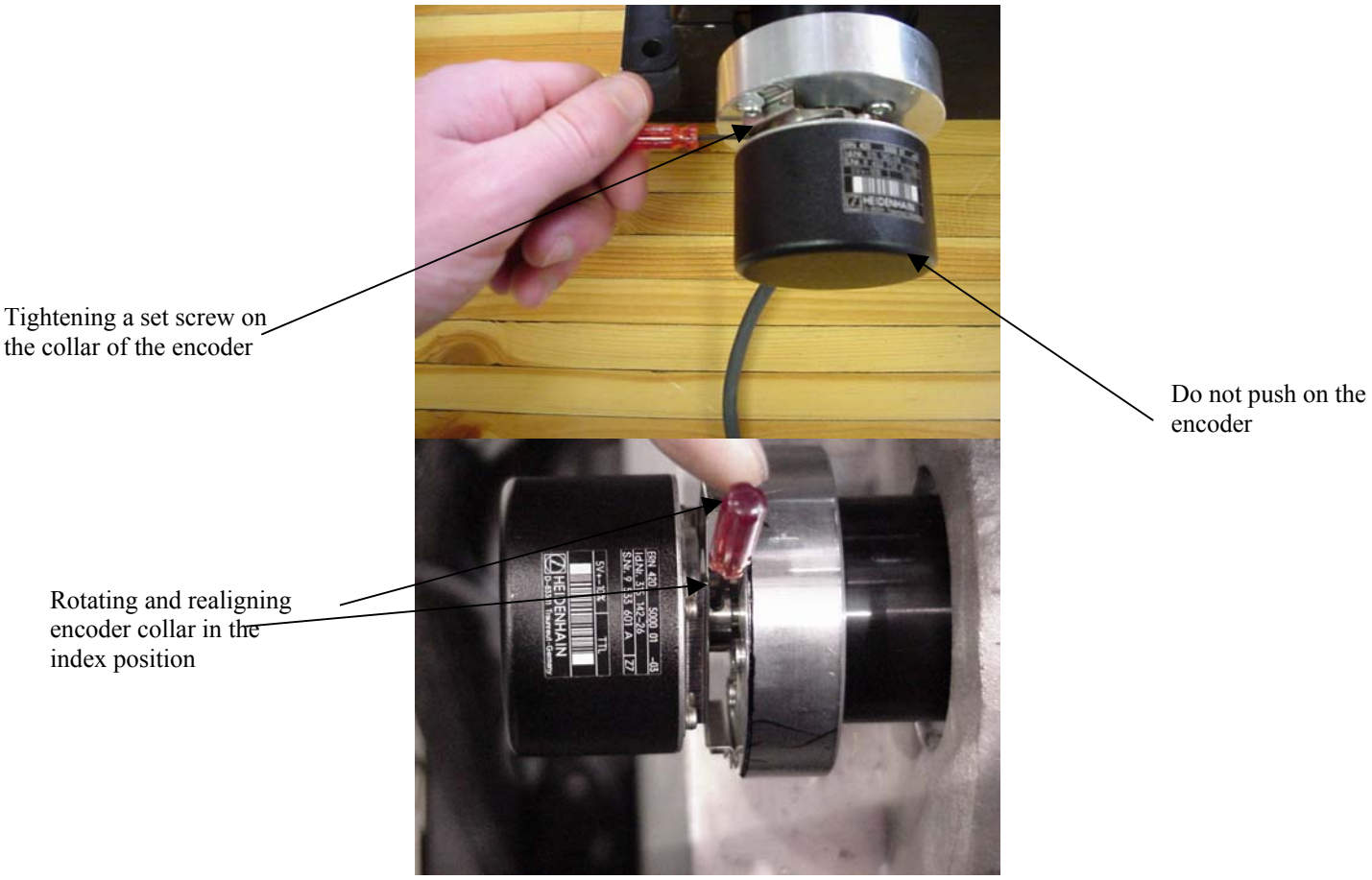


Figure 35: Mounting the encoder (3)

9. On the computer terminal type the following:

   `<drum idle>` (releases the drum)

10. Turn off the power to the machine.

11. Tighten the other set-screw on the encoder collar. (The drum can be rotated manually to allow for easy access to the set-screw).
    The Green LED and buzzer must stay ON all the times. If they do not, go back and follow the procedure in section 3.9 to align the encoder again.

12. Install the dampening collar on the encoder, use loctite 242. o not over torque (use the short arm of the 5/16" Hex Key to tighten) See Figure 36.

Note: Make sure each side of the dampener has three washers to space the collar



Figure 36: Installing the dampening collar

13. Apply the warning label to the back of the encoder.

14. Mount the encoder adapter board on the bracket using M3 x 8 screws (52-4458), M3 Bellville washers and M3 Flat washers (52-3057). The flat washers sit against the board. See Figure 37.

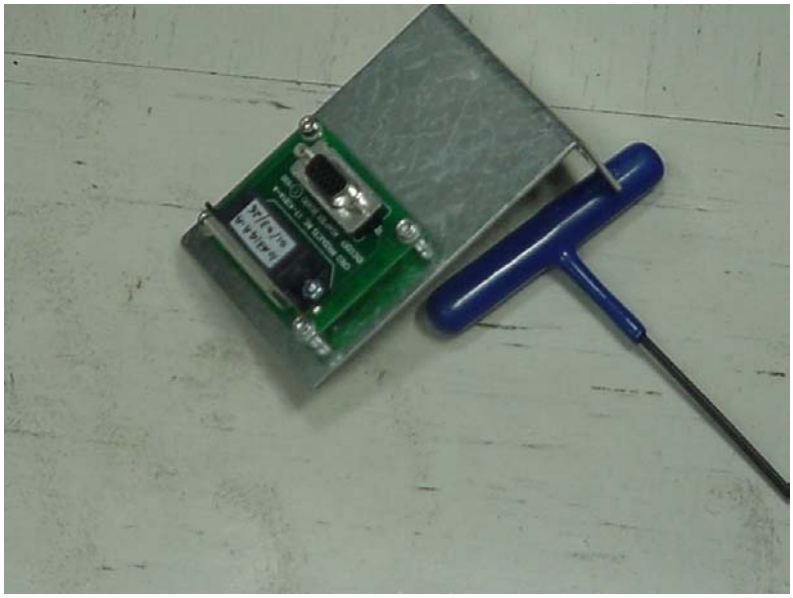


Figure 37: Mounting the encoder adapter board

15. Install the cable adapter bracket. Mount the bracket on the old Creo laser encoder mount using only two M6 x 35 (52-3245) screws and New M6 Bellville Washers (52-4031) See Figure 38.

Note: In order to maintain alignment of the original laser encoder, **do not remove all of the M6 mount screws.**

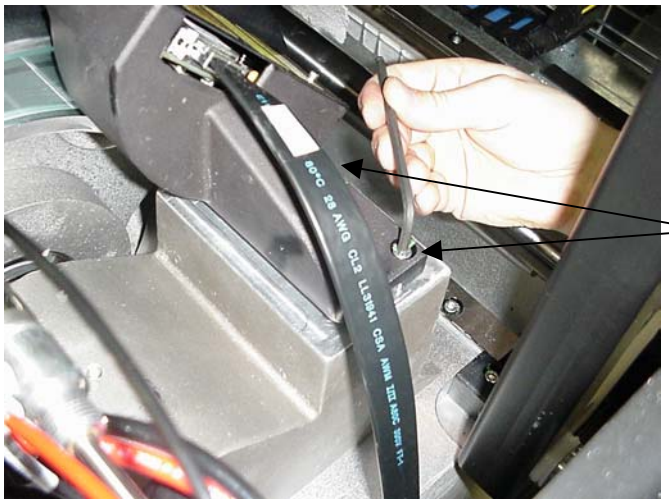


Figure 38: Installing the cable adapter bracket

WARNING: The following instruction requires that you wear an Electro Static Discharge Protection strap and have the machine turned off.

16. Plug the Heidenhain encoder into the encoder adapter board. Plug the cable that is currently connected to the old encoder into the encoder adapter board. See Figure 39.

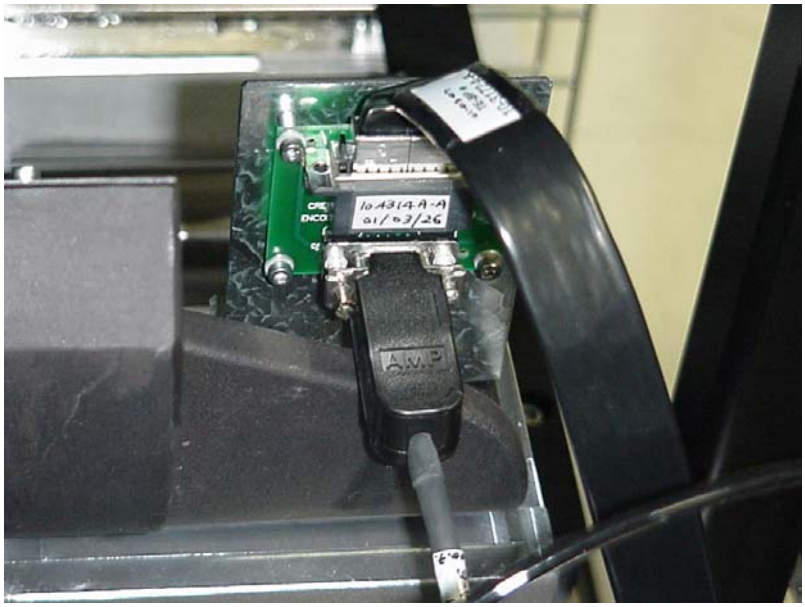


Figure 39: Connecting the shaft encoder (1)

17. Coil the slack in the Encoder cable and tie it down using a cable tie. See Figure 40



Figure 40: Connecting the shaft encoder (2)

18. Remove all tools and jigs from the machine. Spin the drum by hand to ensure that there is no interference.

19. Install the pivot cover. Place the encoder cable under the cover, being careful not to damage the cable. See Figure 41.

Note: If upgrading a VLF Platesetter ignore instructions 20 and 21.

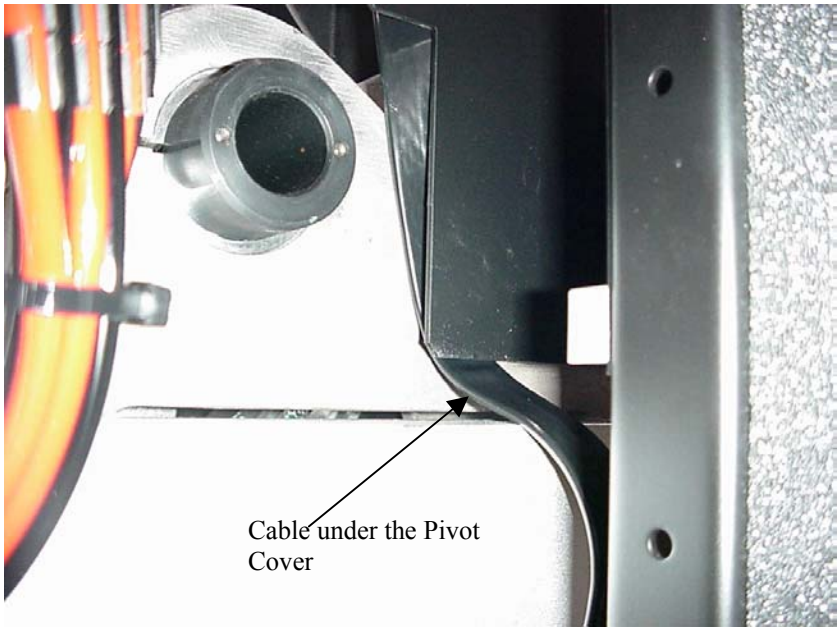


Figure 41: Installing the pivot cover

20. Install the long laser protection cover. Use loctite 242.
    (Not Applicable to VLF-PS).

21. Turn on the power to the machine.

3.10 Updating Firmware Parameters

On Trendsetter VLF devices that have MPE firmware 1.51 or greater installed, you can update the firmware parameters automatically by typing **nvs encoder <hh>**. This command should change the *drum tpr* and d*rum ted* parameters, as well as updating all the drum position nvs parameters that are measured in tach ticks. For Heidenhain encoders, the number of tach ticks is 5000.

Note: On startup, the workstation flush may cause the firmware to reset, making it difficult to change these parameters. For this reason, when upgrading the code and changing these parameters, the workstation software (Allegro, Print Console) must be disabled or offline.

On other devices, you must perform the updates manually as follows:

1. Type `<list version>`. Check that:
   - For Trendsetter VLF, firmware version 1.50 or later is loaded
   - For VLF Platesetter, version 2.40 or later is loaded
   - For Trendsetter VLF Autoloader, version 1.10 or later is loaded

   Upgrade instructions can be found in the Technical Library at http://techplanet.creo.com/firmware/index.html
2. Type:

   ```
   <set head wenable 0>
   <nvs save head>
   <set drum tpr 5000>
   <nvs save drum tpr>
   <set drum ted 0>
   <nvs save drum ted>
   <tec off>
   ```
3. Calculate and enter the following NVS parameters by first multiplying existing saved values by a factor of 5/9 (or 5000/9000):

   For Trendsetter VLF and Trendsetter VLF Autoloader:

   ```
   <set al lecpos (NVS saved value x 5/9)>
   <set al tecpark (NVS saved value x 5/9)>
   <set al rlrpos (NVS saved value x 5/9)>
   <set al tecoff (NVS saved value x 5/9)>
   <set al bdo (NVS saved value x 5/9)>
   ```

<set al bto (NVS saved value x 5/9)>

<set al b1so (NVS saved value x 5/9)>

<set drum epos (NVS saved value x 5/9)>

Note: Check the Drum Edge Position and make sure that the focus laser beam remains on the center of the edge detect strip. Adjust the drum epos if necessary.

<set drum mtol (NVS saved value x 5/9)>

Note: mtol should not be set to less than 3

<nvs save al> (saves all al parameters)

<nvs save drum> (saves all drum parameters)

For VLF Platesetter, type:

<set al lecpos (NVS saved value x 5/9)>

<set al tecpark (NVS saved value x 5/9)>

<set al tecoff (NVS saved value x 5/9)>

<set al bdo (NVS saved value x 5/9)>

<set al b1so (NVS saved value x 5/9)>

<set al b2so (NVS saved value x 5/9)>

<set al bto (NVS saved value x 5/9)>

<set unload lcc (NVS saved value x 5/9)>

Note: For al wp1 and al wp2 run a bal find command <bal find ↵> to find values

<set state al wp1 (value given from bal find)>

<set state al wp2 (value given from bal find)>

<set drum epos (NVS saved value x 5/9)>

Note: Check the Drum Edge Position. Make sure that the focus laser beam remains on the center of the edge detect strip. Adjust drum epos if necessary.

<set drum mtol (NVS saved value x 5/9)>

Note: mtol should not be set to less than 3

Run a drum calibration <drum cal ↵> to reset the drive offset parameter

<nvs save al> (saves all al parameters)

`<nvs save drum>` (saves all drum parameters)

`<nvs save unload>` (saves all unload parameters)

4. Reset the machine.

3.11 Check Leading Edge Position and BDO alignment

1. Enter the following command:

   `<set al>` (find lec value)

   `<tec off>`

   `<drum move (enter lec position) h>`
   (moves the drum to the LEC position)

   `<drum idle>`

2. If using a Trendsetter VLF or Trendsetter VLF Autoloader, type:

   `<lec on>`

3. Remove the solenoid cover.

4. Gently Actuate the solenoid for the TEC by pressing solenoid button

Note: For VLF Platesetter actuate the leading edge clamp solenoid.

WARNING: If the machine is misaligned and the clamp is dropped onto the drum with full force the machine may be damaged.

5. Check to ensure that the leading edge Push Bar is in the center of the dimple in the LEC when **it first makes contact**. See Figure 42.

Note: It is important to that the Push Bar is in the center of the Dimple when it first makes contact.

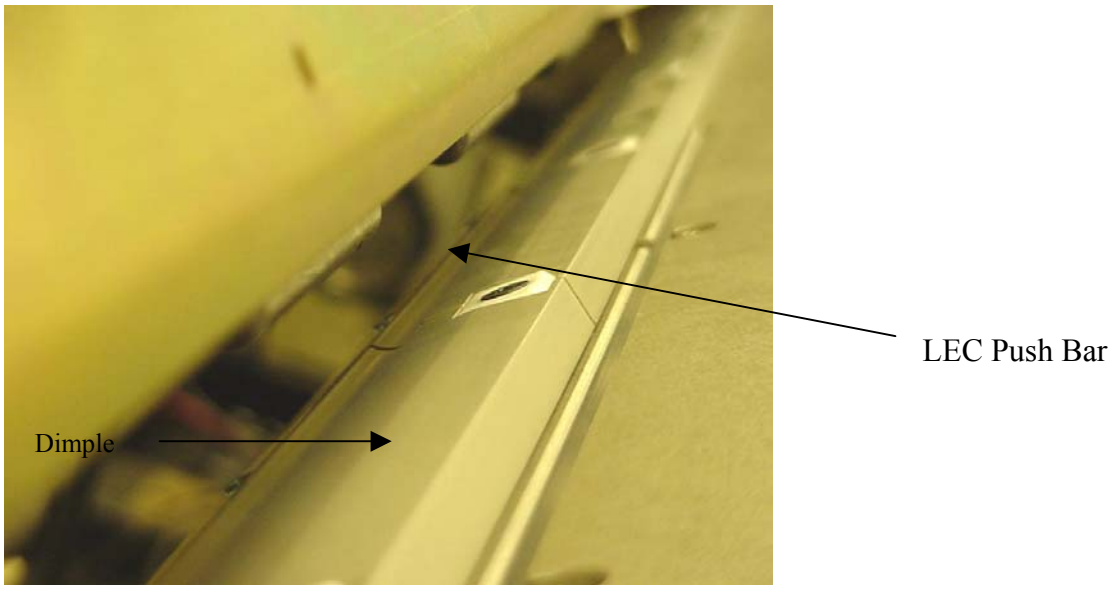


Figure 42: LEC Push Bar

6. If the Push Bar does not sit in the center of the dimple on the LEC when contact is first made, the encoder is misaligned. Change the NVS back to their Creo Encoder values, turn off the machine and then plug the Creo Encoder back in. Now go back and follow the procedure in section **3.9** to align the encoder properly.
7. Check the BDO alignment. See appendix C. Location of BDO Adjustment procedure at http://techplanet.creo.com/docs/bwass3.pdf
8. If the BDO is out of alignment and the LEC is aligned properly, fix the alignment of the BDO. If both are out of alignment, follow the directions in step 6 and realign the shaft encoder.
9. Close the machine and return the safety key switch to Normal operation mode.
10. Type the following commands:

```
<set head wenable 1>
<nvs save head>
```

3.12 Adjusting for Encoder Misalignment

1. Re-image one of the plates previously imaged with the grid 1 pattern, this time use the **grid 2** pattern. See Figure 43 and Figure 44.

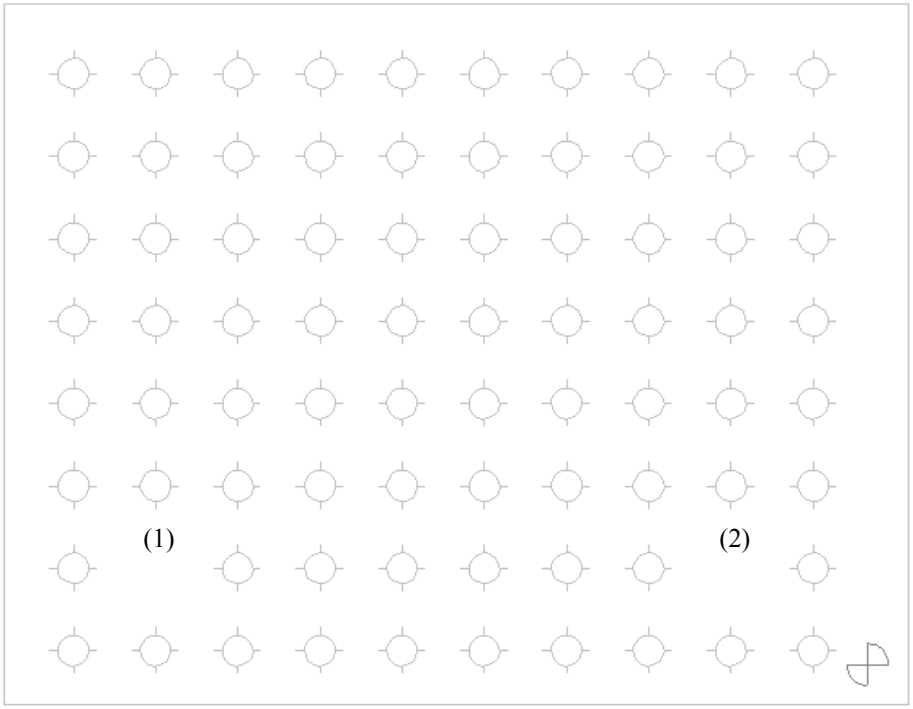


Figure 43: Grid 2 pattern

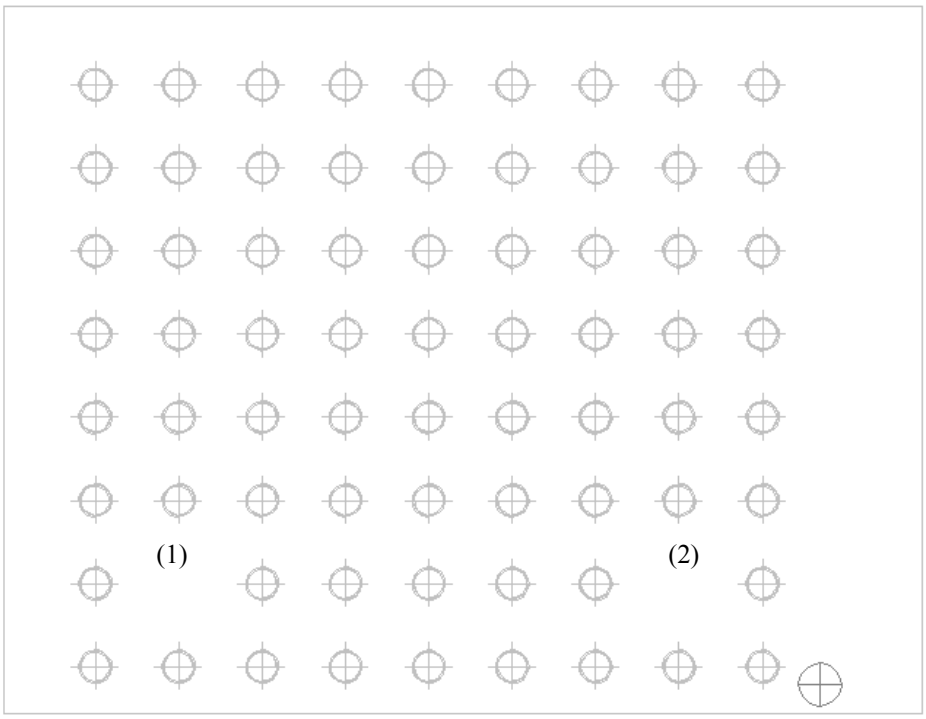


Figure 44: Combination of both Grid 1 and Grid 2

Note: Make sure the plate is imaged in the same orientation as the original image.

2. Process the plate.
3. Using the plate edge to image gauge, measure the error at point 1 and 2. See Figure 45

Note: For Instructions on use of the Plate Edge to Image Gauge see appendix A

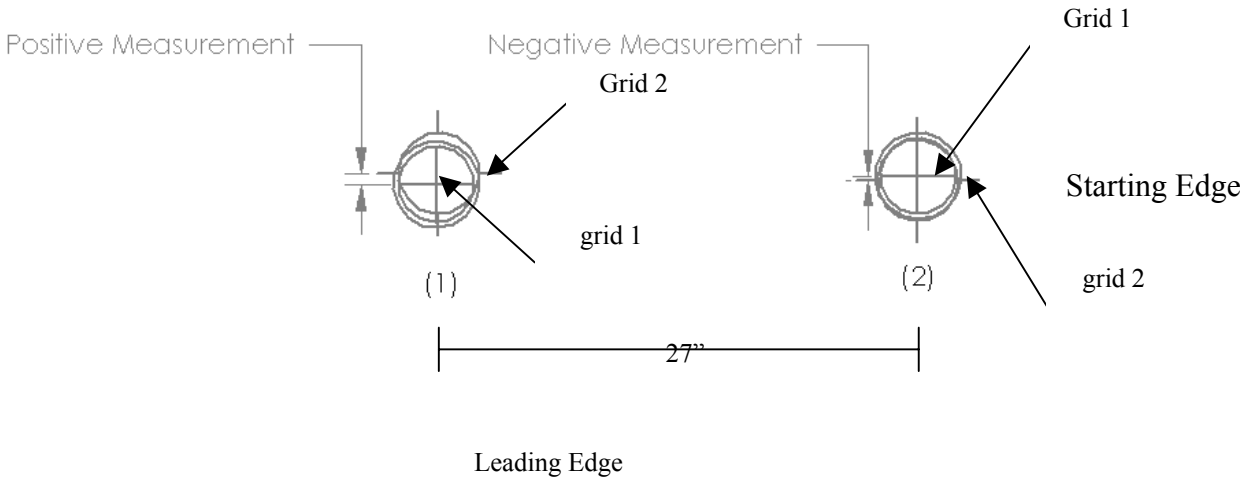


Figure 45: Measuring for Adjustment

Note: Point 2 should be the approximate location of the 1st registration pin (determined in step 3.1.3)

WARNING: This diagram and following equations are all in terms of the view through the microscope - not the actually image on the plate.

4. Following the sign convention shown above; use the following equation to calculate the rotation (Prot) adjustment:

Prot Adjustment = $Tan^{-1}((Value1 - Value2)/27)\times 10^6$

Note: Values 1 and 2 must be in inches. Make sure to follow the sign convention through all equations:

Positive measurement: **Grid 2** appears to be above **grid 1** when viewed through the magnifying lens.
Negative measurement: **Grid 1** appears to be above **grid 2** when viewed through the magnifying lens.

If the solution to the equation is approximately zero,
(0.001” > Value 1-Value2 > -0.001”) move onto step 8.

5. Enter the new value for the Prot, using the following commands:

```
<set gc prot (old prot value + prot adjustment)>
<nvs save gc prot>
```

Note: Make sure to follow the sign of the equation

6. Image another one of the plates previously imaged with the grid 1 pattern, using the **grid 2** command.
7. Process the plate.
8. Make sure the rotation has been corrected properly and proceed to step 8. If not, repeat steps 3 – 6. (Did you follow the sign convention?)
9. Again, measure the error values at points 1 and 2.
10. Average these two values (these should be in inches) and convert to mils using the following equation:

Main Scan Shift Adjustment $= ((Value1 + Value2)/2)x10^3$

11. Enter and save the adjusted value on the computer terminal:

```
<set gc mssa (Old MSSA Value + MSSA Adjustment)>

<nvs save gc mssa>
```

12. Image another one of the plates previously imaged with the grid 1 pattern, using the **grid 2** command.
13. Process the plate.
14. Check the plot to ensure proper alignment (**grid 2** is on the top of **grid 1** with zero error value). Repeat GC adjustment instructions as necessary.

Appendix A: How to use the Plate Edge to Image Gauge

This Instrument is designed to be clamped on the plate in the same location as the Drum Registration block. Its purpose is to accurately measure the distance to within 0.025mm (0.001") to any image within 32mm (1 ¼") of the plate edge.

Set Up

1. Place the imaged plate on a flat surface, the edge to be measured should be close to the surface edge to allow the gauge to partially overhang.
2. Open the clamps on the gauge (the two knurled brass knobs either side of the scope platform) move the platform to a position where you can clearly see the two sides of the plate stop. See Figure 46.

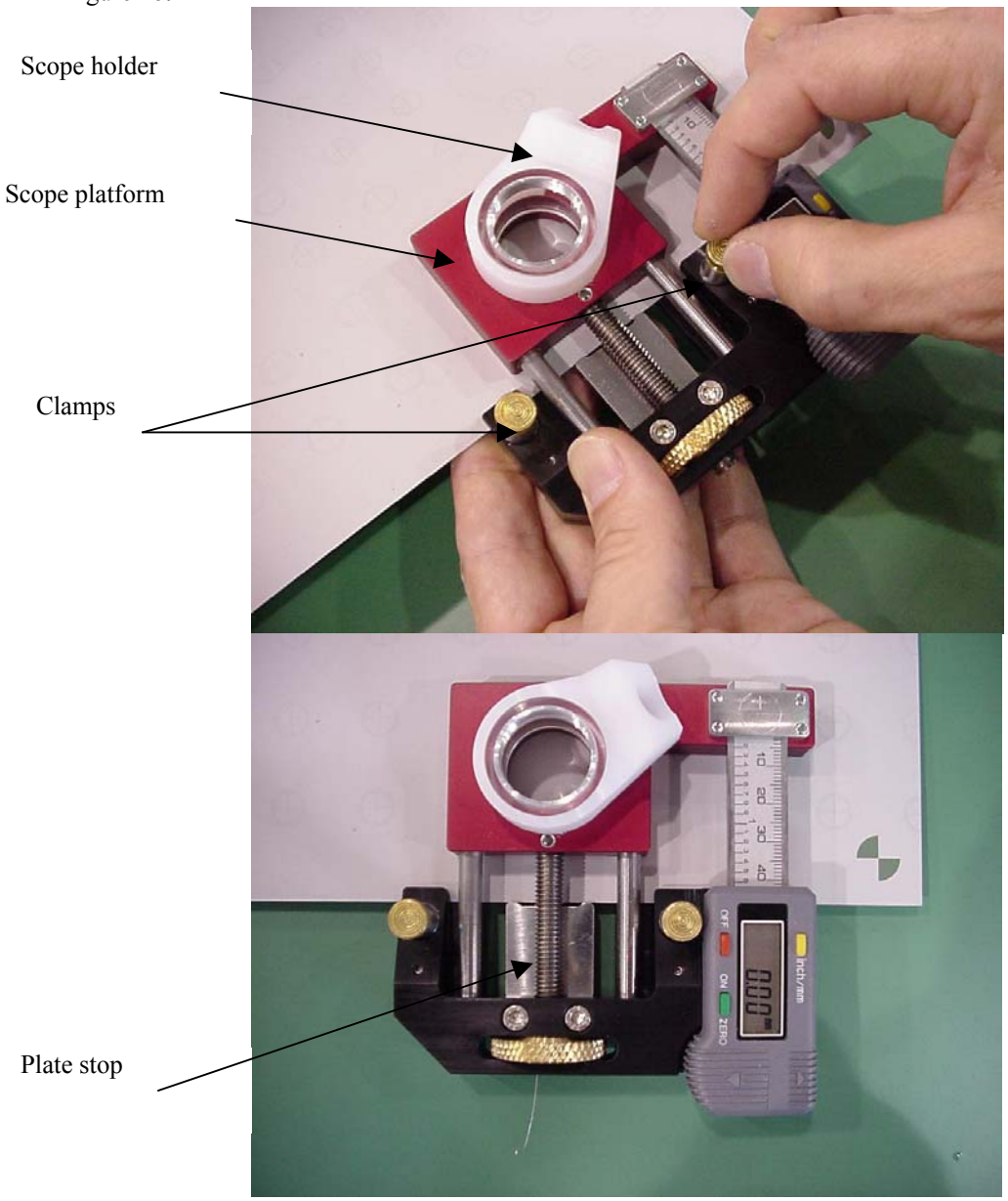


Figure 46: Setting up the Plate Edge to Image Gauge

3. Slide the plate into the gauge all the way to plate stop, make sure **Both Sides** of the plate-stop are firmly against the plate and lightly clamp.
4. Set the Mag light in to the scope holder, switch on and focus the beam to its brightest. Screw the scope into the holder and focus on the plate. See Figure 47.

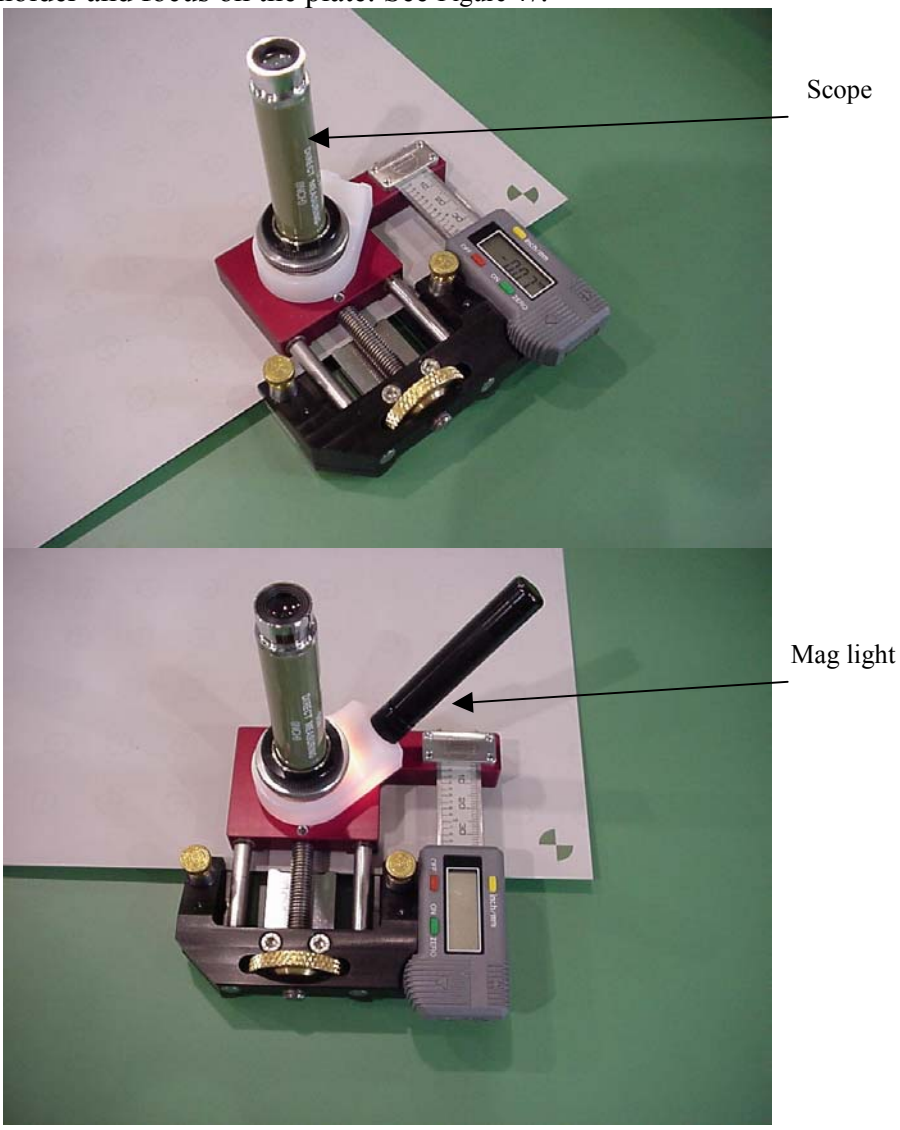


Figure 47: Setting the mag light (1)

5. Move the scope platform over the plate edge, rotate the scope to orient one line of the cross hair to a position parallel to the plate edge. See Figure 48.

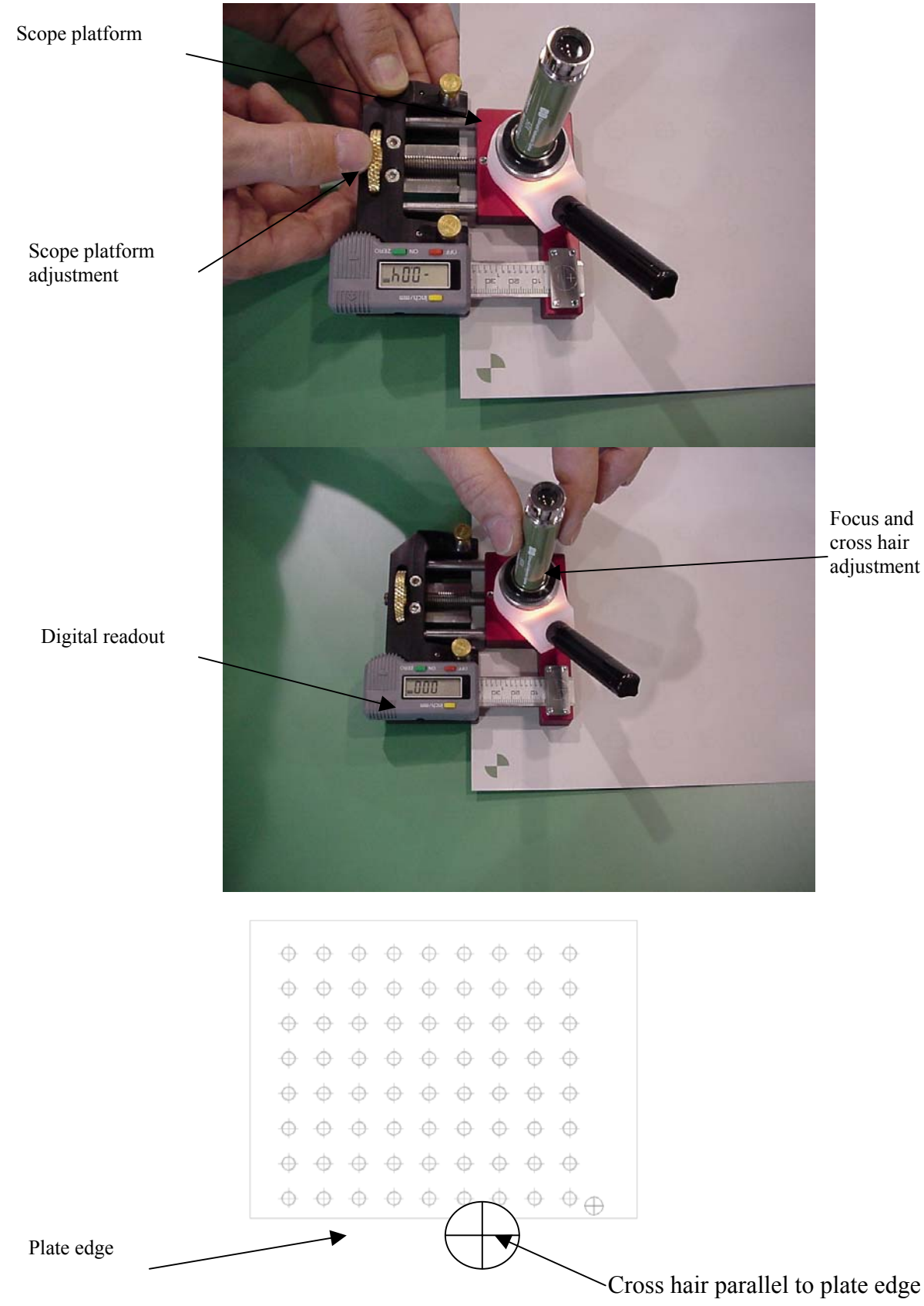


Figure 48: Setting the mag light (2)

Gauge Operation

Now the gauge is set up against the plate and the scope is in focus. Carefully move the cross hair over the plate edge and switch on and zero the digital readout. A reading can now be taken by moving the cross hair to the image on plate.

> **Note:** You may have to change the position of the gauge on the plate to put the crosshair directly above the image. If this has to be done move the crosshair back to plate edge and recheck your zero position.

Aligning two machines or a machine with a new encoder by using a Grid 1 and Grid 2 image

The Plate Edge to Image Gauge will align two machines or a machine with a new encoder. This procedure requires a plate from the reference machine to be imaged with a **grid 1** pattern and then re-imaged on the machine to be aligned using a **grid 2** pattern.

1. Clamp the gauge on the imaged plate with both grids.
2. Follow the gauge set up procedure.
3. Move the scope platform over the image.
4. Rotate the scope until the cross hair is parallel to the horizontal line of grid 1or grid 2. See Figure 49.
5. Zero the digital display on the top of the upper horizontal line, move the cross hair approximately 10 thou above the line and zero again (this is to eliminate the slack in the screw pitch).
6. Slowly move the cross hair downwards to the top of the upper horizontal line of grid 1 or grid 2 and zero the display.
   It does not matter whether it is grid 1 or grid 2 line. See Figure 49.

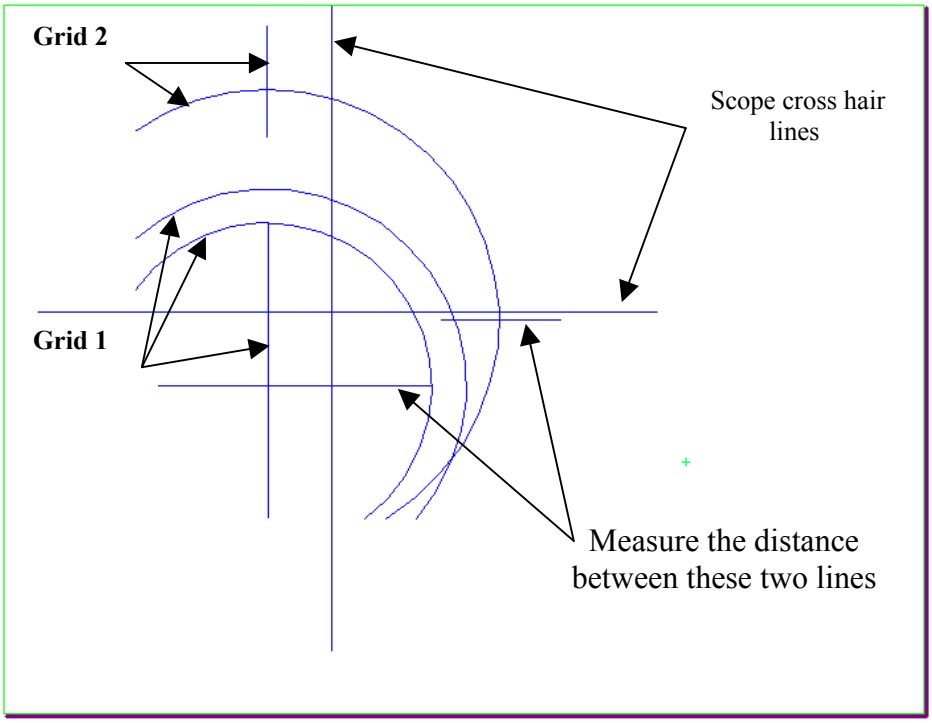


Figure 49: Measurement

7. Slowly move the cross hair line to the top of the lower line of grid 1or grid 2. Record the reading on the digital display, ignore the sign of the reading.
   Note: If you move the cross hair too far, you must restart the procedure to take a reading at step 5.

8. Establish the sign of the reading using Figure 50

Note: This diagram is in reference to the image viewed through the magnifying lens.

Positive measurement: **Grid 2** appears to be above **grid 1** when viewed through the magnifying lens.
Negative measurement: **Grid 1** appears to be above **grid 2** when viewed through the magnifying lens.

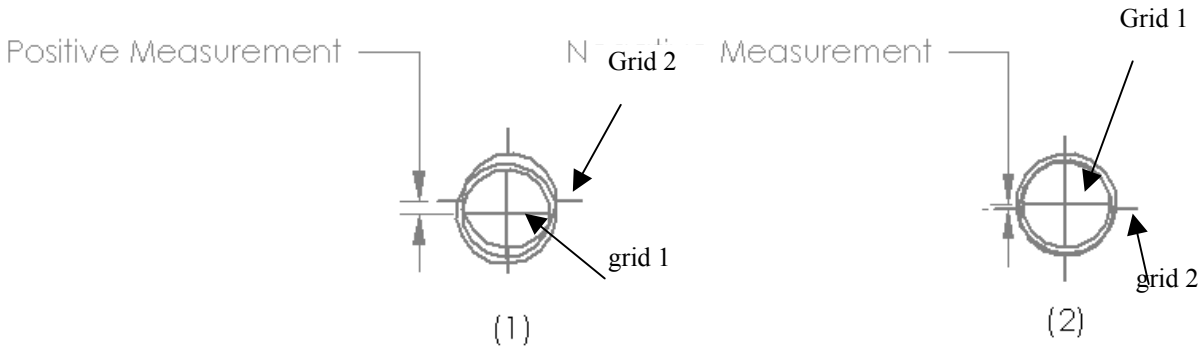


Figure 50: Sign convention for Plate Edge to Image Gauge.

Appendix B: Trouble shooting

Problem: The machine won't initialize after nvs values are changed
Solution: Run a drum cal command.
`<drum cal>`

Appendix C: BDO Adjustment

See attached document entitled: Adjusting the Balance Actuation Assemblies
Located in technical library at http://techplanet.creo.com/docs/bwass3.pdf.

Appendix D: Upgrading a machine that is hard down

Upgrading a machine that is hard down can take significantly longer than a regular upgrade. Please note that the NVS values may not have been correct before and therefore you will have to do a complete check of machine operation following the upgrade to ensure that the upgrade was successful.

1. As you will not be able to plot and plates prior to upgrade, just proceed to the installation of the encoder.
2. Once EDA is installed and you are ready to install the encoder use the drum-bracing block to position the drum so that the leading edge clamp is resting on the block. See Figure 51.

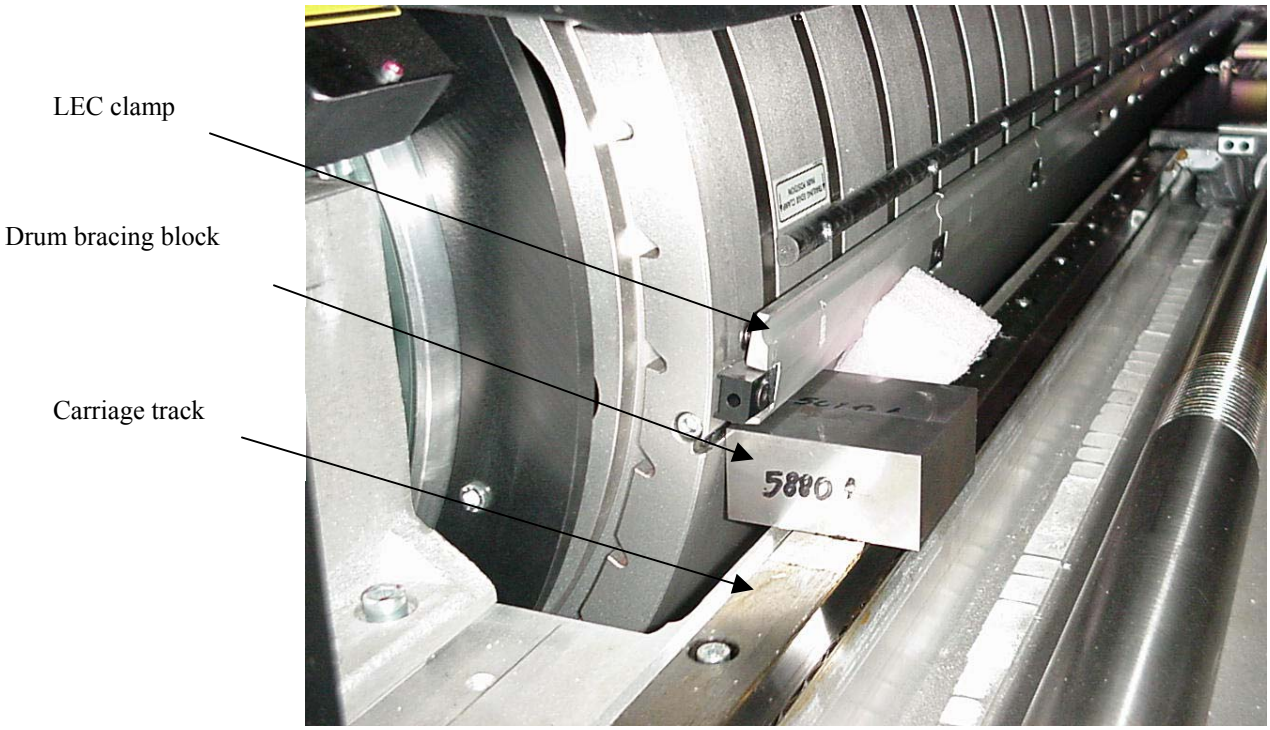


Figure 51: Inserting the drum bracing block

For 5080 machines, the bracing block lies on end (with 72mm vertically from the carriage track to the underside of the leading edge clamp). For 5880 machines, the

bracing block lies on its side (with 35mm vertically from the carriage track to the underside of the leading edge clamp).

3. Brace the drum in this position and install the new encoder in the index position as described in the instructions, section 3.9.

4. Change the NVS values as described in section 3.10, but do not proceed to the LEC and BDO position check, section 3.11.

5. Turn the safety key switch to the Laser Hazards mode and type:
   `<set head wenable>`
   `<nvs save head>`

6. For Trendsetter VLF and Trendsetter VLF Autoloader, type:
   `<tec off>`
   `<lec on>`

7. For VLF Platesetter, type:
   `<tec off>`

8. Type:
   `<drum idle>`

9. Move the drum to the LEC position.

10. Disconnect the air to the Cylinders that drops the TEC onto the drum.

11. Drop the LEC clamp onto the LEC until contact is just made. Make sure the Push Bars sit in the center of the LEC dimple.

12. Record the encoder position by typing**:**
    `<drum>`

13. Plug the air back in to the TEC and type
    `<tec off>`

14. Subtract the LECPOS value calculated from the old NVS values from encoder position value. For example:
    X = **Encoder position** – LECPOS (New HH value)

15. Move the drum to position X.

    `<drum move (X) h ↵>` (it should be corrected “0” drum position)

16. Support drum by using the drum support, see section **3.5.3** Figures 17, 18

17. Enter the following command

    `<drum idle>`

18. Turn off the machine.

19. Unplug the encoder.

20. Reinstall the encoder in the index position, see section **3.9.**4,6,7,8,11,12,16,17,18, and 19.

21. Remove all tools and jigs from the machine.
22. Plug the encoder.
23. The encoder should now be aligned properly.
24. Turn on the machine.
25. Enter the following command.

    `< tec off ↵ >` (you should be able rotate drum by hand)

26. Check the machine to make sure all NVS values are correct and the machine is functioning properly (recheck machine LEC and TEC positions, correct and save corrected values
    `<NVS SAVE Al>`

    WARNING: If the encoder is not properly positioned or the NVS values are incorrect the machine may be damaged if care is not taken to confirm proper operation

27. Complete the rest of instructions starting at section **3.11.**
28. Close the machine.
29. Turn the key switch to the normal operation mode and enter the following commands
    `<set head wenable 1 ↵>`
    `<nvs save head↵>`
30. The adjustment for encoder misalignment will have to be done referencing the image on the plate to the leading edge.

    Note: If the site has more than one machine, you may use a working machine as a reference, by imaging the Grid 1 pattern on the reference machine and following the rest of the instructions regard adjustment for encoder misalignment.