TFX Head

Installing a TFX Head on the ThermoFlex Wide II

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Revision History

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1. OVERVIEW

This document describes the procedures for installing/removing TFX heads on ThermoFlex Wide II devices. It does not apply to TFX heads in any other Creo output device. It also provides basic information on relevant TFX head communications and firmware.

Information and procedures on setting up ThermoFlex media with the TFX head are given in separate documents: see Related Documents.

The formatting for this document is as follows:

- The prompts "TFX>" and ">>" indicate commands and parameters corresponding to the TFX head and MCE firmware respectively. See Communication with the Head in this document for additional information.
- *All NVS and TFX head parameters are in italics.*
- `Commands typed on the diagnostic port or workstation are set in courier.`

1.1 How the TFX Head is Different

- The TFX head is not a square spot head. The edges of halftone dots, when viewed with a 50x or higher-power microscope, are more jagged compared to those written with Thermal 1.x heads.
- The command set used to communicate with TFX heads is different than for Thermal 1.x heads; only the basic syntax structure is given here. Some of the commands and parameters necessary for setting up the TFX head are included.
- Changes made to head firmware parameters are immediately written to non-volatile memory (NVS). You do not need to do *nvs save* to make the parameter change permanent. Therefore it is very important keep track of any changes made during diagnostics or testing, and to undo any unwanted changes on completion of testing.

2. LASER SAFETY PRACTICES

To use this document the CSE (Creo Service Engineer) must have attended and passed a thermal head introductory course and be familiar with the safety precautions when working with a thermal output device.

On the output device, when any interlocked access panel is open, power is automatically removed from both the write laser and the focus laser. With a TFX head, the safety interlock override will *not* re-energize either the autofocus laser or the write laser diodes for any position of the key.

2.1 Restoring Functions using the Keyswitch

Mechanical functions can be restored by turning the safety interlock override key to the **Interlock Override** position. However, in the course of a normal TFX head installation, you will not be required to enable mechanical motion with the table open or panels removed.

This safety label is affixed beside the key switch and inside the power box on the output device.



2.2 Key Switch Safety

Service personnel are issued with their own key and must order a replacement key if it is lost. There is a spare key under the key switch, fixed to the panel by a bolt, which can be removed using a 3 mm hex key. This key is for emergency use only and must be securely bolted back in place on the panel after use. If this key is missing, it should be brought to the attention of both the customer and your service team leader.

The service key can only be removed from the key switch when it is in the **Normal Operation** position. 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.

3. RELATED DOCUMENTS

For additional information, refer to the following:

- TFX head troubleshooting notes:
  see http://techplanet.creo.com/output/heads/tfx/nav/index.htm
- TFX Debris Removal System:
  see http://techplanet.creo.com/output/heads/debris_removal/nav/proced.htm
- TFX Window Replacement: see
  http://techplanet.creo.com/output/computer_to_plate/thermoflex/nav/proced.htm#head
- TFX debris removal system—customer cleaning procedure: see
  http://techplanet.creo.com/output/heads/debris_removal/nav/maint.htm#operator

- Media setup procedures: see http://techplanet.creo.com/consumables/media/nav/flexo.htm
- TFX Head Tilt Series: see http://techplanetpre.creo.com/output/computer_to_plate/thermoflex_II/nav/proced.htm#head

4. INSTALLING THE HEAD ON THE CARRIAGE

4.1 Required Tools

- Antistatic wrist strap
- TFX connect/disconnect tool—see Figure 4 (part number 90-1096A-B)
- Paper towels

4.2 Installing the Head

WARNING: The TFX head is much more static-sensitive than Thermal 1.x heads. You must wear a properly grounded wrist strap at all times while handling and installing the head. The ThermoFlex must be plugged into the AC wall supply for the wrist strap to be grounded.

This procedure assumes the debris removal system is already installed on the carriage. If the debris system is not yet installed, install it before you install the head. Before you install the head, ensure that the red lever on the nozzle assembly is vertical.

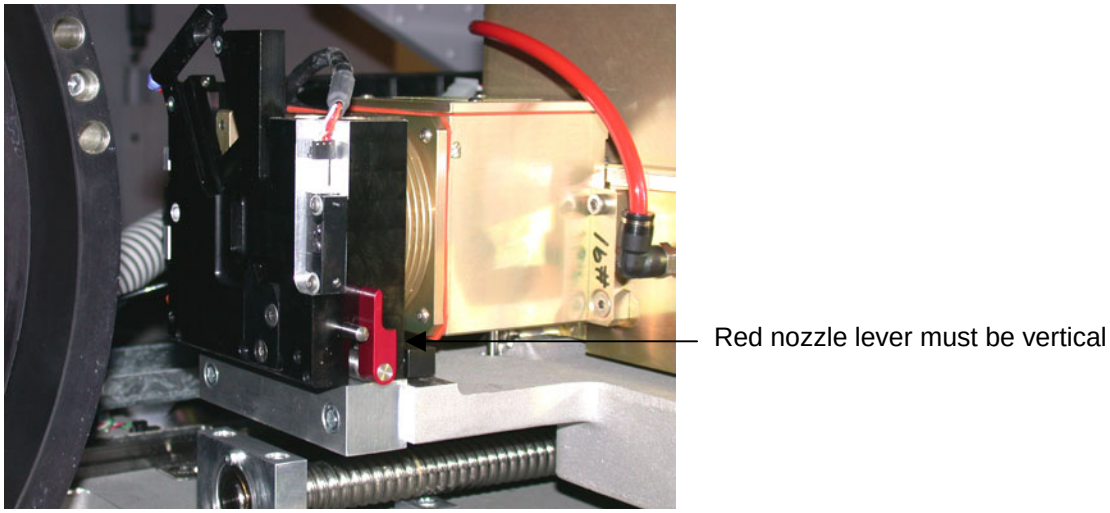


Figure 1: Nozzle lever

Note: You may need to disconnect and reconnect some of the debris air jet and counter-flow supply hoses to install the head.

1. Remove any media that is on the drum.
2. Type `>>carriage moveto 1100` to move the carriage to the center of the device.

3. Turn off the ThermoFlex device at the main power switch.
   Do not unplug the AC supply from the wall. Loosen the 6 M4 nuts on the sides of the head (3 on each side) before mounting the head on the carriage adapter plate.
   Leave a few millimeters of clearance between the nuts and the head; this will make it easier to slide the head into the flexure blade slots.

WARNING:
Be careful not to bump the head, particularly the nosepiece, while installing it.

4. Place the head on the carriage—ensure that you do not bump the nosepiece against the debris removal bracket. Check that the head guide rod is seated in the V-groove and that the nuts clear the flexure blade slots. If the head is seated properly it should slide smoothly back and forth about 1 cm in the V-groove.

5. Gently push the head towards the drum until the spacer on the front of the guide rod contacts the locating pin.

6. Inspect the nosepiece of the head and ensure that it does not touch the debris removal bracket or air jets.
   If the nosepiece is touching any part of the debris removal system, either the debris removal system, the head, or both are not properly seated. If so, check that the head is not skewed on the guide rod or caught up on the flexure blades.

7. With the head guide rod contacting the locating pin, lightly push the head down and forward simultaneously with one hand while tightening the 6 M4 nuts on the sides of the head (3 on each side). Ensure that the head does not twist or lift up as you tighten the nuts.

Note: This step is the one most likely to cause alignment problems and subsequently imaging artifacts.

8. Close the red lever on the nozzle assembly.

9. Check that the head is pushed all the way towards the drum by looking beneath the nosepiece from the home side while shining a flashlight from the away side.

10. Connect the hose from the dehumidifier to the head (if the air fittings are plugged, remove the plugs first) and connect the muffler to the connector side of the head.

11. Connect the diode power cables using the TFX connect/disconnect tool (see Figure 4). Remove the ESD jumper from the head side of the connector. The jumper must be left with the connector—do not discard or remove it.

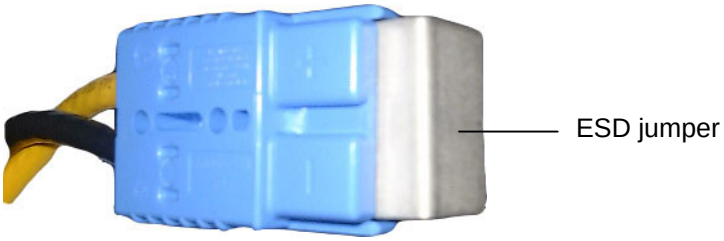


Figure 2: Diode power connector

Note: The two pins on the TFX connect/disconnect tool fit into the corresponding holes on the head side of the connector. The tool is properly mated when the pins are fully inserted and the tool lies flush with the connector. If the tool handle is flipped in the wrong direction, the tool will not mate with the connector correctly.

Note: Push the tool handle forwards all the way to fully engage the two halves of the diode power connector.

12. Connect the cooling hoses.
    a).Before connecting, push in the locking release tab on the head hose fittings to ensure they are open (they should already be open). The hose will not connect if the fitting is locked, but the O-ring on the hose connector can be damaged if you attempt to connect to a locked fitting.
    The hoses are not interchangeable—they must be correctly connected to ensure proper coolant flow direction. The input hose (straight CPC connector) is connected to the tailstock side of the head; the output hose (90º CPC connector) is connected to the headstock side of the head.
    b). Clean up any coolant that drips onto the carriage or cable track when connecting the hoses.

13. Connect the remaining 5 electrical cables:

    a) Connect the hot link (BNC) cable

    b) Connect the head power (9-pin 3x3 mate'n lock)

    c) Connect the MCE communications cable (20-pin ribbon).

    d) Connect the clock signals cable (9-pin female D).

    e) Connect the head serial monitor port (9-pin male D).

    See Figure 3: Cable and coolant connections

Note: Excluding the diode power cables, these are the only five electrical connections to the head. No other cables, ground straps, and so on, should be connected to the head.

14. Check that both debris air jet hoses are connected. One or both may have been disconnected at the PISCO couplings during head removal.

15. Turn on the device and wait for the boot sequence to complete—this takes about 30 seconds.

16. Turn the drum brake override switch to the Brake Override position.

17. Spin the drum by hand to check the clearance between the drum and the head, the debris removal fittings, and hoses.

4.3 Zeroing the Head on the Drum

After you install a head, you must perform the zeroing procedure to ensure accurate automatic media thickness checking when media is loaded.

1. Remove any media that is on the drum.
2. Close all panels on the device, close the table, and close the front panel.
3. Type `>>table lock .`
4. Type `>>media` to determine which media has been configured for the drum. The drum is usually either media 7 or 8.
5. Type `>>media <n>` where n is the media index from step 4 corresponding to the drum.
6. Type `>>zdrive focus 432 calibrate .`
   If the command successfully completes, the ZAC BaseFocusDist parameter is set with the new value.

4.3.1 Troubleshooting the Head Zeroing Procedure

The drum has a very low reflectivity, and the `>>zdrive focus 432 calibrate` command will not work properly if the sum signal is too low. If the command does not work, check that `media <drum> sr` value is 0.02. If the signal is still too low, temporarily increase the focus amplifier gain:

1. TFX> foc rcvrgain
2. Record the value returned—it must be reset to this value if any changes are made to it.
3. The sum signal can be increased by increasing rcvrgain:
   Type `TFX> foc rcvrgain <new value>`. The maximum is 15.

5. CHECKING AND ADJUSTING IMAGE QUALITY

5.1 Media Setup

Refer to the appropriate TFX Media Setup document to check and set:

- Media surface reflectivity
- Focus (surface depth)
- Exposure (diode power)

Each media setup document gives the procedures for finding and setting these parameters for the particular media. See the Media/Flexo page on TechPlanet (http://techplanet.creo.com/consumables/media/nav/flexo.htm).

5.2 Image Quality

Run a **TFX_ITP1_AAxBB.tif** (AAxBB = plate dimensions) plot and examine it for artifacts and overall quality. If possible, in the case of flexo media, use the hardest durometer plate that the customer would normally use, for example: DPH in the case of Cyrel. This will provide a more demanding test of the setup conditions.

- Check solid areas for cleanliness and absence of debris or reflective banding.
- Check tints for moiré.
- For flexo media, examine the plate before and after processing. Check the processed plate for dot height if a dot height gauge is available. Pay particular attention to the dot height in the highlights. On an uncalibrated plate all 5% and higher highlight dots should rise to printing height. Full printing height is the same height to which the solid areas rise.

  If the quality is acceptable, the head installation is complete. If the quality is unacceptable, refer to the TFX Troubleshooting procedures at http://techplanet.creo.com/output/heads/tfx/nav/troubles.htm .
- Run a small 1 in. strip of Plot 2 on Dylux to check the head tilt.
  If moiré or the orthogonality artifact is present, refer to the *TFX Head Tilt Series* document to adjust the head tilt. See http://techplanet.creo.com/output/computer_to_plate/thermoflex_II/nav/proced.htm#head .

6. MCE HEAD FIRMWARE VERSIONS

Minimum required firmware versions are:

- Head: TFX version 0.43 or later
- MCE: ThermoFlex-TFX version 1.00 or later

You can query versions with the MCE command `>>list version`, and the head command `TFX> ver`.

7. COMMUNICATION WITH THE HEAD

Early releases of firmware (prior to version 1.00) will not allow transparent communication to the TFX head through the MCE. There are two methods of communicating with the head, via the MCE or using two COM ports.

7.1 Communicating with the Head via the MCE

You switching communication between the head and the MCE using the commands `>>redirect enable` and `>>redirect disable`.

When the MCE is active (as indicated by the prompt >>), type `>>redirect enable` to redirect communication from the MCE to the head. You will know that head communication

is active by the appearance of the prompt TFX>. This may take a few seconds and will require pressing the **Enter** key at least once. To switch back to the MCE, type `TFX> redirect disable.`

Note: Head communication is slow using this method—you can easily over-type the keyboard. Hence the method outlined in section 7.2 is preferred.

7.2 Communication with the Head using two COM Ports

This is currently the preferred method, and requires either a computer with two COM ports, or two computers; for example: a laptop and the workstation. Communication to the MCE is done in the usual manner through the diagnostic port.

To connect the second COM port to the head:

1. Locate the head serial communications cable. The cable end (9-pin, female D connector) can be found on the floor inside the device near the point where the cable tray harness enters the power distribution box. It may or may not be labeled as TFX or TFX Head. Access it by opening the side panel (away side), pulling the cable out, and closing the panel over it. Remember not to leave the cable outside the machine at the end of the site visit.

Note: This cable is short. You must use another serial cable as an extension to reach a laptop.

2. Communicate with this port using either Procomm or Sterm (Splot) with the following settings:

   Baud rate: 115200

   Parity: None

   Data bits: 8

   Stop bits: 1

Successful communication is indicated by the appearance of the head prompt `TFX>`.

8. REMOVING THE TFX HEAD FROM THE CARRIAGE

8.1 Required Tools

- Antistatic wrist strap
- TFX connect/disconnect tool—see Figure 4 (part number 90-1096A-B)
- Paper towels

You can remove the TFX head without removing the debris removal system hardware. However, in most cases, it is easier to remove and install the head with the debris removal hoses disconnected.

1. Before turning off the device power, check that the carriage is in the home position:
   Type `>>carriage moveto 1100.`

   Note: This step is not crucial to the head removal procedure, but head access is easier when it is in the home position.

2. Turn off the device at the main power switch.
   Do not unplug it from the wall.

3. Rotate the camlock 90º counterclockwise on the nozzle support assembly to move the nozzle away from the front of the head.

4. Disconnect the five electrical cables attached at the rear of the head:

   - Disconnect the head power cable (9-pin 3x3 mate'n lock).
   - Disconnect the clock signals cable (9-pin female D).
   - Disconnect the MCE communications cable (20-pin ribbon).
   - Disconnect the head serial monitor port cable (9-pin male D).
   - Disconnect the hot link cable (BNC).

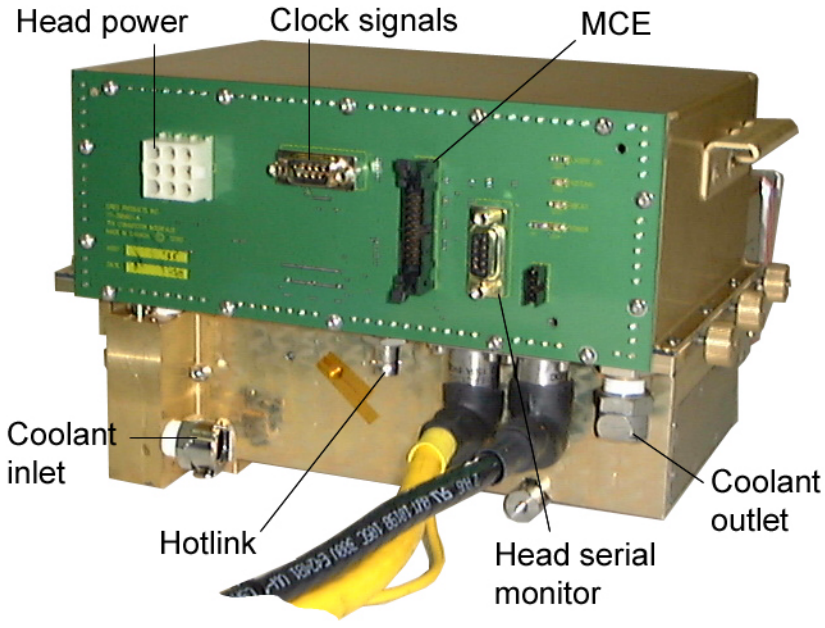


Figure 3: Cable and coolant connections

5. Hold paper towels under the cooling hoses to catch any coolant that runs out and disconnect the two cooling hoses (CPC connectors). Clean up any coolant that drips onto the carriage or cable track.

6. Disconnect the diode power cables using the TFX cable connect/disconnect tool (part number 90-1096A-B).



Figure 4: Cable connect/disconnect tool

Note: The two pins on the tool fit into the corresponding holes on the head side of the connector. The tool is properly mated when the pins are fully inserted and the tool lies flush with the connector. If the tool handle is flipped in the wrong direction, the tool will not correctly mate with the connector.
Pull the tool handle backwards all the way to disconnect the cables. The intermediate handle position will not fully disconnect the connector.

IMPORTANT: After the diode power cables have been disconnected from the cable tray, short them together using the ESD jumper. The head must be transported with the diode power cables shorted together. The ESD jumper is the tinned copper 90º angle bracket attached to the power cables.

7. Disconnect the air hose to the dehumidifier box.

8. Loosen the 6 M4 flexure blade clamping nuts (3 on each side of the head). The head will sit free on the carriage.



WARNING: Be careful not to bump the head nosepiece on any protrusions while removing the head.

9. Hold the handles on either side of the head and slide the head backwards away from the drum (to clear the debris removal bracket) while simultaneously lifting the back end of the head up. Be careful not to snag the power cables while lifting the head.

10. After removing the head, plug (block) the head air fittings using the plugs on the replacement head; if no replacement head is available, seal the fittings using tape. If the hose from the dehumidifier is still attached to the head, remove it from the head and re-attach it to the dehumidifier.

9. APPENDIX A—LOADING MEDIA MANUALLY

The following procedure can be used for loading media manually. Manual loading is more convenient for doing setup plots where only relatively small pieces of media are required; for example, for focus or exposure.

3. Type `>>table open.`
4. Type `>>drum idle`.
5. Type `>>drumvacuum on`.
6. Slide the table back and spin the drum by hand until the registration bars are upright. Align the media against the registration bars and tape it on (the drum brake override switch must be in the brake override position).
7. Pull the table closed.
8. Type `>> media <n>` (where n is the appropriate MCE media index)
9. Type `>>zdrive init.`
10. When the stage zero command finishes, the machine is ready for plotting.
11. After the plotting is finished, unload the media.
    a) Open the table.
    b) Type `>>drum idle.`
    c) Rotate the drum by hand until the media is in position to be un-taped and removed.
12. When all testing is finished, or if a workstation plot is needed, type `>>drumvacuum off.`