INVENTRONICS

EUM-050SxxxDx   *Rev. A*   *50W Programmable IP66/IP67 Driver*

Features

- Full Power at Wide Output Current Range (Constant Power)

- Adjustable Output Current (AOC) with Programmability

- Isolated 1-5V/1-10V/10V PWM/3-Timer-Modes Dimmable

- Output Lumen Compensation

- Input Surge Protection: DM 4kV, CM 6kV

- All-Around Protection: OVP, SCP, OTP

- IP66 / IP67 and UL Dry / Damp / Wet Location
  Only IP66 and UL Dry / Damp Location (DF models)

- Class 2 & SELV Output

- TYPE HL, for use in a Class I, Division 2 hazardous (Classified) location

- Suitable for Luminaires with Protection Class I

- 5 Years Warranty

Description

The EUM-050SxxxDx series is a 50W, constant-current, programmable and IP66/IP67 rated LED driver that operates from 90-305Vac input with excellent power factor. It is created for many lighting applications including low bay, tunnel and street, etc. 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, 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)	Power Factor		Model Number (6)
							120Vac	220Vac	
55-900mA	550-900mA	700 mA	90~305 Vac/ 127~300 Vdc	28~91 Vdc	50W	89.0%	0.99	0.96	EUM-050S090Dx[4]
92-1500mA	920-1500mA	1050 mA	90~305 Vac/ 127~300 Vdc	17~54 Vdc	50W	88.0%	0.99	0.96	EUM-050S150Dx[5]

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 = B are BIS models;
         x = F are UL Class P models with flying leads. See drawings for cable information.

I-V Operation Area

EUM-050S090Dx

Note: 550mA≤Ioset≤900mA

EUM-050S150Dx

Note: 920mA≤Ioset≤1500mA
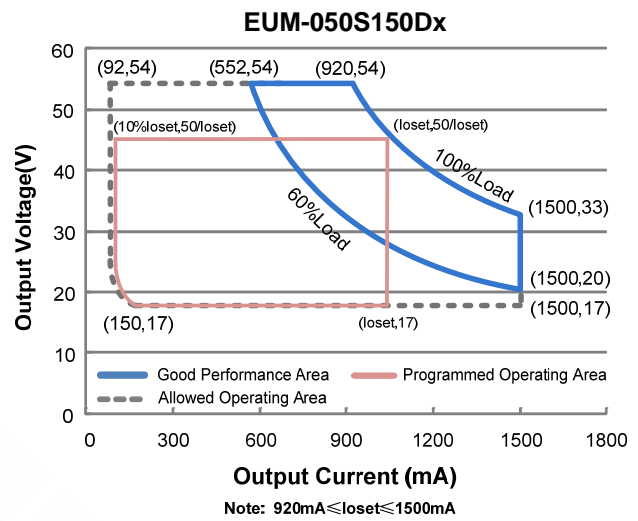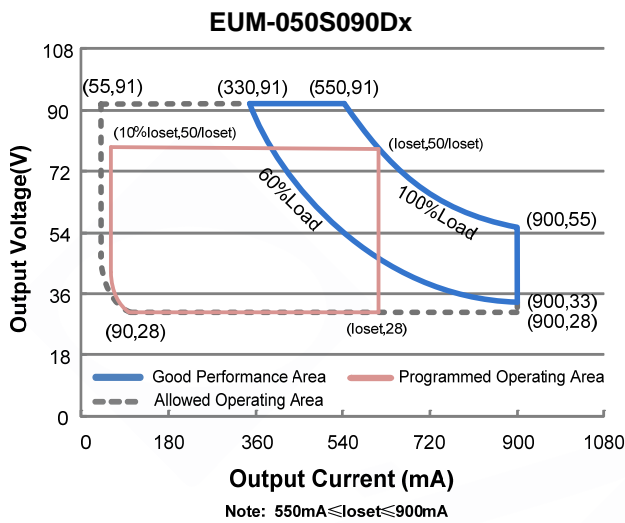
Input Specifications

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	UL8750; 277Vac/ 60Hz
	-	-	0.70 mA	IEC60598-1; 240Vac/ 60Hz,
Input AC Current	-	-	0.55 A	Measured at 100% load and 120 Vac input.
	-	-	0.30 A	Measured at 100% load and 220 Vac input.
Inrush Current(I^2t)	-	-	0.48 A^2s	At 220Vac input, 25°C cold start, duration=292 µs, 10%Ipk-10%Ipk. See Inrush Current Waveform for the details.
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%Ioset	-	5%Ioset	At 100% load condition
Output Current Setting(Ioset) Range EUM-050S090Dx EUM-050S150Dx	 55 mA 92 mA	 - -	 900 mA 1500 mA	

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Output Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Output Current Setting Range with Constant Power EUM-050S090Dx EUM-050S150Dx	 550 mA 920 mA	 - -	 900 mA 1500 mA	
Total Output Current Ripple (pk-pk)	-	5%Iomax	10%Iomax	At 100% load condition. 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)	-	2%Iomax	-	At 100% load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%Iomax	At 100% load condition
No Load Output Voltage EUM-050S090Dx EUM-050S150Dx	 - -	 - -	 120 V 60 V	
Line Regulation	-	-	$\pm1\%$	Measured at 100% load
Load Regulation	-	-	$\pm5\%$	
Turn-on Delay Time	-	-	0.5 s	Measured at 120-277Vac input, 60%-100% Load
Temperature Coefficient of Ioset	-	0.06%/°C	-	Case temperature = 0°C ~Tc max

General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 120 Vac input: EUM-050S090Dx 　　　Io= 550 mA 　　　Io= 900 mA EUM-050S150Dx 　　　Io= 920 mA 　　　Io=1500 mA	 84.0% 85.0% 83.0% 83.5%	 86.0% 87.0% 85.0% 85.5%	 - - - -	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 220 Vac input: EUM-050S090Dx 　　　Io= 550 mA 　　　Io= 900 mA EUM-050S150Dx 　　　Io= 920 mA 　　　Io=1500 mA	 86.5% 87.0% 85.0% 86.0%	 88.5% 89.0% 87.0% 88.0%	 - - - -	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: EUM-050S090Dx 　　　Io= 550 mA 　　　Io= 900 mA EUM-050S150Dx 　　　Io= 920 mA 　　　Io=1500 mA	 87.0% 87.5% 86.0% 86.0%	 89.0% 89.5% 88.0% 88.0%	 - - - -	Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
MTBF	-	548,000 Hours	-	Measured at 220Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	103,000 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 Tc_s	-40°C	-	+90°C	
Operating Case Temperature for Warranty Tc_w	-40°C	-	+80°C	Case temperature for 5 years warrant Humidity: 10% RH to 95% RH;

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General Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
Storage Temperature	-40°C	-	+85°C	Humidity: 5%RH to 95%RH
Dimensions Inches (L × W × H) Millimeters (L × W × H)	3.75 × 2.52 × 1.44 95 × 64 × 36.5			With mounting ear 4.41 × 2.52 × 1.44 112 × 64 × 36.5
Net Weight	-	490 g	-	

Dimming Specifications

Parameter		Min.	Typ.	Max.	Notes
Absolute Maximum Voltage on the Vdim (+) Pin		-20 V	-	20 V	
Source Current on Vdim (+)Pin		200 uA	300 uA	450 uA	Vdim(+) = 0 V
Dimming Output Range	EUM-050S090Dx EUM-050S150Dx	10%Ioset	-	Ioset	550 mA $\leqslant$ Ioset $\leqslant$ 900 mA 920 mA $\leqslant$ Ioset $\leqslant$ 1500 mA
	EUM-050S090Dx EUM-050S150Dx	55 mA 92 mA	-	Ioset	55 mA $\leqslant$ Ioset $<$ 550 mA 92 mA $\leqslant$ Ioset $<$ 920 mA
Recommended Dimming Range for 1-5V		0.25 V	-	4.75 V	Dimming mode set to 1-5V in PC interface.
Recommended Dimming Range for 1-10V		1 V	-	9 V	Default 1-10V dimming mode with positive logic.
PWM_in High Level		-	10V	-	
PWM_in Low Level		-	0V	-	
PWM_in Frequency Range		200 Hz	-	2 KHz	
PWM_in Duty Cycle		0%	-	100%	

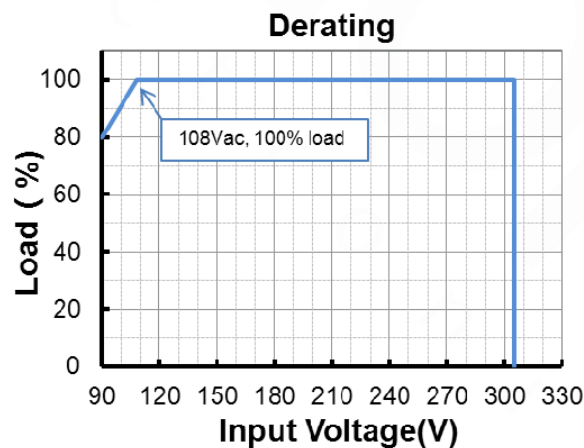## Safety &EMC Compliance

Safety Category	Standard
UL/CUL	UL8750,CAN/CSA-C22.2 No. 250.13
ENEC & CE	EN 61347-1, EN61347-2-13
CB	IEC 61347-1, IEC 61347-2-13
CCC	GB 19510.1, GB 19510.14
PSE	J 61347-1, J 61347-2-13
KS	KS C 7655
BIS	IS 15885(Part2/Sec13)
EMI Standards	**Notes**
EN 55015/GB 17743/KN 15[1]	Conducted emission Test &Radiated emission Test
EN 61000-3-2/GB 17625.1	Harmonic current emissions

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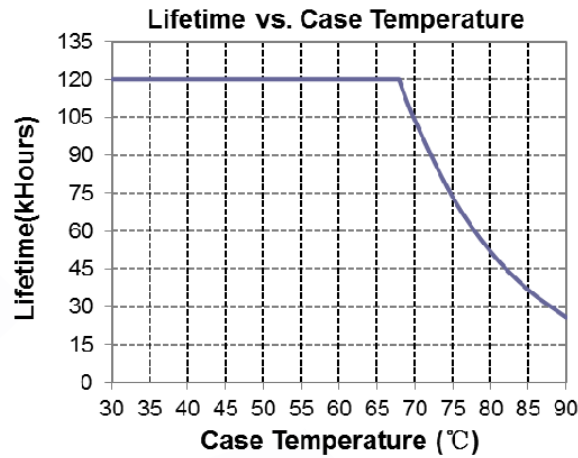## Safety &EMC Compliance (Continued)

EMI Standards	Notes
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): 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	Surge Immunity Test: AC Power Line: Differential Mode 4 kV, Common Mode 6 kV
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

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.
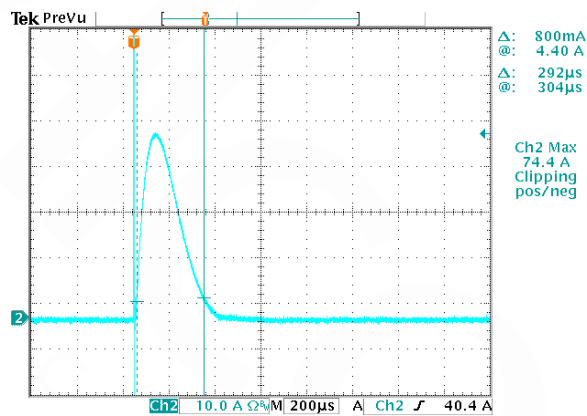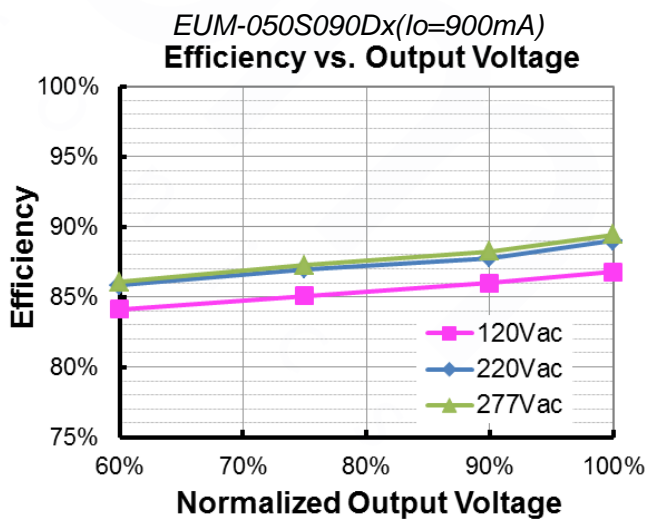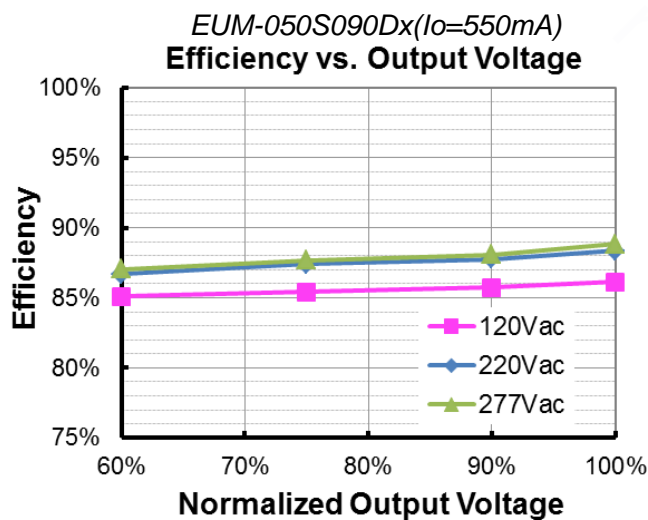
Derating

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Lifetime vs. Case Temperature

Inrush Current Waveform

Efficiency vs. Load

EUM-050S090Dx(Io=550mA)
Efficiency vs. Output Voltage

EUM-050S090Dx(Io=900mA)
Efficiency vs. Output Voltage

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EUM-050S150Dx(Io=920mA)
Efficiency vs. Output Voltage

EUM-050S150Dx(Io=1500mA)
Efficiency vs. Output Voltage

Power Factor

PF vs. Load

Total Harmonic Distortion

THD vs. Load

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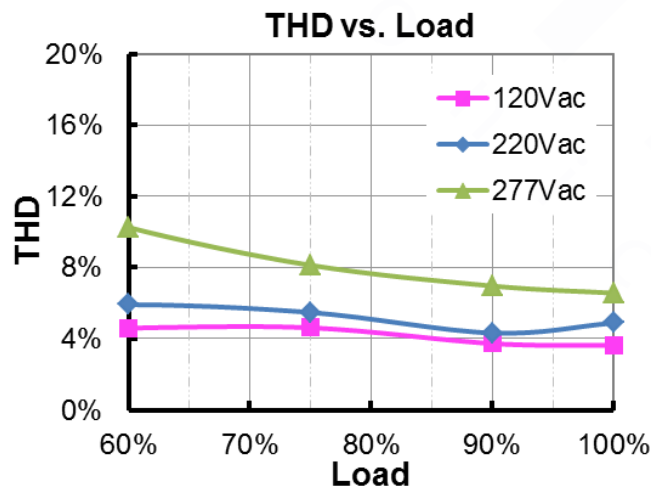
Protection Functions

| Parameter	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.

Dimming

● 1-5V Dimming

The recommended implementation of the dimming control is provided below.
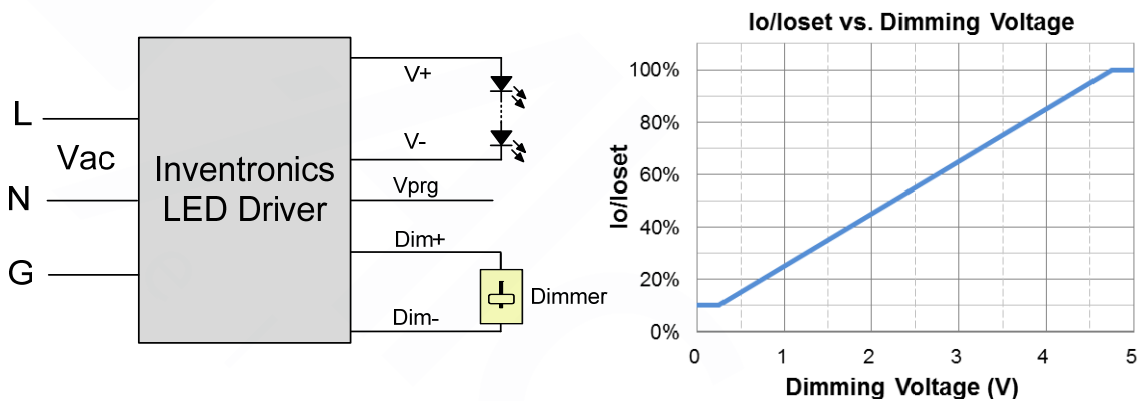
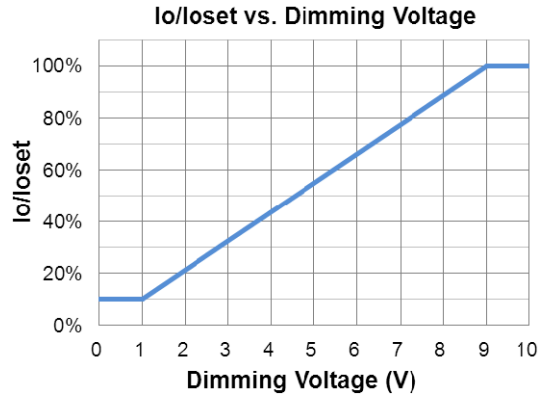**Implementation 1: Positive logic**
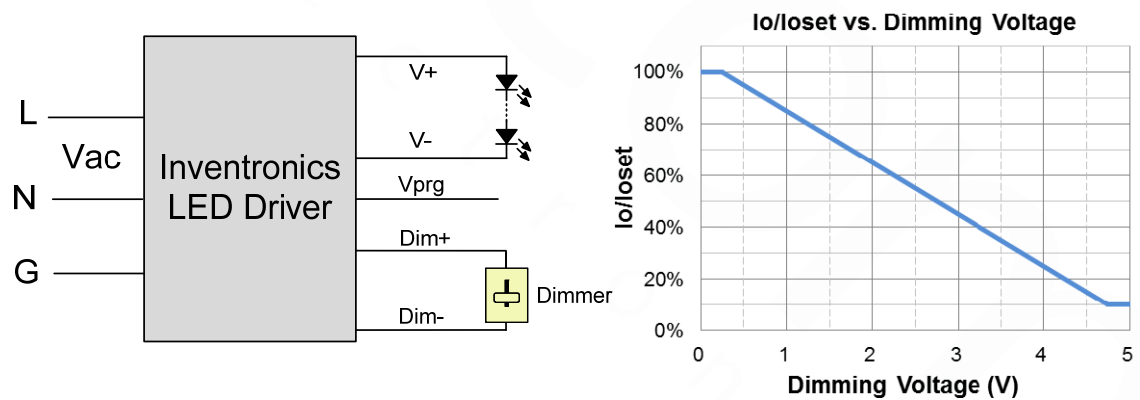
Implementation 2: Negative logic

Notes:
1. The dimmer can also be replaced by an active 1-5V voltage source signal or passive components like resistors and zener.
2. If 1-5V dimming is not used, Dim + should be open.
3. When 1-5V negative logic dimming mode and Dim+ is open, the driver will output maximum current.

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● **1-10V Dimming**

The recommended implementation of the dimming control is provided below.

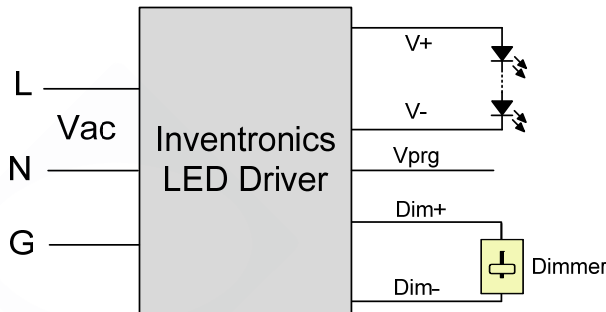**Implementation 3**: **Positive logic**

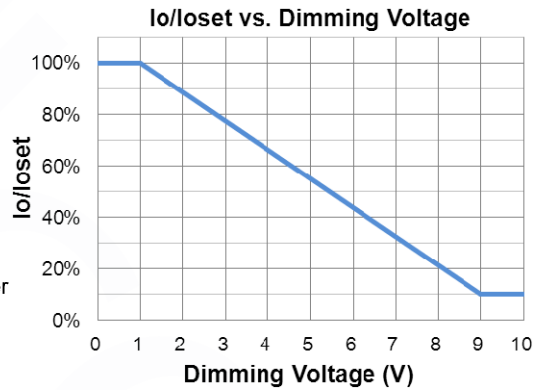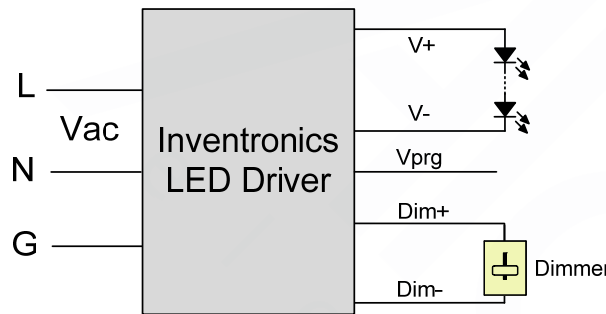**Implementation 4**: **Negative logic**

Notes:
1. The dimmer can also be replaced by an active 1-10V voltage source signal or passive components like resistors and zener.
2. If 1-10V dimming is not used, Dim + should be open.
3. When 1-10V negative logic dimming mode and Dim+ is open, the driver will output minimum current.

● **10V PWM Dimming**

The recommended implementation of the dimming control is provided below.

Implementation 5: **Positive logic**
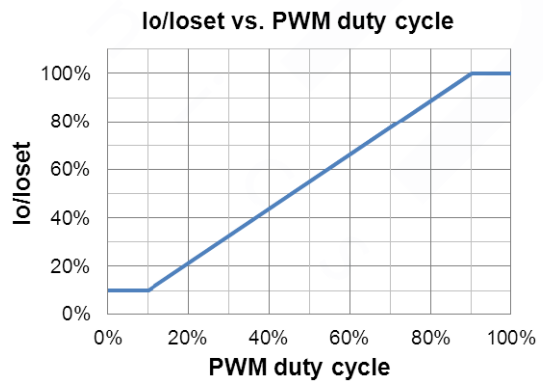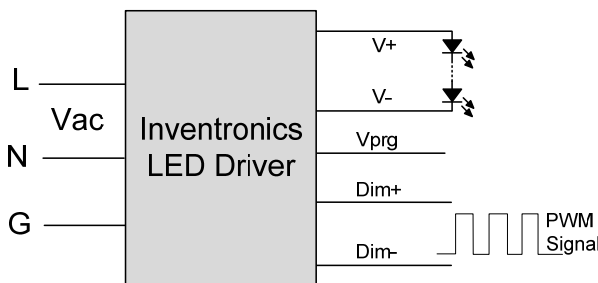
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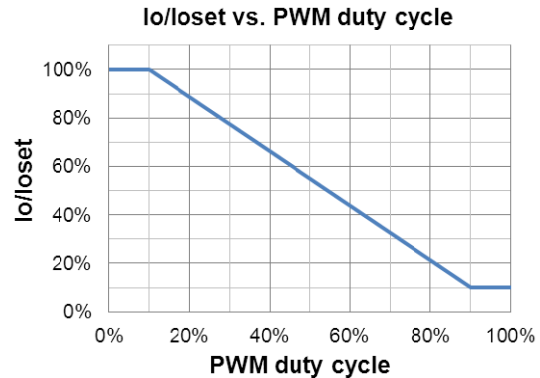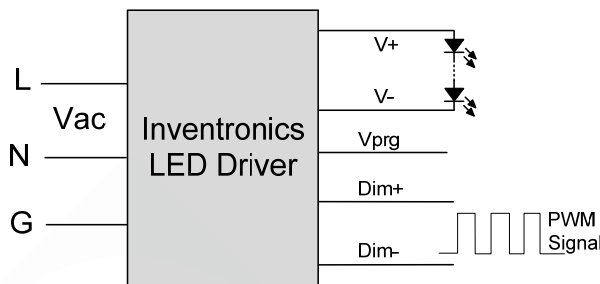
Implementation 6: **Negative logic**

Notes:
1. If PWM dimming is not used, Dim + should be open.
2. When PWM negative logic dimming mode and Dim+ is open, the driver will output minimum current.

● **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.

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Programming Connection Diagram
EUM-050SxxxDG

EUM-050SxxxDT

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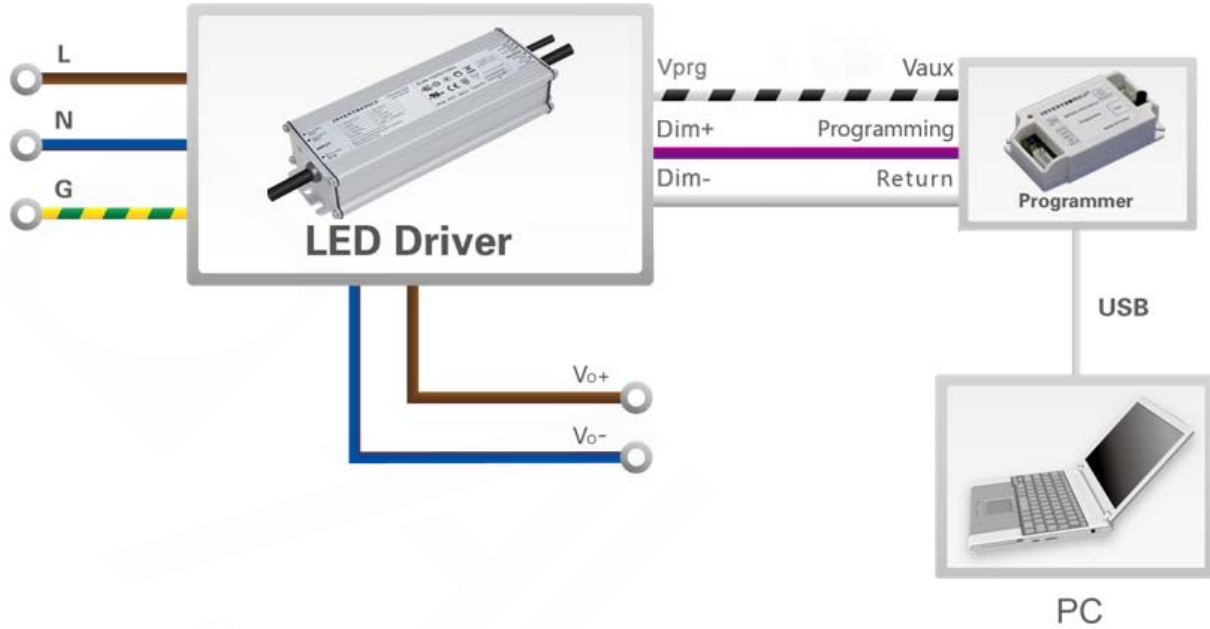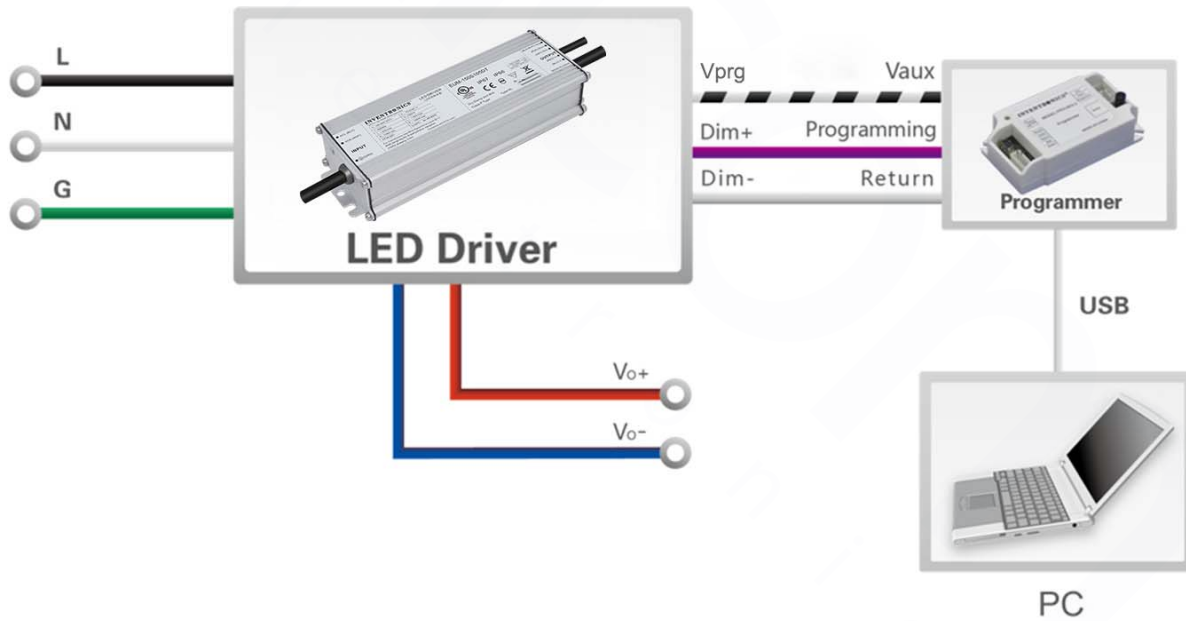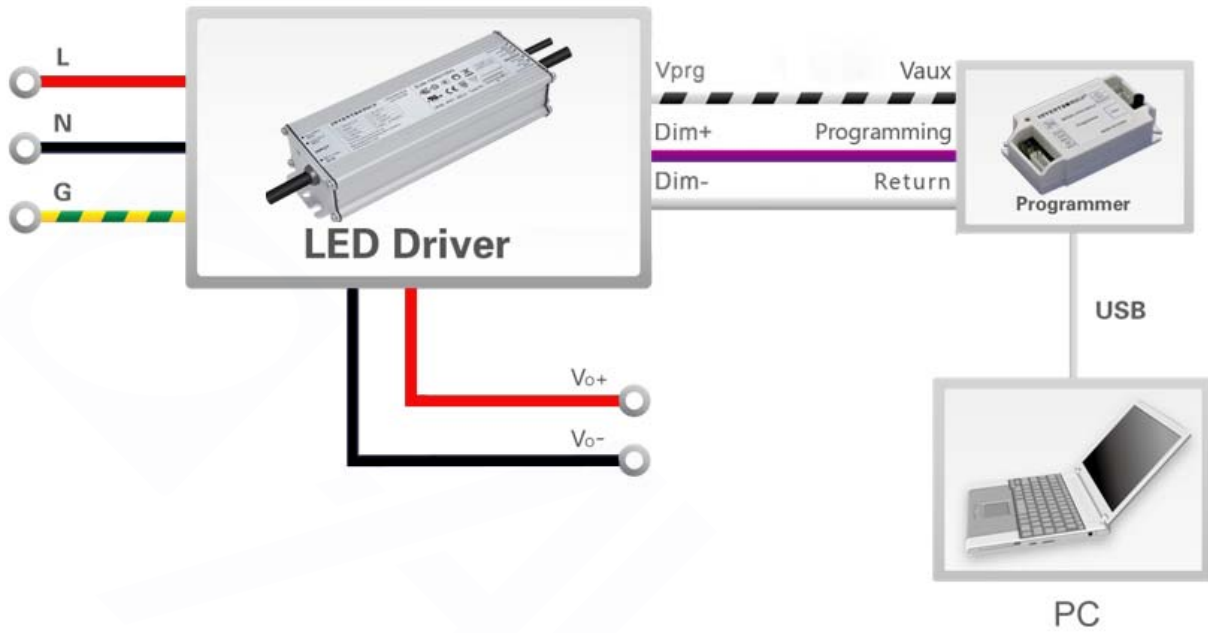
EUM-050SxxxDB

EUM-050SxxxDF
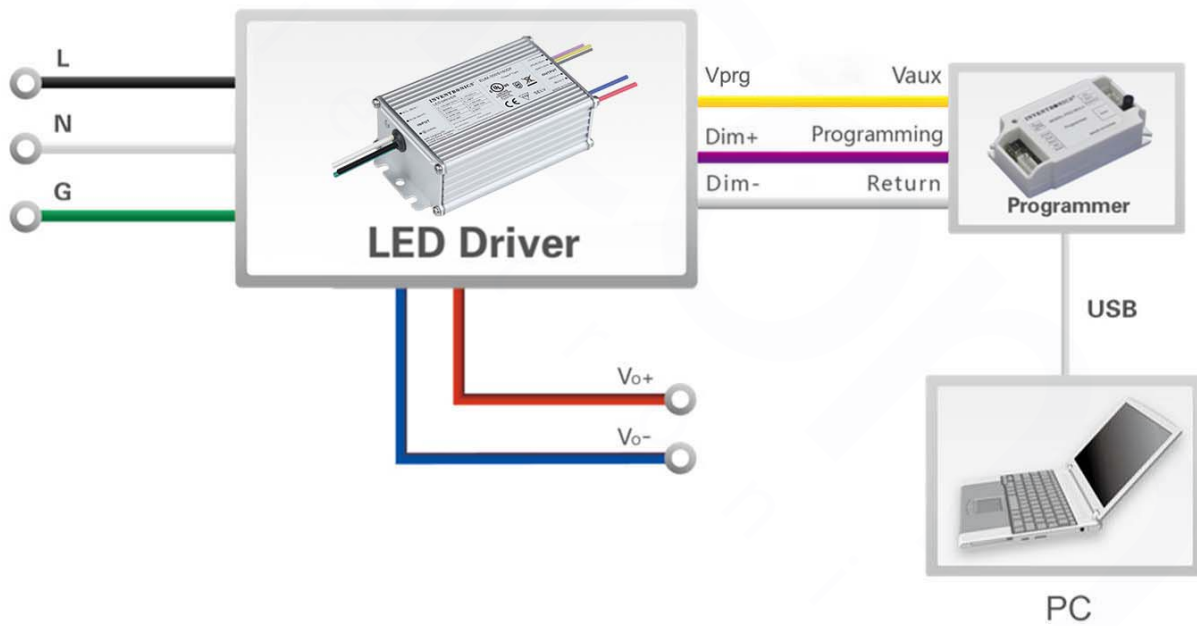
Note: The driver does not need to be powered on during the programming process.

● **Please refer to PRG-MUL2 (Programmer) datasheet for details.**

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Mechanical Outline

EUM-050SxxxDG

INPUT(UL SJOW 17AWG/3C & VDE H05RN-F 3*1.0mm² ⌀8.3)   Dimming Wire(UL21996 22AWG/3C ⌀5.0)

300±20   95   180±20
91
40   55±5   10±2
10±2   50±5   40±5
25±3
AC/L (BROWN)   BLACK/WHITE
AC/N (BLUE)   PURPLE
GND   GRAY
(YELLOW/GREEN)
Tc   39.5
V+ (BROWN)
V- (BLUE)
50±5   10±2
230±20

OUTPUT(UL SJOW 17AWG/2C & VDE H05RN-F 2*1.0mm² ⌀7.8)

36.5
64

112
106
44
28   ⌀5   5
PROJ:
104   **Unspecified tolerance:±1**

EUM-050SxxxDT

INPUT(UL SJTW 18AWG/3C ⌀7.8)   Dimming Wire(UL21996 22AWG/3C ⌀5.0)

300±20   95   180±20
91
40   55±5   10±2
10±2   50±5   40±5
25±3
AC/L (BLACK)   BLACK/WHITE
AC/N (WHITE)   PURPLE
GND (GREEN)   GRAY
Tc   39.5
V+ (RED)
V- (BLUE)
50±5   10±2
230±20

OUTPUT(UL SJTW 18AWG/2C ⌀7.3)

36.5
64

112
106
44
28   ⌀5   5
PROJ:
104   **Unspecified tolerance:±1**

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EUM-050SxxxDB

INPUT(BIS 3*1.0mm² Ø7.25)   Dimming Wire(UL21996 22AWG/3C Ø5.0)

300±20   95   180±20
91
10±2   50±5   40   55±5   10±2
                                        40±5
                                        25±3

AC/L (RED)
AC/N (BLACK)   Tc   BLACK/WHITE
GND   PURPLE
(YELLOW/GREEN)   GRAY

39.5

V+ (RED)
V- (BLACK)
50±5   10±2
230±20

36.5

64

OUTPUT(BIS 2*1.0mm² Ø6.85)

112
106
44 28   Ø5   5

104

PROJ: ⊕ ◁

Unspecified tolerance:±1

EUM-050SxxxDF

INPUT(UL1015 18AWG)   Dimming Wire(UL1430 22AWG)

270±20   95   220±20
91
10±2   40   10±2

AC/L (BLACK)   YELLOW
AC/N (WHITE)   Tc   PURPLE
GND (GREEN)   GRAY

39.5

V+ (RED)
V- (BLUE)
270±20   10±2

36.5

64

OUTPUT(UL1015 18AWG)

112
106
44 28   Ø5   5

104

PROJ: ⊕ ◁

Unspecified tolerance:±1

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.

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Revision History

Change Date	Rev.	Description of Change		
		Item	**From**	**To**
2021-01-21	A	Datasheets Release	/	/