Thermal Head 1.X

Lens Cleaning Instructions

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Revision History

Revision	Date	Author	Comments
A-A	May 11, 2000	Tadams	Initial release
A-B	April 19, 2001	Tadams	Updated flowchart and procedures (placed in new template May 2, 2001
A-C pre-release	29 Nov, 2002	Kurt Shelton (K. DeCarle - TW)	Update logo, tech review and copy edit in preparation for EOL.
A-C	21 Jan 2003	Kurt Shelton (K. DeCarle - TW)	Final review by Kurt S. Posted to TechPlanet by KD.
A-D	5 June 2003	Kurt Shelton (K. DeCarle - TW)	P.N. change (04-0012B) for lens cleaning and encoder cleaning kit. Change number of cleaning swabs from 3-5 to 3-25.

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1. LASER SAFETY PROCEDURES

To use this document the FSE (Field Service Engineer) **must** have attended and passed a thermal introductory course and be familiar with the safety precautions when working with a thermal Output Device.

Note for 48 volt: When any interlocked access panel relied upon for laser safety is opened, power is automatically removed to both the write laser and the focus laser. To install a thermal head 1.7 (48-volt) you must override the access panel safety interlock circuitry by putting the service key switch in the LASER HAZARD position. This will only re-energize the focus laser and not the write laser.

Note for 24 volt: For thermal head 1.7 (24 volt), as with thermal head 1.0, putting the key switch in the LASER HAZARD position will re-energize both the write laser and focus laser. For consistent laser safety, it is recommended that the write laser always be further disabled before positioning the service key switch in the Laser Hazard position. Use the commands below to disable the write laser in the firmware, and to confirm that the write laser has been disabled.

Failure to perform this step using the commands listed below prior to using the service key switch in the Laser Hazard position and opening the access panels could result in permanent eye damage.



DANGER:
The Output Device must not be imaging at the time these commands are issued.

The Output Device should be taken offline in the workstation GUI and allowed to finish imaging and unload any plates. If the Output Device is imaging you will receive the message "Exposure Head is already reserved". None of the commands will be effective and the write laser will not be disabled in firmware.

```
>>laser off
>>set head wenable 0
>>nvs save head
>>laser                          (to verify laser status)
```

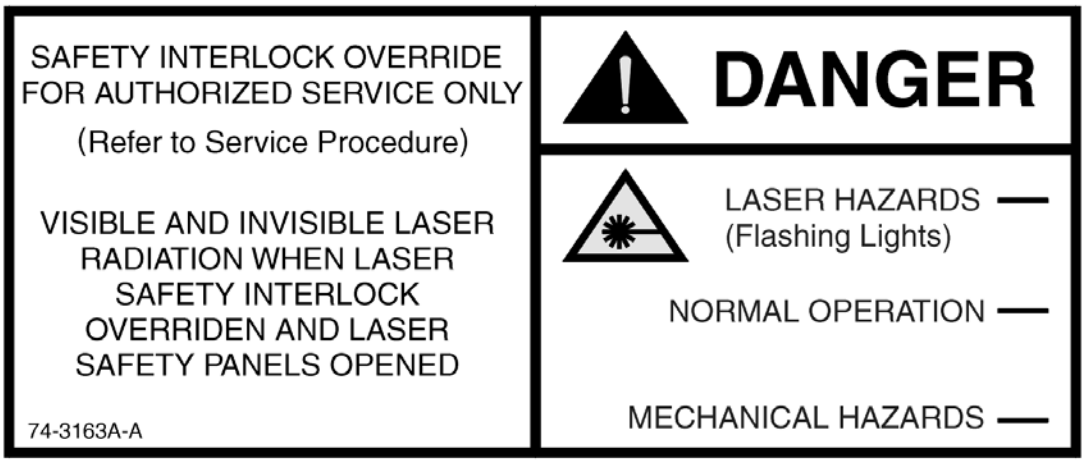


DANGER:
Do not proceed if the laser status is not `write laser state: disabled.`

The commands listed above not only disable the write laser in firmware but save this disabled state as an added safety precaution in case the Output Device is reset. Several deliberate commands would have to be entered in order to re-enable the write laser.

The Thermal head is equipped with 4 dual element LEDs (one on each side at the top of the head) that give a visual indication that the write laser is on. The LEDs should always be off for this entire procedure and offer a visual indication that it is safe to proceed.

The safety label below is displayed beside the key switch and inside the power box on the Output Device.



To the right of the label is a key switch. Service personnel are issued with their own key (if you lose this key you must order a replacement).

> **For devices that have not had FCO E040 applied:** There is a spare key under the key switch, fixed to the panel by a bolt, which can be removed using a 3mm hex key tool. This key is for emergency use only and *must* be securely bolted back in place on the panel after use.

The service key can only be removed from the key switch when it is in the middle position (key horizontal), which indicates that the interlock circuit is intact (normal operation). When the key is inserted in the key switch it cannot be accidentally left in place, since it protrudes out of the enclosure and prevents the enclosure panel from being installed.



DANGER:
Do not tamper with the key switch. The key can only be removed from the key switch while in the middle position (key horizontal).

For Thermal Head 1.7 (24 Volt), when the key switch is turned to the upward position (45°), the complete access panel interlock circuit is overridden and all laser and mechanical functions are restored, with potential laser/mechanical hazards. In this position the flashing LEDs mounted directly above the key switch are energized, indicating that the access panel safety interlock circuit has been overridden.

For Thermal Head 1.7 (48 Volt), when the key switch is turned to the upward position (45°) partial access panel interlock circuitry is overridden and all focus laser and mechanical functions are restored.

> **For devices that have not had FCO E040 applied:** The key must be in place, bolted to the panel, both *before* and *after* the machine has undergone any maintenance procedure. If this key is missing it should be brought to the attention of both the customer and your service team leader.

2. RELATED DOCUMENTS

- *Micro-banding troubleshooting procedures* (77-0034A)
  http://techplanet.creo.com/output/heads/thermal/nav/troubles.htm#ts_guide
- *Thermal Exposure Head 1.7 Installation Procedure for Creo output Devices* (77-0074A)
  http://techplanet.creo.com/output/heads/thermal/nav/install.htm#install_procs
- *Media Technical Notes (Various)*
  http://techplanet.creo.com/consumables/media/nav/medialist.htm
- *Qualified media specifications spreadsheet*
  http://techplanet.creo.com/output/heads/thermal/nav/troubles.htm#media
- *FCO E040*
  http://techplanet.creo.com/output/computer_to_plate/trendsetter_2637/nav/fcos.htm - E040

3. MATERIALS REQUIRED

All the materials required by this cleaning procedure are contained in the following kits:

- *FG, Cleaning Kit, Encoder* (04-0012B)
- *FG, Cleaning Kit Tools, Encoder* (04-0013A)

4. ABOUT DEBRIS BUILD-UP

This document gives instructions on cleaning the lens of the Thermal Exposure Head 1.0/1.7.

Debris build-up often appears first in focus system-related problems, including:

- Edge detection failure
- Random image shifting in the subscan plane
- Inability to learn focus (errors 17744 and 17031)
- Decreased `sr` sensitivity
- Unusually high `fheadcal` (approximately 7 when shipped; range 5–20)
- Low sum values returned from **`>>head install`** `on` command

Debris build-up can also lead to problems with:

- Banding or staining
- Power loss
- Underexposure
- Stroke flattening problems (including error 17732)
- Encoder failure

This procedure *may* help to resolve one or more of the above problems. Before uninstalling the head and cleaning the lens, rule out as many other factors as you can as possible causes of banding, including:

- Incorrect drumspeed and wpower settings (against published spreadsheets)
- Any problems with processing line settings or chemistry (see the appropriate media technical note)

5. OVERVIEW

The following flowchart gives an overview of the lens cleaning procedure.

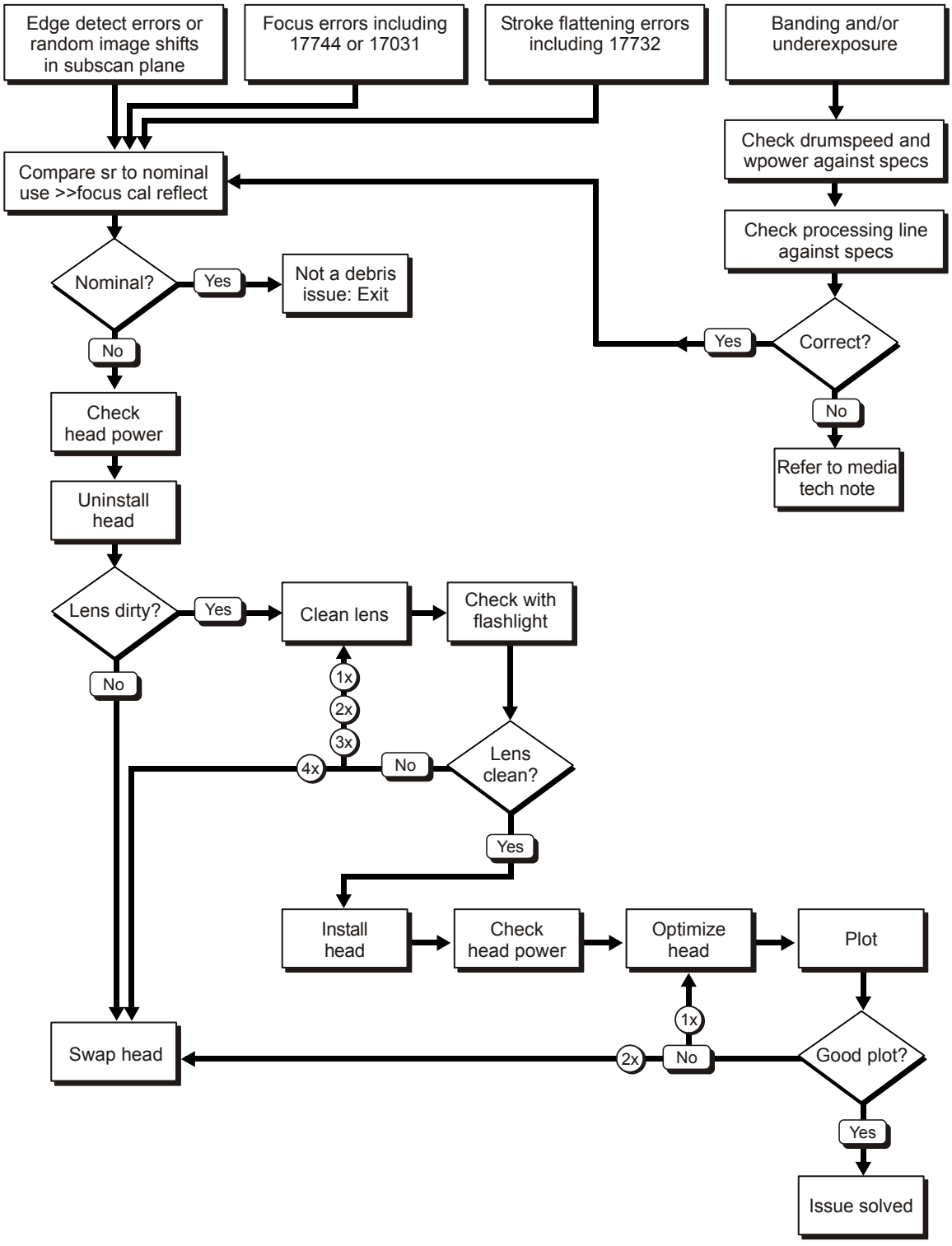


Figure 1 Procedure overview flow chart

6. CHECK SR VALUE AGAINST NOMINAL

If there is debris build-up on the lens, it usually shows up first in the focus system. To check this, compare the recommended sr value for the media (as found in the media technical note) against the current setting for sr and the calculated reflectivity of the media at present (using `>>focus cal reflect`).

If the calculated sr value is lower than the published value for that media, then debris build-up is a good possibility.

7. CHECK HEAD POWER

Before proceeding, check the power output of the head using the appropriate method. Record this value for future reference.

Note: Some Field Thermal Product Specialists have been issued laser power meters and jigs for most accurate readings. If you have one available, use the meter when measuring head power.

7.1 Current firmware and corresponding MPE

Use the following command as a default. If the device does not give you a result within 10 seconds, refer to the following seconds for other possible commands.

Enter: **`>>head power sum`**

7.2 Firmware earlier than V1.56

Enter: **`>>head power full`**

Note: Using the command **`>>head power full`** gives a value of power that is currently being used to calculate the required exposure for setting up a media. Due to the nature of the output vs measuring curve, however, this method can be quite inaccurate (up to ±20% or more) and inadequate for exposure-setting requirements (although it was still preferable to using **`>>wpower`**). Since this **`>>head power full`** method was inadequate, a new method has been incorporated into the new head firmware version 1.56.

7.3 Firmware V1.56 or later with older MPE firmware

If you are working with head firmware version 1.56 or newer but the MPE firmware does not support the **`>>head power sum`** command, please use the following procedure for measuring the output laser power of the head.
Enter:

```
>>mask range
>>laser current 65.532
```

CAUTION: Make sure you have the value correct before you press enter, or you may damage the head. **If the number is not 65.532, it will drive the current to the limit, which is nominal laser current + 20% (about 50 Amps).**

The returned result will be two values for laser power in watts and laser leakage in watts. These values are the most accurate, to help you calculate the exposure, and the measured values can be directly input in the exposure calculating formula.

Note: This is a "back door" method to access utilities that will be more readily available when both the new firmware and corresponding MPE code are available. It will not attempt to drive to 65 Amps. Instead, it will set the laser to the wpower specified under hdm, and measure the power on the nosepiece sensor using the **`>>head power sum`** algorithm, which gives better results than **`>>head power full`**.

8. UNINSTALL AND INSPECT THE HEAD

1. Uninstall the head according to the current procedure.
2. Place the head on a secure surface, oriented so that you can manually open the shutter and view the lens.
3. While holding the shutter open, shine a flashlight at the lens from below (as shown in Figure 2).



Figure 2 Inspecting the lens for debris build-up

4. Inspect the lens for damage. If there are any large gouges or other obvious damage, replace the lens.
5. Make note of the amount of debris on the lens.

9. CLEAN THE LENS

1. Wipe down the area around the lens with acetone.

2. Dip one end of a plastic-handled swab in acetone. A quick shake after dipping often gets rid of any excess.

   Note: Do not dip the swab into the container of acetone, as it will contaminate the contents of the container. Also, do not use wooden-handled swabs, because the acetone breaks down the glue on the swab and leaves residue on the lens.

3. While holding the shutter open, begin cleaning near the center of the lens and roll towards and across the edge (as shown in **Error! Reference source not found.**).



Figure 3 Cleaning the lens

4. Rotate the swab slowly against the surface as you wipe it, so that each part of the glass surface sees a new, clean portion of the swab. The direction of rotation should be against the direction of the stroke. As the swab rotates, it brings clean solvent in contact with the surface.

5. Discard the swab and repeat with a clean swab.

   Keep the time between dipping and cleaning to a minimum, as solvents will dissolve the glue holding the swabs, and possibly the plastic rod as well, contaminating the surface.

   - Do not rotate the swab more than 360º.
   - Use each swab once. You will need in excess of 30 swabs to properly clean the lens.
   - If solvent accumulates on the optical surface, wipe it off before it evaporates with a dry swab. Apply light pressure, similar to the pressure applied when spreading butter on a slice of bread.

6. Repeat steps 3 to 5 until the entire lens surface has been cleaned. Note that it is not unusual to have to clean the lens more than once. It is more efficient to clean the lens two or three times before reinstalling the head.

CAUTION: Do not leave any streaks. Streaks can cause focus errors or plot quality problems.

7. Re-inspect the lens with the flashlight and see if the debris has been removed.

   - If the window appears significantly cleaner, continue with the procedure to reinstall and re-optimize the head.

- If cleaning with acetone still doesn't remove the debris build-up, consider cleaning the lens again with IPA.
- If this fails, the last resort may be swapping the head.

10. REINSTALL HEAD AND CHECK POWER AND BANDING

1. Reinstall and optimize the head, including restoring any focus-related parameters that may have been changed before the debris was diagnosed (sr, fheadcal, bmslope, bmcurve).
2. Recheck head power and compare with the previous results. If the power reading is higher than when you started, the cleaning may have fixed one or more of the image problems listed in section 4.

   Note: The power reading from **`>>head power full`** (firmware version earlier than 1.62) or **`>>head power sum`** (firmware version 1.62 or later) has a history of being inaccurate. Use the readings from that procedure as a guide only. If in doubt, you can check this against the estimated wpower provided in the Qualified Media Specifications spreadsheet.
3. Perform a plot on the head and check for banding. If banding is not present, then the problem is solved. If banding is still present, consider re-cleaning or re-optimizing the head and trying another plot.
4. If banding persists, escalate to your regional Thermal Specialist.