Features

- Ultra High Efficiency (Up to 95.5%)
- Full Power at Wide Output Current Range (Constant Power)
- Adjustable Output Current (AOC) with Programmability
- Isolated 0-10V/10V PWM/Resistor/3-Timer-Modes Dimmable
- Adjustable Dimming Curve
- Dim-to-Off with Standby Power ≤ 0.5W
- Hold Time Adjustable
- Fade-Time Adjustable
- Always-on Auxiliary Power: 12Vdc, 250mA
- Output Lumen Compensation
- End-of-Life Indicator
- Input Surge Protection: DM 6kV, CM 6kV
- All-Around Protection: OVP, SCP, OTP
- IP65 and UL Dry/Damp Location (MF models)
- IP66/IP67 and UL Dry/Damp/Wet Location (MG/MT models)
- TYPE HL, for Use in a Class I, Division 2 Hazardous (Classified) Location
- 5 Years Warranty

Description

The *SUM-330SxxxMx* series is a 330W, constant-current, programmable LED driver that operates from 90-305Vac input with excellent power factor. Created for many lighting applications including Horticulture, High bay, etc. The high efficiency of this driver enables it 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 (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) (5)
						120Vac	220Vac	
610-6900	6100-6900	6100	34-54	330	95.5%	0.99	0.96	SUM-330S690Mx

Notes: (1) Output current range with constant power at 330W.
(2) Measured at 100% load and 220Vac input (see below “General Specifications” for details).
(3) Certified input voltage range: UL, FCC 100-277Vac; otherwise: 100-240Vac
(4) SELV output
(5) x = F are UL Recognized, CE (built-in-use), etc. models with flying leads; x = G are UL Recognized, CE, etc. models; x = T are UL Recognized, CE (built-in-use), etc. models. See below "Mechanical Outline" for details.

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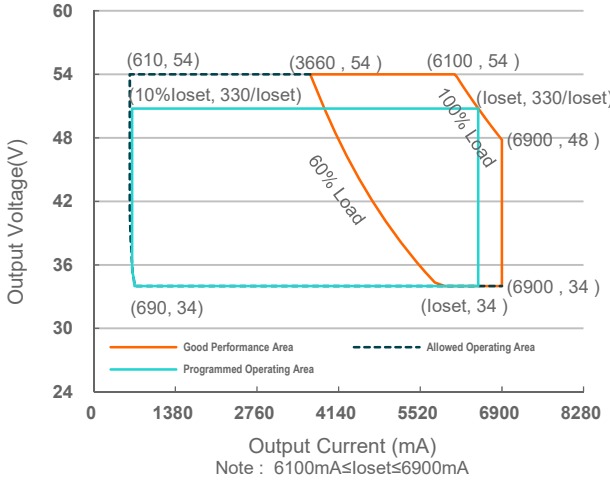
I-V Operation Area



Note : 6100mA≤Ioset≤6900mA

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	-	-	3.23 A	Measured at 100% load and 120 Vac input.
	-	-	1.74 A	Measured at 100% load and 220 Vac input.
Inrush Current(I^2t)	-	-	0.90 A^2s	At 220Vac input, 25°C cold start, duration=6.52 ms, 10%Ipk-10%Ipk.
PF	0.9	-	-	At 100-277Vac, 50-60Hz, 60%-100% load (198-330W)
THD	-	-	20%	
THD	-	-	10%	At 220-240Vac, 50-60Hz, 75%-100% load (248-330W)

Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%Ioset	-	5%Ioset	At 100% load condition
Output Current Setting (Ioset) Range SUM-330S690Mx	610 mA	-	6900 mA	
Output Current Setting Range with Constant Power SUM-330S690Mx	6100 mA	-	6900 mA	

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Output Specifications (Continued)

Parameter	Min.	Typ.	Max.	Notes
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 SUM-330S690Mx	-	-	60 V	
Line Regulation	-	-	±0.5%	Measured at 100% load
Load Regulation	-	-	±3.0%	
Turn-on Delay Time	-	-	0.5 s	Measured at 120-277Vac input, 60%-100%load
Temperature Coefficient of Ioset	-	0.03%/°C	-	Case temperature = 0°C ~Tc max
12V Auxiliary Output Voltage	10.8 V	12 V	13.2 V	
12V Auxiliary Output Source Current	0 mA	-	250 mA	Return terminal is “Dim−“
12V Auxiliary Output Transient Peak Current@ 6W	-	-	500 mA	500mA peak for a maximum duration of 2.2ms in a 6.0ms period during which time the average should not exceed 250mA.
12V Auxiliary Output Transient Peak Current@ 10W	-	-	850 mA	850mA peak for a maximum duration of 1.3ms in a 5.2ms period during which time the average should not exceed 250mA.

General Specifications

Parameter	Min.	Typ.	Max.	Notes
Efficiency at 120 Vac input: SUM-330S690Mx Io=6100 mA Io=6900 mA	 91.5% 91.5%	 93.5% 93.5%	 - -	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: SUM-330S690Mx Io=6100 mA Io=6900 mA	 93.0% 93.0%	 95.0% 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 277 Vac input: SUM-330S690Mx Io=6100 mA Io=6900 mA	 93.5% 93.5%	 95.5% 95.5%	 - -	Measured at 100% load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)
Standby Power	-	-	0.5 W	Measured at 230Vac/50Hz; Dimming off
MTBF	-	229,000 Hours	-	Measured at 220Vac input, 80%load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	-	120,000 Hours	-	Measured at 220Vac input, 80%load and 70°C case temperature; See lifetime vs. Tc curve for the details
	-	84,000 Hours	-	Measured at 120Vac input, 100%load and 40℃ ambient temperature

General Specifications (Continued)

Parameter		Min.	Typ.	Max.	Notes
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	MF models Inches (L × W × H) Millimeters (L × W × H)	14.65 × 1.71 × 1.24 372 × 43.5 × 31.5			With mounting ear 15.59 × 1.71 × 1.24 396 × 43.5 × 31.5
	MG/MT models Inches (L × W × H) Millimeters (L × W × H)	15.04 × 1.71 × 1.24 382 × 43.5 × 31.5			With mounting ear 15.98 × 1.71 × 1.24 406 × 43.5 × 31.5
Net Weight	MF models	-	1110 g	-	
	MG/MT models	-	1220 g	-	

Dimming Specifications

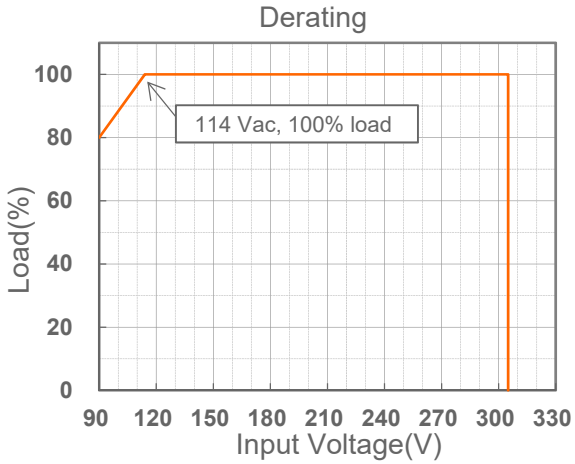
Parameter		Min.	Typ.	Max.	Notes
Absolute Maximum Voltage on the Vdim (+) Pin		-20 V	-	20 V	
Source Current on Vdim (+) Pin		90 μA	100 μA	110 μA	Vdim(+) = 0 V
Dimming Output Range	SUM-330S690Mx	10%Ioset	-	Ioset	6100 mA ≤ Ioset ≤ 6900 mA
	SUM-330S690Mx	610 mA	-	Ioset	610 mA ≤ Ioset ≤ 6100 mA
Recommended Dimming Input Range		0 V	-	10 V	Default 0-10V dimming mode.
Dim off Voltage		0.35 V	0.5 V	0.65 V	
Dim on Voltage		0.55 V	0.7 V	0.85 V	
Hysteresis		-	0.2 V	-	
PWM_in High Level		-	10V	-	.
PWM_in Low Level		-	0V	-	
PWM_in Frequency Range		200 Hz	-	3 KHz	
PWM_in Duty Cycle		0%	-	100%	
PWM Dimming off		3%	5%	8%	
PWM Dimming on		5%	7%	10%	
Hysteresis		-	2%	-	

Safety & EMC Compliance

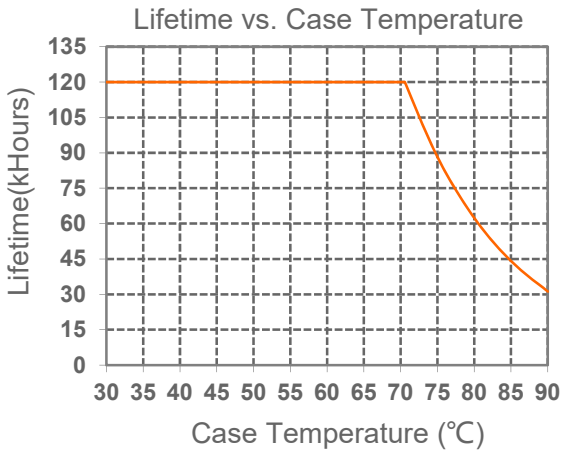
Safety Category	Standard
UL/CUL	UL 8750, CAN/CSA-C22.2 No. 250.13
CE	EN 61347-1, EN 61347-2-13
CB	IEC 61347-1, IEC 61347-2-13
EMI Standards	**Notes**
EN IEC 55015 (1)	Conducted emission Test &Radiated emission Test
EN IEC 61000-3-2	Harmonic current emissions
EN 61000-3-3	Voltage fluctuations & flicker
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): 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 6 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
ANSI Standards	**Notes**
ANSI C82.77-5	6kV combi-wave surge rating to comply with ANSI C82.77-5 CAT low

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.

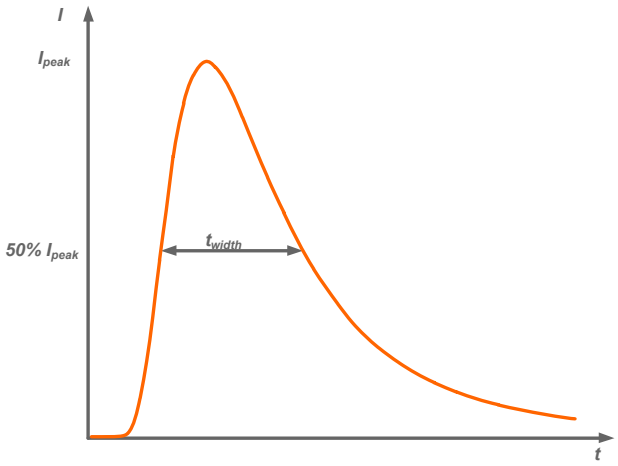
Derating



Lifetime vs. Case Temperature



Inrush Current Waveform



Input AC Voltage	I_{peak}	t_{width} (@ 50% Ipeak)
220Vac	13.6A	1.68ms

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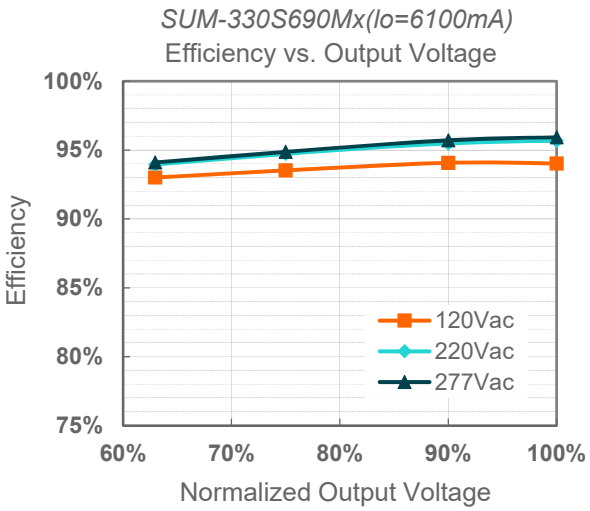
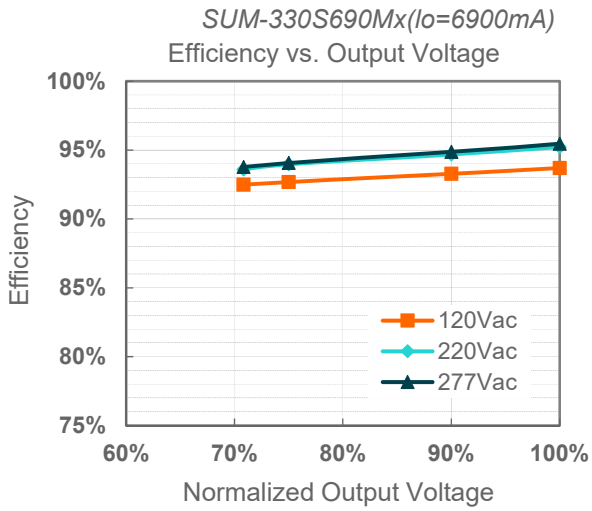
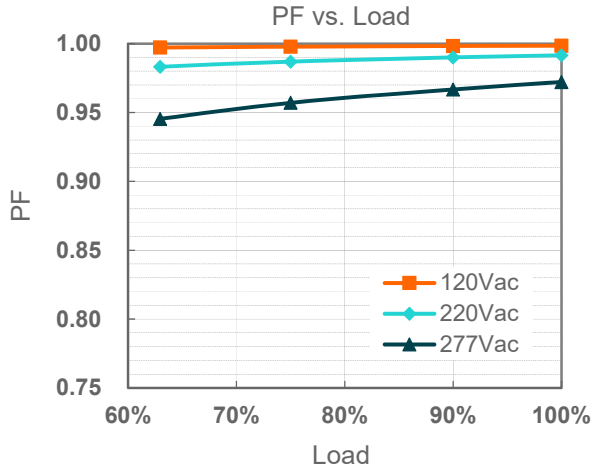
Efficiency vs. Load

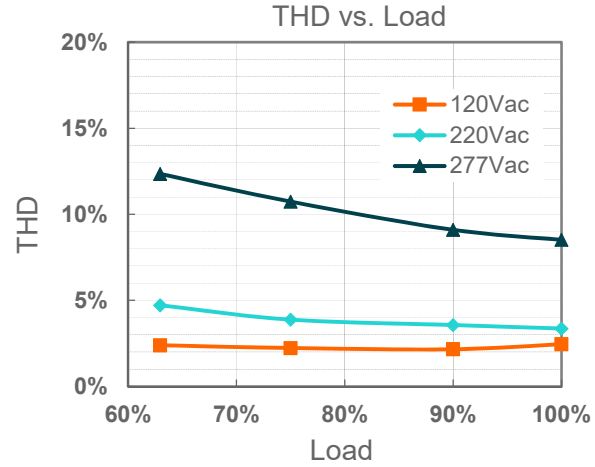




Power Factor



Total Harmonic Distortion



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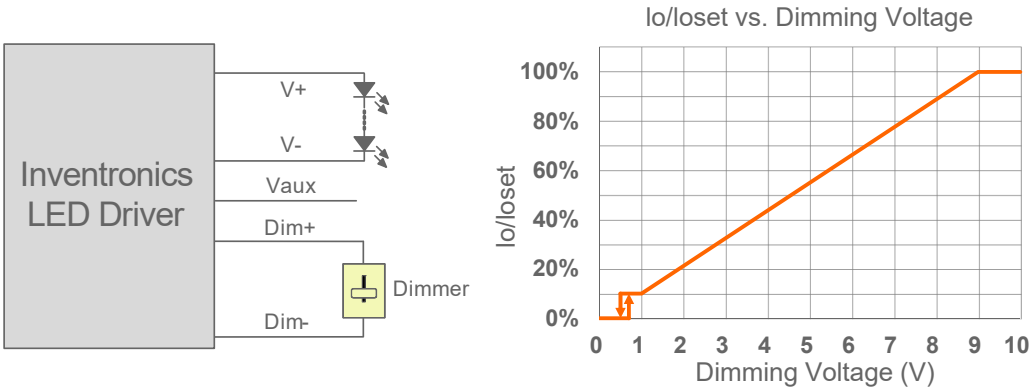
Protection Functions

Parameter	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.

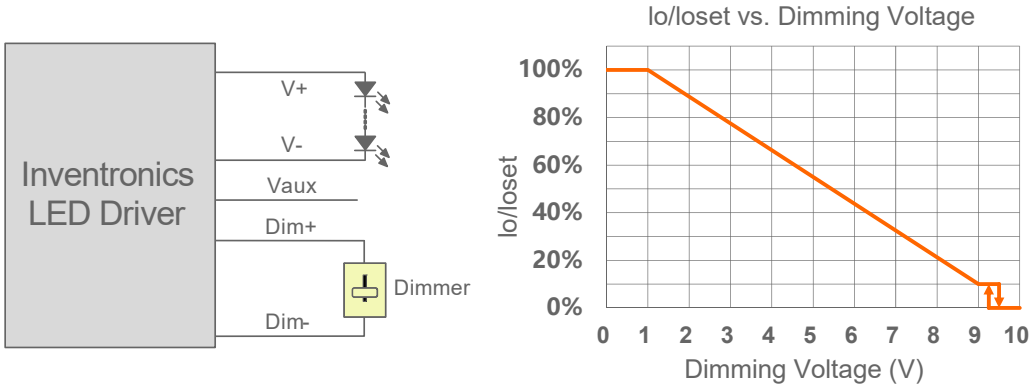
Dimming

0-10V Dimming

The recommended implementation of the dimming control is provided below.



Implementation 1: Positive logic



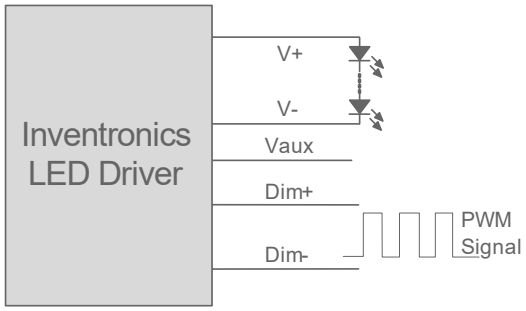
Implementation 2: Negative logic

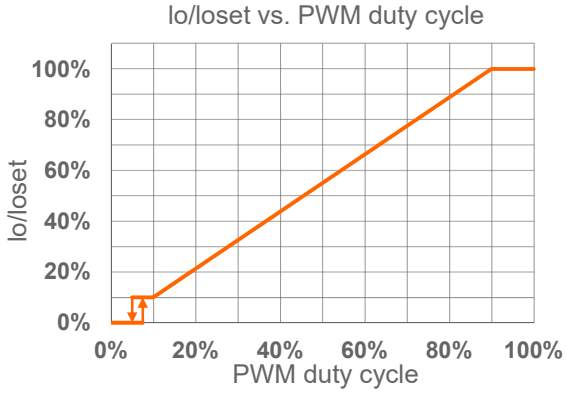
Notes:

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like zener.
3. When 0-10V negative logic dimming mode and Dim+ is open, the driver will dim to off and be standby.

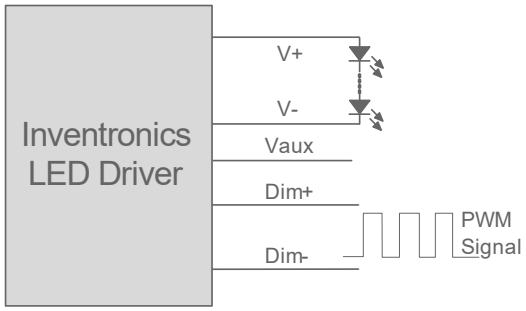
10V PWM Dimming

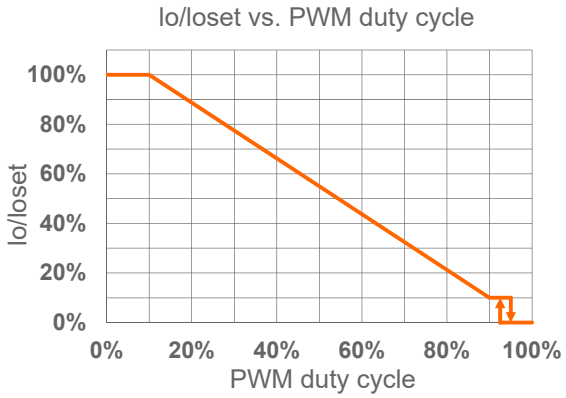
The recommended implementation of the dimming control is provided below.





Implementation 3: Positive logic





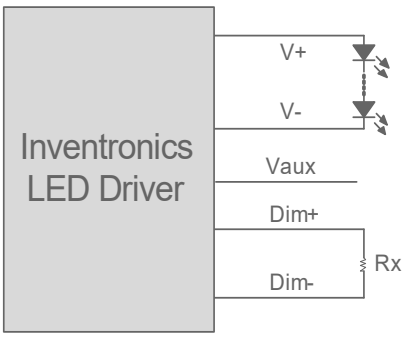
Implementation 4: Negative logic

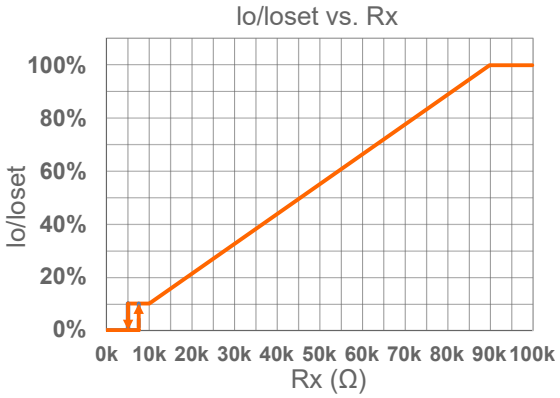
Note:

1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. When 10V PWM negative logic dimming mode and Dim+ is open, the driver will dim to off and be standby.

Resistor Dimming

The recommended implementation of the dimming control is provided below.





Implementation 5: Positive logic

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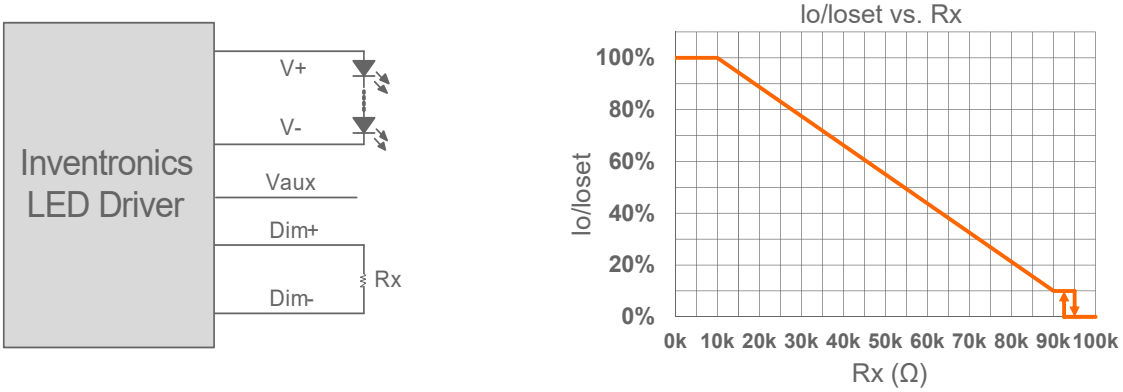
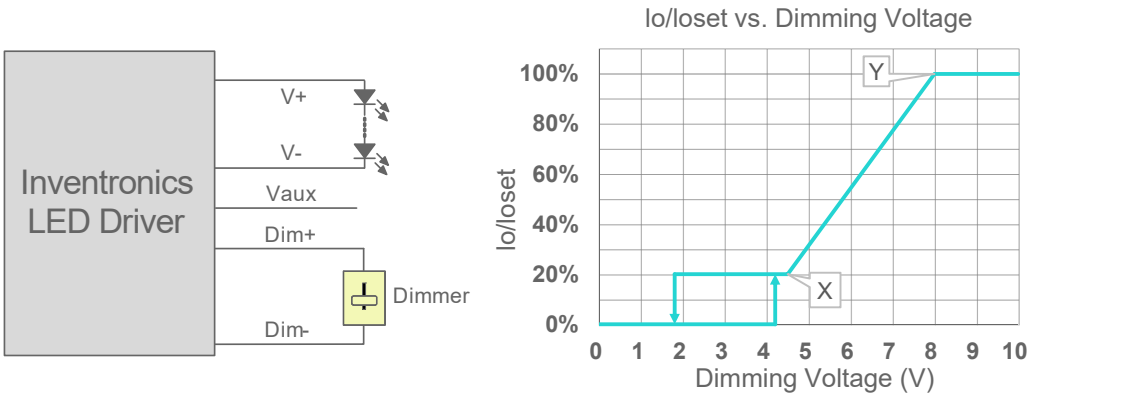


Implementation 6: Negative logic

Notes:
1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. When resistor negative logic dimming mode and Dim+ is open, the driver will dim to off and be standby.

Adjustable Dimming Curve

0-10V dimming curve can be set as corresponding dimming voltage by Inventronics Multi Programmer. Take the positive logic dimming as an example, the recommended implementation of the dimming control is provided below.



Implementation 7: Positive logic

Notes:
1. Do NOT connect Dim− to the output V− or V+, otherwise the driver will not work properly.
2. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like zener.
3. When dimming voltage X point is set to be smaller than Y point, the dimming curve is positive logic, conversely, when X point is set to be bigger than Y point, the dimming curve is negative logic.
4. For best dimming accuracy, the difference between X point and Y point is advised more than 4V.
5. Dimming off voltage adjustable.

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.

- **Hold Time Adjustable**

  When AC power is first applied to the LED driver, enabling a “Hold” period can allow devices powered by the Auxiliary voltage to stabilize before the driver fades up to the maximum dimming level. During this period, the driver will not respond to external dimming commands but will respond again after the hold time ends. Both the initial dimming percentage and the duration of this hold period can be adjusted by the Inventronics Multi Programmer. This function is disabled by default

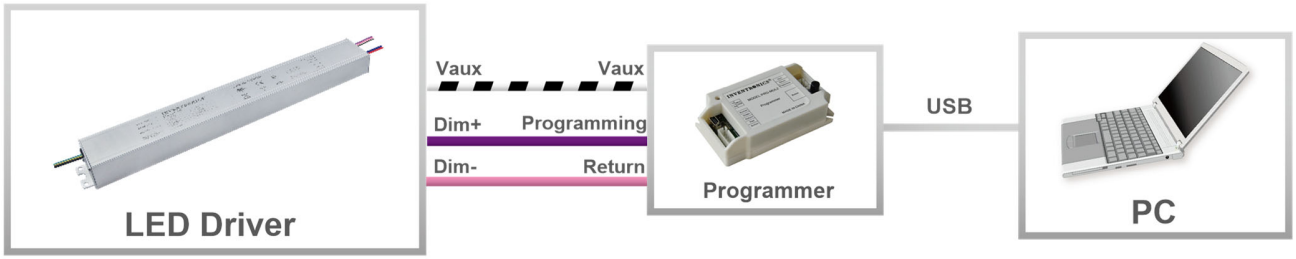
- **Fade Time Adjustable**

  There is a “Fade” period after the “Hold” period. The soft-start time and dimming slope applied to all dimming transitions can be adjusted individually. It is adjusted by the Inventronics Multi Programmer. 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 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-MUL2 (Programmer) datasheet for details.**

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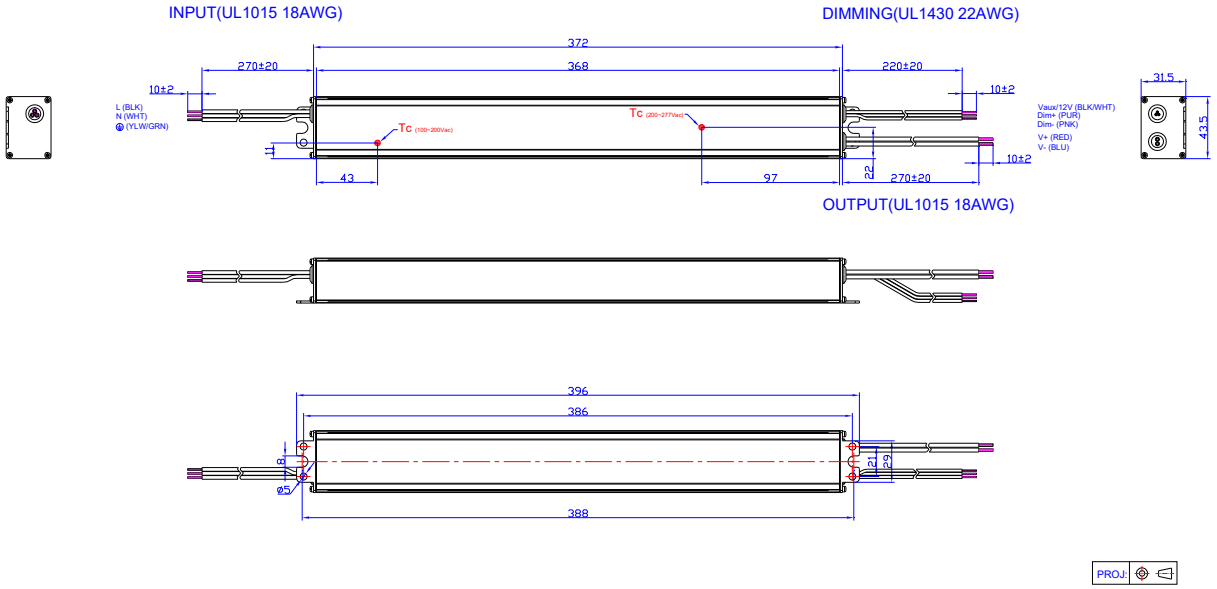
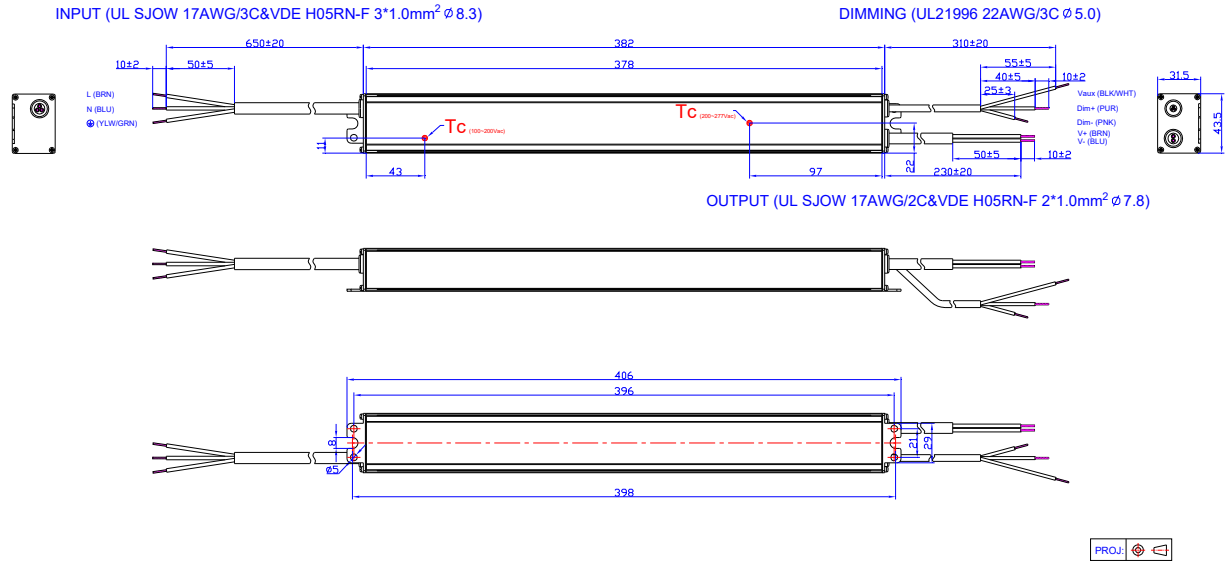
Mechanical Outline

SUM-330SxxxMF



Unspecified tolerance:±1

SUM-330SxxxMG



Unspecified tolerance:±1

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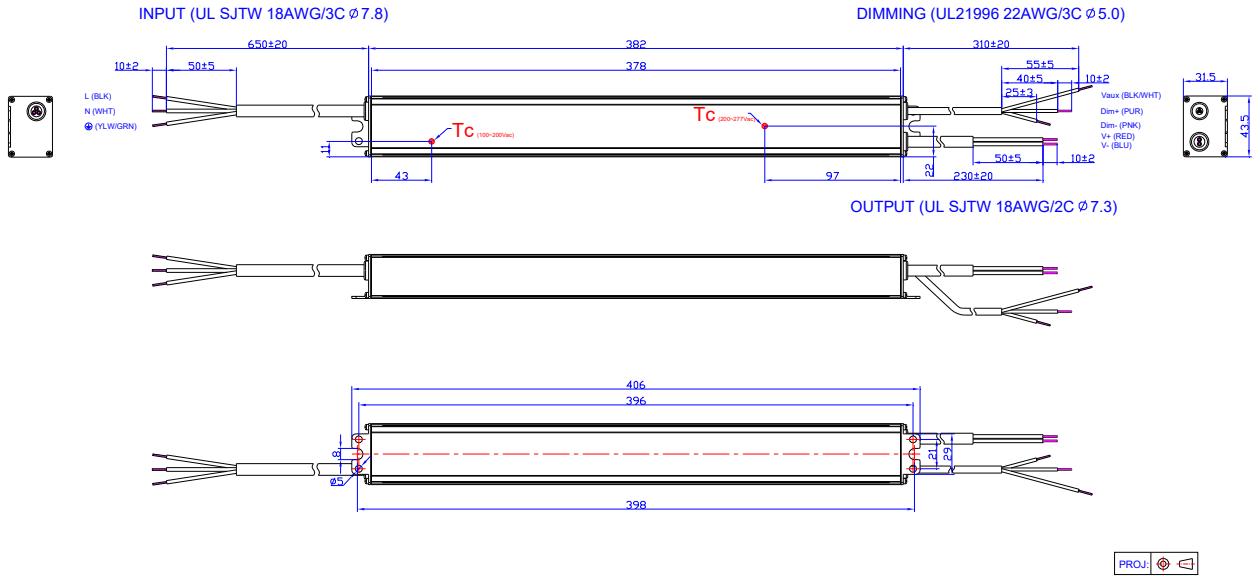
SUM-330SxxxMT



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
2022-05-27	A	Datasheet Release	/	/
2023-01-13	B	Format	/	Updated
		Independent logo	/	Added
		Features	/	Updated
		Models	/	Updated
		General Specifications	/	Updated
		Dimming Specifications	/	Updated
		Safety & EMC Compliance	/	Updated
		Inrush Current Waveform	/	Updated
		Dimming	/	Updated
		Mechanical Outline	/	Updated

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