

## Features

- Full Power at Wide Output Current Range (Constant Power)
- Adjustable Output Current (AOC) with NFC
- DALI-2 Certified (Part 251, 252, 253)
- 3-Timer-Modes Dimmable
- Dim-to-Off with Standby Power  $\leq 0.5$  W
- Integrated Power Monitoring with High Accuracy up to  $\pm 1\%$
- Output Lumen Compensation
- End-of-Life Indicator
- Input Surge Protection: DM 4kV, CM 6kV
- All-Around Protection: IUVP, IOVP, OVP, SCP, OTP
- IP66/IP67  
UL Dry/Damp/Wet Location (ET/EG models)
- TYPE HL, for use in a Class I, Division 2 hazardous (Classified) location (ET/EG models)
- Suitable for Luminaires with Protection Class I
- Suitable for Luminaires with Protection Class I and II (EE models)
- 5 Years Warranty



## Description

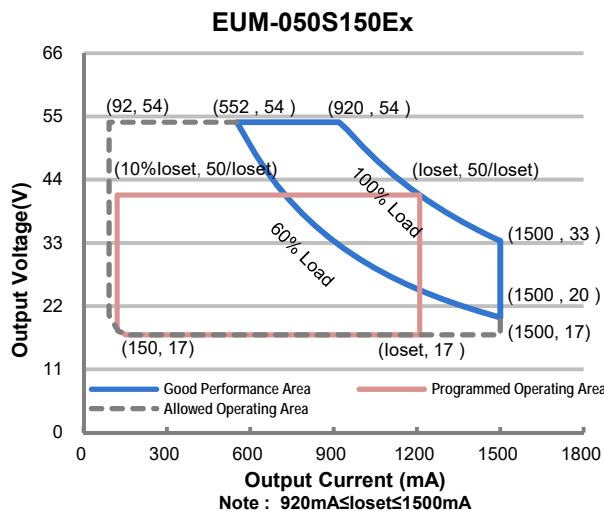
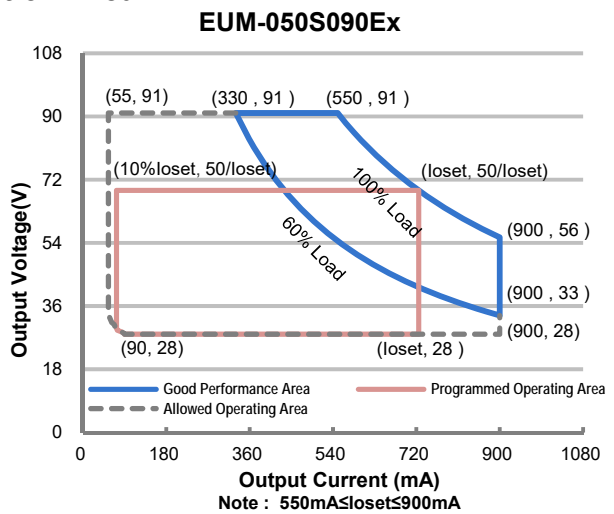
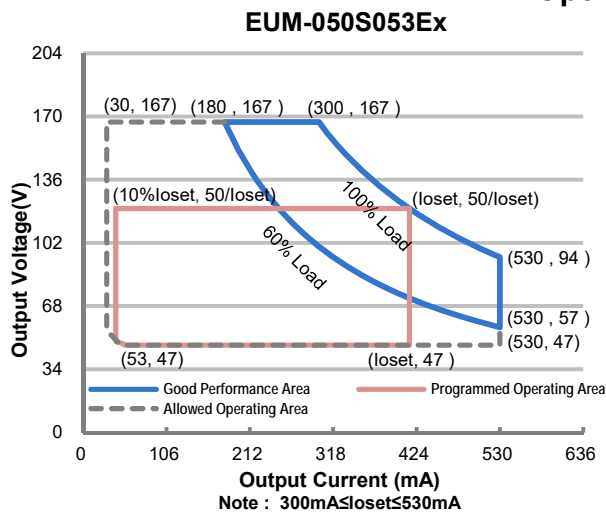
The EUM-050SxxxEx series is a 50W, DALI-2, constant-current, NFC programmable and IP66/IP67 rated LED driver that operates from 90-305Vac input with excellent power factor. Created for intra-luminaire solutions and health monitoring applications, this family provides integrated AC power monitoring and dim-to-off functionality. The dimming control supports two-way communication via DALI-2. 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	Full-Power Current Range (1)	Default Output Current	Input Voltage Range(2)	Output Voltage Range	Max. Output Power	Typical Efficiency (3)	Typical Power Factor		Model Number (6)
							120Vac	220Vac	
30-530mA	300-530mA	530 mA	90~305 Vac/ 127~300 Vdc	47~167 Vdc	50W	90.5%	0.99	0.96	EUM-050S053Ex
55-900mA	550-900mA	700 mA	90~305 Vac/ 127~300 Vdc	28~91 Vdc	50W	89.5%	0.99	0.96	EUM-050S090Ex <sup>(4)</sup>
92-1500mA	920-1500mA	1050 mA	90~305 Vac/ 127~300 Vdc	17~54 Vdc	50W	88.5%	0.99	0.96	EUM-050S150Ex <sup>(5)</sup>

- Notes:** (1) Output current range with constant power at 50W  
 (2) Certified input voltage range: UL, FCC 100-277Vac; otherwise 100-240Vac.  
 (3) Measured at 100% load and 220Vac input (see below "General Specifications" for details).  
 (4) SELV Output.  
 (5) Class 2 & SELV output.  
 (6) x = G are UL Recognized, ENEC and CCC, etc. models; x = T are UL Class P models; x = E are Class II models with ENEC, etc. See below "Mechanical Outline" for details.

## I-V Operation Area



## Input Specifications

Parameter	Min.	Typ.	Max.	Notes
Input AC Voltage	90 Vac	-	305 Vac	
Input DC Voltage	127 Vdc	-	300 Vdc	
Input Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	0.75 MIU	UL 8750; 277Vac/ 60Hz
	-	-	0.70 mA	IEC 60598-1; 240Vac/ 60Hz
Input AC Current	-	-	0.55 A	Measured at 100% load and 120 Vac input.
	-	-	0.29 A	Measured at 100% load and 220 Vac input.
Inrush Current(I <sup>2</sup> t)	-	-	0.71 A <sup>2</sup> s	At 220Vac input, 25°C cold start, duration=372 μs, 10%Ipk-10%Ipk. See Inrush Current Waveform for the details.

## Input Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
PF	0.9	-	-	At 100-277Vac, 50-60Hz, 60%-100% Load (30-50W)
THD	-	-	20%	
THD	-	-	10%	At 220-240Vac, 50-60Hz, 60%-100% Load (30-50W)

## Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%loset	-	5%loset	At 100% load condition
Output Current Setting Range with Constant Power				
EUM-050S053Ex	30 mA	-	530 mA	
EUM-050S090Ex	55 mA	-	900 mA	
EUM-050S150Ex	92 mA	-	1500 mA	
Output Current Setting Range with Constant Power				
EUM-050S053Ex	300 mA	-	530 mA	
EUM-050S090Ex	550 mA	-	900 mA	
EUM-050S150Ex	920 mA	-	1500 mA	
Total Output Current Ripple (pk-pk)	-	5%lomax	10%lomax	At 100% load condition. 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)	-	2%lomax	-	At 100% load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%lomax	At 100% load condition
No Load Output Voltage				
EUM-050S053Ex	-	-	200 V	
EUM-050S090Ex	-	-	120 V	
EUM-050S150Ex	-	-	60 V	
Line Regulation	-	-	±1%	Measured at 100% load
Load Regulation	-	-	±5%	
Turn-on Delay Time	-	-	0.5 s	Measured at all dimming modes except DALI-2, and 120-277Vac input, 65%-100% Load
	-	-	1.0 s	Measured at DALI-2 dimming mode, and 120-277Vac input, 65%-100% Load
Temperature Coefficient of loiset	-	0.06%/°C	-	Case temperature = 0°C ~Tc max

## General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 120 Vac input: EUM-050S053Ex				Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
I <sub>o</sub> = 300 mA	86.0%	88.0%	-	
I <sub>o</sub> = 530 mA	86.0%	88.0%	-	
EUM-050S090Ex				
I <sub>o</sub> = 550 mA	85.0%	87.0%	-	
I <sub>o</sub> = 900 mA	85.0%	87.0%	-	
EUM-050S150Ex				
I <sub>o</sub> = 920 mA	84.0%	86.0%	-	
I <sub>o</sub> =1500 mA	83.5%	85.5%	-	
Efficiency at 220 Vac input: EUM-050S053Ex				Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
I <sub>o</sub> = 300 mA	88.5%	90.5%	-	
I <sub>o</sub> = 530 mA	88.5%	90.5%	-	
EUM-050S090Ex				
I <sub>o</sub> = 550 mA	87.5%	89.5%	-	
I <sub>o</sub> = 900 mA	87.0%	89.0%	-	
EUM-050S150Ex				
I <sub>o</sub> = 920 mA	86.5%	88.5%	-	
I <sub>o</sub> =1500 mA	86.0%	88.0%	-	
Efficiency at 277 Vac input: EUM-050S053Ex				Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
I <sub>o</sub> = 300 mA	89.0%	91.0%	-	
I <sub>o</sub> = 530 mA	89.0%	91.0%	-	
EUM-050S090Ex				
I <sub>o</sub> = 550 mA	88.0%	90.0%	-	
I <sub>o</sub> = 900 mA	87.5%	89.5%	-	
EUM-050S150Ex				
I <sub>o</sub> = 920 mA	87.0%	89.0%	-	
I <sub>o</sub> =1500 mA	86.0%	88.0%	-	
Power Monitoring Accuracy	-1%	-	1%	Measured at 220Vac input and 100%Load
Standby Power	-	-	0.5 W	Measured at 230Vac/50Hz; Dimming off
MTBF	-	480,000 Hours	-	Measured at 220Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	105,000 Hours	-	Measured at 220Vac input, 80%Load and 70°C case temperature; See lifetime vs. Tc curve for the details
Operating Case Temperature for Safety T <sub>c_s</sub>	-40°C	-	+90°C	
Operating Case Temperature for Warranty T <sub>c_w</sub>	-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				With mounting ear
Inches (L × W × H)	3.70 × 2.66 × 1.44			4.41 × 2.66 × 1.44
Millimeters (L × W × H)	94 × 67.5 × 36.5			112 × 67.5 × 36.5
Net Weight	-	510 g	-	

## Dimming Specifications

Parameter		Min.	Typ.	Max.	Notes
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	EUM-050S053Ex EUM-050S090Ex EUM-050S150Ex	10%loset	-	loset	300 mA ≤ loiset ≤ 530 mA 550 mA ≤ loiset ≤ 900 mA 920 mA ≤ loiset ≤ 1500 mA
	EUM-050S053Ex EUM-050S090Ex EUM-050S150Ex	30 mA 55 mA 92 mA	-	loset	30 mA ≤ loiset < 300 mA 55 mA ≤ loiset < 550 mA 92 mA ≤ loiset < 920 mA

## Safety & EMC Compliance

Safety Category	Standard
UL/CUL	UL 8750,CAN/CSA-C22.2 No. 250.13
ENEC	EN 61347-1 <sup>(1)</sup> , EN 61347-2-13
UKCA	BS EN 61347-1 <sup>(1)</sup> , BS EN 61347-2-13 BS EN 301 489-1 BS EN 301 489-3 BS EN 300 330 BS EN 62479/BS EN 50663/BS EN 50665/BS EN 50364
CE	EN 61347-1 <sup>(1)</sup> , EN 61347-2-13 EN 301 489-1 EN 301 489-3 EN 300 330 EN 62479/EN 50663/EN 50665/EN 50364
CCC	GB 19510.1, GB 19510.14
CB	IEC 61347-1 <sup>(1)</sup> , IEC 61347-2-13
KS	KS C 7655
Performance	Standard
ENEC	EN 62384
EMI Standards	Notes
BS EN/EN 55015/GB/T 17743 <sup>(2)</sup>	Conducted emission Test & Radiated emission Test
BS EN/EN 61000-3-2/GB 17625.1	Harmonic current emissions
BS EN/EN 61000-3-3	Voltage fluctuations & flicker
FCC Part 15 <sup>(2)</sup>	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.

## Safety & EMC Compliance (Continued)

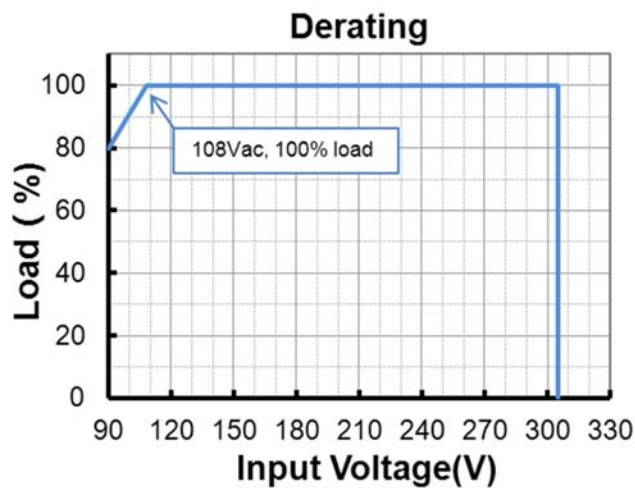
EMS Standards	Notes
BS EN/EN 61000-4-2	Electrostatic Discharge (ESD): 8 kV air discharge, 4 kV contact discharge
BS EN/EN 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-RS
BS EN/EN 61000-4-4	Electrical Fast Transient / Burst-EFT
BS EN/EN 61000-4-5	Surge Immunity Test: AC Power Line: Differential Mode 4 kV, Common Mode 6 kV
BS EN/EN 61000-4-6	Conducted Radio Frequency Disturbances Test-CS
BS EN/EN 61000-4-8	Power Frequency Magnetic Field Test
BS EN/EN 61000-4-11	Voltage Dips
BS EN/EN 61547	Electromagnetic Immunity Requirements Applies To Lighting Equipment
DALI-2 Standards	Notes
DALI-2 <sup>(3)</sup>	IEC 62386-101, 102 & 207

**Notes:** (1) EE models meet the requirements for EN/BS EN/IEC 61347-1(Class II), when the driver is energized, the allowed leakage current is perceptible but harmless.

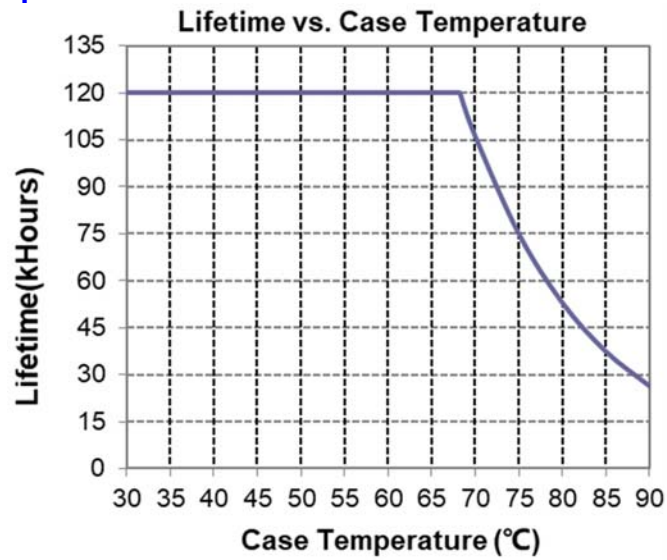
(2) This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.

(3) DALI Parts: 101, 102, 207, 251, 252, 253.

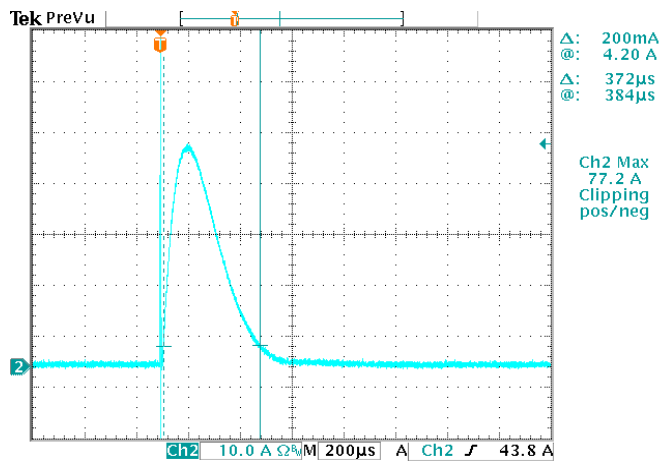
## Derating



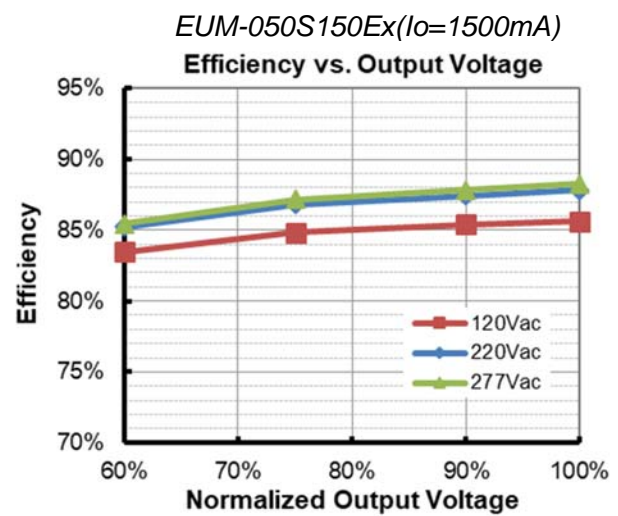
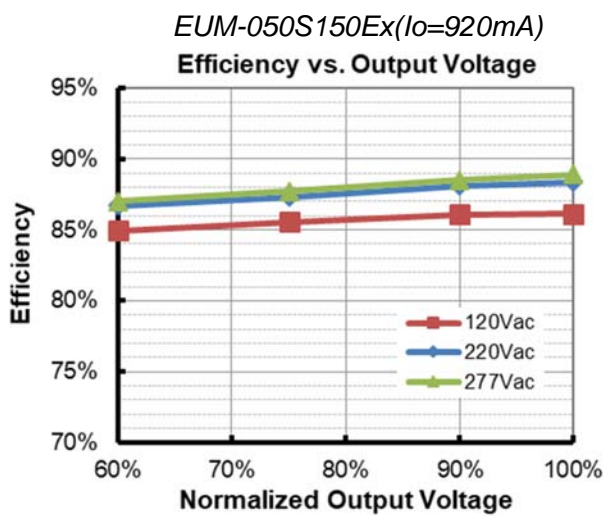
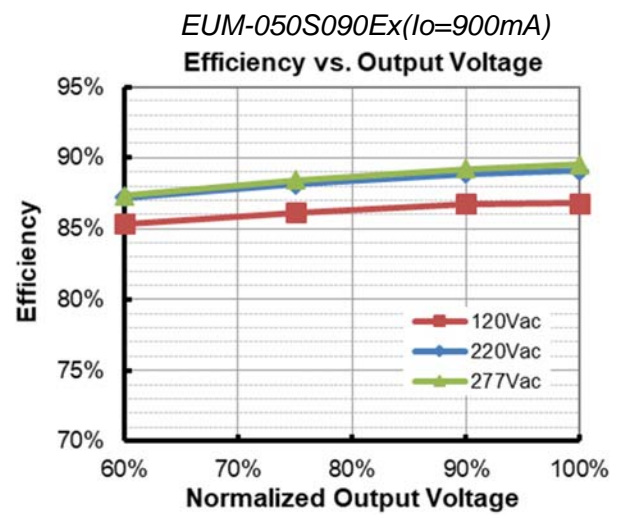
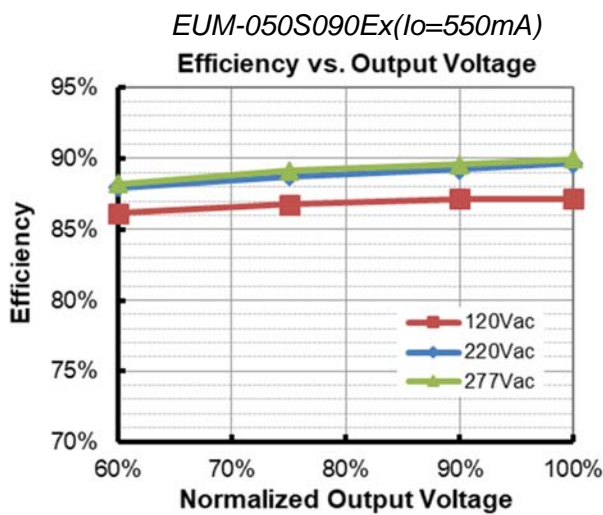
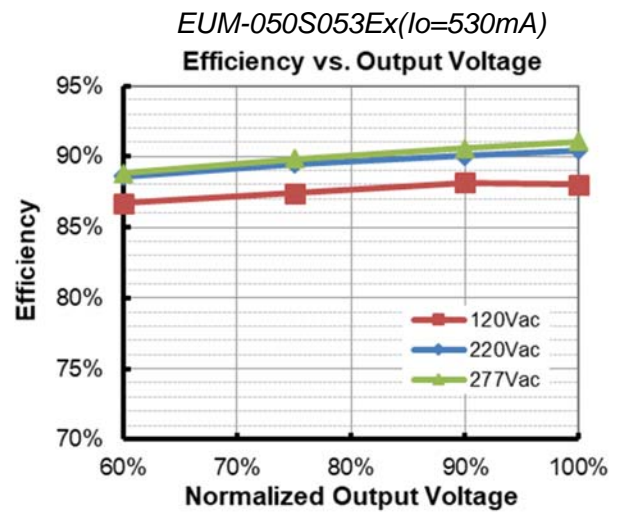
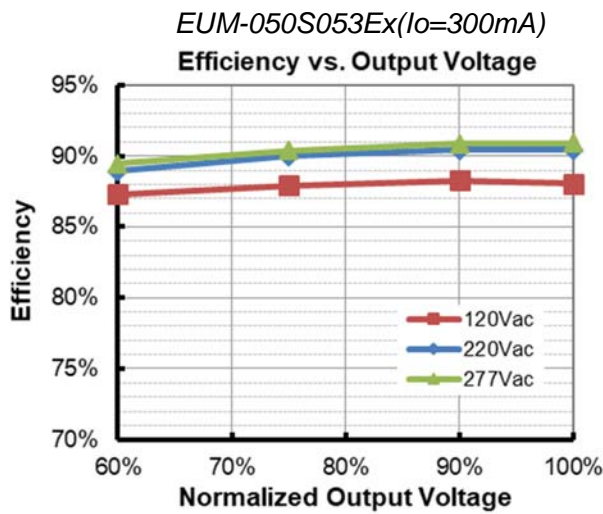
## Lifetime vs. Case Temperature



## Inrush Current Waveform

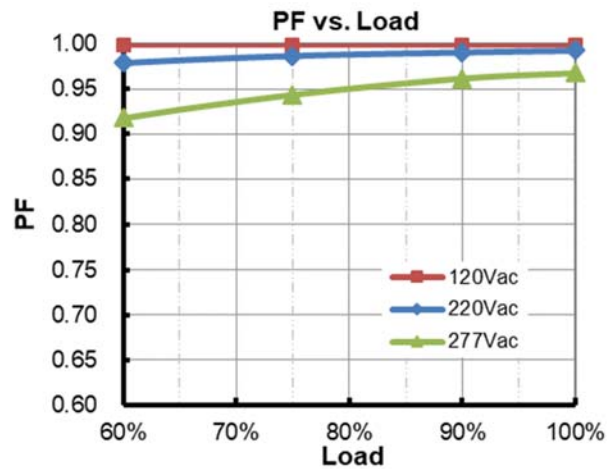


## Efficiency vs. Load

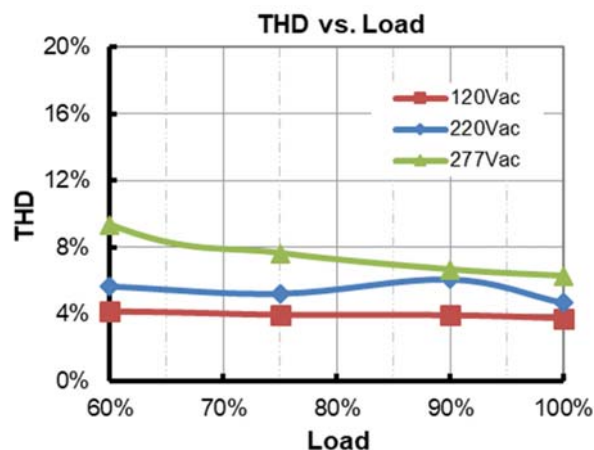




## Power Factor



## Total Harmonic Distortion



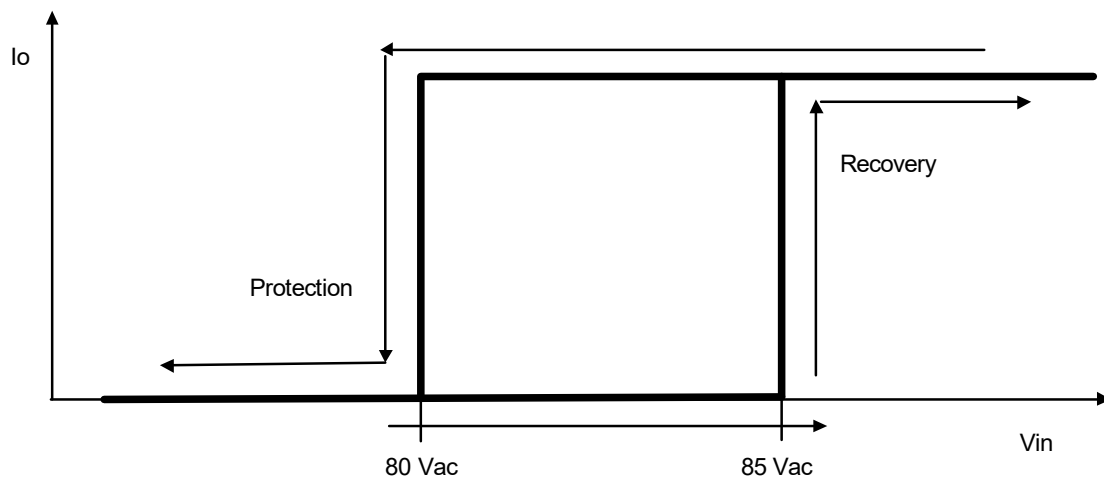
## Protection Functions

Parameter		Min.	Typ.	Max.	Notes
Over Voltage Protection		Limits output voltage at no load and in case the normal voltage limit fails.			
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 Temperature Protection		Decreases output current, returning to normal after over temperature is removed.			
Input Under Voltage Protection (IUV)	Input Under Voltage Protection	70 Vac	80 Vac	90 Vac	Turn off the output when the input voltage falls below protection voltage.
	Input Under Voltage Recovery	75 Vac	85 Vac	95 Vac	Auto Recovery. The driver will restart when the input voltage exceeds recovery voltage.

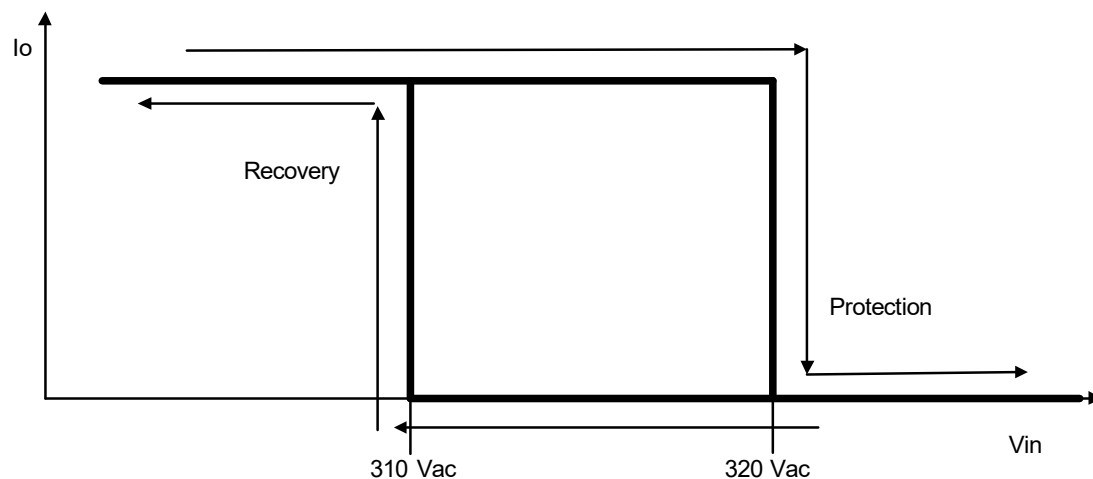
## Protection Functions (Continued)

Parameter		Min.	Typ.	Max.	Notes
Input Over Voltage Protection (IOVP)	Input Over Voltage Protection	310 Vac	320 Vac	330 Vac	Turn off the output when the input voltage exceeds protection voltage.
	Input Over Voltage Recovery	300 Vac	310 Vac	320 Vac	Auto Recovery. The driver will restart when the input voltage falls below recovery voltage.
	Max. of Input Over Voltage	-	-	350 Vac	The driver can survive stabilized input over voltage conditions up to 350Vac for a total of 8 hours.

### ● Input Under Voltage Protection Diagram



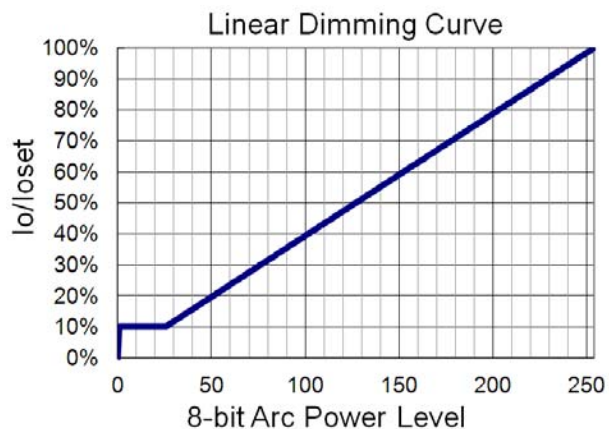
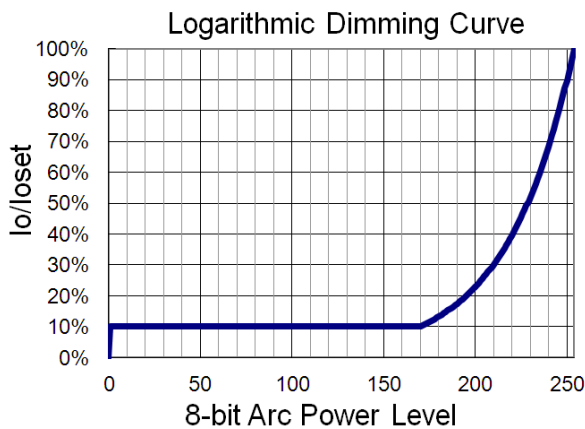
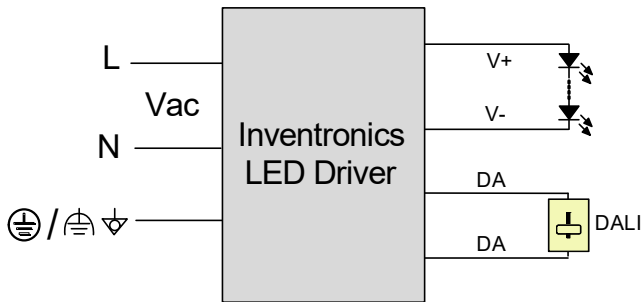
### ● Input Over Voltage Protection Diagram



## Dimming

### ● DALI-2 Dimming

The recommended implementation of the dimming control is provided below.



Implementation: DALI-2 Dimming

### ● 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.

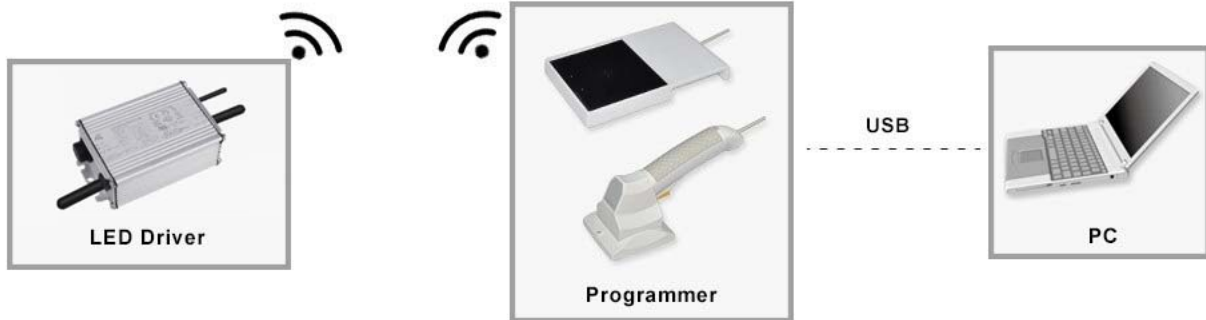
### ● Output Lumen Compensation

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

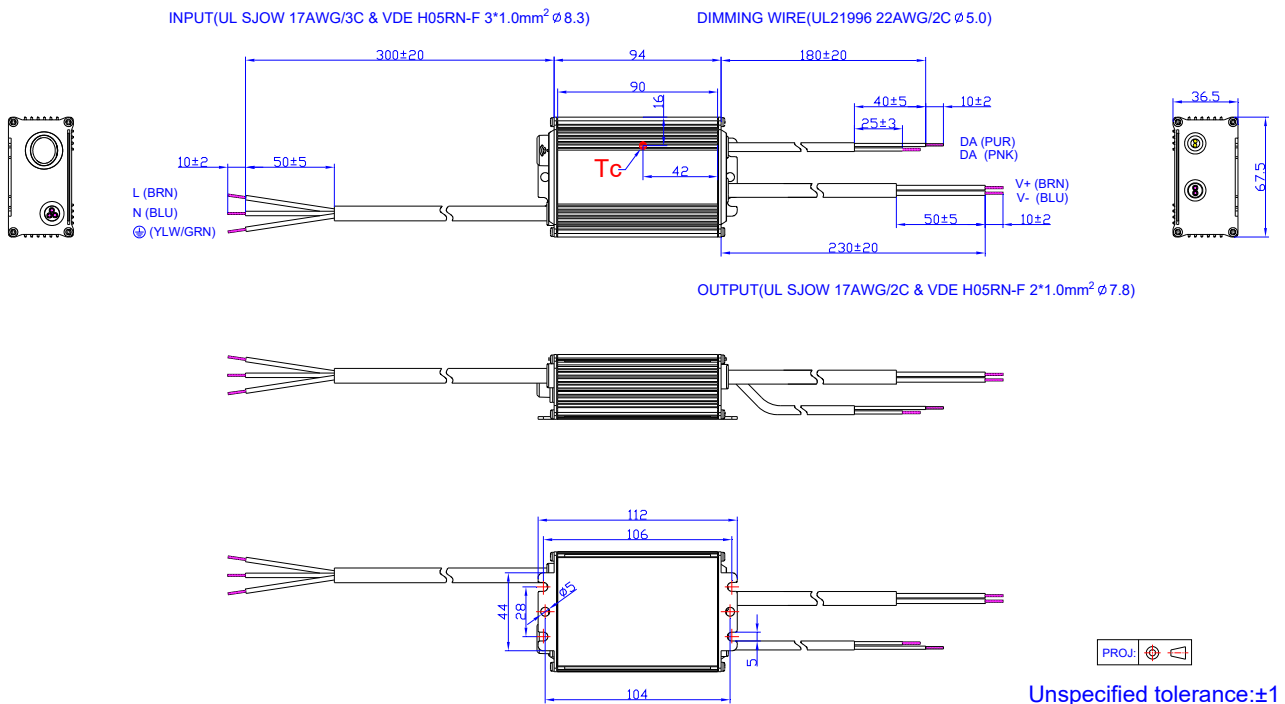


**Note:** The driver does not need to be powered on during the programming process.

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

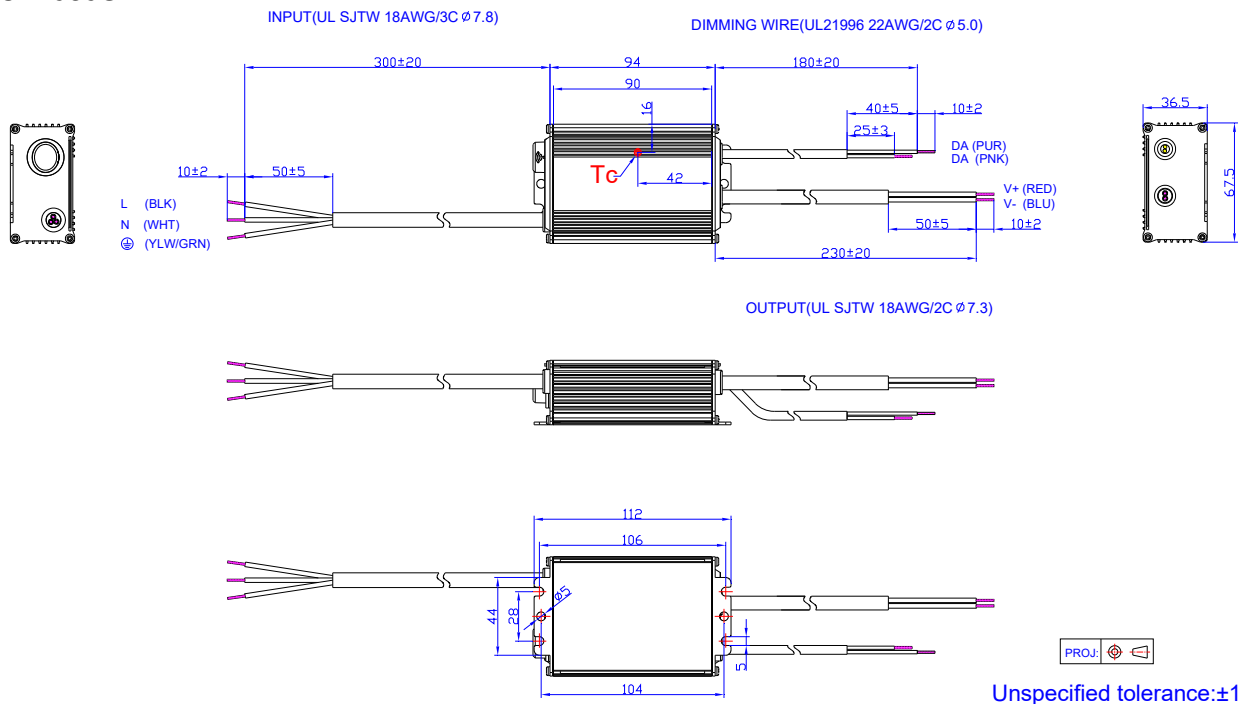
## Mechanical Outline

### EUM-050SxxxEG

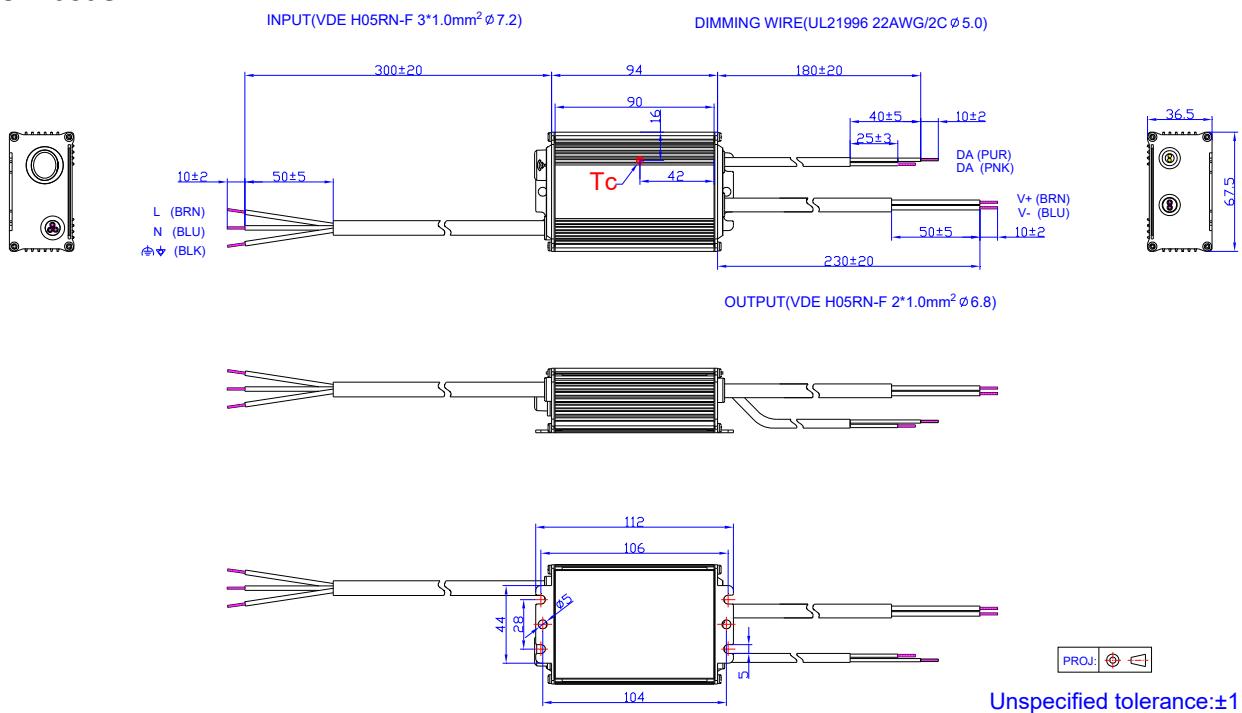


Unspecified tolerance:  $\pm 1$

## EUM-050SxxxET



## EUM-050SxxxEE



## 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
2022-08-27	A	Datasheet Release	/	/
2023-01-04	B	Product Photograph	/	Updated
		CCC logo	/	Added
		Dimming Specifications	/	Updated
		Safety & EMC Compliance	CCC	Added
		Dimming	/	Updated
		Mechanical Outline	/	Updated