LL80DS-DA/AN-350-1400

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

Product code: 5909

80 W 220 – 240 V 50 – 60 Hz

- SELV output protection for safety and flexibility in luminaires
- DALI and 1 - 10 V control input, 1 - 100 % dimming range
- Amplitude dimming for the highest quality light output
- Improved driver surge protection (4 kV / 4 kV)
- Low current ripple, complying with IEEE 1789 recommendation
- Suitable for use in emergency lighting applications
- Helvar Driver Configurator support
- Ideal solution for Class I luminaires

Functional Description

- Adjustable constant current output: 350 mA (default) to 1400 mA
- Current setting via dip-switches
- Dimming available through both DALI and 1 - 10 V interfaces
- Overload, open & short circuit protection
- External NTC thermal input for overtemperature protection

Mains Characteristics

Nominal rated voltage range	220 V – 240 V, 50 – 60 Hz
Rated emergency voltage range*	196 V – 250 V, 0 Hz
AC voltage range	198 VAC – 264 VAC
	Withstands max. 320 VAC (max. 1 hour)
DC voltage range*	176 VDC - 275 VDC
Mains current at full load	0.33 – 0.44 A
Frequency	50 Hz – 60 Hz
THD at full power	< 10 %
Leakage current to earth	< 0.7 mA
Tested surge protection	4 kV L/N-GND**
	4 kV L-N (IEC 61000-4-5)
Tested fast transient protection	2 kV (IEC 61000-4-4)

**For emergency use, see details in page 4*

***Up to 2 kV according IEC61000-4-5, up to 4 kV L-GND or N-GND positive surge pulses.*

Insulation between circuits & driver case

Mains circuit - SELV circuit	Double/reinforced insulation
Mains circuit - 1-10V circuit*	Double/reinforced insulation
Output - Driver case	Basic insulation
Mains input - Ground input	Double/reinforced insulation

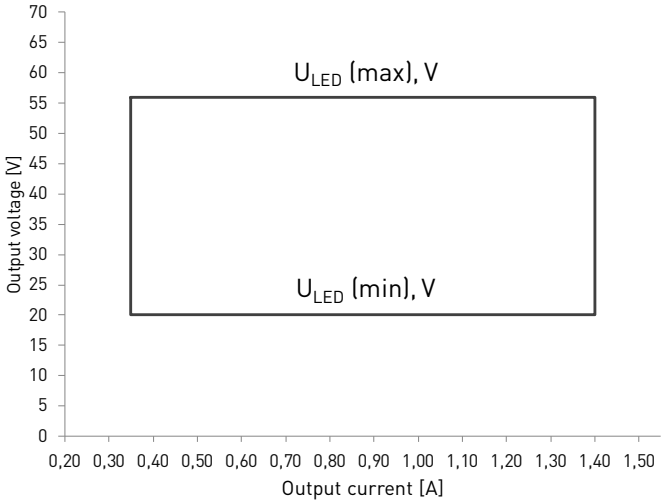
*1 - 10 V circuit connected to SELV circuit / driver output

Load Output (SELV <60 V)

Output current (I_{out})	350 mA (default) – 1400 mA
Accuracy	± 5 %
Ripple	< 3 %* at ≤ 120 Hz
	*) Low frequency, LED load: Cree XP-G LEDs
U_{out} (max) (abnormal)	60 V
EOF_I (EL use)	> 0.98 x output current with AC supply

I_{LED}	350 mA	1400 mA
P_{Rated}	19.5 W	78.4 W
U_{LED}	20 - 56 V	20 - 56 V
PF (λ) at full load	0.84	0.95
Efficiency (η) at full load	87 %	91 %

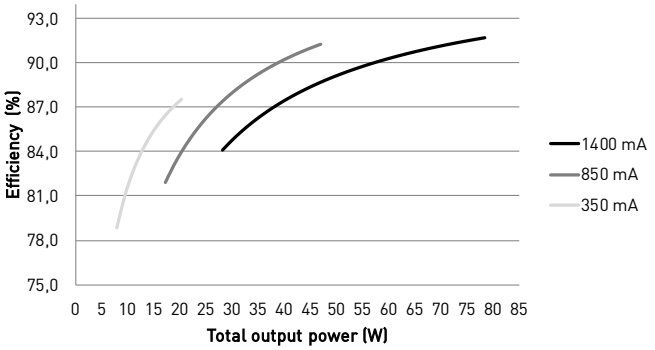
Operating window



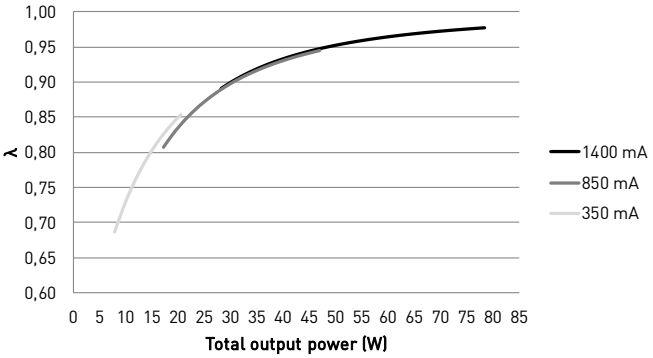
Note: Dimming between 1 % - 100 % possible across the whole operating window

Driver performance

Typical efficiency



Typical power factor

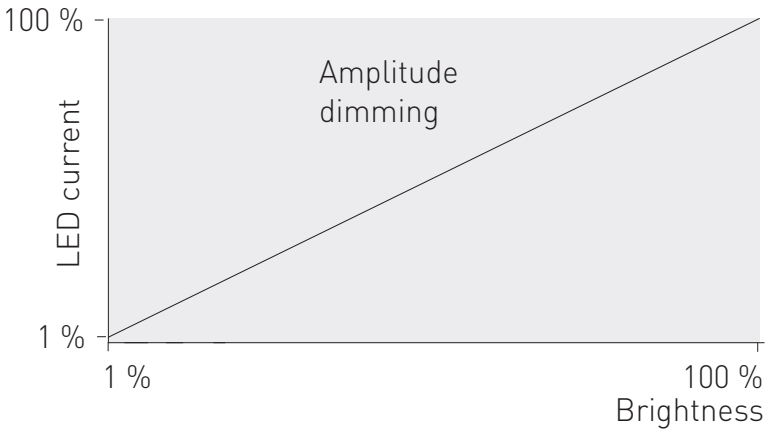


Operating Conditions and Characteristics

Absolute highest allowed t_c point temperature	75 °C
Tc life (50 000 h) temperature	70 °C
Ambient temperature range*	–25 °C … +55 °C*
Storage temperature range	–40 °C … +80 °C
Maximum relative humidity	No condensation
Lifetime (90 % survival rate)	100 000 h, at t_c = 60 °C 50 000 h, at t_c = 70 °C 30 000 h at t_c = 75 °C

**) 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)

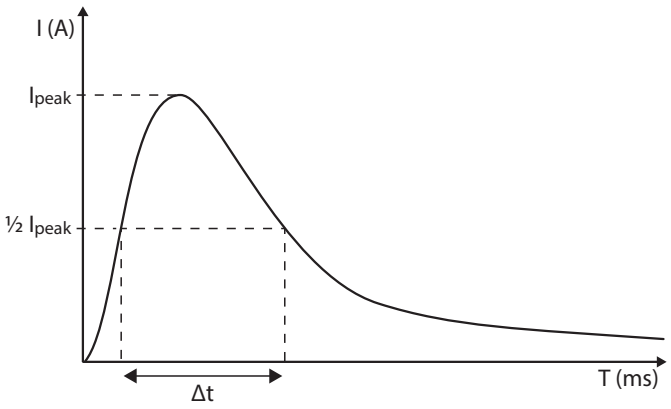
LL80DS-DA/AN-350-1400 LED driver implements amplitude dimming technology across whole dimming range. Amplitude dimming offers the best available technology for dimming the light output in an accurate and flicker-free way to ensure high quality lighting in even the most demanding situations such as camera 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
25 pcs.	10 A	200 µs

CONVERSION TABLE FOR OTHER TYPES OF MINIATURE CIRCUIT BREAKER

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 %



CONTINOUS CURRENT

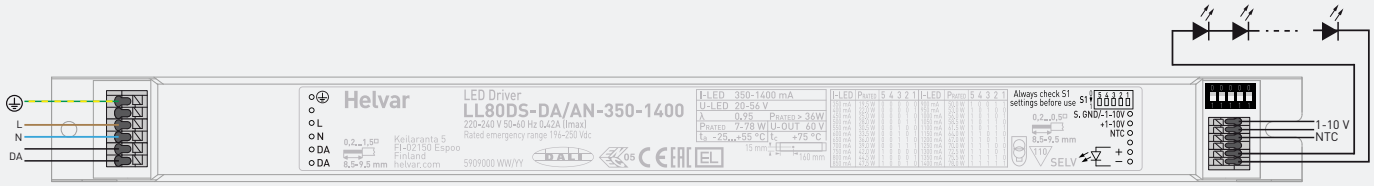
Total continous current of the drivers and installation environment must always be considered and taken into calculations when installing drivers behind miniature circuit breaker. Example calculation of total drivers amount limited by continous current: n(I_{cont}) = (16 A ($I_{nom,Ta}$) / "nominal mains current with full load") x 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 continous 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	Input / DALI: 0.20 mm² – 1.5 mm² Output / 1 - 10 V: 0.20 mm² – 0.5 mm²
Wire type	Solid core and fine-stranded
Wire insulation	According to EN 60598
Maximum driver to LED wire length	1.5 m
Weight	272 g

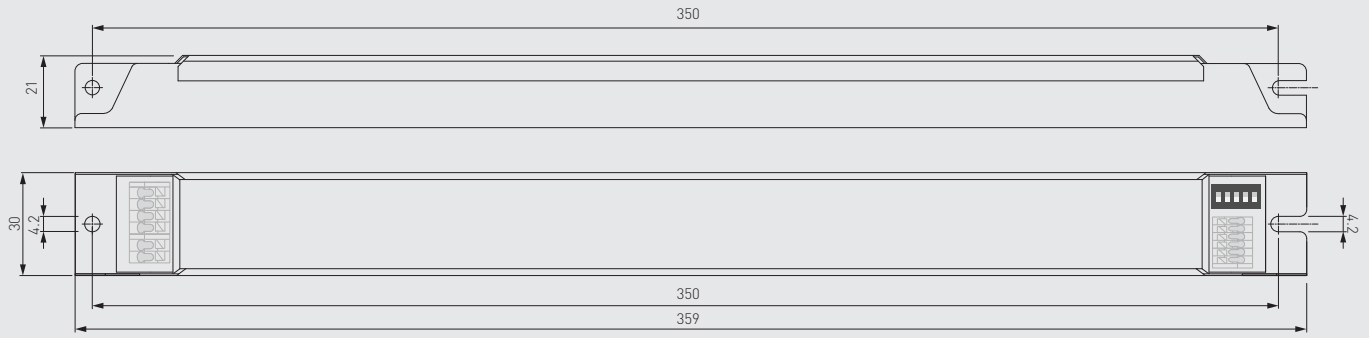
Connections



Note:

- *Not suitable for load side switching operation.*
- *When connecting NTC thermistor, the connection must be done between "NTC" and "S.GND/-1-10V" terminals.*
- *The 1 - 10 V terminal can be used for both 0 / 1 - 10 V purpose as well as with 100 kΩ potentiometer . The current sourced from the terminal is 1 mA .*
- *When using the 0 / 1 – 10 V dimming, the minus port of 0 / 1 - 10 V device must be connected to S.GND terminal and the external connection must be double / reinforced insulated from any mains connected live parts.*
- *Please read the grounding information on page 5.*

Dimensions (mm)



In LL80DS-DA/AN-350-1400, 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 all switches ON (pushed downwards towards the connectors) and minimum with all switches OFF (pushed upwards away from connectors) The output current values according to the dip-switch settings are presented below, with "1" presenting ON and "0" presenting OFF.

Dip-switch combinations, output currents and voltage ranges (Nominal I_{out} (±5 % tol.))

Dip-switch combination	11111	11110	11101	11100	11011	11010	10111	10110	10101	10100	10011
I_{out} (mA)	1400	1350	1300	1250	1200	1150	1100	1050	1000	950	900
Voltage range	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V
Dip-switch combination	10010	10001	10000	00111	00110	00101	00100	00011	00010	00001	00000
I_{out} (mA)	850	800	750	700	650	600	550	500	450	400	350
Voltage range	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V	20 - 56 V

Information and conformity

Helvar

LL80DS-DA/AN-350-1400 LED driver is suited for built-in usage in luminaires. 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

- LL80DS-DA/AN-350-1400 LED driver features a constant current output adjustable via dip-switch combinations. For the combination/current values, refer to the table on page 3.
- Current can be set via HDC software. When set by HDC, the dip-switch setting must remain at the maximum current setting value. The dip-switch shall not be used when current is set by SW.

Emergency use

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

LED driver earthing

- LL80DS-DA/AN-350-1400 LED driver is a protective Class I device and designed for Class I luminaires.
- LED driver must always have the protective earth cable connected for safety reasons.

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.

Helvar Driver Configurator support

LL80DS-DA/AN-350-1400 LED driver is supported by Helvar Driver Configurator software. Helvar Driver Configurator allows user to set current by software and the basic dali parameters; adjust dimming range, linear dimming curve as well as enable the power level to be set on last adjusted level, after power shutdown.

Lamp failure functionality

No load

When open load is detected, driver limits output voltage according to Uout (max) (abnormal).

Overload

Driver can withstand overload, however reliable operation is only guaranteed in specified voltage range.

Short circuit

Driver can withstand output short circuit.

Overtemperature

When overtemperature protection is triggered by external NTC thermistor at 26 kΩ, the light output is decreased and at the 15 kΩ, the driver goes to standby.

Conformity & standards

General and safety requirements	EN 61347-1: 2015
Particular safety requirements for DC or AC supplied electronic control gear for LED modules	EN 61347-2-13: 2014+ A1:2017
Additional safety requirements for AC or DC supplied electronic controlgear for emergency lighting	EN 61347-2-13: 2014 + A1:2017, Annex J
Thermal protection class	EN 61347, C5a
Mains current harmonics	EN 61000-3-2: 2014
Limits for voltage fluctuations and flicker	EN 61000-3-3: 2013
Radio frequency interference	EN 55015: 2013+ A1: 2015
Immunity standard	EN 61547: 2009
Performance requirements	EN 62384: 2006+ A1:2009
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 (pending) and CE marked	

Label symbols

Safety isolating control gear with short circuit protection (SELV control gear).

Thermally controlled control gear, incorporating means of protection against overheating to prevent the case temperature under any conditions of use from exceeding 110 °C.