LL1x50-E-CC-700-1050

freedom in lighting **Helvar**

50 W **Constant Current** LED driver

Product code: 5545

50 W 220 – 240 V 0 / 50 – 60 Hz

- Duplicated output terminals for parallel load connection
- High efficiency up to 90%
- Low current ripple, complying with IEEE 1789 standard
- Long lifetime up to 100 000 h
- Suitable for DC use
- Driver protection Class II
- Suitable for Class I and Class II luminaires
- For driving Class III (SELV) luminaires, optional strain reliefs available for independent use outside of luminaire (LL1x2130-SR)

SELV

Functional Description

- Adjustable constant current output: 700 mA (default) to 1050 mA
- Current setting with external resistors
- Open, short circuit and adaptive overload 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	0.23 – 0.30 A
Frequency	0 / 50 Hz – 60 Hz
THD at full power	< 10 %
Leakage current to earth	< 0.2 mA
Tested surge protection	1 kV L-N, 2 kV L-GND (IEC 61000-4-5)
Tested fast transient protection	4 kV (IEC 61000-4-4)

Insulation between circuits & driver case

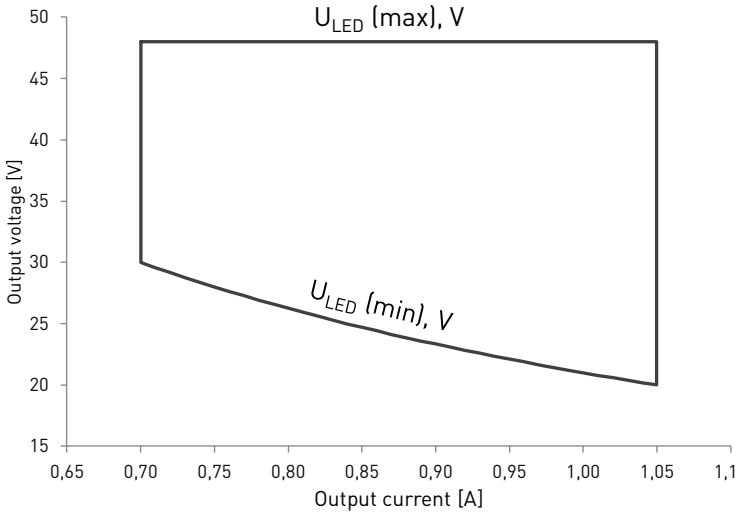
Mains circuit - SELV circuit	Double/reinforced insulation
Mains circuit - Driver case	Double/reinforced insulation

Load Output (SELV <60 V)

Output current (I_{out})	700 mA (default) – 1050 mA
Accuracy	± 5 %
Ripple	< 1 %* at ≤ 120 Hz
	*) Low frequency, LED load: Cree XP-G LEDs
U_{OUT} (max) (abnormal)	60 V

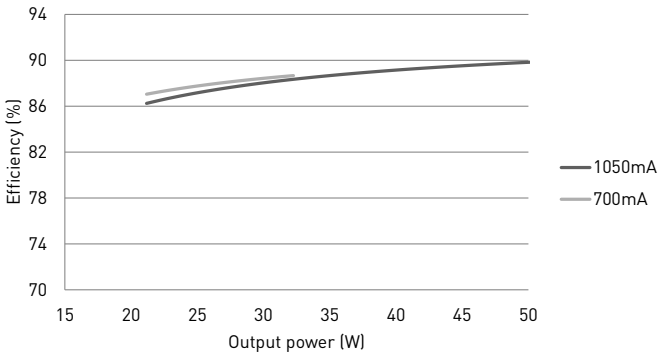
I_{LED}	700 mA	1050 mA
P_{RATED}	33.6 W	50.4 W
U_{LED}	30 – 48 V	20 – 48 V
PF (λ) at full load	0.93	0.96
Efficiency (η) at full load	88 %	90 %

Operating window

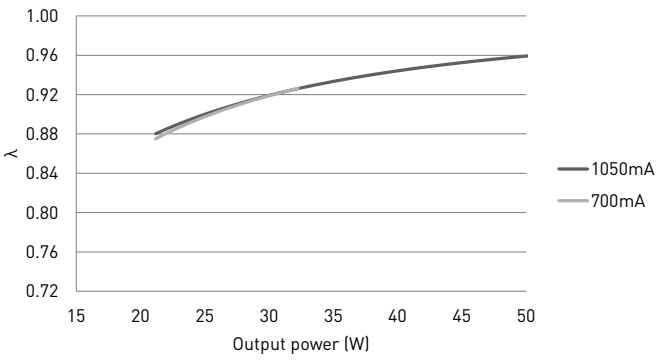


Driver performance

Typical efficiency



Typical power factor



Operating Conditions and Characteristics

Highest allowed t_c point temperature	80 °C
t_c life (50 000 h) temperature	80 °C
Ambient temperature range*	–25 °C ... +50 °C*
Storage temperature range	–40 °C ... +80 °C
Maximum relative humidity	No condensation
Lifetime (90 % survival rate)	100 000 h, at t_c = 70 °C 70 000 h, at t_c = 75 °C 50 000 h at t_c = 80 °C

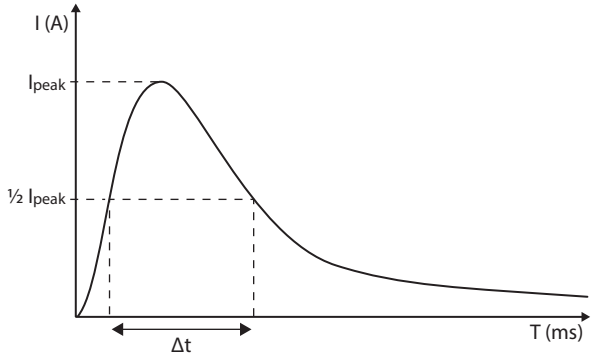
**) For other than independent use, higher t_a of the control gear possible as long as highest allowed t_c point temperature is not exceeded*

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, $I_{peak}^2 \Delta t$
45 pcs.	60 pcs.	29 A	148 µs	0.0901 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 %

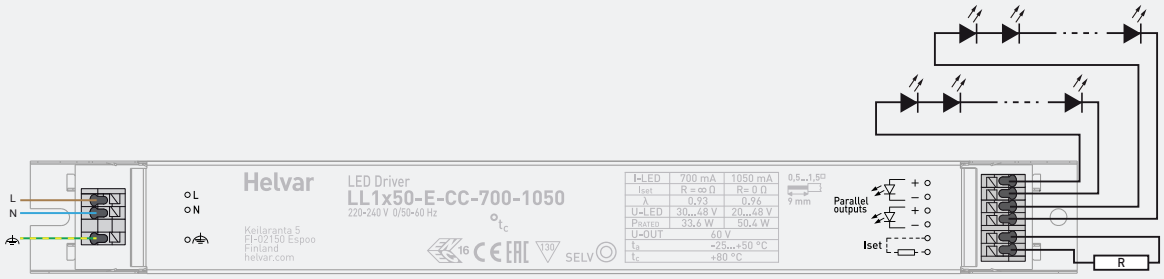


Type C MCB's are strongly recommended to use with LED lighting. Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

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	5 m
Weight	210 g
IP rating	IP20

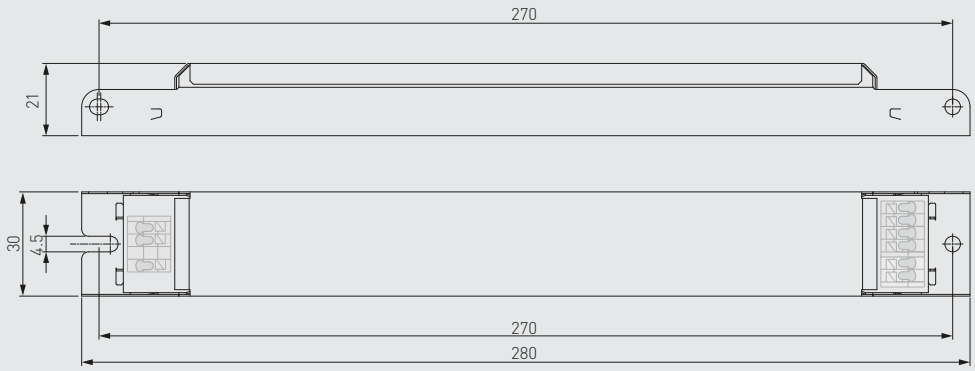
Connections



Note:

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

Dimensions (mm)



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.

Current setting resistor values

R(Ω)	0	1k	2,2k	3,3k	4,7k	8,2k	10k	15k	22k	33k	47k	68k	100k	∞
I_{out} (mA)	1050	1000	960	940	920	880	860	830	800	770	750	730	720	700
Order Code	T70000	T70102	T70222	T70332	T70472	T70822	T70103	N/A	N/A	N/A	N/A	N/A	N/A	N/A

LL1x50-E-CC-700-1050 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

LL1x50-E-CC-700-1050 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.

LED driver earthing

- LED drivers are designed to support different luminaire classifications, such as Class I or Class II fittings (no earth required). LL1x50-E-CC-700-1050 is Class II driver and suitable for Class I and II luminaires, as well as driving SELV Class III luminaires in independent installation with strain reliefs.
- As Class II driver, LL1x50-E-CC-700-1050 does not need the earth connection for electrical safety. To improve e.g. EMC performance, functional earth can be connected.

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 has adaptive overload protection. The driver reduces output current if overload of 1 – 4 V is detected.

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
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 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 130 °C.

Double insulated controlgear suitable for built-in use.