

## 10 - 42 W **Dimmable DALI** LED driver

42 W 220 – 240 VAC 50 – 60 Hz

- DALI control input, 1-100 % dimming range
- Overload, open & short circuit protection
- High efficiency 0.93
- Suitable for class I luminaires
- Long lifetime, up to 100 000 h
- Helvar Driver Configurator support



### Functional Description

- Adjustable constant current output: 120 mA (default) to 350 mA
- Current setting programmable via DALI or with external resistors
- Hybrid dimming technique for high quality light
- Adaptive LED overload protection. Reduces output current if overload of 45 Watts or over is detected
- Output current peak limited (600 mA) during load change
- Full load recognition, automatic recovery
- Multipurpose terminal Iset/NTC for current setting or over temperature protection, please see page 4.
- Constant Light Output (CLO) up to 100 k h, maximum 75% reduction (default disabled)
- Power consumption monitor (real time), Running hour monitor (accumulative), Energy management (accumulative)

### Mains Characteristics

Voltage range	198 VAC – 264 VAC
DC range	176 VDC - 280 VDC
starting voltage	> 190 VDC
Mains current at full load	0.2 A – 0.22 A
Frequency	0 / 50 Hz – 60 Hz
Stand-by power consumption	0.47 W
THD at full power	< 11.4 %
Leakage current to earth	< 0.5 mA
Tested surge protection	1 kV L-N, 2 kV L-GND (IEC 61000-4-5)
Tested fast transient protection	4 kV (IEC 61000-4-4)

### Insulation between circuits

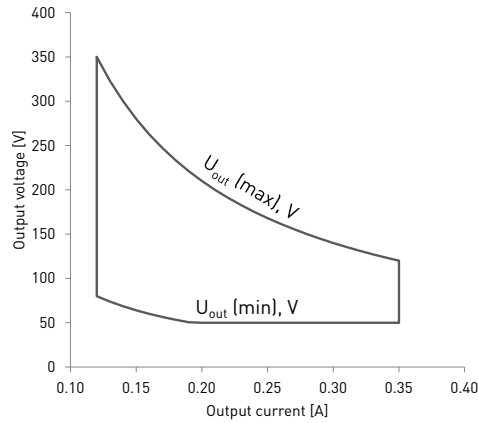
Mains circuit - Output	Non-isolated
DALI circuit - Output	Basic insulation
Mains circuit - DALI circuit	Basic insulation

### Load Output

Output current ( $I_{out}$ )	120 mA (default) – 350 mA
Accuracy	± 5 %
Ripple	< 2 %*, at ≤ 120 Hz (Low frequency) < 12 %*, at > 20 kHz (High frequency)
*) LED load: Cree XM-L LEDs	
$U_{out}$ (max) (abnormal)	400 V

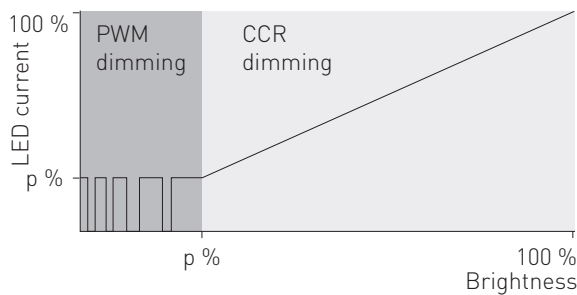
$I_{out}$	120 mA	350 mA
$P_{out}$ (max)	42 W	42 W
$U_{out}$	80 V – 350 V	50 V – 120 V
$\lambda$ at full power	0.96	0.96
Efficiency ( $\eta$ ), max load	0.93	0.92

Operating window



Note: Dimming between 1 % - 100 % possible across the whole operating window

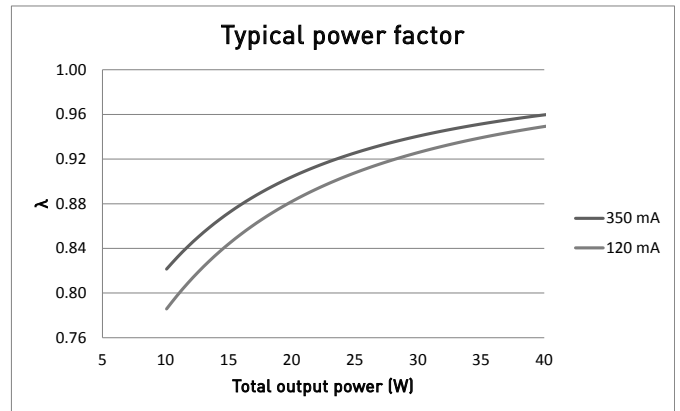
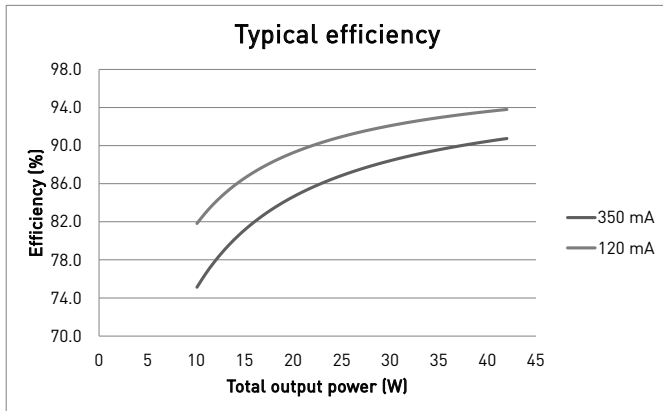
Hybrid dimming technique in automatic dimming



Dimming range	Dimming technique
1 % - 20 %	Pulse Width Modulation (PWM)*
22 % - 100 %	Constant Current Reduction (CCR)

\* PWM dimming frequency 1 kHz

Driver performance



Operating Conditions and Characteristics

Highest allowed $t_c$ point temperature	75 °C
Ambient temperature range	-20 °C ... +50 °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 90 000 h, at $t_c = 70$ °C 60 000 h, at $t_c = 75$ °C

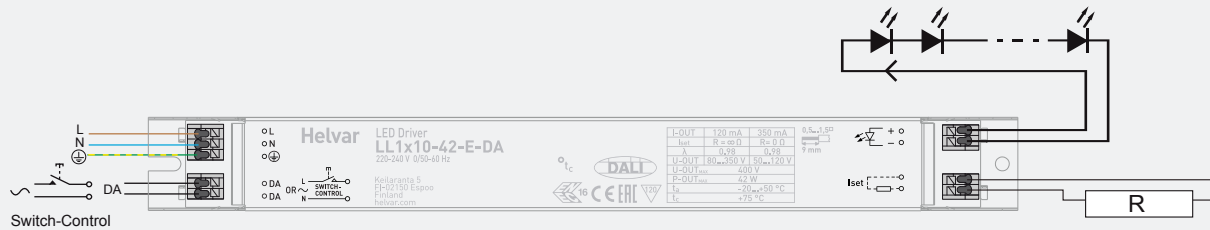
Quantity of drivers per miniature circuit breaker 16 A Type C

Based on $I_{cont}$	Based on $I_{peak}$	Typ.inrush current	1/2 value time, $\Delta t$	Calculated energy, $I_{peak}^2 \Delta t$
53 pcs.	56 pcs.	25 A	177 $\mu s$	0.08 A <sup>2</sup> s

## Connections and Mechanical Data

Wire size	0.5 mm <sup>2</sup> – 1.5 mm <sup>2</sup>
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598
Maximum driver to LED wire length	5 m
Weight	190 g
IP rating	IP20

## Connections



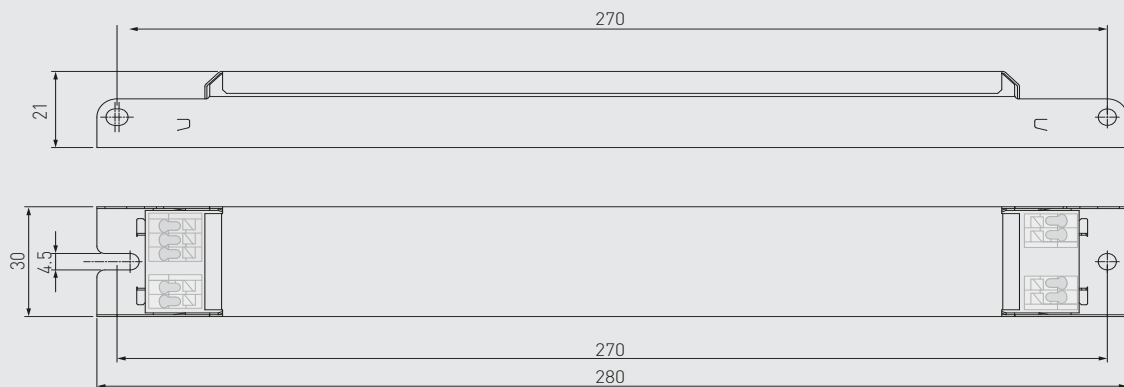
**Note:**

- Not suitable for load side switching operation
- Label may differ if the unit is preset to fixed current

## Current setting resistor values, (Nominal I<sub>out</sub> (±5 % tol.))

Resistor (Ω)	0	47	120	180	270	330	470	560	680	820	1k	1k2	1k5	1k8	2k2	2k7	3k3	3k9	4k7	5k6	8k2	12k	22k	Open
I <sub>out</sub> (mA)	350	340	330	320	310	300	290	280	270	260	250	240	230	220	210	200	190	180	170	160	150	140	130	120

## Dimensions (mm)



LL1x10-42-E-DA LED driver is suited for inbuilt luminaire usage. 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 driver may never exceed the specifications as per the product datasheet.

## Installation & operation

### Maximum $t_c$ temperature:

- Reliable operation and lifetime is only guaranteed if the maximum  $t_c$  point temperature is not exceeded under the conditions of use
- Ensure that the  $t_c$  point temperature does not rise higher than specified on the product datasheets

### Installation site:

- The general preferred installation position of LED drivers for independent use is to have the top cover facing upwards

### Current setting resistor

LL1x10-42-E-DA LED driver features an adjustable constant current output.

- 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
- Iset / NTC -terminal operation can be changed with Helvar Driver configurator software between Iset -resistor series, LEDset resistor series and NTC function. The factory default setting is current setting operation with external resistors using Iset resistor values. The values can be found on page 3.

## Helvar Driver Configurator -support

LL1x10-42-E-DA LED driver is supported by Helvar Driver configurator software. The LL1x10-42-E-DA driver supports output current setting with software, the output current of the driver can be programmed using Helvar Driver Configurator. Also the operation of the multifunction Iset terminal usage can be changed from Helvar specific current setting resistors (default) to LEDset specific resistors or to NTC over temperature protection -operation.

## Lamp failure functionality

### No load

When open load is detected, driver will go to standby after 10 minutes. Automatic recovery is on during the first 10 minutes. If open load is still detected after the first 10 minutes, driver goes to standby mode and recovers through mains reset.

### Short circuit

When short circuit is detected, driver goes to standby mode and returns through mains reset.

### Overload

When high over load is detected, driver goes to standby mode and follows the same logic as described in the short circuit condition. When low over load is detected, output current will be reduced to have maximum rated output power.

### Underload

When under voltage is detected, driver goes to standby mode and returns through mains reset.

## Conformity & standards

General and safety requirements	EN61347-1: 2008+ A1:2011+A2:2013
Particular safety requirements for DC or AC supplied electronic control gear for LED modules	EN61347-2-13: 2014
Thermal protection class	EN61347, C5e
Mains current harmonics	EN61000-3-2: 2014
Limits for voltage fluctuations and flicker	EN61000-3-3: 2013
Radio frequency interference	EN55015: 2013
Immunity standard	EN61547: 2009
Performance requirements	EN62384: 2006+ A1:2009
Compliant with relevant EU directives	
ENEC and CE marked	
ENEC and CE marked	

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