TESTING THE VOLTAGE OF THE SAFETY INTERLOCK

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Applies to

Lotem™ Quantum

Required Tools and Related Documents

- DC voltmeter
- Exposure Head Power Wiring Diagram (P/N 10-4816B-A-AD01), available from: **TechPlanet** > **Output** > **Heads** > **Thermal 2** > **Drawings/Photos** (http://techplanet.creo.com/output/heads/thermal_2/content/images/10-4816B-A-AD01.pdf)
- How to Measure Voltages in a Th2 Head, available from: **TechPlanet** > **Output** > **Heads** > **Thermal 2** > **Troubleshooting** (http://techplanet.creo.com/output/heads/thermal_2/content/docs/th2_measure_volts.pdf)
- Quantum Interlock system and TH2 safety loop error diagram, available from: **TechPlanet** > **Output** > **Heads** > **Thermal 2** > **Drawings/Photos** (http://techplanet.creo.com/output/heads/thermal_2/content/images/safety_loop_diagram.gif)
- Safety Loop Error Procedure, available from: **TechPlanet** > **Output** > **Heads** > **Thermal 2** > **Troubleshooting** (http://techplanet.creo.com/output/heads/thermal_2/content/troubleshooting/safety_loop_error.htm)
- Th2 Voltages and safety circuitry diagram, available from: **TechPlanet** > **Output** > **Heads** > **Thermal 2** > **Drawings/Photos** (http://techplanet.creo.com/output/heads/thermal_2/content/images/th2_voltages_safety_lines.gif)

When to use this procedure

When the following safety loop errors occur:

- `[03553] Safety loop fault has been detected`
- `[03573] A safety loop fault is preventing normal operation`

In order to properly troubleshoot this type of problem, make sure you read the *Safety Loop Error Procedure* (refer to the Required Tools and Related Documents section for details).

How to test the safety interlock voltage

There are two possible scenarios when these safety errors appear:

- The errors are constant (that is, the errors do not go away).
- The errors are intermittent (that is, the errors may occur on every plate, or every few plates, and at around the same carriage position).

When errors are constant

The safety voltage (24V) needs to be applied to the safety lines in the head. In cases where the error is constant, this voltage can be measured from the big military connector. This may indicate failure in the circuitry or the safety power supply.

Refer to the *Th2 Voltages and safety circuitry diagram* for circuitry details (refer to the Required Tools and Related Documents section for details).

Use the following procedure:

1. (Lotem Quantum, Trendsetter NEWS) Turn off the power to the device.
2. (Lotem Quantum) Open the rear panel using the workstation GUI.

CAUTION: Wear a static strap for the next step.

3. Remove both military connectors from the head.
4. Turn on the power to the machine.
5. (Lotem Quantum) **Insert the focus defeater** (refer to Figure 1). This defeater is required to measure the safety interlock voltage.



Figure 1: Inserting the defeater in the Lotem Quantum

CAUTION: (Trendsetter NEWS) Due to changes in focus laser safety, it is recommended that you remove the black top cover and disconnect the military connectors from the head, then reinstall all covers that have interlock switches.

6. To measure the DC voltage, hold the large military connector in your hand, facing towards you. Using a voltmeter (DC voltage), insert the voltmeter leads at the following points:
   - **F** (positive lead) and **E** (negative lead): **should read 24 Volts DC**
   - **H** (positive lead) and **G** (negative lead): **should read 24 Volts DC**
7. (Lotem Quantum) If are not reading this voltage and you have the defeater installed, check the cable that connects the military connector to the power supplies.

When errors are intermittent

When these safety errors occur intermittently, and they appear at around the same carriage position, this is a good indication that the power cable (big military connector) going to the head has a partial fracture in one or more of it's safety wires.

Since the cable moves with the carriage, measuring the 24V safety voltage is not enough. The error must be confirmed in a different way.

Refer to the *Quantum Interlock system and TH2 safety loop error diagram* (refer to the Required Tools and Related Documents section for details).

The engineering team has found that this cable fails because:

- there are many unnecessary cable tie wraps holding the cable to the cable track
- the cable tie wraps are done up too tight

NOTE: Do not remove the tie wraps before confirming a cable failure. Removing the tie wraps before you confirm the problem will make it more difficult to reproduce the failure.

1. Open Splot or Service Shell.
2. Close all the doors, remove any defeaters, and prepare the machine for normal operation.
3. From the GUI or from Splot, move the carriage from home to 1400 mm (or maximum carriage movement in Lotem Quantum 400).
4. Looking at Splot or Service Shell, check for these safety errors. In the GUI or Splot, confirm the carriage position at which the error occurred.
5. Repeat this up to 20 times. Note if the error occurs once or more in approximately the same carriage position.
6. Replace the power cable (big military connector). Refer to the *Exposure Head Power Wiring Diagram (P/N 10-4816B-A-AD01)* (refer to the Required Tools and Related Documents section for details).

Tip: When installing the new cable use only a few cable tie wraps to hold the cable to the cable track.

CAUTION: Do not tie the wraps too tightly. This can damage the cable.

If you have any comments or questions please contact alvaro.ireta@creo.com

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