# LL100HEC-CC-300-700

Helvar

## 100 W **Constant Current** LED driver

Product code: 5953

**100 W 220 – 240 V 50 – 60 Hz**

- Highly energy- and cost-efficient design
- DIP switch current selection for flexibility
- Efficiency up to 94 %
- Low current ripple, complying with IEEE 1789 recommendation
- Maximum output voltage limited to 270 V
- Driver protection Class I
- Ideal solution for Class I luminaires, suitable for Class II luminaires too*

** See page 4 for details.*

## Functional Description

- Adjustable constant current output: 300 mA - 700 mA (default)
- Current setting via DIP switch in steps
- Can withstand load fault situations, see page 4 for details

## Mains Characteristics

| | |
|---|---|
| Nominal rated voltage range | 220 V – 240 V, 50 – 60 Hz |
| AC voltage range | 198 VAC – 264 VAC |
| | Withstands max. 300 VAC (max. 1 hour) |
| | Withstands min. 176 VAC (max. 1 hour) |
| Mains current at full load | Max. 0.6 A |
| Frequency | 50 Hz – 60 Hz |
| THD at full power | < 10 % |
| Leakage current to earth | < 0.7 mA |
| Tested surge protection | 1 kV L-N, 2 kV L-GND (IEC 61000-4-5) |
| Tested fast transient protection | 1 kV (IEC 61000-4-4) |

## Insulation between circuits & driver case

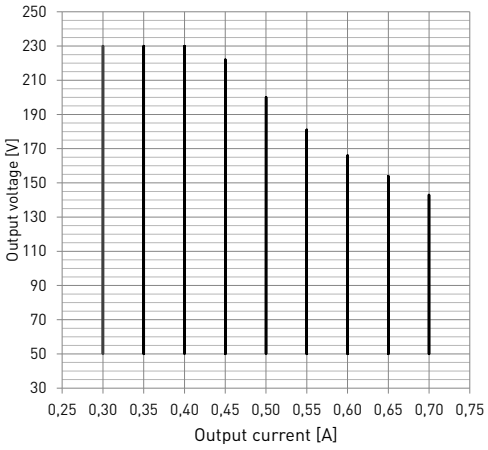
| | |
|---|---|
| Mains circuit - Output | Non-isolated |
| Mains and output - Driver case | Basic insulated |

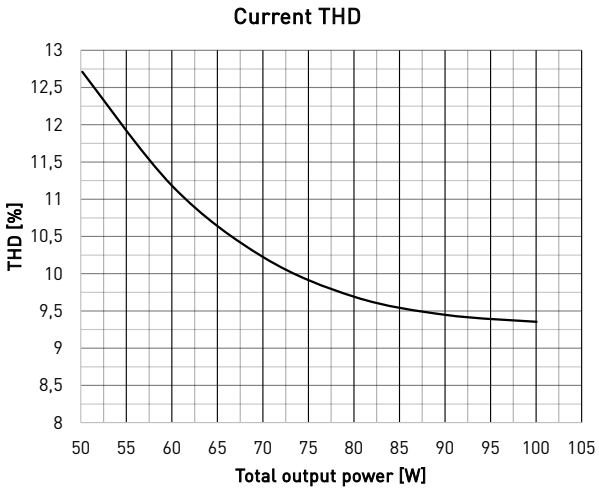
## Load Output (non-isolated)

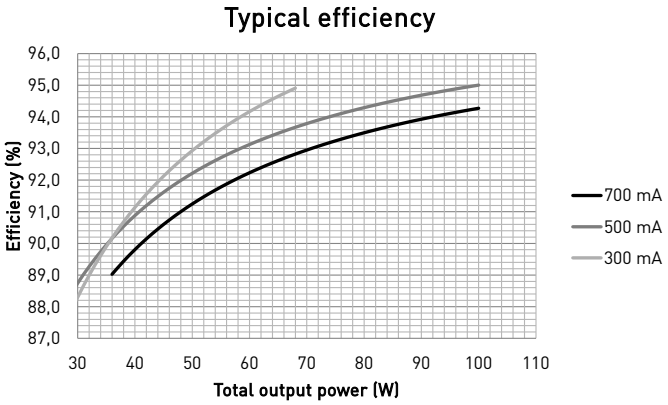
| | |
|---|---|
| Output current ($I_{out}$) | 300 / 350 / 400 / 450 / 500 / 550 / 600 / 650 / 700 mA |
| Accuracy | ± 7.5 % |
| Ripple | < 5 %* at ⩽ 120 Hz |
| | *) Low frequency, LED load: Cree MX3 LEDs |
| PstLM | < 1* |
| SVM | < 0.4* |
| | *) At full power, tested with LED load: Cree MX3 LEDs |
| $U_{OUT}$ (max) (abnormal) | 270 V |

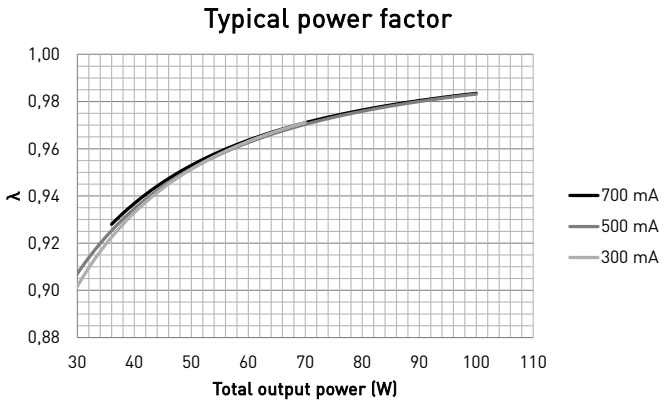
| $I_{LED}$ | 300 mA | 350 mA | 500 mA | 700 mA (default) |
|---|---|---|---|---|
| $P_{Rated}$ | 15 W...69 W | 17.5 W...80.5 W | 25 W...100 W | 35 W...100.1 W |
| $U_{LED}$ | 50 – 230 V | 50 – 230 V | 50 – 200 V | 50 – 143 V |
| PF (λ) at full load | > 0.95 | > 0.95 | > 0.95 | > 0.95 |
| Efficiency (η) at full load | 94 % | 94 % | 94 % | 94 % |

## Operating window & driver performance




## Operating Conditions and Characteristics

| | |
|---|---|
| Highest allowed $t_c$ point temperature | 70 °C |
| $t_c$ life (50 000 h) temperature | 70 °C |
| Ambient temperature range* | –25 °C ... +45 °C |
| Storage temperature range | –40 °C ... +80 °C |
| Maximum relative humidity | No condensation |
| Lifetime (90 % survival rate) | 50 000 h, at $t_c$ = 70 °C |

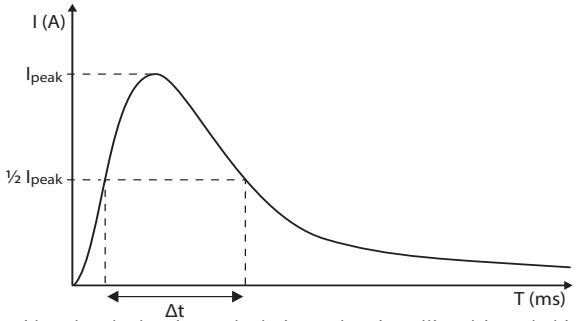
**) For other than independent use, higher $t_a$ of the control gear possible as long as highest allowed $t_c$ point temperature is not exceeded*

## Quantity of drivers per miniature circuit breaker 16 A Type C

| Based on inrush current $I_{peak}$ | Typ. peak inrush current $I_{peak}$ | 1/2 value time, Δt |
|---|---|---|
| 22 pcs | 40.8 A | 256 µs |

*The inrush current is not the limiting factor for the products per MCB, please notice the continous current limitations.*

| 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 % |




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

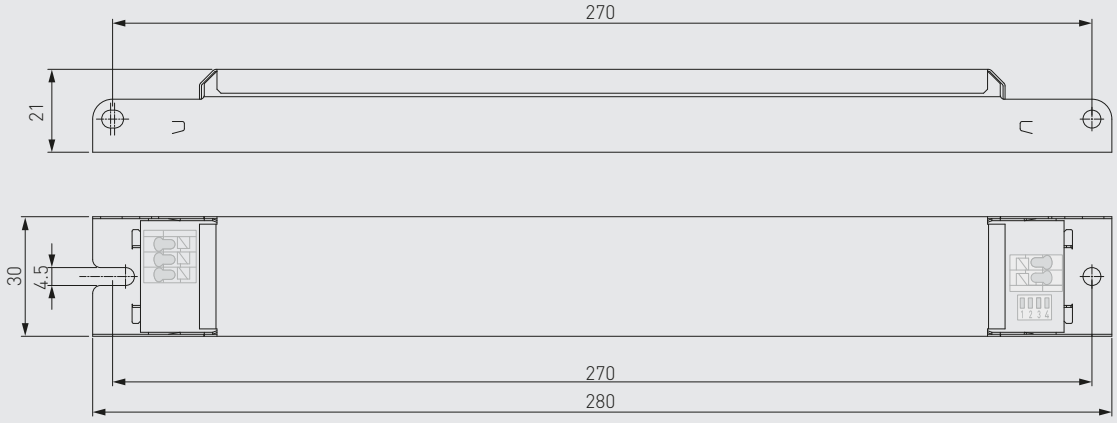
| | |
|---|---|
| Wire size | 0.5 mm² – 1.5 mm² |
| Wire type | Solid core and fine-stranded |
| Wire insulation | According to EN 60598 |
| Maximum driver to LED wire length | 1.5 m |
| Weight | 237 g |
| IP rating | IP20 |

## Connections


*Note:*

- *Not suitable for load side switching operation*

## Dimensions (mm)




In LL100HEC-CC-300-700 the current can be set with DIP switches. With each combination of switch setup, a different output current value can be set. The maximum value can be reached with the DIP switch setting "1111" (all switches pushed towards the output connector) and minimum with setting "0000" (pushed away from the output connector, see connections picture above). The output current values according to the DIP switch settings are presented below.

### DIP switch combinations, output currents and voltage ranges (Nominal $I_{out}$ (±7.5 % tol.))

| DIP switch combination | 0000 | 0010 | 0100 | 0110 | 1000 | 1010 | 1100 | 1110 | 1111 |
|---|---|---|---|---|---|---|---|---|---|
| $I_{out}$ (mA) | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 |
| Voltage range | 50 – 230 V | 50 – 230 V | 50 – 230 V | 50 – 222 V | 50 – 200 V | 50 – 181 V | 50 – 166 V | 50 – 154 V | 50 – 143 V |

LL100HEC-CC-300-700 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**

LL100HEC-CC-300-700 LED driver features a constant current output (300 / 350 / 400 / 450 /500 / 550 / 600 / 650 / 700 mA) adjustable with DIP switch.

- For the combination/current values, refer to the table on page 3.

**LED driver earthing**

- LL100HEC-CC-300-700 LED driver is a protective Class I device and designed for Class I luminaires.
- If used inside **Class I** luminaires, this LED driver must always have the protective earth cable connected for safety reasons.
- The driver is designed to be used inside Class I luminaires. For usage inside **Class II** luminaires, the safety of the luminaire shall be ensured through double/reinforced insulation of live parts and through supplementary insulation of conductive parts of the casing, or any conductive parts connected to the casing, as the casing is only basic insulated from the live parts. The earth connector of the driver shall be left unconnected and there shall be no protective earth terminals in the luminaire terminal block to fulfill the requirements of IEC/EN 60598-1 for Class II luminaires. The EMC performance of the driver change when left unearthed, so it is always the responsibility of the integrator to take measures and necessary actions, for example by luminaire design to ensure the assembled luminaire complies with latest EMC standard.

**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, but the LED load will start to blink or the driver won't start when overload occurs. Reliable operation is only guaranteed in specified operational voltage range.

**Underload**

Driver can withstand underload, but the LED load will start to blink when underload occurs. Reliable operation of the driver is only guaranteed in specified operational voltage range.

**Short circuit**

Driver can withstand output short circuit and after resolving the fault, driver recovers normal operation automatically.

## Conformity & standards

| | |
|---|---|
| General and safety requirements | EN 61347-1 |
| 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 | |
| CE / UKCA 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 110 °C.