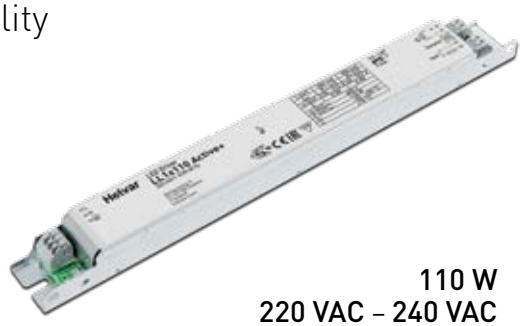
1x110 W **Dimmable** LED driver with Active+ functionality

- Fully automatic standalone setup with smart learning functionality
- Optimised presence detection, daylight harvesting and Constant Light Output (CLO) operation
- No programming, configuration, or external control wiring needed
- Inbuilt power supply for sensor use
- Overwriting option for sensor parameters
- Hybrid dimming technique for high quality light
- Overload, open, and short circuit protection
- Adjustable constant current output: 350 mA (default) to 700 mA
- Low stand-by power < 0.5 W
- High efficiency 0.95
- Suitable for Class I luminaires



110 W
220 VAC – 240 VAC
50 Hz – 60 Hz

Connections

Current setting (p. 2)	
Resistor R	**output I_{fv}**
open	350 mA
0 Ω	700 mA

Note:

- *Not suitable for load side switching operation.*

Mains Characteristics

Voltage range	198 VAC – 264 VAC
DC range	176 VDC – 280 VDC, starting voltage > 190 VDC
Max mains current at full load	0.48 - 0.53 A
Frequency	0 / 50 Hz – 60 Hz
Stand-by power	< 0.5 W

Load Output (non-isolated)

Output current (I_{out})	350 mA (default) – 700 mA
- Accuracy	± 5 %
- Ripple	< ± 5 % high frequency
U_{out} (max) (abnormal)	400 V

I_{out}	350 mA	700 mA
P_{out} (max)	110 W	110 W
U_{out}	120 V – 314 V	50 V – 157 V
λ	0.98	0.98
Efficiency (η), max load	0.95	0.94

Operating Conditions and Characteristics

Max. temperature at t_c point	75 °C
Ambient temperature range	–20 °C ... +50 °C
Storage temperature range	–40 °C ... +80 °C
Maximum relative humidity	no condensation
Life time	55 000 h, at t_c (max) (90 % survival rate)

Connections and Mechanical Data

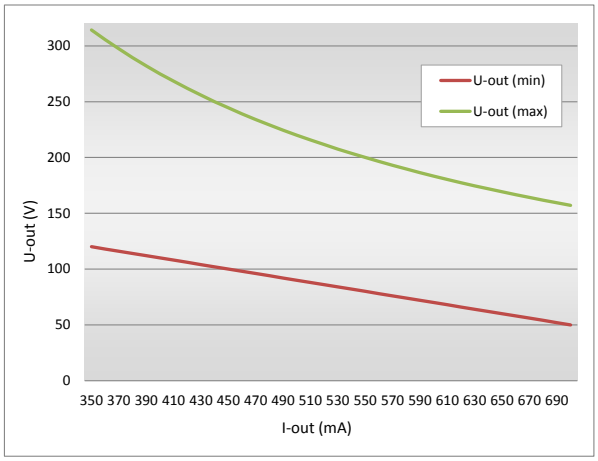
Wire size	0.5 mm^2 – 1.5 mm^2
Wire type	solid core and fine-stranded
Maximum driver to LED wire length	5 m
Weight	238 g
IP rating	IP20

Functional Description

- Active functionality as default (see User Guide)
- Overriding setting of sensor parameters by Helvar Active+ Mobile application (see User Guide)
- Linear dimming with default Active+ settings
- Adaptive overload protection up to 120 W
- Limited outrush current (1350 mA) during load change
- Programmable output current
- Load recognition, automatic recovery

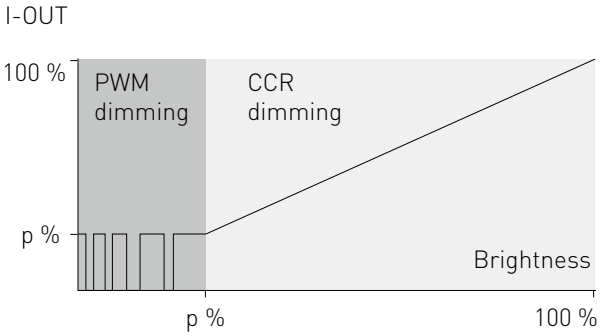
Note: See page 2 - 3 for dimensions and additional information

Load output



U_{out} (max) = 110 W / I_{out}
U_{out} (min) = (–0.2 V / mA) × I_{out} + 190 V

Hybrid dimming technique in automatic dimming



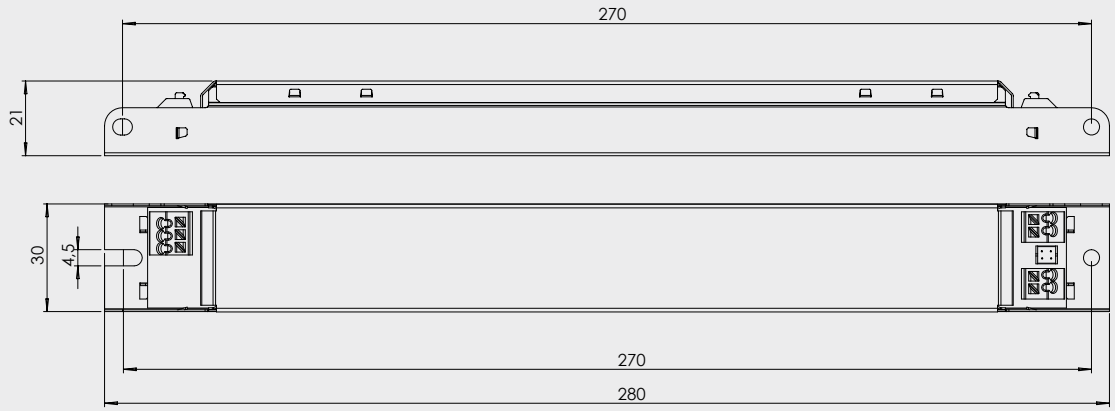
Dimming range	Dimming technique
1 % – 20 %	Pulse Width Modulation (PWM)*
20 % – 100 %	Linear current reduction

* PWM dimming frequency 1 kHz – 8 kHz

Current setting resistor values (Nominal I_{out} (±5 % tol.)

R (Ω)	0	220	470	820	1k2	1k5	2k2	2k7	3k9	5k6	6k8	10k	18k	39k	Open
I_{out} (mA)	700	675	650	625	600	575	550	525	500	475	450	425	400	375	350

Dimensions



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, Δt	Calculated energy, $I_{peak}{}^2\Delta t$
22 pcs.	21 pcs.	46 A	240 µs	0.346 A^2s

LL1x110 Active+ LED driver is suited for in-built 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. Specifications of the LED drivers may never exceed the operating conditions as per the product datasheets.

Wiring

Wire type and cross section: Refer to datasheets connections & mechanical data

Wiring insulation: According to recommendations in EN 60598

Maximum wire lengths: Refer to datasheets connections & mechanical data

Wire connections: Refer to datasheets connections diagram

Miniature Circuit Breakers (MCB: Type-C MCB's with trip characteristics in according to EN 60898 are recommended.

LED driver earthing

- LED drivers are designed to support different luminaire classifications, such as Class I or Class II fittings (no earth required). Check the individual LED driver type for its exact safety class rating.
- For Helvar LED drivers to have a reliable operation and EMC performance, the luminaires are expected to have an earth connection.

Installation & operation

Maximum Tc temperature: Reliable operation and lifetime is only guaranteed if the maximum Tc point temperature is not exceeded under the conditions of use.

Installation site

- Ensure that the LED driver does not exceed temperature higher than specified on the product datasheets.
- The general preferred installation position of LED drivers for independent use is to have the top cover facing upwards.

Current setting resistor

LL1x110 Active+ 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.
- For the resistor/current value selection, refer to the table on page 2.
- For drivers not providing isolation (non-isolated), current setting resistor must be insulated according safety regulations.

Lamp failure functionality

No load: When open load detected, driver will go to stand by, automatic recovery on first 10 minutes. After 10 minutes if no load detected driver goes to standby mode and will recover with mains reset.

Short circuit: When short circuit detected, driver goes to standby, and return by mains reset.

Overload: When high over load is detected, driver goes to stand by and follow the same functions described in No load condition. High over load is triggered when calculated output power reach 120W. When low over load is detected, output current is reduced to result maximum rated power. This protection operate until output voltage reach level of high over load condition.

Underload: When under voltage is detected, driver goes to STB, and return by mains reset.

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
Thermal protection class	EN61347, 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
Compliant with relevant EU directives	Yes
ENEC and CE marked	Yes