

35 W SELV Constant current LED driver

Product code: 5738

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 recommendation
- Suitable for DC use
- Active open load protection
- Long lifetime up to 100 000 h
- Ideal solution for Class I and Class II luminaires



Functional Description

- Adjustable constant current output: 250 mA (default) to 850 mA
- 600 mA fixed current output option
- Current setting with external (LED-Iset) resistors
- Optional functional earth connection, see page 4 for more 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 | < 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 | 2 kV (IEC 61000-4-4) |

Insulation between circuits & driver case

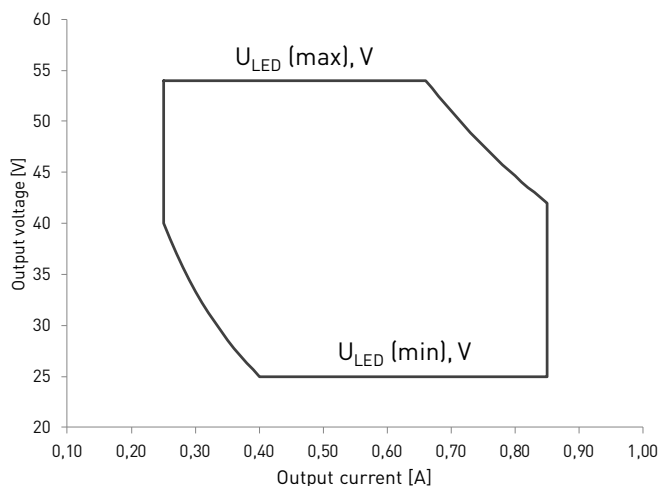
| | |
|------------------------------|------------------------------|
| Mains circuit - SELV circuit | Double/reinforced insulation |
| Output - Driver case | Basic insulation |
| Mains input - Ground input | Double/reinforced insulation |

Load Output (SELV <60 V)

| | |
|------------------------------|--|
| Output current (I_{out}) | 250 mA (default) – 850 mA |
| Accuracy | ± 5 % |
| Ripple | < 1 %* at ≤ 120 Hz |
| PstLM | *] Low frequency, LED load: Cree XP-G LEDs < 0.01* |
| SVM | < 0.05* |
| U_{out} (max) (abnormal) | *] At full power, measured with Cree XP-G LED modules. 60 V |

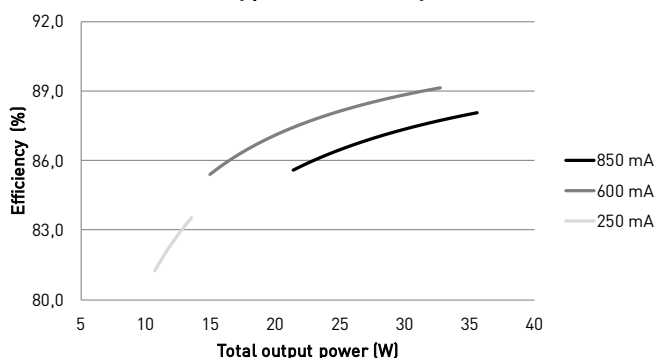
| | 250 mA | 600 mA Fixed output | 850 mA |
|------------------------------------|-----------|---------------------|-----------|
| I_{LED} | 250 mA | 600 mA Fixed output | 850 mA |
| P_{Rated} | 13.5 W | 32.4 W | 35.7 W |
| U_{LED} | 40 - 54 V | 25 - 54 V | 25 - 42 V |
| PF (λ) at full load | 0.88 | 0.97 | 0.98 |
| Efficiency (η) at full load | 84 % | 89 % | 88 % |

Operating window

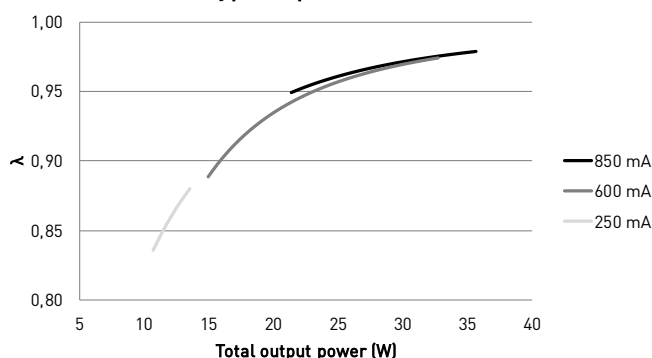


Driver performance

Typical efficiency



Typical power factor



Operating Conditions and Characteristics

| | |
|--|--|
| Absolute highest allowed t_c point temperature | 75 °C |
| T_c life (50 000h) temperature | 75 °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 $t_c = 65$ °C 70 000 h, at $t_c = 70$ °C 50 000 h at $t_c = 75$ °C |

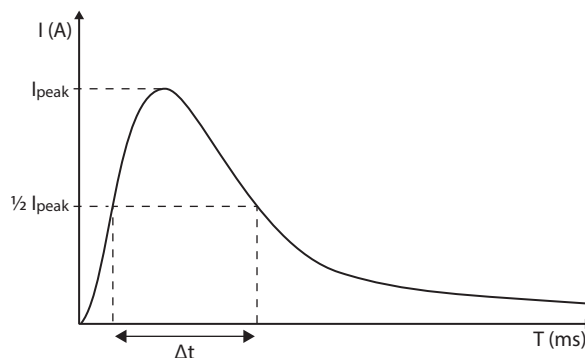
*) For other than independent use, higher t_a of the controlgear possible as long as highest allowed t_c point temperature is not exceeded

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, Δt | Calculated energy, $I_{peak}^2 \Delta t$ |
|---------------------|------------------------------------|-------------------------------------|----------------------------|--|
| 61 pcs. | 79 pcs. | 20 A | 161 μs | 0.0463 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 % |

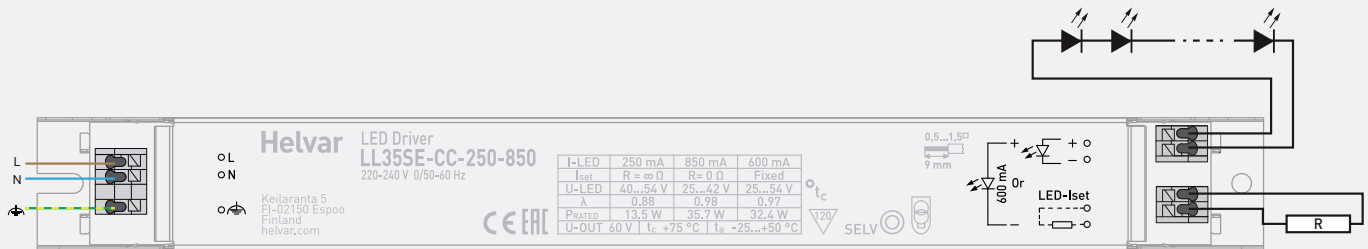


Type C MCB's are strongly recommended to use with LED lighting. Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

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 | 195 g |
| IP rating | IP20 |

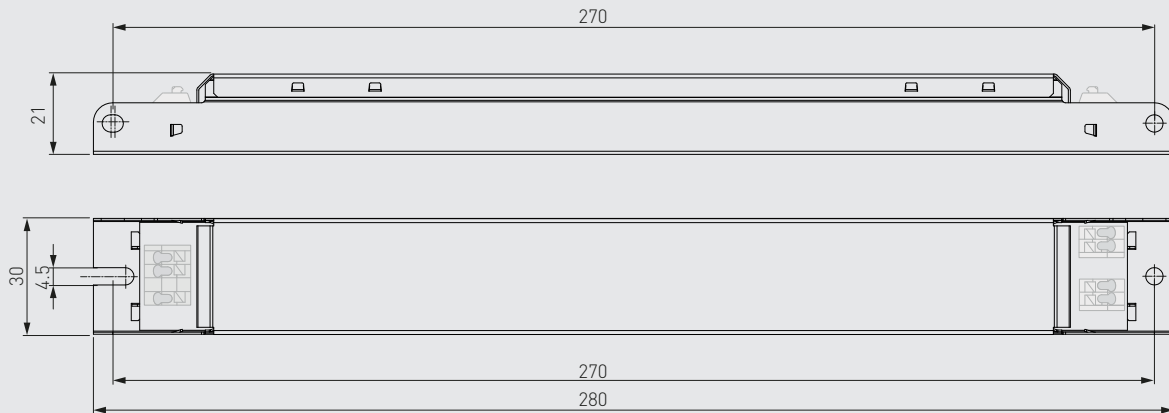
Connections



Note:

- Earth connection to functional earth 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-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 $I_{\text{out}} (\pm 5 \% \text{ tol.})$)

| LED-Iset resistor model | MAX | 800 mA | 750 mA | 700 mA | 650 mA | 600 mA | 550 mA | 500 mA | 450 mA | 400 mA | 350 mA | 300 mA | No resistor |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------------|
| I_{out} (mA) | 850 | 800 | 750 | 700 | 650 | 600 | 550 | 500 | 450 | 400 | 350 | 300 | 250 |
| Order code | T90000 | T90800 | T90750 | T90700 | T90650 | T90600 | T90550 | T90500 | T90450 | T90400 | T90350 | T90300 | N/A |
| Resistance values (Ω) | 0 | 6.2k | 6.65k | 7.15k | 7.68k | 8.25k | 9.09k | 10k | 11k | 12.4k | 14.3k | 16.5k | ∞ |

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.

LL35SE-CC-250-850 LED driver is suited for 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

LL35SE-CC-250-850 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

- LL35SE-CC-250-850 is 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.
- When used inside **Class I and Class II** 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.

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

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+ A1: 2015 |
| 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 | |
| CE / UKCA marked | |

Label symbols



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



Double insulated control gear suitable for built-in use.



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