

35 W SELV Constant current LED driver

Product code: 5732

35 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
- Active open load protection
- Ideal solution for Class I and Class II luminaires*
- For driving Class III (SELV) luminaires, optional strain reliefs available for independent use outside of luminaire (LC-SRA/LC1x30-SR or LC-SRA-LOOP for looping the input cables)



* See page 4 for details



Functional Description

- Adjustable constant current output: 350 mA (default) to 850 mA
- 600 mA fixed current output option
- Current setting with external (LED-Iset) resistors
- Optional earthing connection when used independently or in Class I luminaires, see page 4 for 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 | 0.16 - 0.20 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

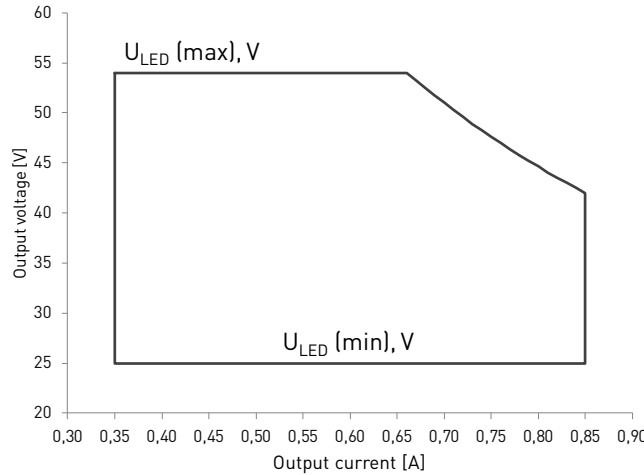
| | |
|--------------------------------|------------------------------|
| Mains circuit - SELV circuit | Double/reinforced insulation |
| Mains and output - Driver case | Double/reinforced insulation |
| Mains input - Ground input | Basic insulation |

Load Output (SELV <60 V)

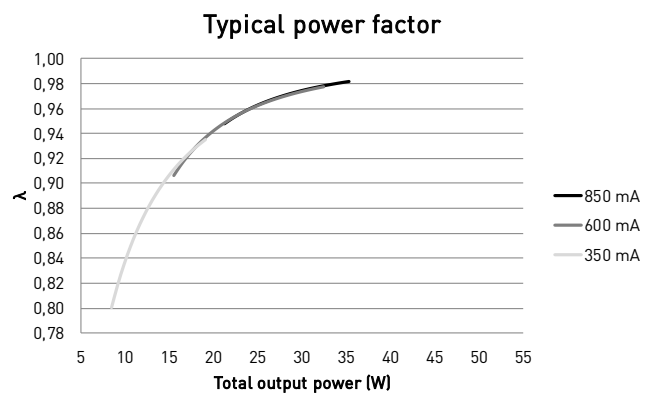
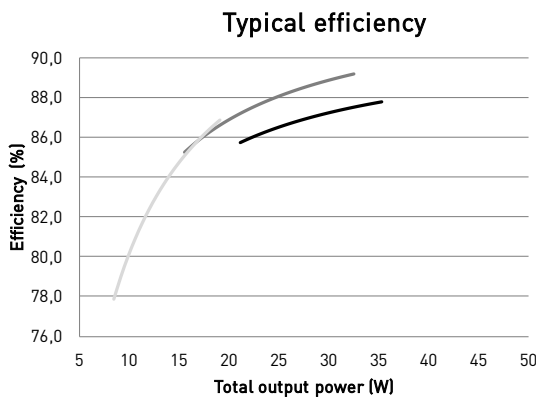
| | |
|------------------------------|--|
| Output current (I_{out}) | 350 mA (default) – 850 mA |
| Accuracy | ± 5 % |
| Ripple | < 1 %* at ≤ 120 Hz |
| | *) Low frequency, LED load: Cree XP-G L LEDs |
| PstLM | < 0.03* |
| SVM | < 0.03* |
| | *) At full power, measured with Cree XP-G LED modules. |
| U_{out} (max) (abnormal) | 60 V |

| I_{LED} | 350 mA | 600 mA Fixed output | 850 mA |
|------------------------------------|-----------|---------------------|-----------|
| P_{Rated} | 18.9 W | 32.4 W | 35.7 W |
| U_{LED} | 25 - 54 V | 25 - 54 V | 25 - 42 V |
| PF (λ) at full load | 0.94 | 0.98 | 0.98 |
| Efficiency (η) at full load | 87 % | 89 % | 88 % |

Operating window



Driver performance



Operating Conditions and Characteristics

| | |
|--|-----------------------------|
| Absolute highest allowed t_c point temperature | 80 °C |
| Tc life (50 000 h) temperature | 80 °C |
| Ambient temperature range* in independent use | -25 °C ... +50 °C* |
| Storage temperature range | -25 °C ... +50 °C |
| Maximum relative humidity | -40 °C ... +80 °C |
| Mains switching cycles | No condensation |
| Life time (90 % survival rate) | > 100 000 cycles |
| | 100 000 h, at $t_c = 70$ °C |
| | 70 000 h, at $t_c = 75$ °C |
| | 50 000 h, at $t_c = 80$ °C |

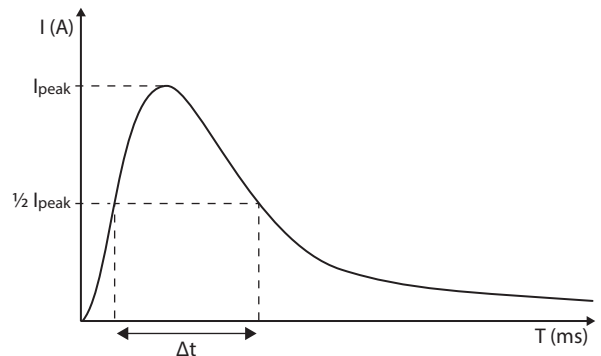
*) For other than independent use, higher t_g of the controlgear possible as long as highest allowed t_c point temperature is not exceeded

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, $I_{peak}^2 \Delta t$ |
|---------------------|------------------------------------|-------------------------------------|----------------------------|--|
| 56 pcs. | 51 pcs. | 25 A | 190 μ s | 0.089 A ² 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 % |

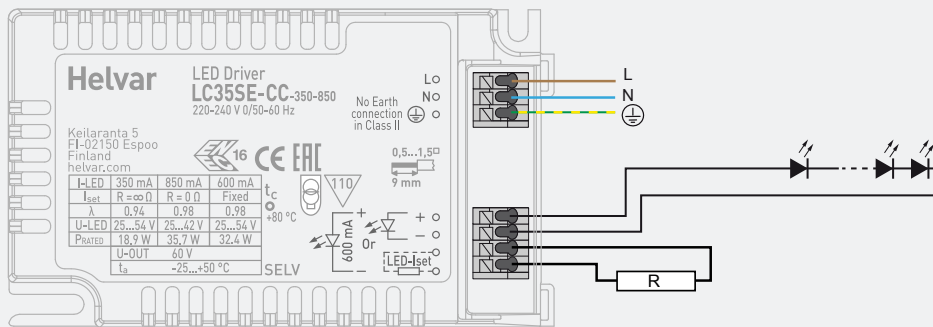


Type C MCB's are strongly recommended to use with LED lighting. Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

Connections and Mechanical Data

| | |
|-----------------------------------|---|
| Wire size | 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 | 116 g |
| IP rating | IP20 |

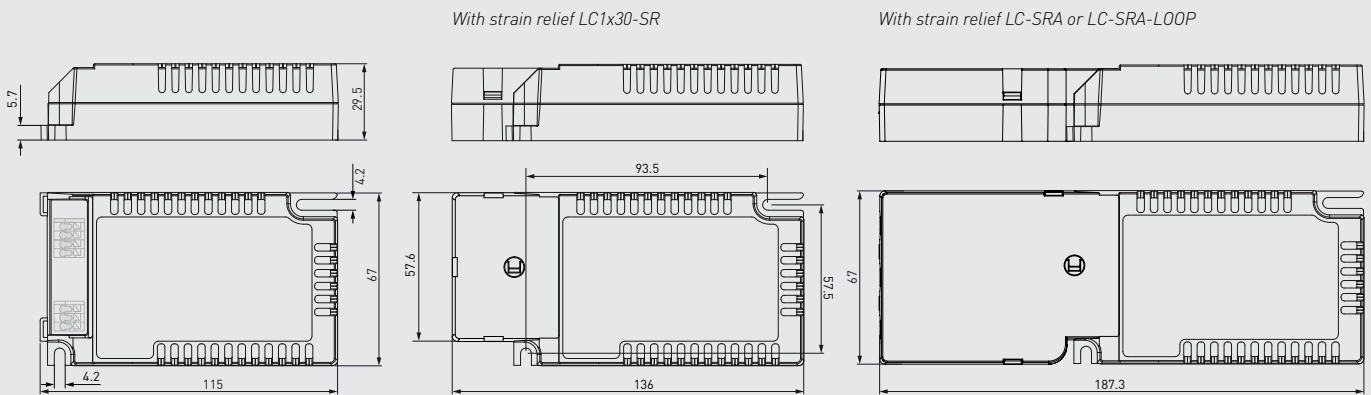
Connections



Note:

- Earth connection to PE 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-Isel 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 $R [\Omega] = (5 [V] / I_{out} [A]) * 1000$. Below are the available LED-Isel resistors from Helvar Components, pre-adjusted for the most common output currents.

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

| LED-Isel resistor model | MAX | 800 mA | 750 mA | 700 mA | 650 mA | 600 mA | 550 mA | 500 mA | 450 mA | 400 mA | No resistor |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|
| I_{out} (mA) | 850 | 800 | 750 | 700 | 650 | 600 | 550 | 500 | 450 | 400 | 350 |
| Order code | T90000 | T90800 | T90750 | T90700 | T90650 | T90600 | T90550 | T90500 | T90450 | T90400 | N/A |
| Resistance values (Ω) | 0 | 6.2k | 6.65k | 7.15k | 7.68k | 8.25k | 9.09k | 10k | 11k | 12.4k | ∞ |

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

LC35SE-CC-350-850 LED driver is suited for built-in usage in luminaires. With LC1x30-SR/LC-SRA/LC-SRA-LOOP strain relief, independent use is possible too. 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

LC35SE-CC-350-850 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

- LC35SE-CC-350-850 is Class I 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.
- If used inside **Class I** 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. Driver RFI measurement data will be provided by request.
- If used inside **Class II** luminaires, the safety of the luminaire shall be ensured through double/reinforced insulation of live parts. LC35SE-CC-350-850 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.

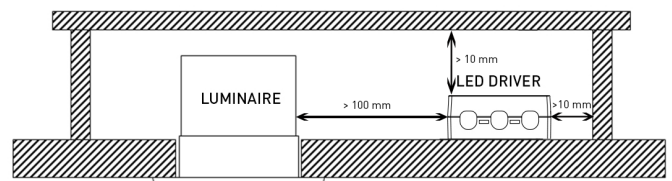
- If used in **independent** installation with Class I/II/III luminaires, the earth cable connection is optional. Please follow the instructions provided in the strain relief datasheets.

Miniature Circuit Breakers (MCB)

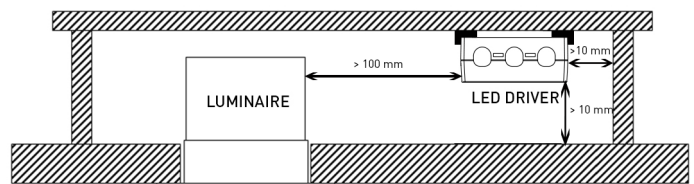
- Type-C MCB's with trip characteristics in according to EN 60898 are recommended.
- Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

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 Components.



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 |
| 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 / UKCA marked | |

Label symbols



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



Thermally controlled control gear, incorporating means of protection against overheating to prevent the case temperature under any conditions of use from exceeding 110 °C.