

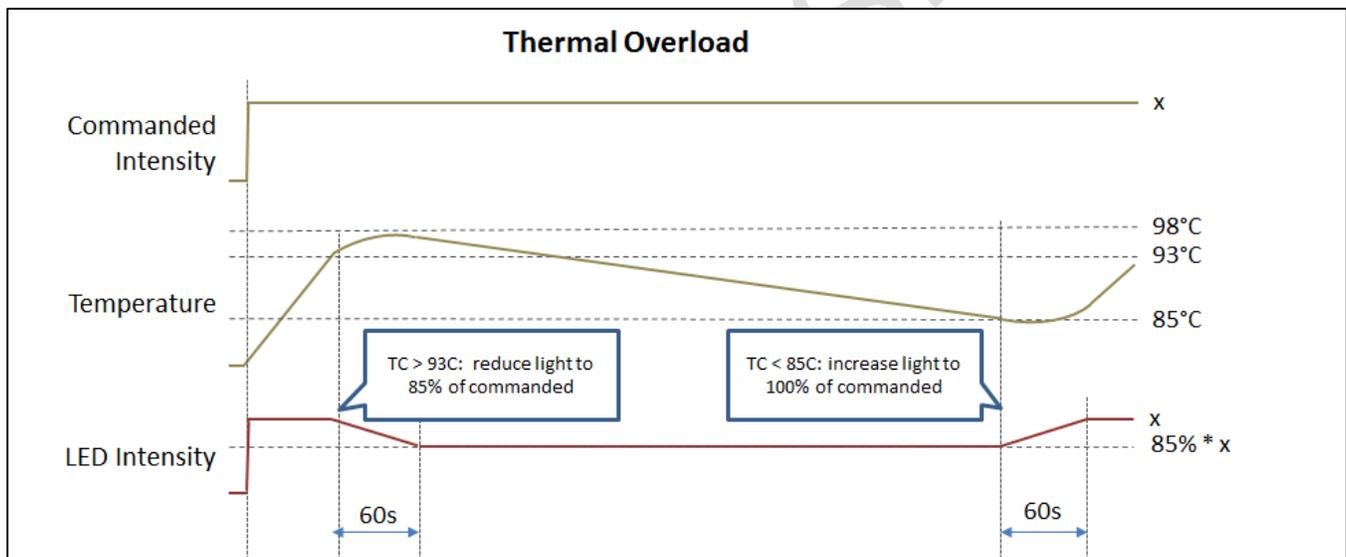
## XIM Operating Guide (October 2014)

### Protection

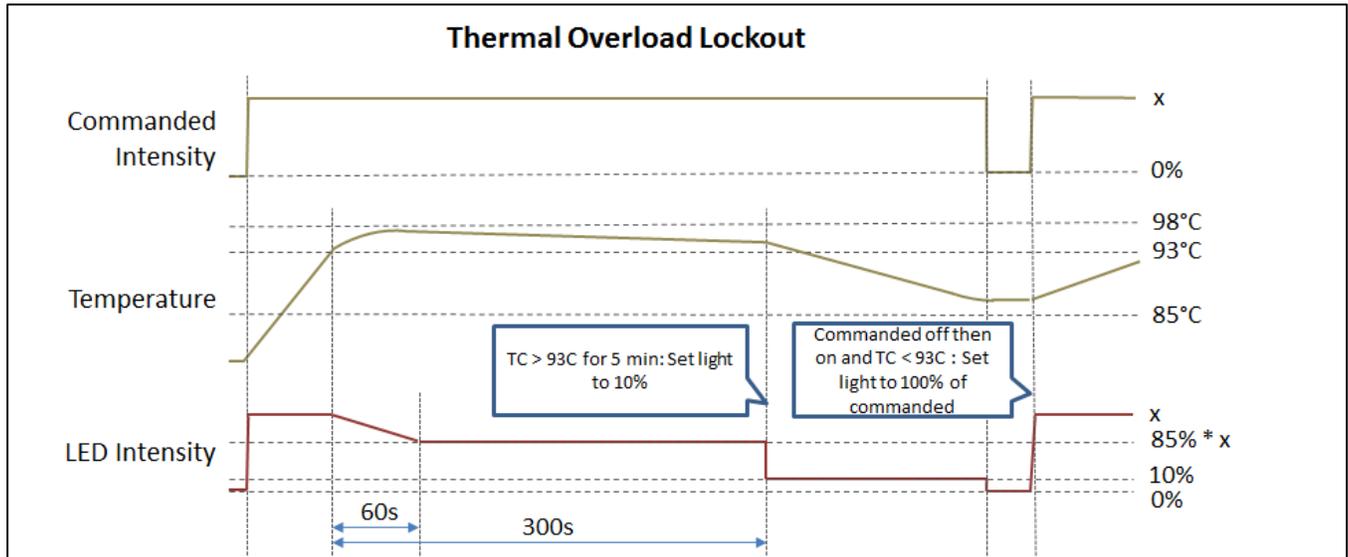
#### Over-Temperature Protection (Thermal Compensation/Fold-Back)

LED luminaires are designed to operate within a specific ambient temperature range. Occasionally the ambient temperature will exceed the design temperature; for example, if insulation is unintentionally placed on or near the luminaire. Additionally, the thermal management system (e.g. heat sink) may get installed incorrectly, which could increase the LED module's temperature above the recommended limit. In these cases, the performance of the electrical components (LEDs and driver electronics) are placed at risk. To address this risk, XIM features over-temperature protection.

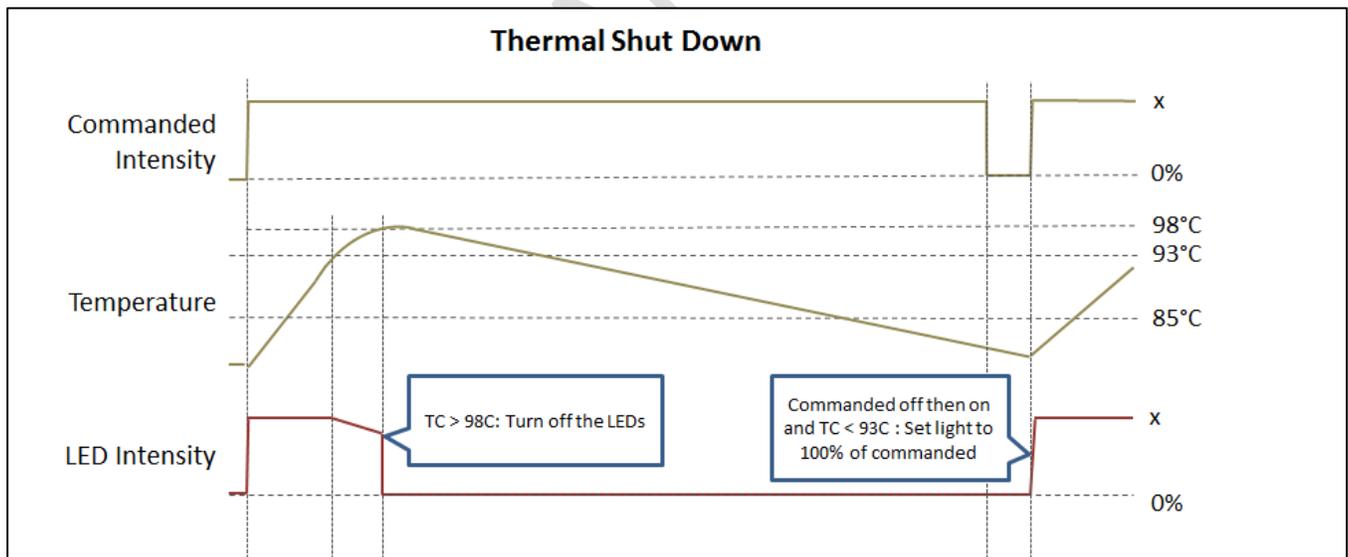
XIM contains a temperature sensor that monitors the  $T_c$  of the LEDs. If the temperature exceeds  $93^{\circ}\text{C}$ , XIM's integrated electronics reduce the intensity which then lowers both current and the temperature. The intensity is reduced to 85% of the commanded intensity over a period of 60 seconds. If the temperature drops below  $93^{\circ}\text{C}$ , but stays above  $85^{\circ}\text{C}$ , XIM will maintain the intensity at the reduced level. If the temperature drops below  $85^{\circ}\text{C}$ , XIM will increase intensity back to 100% of the commanded intensity over a period of 60 seconds. The "Thermal Overload" diagram below illustrates this behavior.



If the module temperature stays below  $98^{\circ}\text{C}$ , but stays above  $93^{\circ}\text{C}$  for 5 minutes, XIM will immediately limit the maximum intensity to 10%. The intensity limit will stay at 10% even if the temperature drops below  $85^{\circ}\text{C}$ . To remove the limit, the user must set the commanded intensity to 0% (turn off the light) and the temperature must be below  $93^{\circ}\text{C}$ . Then, when the user sets the commanded intensity to above 0% (turns on the light), XIM will set the light to the commanded intensity (no reduction). A power cycle of XIM will also remove the limit. The "Thermal Overload Lockout" diagram below illustrates this behavior.



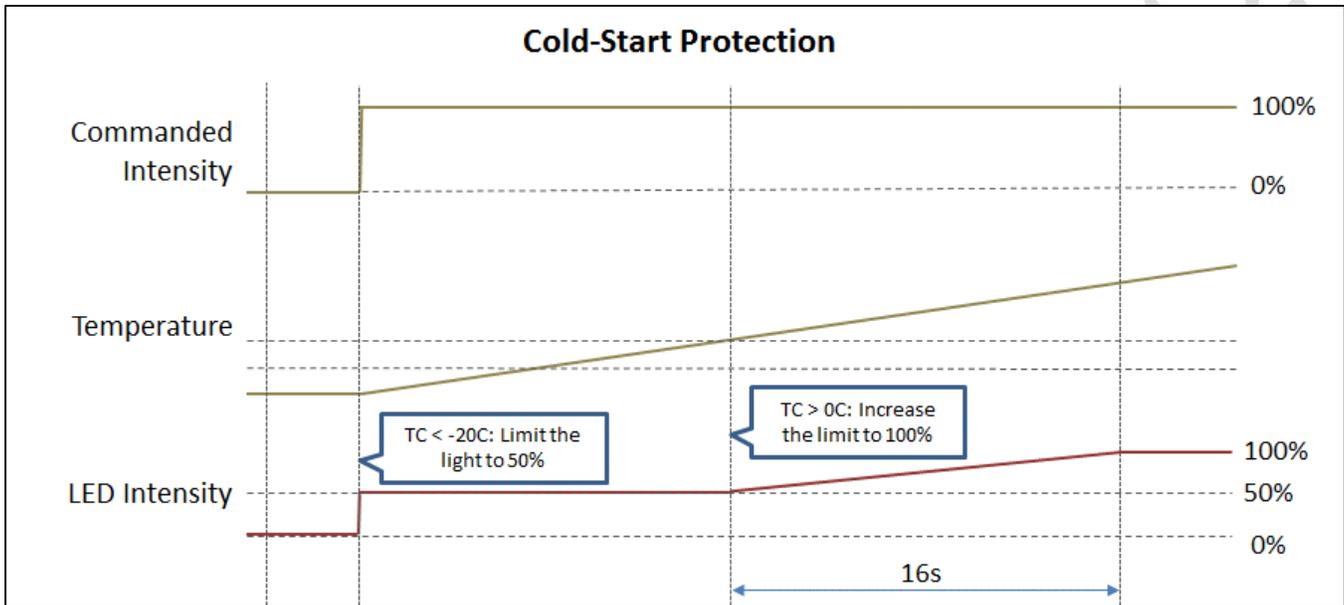
If at any time, the module temperature exceeds 98°C, XIM will immediately turn off the LEDs. The LEDs will stay off even if the temperature drops below 85°C. To turn on the LEDs again, the user must set the commanded intensity to 0% (turn off the light) and the temperature must be below 93°C. Then, when the user sets the commanded intensity to above 0% (turns on the light), XIM will set the light to the commanded intensity (no reduction). A power cycle of XIM will also allow the LEDs to be turned on. The “Thermal Shut Down” diagram below illustrates this behavior.



### Cold-Start Protection

If the temperature is below -20°C, the current draw from XIM could be greater than the specified maximum current. In order to prevent overloading the power supply, XIM reduces the current by reducing the LED intensity.

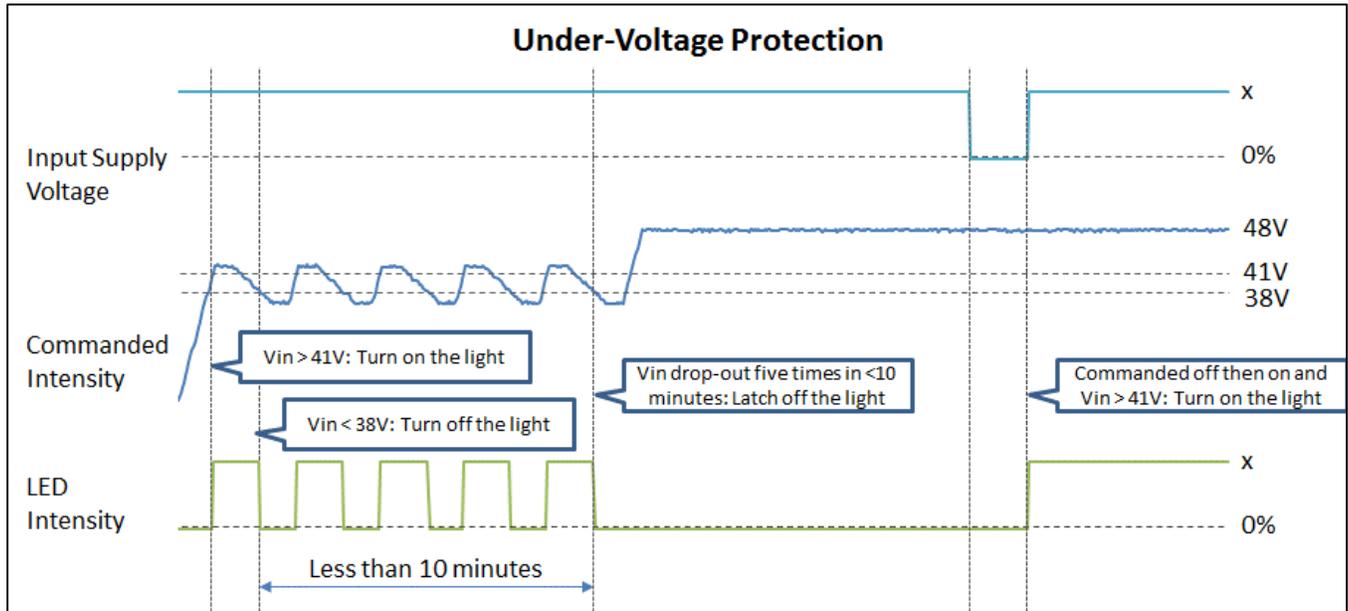
If the temperature of the module is below  $-20^{\circ}\text{C}$ , XIM will limit the maximum intensity to 50% until the temperature exceeds  $0^{\circ}\text{C}$ . During this time, if the commanded intensity is less than 50%, then XIM will set the LEDs to the commanded intensity. If the commanded intensity is greater than or equal to 50%, then XIM will set the LEDs to 50%. When the temperature exceeds  $0^{\circ}\text{C}$ , XIM will increase the limit to 100% over a period of 16 seconds. If the commanded intensity is greater than 50%, XIM will increase the LED intensity from 50% up until it reaches the commanded intensity. The “Cold-Start Protection” diagram below illustrates this behavior.



### Power Supply Under-Voltage Detection

The input supply voltage must be above 41V in order for XIM to turn on the LEDs. If the input supply voltage drops below 38V, XIM will turn off.

If the current draw on the power supply is greater than the power supply's rating, the voltage may fluctuate between a voltage greater than 41V and a voltage less than 38V, which may cause XIM to flash. If XIM detects this voltage drop-out 5 times within 10 minutes, it will shut off. In order to reset XIM, the commanded intensity must be set to off then on, or the supply voltage must drop below 5V. If the power supply voltage drop-out is so severe that the voltage drops below 5V, XIM will flash continuously until the power supply is turned off. The “Under-Voltage Protection” diagram below illustrates this behavior.



### LED Array Short-Circuit Protection

If there is a short circuit in the LED array assembly inside the module, it may be a safety risk. In this situation, XIM will shut off.

PRELIMINARY

## In-Field Trouble Shooting

The following table provides a list of ways to identify and fix problems with the installation and/or environment of XIM.

Symptom	Possible Causes	Debugging Steps
No light	No power to XIM	Check the power connections to PSU and XIM
	XIM is wired backwards	Confirm that Pin 1 (red) = +48V and Pin 2 (black) = 0V
	The supply voltage to XIM is < 41V	Check the voltage with a voltmeter
	The gray and purple wires are shorted (XIM 1-10V)	Check wiring with an ohm-meter
	Thermal Shut Down ( $T_c > 98C$ )	Is XIM hot? See below
	The fuse is blown	Was mains wired to 48V?
When power is applied, the light flashes then turns off	Overloaded PSU	Check the power rating of the PSU
The light stays on for a few minutes, then turns off	Thermal Shut Down ( $T_c > 98C$ )	Is insulation covering the fixture?
The light stays on for a few minutes, then goes to 10% intensity	Thermal Overload Lockout ( $T_c > 93C$ for more than 5 minutes)	Check if the heat sink is damaged or modified. Check if XIM is attached correctly to the heat sink
The light appears to dim	Thermal Overload ( $T_c > 93C$ for less than 5 minutes)	
The light is limited to 50% intensity	Cold Start	Is XIM cold? Let it warm up to 0°C