

42 W **SELV Dimmable DALI-2** LED driver

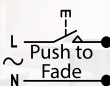
Product code: 5965xxx (see last page)

42 W 220 – 240 V 0 / 50 – 60 Hz

- DALI-2 certified LED driver, 1-100 % dimming range
- Extremely compact and slim 22 mm high mechanics
- High efficiency up to 91 %
- Amplitude dimming technology for the highest quality light output, complying with IEEE 1789 recommendations
- D4i compatible Smart Data features (DALI 251-253)
- Wide output current and output voltage range
- Suitable for use in emergency lighting applications
- For driving Class III (SELV) luminaires, optional strain reliefs for independent use outside of luminaire (LC-SR-MN22 or LC-SR-MN22-LOOP)*



*See also last page.

**Functional Description**

- Adjustable constant current output: 300 mA to 1050 mA (default)
- Current setting via with DIP switches
- Long lifetime up to 100 000 hours
- Potted casing for improved durability
- Amplitude dimming technology for the highest quality light in every application
- D4i compatible Smart Data features, e.g. OEM customer and luminaire data, energy reporting, diagnostics and maintenance
- Push to Fade functionality for easy-to-use intensity control with smooth fade in transitions
- Suitable for flicker-free camera recording applications
- Overload, open & short circuit protection

Mains Characteristics

| | |
|----------------------------------|--|
| Nominal rated voltage range | 220 V – 240 V, 50 – 60 Hz |
| Rated emergency voltage range* | 198-254 VDC |
| AC voltage range | 198-264 VAC |
| DC voltage range | 180-280 VDC |
| Mains current at full load | 0.25 A |
| Frequency | 50 Hz – 60 Hz |
| Stand-by power consumption | < 0.4 W |
| THD at full power | < 7 % |
| Tested surge protection | 1 kV L-N (IEC 61000-4-5) 2 kV L/N-GND (IEC 61000-4-5) |
| Tested fast transient protection | 1 kV (IEC 61000-4-4) |

*) For emergency use, see page 5 for details

Insulation between circuits & driver case

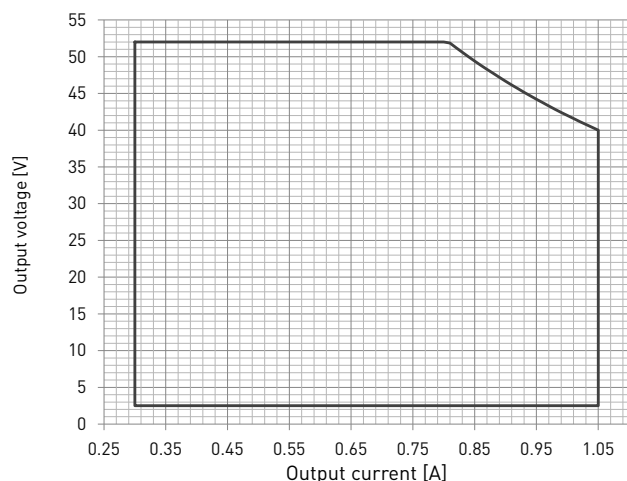
| | |
|--------------------------------------|------------------------------|
| Mains circuit - SELV circuit | Double/reinforced insulation |
| DALI circuit - SELV circuit | Double/reinforced insulation |
| Mains circuit - DALI circuit | Basic insulation |
| Mains, DALI and output - Driver case | Double/reinforced insulation |

Load Output (SELV <60 V)

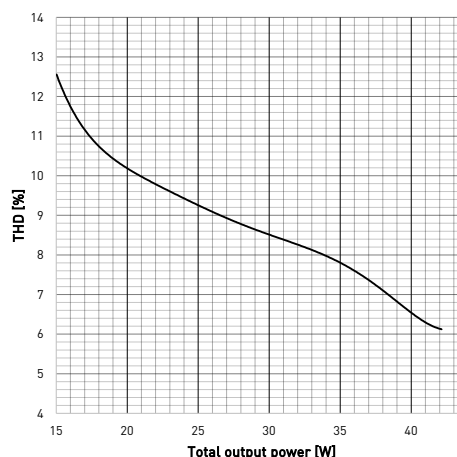
| | |
|------------------------------|--|
| Output current (I_{out}) | 300 mA – 1050 mA (default) |
| Accuracy | ± 5 % |
| Ripple | < ± 3 % ¹⁾ at ≤ 120 Hz |
| | 1) Low frequency, LED load: Cree XP-G LEDs |
| PstLM | < 0.05 ²⁾ |
| SVM | < 0.01 ²⁾ |
| | 2) At full power, measured with Cree XP-G LED modules. |
| U_{out} (max) (abnormal) | 60 V |
| EOFx (EL use) | 15 % |

| I_{LED} | 300 mA | 800 mA | 1050 mA |
|-----------------------------|------------|------------|------------|
| P_{Rated} | 15.6 W | 41.6 W | 42 W |
| U_{LED} | 2.5 – 52 V | 2.5 – 52 V | 2.5 – 40 V |
| PF (λ) at full load | 0.92 | 0.98 | 0.98 |
| Efficiency (η) at full load | 89 % | 91 % | 90 % |

Operating window and driver performance

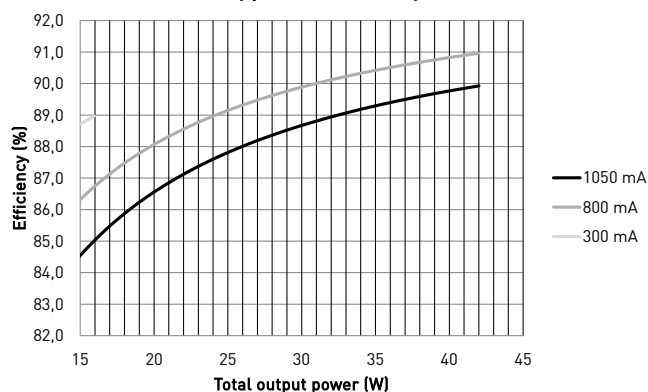


Current THD

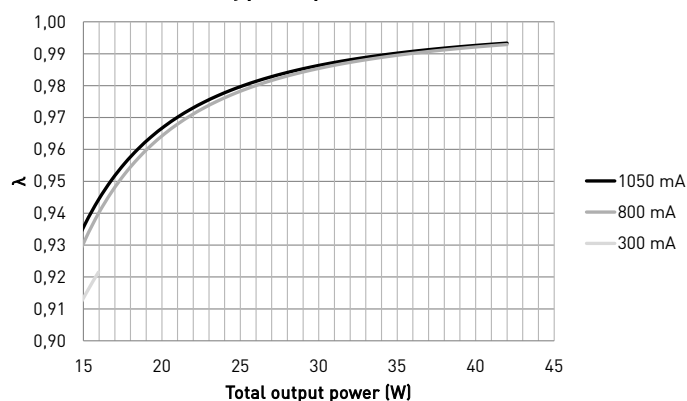


1) Dimming between 1 - 100 % possible accros the operating window, restricted by the absolute minimum dimming current of 3.5 mA
 2) Current value is adjustable in steps via DIP switch. See DIP switch settings in page 5 for details.

Typical efficiency



Typical power factor

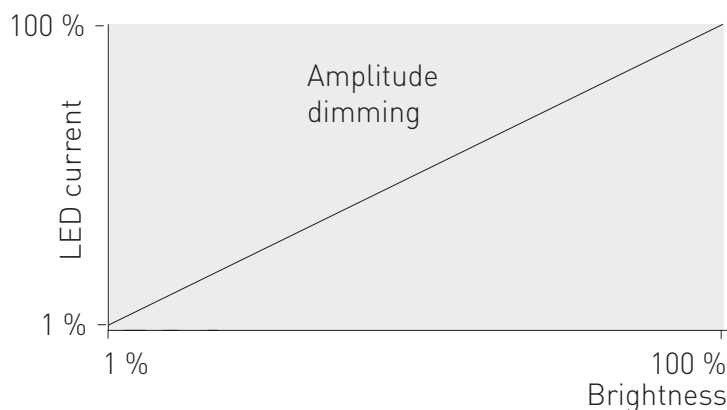


Operating Conditions and Characteristics

| | |
|--|--|
| Absolute highest allowed t_c point temperature | 90 °C |
| T_c life (50 000 h) temperature | 80 °C |
| Ambient temperature range | -20 °C ... +45 °C* |
| Storage temperature range | -40 °C ... +80 °C |
| Maximum relative humidity | No condensation |
| Life time (90 % survival rate) | 100 000 h, at $t_c = 68^\circ\text{C}$ 70 000 h, at $t_c = 75^\circ\text{C}$ 50 000 h, at $t_c = 80^\circ\text{C}$ |

*) 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 | Dimming technology |
|---------------|--------------------|
| 1 % – 100 % | Amplitude (DC) |

LC43MN22-DA-300-1050 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.

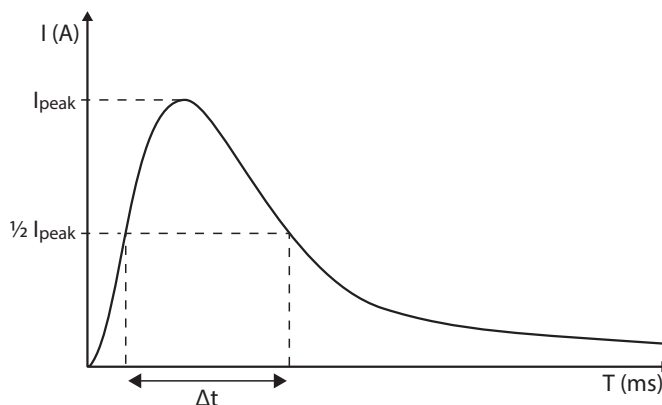
Quantity of drivers per miniature circuit breaker 16 A Type C

| Based on inrush current I_{peak} | Typ. peak inrush current I_{peak} | 1/2 value time, Δt | Calculated energy, $I_{peak}^2 \Delta t$ |
|------------------------------------|-------------------------------------|----------------------------|--|
| 230 pcs* | 5 A | 45 μs | 0.220 A ² s |

*Inrush current is not the limiting factor for the products per C 16 A MCB, please notice the continuous current limitations.

CONVERSION TABLE FOR OTHER TYPES OF MINIATURE CIRCUIT BREAKERS

| 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 % |



CONTINUOUS CURRENT

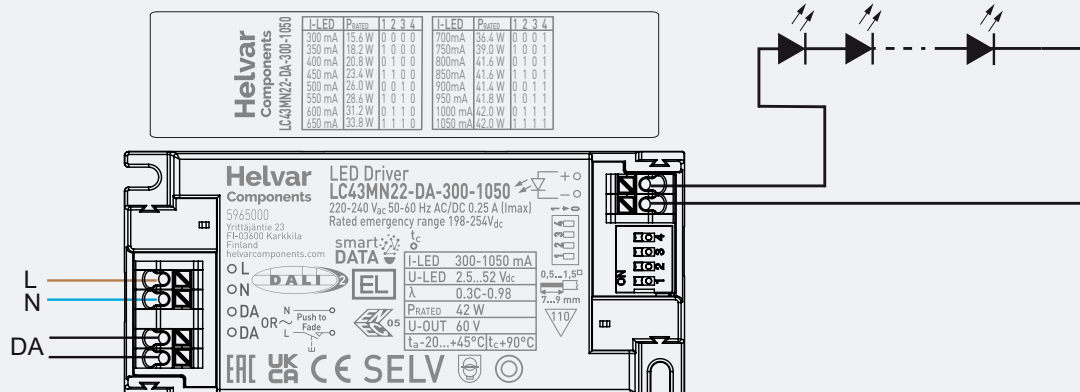
Total continuous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker. Example calculation of total drivers amount limited by continuous current: $n(I_{cont}) = (16 A (I_{nom, Ta}) / \text{"nominal mains current with full load"}) \times 0.76$. 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 continuous 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 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 | 110 g |
| IP rating | IP20 |

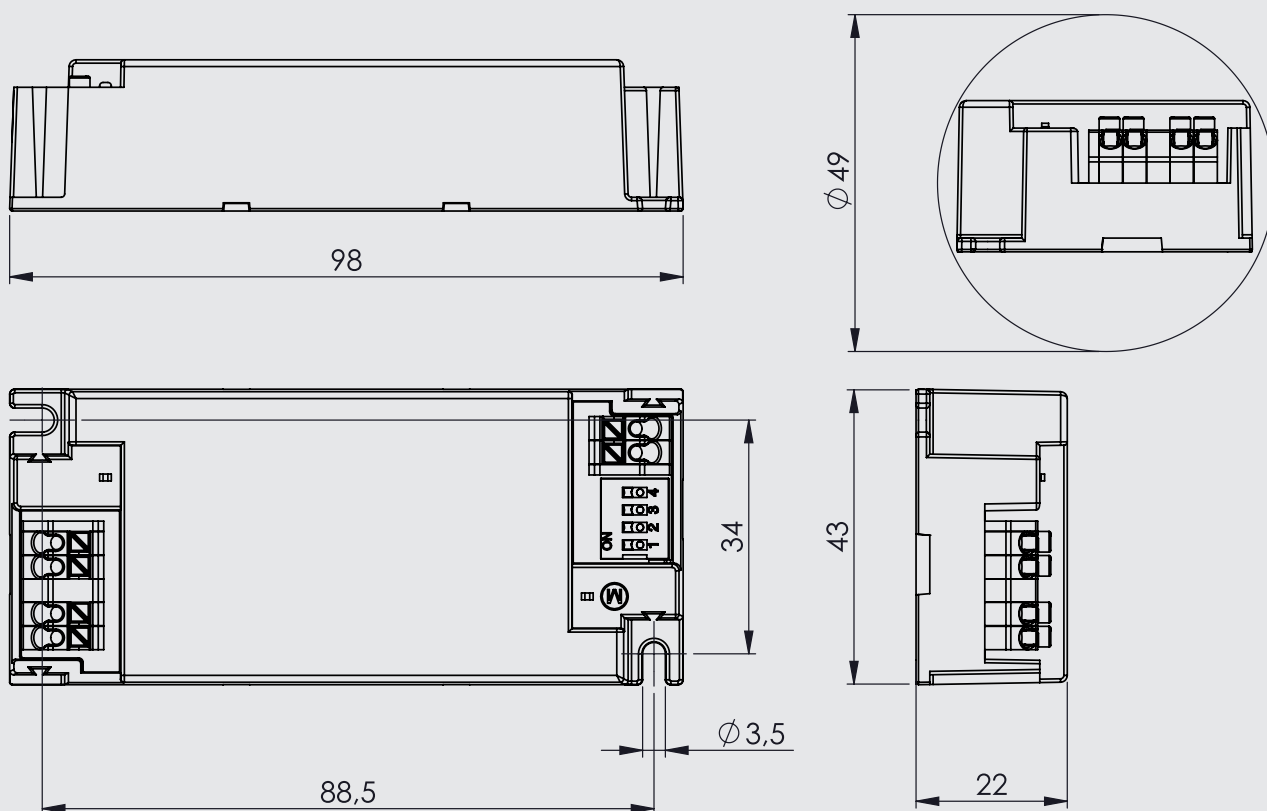
Connections



Note:

- Not suitable for load side switching operation

Dimensions (mm)



D4i-compatible Smart Data Features (DALI 251-253)

LC43MN22-DA-300-1050 driver has integrated Smart Data features, which monitor, gather and provide key data about the LED driver usage and internal parameters through DALI. This useful data provided by LED driver enables various applications and integrations into data management and IoT services, establishing the Helvar Components LED drivers as key components in the latest generation of smart luminaires.

The DALI parts 251-253 include:

- OEM Customer data (DALI part 251)
- Energy reporting (DALI part 252)
- Diagnostics and maintenance (DALI part 253)

The data from these databanks can be accessed and read through DALI bus with the Helvar Driver Configurator.

In LC43MN22-DA-300-1050, 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 presented below and minimum with all switches set to "0" (pushed away from the LED driver label, see connections picture above). The output current values according to the DIP switch settings are presented below.

DIP switch combinations and currents (Nominal I_{out} ($\pm 5\%$ tol.))

| DIP switch combination | 1111 | 0111 | 1011 | 0011 | 1101 | 0101 | 1001 | 0001 |
|------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| I_{out} (mA) | 1050 | 1000 | 950 | 900 | 850 | 800 | 750 | 700 |
| Voltage range | 2.5 - 40 V | 2.5 - 42 V | 2.5 - 44 V | 2.5 - 46 V | 2.5 - 49 V | 2.5 - 52 V | 2.5 - 52 V | 2.5 - 52 V |
| DIP switch combination | 1110 | 0110 | 1010 | 0010 | 1100 | 0100 | 1000 | 0000 |
| I_{out} (mA) | 650 | 600 | 550 | 500 | 450 | 400 | 350 | 300 |
| Voltage range | 2.5 - 52 V | 2.5 - 52 V | 2.5 - 52 V | 2.5 - 52 V | 2.5 - 52 V | 2.5 - 52 V | 2.5 - 52 V | 2.5 - 52 V |

Information and conformity

LC43MN22-DA-300-1050 LED driver is suited for built-in usage in luminaires. With external strain relief (LC-SR-MN22 or LC-SR-MN22-LOOP), 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 via DIP switch

LC43MN22-DA-300-1050 LED driver features a constant current output adjustable via DIP switch combinations.

- For the combination/current values, refer to the table above.

Emergency use

- The product can be continuously operated only with AC, the DC is reserved only for emergency usage.

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, the driver goes to standby and returns through mains reset.

Overload

The driver can withstand output overload. When overload occurs, the driver goes to standby and returns through mains reset.

Short circuit

The driver can withstand output short circuit. When short circuit occurs, the driver goes to standby and returns through mains reset.

AC to DC emergency lighting mode

When AC supply is switched to DC, driver will recognise this and switch to emergency lighting mode. The light level will be adjusted to 15 % of the nominal AC operation output current. The DC light level cannot be adjusted or turned off by manual control. When the AC is switched back on, the driver returns to normal operation.

Push to Fade

Push to Fade solution includes additional fading behavior, which provides smooth transition between on and off states. Please note that Push to Fade is not compatible to be installed in the same circuit with Helvar Switch-Control or Switch-Control 2 devices.

Before installation and for troubleshoot and guidance, refer to user guide at www.helvarcomponents.com.

Use of Push to Fade functionality

- Maximum numbers of LED drivers to be connected to one switch is 30.
- Ensure that all components connected to Push to Fade circuitry are mains rated.
- The transition between 0 to 100% (when turned ON / OFF) is ~ 1 second.

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 (DALI-2) |
| Requirements for DALI control gear | EN 62386-102 (DALI-2) |
| Requirements for control gear of LED modules (DALI Device Type 6) | EN 62386-207 (DALI-2) |
| Memory Bank 1 extension | DALI Part 251 |
| Energy Reporting | DALI Part 252 |
| Diagnostics & Maintenance | DALI Part 253 |
| 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).



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 110 °C.



DALI-2 certified control gear.



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

LC43MN22-DA-300-1050 LED driver can be ordered as just the built-in LED driver itself or then as a combination package with strain reliefs for input and output side. Input strain relief is a LOOPing model with the connector block inside, output strain relief is simple model with screw tightening. Everything is preassembled from the factory, ready to be connected to your LED luminaire! Please refer to the order codes in the table below.

ORDER CODES

| | Order code | Product name | What is included |
|-----------------------------|------------|-----------------------------|--|
| <i>LC43MN22-DA-300-1050</i> | | | |
| Product order codes | 5965000 | LC43MN22-DA-300-1050 | LC43MN22-DA-300-1050 LED driver |
| | 5965010 | LC43MN22-DA-300-1050-SR | LC43MN22-DA-300-1050 LED driver and 2 x LC-SR-MN22 strain reliefs (input + output), preassembled |
| | 5965020 | LC43MN22-DA-300-1050-LOOP-A | LC43MN22-DA-300-1050 LED driver and LC-SR-MN22-LOOP + LC-SR-MN22 strain reliefs (input + output), preassembled |
| | 5966100 | LC-SR-MN22 | 1 x Strain relief, screwable |
| | 5966300 | LC-SR-MN22-LOOP | 1 x Strain relief, LOOP model |

