LL1x150-E-CC

Helvar Components

150 W **Constant Current** LED driver

Product code: 5551

150 W 220 – 240 V 0 / 50 – 60 Hz

- Very high efficiency up to 96%
- Very low output current ripple complying with IEEE 1789 recommendations
- Long lifetime up to 100 000 h
- Suitable for use in emergency lighting applications
- Driver protection Class I
- Ideal solution for Class I luminaires, suitable for Class II luminaires too*

** See page 4 for details.*

Illustrative only, the driver mechanics have been updated from this photo, see connections and dimensions pictures in this datasheet for the latest information..

Functional Description

- Adjustable constant current output: 350 mA (default) to 700mA
- Current setting with external resistors
- Open & short circuit protection

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	0.50 – 0.80 A
Frequency	0 / 50 Hz – 60 Hz
THD at full power	< 7 %
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

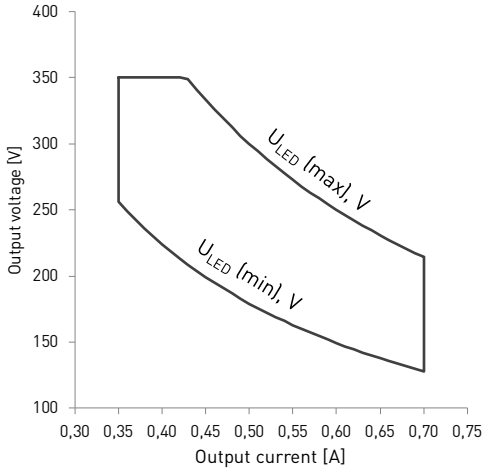
Mains circuit - Output	Non-isolated
Mains and output - Driver case	Basic insulation

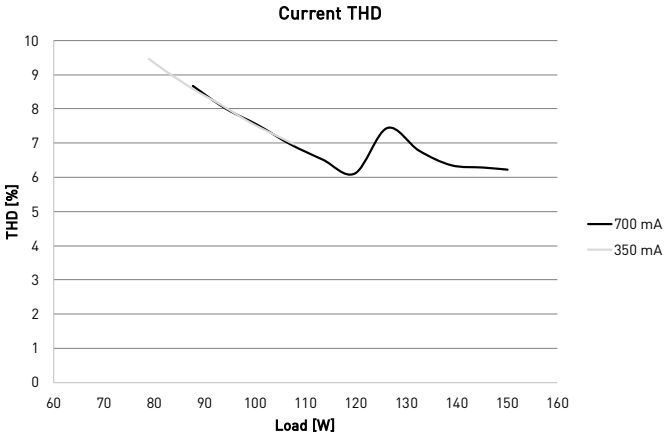
Load Output (non-isolated)

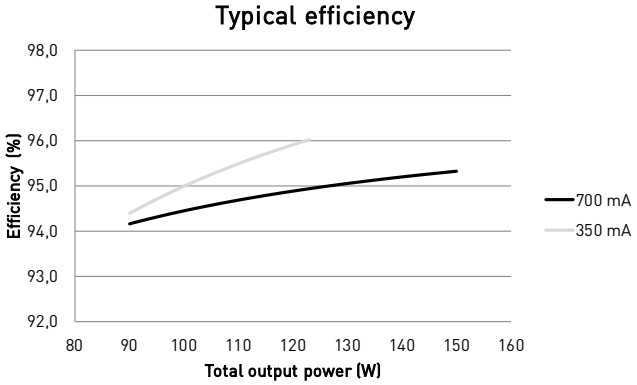
Output current (I_{out})	350 mA (default) – 700 mA
Accuracy	± 5 %
Ripple	< 2 %* at ≤ 120 Hz
	*) Low frequency, LED load: Cree XP-G LEDs
PstLM	< 0.02*
SVM	< 0.01*
	*) At full power, measured with Cree XP-G LED modules.
U_{OUT} (max) (abnormal)	400 V

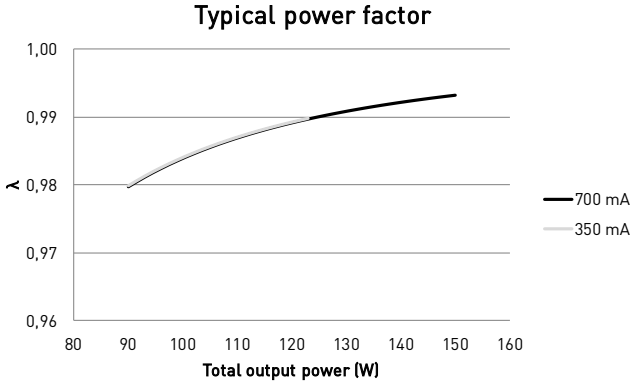
I_{LED}	350 mA	700 mA
P_{RATED}	122.5 W	150 W
U_{LED}	257 – 350 V	128 – 214 V
PF (λ) at full load	0.98	0.98
Efficiency (η) at full load	96 %	95 %

Operating window and driver performance









Operating Conditions and Characteristics

Highest allowed t_c point temperature	85 °C
t_c life (50 000 h) temperature	75 °C
Ambient temperature range*	–25 °C ... +50 °C*
in independent use	–25 °C ... +40 °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 50 000 h, at t_c = 75 °C 25 000 h at t_c = 85 °C

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

Connections and Mechanical Data

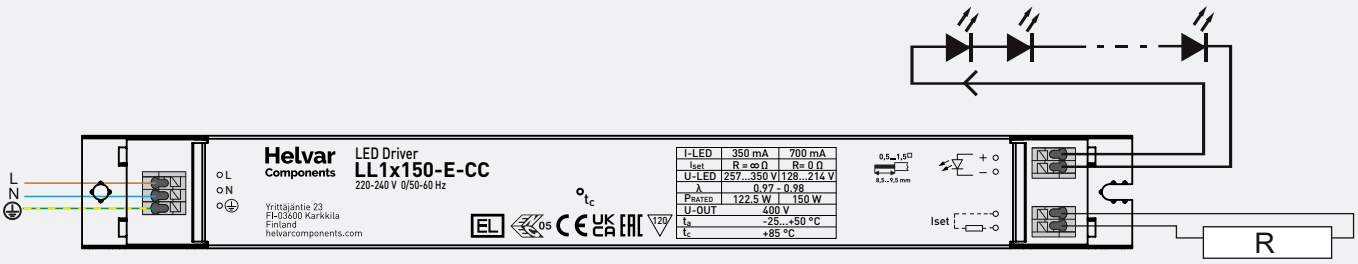
Wire size	0.5 mm² – 1.5 mm²
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598
Maximum driver to LED wire length	5 m
Weight	254 g
IP rating	IP20

Output current can be set with the current setting resistor connected to the Iset terminal. Example current and resistor values across the range can be found in the following table. More information about the current setting resistor is given on page 4.

Iset current setting resistor values

R(Ω)	0	220	470	820	1,2k	1,5k	2,2k	2,74k	3,9k	5,6k	6,8k	10k	18k	39k	∞
I_{out} (mA)	700	675	650	625	600	575	550	525	500	475	450	425	400	375	350
Order Code	T70000	N/A	T70471	T70821	N/A	T70152	T70222	T72741	T70392	T70562	T70682	T70103	T70183	N/A	N/A

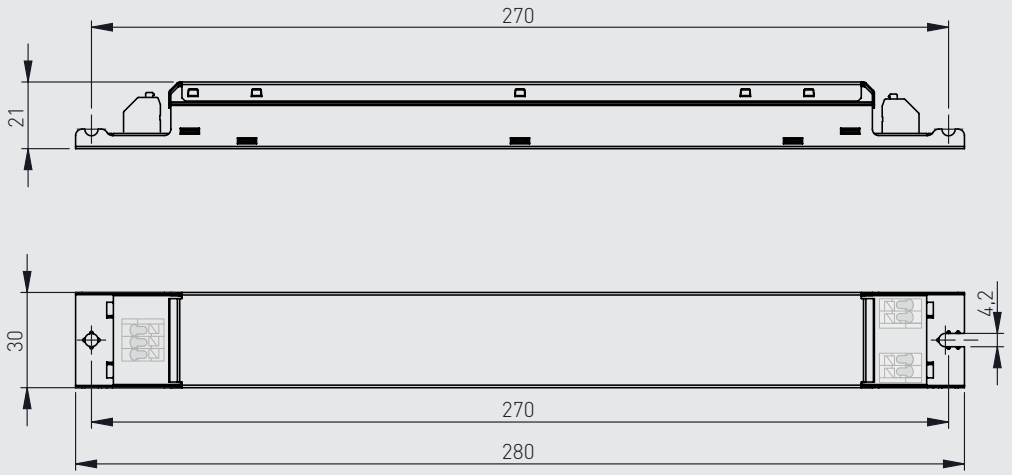
Connections



Note:

- *Not suitable for load side switching operation*
- *Label may differ if the unit is preset to fixed current*

Dimensions (mm)

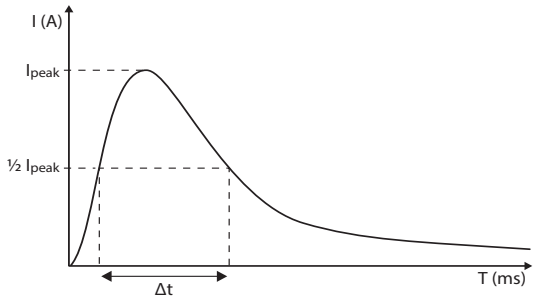


Quantity of drivers per miniature circuit breaker 16 A Type C

Based on inrush current I_{peak}	Typ. peak inrush current I_{peak}	1/2 value time, Δt	Calculated energy, $I_{peak}^2 \Delta t$
18 pcs.	56.2 A	231 µs	0.533 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 %



CONTINOUS CURRENT

Total continous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker. Example calculation of total drivers amount limited by continous current: $n(I_{cont}) = (16\ A\ (I_{nom,Ta}) / \text{"nominal mains current with full load"}) \times 0.76)$. This calculation is an example according to recommended precautions due to multiple adjacent circuit breakers (> 9 MCBs) and installation environment (T_a 30 degrees); variables may vary according to the use case. Both inrush current and continous current calculations are based on ABB S200 series circuit breakers. More specific information in ABB series S200 circuit breaker documentation.

NOTE! 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.

LL1x150-E-CC LED driver is suited for built-in usage in luminaires. With LL1x2130-SR strain reliefs, independent use is possible too (see the LL1x2130-SR datasheet for details). 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

LL1x150-E-CC 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 Iset on the LED driver label.
- For the resistor/current value selection, refer to the table on page 3.
- For drivers not providing isolation (non-isolated), current setting resistor must be insulated according safety regulations.

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.

Installation site

- The general preferred installation position of LED drivers for independent use is to have the top cover facing upwards.

LED driver earthing

- LL1x150-E-CC LED driver is a protective Class I device and designed for Class I luminaires.
- If used inside **Class I** luminaires, this LED driver must always have the protective earth cable connected for safety reasons.
- The driver is designed to be used inside Class I luminaires. For usage inside **Class II** luminaires, the safety of the luminaire shall be ensured through double/reinforced insulation of live parts and through supplementary insulation of conductive parts of the casing, or any conductive parts connected to the casing, as the casing is only basic insulated from the live parts. The earth connector of the driver shall be left unconnected and there shall be no protective earth terminals in the luminaire terminal block to fulfill the requirements of IEC/EN 60598-1 for Class II luminaires. The EMC performance of the driver changes when left unearthed, so it is always the responsibility of the integrator to take measures and necessary actions, for example by luminaire design to ensure the assembled luminaire complies with latest EMC standard.

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

No load

When open load is detected, driver limits output voltage according to Uout (max) (abnormal).

Overload

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

Underload

Reliable operation of the driver is only guaranteed in specified voltage range.

Short circuit

Driver can withstand output short circuit.

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

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