LL40HEC-CC-200-350

Helvar Components

40 W **Constant Current** LED driver

Product code: 5943

41 W 220 – 240 V 50 – 60 Hz

- Highly energy- and cost-efficient design
- DIP switch current selection for flexibility
- Efficiency up to 90 %
- Low current ripple, complying with IEEE 1789 recommendation
- Maximum output voltage limited to 350 V
- Suitable for emergency lighting applications
- 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: 200 mA / 250 mA / 300 mA / 350 mA (default)
- Current setting via DIP switch
- Can withstand load fault situations, see page 4 for details
- Low inrush current

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. 0.30 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

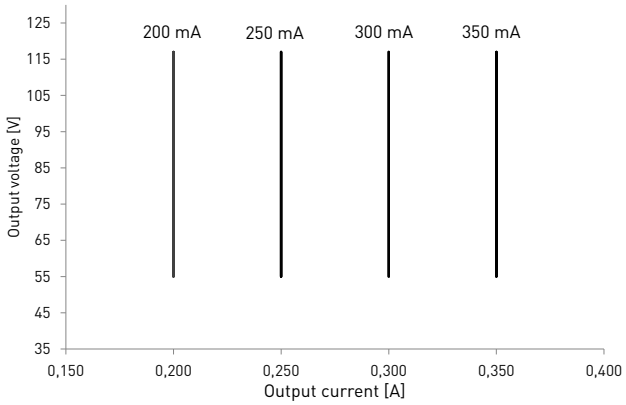
Mains circuit - Output	Non-isolated
Mains and output - Driver case	Basic insulated

Load Output (non-isolated)

Output current (I_{out})	200 mA / 250 mA / 300 mA / 350 mA
Accuracy	± 7.5 %
Ripple	< 5 %* at ⩽ 120 Hz
	*) Low frequency, LED load: Cree MX3 LEDs
PstLM	< 0.03*
SVM	< 0.02*
	*) At full power, LED load: Cree MX3 LEDs
U_{OUT} (max) (abnormal)	350 V

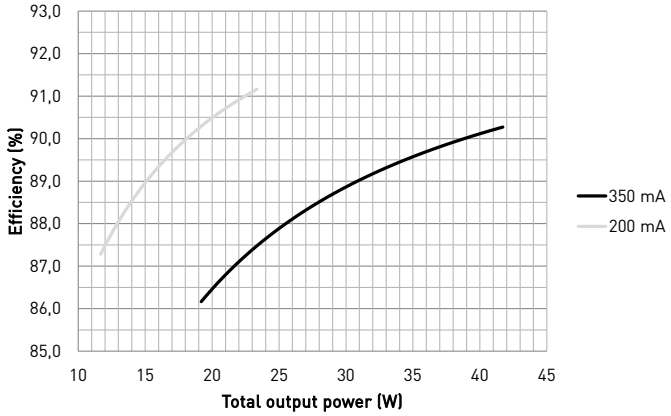
I_{LED}	200 mA	250 mA	300 mA	350 mA (default)
P_{Rated}	11 W...23.4 W	13.75 W...29.25 W	16.5 W...35.1 W	19.25 W...41 W
U_{LED}	55 – 117 V	55 – 117 V	55 – 117 V	55 – 117 V
PF (λ) at full load	0.90c	0.94c	>0.95	>0.95
Efficiency (η) at full load	>90 %	>90 %	>90 %	>90 %

Operating window

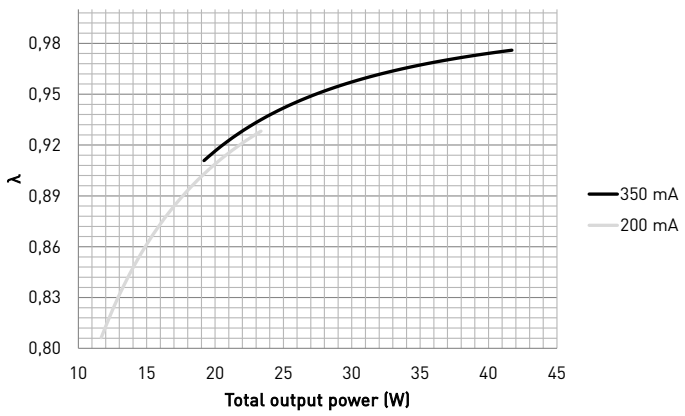


Driver performance

Typical efficiency



Typical power factor



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
Mains switching cycles	> 100 000 cycles
Lifetime (90 % survival rate)	50 000 h, at t_c = 70 °C

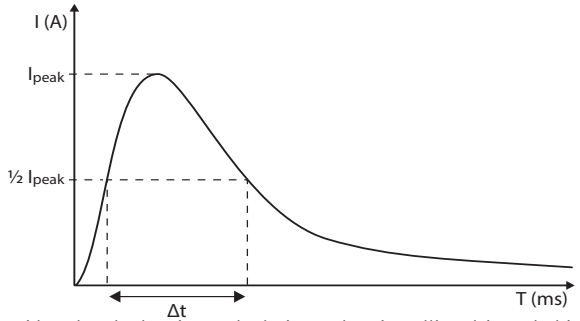
**) For other than independent use, higher t_a of the control gear possible as long as highest allowed t_c point temperature is not exceeded*

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
1058 pcs	6.1 A	**38.5 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 %



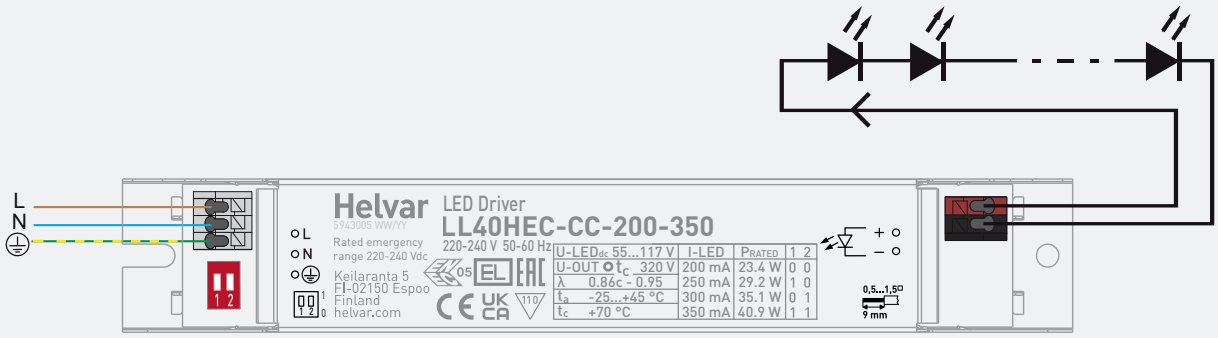
Total continous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker. Example calculation of total drivers amount limited by continous current: n(I_{cont}) = (16 A ($I_{nom,Ta}$) / "nominal mains 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	119 g
IP rating	IP20

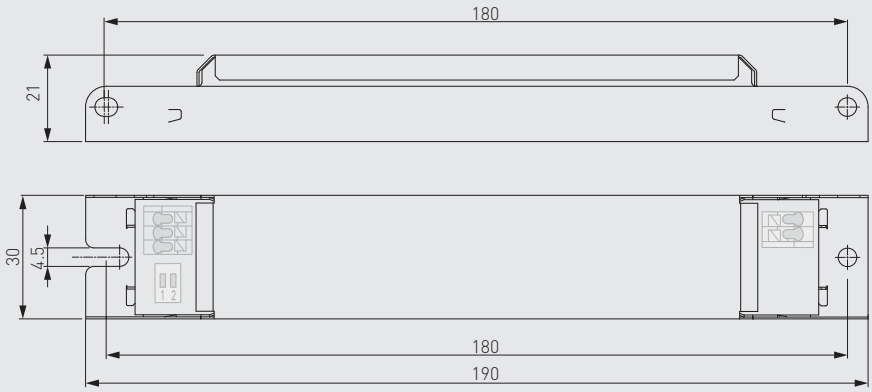
Connections



Note:

- *Not suitable for load side switching operation*

Dimensions (mm)



In LL40HEC-CC-200-350 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 "11" (both switches pushed towards the input connector) and minimum with setting "00" (pushed away from the input 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	00	10	01	11
I_{out} (mA)	200	250	300	350
Voltage range	55 – 117 V	55 – 117 V	55 – 117 V	55 – 117 V

LL40HEC-CC-200-350 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

LL40HEC-CC-200-350 LED driver features a constant current output (200 mA / 250 mA / 300 mA / 350 mA) adjustable with DIP switch.

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

LED driver earthing

- LL40HEC-CC-200-350 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
Particular safety requirements for DC or AC supplied electronic control gear for LED modules	EN 61347-2-13
Additional safety requirements for AC or DC supplied electronic controlgear for emergency lighting	EN 61347-2-13, Annex J
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

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

AC/DC supplied electronic control gear for emergency lighting purposes intended for connection to a centralized emergency power supply.