Features

- Ultra High Efficiency (Up to 96%)
- Full Power at Wide Output Current Range (Constant Power)
- Adjustable Output Current (AOC) with NFC
- DALI-2 and D4i Certified
- DALI-2&DMX-RDM Dimmable
- Multi-channel (up to 3*DT6 or 3*DMX) Operating Mode
- DALI-2/DMX-RDM Controls Up to 44 fps
- Dim-to-Off
- Dimming Range: 0.1%-100%
- Always-on Auxiliary Power: 24Vdc, 125mA (Except DMX-RDM mode)
- Low Inrush Current
- Output Lumen Compensation
- End-of-Life Indicator
- Input Surge Protection: DM 6kV, CM 10kV
- All-Around Protection: IUVP, IOVP, OVP, SCP, OTP
- IP66/IP67 and UL Dry/Damp/Wet Location
- TYPE HL, for Use in a Class I, Division 2 Hazardous (Classified) Location
- 5 Years Warranty

Description

The *EFM-800TxxxBx* is an 800W, 3 channels, constant-current, programmable and IP66/IP67 rated LED driver that operates from 180-528Vac input with excellent power factor. Created for sports lighting application. The dimming control supports two-way communication via DALI-2 and complies with D4i, furthermore it incorporates DMX-RDM dimming. It provides an auxiliary voltage and dim-to-off functionality for powering low voltage, wireless controls. 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.

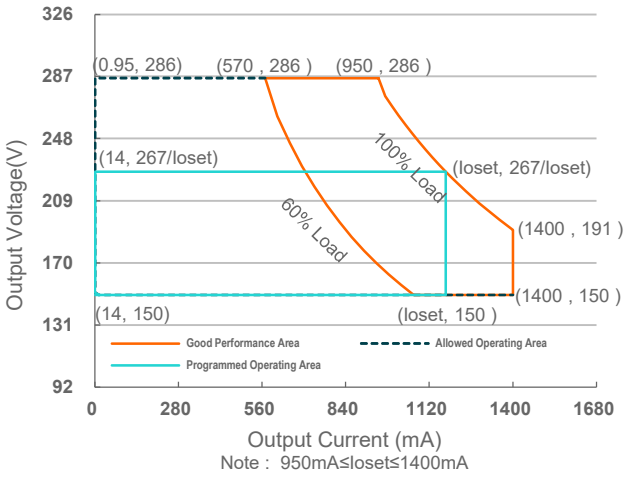
Models

Channel	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)(4)
							220Vac	480Vac	
1	14-1400	950-1400	1050	150-286	267	96.0%	0.99	0.96	EFM-800T140Bx
2	14-1400	950-1400	1050	150-286	267	96.0%	0.99	0.96	
3	14-1400	950-1400	1050	150-286	267	96.0%	0.99	0.96	

Notes: (1) Output current range with constant power at 800W.
(2) Measured at 100% load and 480Vac input (see below “General Specifications” for details)
(3) Certified voltage range: 200-480Vac
(4) x= G are UL Recognized and CCC, etc. models; x = T are UL Class P models.

www.inventronics-co.com Tel: 86-571-56565800 Fax: 86-571-86601139 sales@inventronicsglobal.com

I-V Operating Area



Note : 950mA≤Ioset≤1400mA

Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input AC Voltage	180 Vac	-	528 Vac	
Input DC Voltage	255 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 AC Current	-	-	4.33 A	Measured at 100% load and 220 Vac input.
	-	-	3.44 A	Measured at 100% load and 277 Vac input.
	-	-	2.03 A	Measured at 100% load and 480 Vac input.
Inrush Current Peak	-	-	20A	At 480Vac input, 25°C cold start
Inrush Current(I^2t)	-	-	1.86 A^2s	At 480Vac input, 25°C cold start, duration=11.8 ms, 10%Ipk-10%Ipk..
PF	0.90	-	-	At 200-480Vac, 50-60Hz, 60%-100% Load (480 - 800W)
THD	-	-	20%	
THD	-	-	10%	At 220-240Vac, 50-60Hz, 75%-100% Load (600 - 800W)

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%Ioset	-	5%Ioset	100% load
Output Current Setting (Ioset) Range EFM-800T140Bx	14 mA	-	1400mA	
Output Current Setting Range with Constant Power EFM-800T140Bx	950 mA	-	1400mA	

Output Specifications (Continued)

Parameter		Min.	Typ.	Max.	Notes
Total Output Current Ripple (pk-pk)		-	5%Iomax	10%Iomax	100% load, 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)		-	-	2%Iomax	70%-100% load
Stroboscopic Ratio		-	-	2%	100% load
Startup Overshoot Current		-	-	10%Iomax	100% load
No Load Output Voltage EFM-800T140Bx		-	-	320 V	
Line Regulation		-	-	±0.5%	100% load
Load Regulation		-	-	±5.0%	
Turn-on Delay Time		-	-	1.0 s	Measured at 200-480Vac input, 60%-100% Load
Temperature Coefficient of Ioset		-	0.03%/°C	-	Case temperature = 0°C ~Tc max
Auxiliary is always-on except DMX-RDM Mode(1)	24V Auxiliary Output Voltage	21.6 V	24 V	26.4 V	Pload ≥0.1W
		-	-	30 V	Pload＜0.1W
	24V Auxiliary Output Source Current	0 mA	-	125 mA	Return terminal is “DA−“
	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.
DALI-2 Bus Power Supply(2)(3)	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 ≥12V

Notes: (1) When driver works in DMX-RDM mode, 24V Auxiliary is disabled.
(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 220 Vac input: CH1+CH2+CH3 Io= (950+950+950) mA Io= (1400+1400+1400) mA	 92.5% 92.0%	 94.5% 94.0%	 - -	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 277 Vac input: CH1+CH2+CH3 Io= (950+950+950) mA Io= (1400+1400+1400) mA	 93.5% 92.5%	 95.5% 94.5%	 - -	Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
Efficiency at 400 Vac input: CH1+CH2+CH3 Io= (950+950+950) mA Io= (1400+1400+1400) mA	 94.0% 93.0%	 96.0% 95.0%	 - -	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: CH1+CH2+CH3 Io= (950+950+950) mA Io= (1400+1400+1400) mA	 94.0% 93.0%	 96.0% 95.0%	 - -	Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
Standby Power	-	1.5W	-	Measured at 480Vac/50Hz; Dimming off
MTBF	-	128,000 Hours	-	Measured at 480Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	52,000 Hours	-	Measured at 200Vac input, 100%Load and 80°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
Operating Case Temperature for Tc	-	-	+90°C	200-480Vac ,100%load @ Ta=50℃
Storage Temperature	-40°C	-	+85°C	Humidity: 5%RH to 95%RH
Dimensions Inches (L × W × H) Millimeters (L × W × H)	11.22 × 5.55 × 1.91 285 × 141 × 48.5			With mounting ear 12.20 × 5.55 × 1.91 310 × 141 × 48.5
Net Weight	-	3890 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%Ioset	-	Ioset	950 mA ≤ Ioset ≤ 1400 mA
		0.95 mA	-	Ioset	14 mA ≤ Ioset ＜950 mA

Dimming Specifications (Continued)

Parameter		Min.	Typ.	Max.	Notes
DMX-RDM Dimming Mode	DMX+ to DMX-	-6 V	-	6 V	
	DMX+ to Chassis	22M ohm	-	-	At 42Vdc
	DMX- to Chassis	22M ohm	-	-	At 42Vdc
	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%Ioset	-	Ioset	950 mA ≤ Ioset ≤ 1400 mA
		0.95 mA	-	Ioset	14 mA ≤ Ioset ＜950 mA

Safety &EMC Compliance

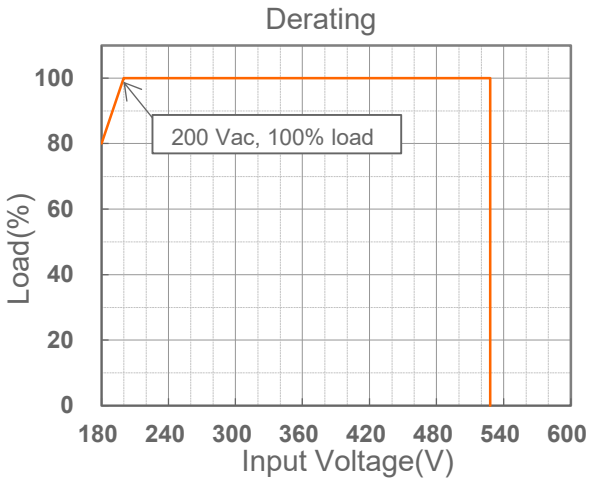
Safety Category	Standard
UL/CUL	UL 8750, CAN/CSA-C22.2 No. 250.13
CE	EN 61347-1, EN 61347-2-13 EN 301 489-1 EN 301 489-3 EN 300 330 EN 62479/EN 50663/EN 50665/EN 50364
CB	IEC 61347-1, IEC 61347-2-13
CCC	GB 19510.1, GB 19510.14
EMI Standards	**Notes**
EN IEC 55015/GB/T 17743(1)	Conducted emission Test &Radiated emission Test
EN IEC 61000-3-2/GB 17625.1	Harmonic current emissions
EN 61000-3-3	Voltage fluctuations & flicker
FCC Part 15(1)	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): 8kV air discharge, 4kV 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	Surge Immunity Test: AC Power Line: Differential Mode 6kV, Common Mode 10kV
EN 61000-4-6	Conducted Radio Frequency Disturbances Test-CS
EN 61000-4-8	Power Frequency Magnetic Field Test

Safety &EMC Compliance (Continued)

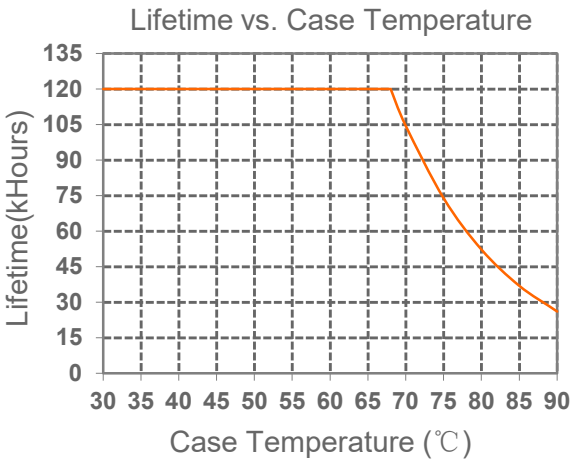
EMS Standards	Notes
EN 61000-4-11	Voltage Dips
EN 61547	Electromagnetic Immunity Requirements Applies To Lighting Equipment
DALI-2 Standards	**Notes**
DALI-2(3)	IEC 62386-101, -102 & -207

Note: (1) This LED driver 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.
(2) According to Directive of 2009/125/EC (ErP), implementing Measure (EU) 2019/2020, if the LED control gear and light source are NOT removable from a luminaire and the luminous flux of the light source exceeds 82,000 lumens then the whole luminaire including LED control gear and light source is out of the scope of ErP directive.
(3) DALI parts: 101, 102, 207, 250, 251, 252, 253

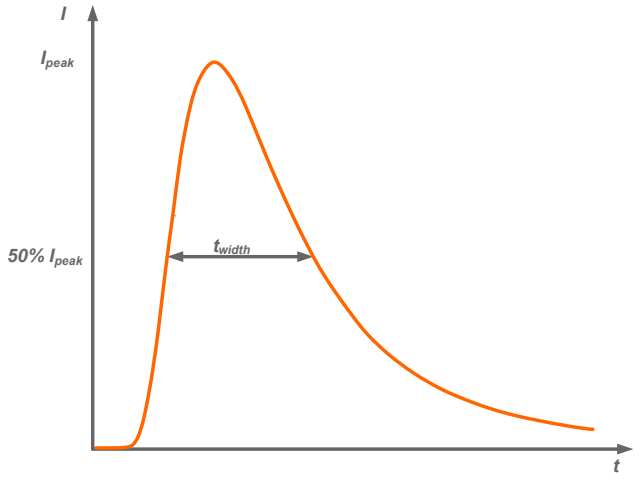
Derating



Lifetime vs. Case Temperature



Inrush Current Waveform

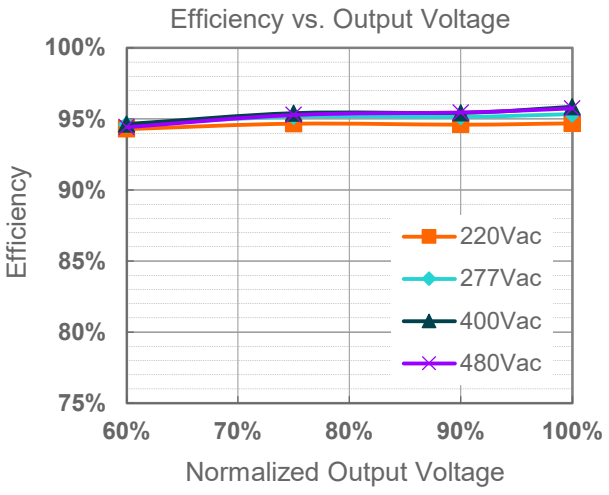


Input AC Voltage	I_{peak}	t_{width} (@ 50% Ipeak)
220Vac	6.40A	3.20ms
277Vac	7.40A	3.20ms
400Vac	10.4A	3.84ms
480Vac	14.5A	3.76ms

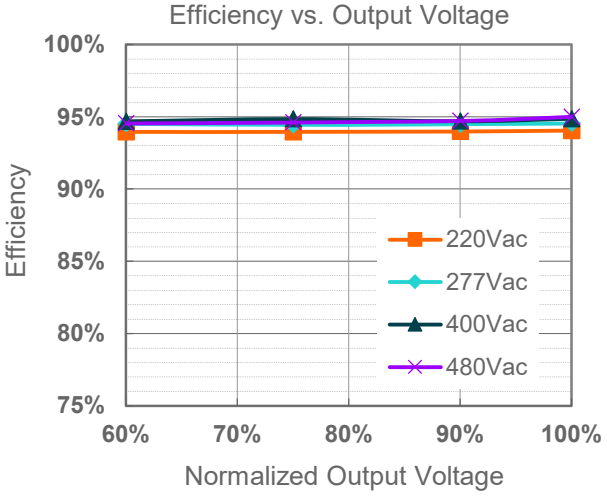
MCB	Tripping Curves	B	B	B	B	C	C	C	C
	Rated Current	10A	16A	20A	25A	10A	16A	20A	25A
The Number of LED Driver can be Configured	220Vac	1	2	2	3	1	2	3	4
	277Vac	1	2	3	4	2	3	4	5
	400Vac	1+1+1	2+2+2	2+2+2	3+3+3	1+1+1	2+2+2	3+3+3	4+4+4
	480Vac	1+1+1	2+2+2	3+3+3	4+4+4	2+2+2	3+3+3	4+4+4	5+5+5

Efficiency vs. Load

Io=950+950+950mA

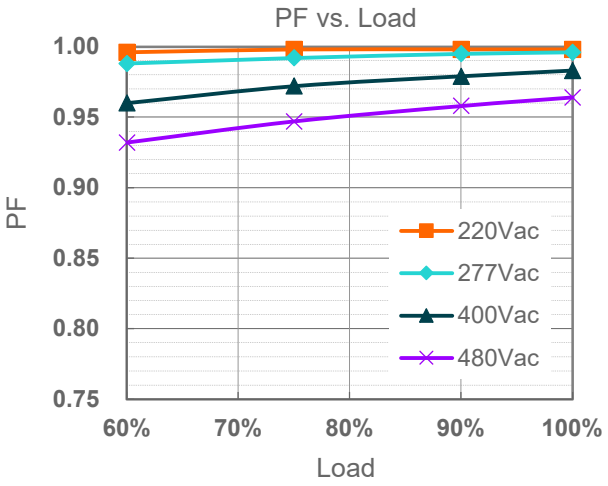


Io=1400+1400+1400mA

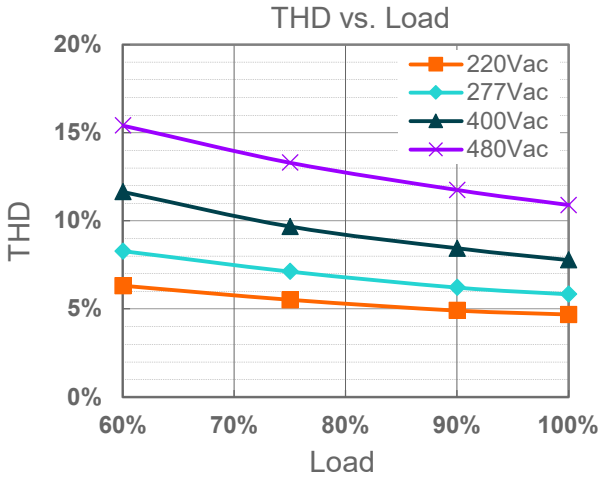


www.inventronics-co.com Tel: 86-571-56565800 Fax: 86-571-86601139 sales@inventronicsglobal.com

Power Factor



Total Harmonic Distortion

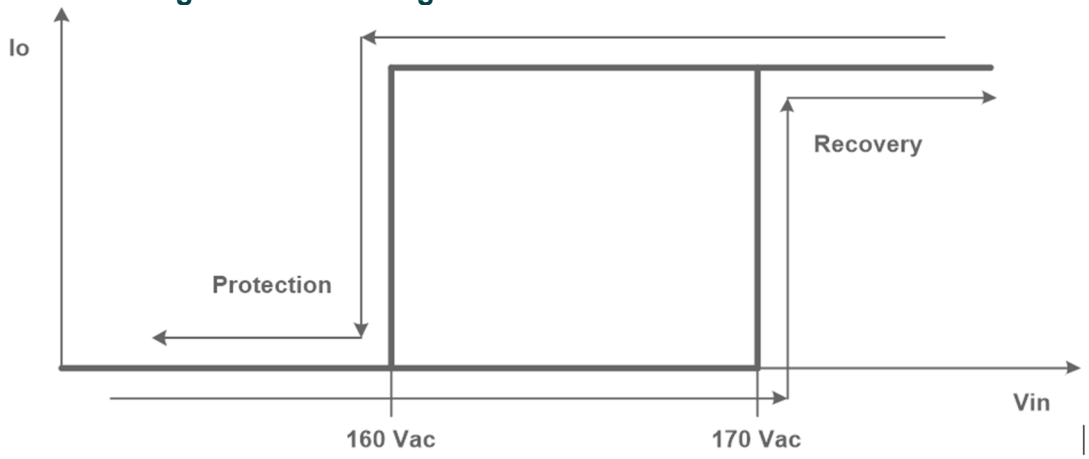


Protection Functions

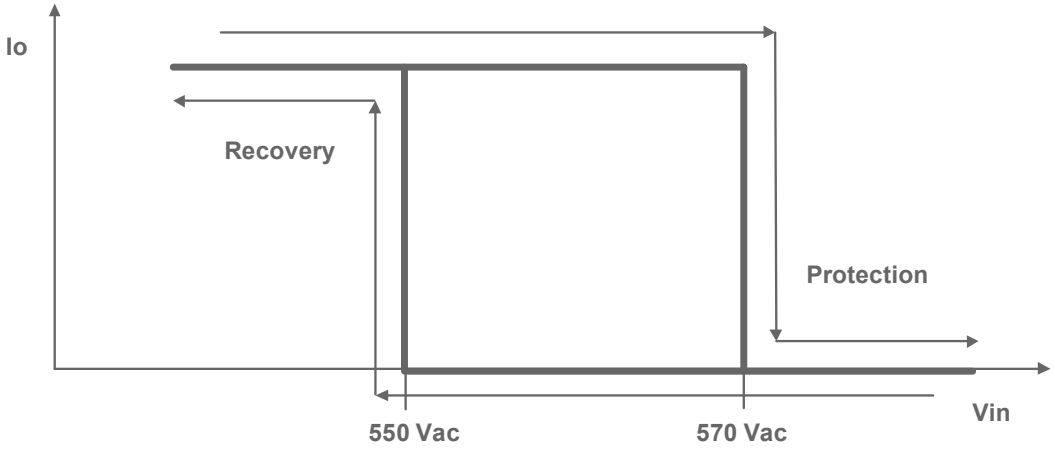
Parameter		Min.	Typ.	Max.	Notes
Over Temperature Protection		Decreases output current, returning to normal after over temperature is removed.			
Short Circuit Protection		Auto Recovery. No damage will occur when any output is short circuited. The output shall return to normal when the fault condition is removed.			
Over Voltage Protection		Limits output voltage at no load and in case the normal voltage limit fails.			
Input Under Voltage Protection (IUVP)	Input Protection Voltage	150 Vac	160 Vac	170 Vac	Turn off the output when the input voltage falls below protection voltage.
	Input Recovery Voltage	160 Vac	170 Vac	180 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.

www.inventronics-co.com Tel: 86-571-56565800 Fax: 86-571-86601139 sales@inventronicsglobal.com

Input Under Voltage Protection Diagram



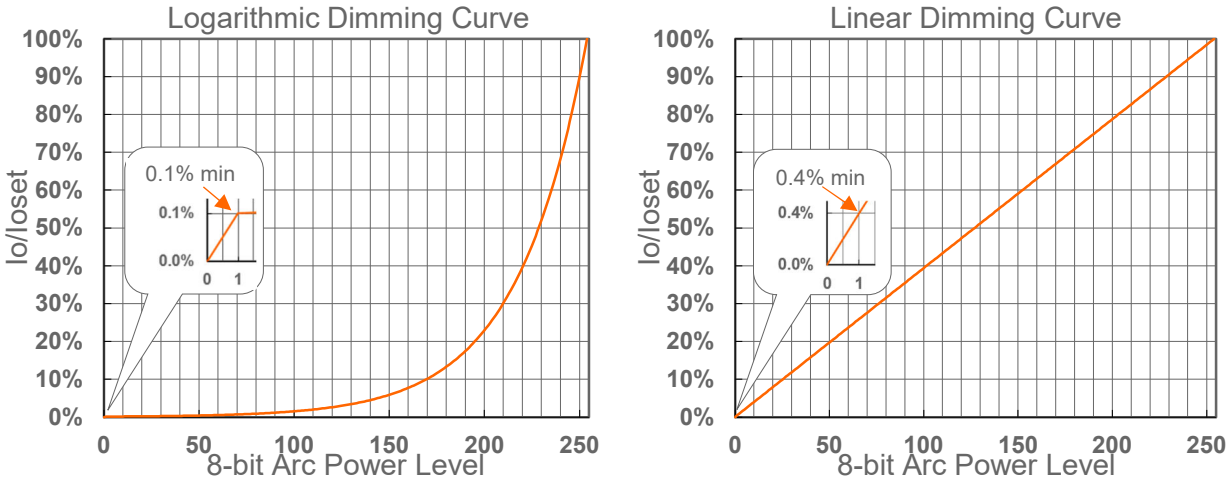
Input Over Voltage Protection Diagram



Dimming

DALI-2 Dimming

The recommended implementation of the dimming control is provided below.

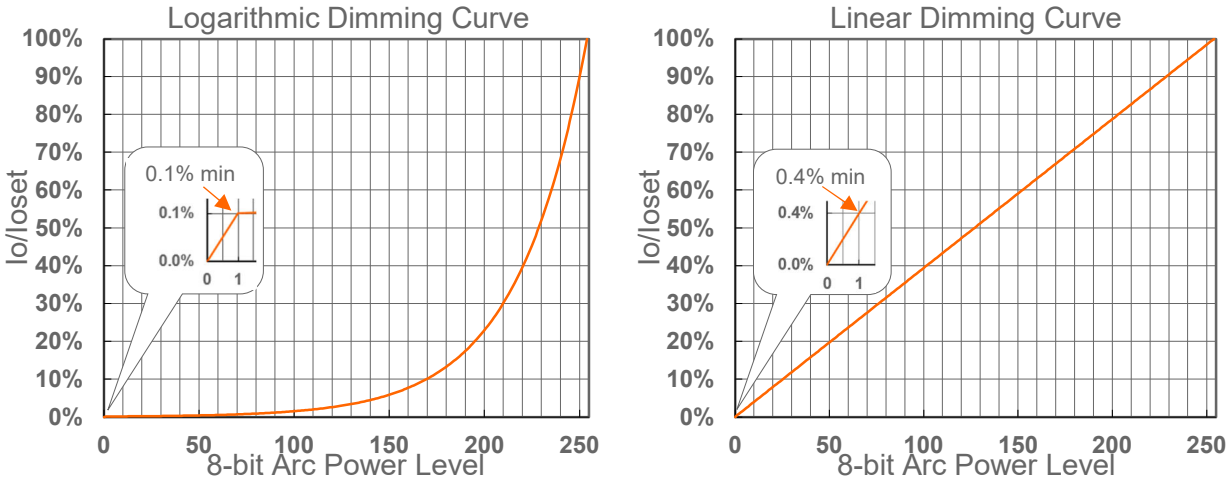


Implementation: DALI-2 Dimming

www.inventronics-co.com Tel: 86-571-56565800 Fax: 86-571-86601139 sales@inventronicsglobal.com

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.

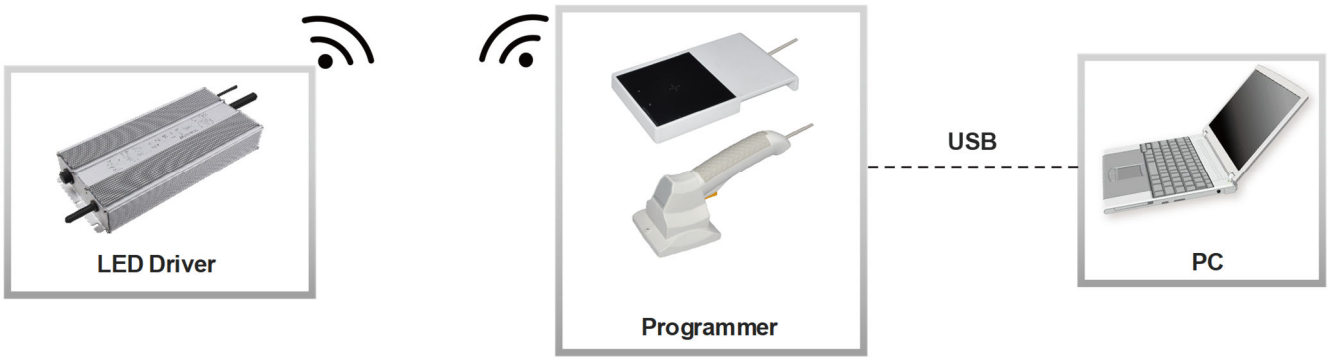
Output Lumen Compensation

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.

Programming Connection Diagram

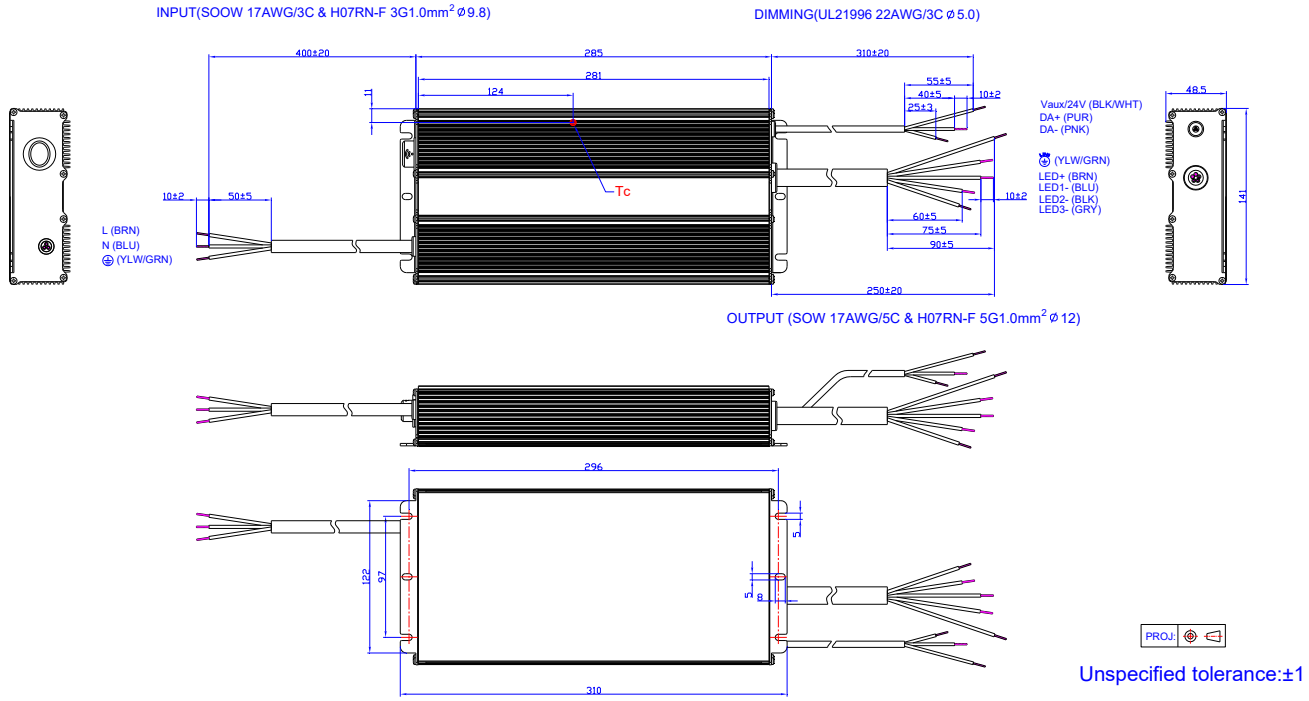


Note: The driver does not need to be powered on during the programming process.

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

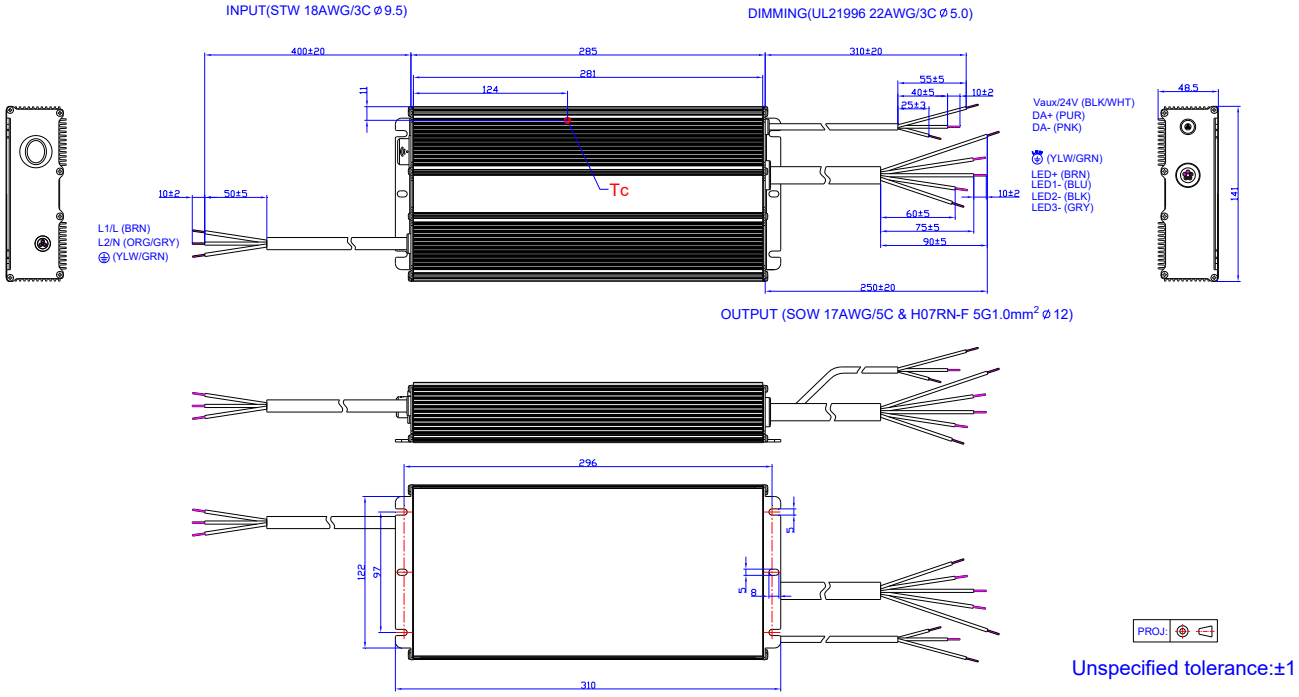
Mechanical Outline

EFM-800TxxxBG



Unspecified tolerance:±1

EFM-800TxxxBT



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
2025-09-02	A	Datasheet Release	/	/

www.inventronics-co.com Tel: 86-571-56565800 Fax: 86-571-86601139 sales@inventronicsglobal.com