

110 W **Dimmable** LED driver with Active+ (and ActiveAhead gen.1*) 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
- Enhanced hybrid dimming, with varying PWM frequency for high quality light, complying with IEEE 1789 recommendation**
- No programming, configuration, or external control wiring needed

* ActiveAhead Gen 1 phased out, visit www.helvar.com for more information on the newest generation of ActiveAhead

** See page 2 for details.



110 W
220 VAC – 240 VAC
50 Hz – 60 Hz



Connections



Current setting (p. 2)	
Resistor R	output I_{out}
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	< 2 %* at ≤ 120 Hz
	*Low frequency, LED load: Cree MX3 LEDs
PstLM	< 0.03*
SVM	< 0.01*
	*I At full power, LED load: Cree XP-G LEDs

Max output power	110 W
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 at full load	0.98	0.98
Efficiency (η) at full 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 (90 % survival rate)	100 000 h, at $t_c = 65$ °C 75 000 h, at $t_c = 70$ °C 55 000 h, at $t_c = 75$ °C

Connections and Mechanical Data

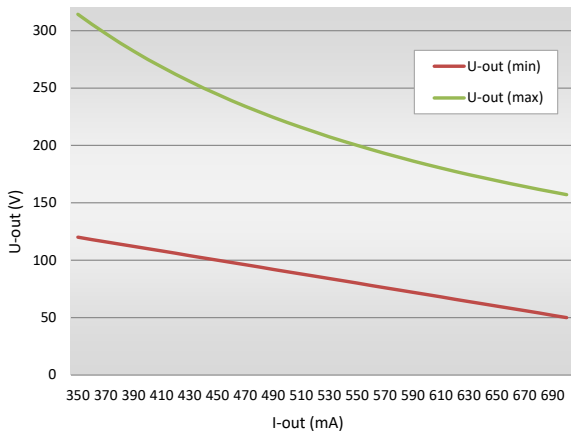
Wire size	0.5 mm ² – 1.5 mm ²
Wire type	solid core and fine-stranded
Wire insulations	According to EN 60598
Maximum driver to LED wire length	5 m
Weight	238 g
IP rating	IP20

Functional Description

- Adaptive overload protection up to 120 W
- Limited outrush current (1350 mA) during load change
- Programmable output current
- Load recognition, automatic recovery
- ON level: fully automatic Constant Lumen Output, dynamic operational area between ON level and energy saving level
- Occupancy timeout: 3.5 min, fade time to energy saving level: 1.5 min
- Customization of luminaire parameters through use of Helvar Active+ mobile app (see User Guide)
- Inbuilt power supply for use of sensor and control unit

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

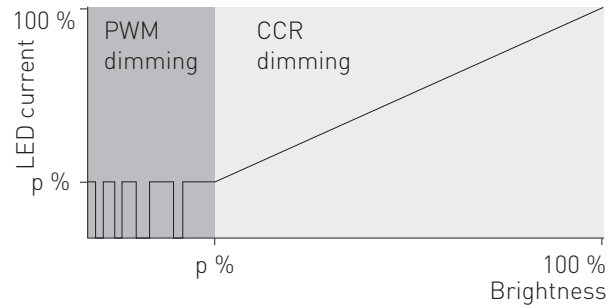
Operating window



$$U_{out} (max) = 110 W / I_{out}$$

$$U_{out} (min) = (-0.2 V / mA) \times I_{out} + 190 V$$

Hybrid dimming technique in automatic dimming



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

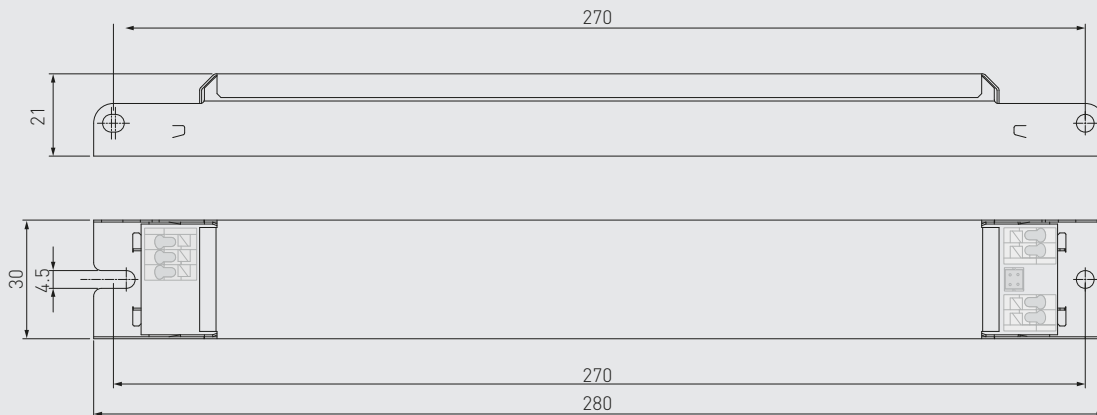
* PWM dimming frequency 1 kHz – 8 kHz

Helvar hybrid dimming products combines both Constant Current Reduction (CCR) amplitude dimming and Pulse Width Modulation (PWM) dimming. CCR is a very efficient technique for dimming the light output, especially on higher range. On lower range, the hybrid dimming products implement high-frequency PWM dimming according to the table above. The dimming technology complies with IEEE 1789-2015 recommendation about current modulation percent and frequency in the dimming range between 3 % - 100 %.

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 Δt
22 pcs.	21 pcs.	46 A	240 μs	0.346 A ² s

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.

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.

Miniature Circuit Breakers (MCB):

- Type-C MCB's with trip characteristics in according to EN 60898 are recommended.

LED driver earthing

- The LL1x110 Active+ LED driver is suitable for use in safety Class I and Class II luminaires.
- For Helvar LED drivers to have a reliable operation and EMC performance, the luminaires are expected to have an earth connection.

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
Recommended Practices for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers	IEEE 1789-2015
Compliant with relevant EU directives	
CE / UKCA marked	