LC150HE-CC-350-700-IND-PCB

Helvar

150 W **Constant Current** LED driver

Product code: 57299

150 W 220 – 240 V 0 / 50 – 60 Hz

- Very high efficiency up to 96 %
- Low current ripple complying with IEEE 1789 recommendation
- Improved driver surge protection (4 kV / 4 kV)
- Wide ambient temperature operation range
- Long lifetime up to 100 000 h
- Suitable for DC use
- PCB only model*

** See page 4 for details.*

CE EAC

Functional Description

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

Mains Characteristics

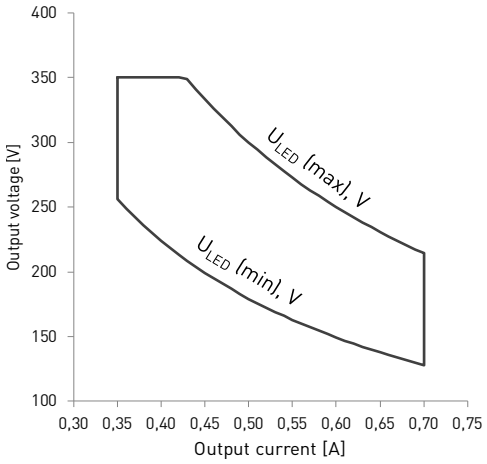
Nominal rated voltage range	220 V – 240 V, 0 / 50 – 60 Hz
AC voltage range	198 VAC – 264 VAC
	Withstands max. 320 VAC (max. 1 hour)
DC voltage range	176 VDC – 280 VDC
DC starting voltage	> 190 VDC
Mains current at full load	0.60 – 0.80 A
Mains power at full load	157 W
Frequency	0 / 50 Hz – 60 Hz
THD at full power	< 10 %
Leakage current to earth	< 0.3 mA
Tested surge protection	4 kV L-N, 4 kV L-GND (IEC 61000-4-5)
Tested fast transient protection	4 kV (IEC 61000-4-4)
Mains circuit - Output	Non-isolated

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 MX3 LEDs
U_{OUT} (max) (abnormal)	370 V

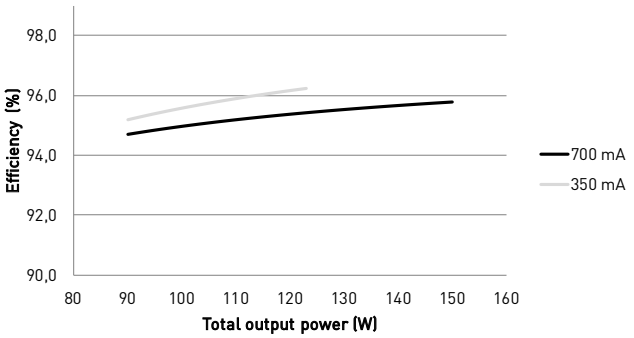
I_{LED}	350 mA	700 mA
P_{RATED}	122.5 W	150 W
U_{LED}	257 V – 350 V	128 V – 214 V
PF (λ) at full load	0.98	0.98
Efficiency (η) at full load	96 %	95 %

Operating window

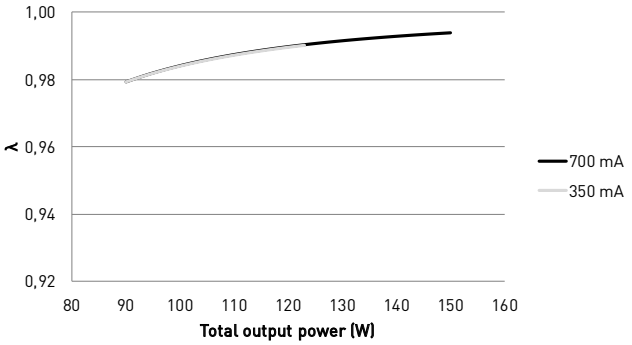


Driver performance

Typical efficiency



Typical power factor



Operating Conditions and Characteristics

Highest allowed t_c point temperature	90 °C
t_c life (60 000 h) temperature	85 °C
Ambient temperature range*	–40 °C ... +60 °C
Storage temperature range	–40 °C ... +80 °C
Maximum relative humidity	No condensation
Lifetime (90 % survival rate)	100 000 h, at t_c = 75 °C 60 000 h, at t_c = 85 °C 45 000 h at t_c = 90 °C

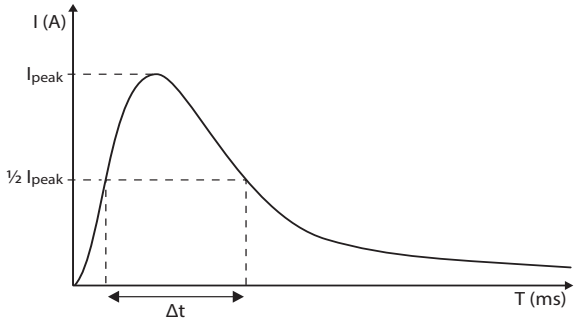
*) Higher t_a of the control gear is possible as long as highest allowed t_c point temperature is not exceeded

Quantity of drivers per miniature circuit breaker 16 A Type C

Based on inrush current I_{peak}	Typ. peak inrush current I_{peak}	1/2 value time, Δt	Calculated energy, I_{peak}^2Δt
24 pcs.	46 A	207 µs	0.296 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

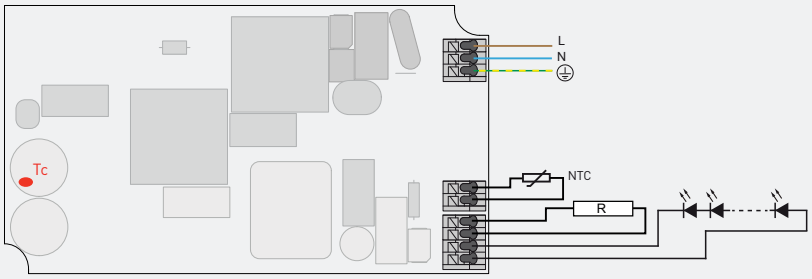
Total continous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker. Example calculation of total drivers amount limited by continous current: n(I_{cont}) = (16 A ($I_{nom,Ta}$) / "nominal mains current with full load") x 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.

Connections and Mechanical Data

Wire size	0.5 mm^2 – 1.5 mm^2
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598
Maximum driver to LED wire length	1.5 m
Weight	140 g
NTC trigger point	8.2 kΩ
IP rating	IP00

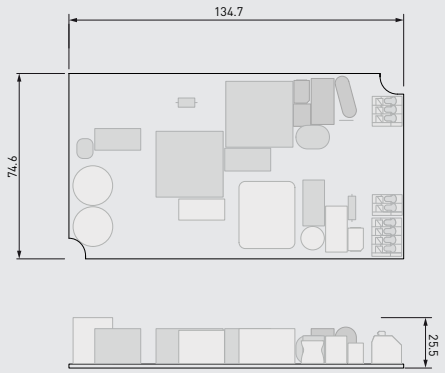
Connections and Tc point location



Note:

- *Not suitable for load side switching operation*
- *Label may differ if the unit is preset to fixed current.*
- *Tc point is measured from the electrolyte condensator in the spot illustrated above*

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, pre-adjusted for the most common output currents.

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

LED-Iset resistor model	MAX	650 mA	600 mA	550 mA	500 mA	475 mA	450 mA	425 mA	400 mA	375 mA	No resistor
I_{out} (mA)	700	650	600	550	500	475	450	425	400	375	350
Order code	T90000	T90650	T90600	T90550	T90500	T90475	T90450	T90425	T90400	T90375	N/A
Resistance values (Ω)	0	7.68k	8.25k	9.09k	10k	10.5k	11k	11.8k	12.4k	13.3k	∞

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.

LC150HE-CC-350-700-IND-PCB LED driver is suited for built-in usage in luminaires. In order to have safe and reliable operation, the luminaire shall comply with the relevant standards and regulations (e.g. IEC/EN 60598-1) and the EMC performance shall be fullfilled for the luminaire construction. The luminaire shall be designed to adequately protect the LED driver from dust, moisture and pollution and the user from any accidental contact with the live parts. 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

LC150HE-CC-350-700-IND-PCB 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.

LED driver earthing

- LC150HE-CC-350-700-IND-PCB LED driver is PCB only driver designed for Class I luminaires.
- When used inside **Class I** luminaires, this LED driver must always have the protective earth cable connected.

ESD precautions at luminaire assembly site

The LC150HE-CC-350-700-IND-PCB PCB's are sensitive to the electrostatic discharge (ESD) and surge current. If voltage exceeding the absolute maximum rating is applied to PCB's, it may cause damage or even destruction to LED devices.

- IEC / EN 61340-5-1: Protection of electronic devices from electrostatic phenomena – General Requirements describes procedures for protection for damage caused by electrostatic discharge while handling electronic devices, following list lists basic protective measures described in the standard.

ESD protection measures in handling and assembling LED driver PCBs

- Employee training for correct handling.
- Personnel grounding via wrist band / footwear.
- ESD protective clothing / shoes.
- Handle PCBs only in ESD protected areas and workplaces.

Mechanical considerations

- While handling the LC150HE-CC-350-700-IND-PCB PCB avoid mechanical stress or pressure applied to the driver.
- Avoid dropping the driver.
- Bending of the driver is not permitted.
- Avoid touching the components on PCB.
- Mechanical modifications (e.g. drilling, milling or sawing the PCB) are not permitted.

Installation considerations

- EMC performance is always dependant on the luminaire structure and therefore it is always the responsibility of the integrator to take measures to ensure that the assembled luminaire complies with latest EMC standards.
- The driver PCB has exposed hazardous live parts and therefore integrator is responsible to ensure sufficient and reliable isolation between live parts and accessible parts of the luminaire. The requirements for isolation, creepage and clearance distances and other safety requirements must be according to relevant luminaire safety standard(s).
- For creepage and clearance distance coordination the mains circuit voltage and LED circuit voltage (Uout) must be considered.
- In case of potting the PCB, do not use material with poor thermal conductivity to avoid more onerous installation than without potting.

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.

Overtemperature

When overtemperature protection is triggered by external NTC thermistor at 8.2 kΩ, the light output is decreased to 50 % (± 5 %) of the nominal.

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*
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
Compliant with relevant EU directives	
RoHS/REACH compliant	

***This LED driver does not have its own enclosure and is delivered as a bare circuit board. It relies upon the luminaire enclosure for protection against accidental contact with live parts.**