LL25SE-CC-150-500

25 W **SELV Constant current** LED driver

Product code: 5770

25 W 220 – 240 V 0/ 50 – 60 Hz

- SELV output protection for safety and flexibility in luminaires
- Very low current ripple, complying with IEEE 1789 recommendation
- Suitable for DC use
- Active open load protection
- Long lifetime up to 100 000 h
- Ideal solution for Class I and Class II luminaires

Functional Description

- Adjustable constant current output: 150 mA (default) to 500 mA
- 350 mA fixed current output option
- Current setting with external (LED-Iset) resistors
- Optional functional earth connection, see page 4 for more details.

Mains Characteristics

Voltage range	198 VAC – 264 VAC
	Withstands max. 320 VAC (max. 1 hour)
DC range	176 VDC - 280 VDC
starting voltage	> 190 VDC
Mains current at full load	0.11 – 0.14 A
Frequency	0 / 50 Hz – 60 Hz
THD at full power	< 15 %
Leakage current to earth	< 0.3 mA
Tested surge protection	1 kV L-N, 2 kV L-GND (IEC 61000-4-5)
Tested fast transient protection	2 kV (IEC 61000-4-4)

Insulation between circuits & driver case

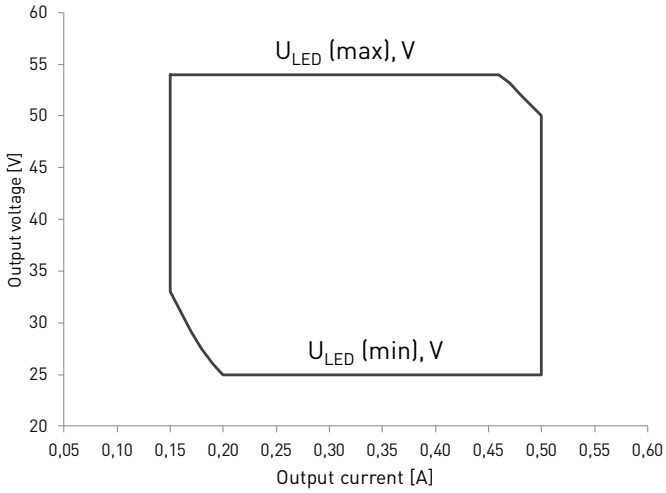
Mains circuit - SELV circuit	Double/reinforced insulation
Output - Driver case	Basic insulation
Mains input - Ground input	Double/reinforced insulation

Load Output (SELV <60 V)

Output current (I_{out})	150 mA (default) – 500 mA
Accuracy	± 5 %
Ripple	< 1 %* at ≤ 120 Hz
	*) Low frequency, LED load: Cree XP-G LEDs
PstLM	< 0.03*
SVM	< 0.05*
	*) At full power, measured with Cree XP-G LED modules.
U_{out} (max) (abnormal)	60 V

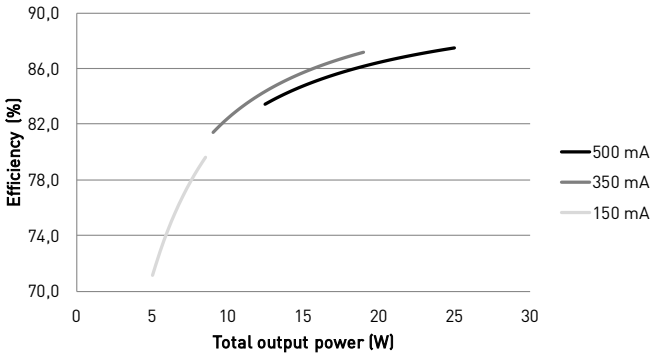
I_{LED}	150 mA	350 mA Fixed output	500 mA
P_{Rated}	8.1 W	18.9 W	25 W
U_{LED}	33 - 54 V	25 - 54 V	25 - 50 V
PF (λ) at full load	0.85	0.96	0.97
Efficiency (η) at full load	79 %	87 %	87 %

Operating window

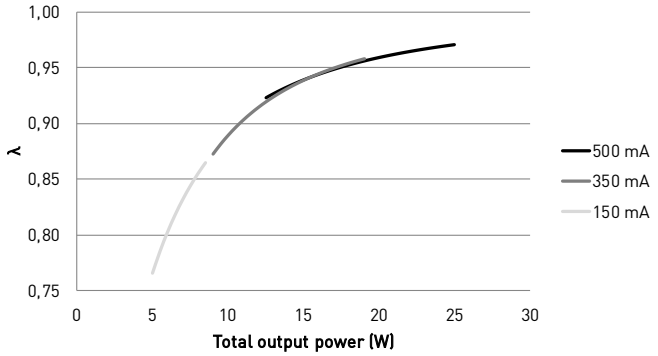


Driver performance

Typical efficiency



Typical power factor



Operating Conditions and Characteristics

Absolute highest allowed t_c point temperature	75 °C
Tc life (60 000 h) temperature	75 °C
Ambient temperature range*	–25 °C … +55 °C*
Storage temperature range	–40 °C … +80 °C
Maximum relative humidity	No condensation
Mains switching cycles	> 100 000 cycles
Lifetime (90 % survival rate)	100 000 h, at t_c = 65 °C 90 000 h, at t_c = 70 °C 60 000 h at t_c = 75 °C

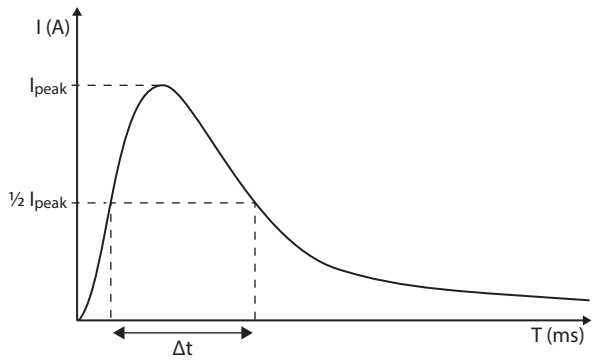
**) For other than independent use, higher t_a of the controlgear possible as long as highest allowed t_c point temperature is not exceeded*

Quantity of drivers per miniature circuit breaker 16 A Type C

Based on I_{cont}	Based on inrush current I_{peak}	Typ. peak inrush current I_{peak}	1/2 value time, Δt	Calculated energy, $I_{peak}^2 \Delta t$
80 pcs.	86 pcs.	22 A	136 µs	**0.0461 A^2s**

CONVERSION TABLE FOR OTHER TYPES OF MINIATURE CIRCUIT BREAKER

MCB type	Relative quantity of LED drivers
B 10 A	37 %
B 16 A	60 %
B 20 A	75 %
C 10 A	62 %
C 16 A	100 % (see table above)
C 20 A	125 %

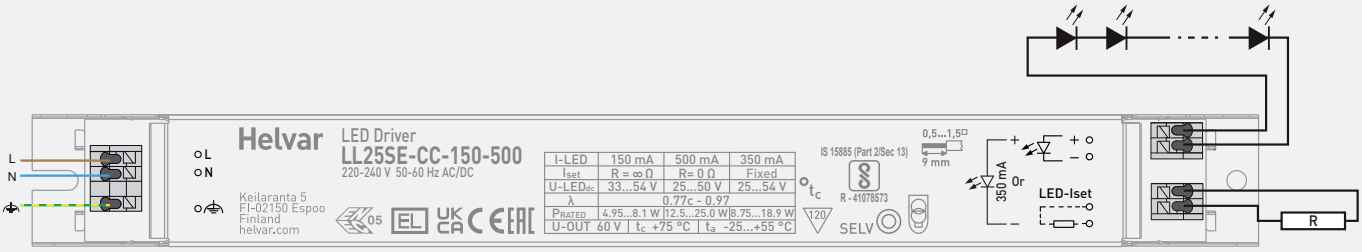


Type C MCB's are strongly recommended to use with LED lighting. Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

Connections and Mechanical Data

Wire size	0.5 mm² – 1.5 mm²
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598
Maximum driver to LED wire length	1.5 m
Weight	195 g
IP rating	IP20

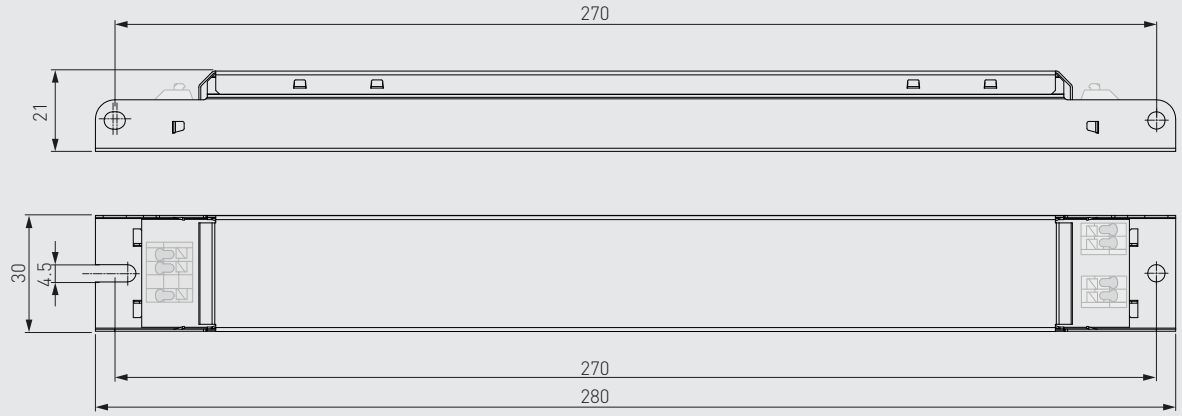
Connections



Note:

- *Earth connection to functional earth terminal is optional and not needed for the functionality of the driver. See page 4 for details.*
- *Not suitable for load side switching operation*
- *Label may differ if the unit is preset to fixed current*

Dimensions (mm)



The LED-Iset resistor/current setting values are adjusted according to the LEDset specification. The resistor value for each required output current can thus be calculated from the formula R [Ω] = (5 [V] / I_out [A]) * 1000. Below are the available LED-Iset resistors from Helvar Components, pre-adjusted for the most common output currents.

Helvar Components LED-Iset resistors and currents (Nominal I_{out} (±5 % tol.))

LED-Iset resistor model	MAX	475 mA	450 mA	425 mA	400 mA	375 mA	350 mA	325 mA	300 mA	275 mA	250 mA	225 mA	200 mA	No resistor
I_{out} (mA)	500	475	450	425	400	375	350	325	300	275	250	225	200	150
Order code	T90000	T90475	T90450	T90425	T90400	T90375	T90350	T90325	T90300	T90275	T90250	T90225	T90200	N/A
Resistance values (Ω)	0	10.5k	11k	11.8k	12.4k	13.3k	14.3k	15.4k	16.5k	18.2k	20k	22.1k	24.9k	∞

The current can be adjusted also with normal resistors by selecting suitable resistor value (formula R [Ω] = (5 [V] / I_out [A]) * 1000). Reference resistor values can be found below order code in the table above.

LL25SE-CC-150-500 LED driver is suited for built-in usage in luminaires. In order to have safe and reliable LED driver operation, the LED luminaires will need to comply with the relevant standards and regulations (e.g. IEC/EN 60598-1). The LED luminaire shall be designed to adequately protect the LED driver from dust, moisture and pollution. The luminaire manufacturer is responsible for the correct choice and installation of the LED drivers according to the application and product datasheets. Operating conditions of the LED drivers may never exceed the specifications as per the product datasheet.

Installation & operation

Maximum ambient and t_c temperature:

- For built-in components inside luminaires, the t_a ambient temperature range is a guideline given for the optimum operating environment. However, integrator must always ensure proper thermal management (i.e. mounting base of the driver, air flow etc.) so that the t_c point temperature does not exceed the t_c maximum limit in any circumstance.
- Reliable operation and lifetime is only guaranteed if the maximum t_c point temperature is not exceeded under the conditions of use.

Current setting resistor

LL25SE-CC-150-500 LED driver features a constant current output adjustable via current setting resistor.

- An external resistor can be inserted in to the current setting terminal, allowing the user to adjust the LED driver output current.
- When no external resistor is connected, then the LED drivers will operate at their default lowest current level.
- A standard through-hole resistor can be used for the current setting. To achieve the most accurate output current it is recommended to select a quality low tolerance resistor. Minimum diameter for resistor leg is 0.51mm.
- Always connect the current setting resistor only into the terminals marked with LED-Iset on the LED driver label.
- For the resistor/current values, refer to the table on page 3.

LED driver earthing

- LL25SE-CC-150-500 is LED driver suitable for Class I and II luminaires as well as driving Class III (SELV) luminaire parts in independent installation with external strain relief.
- When used inside **Class I and Class II** luminaires, the earth cable is recommended to be connected to improve the EMC performance of the driver, but it is not mandatory. It is the responsibility of the integrator to ensure that the assembled luminaire EMC performance complies with the latest standards.

Miniature Circuit Breakers (MCB)

- Type-C MCB's with trip characteristics in according to EN 60898 are recommended.
- Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

Lamp failure functionality

Short circuit

Driver can withstand output short circuit.

Underload

Driver can withstand underload, however reliable operation is only guaranteed in specified voltage range.

Overload

Driver can withstand minor overload, however reliable operation is only guaranteed in specified voltage range.

No load

When open load is detected, driver limits output voltage according to Uout (max) (abnormal) and goes into low power consumption stand-by mode. After resolving the fault, the normal driver operation can be resumed through a mains reset (> 2 seconds).

Conformity & standards

General and safety requirements	EN 61347-1
Particular safety requirements for DC or AC supplied electronic control gear for LED modules	EN 61347-2-13
Additional safety requirements for AC or DC supplied electronic controlgear for emergency lighting	EN 61347-2-13, Annex J
Thermal protection class	EN 61347, C5e
Mains current harmonics	EN 61000-3-2
Limits for voltage fluctuations and flicker	EN 61000-3-3
Radio frequency interference	EN 55015
Immunity standard	EN 61547
Performance requirements	EN 62384
Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers	IEEE 1789-2015
Compliant with relevant EU directives	
RoHS/REACH compliant	
ENEC and CE / UKCA marked	

Label symbols

Safety isolating control gear with short circuit protection (SELV control gear).

Double insulated control gear suitable for built-in use.

Thermally controlled control gear, incorporating means of protection against overheating to prevent the case temperature under any conditions of use from exceeding 120 °C.

AC/DC supplied electronic control gear for emergency lighting purposes intended for connection to a centralized emergency power supply.