Internal Thermal Protection

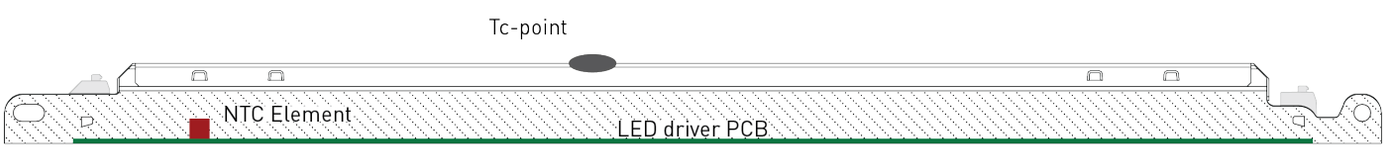
CALIBRATION GUIDE FOR LUMINAIRE MANUFACTURERS

Helvar LED drivers with Internal Thermal Protection (ITP) feature have the capability of measuring LED driver internal temperature (Control Gear Temperature). This feature gives flexible possibilities for the luminaire manufacturers to calibrate the behaviour of Helvar LED drivers in high temperatures, for e.g. increased protection, improved lifetime management or extended warranty.

ABOUT THE THERMAL MEASUREMENTS

In LED drivers with ITP feature an NTC element is placed close to the lifetime-critical components inside the Helvar LED driver to control accurately the LED driver lifetime.

Luminaire design, orientation of the LED driver, luminaire materials and external conditions always affect the thermal behaviour of the LED driver. Please note that internal measured temperature does not equal the t_c point temperature of the LED driver!



Correlation between t_c point and NTC element reading depends on luminaire design.

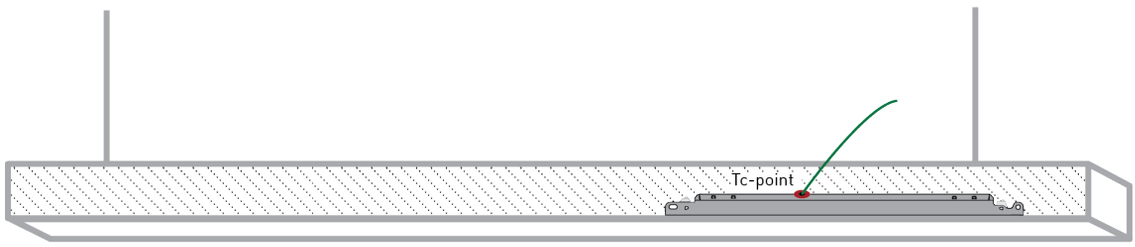
NOTE!

Configuring the ITP feature always requires thermal measurement of the whole luminaire!

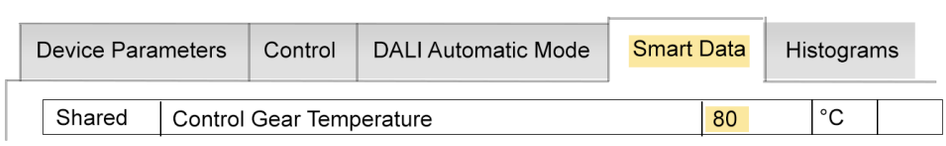
MEASUREMENT SETUP FOR CALIBRATION

STEPS FOR THE LUMINAIRE MANUFACTURER

1. K-type thermocoupler is placed on t_c point of the LED driver in order to measure t_c point temperature during the measurement.



2. LED driver is connected via DALI bus with USB-DALI interface to the computer to read the LED driver (Control Gear) internal temperature from Helvar Driver Configurator software tool. This value can be found in the Smart Data tab. Please refer to the Helvar Driver Configurator (HDC) User Guide for more details.



3. Luminaire t_a temperature is elevated up to it's maximum specified ambient temperature. Please take into account that stabilization of the temperature takes a long time.

4. After both t_c point and **Control Gear Temperature** values have stabilized, the correlation between these two measurements is confirmed and results can be used to calibrate the Internal Thermal Protection feature.

NOTE!

Measured t_c point value must not ever exceed the maximum value specified in LED driver datasheet!

For 8 year warranty, if applicable, allowed t_c point temperature is lower than the specified maximum value. See the LED driver datasheet for details!

SETTING UP THE FEATURE IN HDC (EXAMPLE 1)

EXAMPLE USE CASE

A luminaire manufacturer is designing a new luminaire model with Helvar LED driver inside. ITP feature is enabled by default and the **Derating temperature (°C)** limit shall be set to level where ITP starts to reduce LED driver output power before t_c max temperature (or other desired t_c temperature) is exceeded.

Example Measurement Results of Luminaire
Luminaire t_a temperature: 40 °C
Measured t_c point temperature: 77 °C
Control Gear Temperature: 86 °C

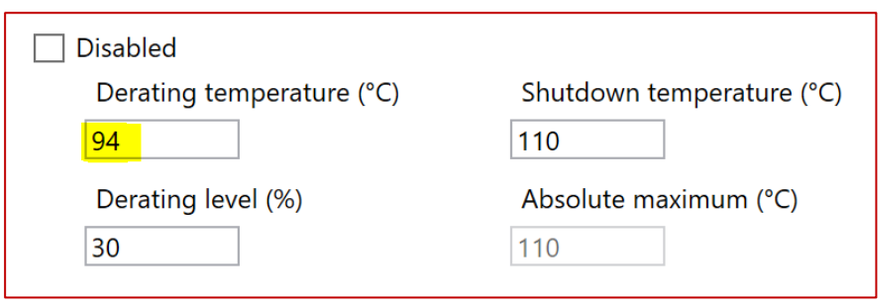
LED driver Specification
Maximum t_c point temperature: 85 °C

Measured t_c point temperature of 77 °C is 8 °C below the t_c max temperature 85 °C of the LED Driver.

85 °C - 77 °C = 8 °C

Control Gear Temperature can elevate up to 94 °C before t_c max temperature of the LED Driver is exceeded

86 °C + 8 °C = 94 °C



SETTING UP THE FEATURE IN HDC (EXAMPLE 2)

EXAMPLE USE CASE

A luminaire manufacturer is designing a new luminaire model with Helvar LED driver inside, and full 8 year warranty is desired. In the LED driver datasheet the requirements for 8 year warranty are specified for each Helvar LED driver, where applicable.

Example Measurement Results of Luminaire
Luminaire t_a temperature: 25 °C
Measured t_c point temperature: 51 °C
Control Gear Temperature: 58 °C

LED driver Specification
Maximum t_c point temperature: 85 °C
t_c point maximum temperature for 8 years warranty to apply: **t_c max - 10 °C**

For 8 year warranty the t_c point temperature must not exceed 75 °C.

85 °C - 10 °C = 75 °C

Measured t_c point temperature of 51 °C is 24 °C below the t_c point temperature 75 °C allowed for 8 year warranty.

75 °C - 51 °C = 24 °C

Control Gear Temperature can elevate up to 82 °C before t_c max temperature of the LED driver is exceeded

58 °C + 24 °C = 82 °C