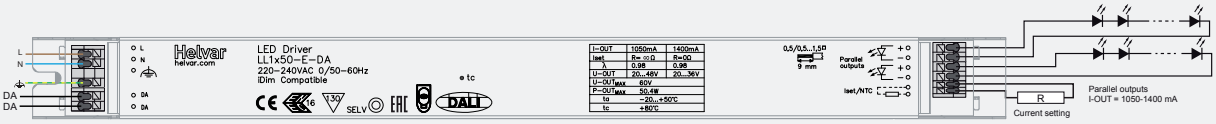
1x50 W **Dimmable DALI** LED driver

- DALI control input, 1 % - 100 % dimming range
- Hybrid dimming technique for high quality light
- Overload, Open & short circuit protection
- Suitable for emergency lighting purposes
- Helvar DALI Driver Configurator support
- Adjustable constant current output: 1050 mA (default) to 1400 mA
- Low standby power consumption < 0.5 W
- Long lifetime, up to 100 000 h
- Suitable for Class I, Class II

50 W
220 VAC – 240 VAC
50 Hz – 60 Hz

Connections



Current setting (p. 2)	
Resistor R	**output I_{fv}**
open	1050 mA
0 Ω	1400 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
Mains current at full load	0.22 A – 0.31 A
Frequency	0 / 50 Hz – 60 Hz
Stand-by power consumption	< 0.5 W

Load output (SELV < 60 V)

Output current (I_{out})	1050 mA (default) – 1400 mA
Accuracy	± 5 %
Ripple	< 2 % at ≤ 120 Hz*
	< 15 % at > 20 kHz*
	*) LED load: Cree XM-L LEDs
U_{out} (max) (abnormal)	60 V

I_{out}	1050 mA	1400 mA
P_{out} (max)	50.4 W	50.4 W
U_{out}	20 V – 48 V	20 V – 36 V
λ	0.98	0.98
Efficiency (η), max load	0.88	0.86

Insulation between circuits

Mains circuit – SELV circuit:	Double/reinforced insulation
DALI circuit - SELV circuit:	Double/reinforced insulation

Operating conditions and characteristics

Max. temperature at t_c point	80 °C
Life time	50 000 h, at t_c = 80 °C
	70 000 h, at t_c = 75 °C
	100 000 h, at t_c = 70°C
	(90 % survival rate)
Ambient temperature range	–20 °C ... +50 °C
Storage temperature range	–25 °C ... +80 °C
Maximum relative humidity	no condensation

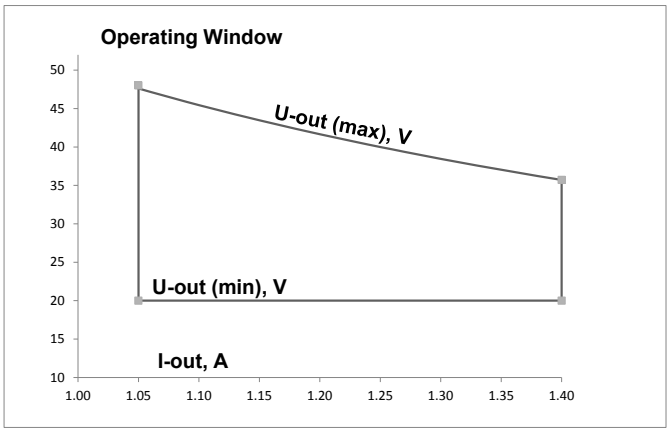
Connections and mechanical data

Wire size	0.5 mm² – 1.5 mm²
for I[set] terminal	*0.14 mm² – 0.5 mm²*
Wire type	solid core and fine-stranded
Maximum driver to LED wire length	1 m
Weight	270 g
IP rating	IP20

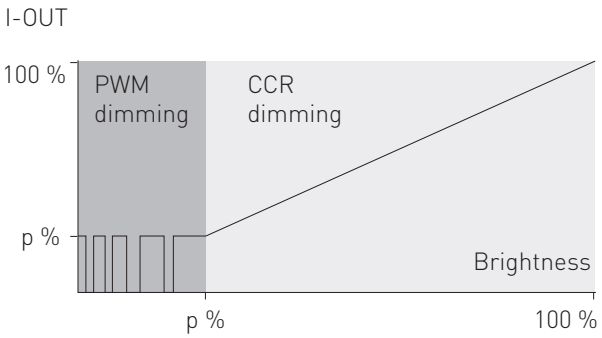
Functional description

- DALI memory bank functionality
- Adaptive overload protection up to 52 V. Reduces output current if overload is connected.
- Programmable output current
- Multipurpose terminal; I[set], NTC (default trigger level at 8k2)
- Constant Light Output CLO, up to 100 000 h, maximum 75 % reduction (default disabled)
- Full load recognition, automatic recovery

Load output



Hybrid dimming technique



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

* PWM dimming frequency 800 Hz

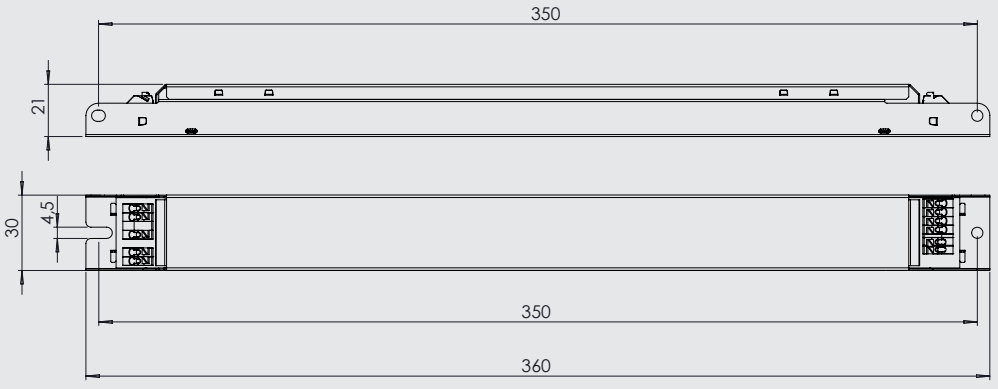
Current setting resistor values (Nominal I_{out} (±5 % tol.)

R (Ω)	0	1k	2k2	3k3	4k7	8k2	10k	15k	22k	33k	47k	68k	100k	220k	Open
I_{out} (mA)	1400	1380	1360	1340	1320	1290	1270	1240	1200	1170	1140	1120	1100	1070	1050

Configurator value for NTC triggering resistance

Triggeing R (Ω)	0	1k	2k2	3k3	4k7	8k2	10k	15k	22k	33k	47k	68k	100k	220k	Open
Configurator value	0	93	184	253	326	459	509	610	699	779	837	880	922	969	1023

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, $I_{peak}^2 \Delta t$
41 pcs.	60 pcs.	18 A	180 µs	0.0412 A^2s

LL1x50-E-DA 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 datasheet's connections & mechanical data

Wiring insulation: According to recommendations in EN 60598

Maximum wire lengths: Refer to datasheet's connections & mechanical data

Wire connections: Refer to datasheet's 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 LED driver type from the page1.

For Helvar LED drivers to have a reliable operation and EMC performance, the luminaires are expected to have an earth connection.

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.

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

LL1x50-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 0.41mm.
- 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 DALI command or mains reset. *The time out can be modified through DALI commands.*

Short circuit

When short circuit detected, driver goes to standby, and return by DALI command or mains reset. *Flag of short circuit will be set for DALI.*

Overload

When high over load detected, driver goes to stand by and follow the same functions described in open load condition. High over load is triggered by over voltage above the limit of 52 V. When low over load is detected, output current will be reduced to result maximum rated power. This is tiggered by over voltage below the limit of 52 V. *Flag of over-load will be set for DALI.*

Underload

When under voltage is detected, driver goes to STB, and return by DALI command or mains reset. *Flag of short circuit will be set for DALI.*

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
Digital addressing lighting interface	EN62386-207
Compliant with relevant EU directives	
ENEC and CE marked	