inventronics

ICUTRONIC

IT DX 110/220-240 NFC E

The ICUTRONIC DEXAL 110W Class I/II NFC Driver with DALI-2 and D4i series is a 110W, constant-current, NFC programmable and IP20 rated LED driver that operates from 170-264 Vac input with excellent power factor. Created for many lighting applications including street, tunnel, and low bay, etc., this family provides integrated AC power monitoring with an auxiliary voltage and dim-to-off functionality for powering low voltage, wireless controls.

Features

- Full Power at Wide Output Current Range (Constant Power)
- Adjustable Output Current (AOC) with NFC
- AstroDIM(Timer) for Autonomous Dimming with Five Independent Levels (Astro, Time Mode)
- Dim-to-Off with Standby Power ⩽ 0.5 W
- Integrated 16Vdc Bus Power Supply Based on DALI-2
- Constant Lumen
- End-of-Life Indicator
- Input Surge Protection: DM 6kV, CM 10kV
- All-Around Protection: OTP, OVP, SCP, OLP, NLP
- Support DALI Programming and NFC Programming
- DEXAL Interface Based on DALI-2 Communication
- DALI-2 and D4i Certified
- Always-on Auxiliary Power: 24Vdc, 125mA, 3W (Transient Peak Power up to 6W)
- Complies with Zhaga Interface Specification Book 13
- Integrated Power Monitoring with Accuracy up to ±5%
- Enables Programming via DALI Cables up to 15m Length
- Full Compatibility with T4T(Tuner4TRONIC) and T4T Field App

Application

- IP20 Design and Suitable for Outdoor Applications in Luminaires with IP>54
- Suitable for Luminaires with Protection Class I and II
- Suitable for Built-in Use
- Street and Urban Lighting

Models

Adjustable Output Current Range (mA)	Full Power Current Range (mA)(1)	Default Output Current (mA)	Nominal Output Voltage Range (Vdc)	Maximum Output Power (W)	Typical Efficiency(2)	Power Factor λ	Product Name(3)
200-1050	478-1050	700	65-230	110	93.0%	0.95	IT DX 110/220-240/1A0 NFC E

Notes: (1) Output current range with constant power at 110W
(2) Measured at 100% load and 230Vac input (see below “General Specifications” for details).
(3) Nominal input voltage: 220-240Vac.

Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input Voltage AC	170 Vac	-	264 Vac	
Input Voltage DC	176 Vdc	-	276 Vdc	Derating 80% for the Whole Range
Mains Frequency	47 Hz	-	63 Hz	
Nominal Input Current	-	-	0.57 A	Measured at 100% load and 230 Vac input.
Suitable for Fixtures with Protection Class	Class I/II			

Input Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Power Factor λ	0.95	-	-	At 230Vac, 50Hz, 60%-100% Load (66 - 110W)
Total Harmonic Distortion	-	-	7%	
Total Harmonic Distortion Extended Range	-	-	12%	At 230Vac, 50Hz, 25%-100% Load (27.5 - 110W)

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Number of Channels		1		
Programmable Output Current	200 mA	-	1050 mA	
Minimum Output Current	50 mA	-	-	
Nominal Output Voltage	65 V	-	230 V	
Output Current Tolerance	-5%	-	+5%	At 100% load condition
Output Current Ripple LF	-	-	4%Iomax	At 100% load condition, ＜1k Hz (pk-pk).
$P_{st}LM$	-	-	1.0	
SVM	-	-	0.4	
Startup Overshoot Current	-	-	10%Iomax	At 100% load condition
U_{out}	-	-	280 V	
Galvanic Isolation		Double		
Line Regulation	-	-	±1%	Measured at 100% load
Load Regulation	-	-	±5%	
Turn-on Delay Time	-	-	1 s	Measured at DALI-2 dimming mode, and 230Vac input, 60%-100% Load
Temperature Coefficient	-	0.03%/°C	-	Case temperature = 0°C ~Tc max
Auxiliary Output Voltage	21.6 V	24 V	26.4 V	
Auxiliary Output Source Current	0 mA	-	125 mA	Return terminal is “DA−“
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.
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		62 mA		
Integrated DALI-2 Bus Power Guaranteed Supply Current		53 mA		DALI-2 bus power supply voltage ⩾12V

Notes: (1) DALI-2 bus power supply is enabled by default and can be disabled via programming interface.
(2) DALI-2 bus power supply supports automatic shut-down and restart after short-circuit.

General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 230Vac Input Io=478 mA Io=1050 mA	 91.0% 91.0%	 93.0% 93.0%	 - -	Measured at 100% load and Steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
Device Power Loss	-	-	10.88 W	
Power Monitoring Accuracy	-5%	-	+5%	Measured at 230Vac input and 100% load
Networked Standby Power	-	-	0.5 W	Measured at 230Vac/50Hz; DALI-2 bus power supply off. ＜=0.5W DALI-2 bus power supply on.
MTBF	-	257,000 Hours	-	Measured at 230Vac input, 80%load and 25°C ambient temperature (MIL-HDBK-217F)
Operating Case Temperature for Safety Tc_s	-40°C	-	+85°C	
Max. Housing Temperature in Case of Fault	-	-	+120°C	
Operating Case Temperature for Warranty Tc_w	-40°C	-	+85°C	Case temperature for 5 years warranty. Please see Inventronics Warranty Statement for complete details. Humidity: 5% RH to 85% RH, No condensation
Lifetime at Tc_w.	-	50,000 Hours	-	Measured at 230Vac input, 100% load. See lifetime vs. Tc curve for the details
Lifetime at Tc_w – 10°C.	-	100,000 Hours	-	Measured at 230Vac input.
Ambient Temperature	-40°C	-	+55°C	Measured at 230Vac input, 100% load @ Tc_w
Permitted rel. Humidity During Operation	5%	-	85%	No Condensation
Temperature at Storage	-40°C	-	+85°C	Humidity: 5% RH to 85% RH, No condensation
Mains Switching Cycles	100,000	-	-	
IP Rating	IP20			
Dimensions (L × W × H)	5.91 x 3.54 x 1.56 Inches 150.0 x 90.0 x 39.5 mm			
Net Weight	-	345 g	-	

Inrush Current Waveform

Input AC Voltage	Inrush Current I_{peak}	Inrush Current Width t_{width} (@ 50% I_{peak})	The Number of LED Driver can be Configured (MCB)							
			B10A	B16A	B20A	B25A	C10A	C16A	C20A	C25A
230Vac	50.4A	200μs	8	13	17	21	13	21	27	33

Notes: The maximum number of units per circuit breaker is an indicative value.

Dimming Specifications

Parameter		Min.	Typ.	Max.	Notes
DALI-2	DA+, DA- High Level	9.5 V	16 V	22.5V	
	DA+, DA- Low Level	-6.5 V	0 V	6.5 V	
	DA+, DA- Current	0 mA	-	2 mA	
Dimming Output		10% Ioset	-	Ioset	478 mA ⩽ Ioset ⩽ 1050 mA
		50 mA	-	Ioset	200 mA ⩽ Ioset＜ 478 mA
AstroDIM (Timer)		10%	-	100%	

Certificates & Standards

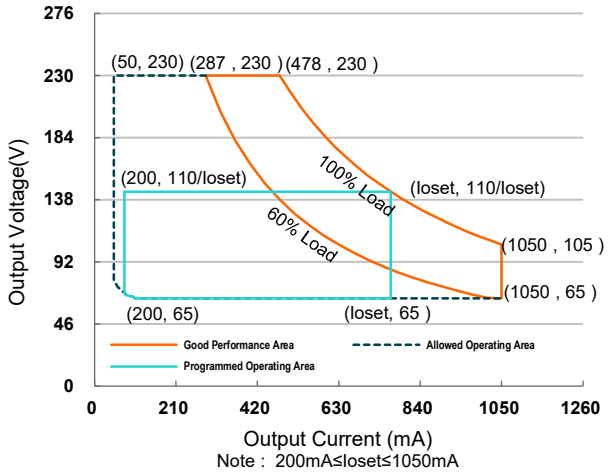
Safety Category	Standard
ENEC	EN 61347-1, EN 61347-2-13, EN IEC 62384
CE	EN 61347-1, EN 61347-2-13, EN 301 489-1, EN 301 489-3, EN 300 330, EN 62479/EN 50663/EN 50665/EN 50364, EN IEC 55015, EN 61547, EN IEC 61000-3-2, EN 61000-3-3
CB	IEC 61347-1, IEC 61347-2-13
KS	KS C 7655
CCC	GB 19510.1, GB 19510.14, GB/T 17743, GB 17625.1
DALI-2	IEC 62386-101, 102 & 207

Note: (1) This product meets the requirements for EN/IEC 61347-1 [Annex O (Double insulation)].
(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) The control terminal serves as a local wired port. The maximum allowable length of the control connection wire shall be shorter than 3 meters.
(4) DALI Parts: 101, 102, 150, 151, 152, 207, 250, 251, 252, 253.

Isolation Levels

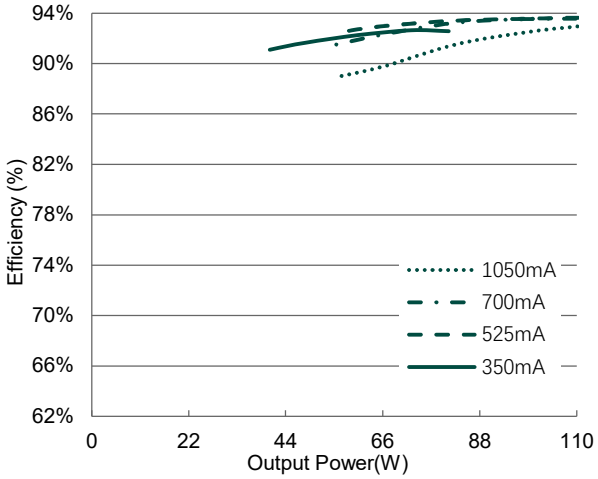
	Input	Output	Dimming	Aux	External OTP	EQUI
Input	N/A	Reinforced	Reinforced	Reinforced	N/A	Reinforced
Output	Reinforced	N/A	Basic	Basic	N/A	Basic
Dimming	Reinforced	Basic	N/A	N/A	N/A	Basic
Aux	Reinforced	Basic	N/A	N/A	N/A	Basic
External OTP	N/A	N/A	N/A	N/A	N/A	N/A
EQUI	Reinforced	Basic	Basic	Basic	N/A	N/A

Operating Window

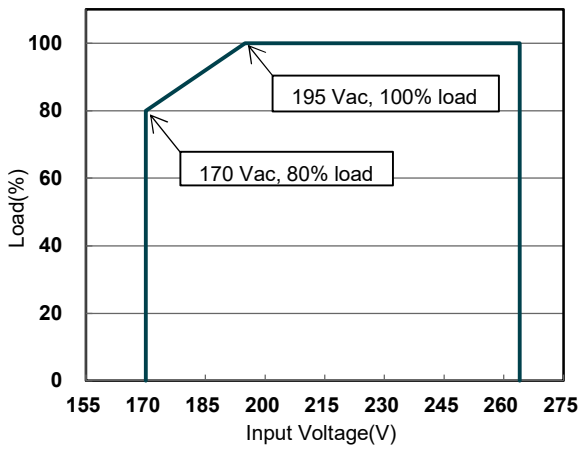


Note： 200mA≤loset≤1050mA

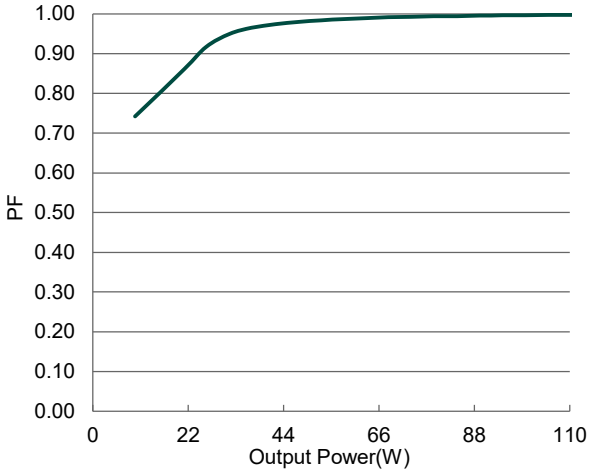
Efficiency vs. Load@230Vac



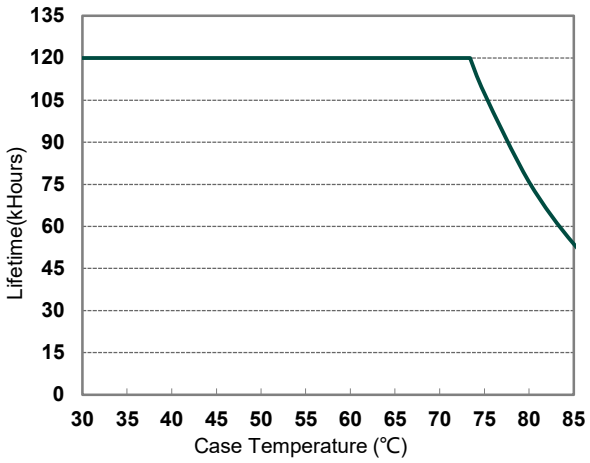
Derating



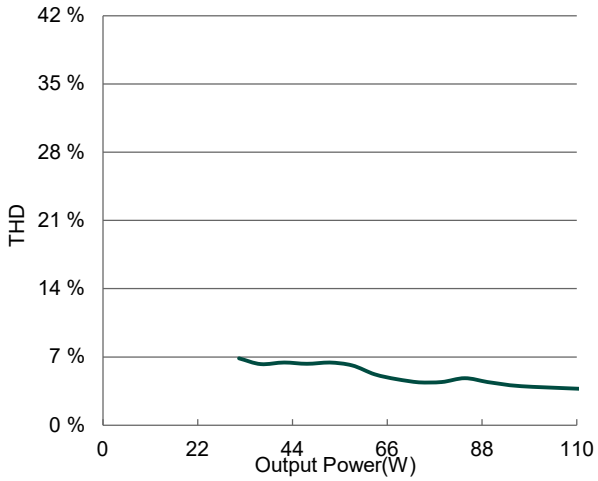
Power Factor



Lifetime vs. Case Temperature



Total Harmonic Distortion



Protection Functions

Over Temperature Protection(OTP)

Protection based on safety: decreases output current if maximum internal temperature is reached, returning to normal value after over temperature is removed.
When output current reaches 55%, switch-off until over temperature is removed.

Driver Guard

Default setting: disabled
Protection based on lifetime: It can be activated via T4T. Set a lower internal temperature threshold (Thermal Settings: reduce the temperature threshold by 5°C, 10°C, 15°C or 20°C) to activate the over temperature protection - see description.
The driver is protected against temporary overheating by automatically reduction of the output current.

Over Voltage Protection(OVP)

Limits output voltage at no load and in case the normal voltage limit fails.

Over Load Protection(OLP)

The driver automatically limits the output current to keep its output power in the specified range.

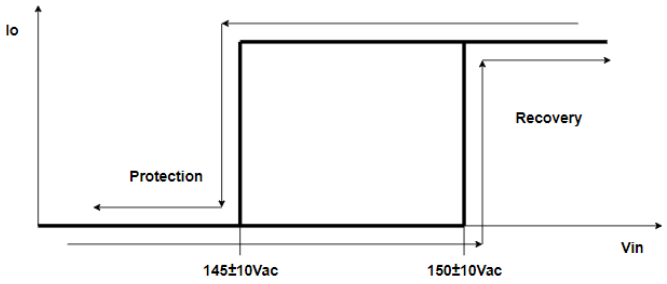
Short Circuit Protection(SCP)

Auto Recovery. No damage will occur when any output is short circuited. The output shall return to normal when the fault condition is removed.

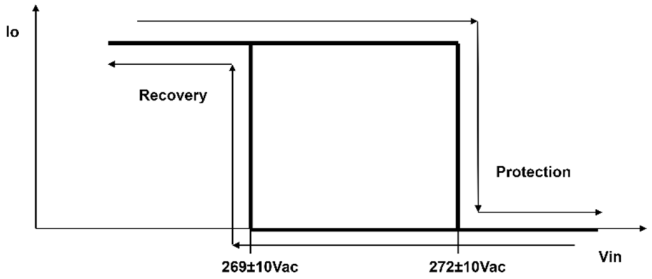
No Load Protection(NLP)

The driver automatically adjusts the output voltage to the maximum output voltage if no load is connected and switches off its output after some seconds.
Hot-plug of the load or external switching on the secondary side is not allowed.

Input Under Voltage Protection(IUVP)



Input Over Voltage Protection(IOVP)

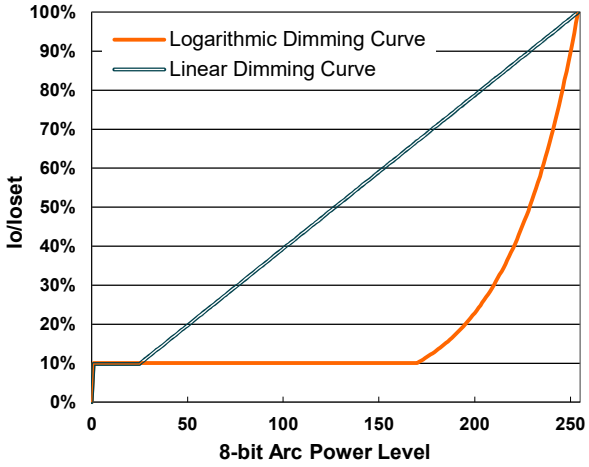


Notes: (1) The driver can survive stabilized input over voltage conditions up to 350Vac for a total of 2 hours.

Dimming

DALI-2 Dimming

The recommended implementation of the dimming control is provided below.



AstroDIM(Timer)

AstroDIM (Timer) includes 2 kinds of modes, they are Astro Based and Time Based.

- **Astro Based**: The benchmark for the dimming profile is based on the average midnight each year, which is precisely calculated using theoretical sunrise and sunset times. The LED driver strictly adheres to daily power-on and power-off times to execute the corresponding dimming configuration file. Furthermore, the adjustment of the dimming schedule is dynamic, automatically adapting according to the actual length of the night to ensure that the lighting effect aligns with nighttime environmental needs.
- **Time Based:** The dimming profile defined in the reference schedule is referenced to the switch-on time of the LED driver.

Constant Lumen

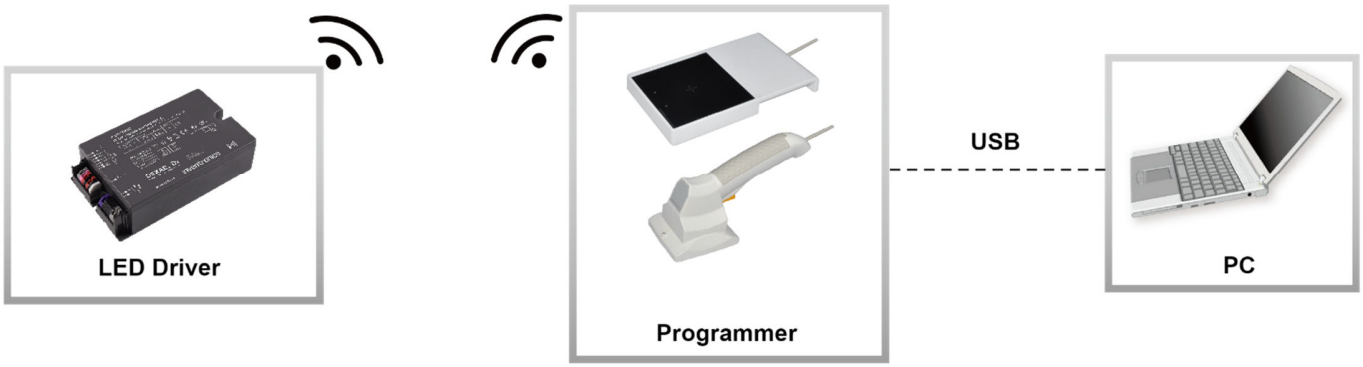
Constant lumen function may be used to maintain constant light output over the life of the LEDs by driving them at a reduced current when new, then gradually increasing the drive current over time to counteract LED lumen degradation. This function is disabled by default.

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 (minimum output current level) during the first 10 minutes before normal operation is continue.

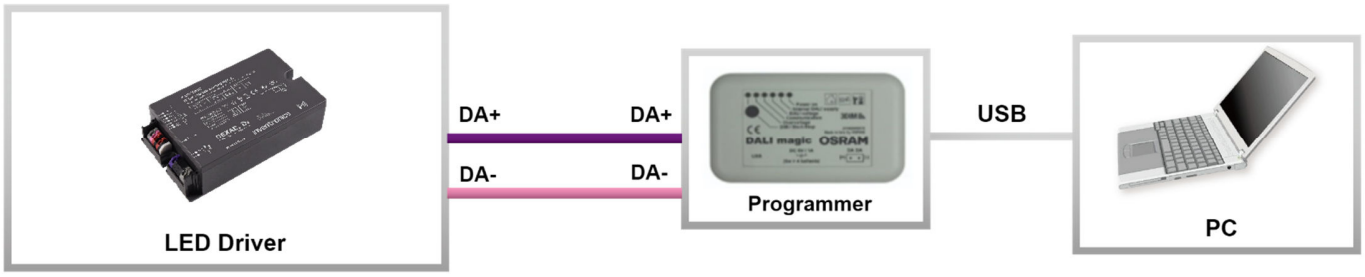
Programming Connection Diagram

NFC Programming Device



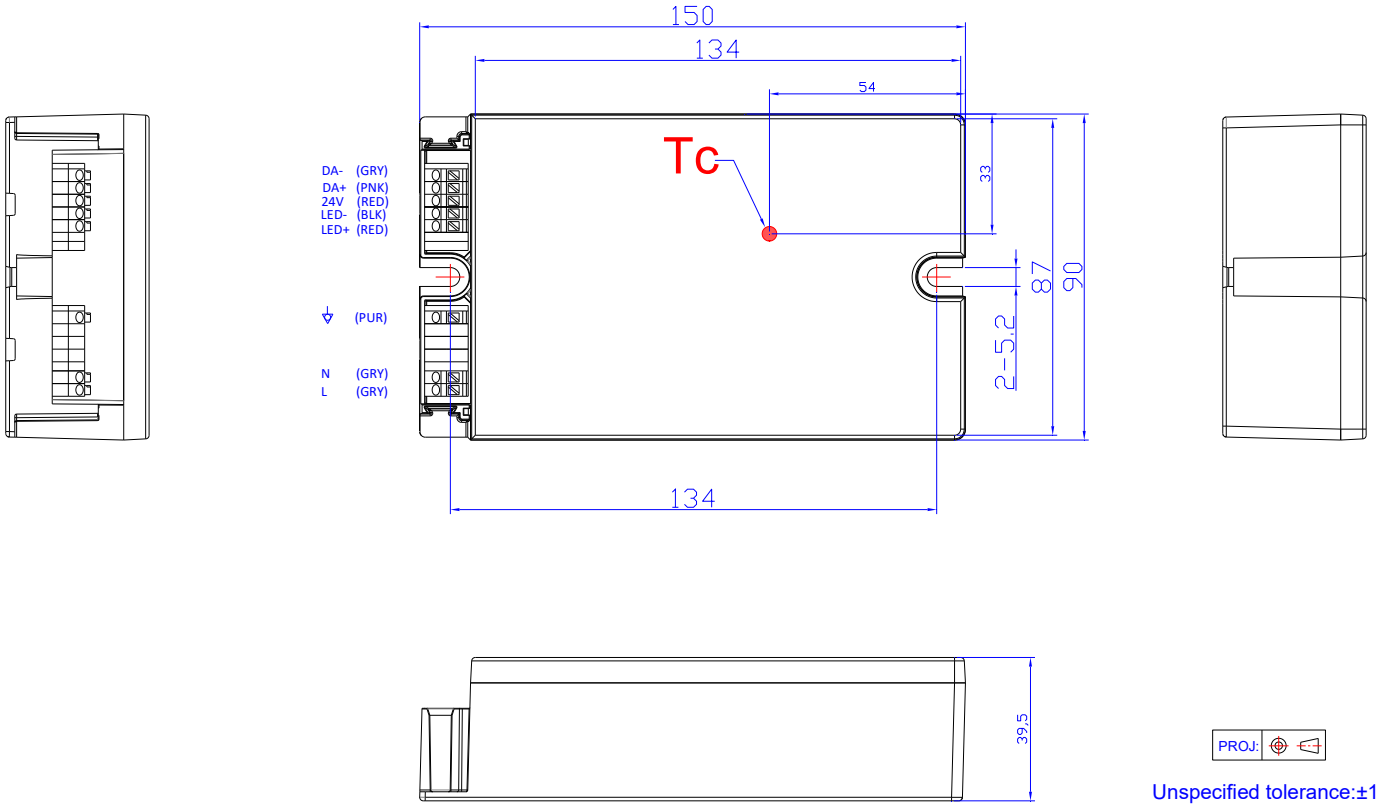
Note: (1) The driver does not need to be powered on during the programming process.
(2) Please refer to PRG-NFC-H or PRG-NFC-D2 (Programmer) datasheet for details.
(3) Supports both T4T and Tuner4TRONIC Field App functionality.

DALI Programming Device



Note: (1) The driver does not need to be powered on during the programming process.
(2) Please refer to DALI magic (Programmer) datasheet for details.
(3) Supports both T4T and Tuner4TRONIC Field App functionality.

Mechanical Outline



Unspecified tolerance:±1

Connection Diagram

Parameter		Min.	Typ.	Max.	Notes
L, N, ⏚, +24V, DA+, DA-	Wire Cross-section	0.2 mm²	-	1.5 mm²	Push-in at 45°angle, solid and stranded wire
		22 AWG	-	16 AWG	
	Strip Length	8.5 mm	-	9.5 mm	
LED+, LED-	Wire Cross-section	0.2 mm²	-	1.5 mm²	Push-in at 45°angle, solid and stranded wire
		22 AWG	-	16 AWG	
	Strip Length	8.5 mm	-	9.5 mm	

Environmental Compliance

RoHS

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.

Product Order Overview

Order Code & Packaging

Order Code (EAN)	Product Version Name	Certification Markings on Product	Packaging unit (Pieces/Box)	Packing Dimensions (L × W × H)(mm)
6977078998901	IT DX 110/220-240/1A0 NFC E	CE, ENEC, CCC, D4i	12	319 x 210 x 156

Logistical Data

Region	Commodity Code
Europe	85044083900