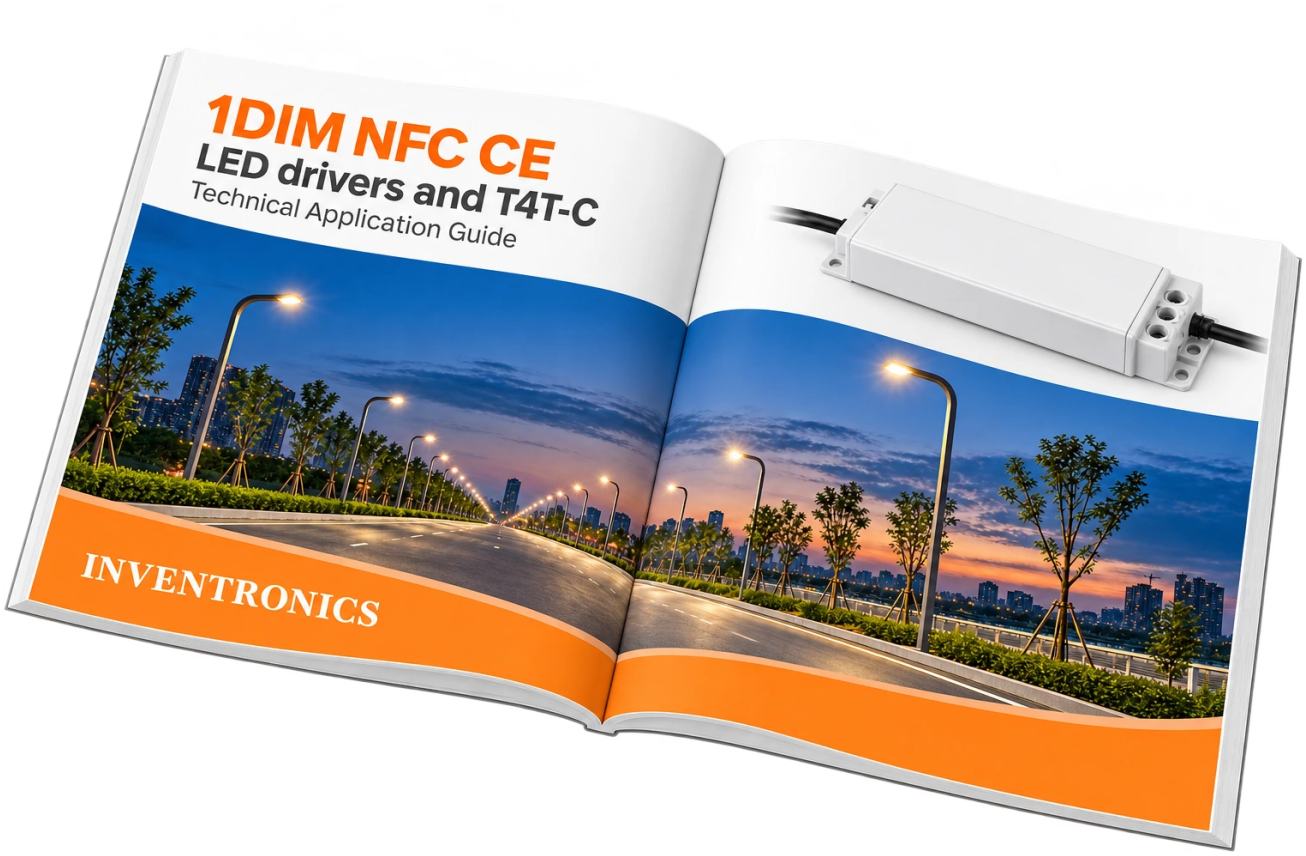
APPLICATION GUIDES

1DIM NFC CE LED drivers and T4T-C

Technical application guide for 1DIM outdoor and industrial LED drivers, current setting, thermal protection, AstroDIM, NFC programming, and electrical integration.

Updated 2026-10-29

1DIM NFC CE LED drivers and T4T-C



Technical application guide · Inventronics · Source edition April 2023

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> **Edition note:** Adapted from the April 2023 application guide with Inventronics branding. Technical product names, specifications, software settings, and operating instructions reflect that source edition. The product illustration has been adapted for branding; use the tables and product documentation for technical ratings.

Contents

• 1 Introduction

• 2 Features
• 3 Operating modes
• 4 Additional information
• 5 Programming
• Disclaimer

Please note

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1 Introduction

1.1 Inventronics LED drivers with 1DIM functionality for outdoor and industrial applications

Long lifetime, low maintenance costs and high efficiency are very important for outdoor and industrial applications. OPTOTRONIC® LED drivers for outdoor applications meet these requirements and unlock the full potential of LED-based light sources.

Thanks to the high flexibility of the programmable OPTOTRONIC® 1DIM NFC CE LED drivers, LED luminaire systems can be tailored to the on-site conditions and their cost can be optimized. Using the AstroDIM functionality, significant energy savings and a reduction of greenhouse gas emissions can be achieved.

Due to the wide operating window (voltage/current) of these LED drivers, both Inventronics LED modules for outdoor applications and customer-specific LED modules can be operated. This also means that the overall amount of different LED drivers on stock can be kept low and that the overall complexity of luminaire maintenance over the entire life cycle can be reduced.

The NFC interface implemented in the 1DIM NFC CE family enables an easy and safe way of programming LED drivers during the production process and also in the field. The parameters can be transferred without the need to power the LED driver and time is saved compared to other ways of programming.

Finally, due to integrated overvoltage protection, LED drivers with 1DIM NFC CE functionality offer a high surge protection against common-mode surges of up to 10 kV for class I and II luminaires.

1.2 1DIM NFC CE product family

The 1DIM NFC CE product family consists of five different output power classes of up to 165 W. All six types have the same 1DIM dimming capabilities and the NFC interface. They can be programmed via the Tuner4TRONIC® software. The following overview shows the main features of these LED drivers.

Table 1: Family overview

Product	Maximum power	Input voltage L/N	Nominal output voltage	Output current range	Surge dif/ com	Primary/ secondary insulation	Casing insulation	Stand-by power
OT 20/170-240/1A0 1DIMLT2 G1 CE	22 W	170–264 V	10–38 V	70–1050 mA	6/10 kV	SELV	Double	< 0.5 W
OT 40/170-277/1A0 1DIMLT2 G1 CE	40 W	170–264 V	15–56 V	70–1050 mA	6/10 kV	SELV	Double	< 0.5 W
OT 75/170-240/1A0 1DIMLT2 G1 CE	75 W	170–264 V	35–115 V	70–1050 mA	6/10 kV	SELV	Double	< 0.5 W
OT 110/170-240/1A0 1DIMLT2 G1 CE	110 W	170–264 V	80–220 V	70–1050 mA	6/10 kV	Double	Double	< 0.5 W
OT 75/220-240/1A0 1DIM G2 CE	75 W	198–264 V	35–115 V	70–1050 mA	6/10 kV	Double	Double	< 0.5 W
OT 165/220-240/1A0 1DIM G2 CE	165 W	198–264 V	130–260 V	70–1050 mA	6/10 kV	Double	Double	< 0.5 W

Table 1 continued: Feature availability

Feature	1DIMLT2 G1 CE	1DIM G2 CE
AstroDIM (astro-based)	Yes	Yes
AstroDIM (time-based)	Yes	Yes
Constant Lumen function	Yes	Yes
LEDset2	Yes	–
External NTC	Yes	–
Configuration Lock	Yes	Yes
Tuning Factor	Yes	Yes
Driver Guard	Yes	Yes
Tuner4TRONIC	Yes	Yes
Tuner4TRONIC Field	Yes	Yes

AstroDIM

Automatic dimming via an integrated timer (no real-time clock): Five independent dimming levels and zones can be set with the Tuner4TRONIC® software.

CLO (constant lumen output)

The decrease in the luminous flux of an LED module can be compensated over its entire lifetime via a preprogrammed current curve. This not only ensures stable lighting but also saves energy and increases the lifetime of the LEDs.

LEDset (Generation 2)

LEDset2 is an improved LED module interface for the combination of single or multiple LED modules with one LED driver via a single analog control line. This interface enables external current setting and temperature monitoring. The LEDset2 interface has no auxiliary supply and is not compatible with LEDset (Generation 1). LEDset2 has an absolute current coding, while LEDset (Generation 1) only has a relative one.

External temperature sensor

This feature allows the temperature protection of the LED module or the complete luminaire in hot ambient temperatures via an external sensor (e.g. NTC, negative temperature coefficient resistor). The derating can be modified via the Tuner4TRONIC® software.

LEDset2 and external NTC are only available with 1DIMLT2 NFC G1.

Integrated surge pulse overvoltage protection

The 1DIM NFC CE drivers have an integrated overvoltage protection of up to 6 kV for differential and 10 kV for common-mode surge pulse overvoltages.

Configuration Lock

This feature is an advancement of OEM Key, which allows controlling the access rights for individual features within the LED driver via Tuner4TRONIC® software and to assign different rights to the luminaire manufacturer, to the service team and to the general user. Assigning user rights also allows offering "light as a service" and still maintaining total control over who may change which parameters within the device or luminaire.

Tuning Factor

Within limits predefined by the luminaire manufacturer, this feature allows an adjustment of the amount of light in the field or in production. Thus, one luminaire can manage different lumen packages. If the feature is combined with LEDset2, other lumen packages can also be achieved by applying different resistor coding.

Driver Guard T, P

By default, the internal safety mechanisms of the LED driver are designed for maximum performance and temperature, however, not for those of the luminaire. By means of this feature, you can adjust the performance and temperature derating of the LED driver so that they not only match the luminaire, but also lead to a higher reliability of the luminaire.

1.3 Nomenclature

The product name of each OPTOTRONIC® 1DIM NFC CE LED driver is defined as shown below.

Figure 1: OT 40/170-240/1A0 1DIMLT2 G1 CE – illustrative product view, branding adapted



Product nomenclature

Element	Meaning
OT	OPTOTRONIC® LED driver
40	Power class: 40 W
170-240	Input voltage range (L/N): 170–240 V
1A0	Maximum output current: 1050 mA
1DIM	AstroDIM
LT2	LEDset2 (LED module interface); only available with 1DIMLT2 NFC G1
G1	Generation 1
C	Compact housing shape
E	For exterior use under specific conditions

1.4 Operating windows

The OPTOTRONIC® 1DIM NFC CE LED driver family is split up into five different power classes to provide the best suitable power supply for different applications. The nominal output current of 200–1050 mA is available in the following power packages.

Table 2: 1DIM NFC CE maximum allowed output power

Type	Maximum power	Ambient temperature	Nominal input voltage
OT 20/170-240/1A0 1DIMLT2 G1 CE	22 W	–40…+60 °C	170–264 V AC
OT 40/170-240/1A0 1DIMLT2 G1 CE	40 W	–40…+60 °C	170–264 V AC
OT 75/170-240/1A0 1DIMLT2 G1 CE	75 W[1]	–40…+60 °C	170–264 V AC
OT 110/170-240/1A0 1DIMLT2 G1 CE	110 W[1]	–40…+55 °C	170–264 V AC
OT 75/220-240/1A0 1DIM G2 CE	75 W[1]	–40…+55 °C	198–264 V AC
OT 165/220-240/1A0 1DIM G2 CE	165 W[1]	–40…+55 °C	198–264 V AC

[1] At input voltages below 190 V, the driver protects itself as shown in figure 4.

Figure 2 gives a complete overview of the possible 1DIM NFC CE operating windows.

Figure 2: Overview of 1DIM NFC CE operating windows

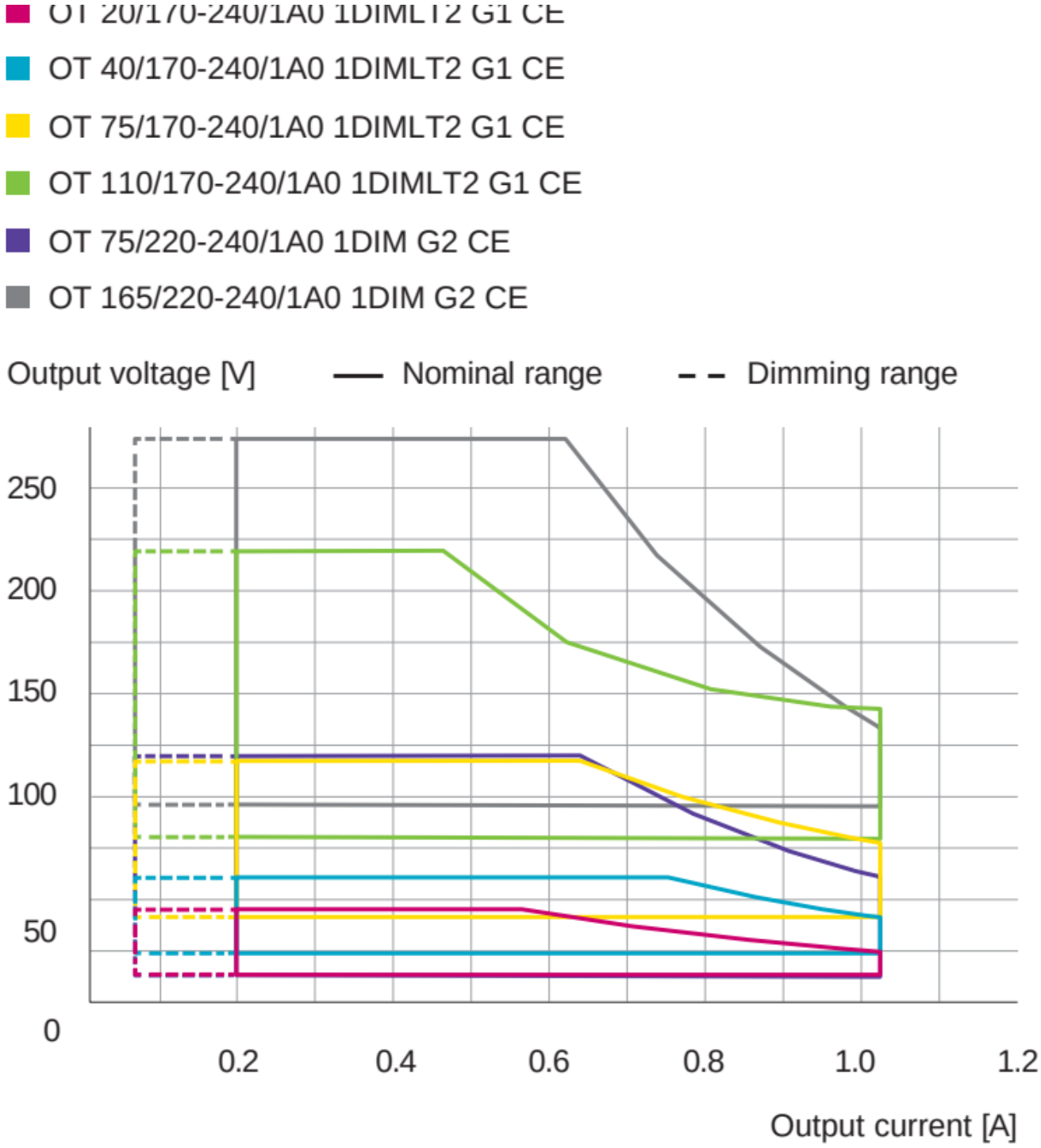


Table 3: 1DIM NFC CE operating range

Type	Minimum dimming current	Minimum nominal current	Maximum nominal current	Minimum output voltage	Maximum output voltage
OT 20/170-240/1A0 1DIMLT2 G1 CE	70 mA	200 mA	1050 mA	10 V	38 V
OT 40/170-240/1A0 1DIMLT2 G1 CE	70 mA	200 mA	1050 mA	15 V	56 V

Type	Minimum dimming current	Minimum nominal current	Maximum nominal current	Minimum output voltage	Maximum output voltage
OT 75/170-240/1A0 1DIMLT2 G1 CE	70 mA	200 mA	1050 mA	35 V	115 V
OT 110/170-240/1A0 1DIMLT2 G1 CE	70 mA	200 mA	1050 mA	80 V	220 V
OT 75/220-240/1A0 1DIM G2 CE	70 mA	200 mA	1050 mA	35 V	115 V
OT 165/220-240/1A0 1DIM G2 CE	70 mA	200 mA	800 mA	130 V	260 V
OT 165/220-240/1A0 1DIM G2 CE	70 mA	800 mA	1050 mA	130 V	205 V

It is possible to operate the LED driver below the minimum nominal current through initial setting of the output current.

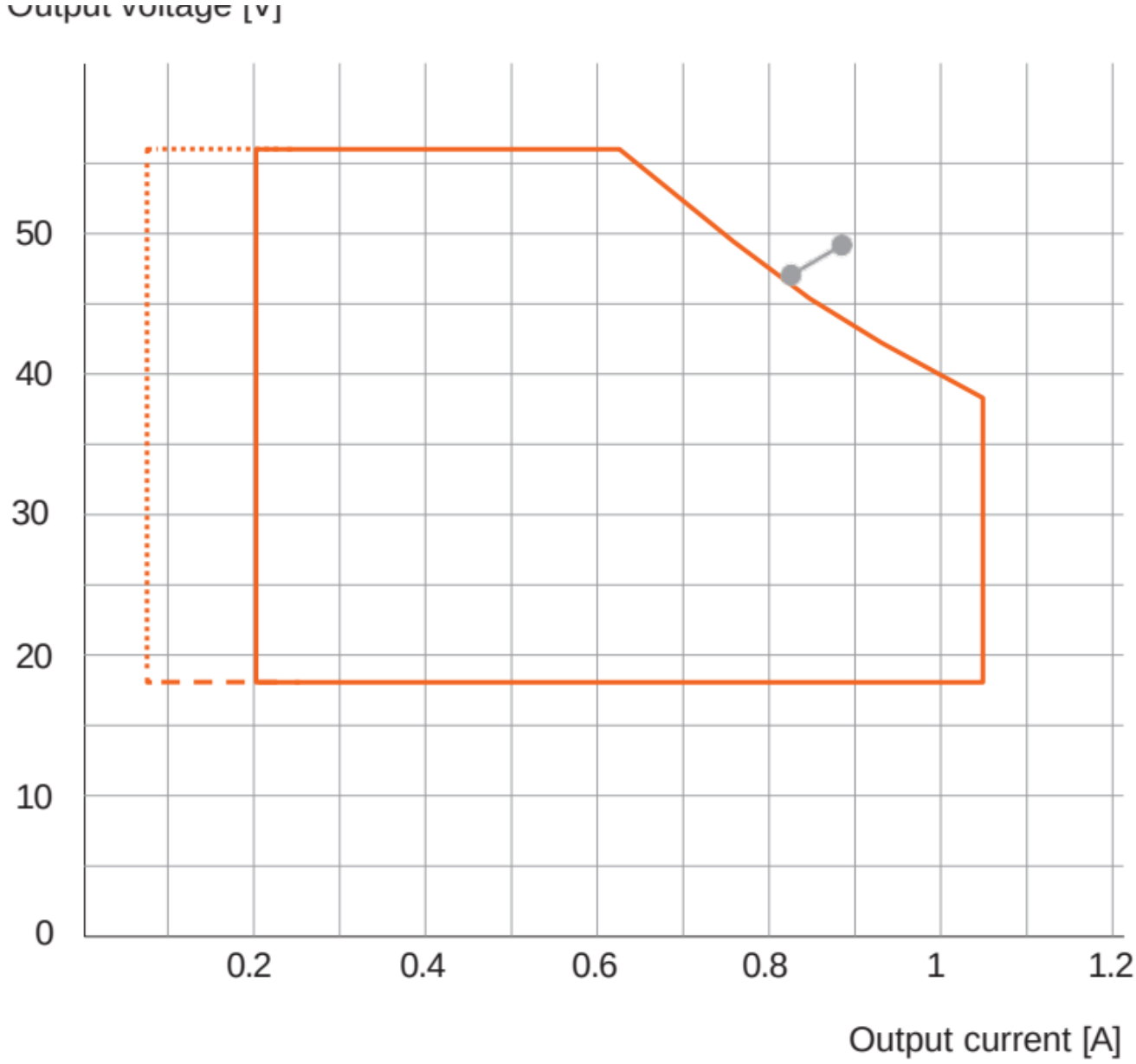
Warning

When LED drivers are permanently operated below the minimum nominal current, it is necessary to ensure compliance with relevant IEC standards (for example mains current distortion and power factor). Please consider that the certificates are only valid within the nominal output current range.

1.4.1 Current foldback

The intelligent 1DIM NFC CE family allows a safe start-up of the system, even if the power consumption of the LED module exceeds the maximum output power of the LED driver. In this case, the unit reduces the current until the maximum output power is not exceeded anymore. If no stable operating point is achieved, the unit switches on and off continuously or switches off completely.

Figure 3: Current foldback (example: OT 40 1DIMLT2)



1.4.2 Low input voltage protection

In case of a very low input voltage, the driver protects itself against being damaged by high input currents. The behavior of the driver can be seen in figure 4.

Figure 4: Input voltage vs. output power, 1DIM NFC CE driver

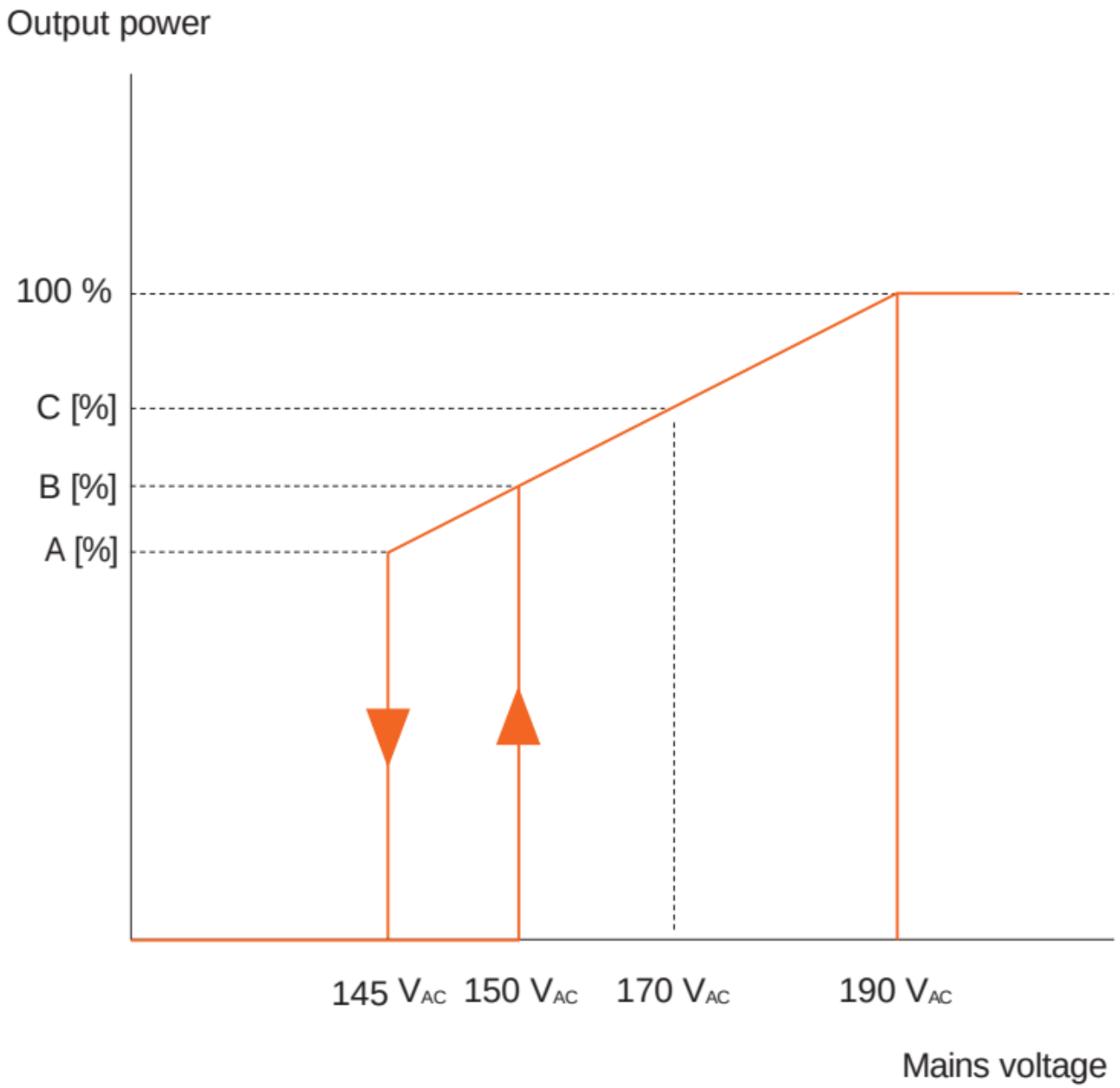


Figure 4: Protection thresholds

Type	A [%]	B [%]	C [%]	100 %
OT 20/170-240/1A0 1DIMLT2 G1 CE	48	50	75	–
OT 40/170-240/1A0 1DIMLT2 G1 CE	68	70	85	–
OT 75/170-240/1A0 1DIMLT2 G1 CE	68	70	85	–
OT 110/170-240/1A0 1DIMLT2 G1 CE	73	75	85	–
OT 75/220-240/1A0 1DIM G2 CE	70	70	85	80 W
OT 165/220-240/1A0 1DIM G2 CE	70	70	85	170 W

2 Features

2.1 Operating current

Flexible current setting allows taking advantage of the continuously improving LED technology and building a future-proof system. The 1DIM NFC CE family offers two modes* for current setting, which can be set via the Tuner4TRONIC® software:

Fixed current: Current setting via programmable interface

LEDset2: Current setting via the LEDset2 interface

LEDset2 interface only available with 1DIMLT2 G1 products.

Figure 5: Setting of the operating current



Without any resistor connected to the LEDset2 interface, the factory default current is 700 mA. As soon as the LED driver detects a resistor value for more than 3 seconds within the valid resistor range of 2.37 kΩ (1050 mA) and 24.9 kΩ (200 mA), it switches to the LEDset2 mode.

2.1.1 Fixed current mode

To use the fixed current mode, it has to be selected in the Tuner4TRONIC® software. The minimum and maximum rated output currents are displayed according to the selected LED driver. The output current of the LED driver can be set by changing the value in the “Operating Current” field.

2.1.2 LEDset2 mode

The LEDset2 interface (LEDset generation 2) is a standardized LED module interface to set the right output current and establish an easy and low-cost temperature protection for the connected LED module. This multi-vendor interface is suitable for LED modules connected in parallel or in series.

Note

In the following figures, the LED module is displayed in a simplified way. The real number of LEDs depends on the output voltage of the LED driver.

Figure 6: LEDset2 parallel connection

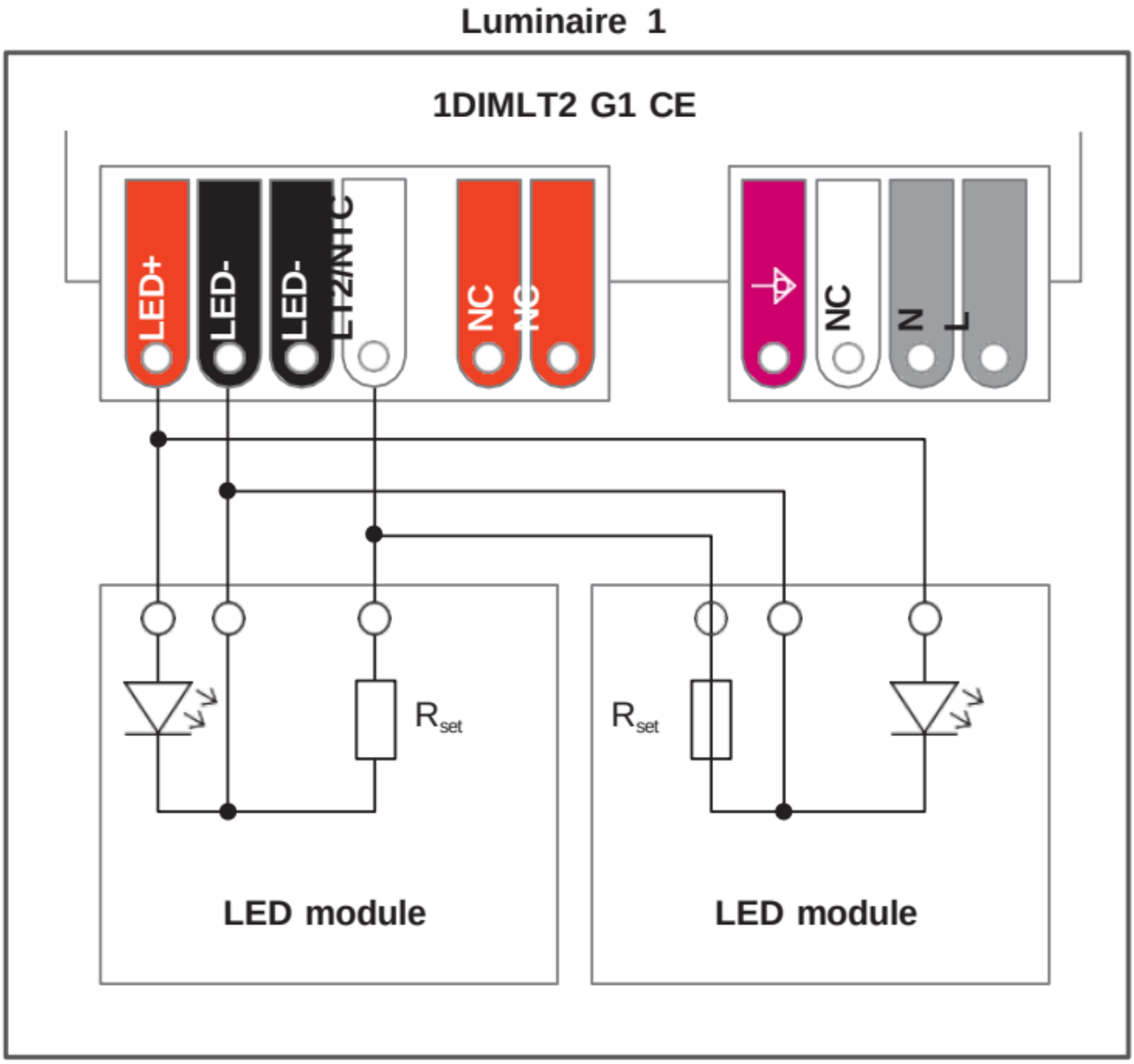
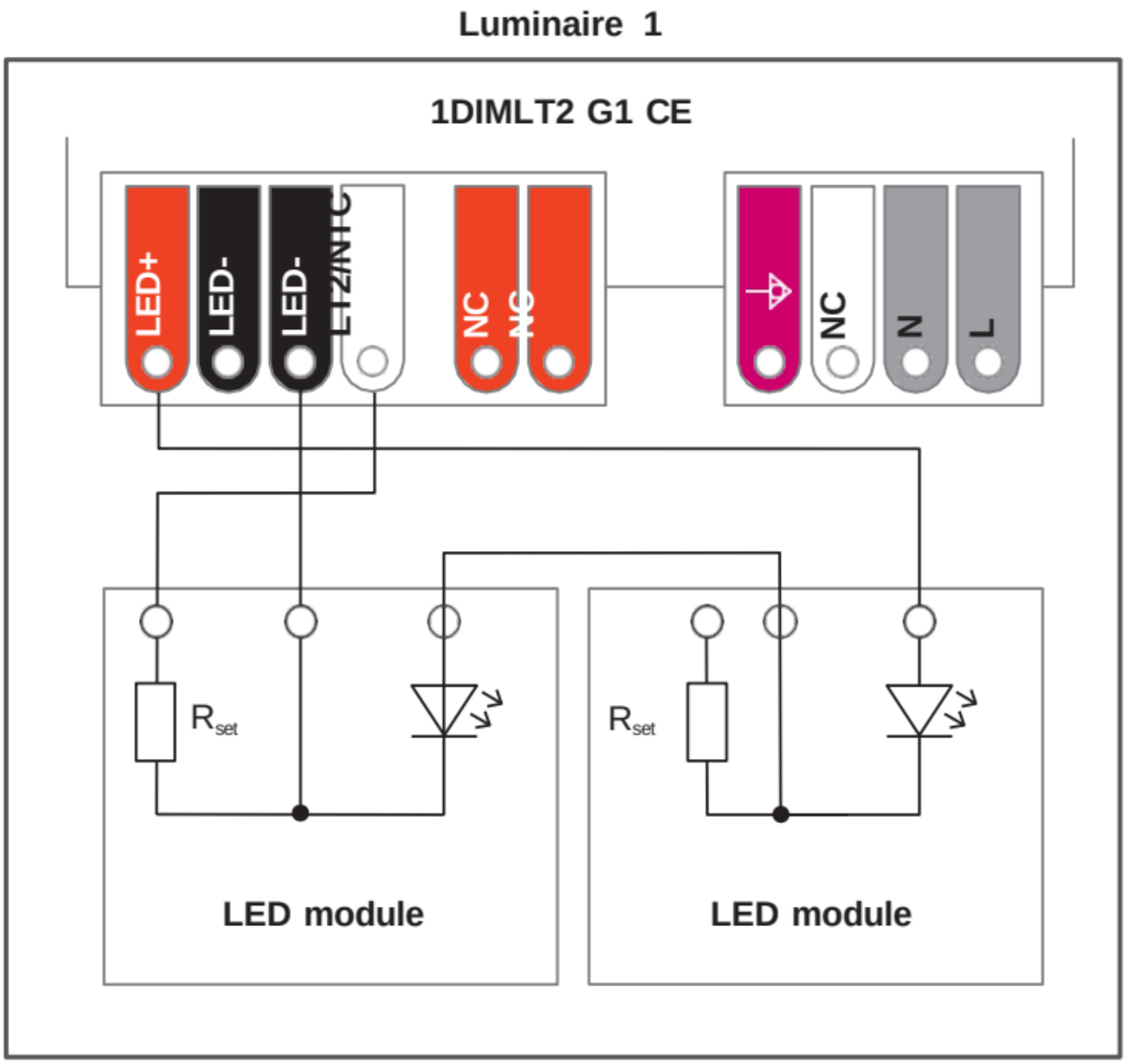
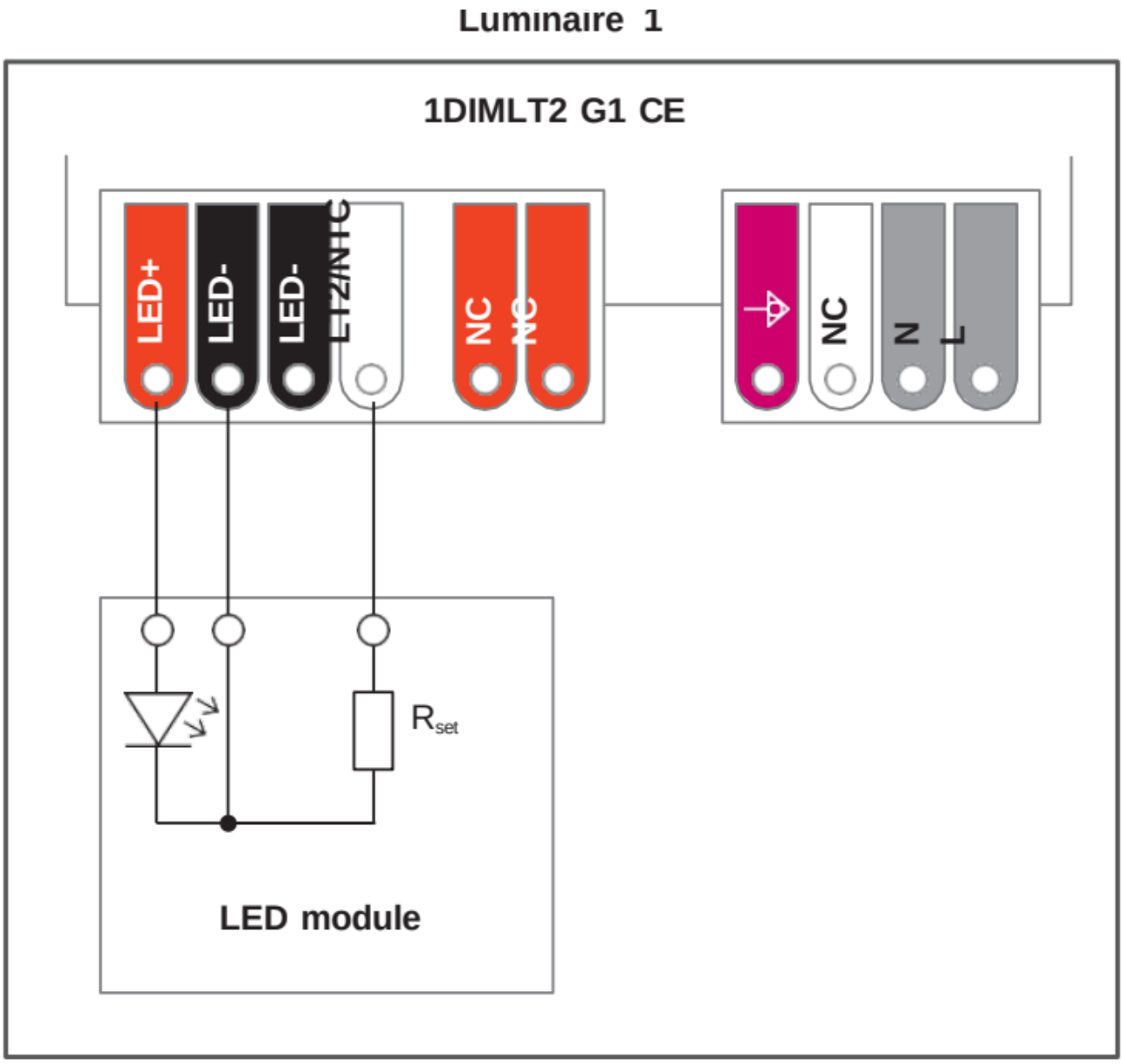


Figure 7: LEDset2 series connection



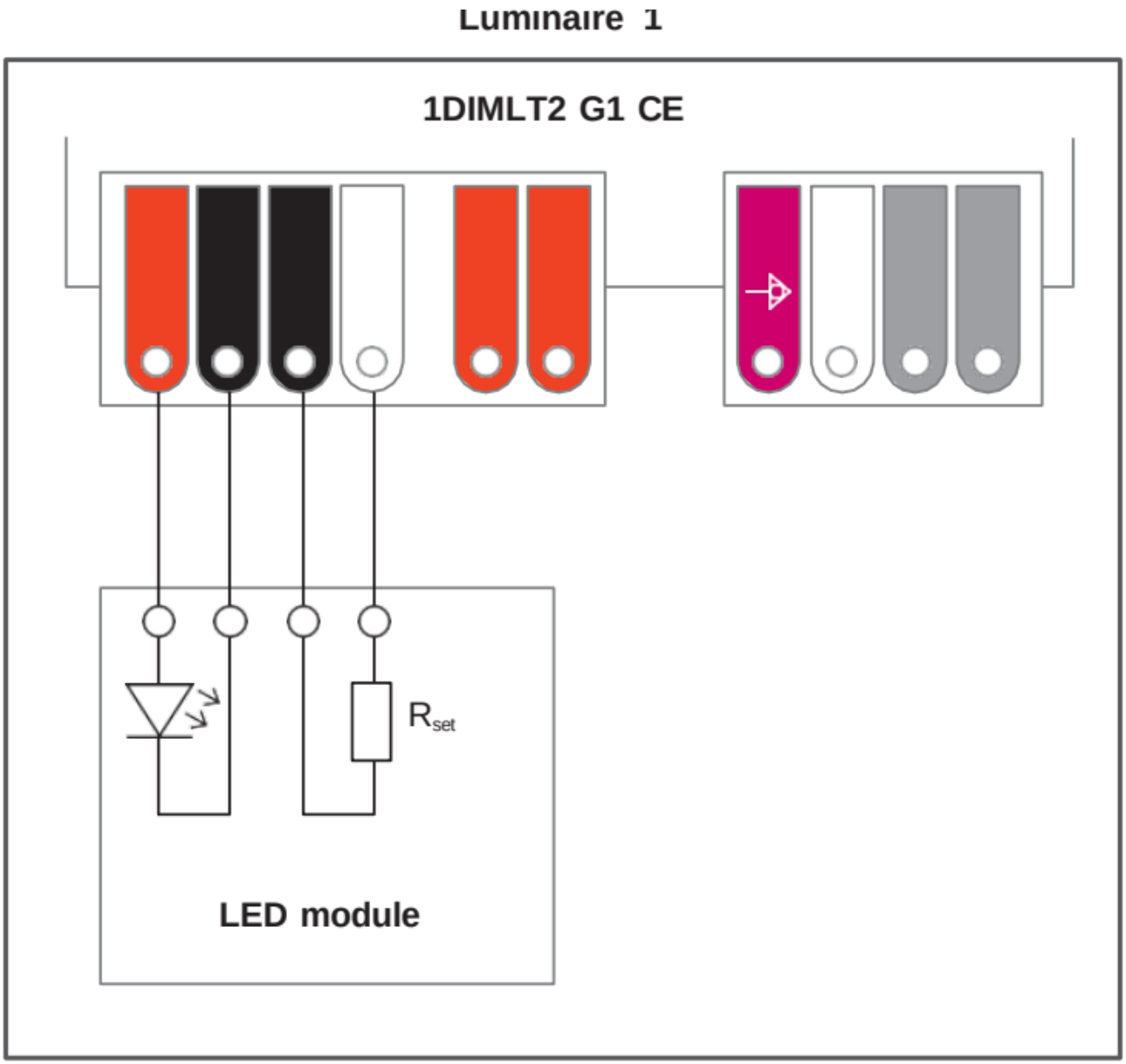
The output current of the LED driver can be set using an externally connected resistor (min. power rating 50 mW, max. tolerance 0.5 %). This provides the possibility to set the LED current manually without the need for an additional programming of the LED driver. With a resistor mounted on the LED module as shown in figure 8, the correct LED current can be set automatically. With this resistor, the desired current for the LED module is set according to the used LED bin and needed lumen output, offering a real plug-and-play solution and making the system future-proof.

Figure 8: Rset connection



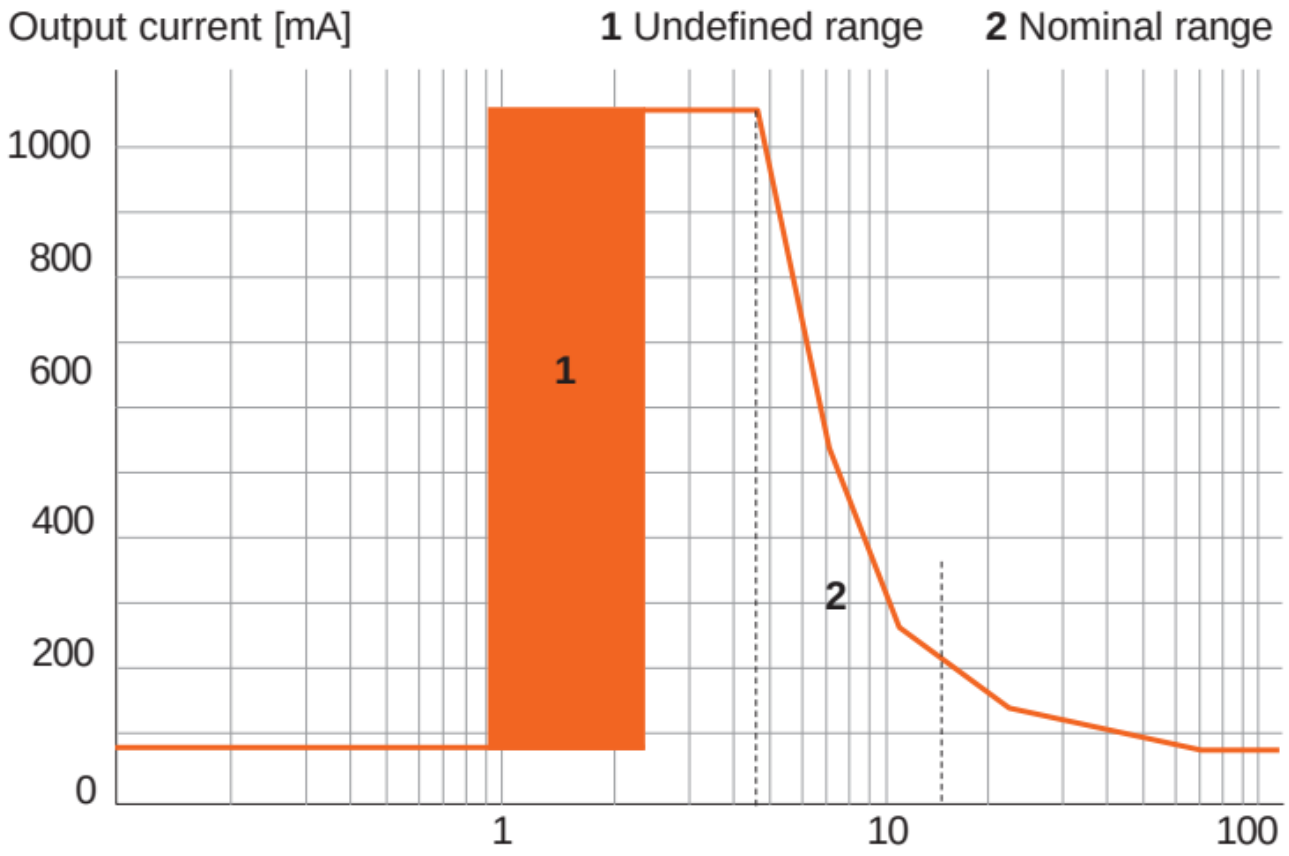
To achieve a more accurate current setting, the second LED- terminal of the LED driver can be used as shown in figure 9. This increases the accuracy by roughly 0.5 %.

Figure 9: Rset connection with higher accuracy



The LEDset2 coding for the 1DIMLT2 G1 CE family is shown in the following graph.

Figure 10: LEDset2 coding



Assuming a tuning factor of 100 %, the corresponding output current can be calculated with the following formula within the valid resistor range (Rset = 2.37–24.9 kΩ):

```
I_out [A] = (5 V / R_set [Ω]) × 1000
```

The undefined range should be avoided because the output current of the LED driver is not predictable.

Table 4 gives an overview of commonly used current values and the appropriate resistor values.

Table 4: LEDset2 resistor coding

I out [mA] reference	R set [kΩ] [tolerance ≤ 0.5 %]	I out [mA] nominal
Open circuit	> 71	70
350	14.0 (E192)	357
500	10.0 (E192)	500
700	7.15 (E192)	699
1050	4.64 (E192)	1050
Undefined	0.35– 1.0	1050/70
Short circuit	< 0.35	70

For further details, please consult the LEDset2 application guide.

2.1.3 Tuning Factor

Modern street lighting has a high potential to save energy as efficient LED technology allows light planners and luminaire manufacturers to perfectly adapt the behavior of the luminaire to the requirements of the illuminated street. On the other hand, this flexibility increases the complexity of maintaining the installation for cities and installers.

Our Tuning Factor feature helps to reduce this complexity to a minimum as it enables installers to adapt the settings of a luminaire according to their current needs.

Example

A luminaire manufacturer develops a luminaire which can be operated within a light output range of 2000–4000 lm. The installer commissioned by the city can then use the Tuner4TRONIC® Field application to adjust the lumen output to the level that is needed, while not exceeding the limits set by the luminaire manufacturer.

Figure 11: Tuner4TRONIC user interface – Tuning Factor



Maximum limit

This is the maximum operating current set by the luminaire manufacturer. It is equivalent to 100 %.

Minimum limit

This is the minimum definable output current level. Valid range: 10–100 %.

Luminaire reference light output

This value indicates a reference light output of the luminaire at the maximum set operating current. This enables the installer to easily adjust the light output in lumens instead of the output current.

Tuning level

This is the current tuning level set by the installer.

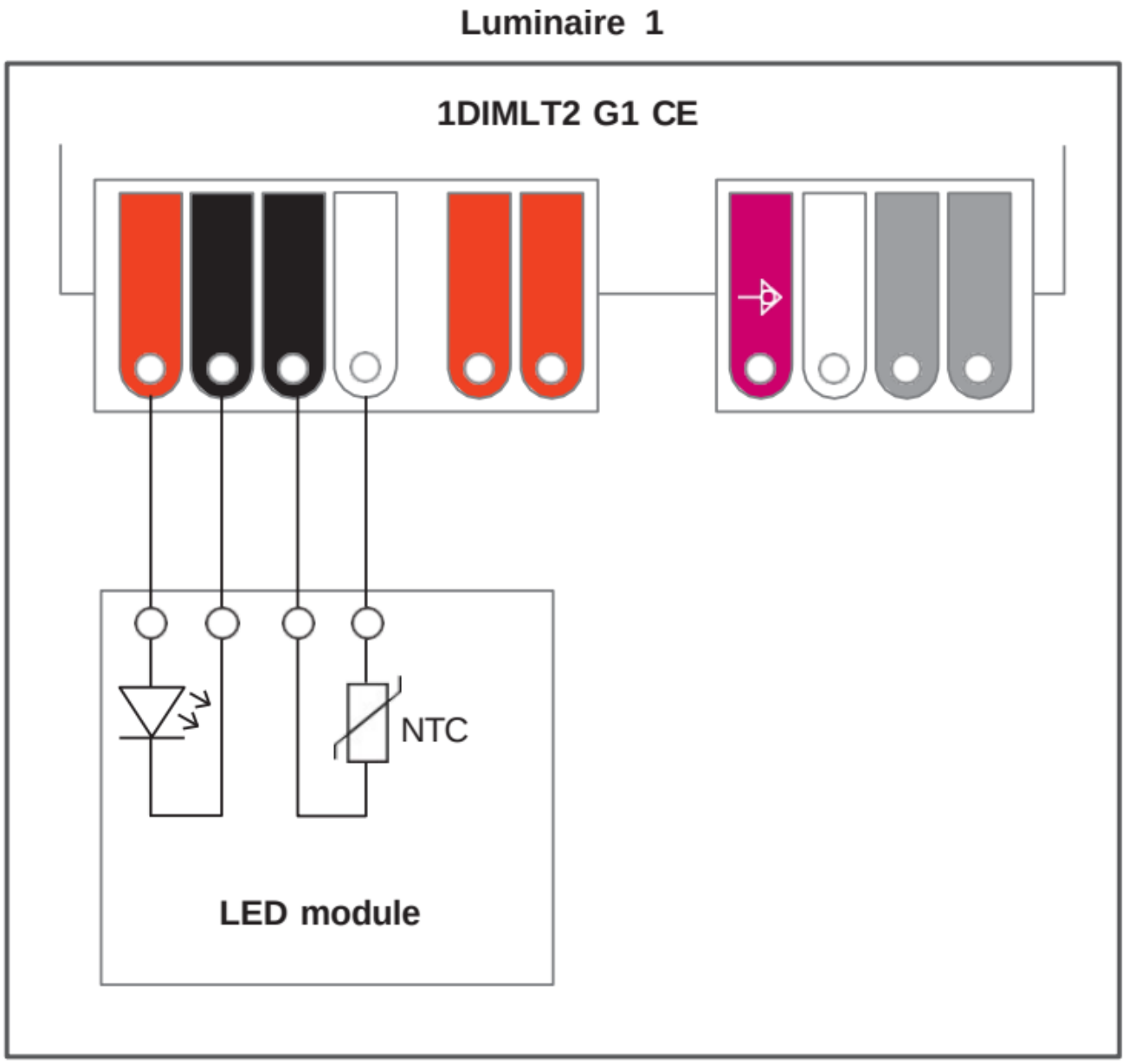
The "limits and reference lumen" can be independently protected by the Configuration Lock feature in order to avoid unauthorized usage of this feature outside the limits defined by the luminaire manufacturer.

2.2 Thermal derating and protection

2.2.1 External temperature sensor

By connecting an external temperature sensor to the LT2/NTC port of the 1DIMLT2 G1 CE driver, a very easy and cost-efficient temperature protection of the LED module can be realized. As an example, an NTC (negative temperature coefficient resistor) can be mounted on the LED module and connected as shown in figure 12. In case the thermal protection feature is enabled and nothing is connected to the LT2/NTC terminal, the driver delivers 100 % light output.

Figure 12: NTC connection



Note

The LEDset feature and the external temperature protection cannot be used at the same time.

Resistor-based mode

The resistor-based mode is activated by default. If the connected resistor sensor value falls within the range between 6.3 and 5.0 kΩ, the output current is continuously lowered down to 50 %. If the value falls further below 4.5 kΩ, the output is switched off completely until the sensor reaches 5.0 kΩ again. The complete switch-off can be deactivated by clicking the “Shut Off” check box.

In this mode, a common NTC can be used to achieve a fixed thermal protection as shown in table 5. The specified temperatures can vary, depending on the used NTC component and the corresponding tolerances.

Table 5: Overview of standard NTCs

NTC type	Start derating temperature (6.3 kΩ)	End derating temperature[1] (5.0 kΩ)	Shut-off temperature (4.5 kΩ)
22 kΩ	56 °C	62 °C	66 °C
33 kΩ	66 °C	72 °C	78 °C
47 kΩ	75 °C	83 °C	89 °C
68 kΩ	85 °C	92 °C	102 °C

1. Switch-on temperature in case the temperature has reached the shut-off condition

2.2.2 Thermal management and Driver Guard feature

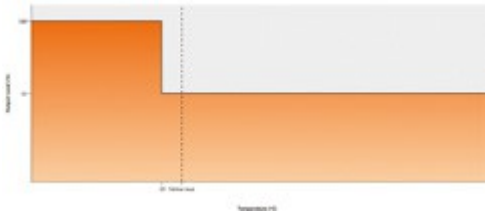
The 1DIM NFC CE LED driver products have a reversible internal thermal protection. If the maximum allowed LED driver temperature is exceeded, the LED driver starts derating the output current down to 55 %. If the temperature keeps increasing, the LED driver switches off. It switches back on at the maximum allowed temperature.

In outdoor installations especially, the lifetime and reliability of a luminaire is very important. As the lifetime of a luminaire always depends on the operating temperature of the components, the “Driver Guard” feature helps limiting the LED driver’s temperature during its operation. The thermal behavior of the LED driver can be activated at lower temperatures using the “Prestart Derating” setting shown in the figure below.

Driver Guard thermal settings



Driver Guard output-current derating graph



Note

The luminaire manufacturer is responsible for the proper thermal design of the luminaire. The temperature indicated in this feature might significantly differ from the tc temperature mentioned on the top of the LED driver. To achieve the lifetime data of the LED driver, the luminaire manufacturer needs to ensure that the maximum tc temperature is never exceeded.

2.3 Constant Lumen function

Over the lifetime of an LED module, the light output drops due to the aging process of the LEDs. To achieve a constant light output of the module, the LED driver stores the operating hours of the LED module and increases the output current to react to the light output drop. To set this feature according to the applied LED module, the Tuner4TRONIC® software can be used as shown, for example, in figure 13.

The output levels have to be steadily increasing from the beginning to the end.

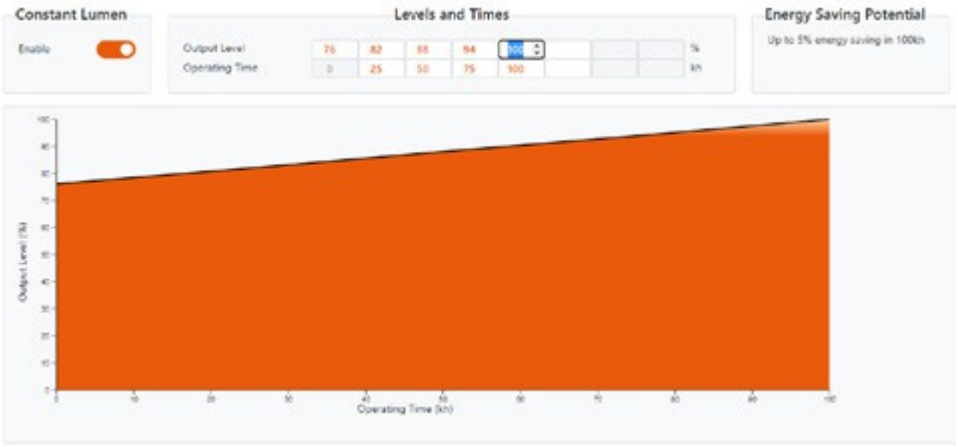
Warning

The output level cannot fall below the minimum physical dimming level of the LED driver, even if the software displays a lower value.

Next to the table, the estimated energy savings are calculated as shown in figure 13. This value is only an estimation because it does not consider, for example, the LED Vf behavior and efficiency of the driver.

The exact values for programming the Constant Lumen function for the connected LED module need to be obtained from the corresponding LED supplier.

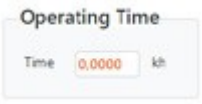
Figure 13: Constant lumen programming graph (operating time = 10 kh)



2.4 Lamp operating time

The LED driver monitors the operating hours of the connected LED module. In case of a fault of the LED driver or the LED module, the lamp operating time has to be (re)set accordingly with the Tuner4TRONIC® software. The lamp operating time also has an influence on the constant lumen function and the “end of life” feature. It can be set using the Tuner4TRONIC® software as shown in figure 14.

Figure 14: Lamp operating time (10 kh)



2.5 Configuration Lock

The protection of the LED driver settings is mandatory to guarantee a safe operation of a luminaire over its entire lifetime. In order to meet growing market demands to change settings of a luminaire in the field, we developed a Configuration Lock, allowing a safe operation of the luminaire while also giving the end customers the possibility to adapt the settings of the luminaire in the field. With this approach, the luminaire manufacturer keeps the complete control on the boundaries defining how his product will be operated.

Example 1

Luminaire manufacturer locks all settings, no in-field changes possible.

The luminaire manufacturer sets a “Master Key” and locks all the features. Without knowing the programmed “Master Key,” nobody can change the LED driver settings anymore. Features can be kept unlocked by selecting “Everyone” in the corresponding line.

Configuration Lock example 1 – settings locked



Example 2

Luminaire manufacturer defines boundary conditions and enables in-field programming.

The luminaire manufacturer defines his “Master Key” and keeps the full access rights to the settings of the LED driver. An additional “Service Key” can be set to allow people knowing this key to adapt the corresponding feature(s) of the LED driver.

In this example, people who received the “Service Key” (e.g. service personnel) can change the light output of the luminaire using the Tuning Factor level and they can reset the lamp operating time. As the “Limits and Reference Lumen” of the tuning factor feature is locked, the user can only adapt the light output within the limits defined by the luminaire manufacturer. In this case, all settings of the AstroDIM feature can be changed without the need of a key.

Configuration Lock example 2 – access rights



3 Operating modes

The operating modes of a 1DIM NFC CE LED driver can be selected using the Tuner4TRONIC® software.

3.1 On/off operating mode

1DIM NFC CE LED drivers can also be used in a simple on/off operating mode. The following operating mode has to be selected:

– On/Off

Figure 15: Operating/dimming modes

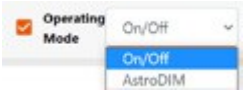
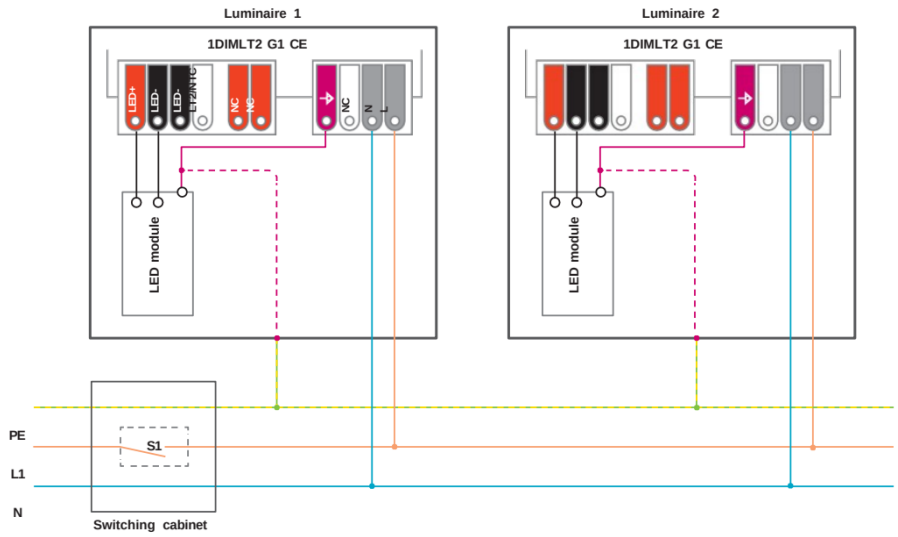


Figure 16: Wiring for on/off operation



3.2 AstroDIM feature

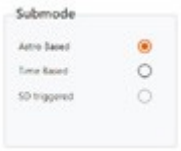
The AstroDIM feature allows an autonomous dimming without the need for an additional control line. 1DIM NFC CE LED drivers support up to five independent dimming levels and flexible settings of fade times between the individual dimming levels.

The output levels can be set between 10 % and 100 % in steps of 1 %.

In addition, switch-on and switch-off fade times can be programmed at the beginning and the end of a switching cycle to allow further energy savings during the twilight phase. This function is also helpful for installations with a pedestrian crossing where no specific infrastructure is available to switch the pedestrian crossing illumination independently of the rest of the street light illumination.

Two different modes for AstroDIM are supported:

AstroDIM submode selection



Time-based: The dimming profile defined in the reference schedule is referenced to the switch-on time of the LED driver.

Astro-based: The dimming profile defined in the reference schedule is referenced to the annual average middle of the night, which is calculated based on the theoretical sunrise and sunset times.

The LED driver does not have a real-time clock. The internal reference clock is derived from the mains frequency and the driver detects it if it is connected to a 50 Hz or 60 Hz supply system, assuming a time base of 20 ms or 16.6 ms. This allows a synchronized switching of all units. In case of DC operation, the dimming mode is stopped until the AC voltage is applied again and a power-off/on cycle is performed.

Warning

If the output level is set below the minimum physical dimming level of the LED driver, the minimum dimming current is used. The software still displays the original value. If the output level falls below the minimum allowed dimming current, the value is visualized in red.

3.2.1 Feature activation

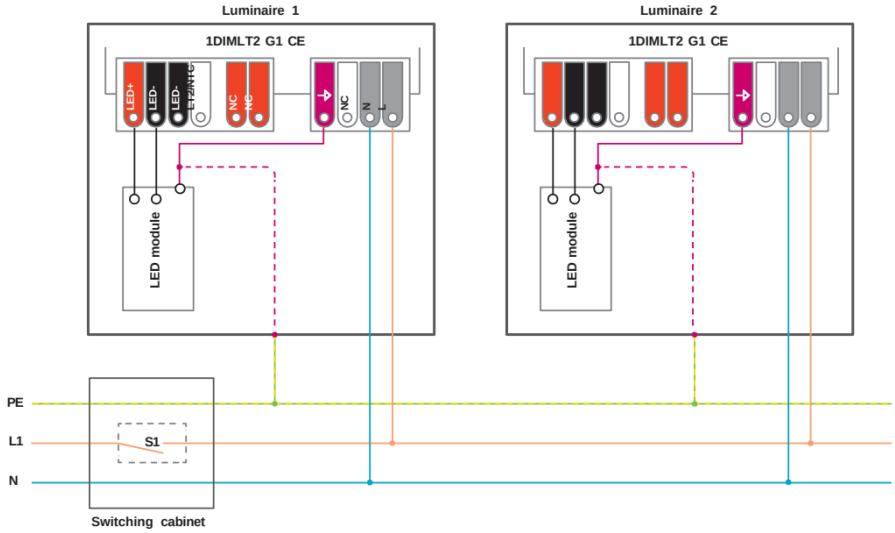
The AstroDIM functionality has to be activated by selecting the following operating mode:

— AstroDIM

AstroDIM operating-mode selection



Figure 17: Wiring — AstroDIM



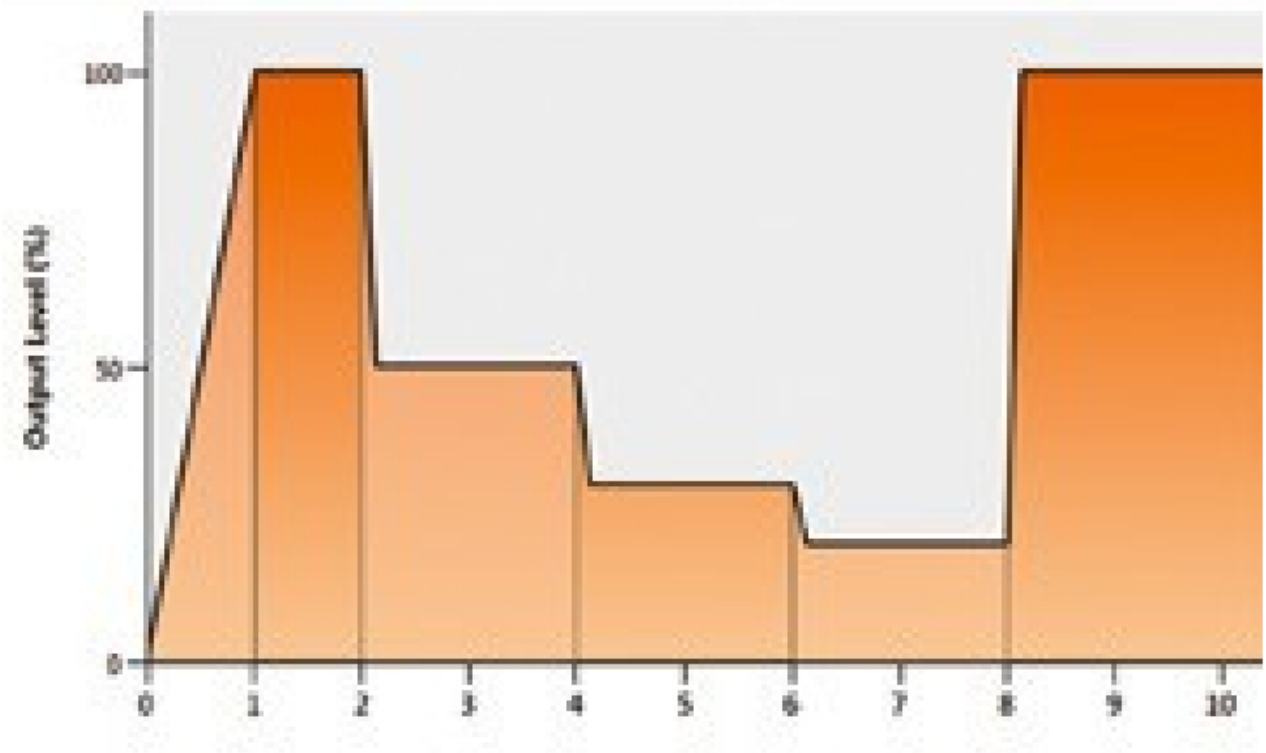
3.2.2 Time-based mode

In this mode, the LED driver performs the dimming profile defined in the reference schedule based on the switch-on time of the unit. Five independent output levels can be set for each step. The minimum length of one dimming period has to be longer than the AstroDIM fade time.

The maximum duration of the schedule is 23 h and 59 min. If less than five output levels need to be performed, two sequenced levels have to be set to the same value. The AstroDIM dimming profile in the time-based mode already starts after the first power-off/on cycle after programming.

Figure 18: Time-based AstroDIM





Fade timing

AstroDIM fade time: Fade time between the different dimming levels.

Switch-on fade time: Fade time after the power-on of the LED driver. The output level at the end of this fade time is defined by the output level of the corresponding dimming period.

Table 6: Fade timing parameters (time-based mode)

Parameter	Min.	Max.	Default
AstroDIM fade time	0, 2 s	8 min	3 min
Switch-on fade time	0, 15 s	60 min	0 s

3.2.3 Astro-based mode

In this mode, the LED driver performs a dimming profile based on the daily power-on and power-off times. The dimming schedule is adapted according to the length of the night.

The Tuner4TRONIC® software calculates the annual average middle of the night based on the theoretical sunrise and sunset times, which are related to the location selected in the software. Based on this average middle of the night, five independent dimming periods can be defined in the reference schedule. The minimum length of one dimming period has to be longer than the AstroDIM fade time. Valid time values can be set between 12:00 pm and 11:59 am. If less than five output levels need to be performed, two sequenced levels have to be set to the same value.

The defined dimming profile is already performed after the second power-off/on cycle after programming.

Figure 19: Astro-based AstroDIM



Fade timing

AstroDIM fade time: Fade time between the different dimming levels.

To achieve further energy savings in the twilight phase, the switch-on and switch-off fade time can be set to up to 60 minutes.

Switch-on fade time: Fade time after the LED driver has been powered on. The output level at the end of this fade time is defined by the output level of the related dimming period.

Switch-off fade time: Fade time prior to the estimated power-off point. The switch-off fading is performed down to the minimum dimming current until the LED driver is switched off externally.

Table 7: Fade timing parameters (astro-based mode)

Parameter	Min.	Max.	Default
AstroDIM fade time	0, 2 s	8 min	3 min
Switch-on fade time	0, 15 s	60 min	0 s

Parameter	Min.	Max.	Default
Switch-off fade time	OFF, 0 s	60 min	OFF

Based on the theoretical sunrise and sunset times, the “schedule by day” in the AstroDIM feature tab calculates the estimated dimming behavior for a specific day. If daylight saving has to be considered, the corresponding check box needs to be ticked. The LED driver itself is not able to detect summer and winter time and does not have an internal real-time clock.

In case the installation is not powered on and off at the calculated sunrise and sunset times, the correct values can be entered in the manual mode as shown in figure 20.

Figure 20: Schedule by day

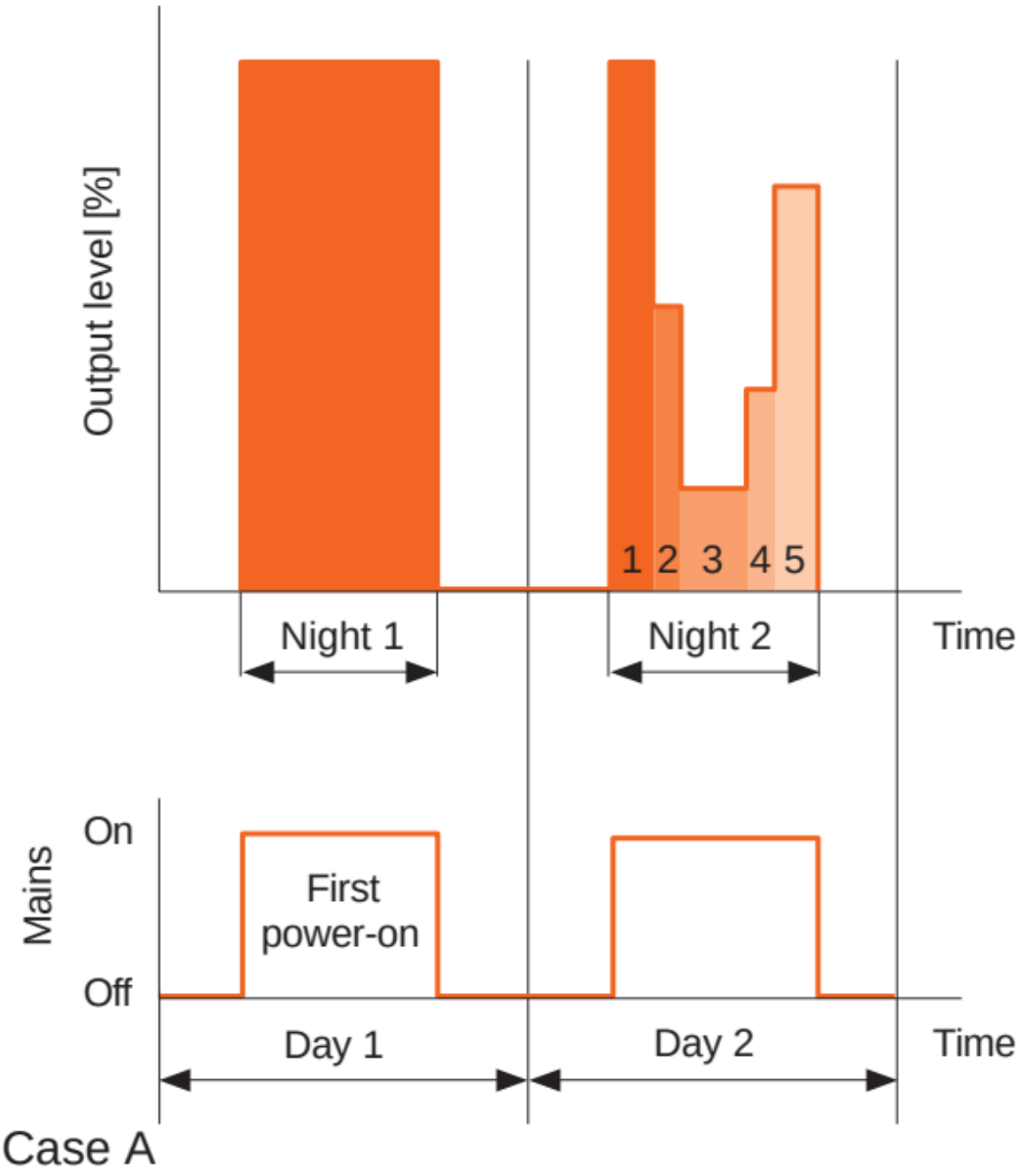


The AstroDIM function in astro-based mode relies on an intelligent algorithm. It starts after the first valid night and reaches its maximum precision after 8 valid days. A valid on-time is defined if the duration of the operation is longer than 4 hours and shorter than 24 hours.

AstroDIM use cases

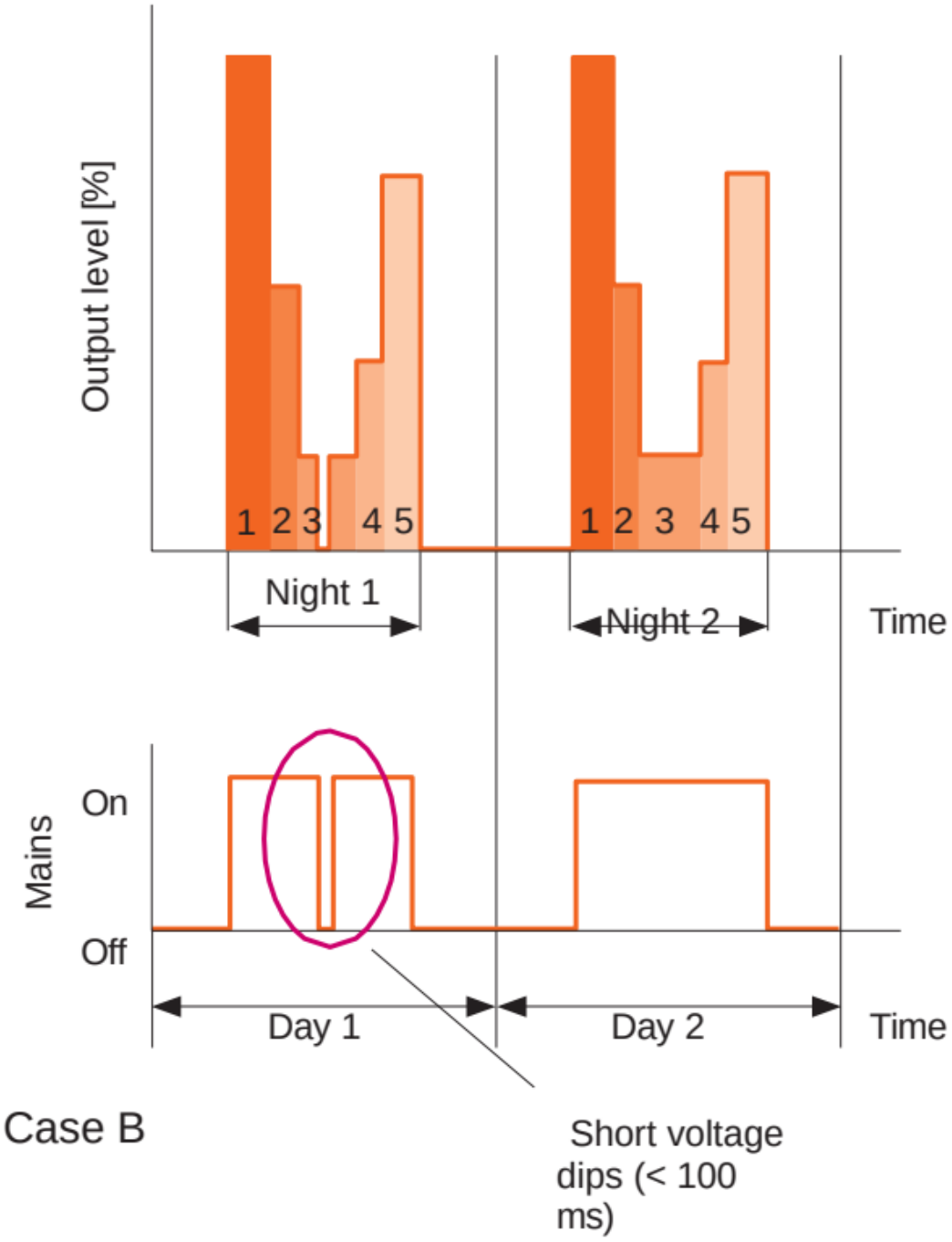
The AstroDIM profile is performed after the first valid on-time.

Figure 21, case A: First valid on-time



Voltage dips of less than 100 ms do not affect the on-time (case B).

Figure 21, case B: Short voltage dips



If the on-time of the LED driver is shorter than 4 hours, it is not saved and therefore not used to calculate the next on-time (case C).

Figure 21, case C: On-time shorter than four hours

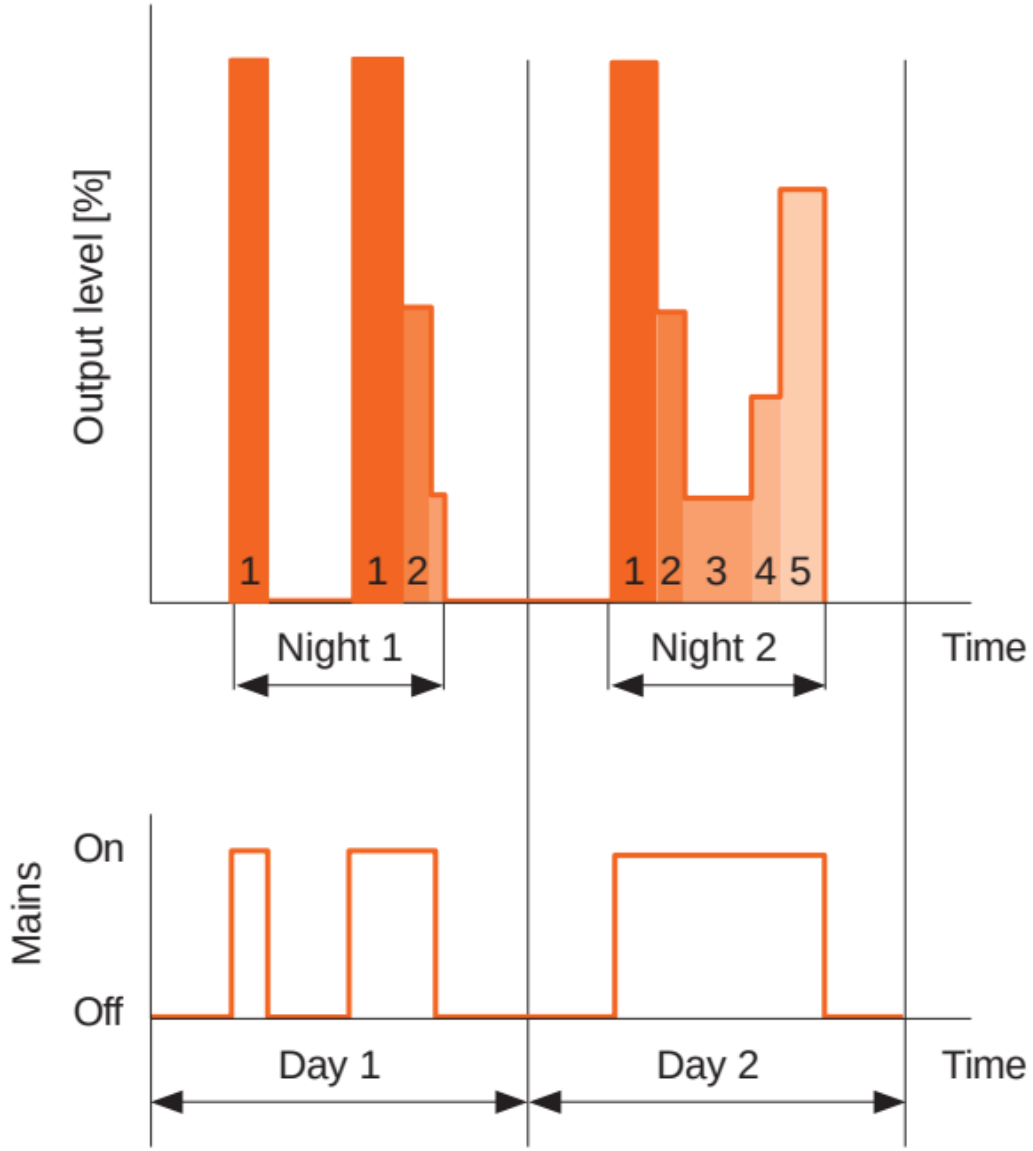
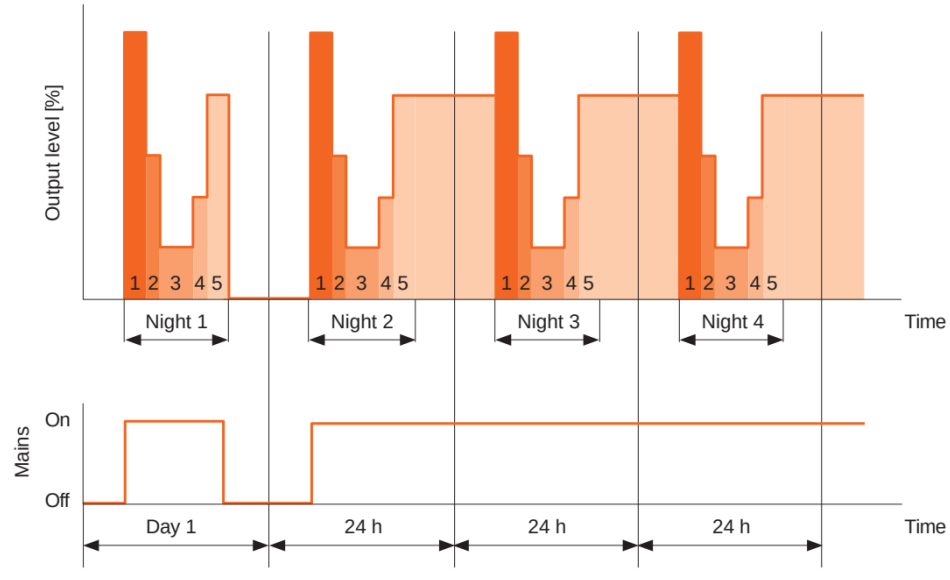
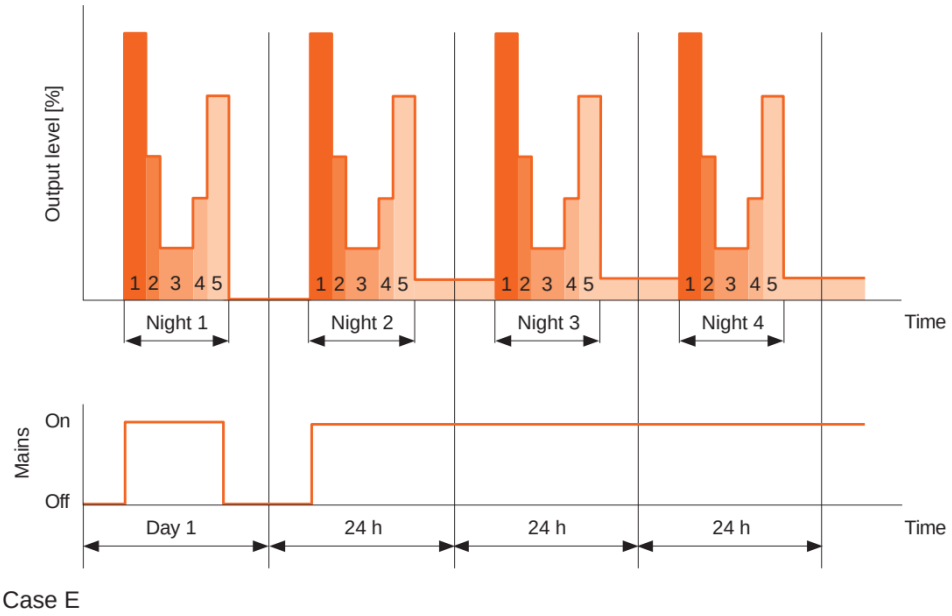


Figure 21, case D: Without switch-off fade time



Case D

Figure 21, case E: With switch-off fade time



Case E

If the on-time of the LED driver is longer than 24 hours, it is not saved and therefore not used to calculate the next on-time.

Note

If the 1DIM NFC CE LED driver is operated longer than 24 hours, it cannot be assumed that the different dimming level will start at the same time, because the time base is affected by the accuracy of the mains frequency over the day, week, month and year.

4 Additional information

4.1 Insulation

1DIM NFC CE LED drivers have a double/reinforced insulation between the primary and the secondary side and a double/reinforced insulation between all electronic parts and the casing.

Table 8: Insulation and Uout

Type	Primary/secondary insulation	Casing insulation	Uout
OT 20/170-240/1A0 1DIMLT2 G1 CE	SELV	Double	60 V
OT 40/170-240/1A0 1DIMLT2 G1 CE	SELV	Double	60 V
OT 75/170-240/1A0 1DIMLT2 G1 CE	SELV	Double	120 V
OT 110/170-240/1A0 1DIMLT2 G1 CE	Double	Double	250 V
OT 75/220-240/1A0 1DIM G2 CE	Double	Double	115 V
OT 165/220-240/1A0 1DIM G2 CE	Double	Double	206 V / 260 V

The equipotential pin (EQUI) meets the requirements for double insulation versus the primary side and requirements for basic insulation versus the secondary side (it complies with the requirements of IEC 60598-1 Annex A – "safe to be touched" – in case of insulation fault between all secondary circuits and accessible conductive parts).

The detailed insulation levels are defined in the instruction sheet of the product.

4.2 Cable preparation

1DIM NFC CE LED drivers use open terminals for easy and quick wiring. To ensure a safe and stable hold of the wires, the insulation of the cables should be stripped accordingly.

Figure 22: Cable preparation, primary side

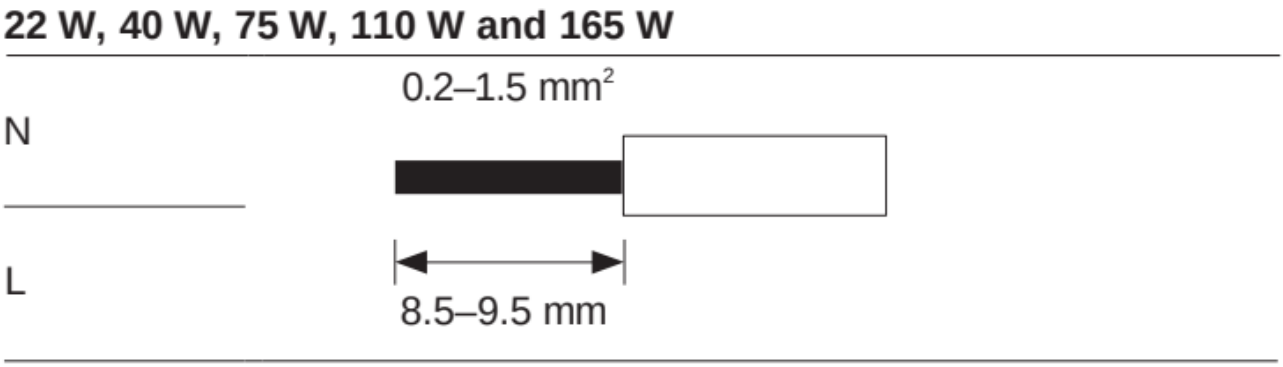
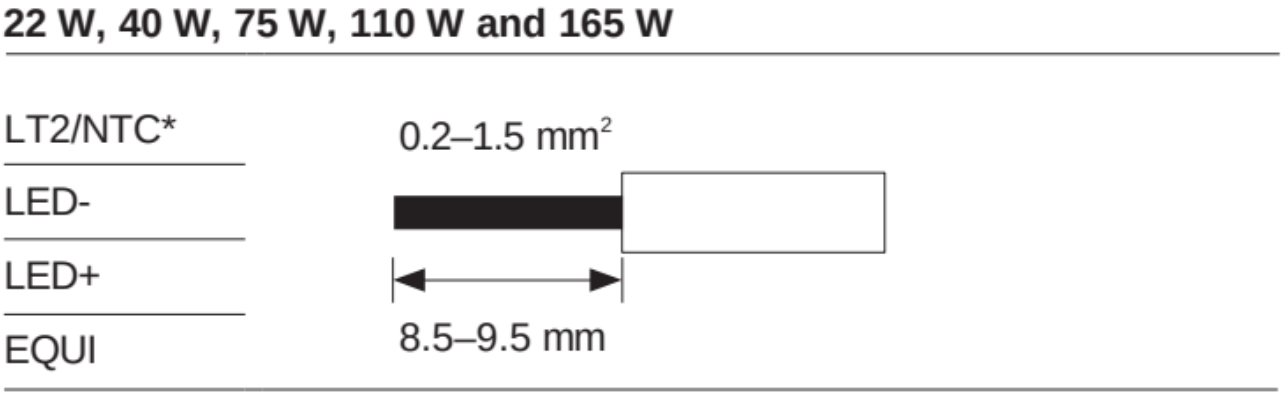


Figure 23: Cable preparation, secondary side and equipotential pin



- LT2/NTC connector only available with 1DIMLT2 products

4.3 Incorrect wiring on the output side

1DIM NFC CE LED drivers are inherently protected against incorrect wiring on the output side. Incorrect wiring between LED+ and LT2/NTC can irreversibly damage the LED driver. If there is a short circuit between LED+ and LED-, the LED driver shuts down and tries to switch the load back on. The same behavior might occur if the output voltage falls below the minimum allowed voltage.

4.4 Input overvoltage

The driver withstands an input voltage of up to 305 VAC for an unlimited time, but a shutdown of the output load might occur in case the supply voltage exceeds 270 V AC. In case of miswiring, the driver can withstand up to 350 VAC for no longer than two hours. Under operation conditions in which overvoltage levels of >264 VAC occur, the product needs to be additionally protected by an external fuse (400 V 4 A, time lag, I2 t >160 A2 sec).

4.5 Surge protection

1DIM NFC CE LED drivers offer a common-mode protection level of up to 10 kV with a unique integrated overvoltage suppression for the connected LED module, which minimizes the stress on the LED module and thus ensures high reliability in the field. To achieve the surge protection levels, the EQUI pin needs to be connected to the heat sink of the LED module (see figures 24 and 25). The EQUI pin meets the insulation requirements for protection class I and II luminaires. The protection level between L and N is 6 kV.

In case an external overvoltage protection device (SPD) is used to protect the mains input, the protection level UP of the SPD between mains input and earth should be equal.

The following protection levels can be achieved for class I and II luminaires:

Table 9: 1DIM NFC CE surge protection levels

Surge between	Test condition according to EN 61547
L–N	6 kV at 2-Ω source
L–EQUI / N–EQUI	10 kV at 12-Ω source

If an additional external surge protection device is used, please contact your Inventronics sales contact for support.

Figure 24: Protection class I luminaire

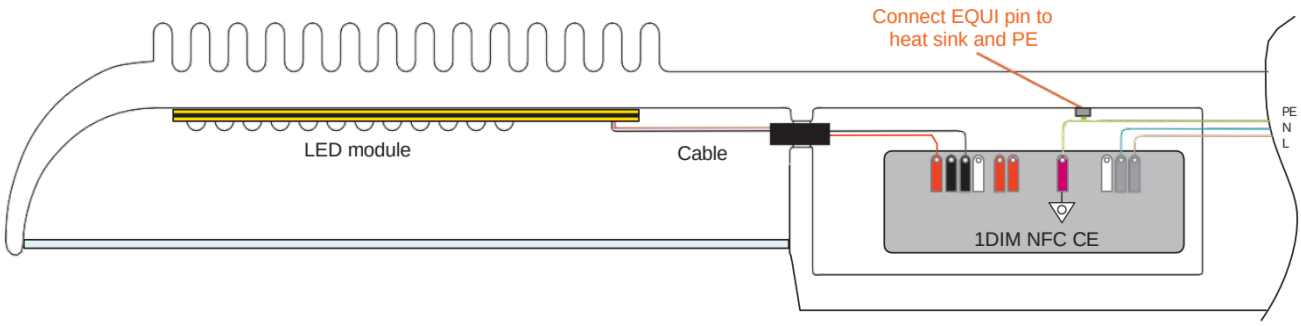
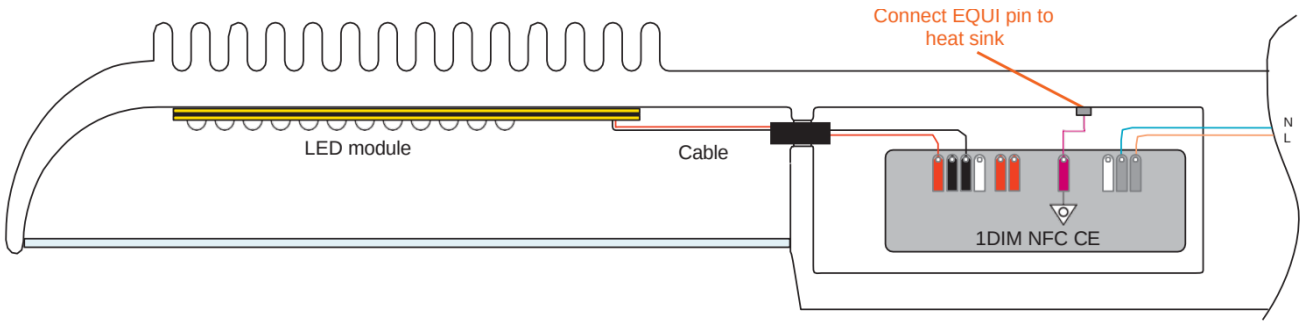


Figure 25: Protection class II luminaire



5 Programming

1DIM NFC CE LED drivers can be programmed using Tuner4TRONIC® via NFC. Please find details about the Tuner4TRONIC® tool chain, user manuals, application guides, tutorials and download links on https://www.inventronics-light.com/t4t

Note

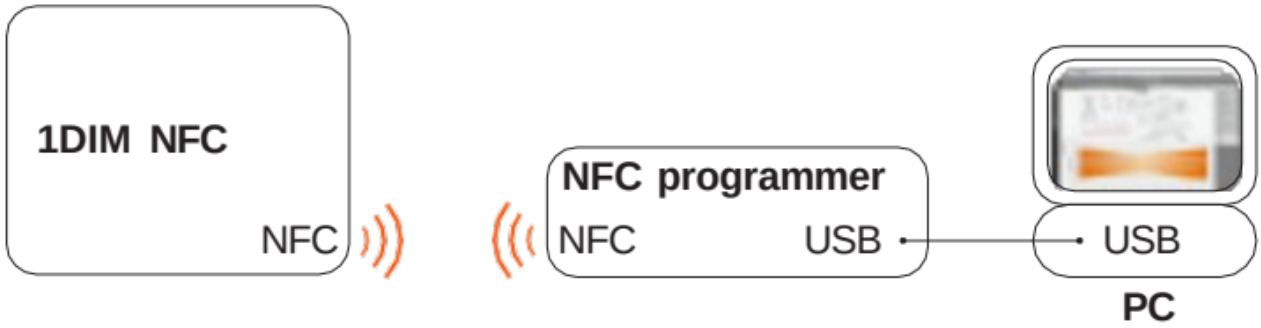
Performance check: If electronically controlled control gears are combined with electrical power supplies, the electronic circuits of both devices might influence each other. This could lead to wrong measurements (e.g. lower power factor).

5.1 Programming with NFC USB readers

1DIM NFC CE LED drivers must not be powered during programming with T4T-Production via NFC. Place the LED driver on the NFC reader and align the antennas of both devices. The position of the NFC antenna is indicated by the NFC logo on the label of the LED driver and is mounted vertically at the side of the driver's housing. When using box programming, the NFC logo on the box needs to be placed in the center of the FEIG Antenna ANT310/310.

Please find a list of supported NFC readers in the T4T-Production user manual.

Figure 26: LED driver programming with NFC



Note

A power-off/on cycle is necessary to activate the password settings in ConfigLock

5.2 Programming with T4T-Field App

1DIM NFC CE LED drivers can be programmed via NFC with the Tuner4TRONIC® Field app available for download to Android and iOS mobile devices from GooglePlay and AppStore. T4T-Field App allows reading driver data, programming drivers from production files and editing data such as light output, CLO, dimming profiles and luminaire info data. Reading and writing data with T4T-Field App is possible with and without powering the driver with mains. Programming data may be restricted by password settings from the luminaire manufacturer.

Tuner4TRONIC Field app



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