LC45iC-DA-100-900

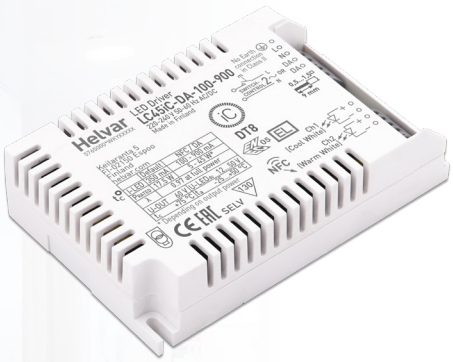
Helvar

45 W **Dimmable two channel** intelligent Colour LED driver

Product code: 5765

45 W 220 – 240 V 0/ 50 – 60 Hz

- 2-channel tunable white for human centric lighting
- Wide dynamic range of colour temperatures on all dimming levels *
- Amplitude dimming for the highest quality light output, complying with IEEE 1789 recommendation
- NFC technology for wireless programming
- Suitable for use in emergency lighting applications
- Suitable for Class I and Class II luminaires
- Optional strain relief for independent use outside of luminaire (LC-SRB and LC-SRB-LOOP) and driving Class III luminaires
- Helvar Driver Configurator support



*) See pages 2-3 for details

iC SWITCH-CONTROL 2 TUNABLE WHITE NFC SELV 120

Functional Description

- DALI Type 8 compatible. One DALI address for controlling colour temperature by two output channels
- DALI colour type: Colour temperature T_c
- Adjustable constant current output: 100 mA to 900 mA (350 mA default current)
- Current setting programmable via NFC or DALI
- Suitable for flicker-free camera recording applications
- Patented Switch-Control 2 functionality for easy-to-use intensity and colour temperature control with single push button
- Full load recognition with automatic recovery, open and short circuit protection
- Constant Light Output (CLO), adjustable up to 100 000 h (default disabled)
- Energy consumption monitor (real time), running hour monitor (accumulative), energy management (accumulative)

Mains Characteristics

Nominal rated voltage range	220 V – 240 V, 0 / 50 – 60 Hz
AC voltage range	198 VAC – 264 VAC
	Withstands max. 320 VAC (max. 1 hour)
	Withstands min. 176 VAC (max. 1 hour)
DC voltage range	176 VDC – 280 VDC
DC starting voltage	> 190 VDC
Mains current at full load	< 0.24 A
Frequency	0 / 50 Hz – 60 Hz
Stand-by power consumption	< 0.5 W
THD at full power	< 15 %
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
DALI circuit - SELV circuit	Double/reinforced insulation
Mains circuit - DALI circuit	Basic insulation
Mains, DALI and output - Driver case	Double/reinforced insulation
Mains input - Ground input	Basic insulation

Load Output (SELV <60 V)

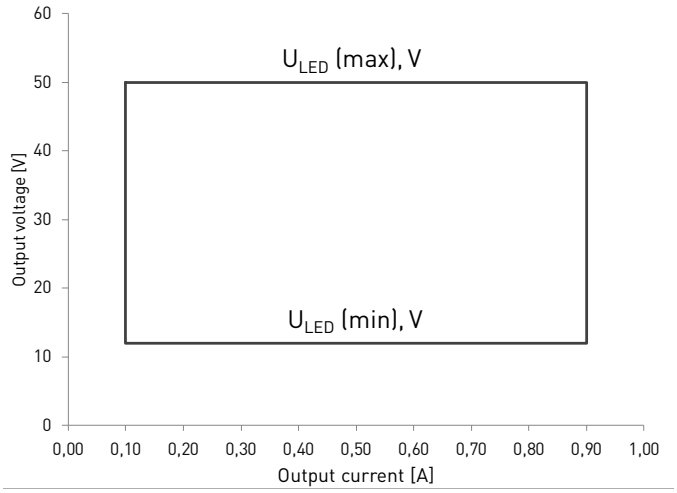
Output current (I_{out})	100 mA – 900 mA	
Accuracy	± 5 %*	
Ripple	< 1 %** at ≤ 120 Hz	*) At maximum current **) Low frequency, LED load: Cree XP-G LEDs
PstLM	< 0.15*	
SVM	< 0.01*	*) At full power, measured with Cree XP-G LED modules.

U_{out} (max) (abnormal) 60 V

I_{LED*}	100 mA	350 mA (default)	900 mA
P_{Rated*}	5 W	17.5 W	45 W
U_{LED*}	12 – 50 V	12 – 50 V	12 – 50 V
PF (λ) at full load	0.67	0.89	0.97
Efficiency (η) at full load	66 %	83 %	88 %

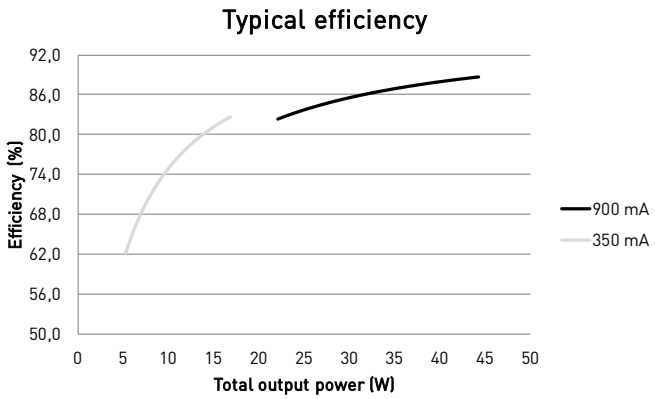
Current and power are divided into two channels according to the chosen CCT and module specifications. Total maximum power of the two channels can't exceed given P_{Rated}.

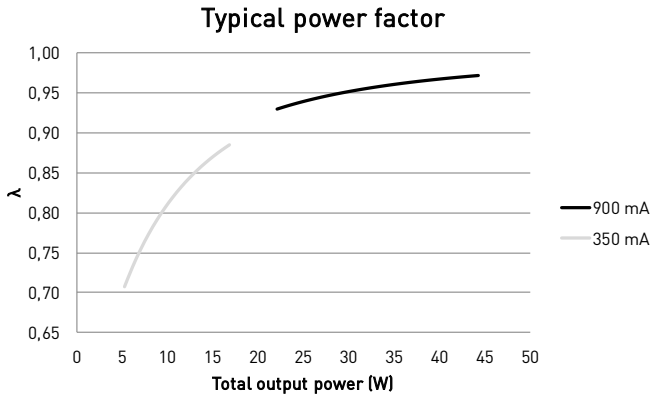
Operating window



**From 500 mA to 900 mA, full dimming range (2 % - 100 %) and wide CCT dynamic range available in the whole area. From 100 mA to 500 mA, the absolute minimum dimming level is limited to 10 mA of total current. Dimming / CCT control possible all the way down to that current, but the dynamic range may be limited. Each single channel can dim down to 0.5 mA level.*

Driver performance



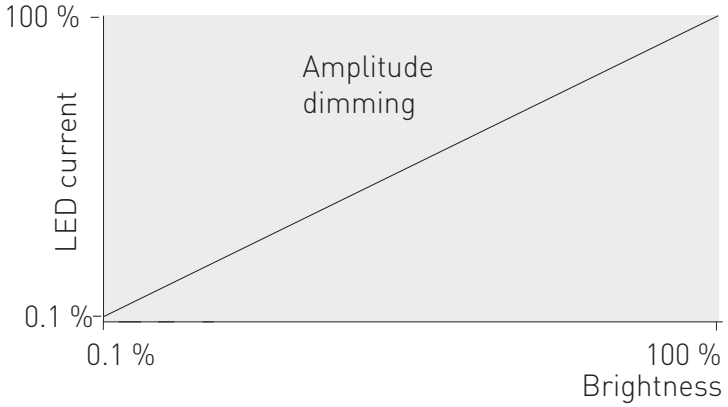


Operating Conditions and Characteristics

Absolute highest allowed t_c point temperature	75 °C
Tc life (50 000 h) temperature	75 °C
Ambient temperature range*	–25 °C ... +50 °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 = 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*

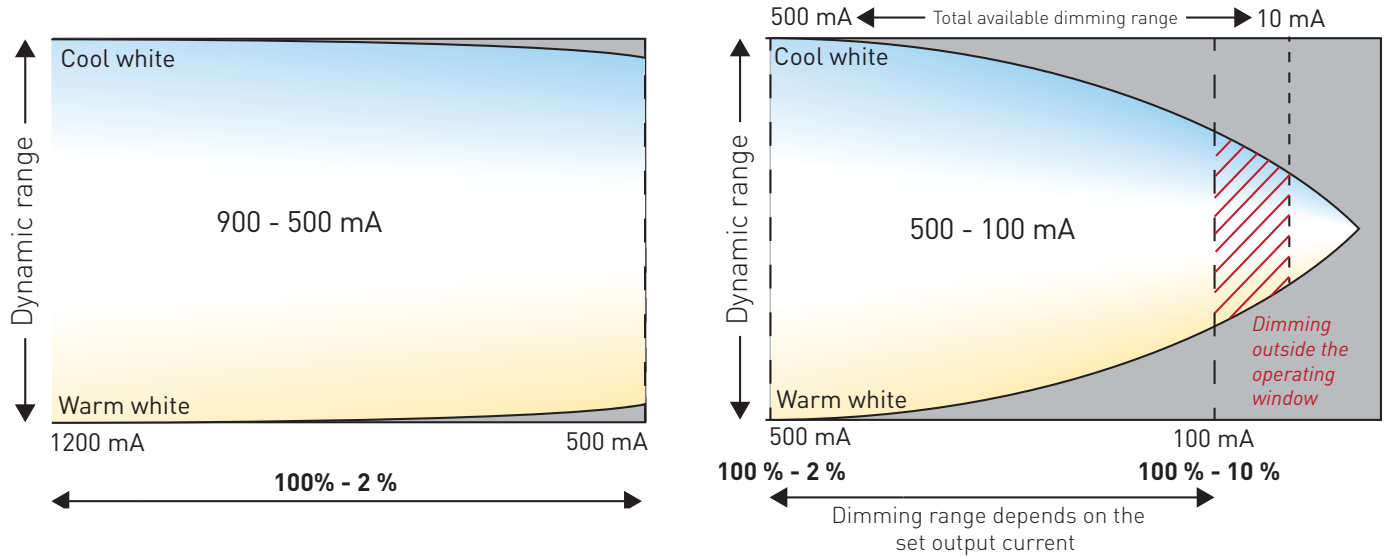
Amplitude dimming technology



Dimming range per single channel	Dimming range in tunable white use	Dimming technology
0.1 % – 100 %	2 % - 100 %	Amplitude (DC)

LC45iC-DA-100-900 LED driver implements amplitude dimming technology across whole dimming range. Amplitude dimming offers the best available technology for dimming the light output in an accurate and flicker-free way to ensure high quality lighting in even the most demanding situations such as camera recording applications. Amplitude dimming technology complies with IEEE 1789-2015 recommendations of current modulation to mitigate health risks to viewers.

Dynamic range in colour temperature control



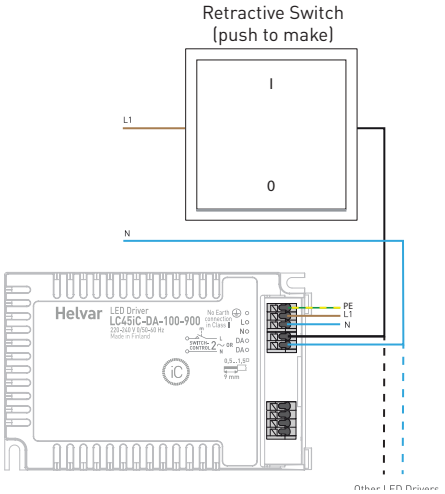
LC45iC-DA-100-900 LED driver is ready to be used out of the box.

Highest precision and color consistency in controlling combinations of different luminaire types is achieved by setting colour temperatures and lumen outputs before use with Helvar driver configurator. The configured colour temperatures of the channels should match the ones of the LED modules used. The factory default settings of cool and warm channels are 6500 K and 2700 K accordingly.

After setting up the colour temperatures, the lumen output values of full dimming level (100 %) should be configured for both channels. By default, output currents are set to be equal in both channels.

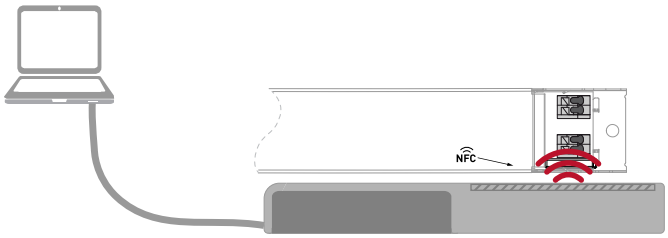
Switch-Control 2 with tunable white

Helvar iC drivers provide the simplest form of control in tunable white with Helvar patented single switch Switch-Control 2 functionality. With single push button the user is able to control both the light intensity and colour temperature to the desired level. The system synchronises the light levels and CCTs every time the colour temperature is adjusted to ensure pleasant user experience and uncompromised lighting comfort. More information about the functionality can be found in Switch-Control user guide at www.helvar.com.



Wireless configuration

LC45iC-DA-100-900 LED driver is equipped with NFC wireless technology for effortless configuration of the driver via Helvar Driver Configurator Support. Helvar Driver Configurator enables easy-to-use automatic configuration of the driver parameters via NFC, without mains or DALI connection to the driver. The most popular MD-SIG qualified NFC readers are supported giving flexibility for the operator. For further information about the usage with Helvar Driver Configurator, please see the user guide at www.helvar.com



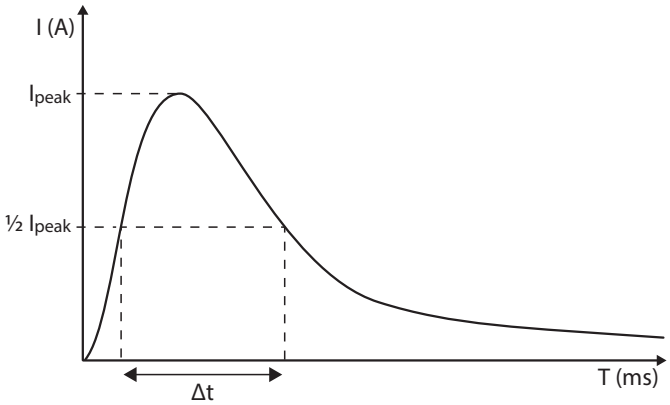
Feig NFC reader

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, $I_{peak}^2 \Delta t$
51 pcs	58 pcs	29 A	153 µs	0.093 A^2s

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 %



CONTINOUS CURRENT

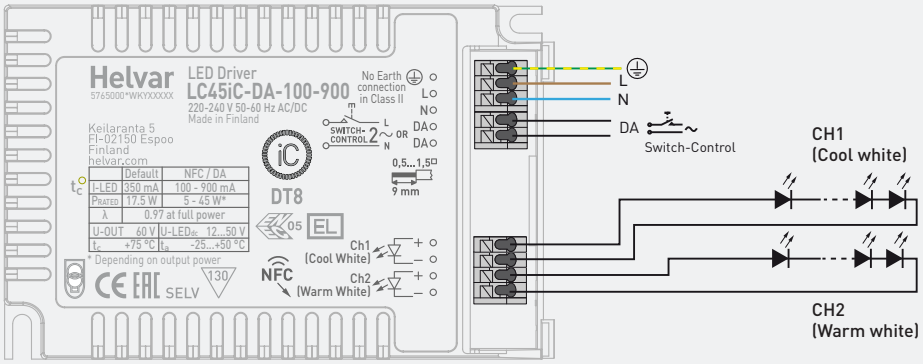
Total continous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker. Example calculation of total drivers amount limited by continous current: n(I_{cont}) = (16 A ($I_{nom,Ta}$) / "nominal mains 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	193 g
IP rating	IP20

Connections

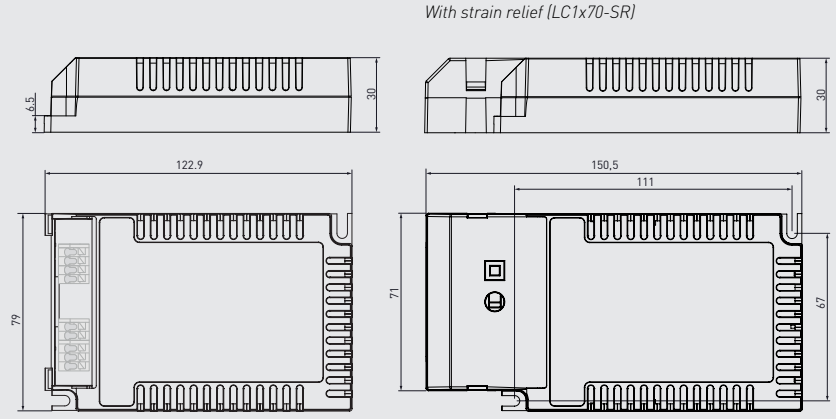


Note:

- *Earth connection to PE terminal is optional and not needed for the functionality of the driver. See page 6 for details.*
- *Not suitable for load side switching operation*
- *Label may differ if the unit is preset to fixed current*

Dimensions (mm)

With strain relief (LC1x70-SR)



LC45iC-DA-100-900 LED driver is suited for built-in usage in luminaires. With LC1x70-SR/LC-SRB/LC-SRB-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.

LED driver earthing

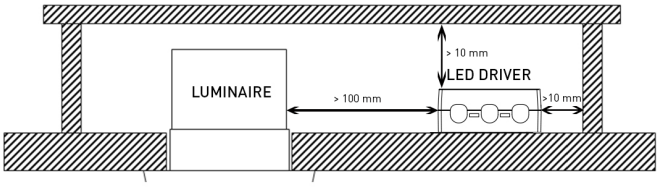
- LC45iC-DA-100-900 is Class I LED driver suitable for Class I and II luminaires, as well as driving Class III (SELV) luminaire parts in independent installation with external strain relief.
- If used inside **Class I** luminaires, the earth cable is recommended to be connected to improve the EMC performance 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. LC45iC-DA-100-900 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)

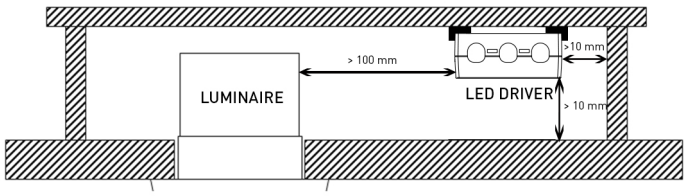
- Type-C MCB's with trip characteristics in according to EN 60898 are recommended.
- Please see more details in "MCB information" document in each driver product page in "downloads & links" section.

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.



Helvar Driver Configurator -support

LC45iC-DA-100-900 LED driver is supported by Helvar Driver configurator software. The LC45iC-DA-100-900 driver supports output current setting with software, the output current of the driver can be programmed using Helvar Driver Configurator, as well as OEM customer data and parameters for functions such as CLO and Tunable White behavior. Programming the driver with Helvar Driver Configurator can be done either wirelessly via NFC or then via DALI bus.

Lamp failure functionality

No load
When open load is detected, driver will go to standby power consumption and remains in automatic recovery mode. In automatic recovery mode, the driver waits till load is returned and once that happens, it returns to normal operation.

Short circuit
When short circuit is detected, driver goes to automatic recovery mode and follows the same logic as described in the no load condition.

Overload
When overload is detected, driver goes to standby mode and returns through mains reset.

Underload
When undervoltage is detected, driver goes to standby mode and returns through mains reset.

Switch-Control 2

Use of Switch-Control functionality

- Maximum numbers of LED drivers to be connected to one switch is 60. Wire length is not restricted by the driver technology.
- Ensure that all components connected to Switch-Control circuitry are mains rated.
- More information in Switch-Control User Guide at www.helvar.com.

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
Digital addressing lighting interface:	
General requirements for DALI system	EN 62386-101
Requirements for DALI control gear	EN 62386-102
Requirements for control gear of LED modules	EN 62386-207
Particular requirements for control gear - Colour control (Dali Device Type 8)	EN 62386-209
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 120 °C.

Driver equipped with NFC wireless technology for effortless configuration.

Helvar Intelligent Colour drivers providing DALI colour control (tunable white) functionality.