

Features

- Non-Isolated Class I Driver
- No Afterglow
- Dimming Range: 0.1%-100%
- Max Remote Distance Up to 300 Meters (Dimming and Output)
- Ultra High Efficiency (Up to 97%)
- Full Power at Wide Output Current Range (Constant Power)
- Adjustable Output Current (AOC) with NFC
- DALI-2 and D4i Certified & DMX-RDM & 3-Timer-Modes Dimmable
- DALI-2/DMX-RDM Controls Up to 44 fps
- Integrated Power Metering with High Accuracy up to $\pm 1\%$
- Thermal Sensing and Protection for LED Module
- Low Inrush Current
- Output Lumen Compensation
- End-of-Life Indicator
- Input Surge Protection: DM 10kV, CM 10kV
- All-Around Protection: IOVP, IUVP, OVP, SCP, OTP, OPP
- IP66
- IK08 Enclosure
- 5 Years Warranty



Description

The NSS-700SxxxBC series is a 700W, single channel, constant-current, programmable and IP66 LED driver that operates from 249-528 Vac input with excellent power factor. Created for many lighting applications including sports, high mast, UV-LED, aquaculture, and horticulture, etc. The dimming control supports two-way communication via DALI-2 and complies with D4i, furthermore it incorporates DMX-RDM dimming. The high efficiency of these drivers and compact metal case enables them to run cooler, significantly improving reliability and extending product life. To ensure trouble-free operation, protection is provided against input surge, input under voltage, input over voltage, output over voltage, short circuit, and over temperature.

Models

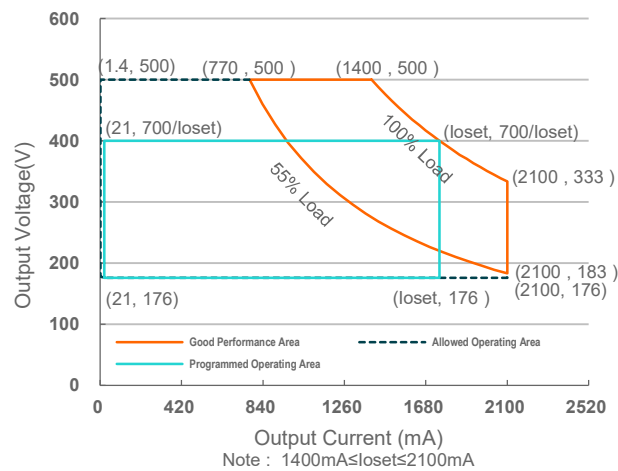
| Adjustable Output Current Range (mA) | Full-Power Current Range (mA) ⁽¹⁾ | Default Output Current (mA) | Output Voltage Range (Vdc) | Max. Output Power (W) | Typical Efficiency ⁽²⁾ | Typical Power Factor | | Model Number ⁽³⁾ |
|--------------------------------------|--|-----------------------------|----------------------------|-----------------------|-----------------------------------|----------------------|--------|-----------------------------|
| | | | | | | 277Vac | 480Vac | |
| 1.4-2100 | 1400-2100 | 1400 | 176-500 | 700 | 97.0% | 0.99 | 0.95 | NSS-700S210BC |

Notes: (1) Output current range with constant power at 700W

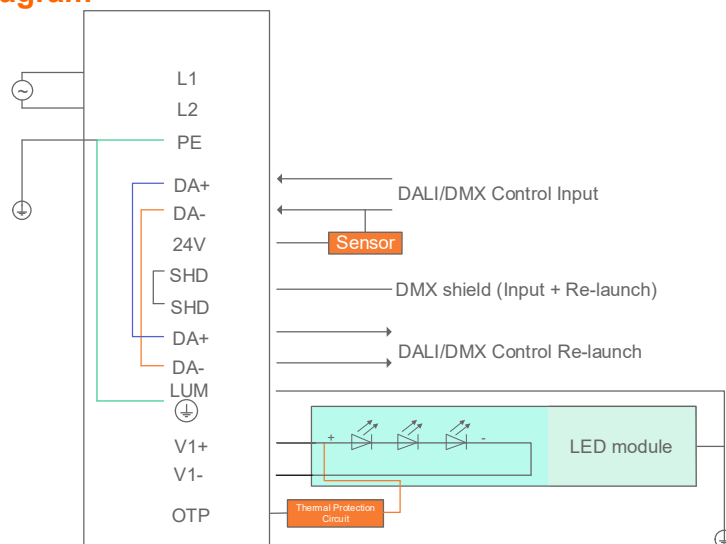
(2) Measured at 100% load and 480Vac input (see below "General Specifications" for details).

(3) Certified voltage range: 277-480Vac

I-V Operation Area



Driver Function Diagram



Input Specifications

| Parameter | Min. | Typ. | Max. | Notes |
|------------------|---------|------|----------|--|
| Input AC Voltage | 249 Vac | - | 528 Vac | |
| Input DC Voltage | 352 Vdc | - | 500 Vdc | |
| Input Frequency | 47 Hz | - | 63 Hz | |
| Leakage Current | - | - | 0.75 MIU | UL 8750; 480Vac/ 60Hz |
| | - | - | 0.70 mA | IEC 60598-1; 480Vac/ 60Hz, grounding effectively |

Input Specifications (Continued)

| Parameter | Min. | Typ. | Max. | Notes |
|----------------------------------|------|------|-----------------------|---|
| Input AC Current | - | - | 2.92 A | Measured at 100% load and 277 Vac input. |
| | - | - | 1.72 A | Measured at 100% load and 480 Vac input. |
| Inrush Current(I ² t) | - | - | 1.69 A ² s | At 480Vac input, 25°C cold start, duration=8.8 ms, 10%I _{pk} -10%I _{pk} . |
| PF | 0.90 | - | - | At 277-480Vac, 50-60Hz, 55%-100% Load (385 - 700W) |
| THD | - | - | 20% | |

Output Specifications

| Parameter | Min. | Typ. | Max. | Notes |
|--|----------|---------------------|----------------------|--|
| Output Current Tolerance | -5%loset | - | 5%loset | 100% load |
| Output Current Setting(loset) Range | | | | |
| NSS-700SxxxBC | 21 mA | - | 2100 mA | |
| Output Current Setting Range with Constant Power | | | | |
| NSS-700SxxxBC | 1400 mA | - | 2100 mA | |
| Total Output Current Ripple (pk-pk) | - | 2%I _{omax} | 5%I _{omax} | 100% load, 20 MHz BW |
| Output Current Ripple at < 3000 Hz (pk-pk) | - | 1%I _{omax} | - | At 70-100% load condition. Only this component of ripple is associated with visible flicker. |
| Startup Overshoot Current | - | - | 10%I _{omax} | 100% load |
| No Load Output Voltage | - | - | 600 V | |
| Line Regulation | - | - | ±2.5% | 100% load |
| Load Regulation | - | - | ±5.0% | |
| Turn-on Delay Time | - | - | 0.5 s | Measured at DMX-RDM/Time dimming mode, and 277-480Vac input, 55%-100% Load |
| | - | - | 1.0 s | Measured at DALI-2 dimming mode, and 277-480Vac input, 55%-100% Load |
| Temperature Coefficient of loset | - | 0.03%/°C | - | Case temperature = 0°C ~T _c max |

Output Specifications (DALI Dimming Mode)

| Parameter | Min. | Typ. | Max. | Notes |
|---|--------|------|--------|---|
| 24V Auxiliary Output Voltage | 21.6 V | 24 V | 26.4 V | P _{load} ≥ 0.1W |
| | - | - | 30V | P _{load} < 0.1W |
| 24V Auxiliary Output Voltage ripple (pk-pk) | - | - | 1.0V | P _{load} ≥ 0.1W, f _{ripple} > 10kHz |
| 24V Auxiliary Output Source Current | 0 mA | - | 125 mA | Return terminal is "DA-" |

Output Specifications (DALI Dimming Mode) (Continued)

| Parameter | Min. | Typ. | Max. | Notes |
|---|--------|--------|--------|---|
| 24V Auxiliary Output Transient Peak Current@6W | - | - | 250 mA | 250mA peak for a maximum duration of 2.2ms in a 6.0ms period during which time the average should not exceed 125mA. |
| 24V Auxiliary Output Transient Peak Current@10W | - | - | 425 mA | 425mA peak for a maximum duration of 1.3ms in a 5.2ms period during which time the average should not exceed 125mA. |
| Integrated DALI-2 Bus Power Supply Voltage | 12 Vdc | 16 Vdc | 20 Vdc | Voltage is depending on loading. |
| Integrated DALI-2 Bus Power Maximum Supply Current | 60 mA | | | |
| Integrated DALI-2 Bus Power Guaranteed Supply Current | 50 mA | | | DALI-2 Bus Power Supply Voltage $\geq 12V$ |

Notes: (1) When driver works in DMX-RDM mode, 24V auxiliary cannot be loaded and cannot be connected to the system.
 (2) DALI-2 bus power supply is enabled by default and can be disabled via programming interface.
 (3) DALI-2 bus power supply supports automatic shut-down and restart after short-circuit.

General Specifications

| Parameter | Min. | Typ. | Max. | Notes |
|---|---------------------------------------|----------------|--------|---|
| Efficiency at 277 Vac input: Io= 1400 mA Io= 2100 mA | 94.5% 94.0% | 96.5% 96.0% | - - | Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.) |
| Efficiency at 400 Vac input: Io= 1400 mA Io= 2100 mA | 95.0% 95.0% | 97.0% 97.0% | - - | Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.) |
| Efficiency at 480 Vac input: Io= 1400 mA Io= 2100 mA | 95.0% 94.5% | 97.0% 96.5% | - - | Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.) |
| Power Monitoring Accuracy | -1% | - | 1% | Measured at 480Vac input and 100%Load |
| Standby Power | - | 1.5W | | Measured at 480Vac/50Hz; Dimming off when Bus Power Supply is disabled |
| MTBF | - | 289,000 Hours | - | Measured at 480Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F) |
| Lifetime | - | 100,000 Hours | - | Measured at 480Vac input, 80%Load and 70°C case temperature; See lifetime vs. Tc curve for the details |
| Operating Case Temperature for Safety Tc_s | -40°C | - | +90°C | |
| Operating Case Temperature for Warranty Tc_w | -40°C | - | +80°C | Case temperature for 5 years warranty Humidity: 10%RH to 95%RH |
| Storage Temperature | -40°C | - | +85°C | Humidity: 5%RH to 95%RH |
| Dimensions Inches (L × W × H) Millimeters (L × W × H) | 12.20 × 5.71 × 2.76 310 × 145 × 70 | | | |
| Net Weight | - | 3050 g | - | |

Dimming Specifications

| Parameter | | Min. | Typ. | Max. | Notes |
|-----------------------------|-------------------------|-----------|----------|--------|----------------------------|
| DALI Dimming Mode (Default) | DA+, DA- High Level | 9.5V | 16V | 22.5V | |
| | DA+, DA- Low Level | -6.5V | 0V | 6.5V | |
| | DA+, DA- Current | 0mA | - | 2mA | |
| | Dimming Output Range | 0.1%loset | - | loset | 1400 mA ≤ loiset ≤ 2100 mA |
| | | 1.4 mA | - | loiset | 21 mA ≤ loiset < 1400 mA |
| DMX-RDM Dimming Mode | DMX+ to DMX- | -6 V | - | 6 V | |
| | DMX+ to Chassis | 22M ohm | - | - | |
| | DMX- to Chassis | 22M ohm | - | - | |
| | Logic 0 Input | - | - | -0.2 V | DMX+ to DMX- |
| | Logic 1 Input | 0.2 V | - | - | DMX+ to DMX- |
| | Communication Baud Rate | - | 250k bps | - | |
| | Dimming Output Range | 0.1%loset | - | loiset | 1400 mA ≤ loiset ≤ 2100 mA |
| | | 1.4 mA | - | loiset | 21 mA ≤ loiset < 1400 mA |

Safety & EMC Compliance

| Safety Category | Standard |
|--|---|
| UL/CUL | UL 8750, CAN/CSA-C22.2 No. 250.13 |
| ENEC | EN 61347-1, EN 61347-2-13 ⁽¹⁾ |
| CE | EN 61347-1, EN 61347-2-13 ⁽¹⁾ EN 301 489-1 EN 301 489-3 EN 300 330 EN 62479/EN 50663/EN 50665/EN 50364 |
| CB | IEC 61347-1, IEC 61347-2-13 ⁽¹⁾ |
| CCC | GB 19510.1, GB 19510.14 |
| global-mark | AS/NZS 61347.1, AS/NZS 61347.2.13 |
| Performance | Standard |
| ENEC | EN IEC 62384 |
| EMI Standards | Notes |
| EN IEC 55015/GB/T 17743 ⁽²⁾ | Conducted emission Test & Radiated emission Test |
| EN IEC 61000-3-2/GB 17625.1 | Harmonic current emissions |
| EN 61000-3-3 | Voltage fluctuations & flicker |

Safety & EMC Compliance (Continued)

| EMI Standards | Notes | |
|----------------------------|---|--|
| FCC Part 15 ⁽²⁾ | ANSI C63.4 Class B | |
| | This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: [1] this device may not cause harmful interference, and [2] this device must accept any interference received, including interference that may cause undesired Operation. | |
| EMS Standards | Notes | |
| EN 61000-4-2 | Electrostatic Discharge (ESD): 8 kV air discharge, 4 kV contact discharge | |
| EN 61000-4-3 | Radio-Frequency Electromagnetic Field Susceptibility Test-RS | |
| EN 61000-4-4 | Electrical Fast Transient / Burst-EFT | |
| EN 61000-4-5 | AC mains | Surge Immunity Test: AC Power Line: Differential Mode 10 kV, Common Mode 10 kV |
| | Output | - Common Mode: 3kV V+ to PE V- to PE - Differential Mode: 1kV (V+ to V-,) |
| | Dimming | -Common Mode: 3kV DA+/DA- to PE - Differential Mode: 1kV DA+ to DA- |
| | OTP | -Common Mode: 3kV OTP to PE - Differential Mode: 1KV OTP to V+ |
| EN 61000-4-6 | Conducted Radio Frequency Disturbances Test-CS | |
| EN 61000-4-8 | Power Frequency Magnetic Field Test | |
| EN 61000-4-11 | Voltage Dips | |
| EN 61547 | Electromagnetic Immunity Requirements Applies To Lighting Equipment | |
| DALI-2 Standards | Notes | |
| DALI-2 ⁽³⁾ | IEC 62386-101, -102 & -207 | |

Note: (1) This LED driver complies with IEC/EN 61347-2-13, Annex J (EL mark) requirements for AC emergency lighting LED drivers. It is suitable for emergency luminaires (IEC 60598-2-22), but not intended for use in high-risk emergency lighting locations as defined by the ISO 30061.

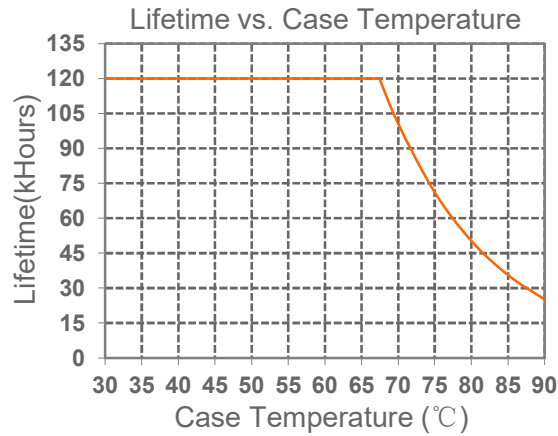
(2) This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.

(3) DALI parts: 101, 102, 150, 207, 250, 251, 252, 253.

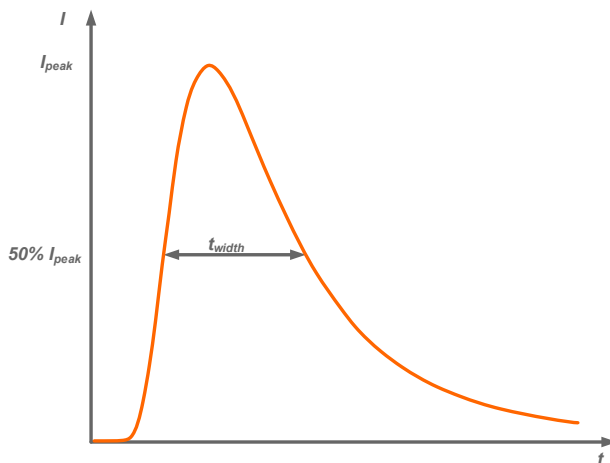
● Isolation levels between different circuits:

| | AC Input | DC Output | Dimming (SELV) | Housing |
|----------------|--------------|--------------|----------------|---------|
| AC Input | / | No isolation | Double | Basic |
| DC Output | No isolation | / | Double | Basic |
| Dimming (SELV) | Double | Double | / | Basic |
| Housing | Basic | Basic | Basic | / |

Lifetime vs. Case Temperature



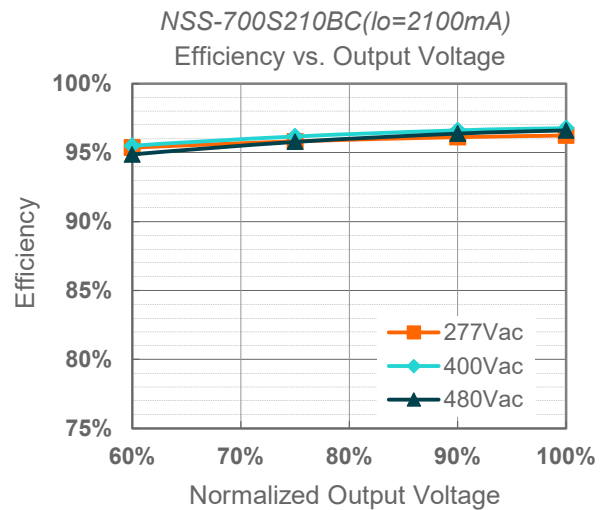
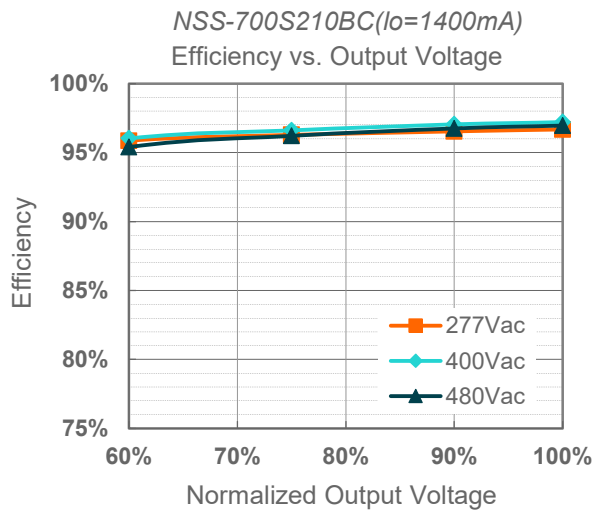
Inrush Current Waveform



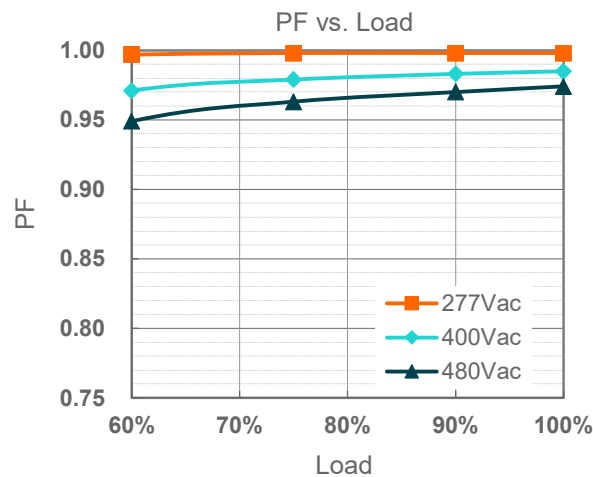
| Input AC Voltage | I_{peak} | t_{width} (@ 50% I_{peak}) |
|------------------|------------|------------------------------------|
| 277Vac | 11.0 A | 2.00 ms |
| 400Vac | 14.8 A | 2.24 ms |
| 480Vac | 16.0 A | 2.64 ms |

| MCB | Tripping Curves | B | B | B | B | C | C | C | C |
|--|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Rated Current | 10A | 16A | 20A | 25A | 10A | 16A | 20A | 25A |
| The Number of LED Driver can be Configured | 277Vac | 2 | 3 | 4 | 5 | 2 | 4 | 5 | 6 |
| | 400Vac | 1+1+1 | 2+2+2 | 3+3+3 | 4+4+4 | 2+2+2 | 3+3+3 | 4+4+4 | 5+5+5 |
| | 480Vac | 2+2+2 | 3+3+3 | 4+4+4 | 5+5+5 | 2+2+2 | 4+4+4 | 5+5+5 | 6+6+6 |

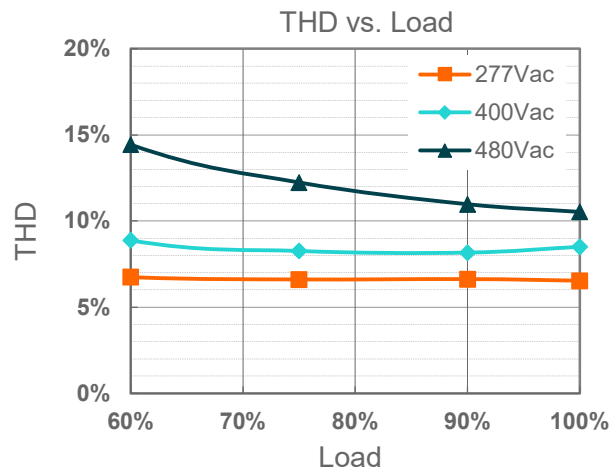
Efficiency vs. Load



Power Factor



Total Harmonic Distortion

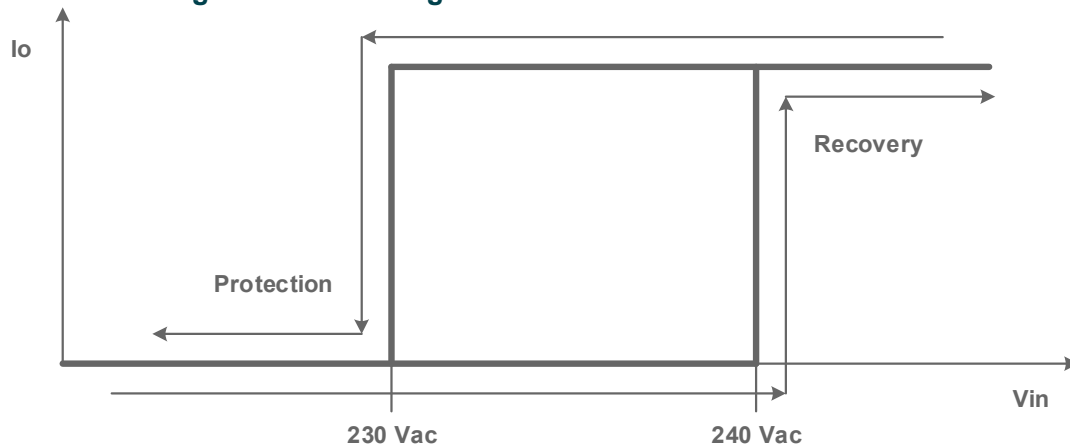


Protection Functions

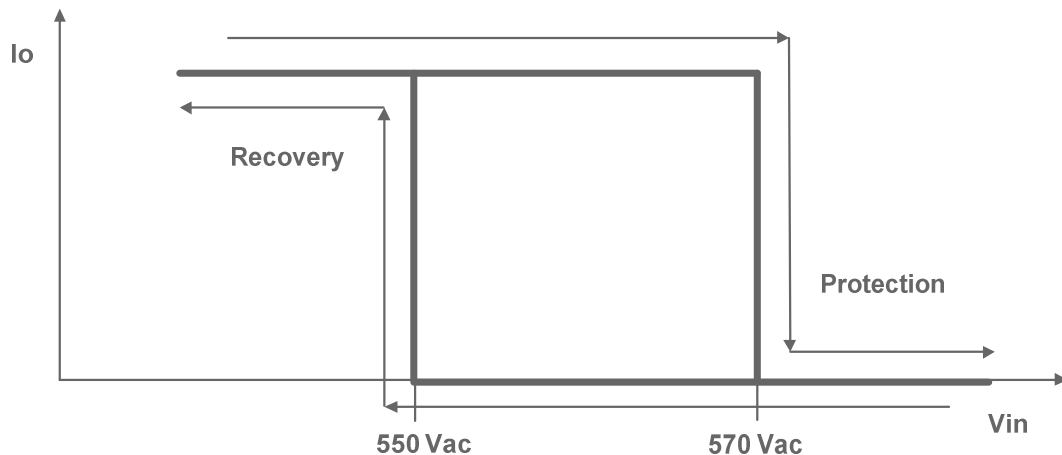
| Parameter | | Min. | Typ. | Max. | Notes |
|---------------------------------------|--------------------------------|--|---------|---------|--|
| Over Temperature Protection | | Decreases output current, returning to normal after over temperature is removed. | | | |
| Short Circuit Protection | | Auto Recovery. No damage will occur when any output is short circuited. The output shall return to normal when the fault condition is removed. | | | |
| Over Voltage Protection | | Limits output voltage at no load and in case the normal voltage limit fails. | | | |
| Over Power protection | | Each channel exceeds 735W (typical), the driver will decrease this channel output current automatically. | | | |
| Emergency Protection ⁽¹⁾ | | -40°C | - | +60°C | EOF _w =1 |
| | | - | - | +80°C | The driver can stably and continuously output 20% of its rated power in an environment of 80°C, and the EOF _w = 0.2 |
| Input Under Voltage Protection (IUVP) | Input Under Voltage Protection | 220 Vac | 230 Vac | 240 Vac | Turn off the output when the input voltage falls below protection voltage. |
| | Input Under Voltage Recovery | 230 Vac | 240 Vac | 250 Vac | Auto Recovery. The driver will restart when the input voltage exceeds recovery voltage. |
| Input Over Voltage Protection (IOVP) | Input Over Voltage Protection | 550 Vac | 570 Vac | 590 Vac | Turn off the output when the input voltage exceeds protection voltage. |
| | Input Over Voltage Recovery | 530 Vac | 550 Vac | 570 Vac | Auto Recovery. The driver will restart when the input voltage falls below recovery voltage. |
| | Max. of Input Over Voltage | - | - | 590 Vac | The driver can survive for 8 hours with a stable input voltage stress of 590Vac. |

Note: (1) EOF_w is "Emergency Output Factor", means the ratio of the output power of the control device in emergency mode to those under normal lighting conditions.

● Input Under Voltage Protection Diagram

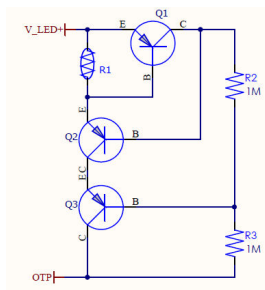


● Input Over Voltage Protection Diagram



● External Thermal Protection

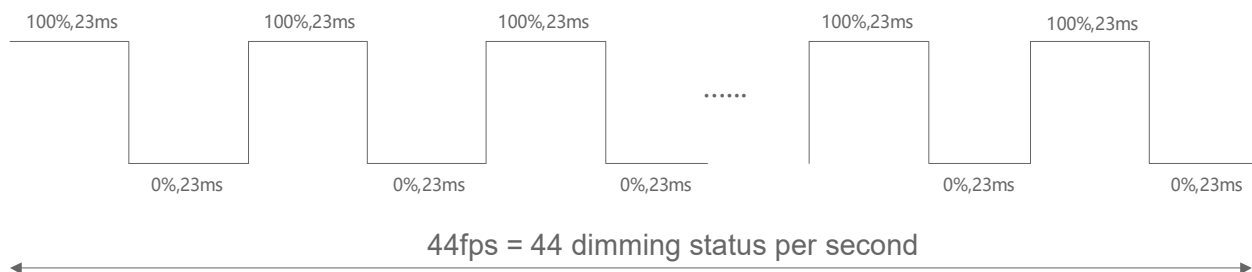
This needs an external circuit which locates on the hottest part of LEDs to protect the whole luminaires when the temperature exceeds the ratings. The circuit will be connected by V+ LED and OTP terminal on driver. The default protection temperature point is 90°C , it can be changed by Inventronics programmer along with the actual target.



| Reference | Description | Recommendation |
|-----------|----------------------------------|--|
| Q1/Q2/Q3 | 500V PNP high-voltage transistor | NEXPERIA / PBHV9050T |
| R1 | NTC 10K Ω | 0603 SMD 3% EPCOS / TDK B57371V2103H060 B25-100=4480 |
| R2/R3 | 1M Ω Resistor | 1M 1% -55~155 $^{\circ}\text{C}$ 0805/1206 200V |

● Strobe function

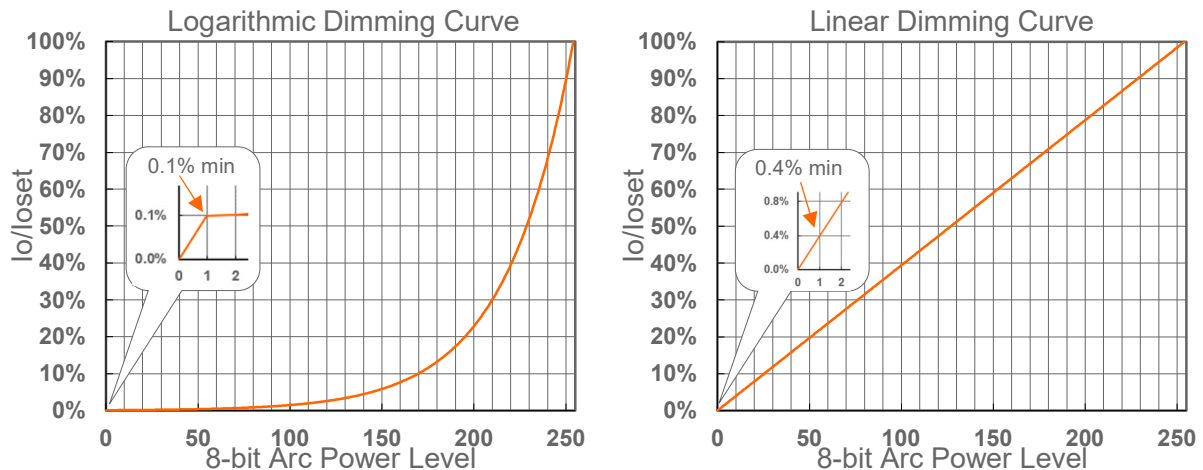
This driver supports strobe function up to 44 fps from 100% dimming to 0% change forth and back. In order to protect relays reliability, the relays will still keep 3s 'ON' status when receiving the dim-to-off command and then enter "OFF" status without receiving dimming ON command, but it will immediately operates back to "ON" status if receiving the dimming on command, so the relays will not operate 'ON' and 'OFF' frequently in fast strobe operation within 3s duration time in default mode. The default 3s can be adjusted by programming interface or commands.



Dimming (DALI Dimming Mode)

● DALI-2 Dimming

The recommended implementation of the dimming control is provided below.

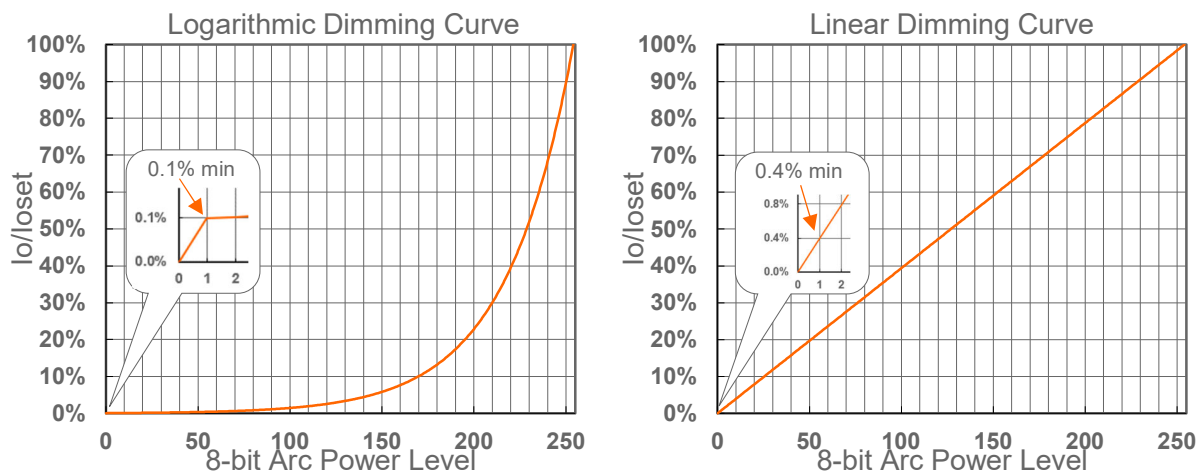


Implementation: DALI-2 Dimming

Dimming (DMX-RDM Dimming Mode)

● DMX-RDM Dimming

The recommended implementation of the dimming control is provided below.



Implementation: DMX-RDM Dimming

Notes:

1. The compatible on control system list please refer to: [DMX-RDM Dimming Compatible Controller System List](#).
2. Up to 32 drivers may be daisy-chained, terminated by a 120 ohms resistor (connected between DMX+ & DMX- at the last driver)
3. 300m maximum length between driver and master
4. 100m maximum between drivers
5. For best performance, a characteristic impedance of 120 ohms should be maintained for the entire length of the control line.

● Time Dimming

Time dimming control includes 3 kinds of modes, they are Self Adapting-Midnight, Self Adapting-Percentage and Traditional Timer.

- **Self Adapting-Midnight:** Automatically adjusts the dimming curve based on the on-time of past two days (if difference <15 minutes), assuming that the center point of the dimming curve is midnight local time.
- **Self Adapting-Percentage:** Automatically adjusts the on-time of each step by a constant percentage = (actual on-time for the past 2 days if difference <15 min) / (programmed on-time from the dimming curve).
- **Traditional Timer:** Follows the programmed timing curve after power on with no changes.

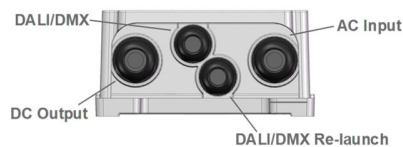
● Output Lumen Compensation

Output Lumen Compensation (OLC) may be used to maintain constant light output over the life of the LEDs by driving them at a reduced current when new, then gradually increasing the drive current over time to counteract LED lumen degradation.

● End Of Life

End-of-Life (EOL) is providing a visual notification to a user that the LED module has reached the end of manufacturer-specified life and that the replacement is recommended. Once active, an indication is given at each power-up of the driver, which the driver indicates this through a lower light output during the first 1 minute before normal operation is continued.

● Cable Gland Diagram



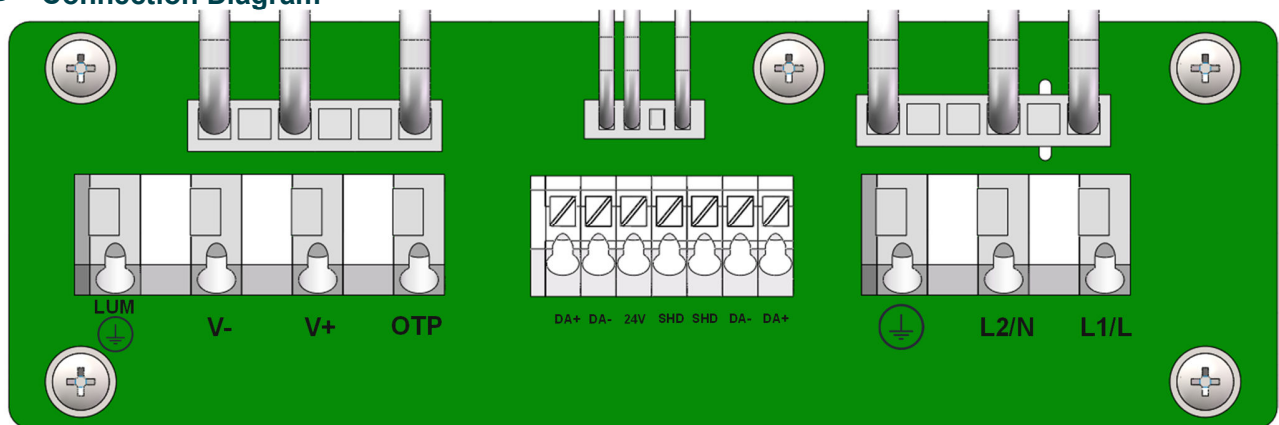
| Connection | Cable Gland | Torque (N·m) | Cable Diameter (mm) | Cable AWG | Cable Section (mm²) | Strip Length (mm) |
|--------------------|-------------|--------------|---------------------|-----------|---------------------|-------------------|
| AC Input | M20 | 4 | 6.5-10.2 | 18-14 | 1.0-2.5 | 9-10 |
| DC Output | M20 | 4 | 6.5-10.2 | 18-14 | 1.0-2.5 | |
| DALI/DMX | M16 | 2.5 | 6.5-10 | 18-16 | 0.75-1.5 | |
| DALI/DMX Re-launch | M16 | 2.5 | 6.5-10 | 18-16 | 0.75-1.5 | |

Note: An additional sealing accessory with detailed specifications listed in the table below, is included:



| Location | Fitting Cable Diameter(mm) |
|--------------------|----------------------------|
| AC input/DC output | 12.6-14 |

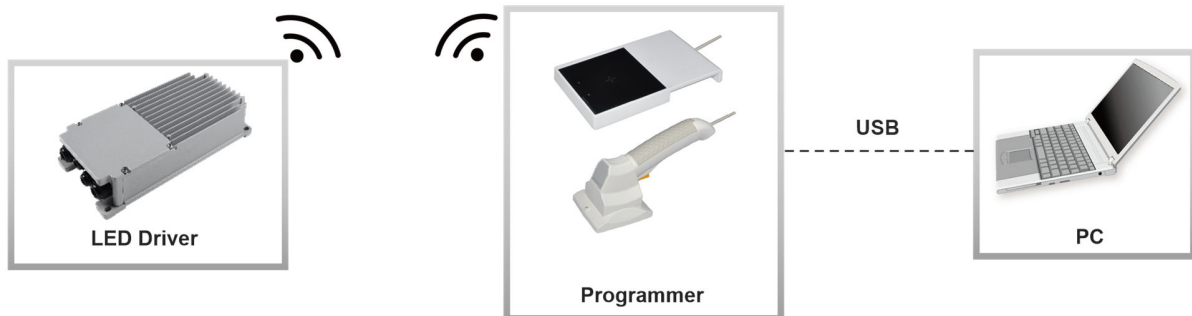
● Connection Diagram



| Number | Label | Description |
|--------|----------|-----------------------------------|
| 1 | LUM ⊕ | Protection Earth for LED Module |
| 2 | V- | LED- Connection |
| 3 | V+ | LED+ Connection |
| 4 | OTP | Thermal protection input |
| 5 | DA+ | Reused,DALI/DMX input+ |
| 6 | DA- | Reused,DALI/DMX input- |
| 7 | 24V | 24V auxiliary source |
| 8 | SHD | DMX SHIELD input |
| 9 | SHD | DMX SHIELD output |
| 10 | DA- | DALI/DMX reused Re-launch output- |
| 11 | DA+ | DALI/DMX reused Re-launch output+ |
| 12 | PE | Protection Earth |
| 13 | L2/N | AC input L2/N |
| 14 | L1/L | AC input L1/L |

Note: DALI function and DMX function cannot be used at the same time.

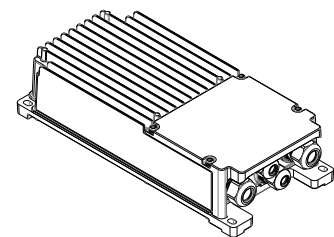
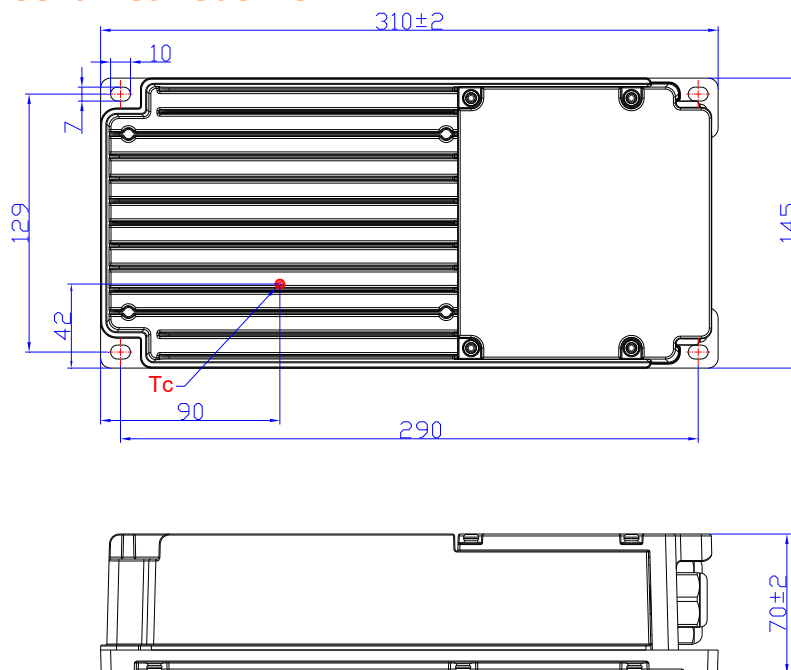
Programming Connection Diagram



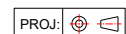
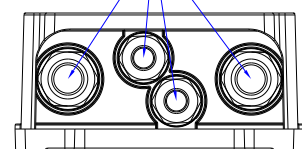
Note: The driver **does not need to be powered on** during the programming process.

- Please refer to [PRG-NFC-H](#) or [PRG-NFC-D2](#) (Programmer) datasheet for details.

Mechanical Outline



Waterproof Plug



Unspecified tolerance: ± 1

Installations

To download the Installation Guidelines, please click here: [Inventronics Considerations for Non-Isolated LED Drivers](#) and [Installation Guidelines: NFS-600-BC/NSS-700-BC Driver](#)

RoHS Compliance

Our products comply with reference to RoHS Directive (EU) 2015/863 amending 2011/65/EU, calling for the elimination of lead and other hazardous substances from electronic products.

Revision History

| Change Date | Rev. | Description of Change | | |
|-------------|------|-------------------------|------|---------|
| | | Item | From | To |
| 2024-07-11 | A | Datasheet Release | / | / |
| 2024-07-19 | B | Features | / | Updated |
| | | Output Specifications | Note | Added |
| | | Dimming | / | Updated |
| 2025-05-16 | C | EL logo | / | Added |
| | | Safety & EMC Compliance | / | Updated |
| | | Protection Functions | / | Updated |
| | | Cable Gland Diagram | / | Updated |