

51 W **SELV Constant current** LED driver

Product code: 5740

51 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 standard
- Suitable for DC use
- Long lifetime up to 100 000 h
- Optimised driver mechanics for independent usage applications
- Integrated spacious strain reliefs with screwless clamps, quick and simple installation process
- Doubled input terminals for looping the mains cables
- Ideal solution for Class I, Class II and Class III (SELV) luminaires



SELV

**Functional Description**

- Adjustable constant current output: 900 mA (default) to 1400 mA
- 1200 mA fixed current output option
- Current setting with external (LED-Iset) resistors

**Mains Characteristics**

|                                  |  |
|----------------------------------|--|
| Voltage range                    | 198 VAC – 264 VAC<br>Withstands max. 320 VAC (max. 1 hour) |
| DC range                         | 176 VDC - 280 VDC  |
| starting voltage                 | > 190 VDC  |
| Mains current at full load       | 0.23 - 0.26 A  |
| Frequency                        | 0 / 50 Hz – 60 Hz  |
| THD at full power                | < 10 %   |
| 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 | 4 kV (IEC 61000-4-4)                                       |

**Insulation between circuits & driver case**

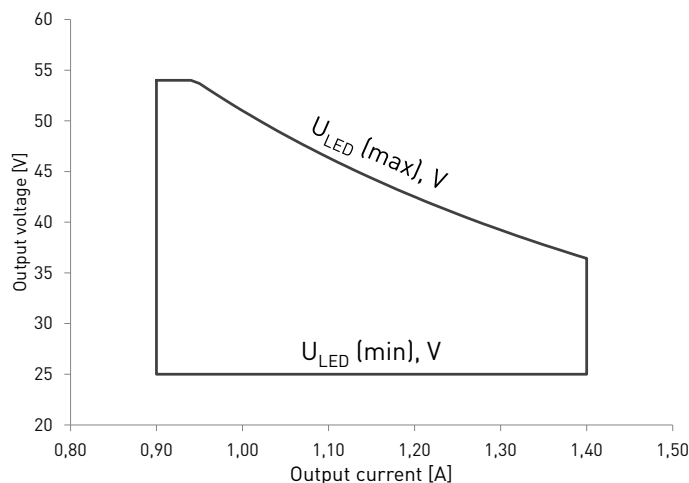
|                                |                              |
|--------------------------------|------------------------------|
| Mains circuit - SELV circuit   | Double/reinforced insulation |
| Mains and output - Driver case | Double/reinforced insulation |
| Mains input - Ground input     | Basic insulation             |

**Load Output (SELV <60 V)**

|                              |  |
|------------------------------|--|
| Output current ( $I_{out}$ ) | 900 mA (default) – 1400 mA                 |
| Accuracy                     | $\pm 5 \%$                                 |
| Ripple                       | < 1 %* at $\leq 120$ Hz                    |
|                              | *] Low frequency, LED load: Cree XP-G LEDs |
| $U_{out}$ (max) (abnormal)   | 60 V                                       |

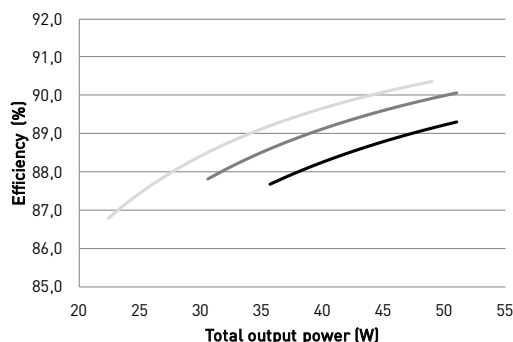
| $I_{LED}$                          | 900 mA    | 1200 mA Fixed output | 1400 mA     |
|------------------------------------|-----------|----------------------|-------------|
| $P_{Rated}$                        | 48.6 W    | 51 W                 | 51 W        |
| $U_{LED}$                          | 25 - 54 V | 25 - 42.5 V          | 25 - 36.4 V |
| PF ( $\lambda$ ) at full load      | 0.98      | 0.98                 | 0.98        |
| Efficiency ( $\eta$ ) at full load | 90 %      | 90 %                 | 89 %        |

## Operating window

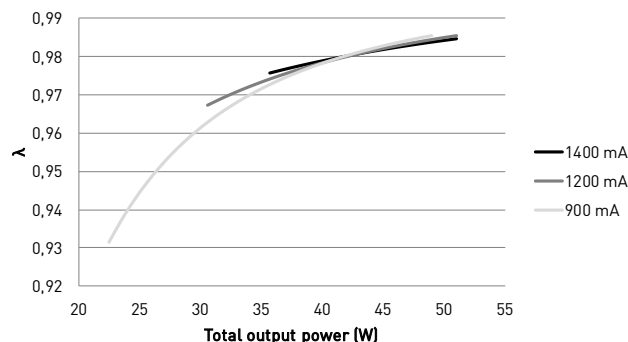


## Driver performance

## Typical efficiency



## Typical power factor



## Operating Conditions and Characteristics

|  |   |
|--|---|
| Absolute highest allowed $t_c$ point temperature | 80 °C   |
| $T_c$ life (60 000 h) temperature                | 80 °C   |
| Ambient temperature range                        | -25 °C ... +45 °C   |
| in independent use                               | -25 °C ... +45 °C   |
| Storage temperature range                        | -40 °C ... +80 °C   |
| Maximum relative humidity                        | No condensation   |
| Life time (90 % survival rate)                   | 100 000 h, at $t_c = 70$ °C<br>90 000 h, at $t_c = 75$ °C<br>60 000 h, at $t_c = 80$ °C |

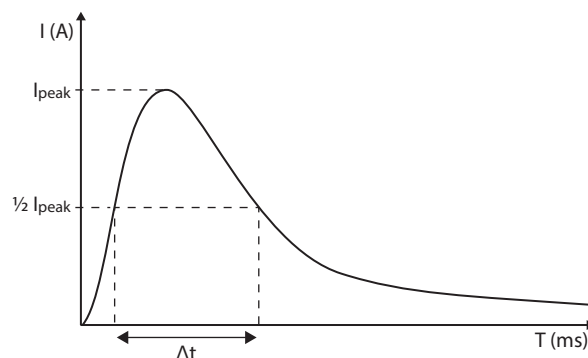
\*) For other than independent use, higher  $t_a$  of the controlgear possible as long as highest allowed  $t_c$  point temperature is not exceeded

## 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, $\Delta t$ | Calculated energy, $I_{peak}^2 \Delta t$ |
|---------------------|------------------------------------|-------------------------------------|----------------------------|--|
| 43 pcs.             | 55 pcs.                            | 30 A                                | 158 $\mu$ s                | 0.105 A <sup>2</sup> s                   |

## 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

Input: 0.5 mm<sup>2</sup> – 2.5 mm<sup>2</sup>

Wire type

Output: 0.5 mm<sup>2</sup> – 1.5 mm<sup>2</sup>

Wire insulation

Solid core and fine-stranded

Maximum driver to LED wire length

According to EN 60598

Weight

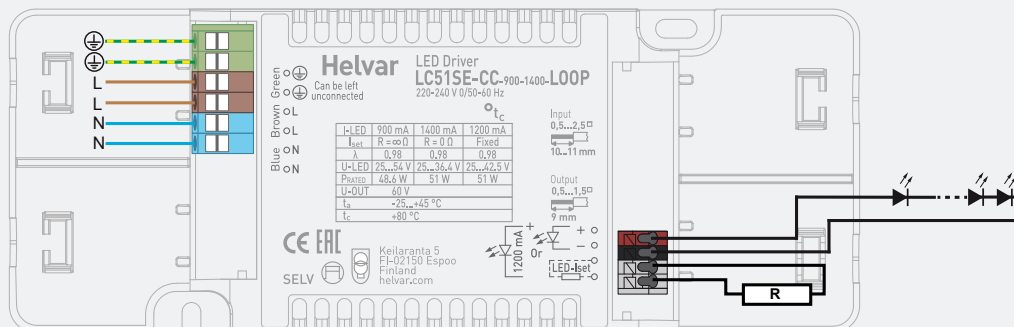
1.5 m

IP rating

215 g

IP20

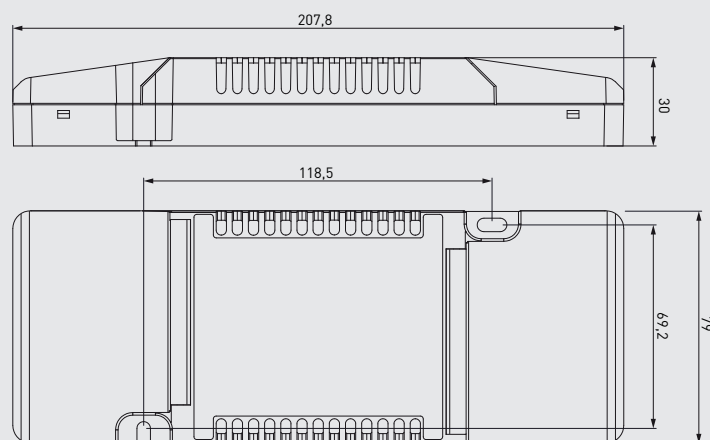
## Connections



Note:

- PE terminal is for looping only and therefore earth connection is 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  $R [\Omega] = [5 \text{ V}] / I_{\text{out}} [\text{A}] * 1000$ . Below are the available LED-Iset resistors from Helvar, pre-adjusted for the most common output currents.

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

| LED-Iset resistor model | MAX    | 1350 mA | 1300 mA | 1250 mA | 1200 mA | 1150 mA | 1100 mA | 1050 mA | 1000 mA | 950 mA | No resistor |
|-------------------------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--------|-------------|
| $I_{\text{out}}$ (mA)   | 1400   | 1350    | 1300    | 1250    | 1200    | 1150    | 1100    | 1050    | 1000    | 950    | 900         |
| Order code              | T90000 | T91350  | T91300  | T91250  | T91200  | T91150  | T91100  | T91050  | T91000  | T90950 | N/A         |
| Resistance values (Ω)   | 0      | 3.74k   | 3.83k   | 4.02k   | 4.12k   | 4.32k   | 4.53k   | 4.75k   | 4.99k   | 5.23k  | ∞           |

The current can be adjusted also with normal resistors by selecting suitable resistor value (formula  $R [\Omega] = [5 \text{ V}] / I_{\text{out}} [\text{A}] * 1000$ ). Reference resistor values can be found below order code in the table above.

LC51SE-CC-900-1400-LOOP LED driver is suited for independent use and 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

LC51SE-CC-900-1400-LOOP 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

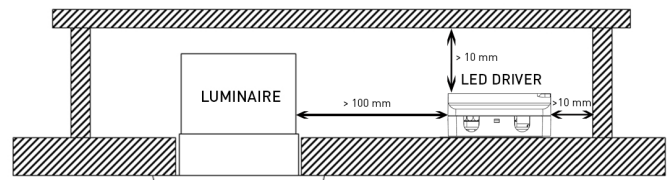
- LC51SE-CC-900-1400-LOOP is Class I LED driver suitable for Class I and II luminaires, as well as driving Class III (SELV) luminaire parts in independent installation.
- If used inside **Class I** luminaires, the earth cable is not required for electrical safety in this driver. The PE connection is designed for earth signal looping between drivers.
- If used inside **Class II** luminaires, the safety of the luminaire shall be ensured through double/reinforced insulation of live parts. LC51SE-CC-900-1400-LOOP has double/reinforced insulation between accessible and live parts, and is suitable for use in all Class II luminaires. In this case the earth terminal of the driver must be left unconnected and the luminaire terminal block shall not have any protective earthing terminal.
- If used in **independent** installation with Class I/II/III luminaires, the earth cable is not required to be connected. The PE connection is designed for earth signal looping between drivers.

### Miniature Circuit Breakers (MCB)

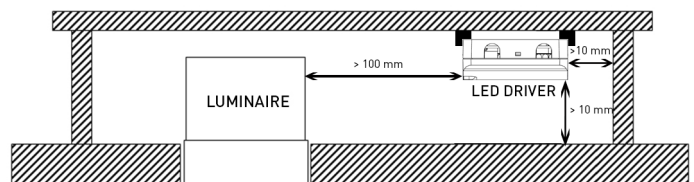
- Type-C MCB's with trip characteristics in according to EN 60898 are recommended.
- Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

### Installation site

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



- Suitable for installation upside down and in the corner, in this case separate spacers must be used. For more information, please consult Helvar.



## 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  $U_{out} (max)$  (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: 2015               |
| Particular safety requirements for DC or AC supplied electronic control gear for LED modules                | EN 61347-2-13: 2014 + A1: 2017 |
| Thermal protection class  | EN 61347, C5e                  |
| Mains current harmonics   | EN 61000-3-2: 2014             |
| Limits for voltage fluctuations and flicker   | EN 61000-3-3: 2013             |
| Radio frequency interference  | EN 55015: 2013                 |
| Immunity standard   | EN 61547: 2009                 |
| Performance requirements  | EN 62384: 2006+ A1:2009        |
| 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 (pending) and CE marked  |                                |

## Label symbols



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



Symbol for independent control gear.