

VLF Platesetter / Trendsetter VLF

Upgrading from an Optical Encoder to a Shaft Encoder

Document Number
719-00578A-A

2005-10-19

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Revision History

Revision	Date	Author	Comments
A	18 Oct, 2005	A.Blignaut/M.Zgrych	This procedure is for an upgrade to the new shaft encoders (no dampening collar).

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1. BACKGROUND

This procedure describes how to upgrade the VLF Platesetter, Trendsetter VLF, or Trendsetter VLF Autoloader from using an optical encoder to using a shaft encoder. Because there are two generations of shaft encoders and there is already an upgrade procedure for the older generation shaft encoder, this procedure will describe the upgrade procedure for the new generation shaft encoder only.

The principle of operation of the two types of shaft encoders is the same, but the mounting and physical appearance is different.

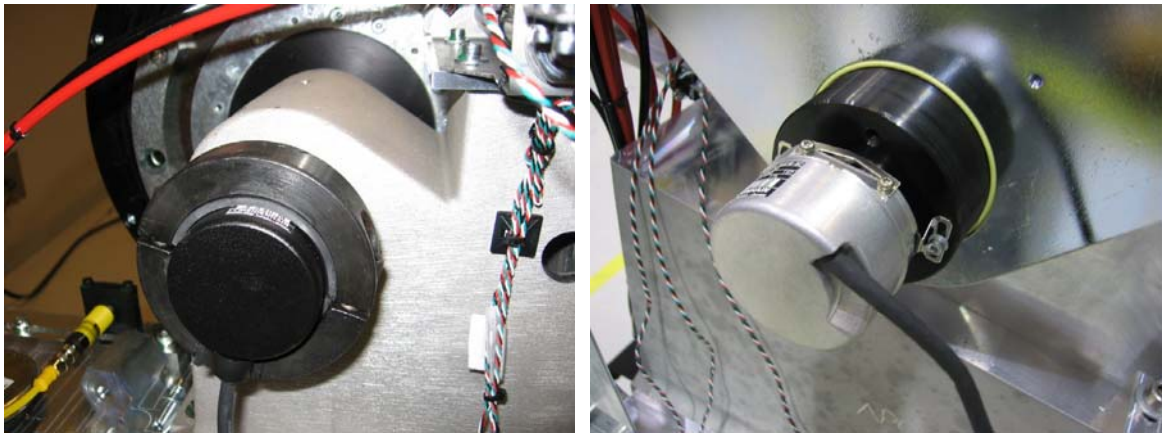


Figure 1: Old encoder (left) and new encoder (right)



2. SCOPE

This procedure outlines the steps involved in upgrading the external glass encoder with the new style 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.

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.

3. 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 `Courier New` font. For example: `>>list version.`

4. PARTS, TOOLS, AND SUPPLIES REQUIRED

Parts

Figure 2	Description	Part number	Qty
a	Expanding drive anchor assy. (EDA)	50-2294A	1
b	Heidenhain encoder	507-00165A	1
c	Encoder adapter board	10-4314A	1
d	Encoder adapter bracket	57-8806A	1
e	Adapter plate with bearing	50-2312A	1
f	Drum pin	50-2295A	1
-	Warning sticker	74-3316A	1
-	Screw, M2.5x12, sock-cap, ss	300-00306	2
-	scrw,M3x8,sock-cap,s-plated	52-4458	6
-	Wash,m3,flt,s-plated	52-3057	6
-	Wash,M3,bel,hds,s-plated	52-4262	6
-	Scrw,M4x16,sock-cap,s-plated	52-4460	4
-	Wash,M4,bel,hds,4.3x9x1,s-plated	52-4261	4
-	Scrw,M6x35,sock-cap,s-plated	52-3245	2
-	Wash,M6,bel	52-4031	2



Figure 2: Encoder upgrade parts

Tools

Figure 3	Description	Part number	Qty
g	EDA installation tool	50-2296A	1
h	Encoder alignment tool with 9v batt.	92-0147C	1
i	Drum support	92-0081A	1
j	0.625x1x0.045 in. spring	59-3827	1
k	12 mm coupling	55-1145	1
l	Foam padding	50-1196 and 50-1197	1 set
m	Metric hex keys	90-1037	1 set
n	M10 shoulder bolt	52-5105	1
o	1.5 mm flat end hex key	90-1194	1
p	Wedge	90-1198	1
q	Slot screwdriver small	90-1195	1
r	CD containing Grid1 and Grid2	See TechPlanet	1
s	2.5 mm long arm T-handle hex key	90-1034	1
t	3 mm long arm T-handle hex key	90-1033	1
u	Torque wrench, 12 NM	90-1199	1
v	6 mm hex fitting for torque wrench	90-1200	1
w	Plate edge to image gauge	92-0670A	1
x	Encoder gauge block – 5080/5880	57-9072A	1
y	Tool, Torx Key, M2,5, Encoder	690-00342A	1
z	Torque Wrench, TQ.LDR Minor Hex, 1.1NM	690-00610A	1
aa	Tool, 2.00MM Hex Bit 1/4" Hex Shank	690-00612A	2
bb	Jig, Drum Alignment, Heidenhain Encoder, MTA	690-00477A	1
cc	Tool,balldriver,hex key,5/16"x6"	90-1193	1
dd	KIT,Parts,shaft encoder, upgrade, TSV	05-0195B	



Figure 3: Encoder upgrade tools

Supplies

Photo ID	Description	Part number	Qty
-	Microlube grease (or substitute)	89-0091	-
-	Loctite 242	89-0053	-
-	Isopropyl alcohol	-	-
-	Lint free cloths	-	-

5. UPGRADE PROCEDURE

5.1 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 VLF Trendsetters or VLF Trendsetter 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 Platesetters, 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 that the leading edge push bar is in the center of the dimple in the LEC when it first makes contact. See Figure 4.

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

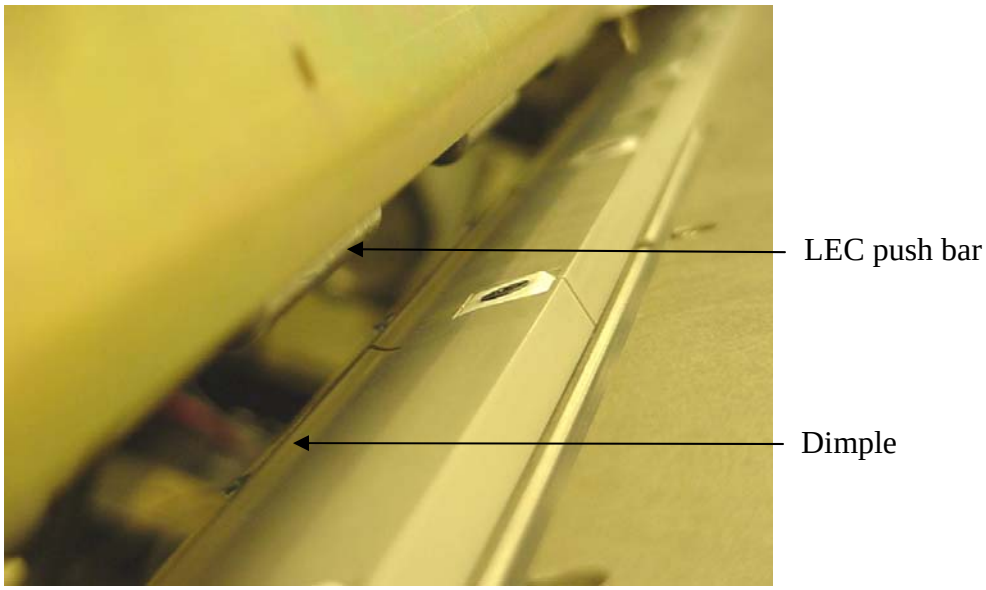


Figure 4: LEC push bar

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 balance détente offset (BDO) alignment. See *Adjusting the Balance Actuation Assemblies* and 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
```

5.1.1 Obtaining a test plot

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



Figure 5: 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.

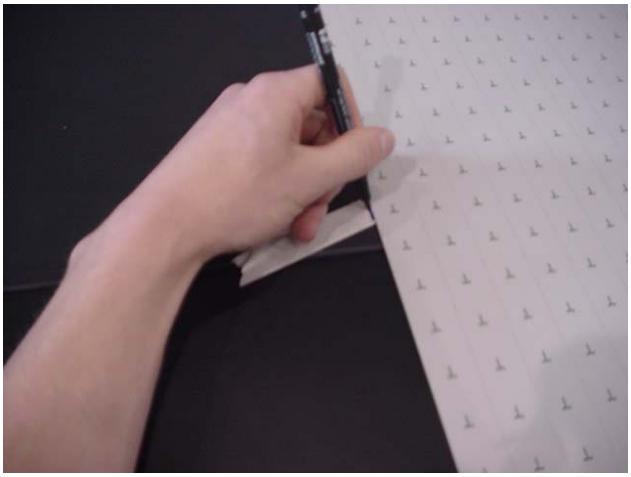


Figure 6: Marking the plate starting edge

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 1010 mm (40 in.) measured from the left edge of the table.

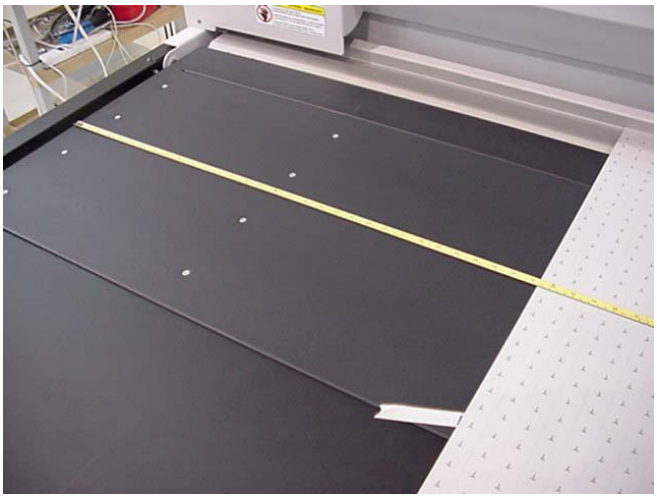


Figure 7: Registration pin

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 8.

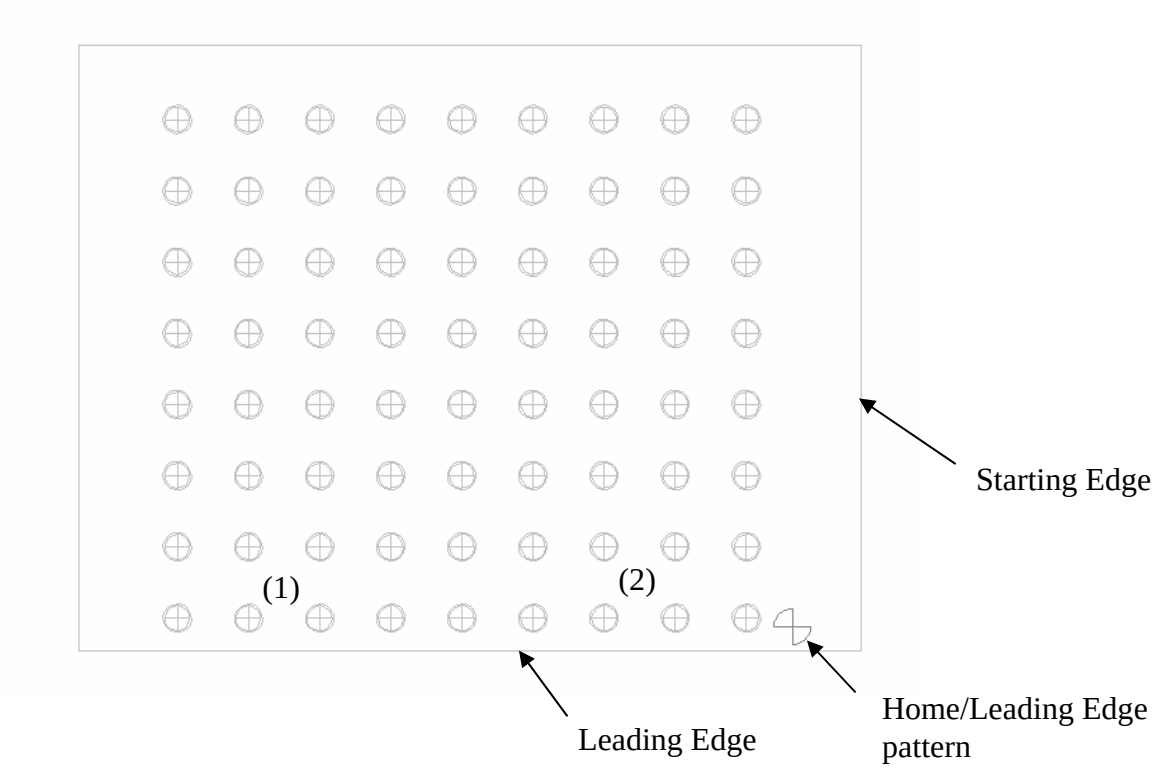


Figure 8: Grid 1 test plot

Note: Take note of the orientation of 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.

5. Type `>>set media (n) inv 0`. For media information, see http://internet.creo.com/support/html/media/medialist.htm

6. Backup all NVS values using the following commands:

```
>>fsave all
>>nvs dump
>>nvs dump diff
```

5.2 Preparing a 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. Type `>>carriage moveto 41000`

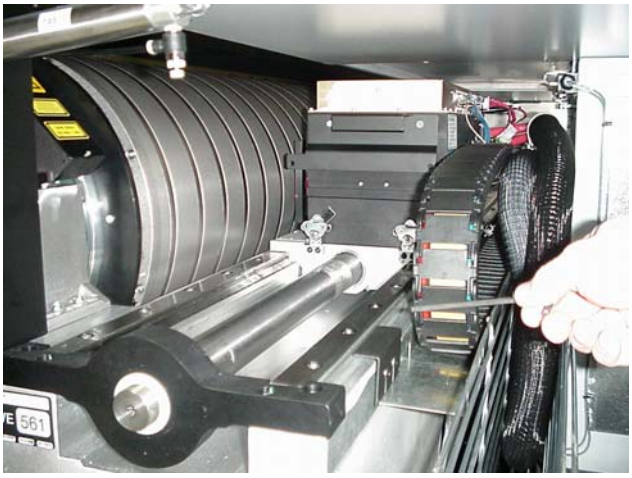


Figure 9: Moving the carriage

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

4. Open the P-door and let the table idle by using the following commands:

```
>>Pdoor open
>>table idle
```

Note: On the VLF Trendsetter 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 10.

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 10: Removing the laser protection panel

9. Remove the pivot cover (fastened with four screws).



Figure 11: Removing the pivot cover

10. Turn the main power to the machine off.

5.3 Assembling 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.

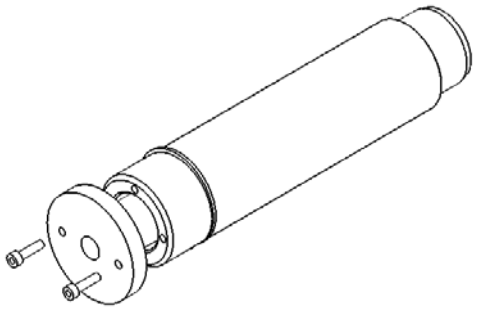


Figure 12: Drum pin assembly

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.

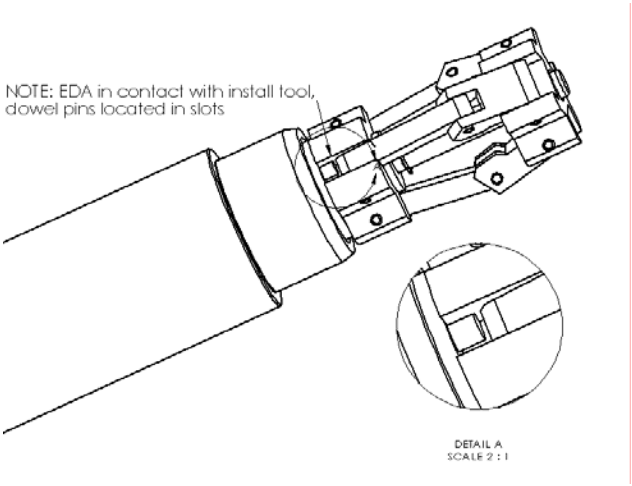


Figure 13: Attaching the EDA

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 5-10 mm.



Figure 14: Coupling shoulder bolt assembly to encoder shaft

6. Tighten the coupling to the encoder shaft.

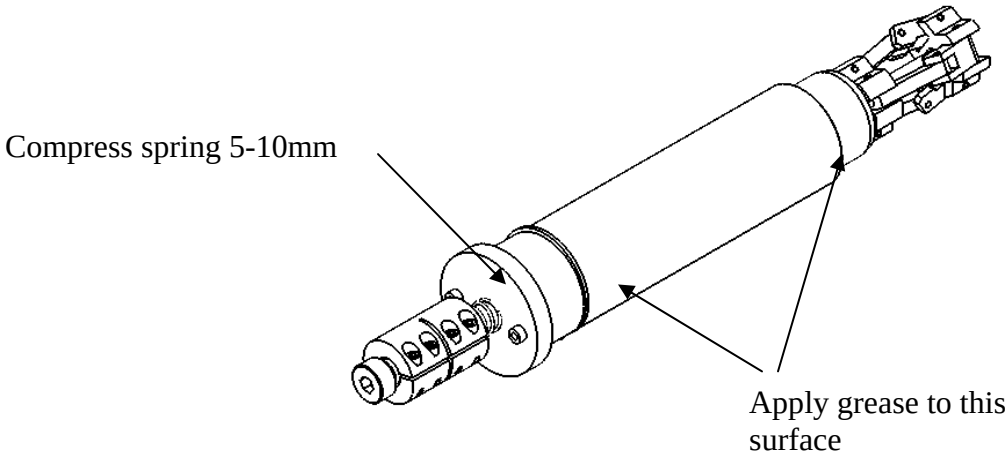


Figure 15: Coupling shoulder bolt assembly

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).

5.4 Removing 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.

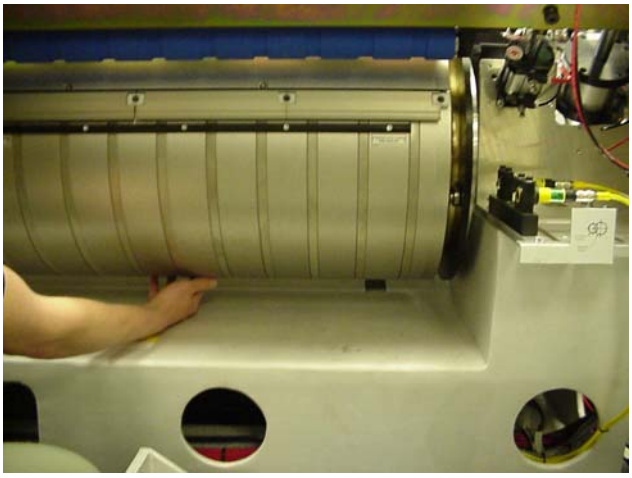


Figure 16: Preparing drum for removal (1)

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.

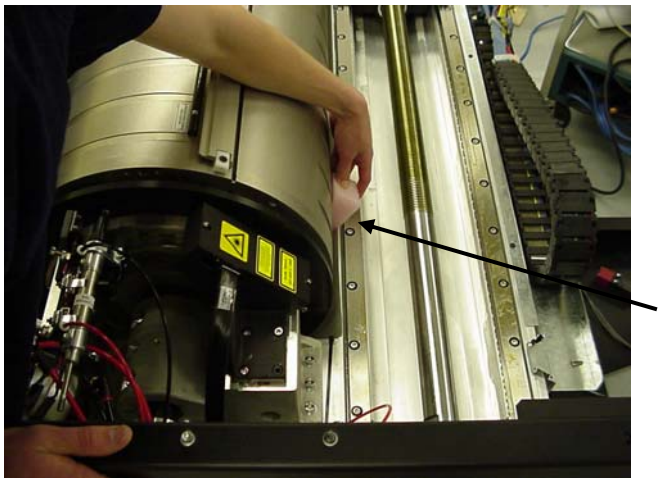


Figure 17: Preparing drum for removal (2)

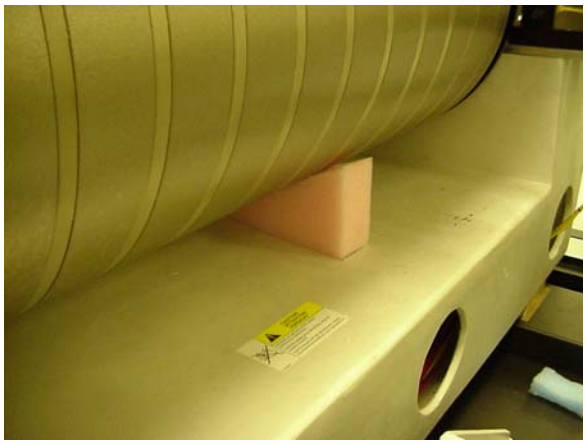


Figure 18: Preparing drum for removal (3)

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.

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

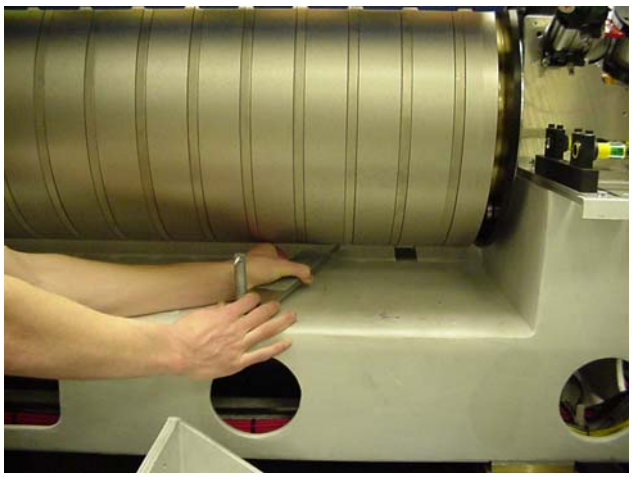


Figure 19: Installing the drum support



Figure 20: Lift and Foam Support

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

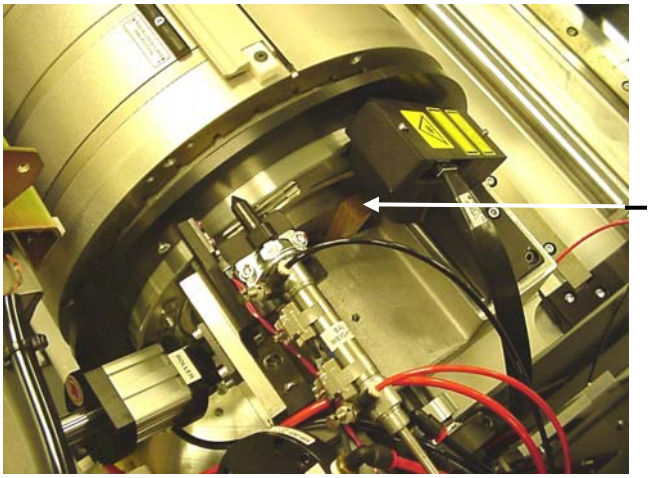


Figure 21: Placing wedge between drum end bell and the pillow block

5. Loosen the two M8 screws on the pillow block. Move one screw to the middle hole and use it as a jackscrew to open the pillow block. Take care not to lose the Belleville washers.

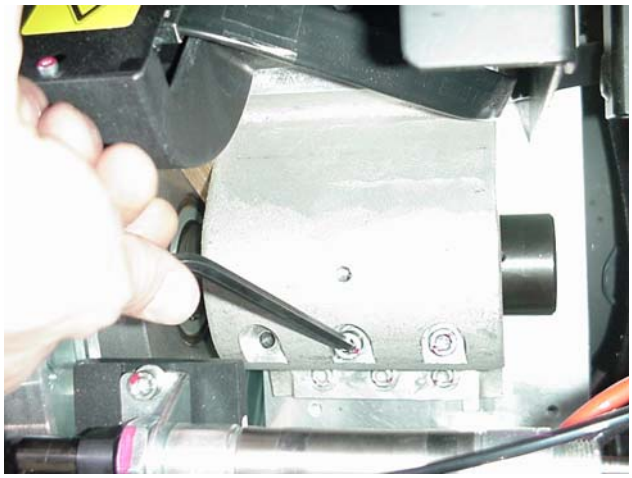


Figure 22: Opening the pillow block

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.



Figure 23: Raising the drum support

5.5 Installing the New Drum Pin

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 it 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.

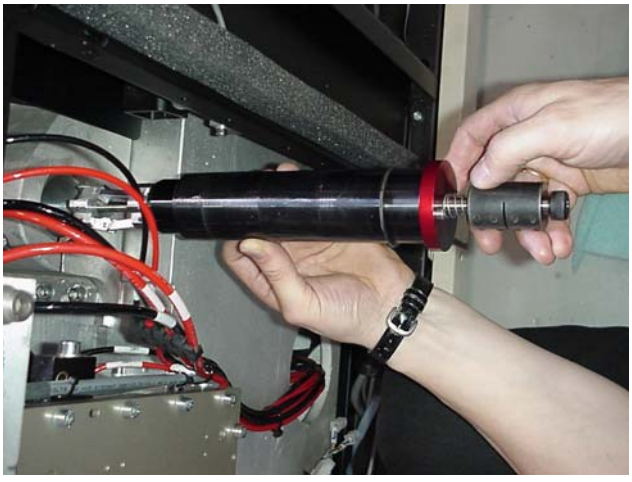


Figure 24: Installing the drum pin

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 25. The bolts should be orientated as shown.

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

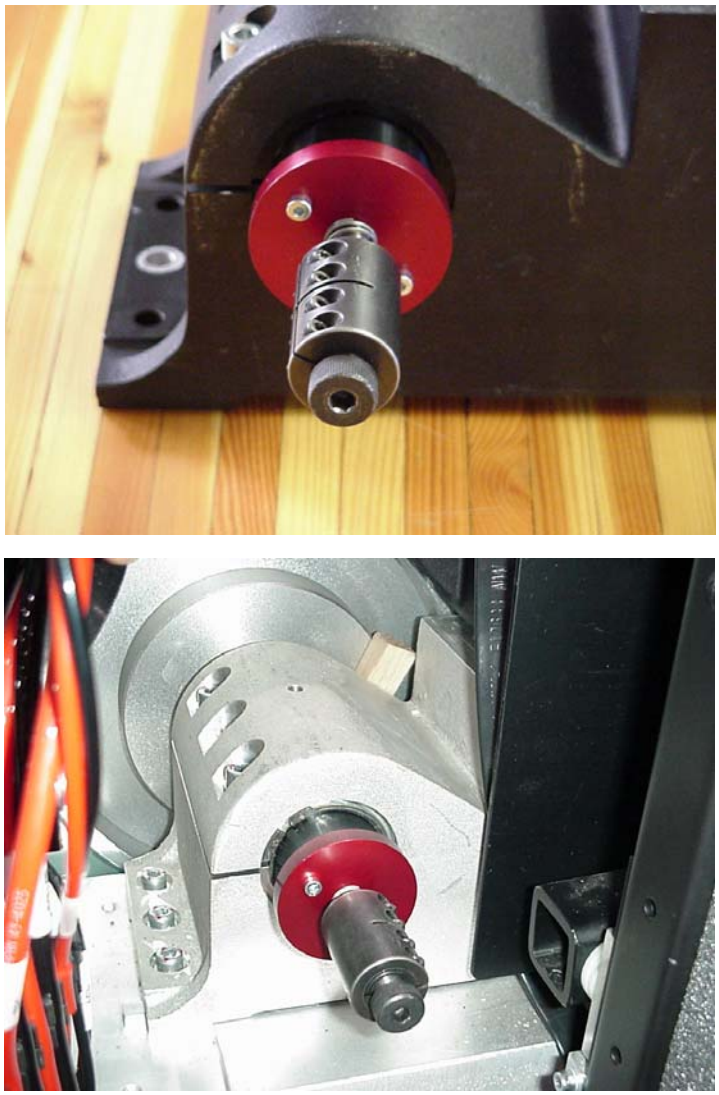


Figure 25: Orientating the drum pin

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 with a long handle hex key.

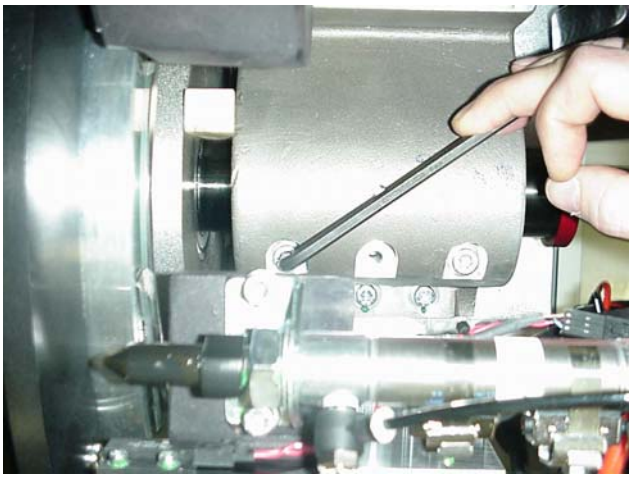


Figure 26: Tightening the pillow block screws

8. Raise the drum lift ¼ turn past contact with the drum to prevent the drum from rotating.
9. Remove the wooden wedge.

5.5.1 Expanding the EDA

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

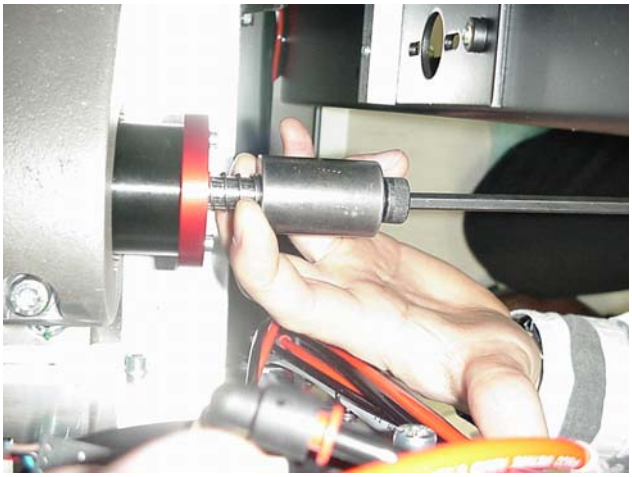


Figure 27: Expanding the EDA (1)

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.

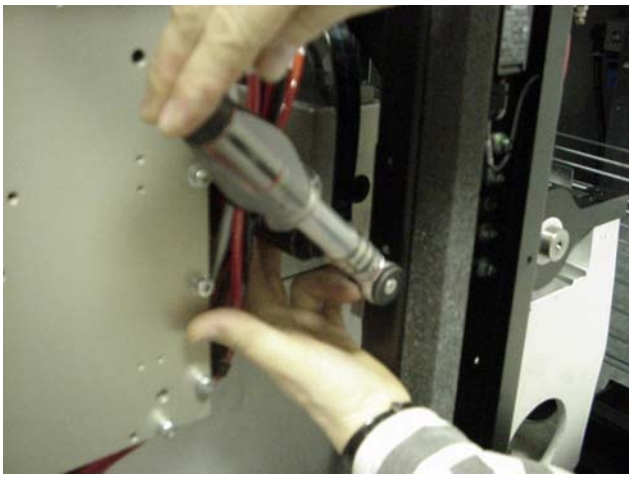


Figure 28: Expanding the EDA (2)

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

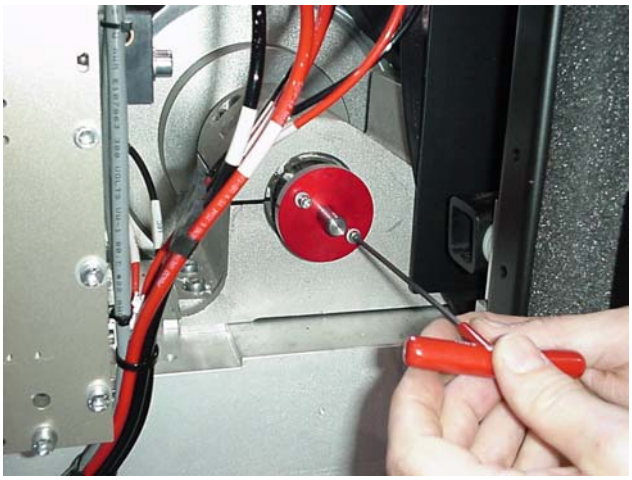


Figure 29: Removing the install tool

5. Remove the drum support and all the foam bracing.
6. Make sure the encoder shaft feels secure.
7. Spin the drum by hand to ensure there is no interference.



Figure 30: Orientating the drum pin

5.6 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).

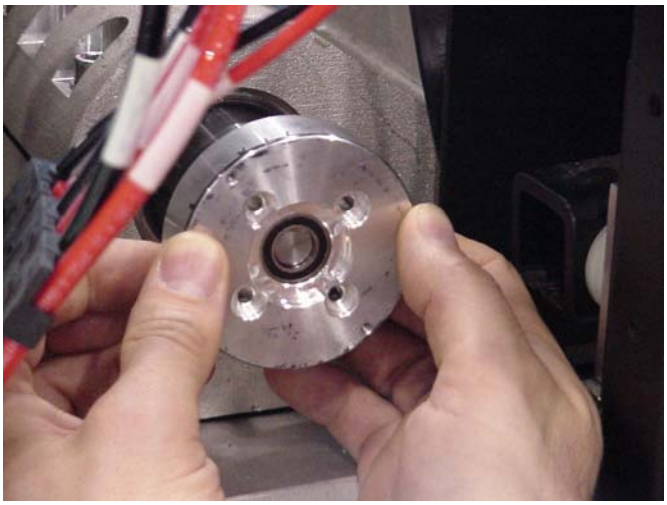


Figure 31: Installing the encoder adapter plate

2. Bolt the assembly to the drum pin using four M4x16 (52-4460) screws, four Belleville (52-4261) washers, and Loctite 242. Note the orientation of the adapter plate from Figure 32.

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.

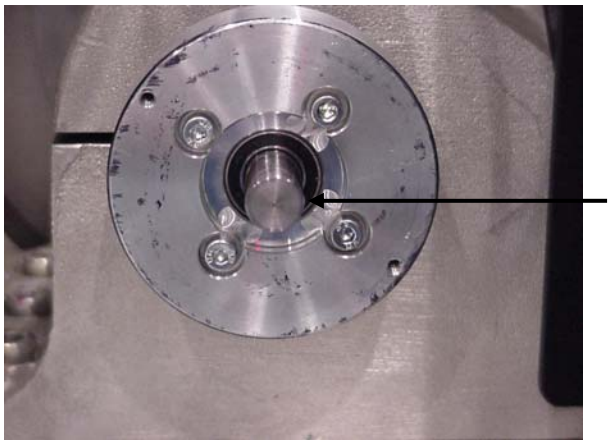


Figure 32: Adapter plate orientation

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

Note: Do not get alcohol on the bearing.

5.7 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. Brace the drum in the drum zero position by placing the drum bracing block on the carriage track and rotate the drum until the LECs are resting on the block—brace the drum in this position to prevent it from turning.

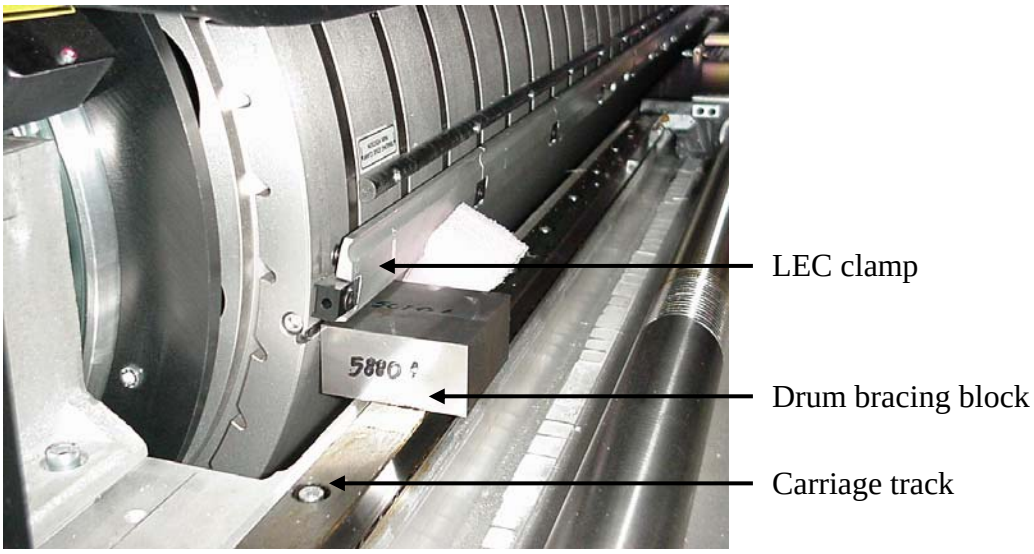


Figure 33: Inserting the drum bracing block

For 5080 machines, the bracing block lies on end (72 mm vertically from the carriage track to the underside of the LEC). For 5880 machines, the bracing block lies on its side (35 mm vertically from the carriage track to the underside of the LEC).

5. Connect the encoder to the encoder alignment tool and turn the tool on.
6. Find encoder index "0" position by rotating the encoder collar until both green lights on the alignment tool are on—the buzzer will also sound.



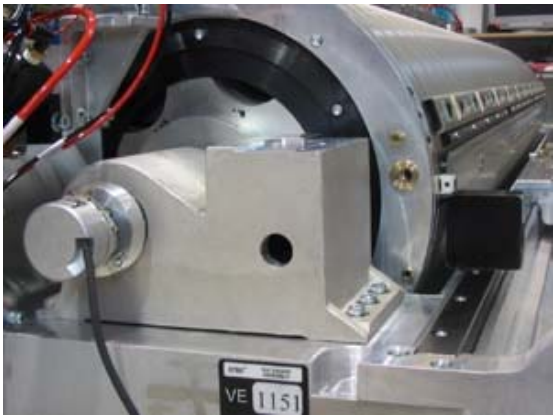
Figure 34: Connecting the encoder alignment tool

7. Loosen the M2.5 collar screw and use pliers to hold the shaft sleeve. Rotate the collar to the shown position in the Figure 34 and Figure 35. Both green LEDs lights should still light up.



Figure 35: Holding the encoder shaft sleeve

8. Carefully mount the encoder on the encoder shaft while keeping the encoder in the index position (green LEDs and buzzer should stay on). The slots in the encoder brackets must be centered over the holes in the drum pin and the encoder cable should point downwards. Lightly tighten the two mounting M4x10 screws.





9. Rotate the collar (using torque wrench) and encoder body (by hand) at the same time to bring the encoder closer to the “0”index position. The slots in the encoder brackets should still in centered. Both green lights should be on and the buzzer audible.

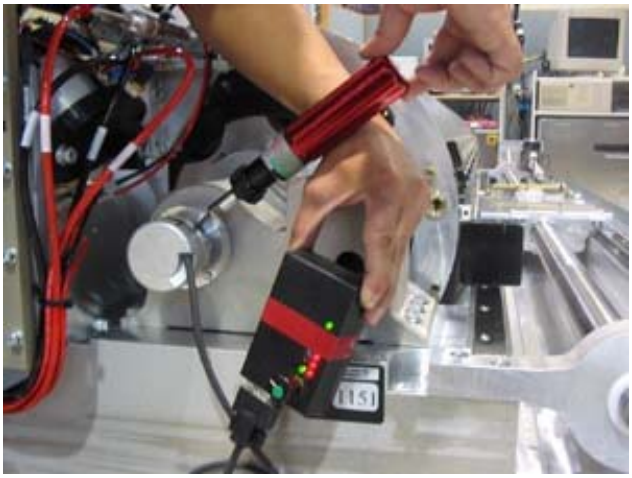


Figure 36: Adjusting the encoder to the index position

10. Tighten the M2.5 collar screws with a 1.1 Nm torque wrench.



Figure 37: Tightening the collar screws

11. If the encoder moved from the “0” index position after tightening the collar screws, gently rotate the encoder body in the bracket slot range until both LEDs are on and the buzzer sounds. Tighten the two M4x10 screws with a T-handle hex key.

12. To ensure that there is no twist on the encoder mounting bracket, tap lightly on the encoder body with the handle of the T-handle hex key. The encoder should not move from the “0” index position.



Figure 38: Checking for twist is the encoder mounting bracket

13. If the “0” index position was lost after tapping on the encoder body, it means that there is twist between the mounting bracket and the collar. Remove the encoder from the encoder shaft and reinstall and realign it.

Note: If you do not correct the twist between the encoder body and the collar, the encoder will have a week “0” index position resulting in artifacts during imaging.

14. Mount the encoder adapter board on the bracket using M3x8 screws (52-4458), M3 Belleville washers and M3 flat washers (52-3057). The flat washers sit against the board.

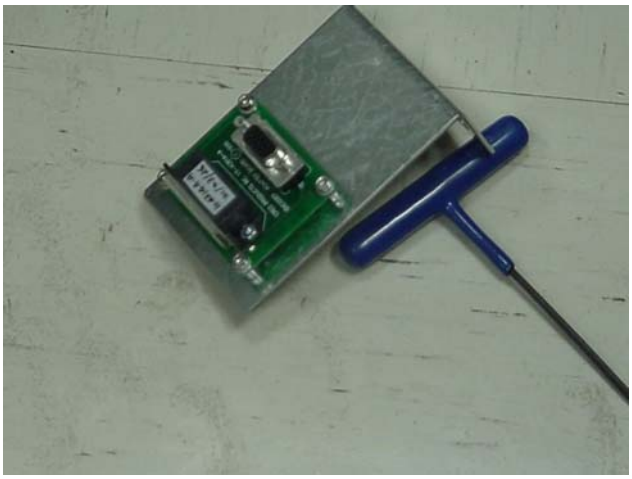


Figure 39: Mounting the encoder adapter board

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 Belleville washers (52-4031) See Figure 40.

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

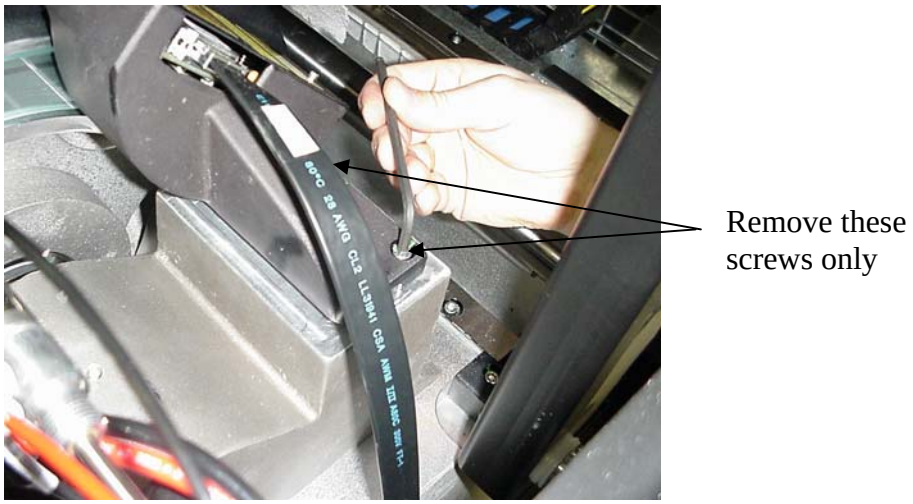


Figure 40: Installing the cable adapter bracket

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.

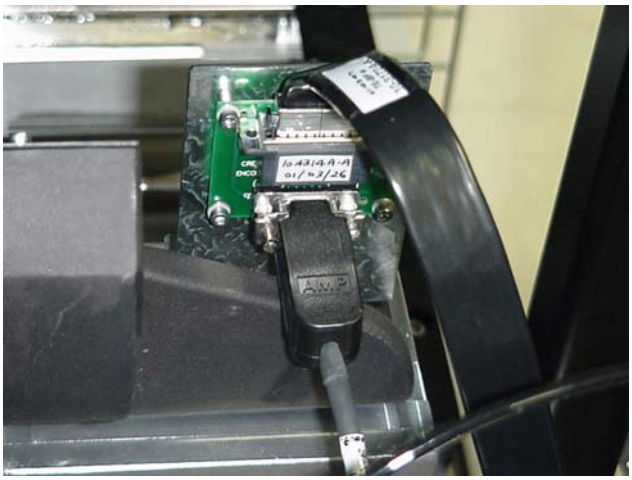


Figure 41: Connecting the shaft encoder (1)

17. Coil the slack in the encoder cable and tie it down using a cable tie.



Figure 42: 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.

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

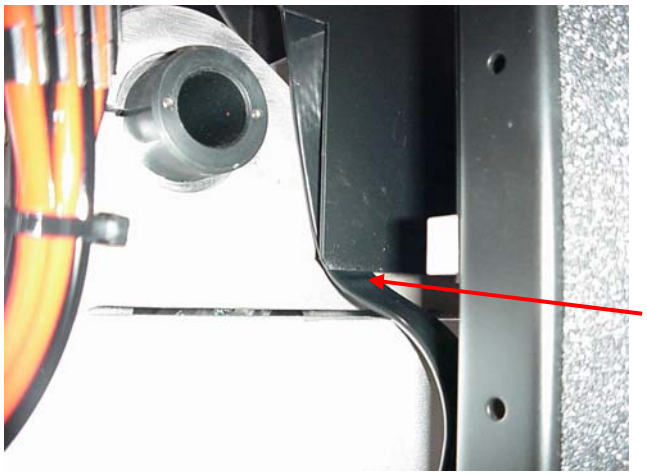


Figure 43: Installing the pivot cover

20. Install the long laser protection cover. Use Loctite 242 (not applicable to VLF Platesetters).

21. Turn on the power to the machine.

5.8 Updating the 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 TechPlanet at
http://intranet.creo.com/support/firmware/CTP/ctp_versions.htm

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 VLF Trendsetter and VLF Trendsetter 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)> (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 – type >>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.

5.9 Checking the 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 VLF Trendsetter or VLF Trendsetter Autoloader, type >>lec on

3. Remove the solenoid cover.

4. Gently actuate the solenoid for the TEC by pressing the 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 4.

Note: It is important to that the push bar is in the center of the dimple when it first makes contact.

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 5.7 to align the encoder properly.

7. Check the balance détente offset (BDO) alignment. See *Adjusting the Balance Actuation Assemblies* .
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
```

5.10 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 44 and Figure 45.

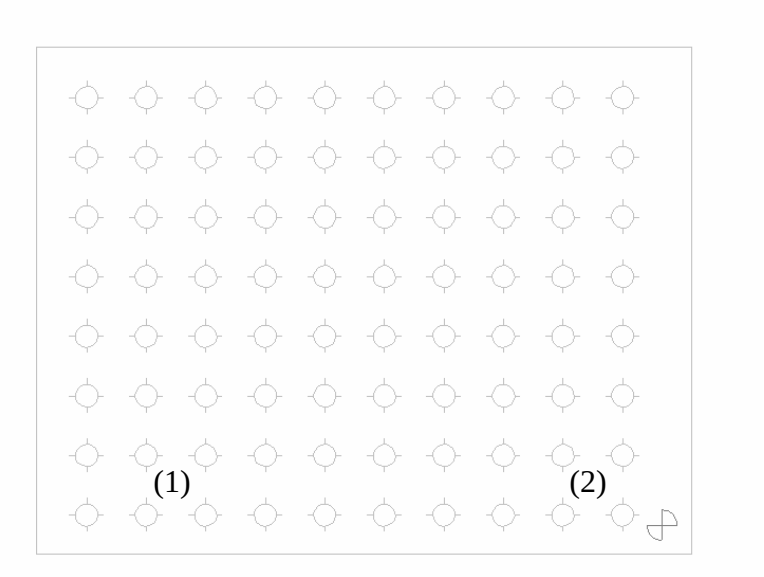


Figure 44: Grid 2 pattern

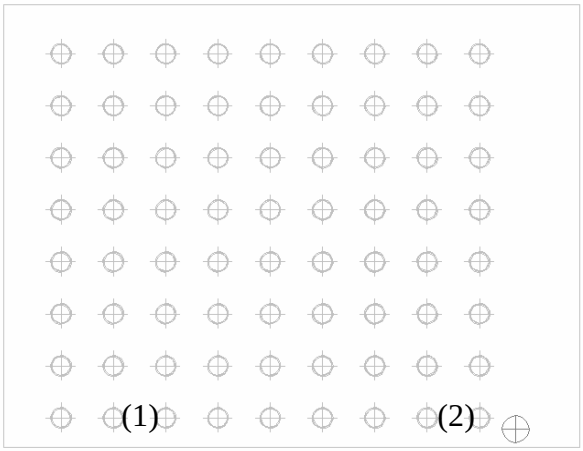


Figure 45: Combination of both grid 1 and grid 2

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 46

Note: For Instructions on use of the plate edge to image gauge see Appendix A.

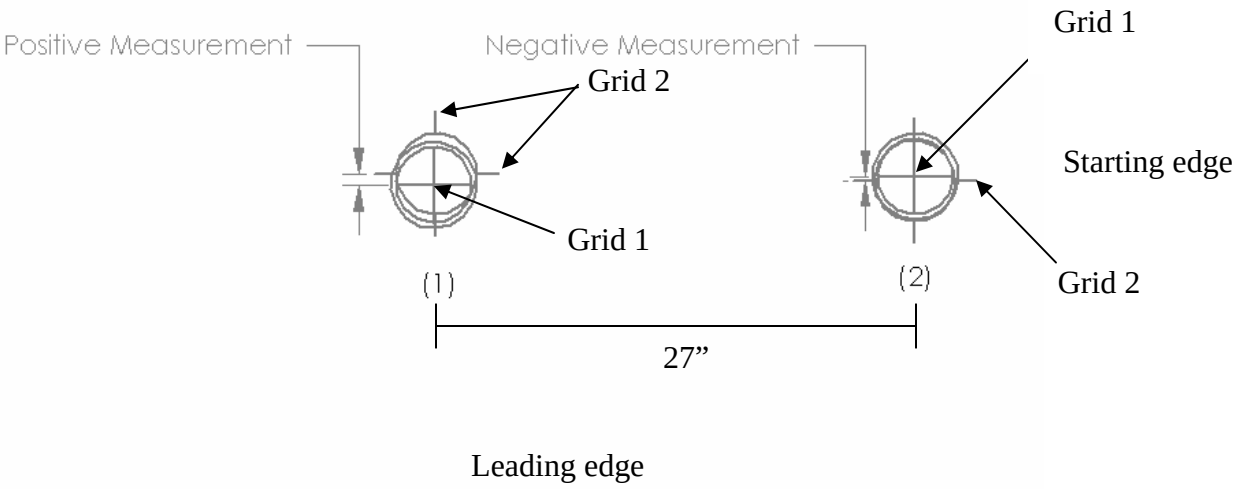


Figure 46: Measuring for adjustment

Note: Point 2 should be the approximate location of the 1st registration pin (determined in step 5.1.1.3)

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 with the grid 2 pattern.

7. Process the plate.

8. Make sure the rotation has been corrected properly and proceed to step 9. If not, repeat steps 3 – 6. (remember to 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.

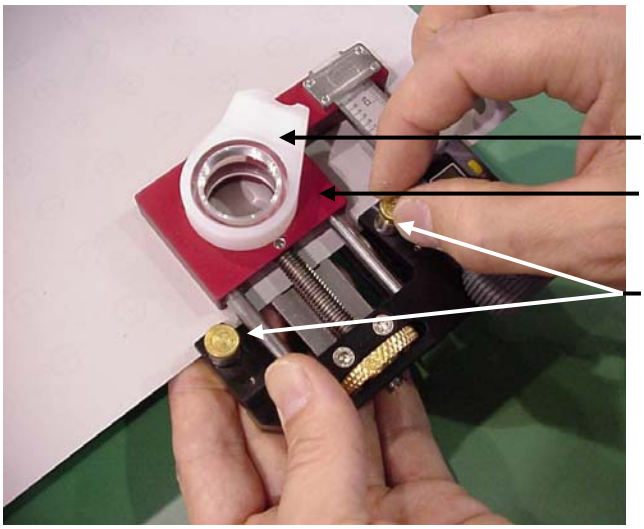
6. APPENDIX A: HOW TO USE THE PLATE EDGE TO IMAGE GAUGE

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 0.025 mm (0.001") to any image within 32 mm (1 ¼") of the plate edge.

6.1 Setting up the Gauge

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.



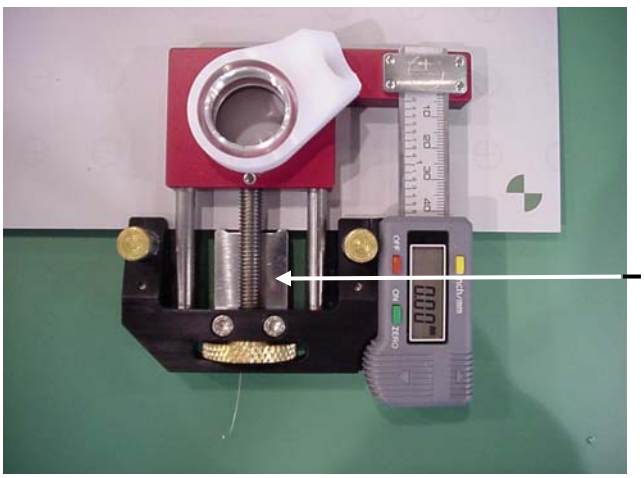


Figure 47: Setting up the plate edge to image gauge

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.

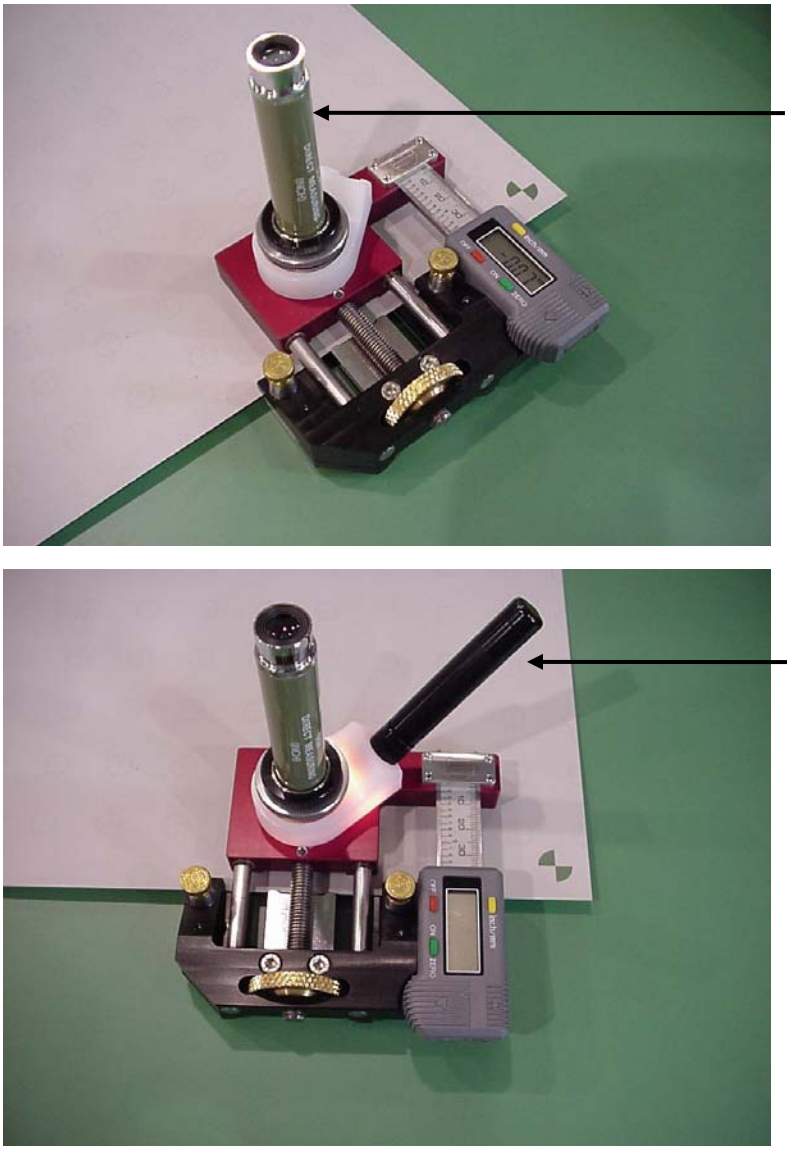
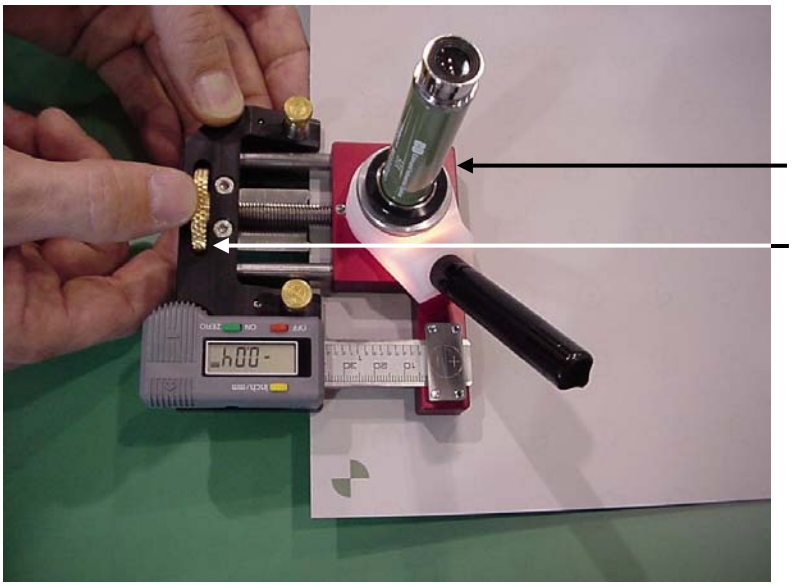
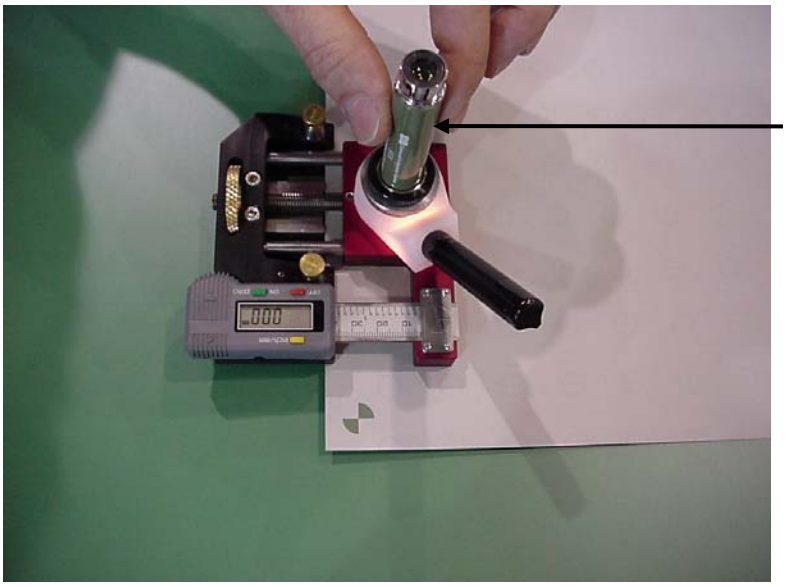


Figure 48: Setting the mag light (1)

5. Move the scope platform over the plate edge and rotate the scope to orient one line of the cross hair to a position parallel to the plate edge. See Figure 49.





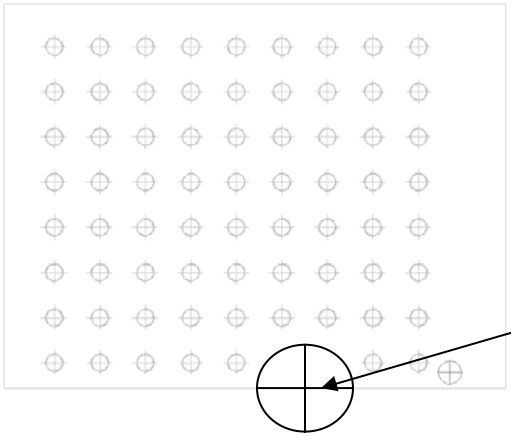


Figure 49: Setting the mag light (2)

6.2 Using the Gauge

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.

Note: You align two machines or a machine with a new encoder by using the grid 1 and grid 2 images.

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 50.
5. Zero the digital display on the top of the upper horizontal line, move the cross hair approximately 10 thou (0.01 in.) 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.

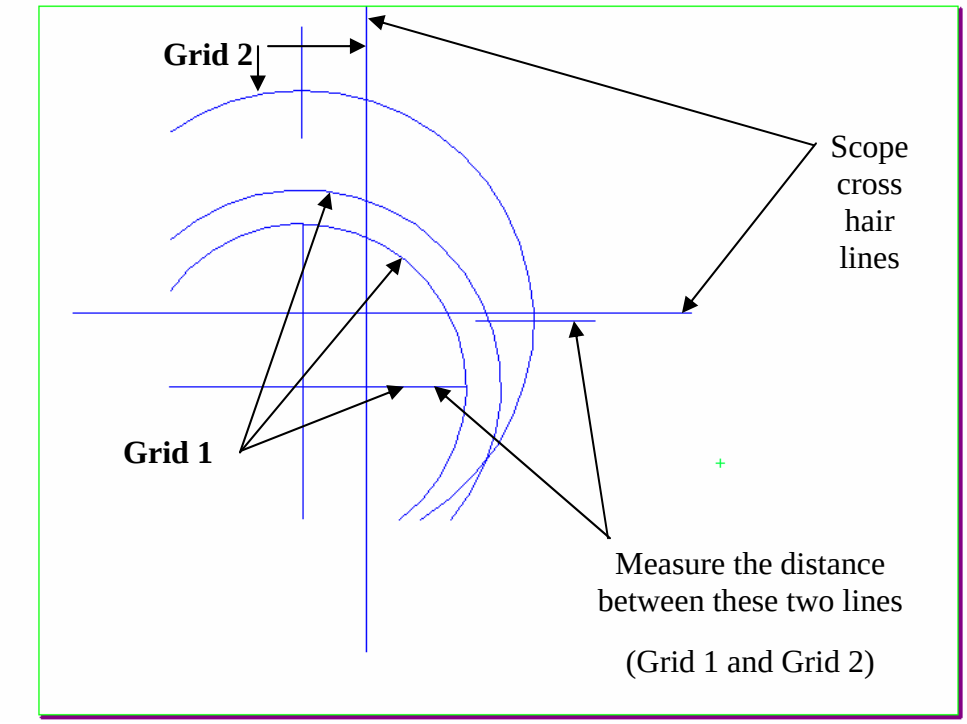


Figure 50: Measurement

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 51.

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.

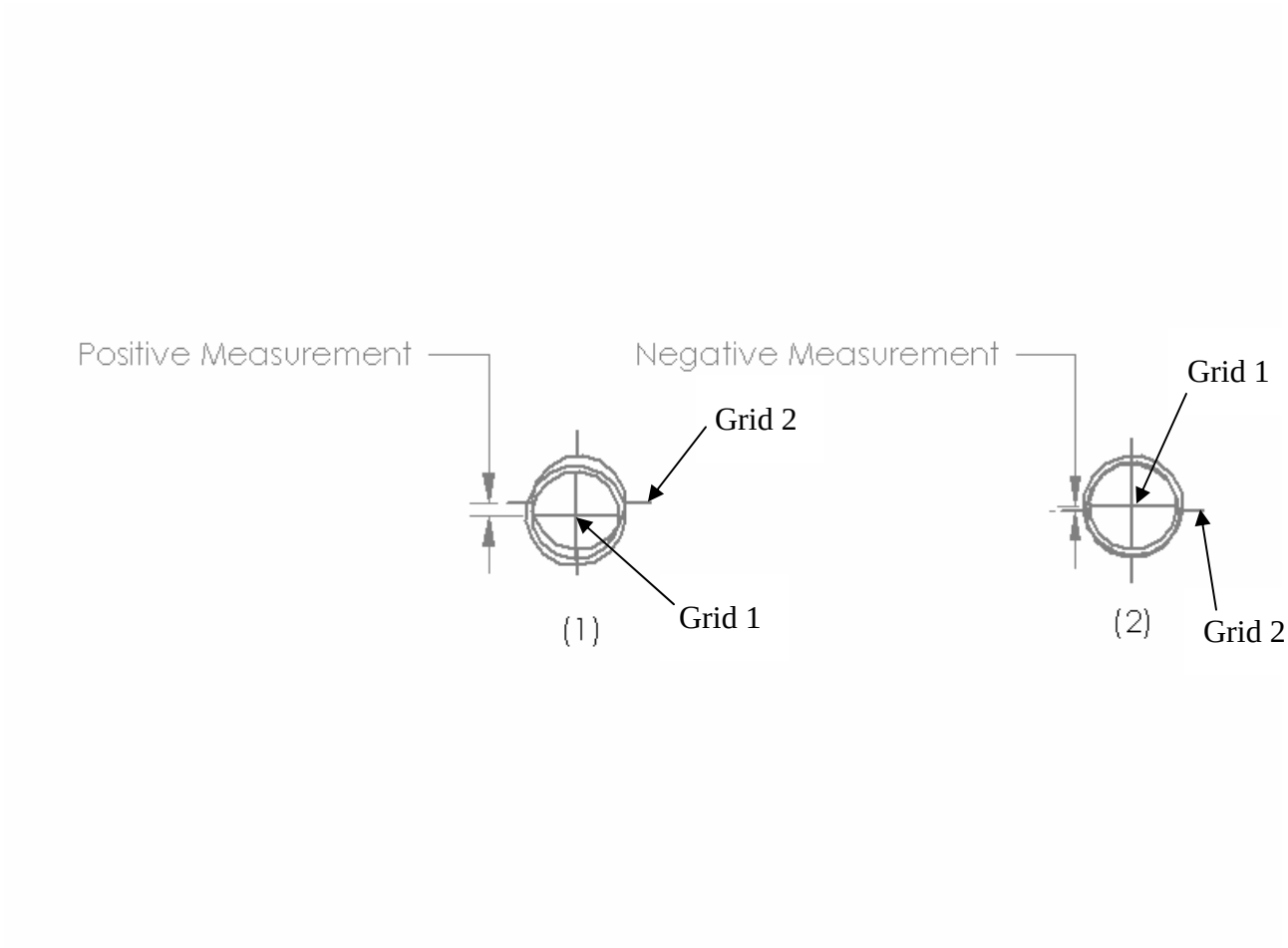


Figure 51: Sign convention for plate edge to image gauge.

7. APPENDIX B: TROUBLESHOOTING

Problem: The machine won't initialize after NVS values are changed

Solution: Run a drum cal command. Type `>>drum cal`

8. 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.

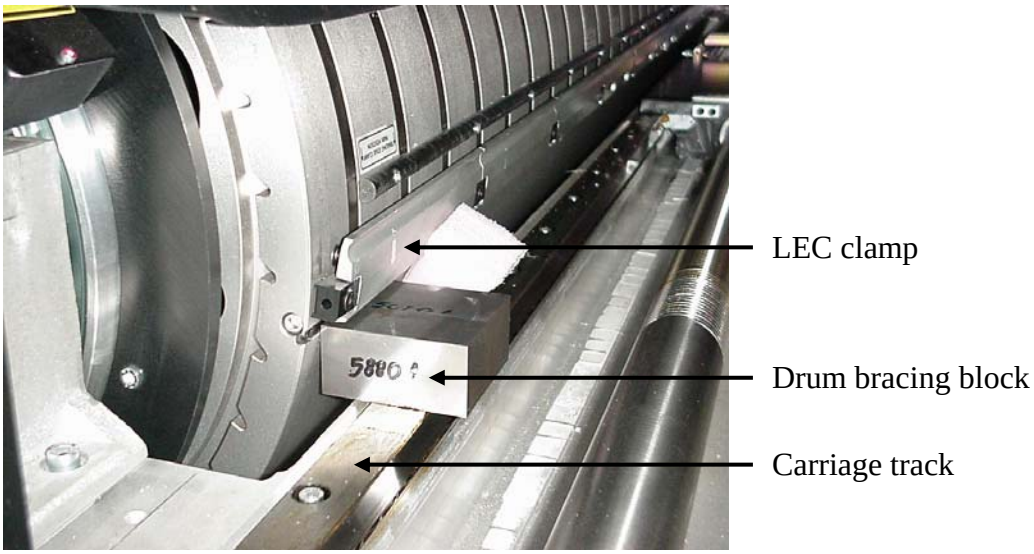


Figure 52: Inserting the drum bracing block

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 section 4.9.

4. Change the NVS values as described in section 4.10, but do not proceed to the LEC and BDO position check, section 4.11.

5. Turn the safety key switch to the **Laser Hazards** mode and type:

```
>>set head wenable
>>nvs save head
```

6. For VLF Trendsetter and 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. Type `>>drum move (X) h` (it should be corrected "0" drum position)
16. Support drum by using the drum support.
17. Type `>>drum idle`
18. Turn off the machine.
19. Unplug the encoder.
20. Reinstall the encoder in the index position, see Installing and Aligning the Encoder.
21. Remove all tools and jigs from the machine.
22. Connect the encoder—it should now be aligned properly.
23. Turn on the machine.
24. Type `>>tec off` (you should be able rotate drum by hand)
25. 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 . Type `>>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

26. Complete the rest of instructions starting at section 5.9**.**
27. Close the machine.
28. Turn the key switch to the normal operation mode and enter the following commands:

```
set head wenable 1

nvs save head
```

29. The adjustment for encoder misalignment will have to be done referencing the image on the plate to the leading edge.

30. 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.