

96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING



DIMMING
LP96W Series
96W

Model: LP96W Series

- Drive Mode: Constant Current or Constant Voltage
- Technology: PFC Corrected 2-Stage Switch Mode
- Output Power: 96W Max.
- Input Voltage: 120 to 277VAC, 47- 63Hz
- Number of Outputs: One
- Output Voltages: 12VDC - 274VDC
- Output Currents: 350mA - 4000mA
- Optional 0-10V or PWM Positive Dimming 5% to 100%

Environmental

1. Operating temperature: Tc 90C Maximum. Reference -40 to +60°C ambient
2. Storage temperature range: -40 to +85°C
3. Humidity (non-condensing): 5% - 95%RH
4. Cooling: Convection
5. Vibration Frequency: 5-55Hz/2g, 30 minutes
6. Impact resistance: 1g/s
7. MTBF@ 40°C: 474,000 hours @ Full Load per MIL-HDBK-217F Notice 2.

Safety and Compliance

1. Class P: UL8750, CSA 22.2 listed, UL Type HL
2. FCC, 47CFR Part 15 & EN55015 compliant.
3. Water resistant and Dust Proof Design: IP67, NEMA4, for Dry & Damp Locations.
4. Low AC Inrush Design.
5. Safety Isolation between Primary, Secondary & 0-10V Dimming
6. Meets EN61000-3-2 & EN61000-3-3 Class C
7. Protection: output over-voltage, output over-current, output short circuit, auto-recovery.
8. EN61000-4-5: 4kV/6kV 8/20 μsec surge protection.

Electrical Specifications at 25°C

- Input voltage range: 120 to 277Vac (Full Range 100 to 305Vac)
- Frequency: 47- 63Hz
- Power Factor: ≥ 0.90 at $\geq 60\%$ Load, 120Vac/230Vac/277Vac
- THD%: $\leq 20\%$ at $\geq 60\%$ Load, 120Vac/230Vac, $\geq 70\%$ Load, 277Vac
- Inrush current: $< 70A$ at 25C, 277V, cold start, Max. Load
- Input current: 1.01A Maximum @ 120Vac
- Efficiency: Up to 91% typical at 230Vac Full Load
- Line regulation accuracy: $\pm 3\%$
- Load regulation accuracy: $\pm 4\%$
- Leakage current: 277Vac, 750uA maximum

Mechanical Dimensions: Inches [mm]

Material: Black Aluminum Housing
Fully Encapsulated
Weight: 21.6 oz (612 grams) Typical

Labeling Example: UL Class P Listed, Type HL

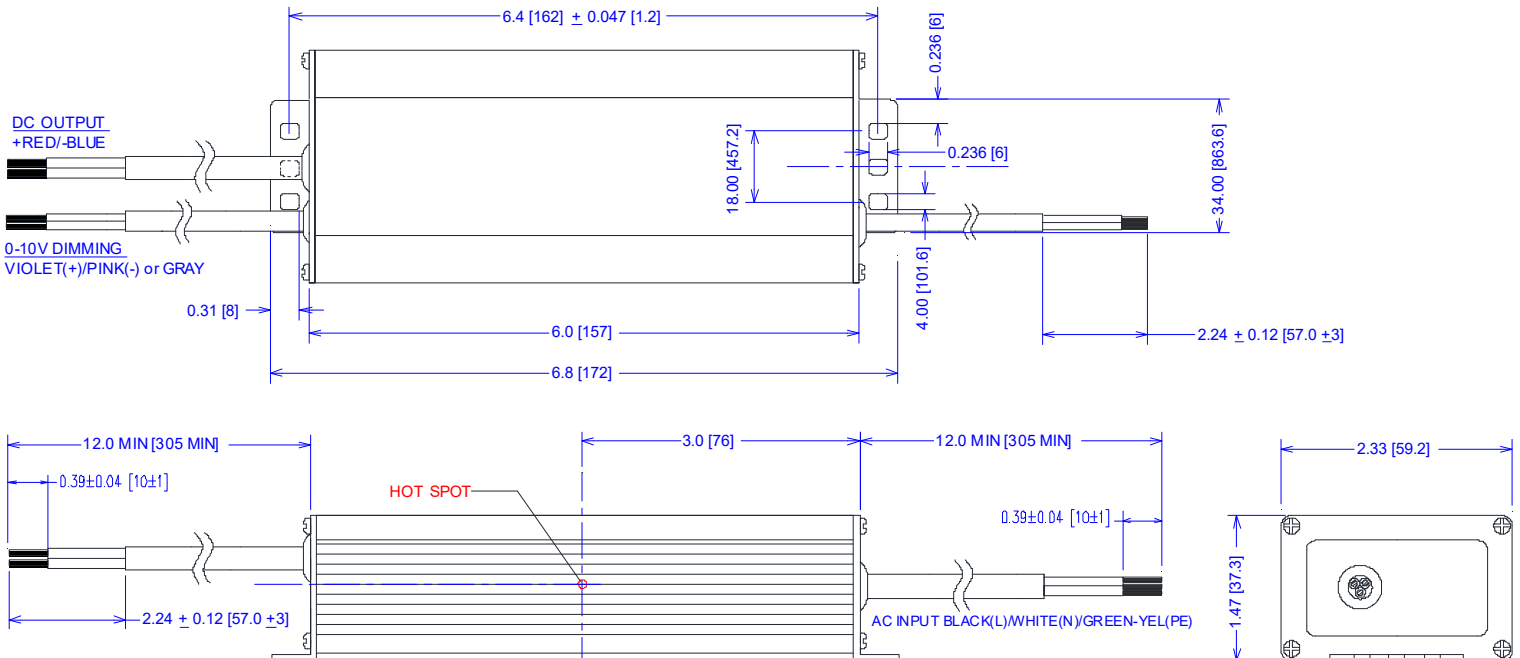
0-10V CCR Dimmable LED Optimized Driver
EPtronics, Inc.
www.EPtronics.com
800.643.0688 / 310.536.0700

Part Number: LP96W-36-C2660-PRD
Input Voltage: 120-277VAC 50/60Hz
Input Current: 1.01 Amp Max @ 120Vac
Output Voltage: 12-36 VDC, 96W Maximum
Output Current: 2660 mA Constant Current
UL & cUL Class 2 Output & 0-10V CCR Dimming
Isolated Class 2 Dimming suitable for Class 1 or 2 circuit
Suitable for use in Dry & Damp Locations, UL Type HL
UL Class P, For Connections use wire rated $\geq 90C$ (194F)

IP67 CE E
UL LISTED E325626
RoHS

0-10V DIMMING
DIM+ = VIOLET
DIM- = PINK
DC OUTPUT
+ = RED
- = BLUE

MADE IN CHINA REV B



96W

LP96W Series

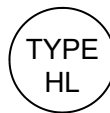
DIMMING



LED Optimized Drivers

96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING



IP67



UL Class P Constant Current Versions

Part Number ⁽²⁾	US Class 2	CN Class 2	UL Types	Output Voltage Range	Output Constant Current	Current Accuracy	Output Power Maximum	Typical Efficiency ⁽¹⁾
LP96W-274-C0350-PRD	NO	NO	HL	92 - 274 VDC	350 mA	± 5%	96W	92%
LP96W-213-C0450-PRD	NO	NO	HL	71 - 213 VDC	450 mA	± 5%	96W	92%
LP96W-137-C0700-PRD	NO	NO	HL	46 - 137 VDC	700 mA	± 5%	96W	92%
LP96W-92-C1050-PRD	NO	NO	HL	31 - 92 VDC	1050 mA	± 5%	96W	91%
LP96W-69-C1400-PRD	NO	NO	HL	23 - 69 VDC	1400 mA	± 5%	96W	91%
LP96W-54-C1750-PRD	YES	YES	HL	18 - 54 VDC	1750 mA	± 5%	96W	91%
LP96W-48-C2000-PRD	YES	YES	HL	16 - 48 VDC	2000 mA	± 5%	96W	90%
LP96W-46-C2100-PRD	YES	YES	HL	16 - 46 VDC	2100 mA	± 5%	96W	90%
LP96W-43-C2230-PRD	YES	YES	HL	15 - 43 VDC	2230 mA	± 5%	96W	90%
LP96W-39-C2450-PRD	YES	YES	HL	14 - 39 VDC	2450 mA	± 5%	96W	89%
LP96W-36-C2660-PRD	YES	YES	HL	12 - 36 VDC	2660 mA	± 5%	96W	89%
LP96W-34-C2800-PRD	YES	YES	HL	12 - 34 VDC	2800 mA	± 5%	96W	89%
LP96W-30-C3150-PRD	YES	YES	HL	10 - 30 VDC	3150 mA	± 5%	96W	89%
LP96W-27-C3500-PRD	YES	YES	HL	9 - 27 VDC	3500 mA	± 5%	96W	88%
LP96W-24-C4000-PRD	YES	YES	HL	8 - 24 VDC	4000 mA	± 5%	96W	88%

UL Class P Constant Voltage Versions

Part Number	US Class 2	CN Class 2	UL Types	Output Constant Voltage	Output Current Range	Voltage Accuracy	Output Power Maximum	Typical Efficiency ⁽¹⁾
LP96W-274-P	NO	NO	HL	274 VDC	88 - 350 mA	± 5%	96W	92%
LP96W-213-P	NO	NO	HL	213 VDC	113 - 450 mA	± 5%	96W	92%
LP96W-137-P	NO	NO	HL	137 VDC	175 - 700 mA	± 5%	96W	92%
LP96W-92-P	NO	NO	HL	92 VDC	263 - 1050 mA	± 5%	96W	91%
LP96W-69-P	NO	NO	HL	69 VDC	350 - 1400 mA	± 5%	96W	91%
LP96W-54-P	YES	YES	HL	54 VDC	438 - 1750 mA	± 5%	96W	91%
LP96W-48-P	YES	YES	HL	48 VDC	500 - 2000 mA	± 5%	96W	90%
LP96W-46-P	YES	NO	HL	46 VDC	525 - 2100 mA	± 5%	96W	90%
LP96W-43-P	YES	YES	HL	43 VDC	558 - 2230 mA	± 5%	96W	90%
LP96W-39-P	YES	YES	HL	39 VDC	613 - 2450 mA	± 5%	96W	89%
LP96W-36-P	YES	YES	HL	36 VDC	665 - 2660 mA	± 5%	96W	89%
LP96W-34-P	YES	YES	HL	34 VDC	700 - 2800 mA	± 5%	96W	89%
LP96W-30-P	YES	YES	HL	30 VDC	788 - 3150 mA	± 5%	96W	89%
LP96W-27-P	YES	YES	HL	27 VDC	875 - 3500 mA	± 5%	96W	88%
LP96W-24-P	YES	YES	HL	24 VDC	1000 - 4000 mA	± 5%	96W	88%

Notes

- Typical efficiency measured at 230VAC input, full load
- PRD 0-10V standard dimmable part numbers shown. For other versions change designator at the end of the part number. For Example: LP96W-24-C4000-P is non-dimmable version, LP96W-24-C4000-PPD is PWM dimmable version.
-PRD 0-10V & Resistance dimmable version comes with an extra two wires +VIOLET/-PINK on the output side. (Legacy DIM- = GRAY)
-PPD PWM Dimmable version comes with an extra two wires +VIOLET/-PINK on the output side. (Legacy DIM- = GRAY)
- PRD 0-10V Dimming is compatible with most quality 0-10V wall dimmers and direct 0-10V analog signal. See page 3 for details.
- PPD PWM version is PWM Dimmable via a positive 0% to 100% Duty Cycle, 500Hz to 1.5kHz, 0-10V Pulse. See page 4 for details.

Specifications subject to change without notice

Custom designs available. Please consult with the factory.

96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

DIMMING
LP96W Series
96W

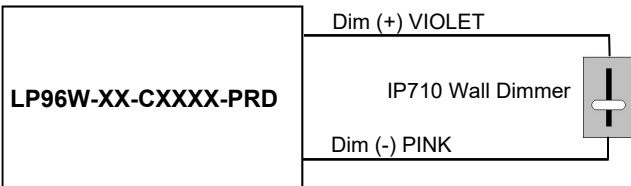
-RD 2-Wire 0-10V CCR Dimming Scheme

Parameters	Minimum	Typical	Maximum
Source Current out of 0-10V VIOLET Wire	0uA	—	250uA
Absolute Voltage Range on 0-10V (+) VIOLET Wire	-2.0V	—	+15V

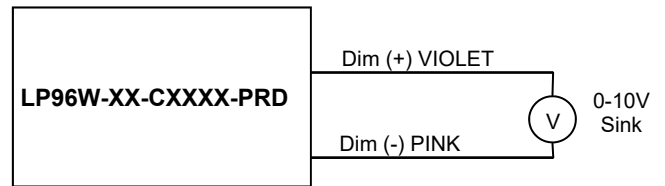
Notes

1. -RD 0-10V dimmable version comes with an extra two wires +VIOLET/-PINK on the output side.
2. -RD version is compatible with most 0-10V Wall Slide dimmers and direct 0-10V analog signal.
Recommended wall slide dimmer is Leviton IP710 or equivalent
3. -RD 0-10V dimmable version will be $\leq 5\%$ @ $\leq 1.0V$ or with VIOLET/PINK Shorted.
4. -RD 0-10V dimmable version output will be 100% with VIOLET/PINK open and minimum with VIOLET/PINK Shorted.

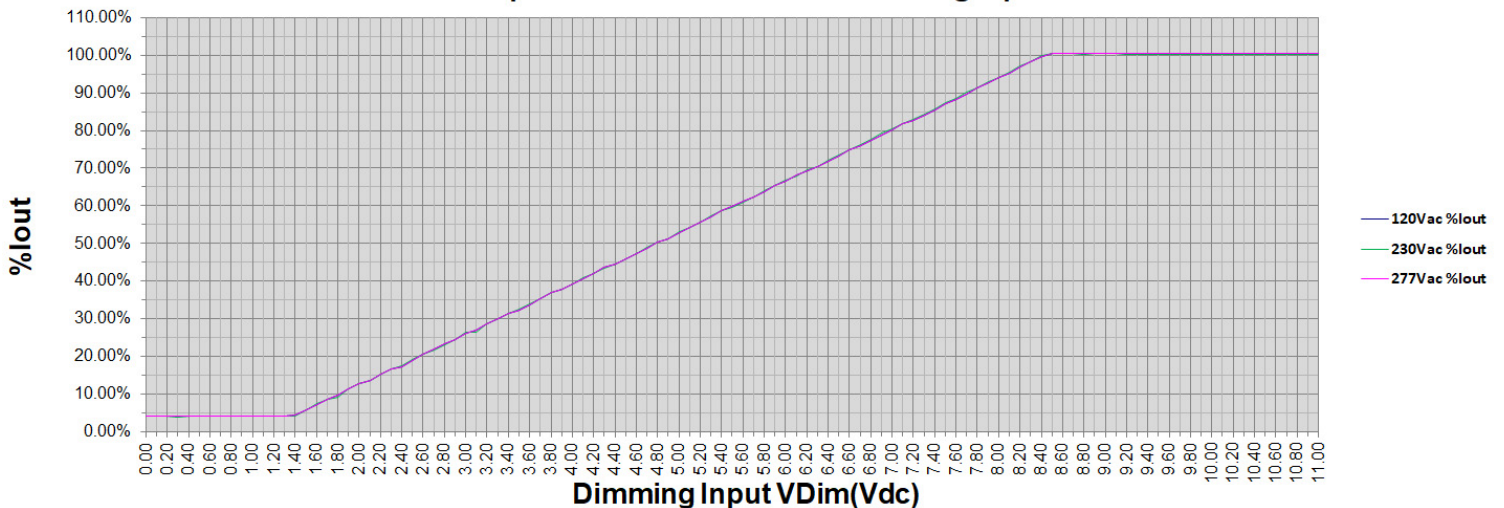
-RD 2-Wire Resistance Dimming Scheme



-RD 2-Wire 0-10V Analog Dimming Scheme



% Output Current Vs. 0-10V DC Dimming Input



96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

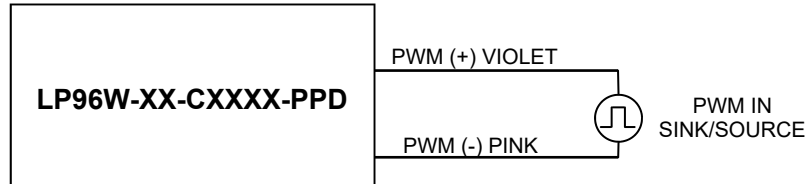
-PD 2-Wire CCR PWM Positive Dimming Scheme

Parameters	Minimum	Typical	Maximum
Absolute Maximum Voltage Range on PWM Input (VIOLET Wire)	-2.0V	10V	+15V
Input LOW Level Voltage Range (VIOLET Wire)	-2.0V	0V	+5.5V
Input HIGH Level Voltage Range (VIOLET Wire)	+9.0V	10V	+15V
Source Current out of PWM Input (VIOLET Wire)	0uA	—	250uA
Sink Current into PWM Input (VIOLET Wire)	0uA	—	25uA
PWM Input Signal Frequency	500Hz	—	1500Hz
PWM Input Signal Positive Duty Cycle	0%	10-90%	100%

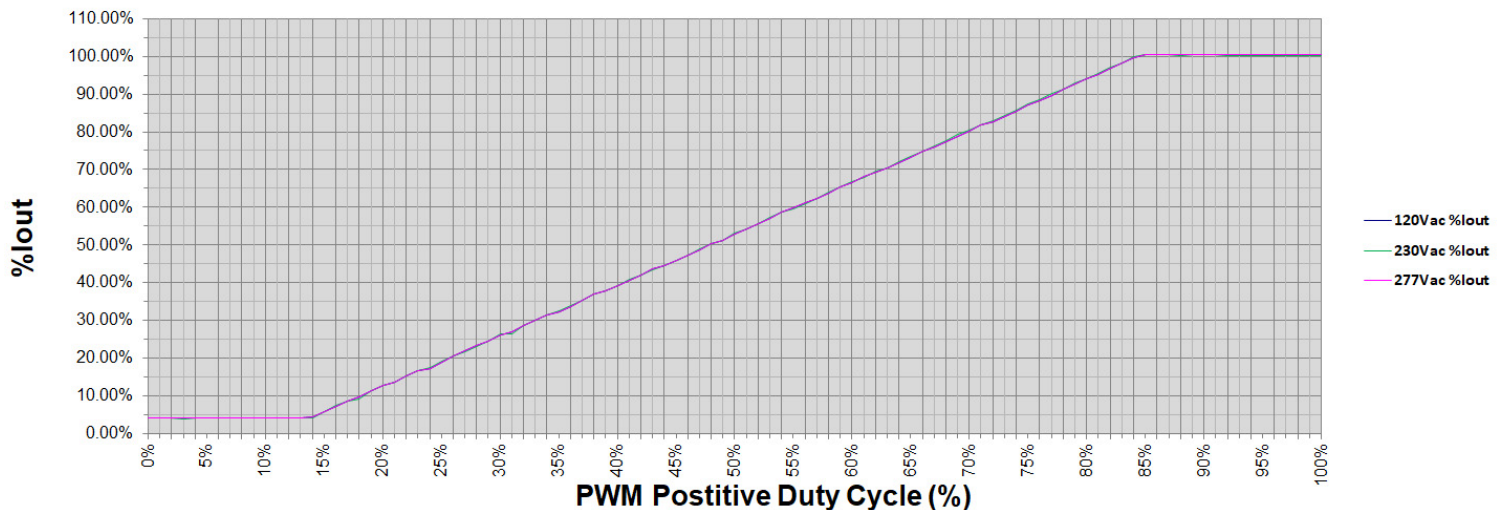
Notes

1. -PD PWM Dimmable version comes with an extra 2 wires +VIOLET/-PINK on the output side.
2. -PD PWM dimmable version will be $\leq 5\%$ @ $\leq 10\%$ Duty Cycle or with VIOLET/PINK Shorted
3. -PD PWM dimmable version output will be 100% with VIOLET/PINK open and minimum with VIOLET/PINK Shorted.

-PD 2-Wire PWM Positive Dimming Scheme



% Output Current Vs. 1.0KHz Positive Duty Cycle Dimming Input



96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

Input Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Input Voltage	100 Vac	—	305 Vac	120, 230, 240, 277 Vac Nominal Values
Input Frequency	47 Hz	—	63 Hz	50/60Hz Nominal
Input AC Current	—	—	1.01 A	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.50 A	Measured at 277Vac/60Hz Input, Output Full load.
Inrush Current (Peak) I _{pk} 10%P _w @120V≤340usec I _{pk} 10%P _w @277V≤660usec	—	—	55 A	Measured at 120Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start
	—	—	70 A	Measured at 277Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start
Leakage Current	—	—	0.68mA	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.75mA	Measured at 277Vac/60Hz Input, Output Full load.
THD	—	—	20%	Measured at 120/230Vac ≥ 60% Load, 277Vac ≥ 70% Load
Power Factor (PF)	0.90	—	—	Measured at 120/230/277Vac ≥ 60% Load

Output Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
DC Output Voltage	Per Table	—	Per Table	Per Tables on Page 2
DC Output Constant Current	-5%	Per Table	+5%	Per Tables on Page 2
Output Power	—	—	Per Table	Per Tables on Page 2
Ripple & Noise (V _{pk-pk})	—	—	5% V _o	20 MHz BW, Full load output in parallel with 0.1 μF ceramic & 10 μF Electrolytic.
Ripple (I _{pk-pk})	—	—	5% I _o	20 MHz BW, Full load output in parallel with 0.1 μF ceramic & 10 μF Electrolytic. 120 Hz component (Flicker Free)
Start-up Time	—	—	500 mS	Measured at 120Vac/60Hz Input, Output Full load.
Hold-up Time	—	40 mS	—	Typical @ 277Vac Input, Output Full load.

Environmental Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Case Temperature (T _c)	-40 °C	—	+90 °C	Measured at location specified on case.
Operating Temperature (T _a)	-40 °C	—	+60 °C	This is a reference range. T _c controls temperature range.
Storage Temperature (T _s)	-40 °C	—	+85 °C	Non operating temperature range.
Operating Humidity	—	—	95% RH	Relative Humidity, non-condensing.
Vibration	5 Hz	—	55 Hz	2G, 10 minutes/1 cycle, period 30 minutes, each along X, Y, Z axis.
MTBF	474,000 Hours	—	—	MIL-HDBK-217F Notice 2, T _a = 25C, Output Full Load.

Protection Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Output Short Circuit (SCP)	—	—	—	No Damage, Auto recovery after short is removed.
Output Over Current (OCP)	—	—	+8% I _o	Constant Current Limiting circuit.
Output Over Voltage (OVP)	—	—	120% V _o	No Damage, Auto recovery after fault is removed.

96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

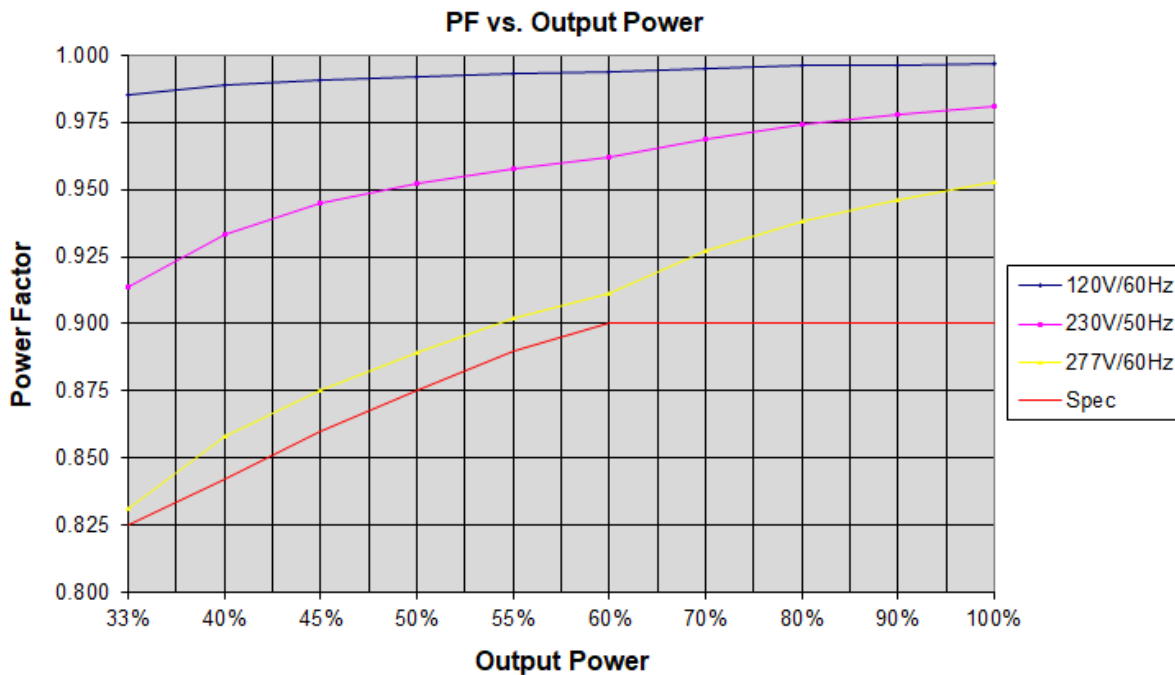
Safety Compliance

Safety	Notes/Standards
UL/CUL Listed UL Class P	UL8750 & CAN/CSA C22.2 No. 250.13, UL Class P, UL Type HL
CE	EN61347-1, EN61347-2-13, EN62493
Dielectric Withstand Voltage	Input to Output & Dimming: 3750 Vac (CE, ENEC covers UL 2000V requirement) Dimming to Output: 2500 Vac
Isolation Resistance	Input to Output: >100 M Ω , 500VDC @ 25 °C, 70 % RH
0-10V Class 2 Isolated Dimming Circuit	Dim+ VIOLET/Dim- PINK are Class 2 Isolated from all other inputs & outputs. 0-10VDC Dimming suitable for Class 1 or Class 2 circuit.
FG	The metal case of the driver must be connected to earth ground (FG) in the end-use application.
Sound Rating	<24dB Class A @ 1 Meter

EMC Compliance

Standard	Notes/Conditions
FCC, 47 CFR Part 15 ANSI C63.4	Class B @120Vac, Class A @ 277Vac
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment.
EN 61000-3-2	Part 3-2: Limits for harmonic current emissions Class C, $\geq 80\%$ Rated Power
EN 61000-3-3	Part 3-3: Limitation of voltage changes, voltage fluctuations and flicker.
EN 61000-4-5	Part 4-5: Surge Immunity test, 4kV L-N, 6kV L-FG & N-FG
Energy Star	Energy Star transient protection: Ballast or driver shall comply with ANSI/IEEE C62.41.1-2002 and ANSI/IEEE C62.41.2-2002, Category A operation. The line transient shall consist of seven strikes of a 100 kHz ring wave, 2.5 kV level, for both common mode and differential mode. 2.5kV L-N, 5.0kV L-G & N-G

Power Factor Curves (Typical)



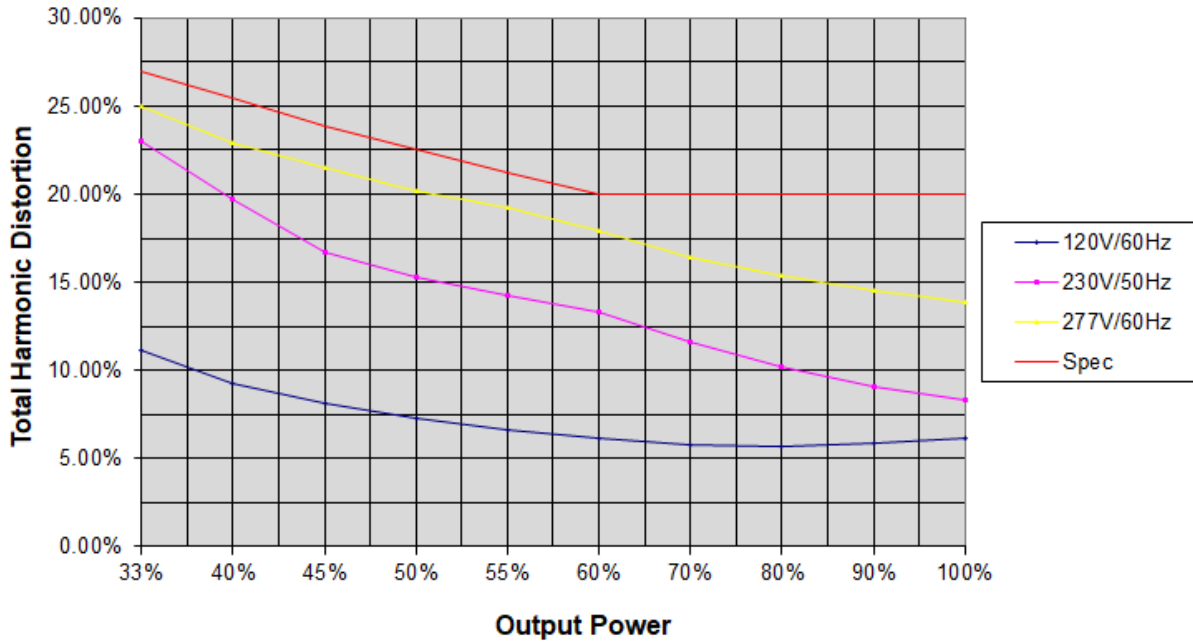
96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

DIMMING
LP96W Series
96W

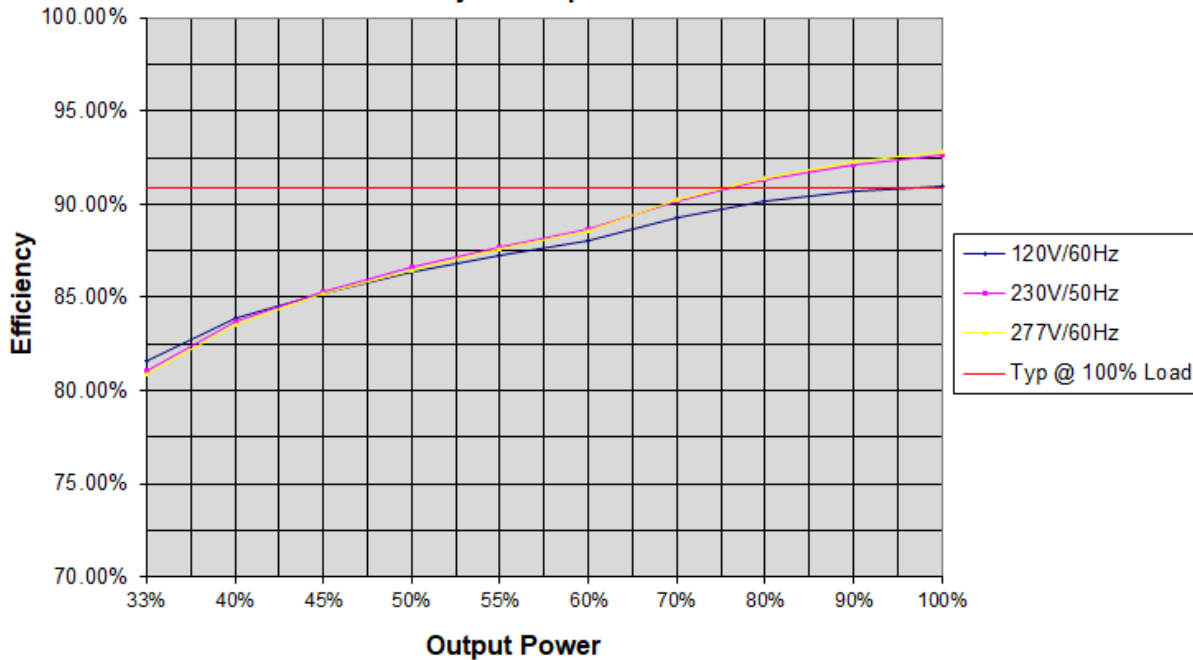
THD Curves (Typical)

THD vs. Output Power



Efficiency Curve (Typical)

Efficiency vs. Output Power



96W

LP96W Series

DIMMING



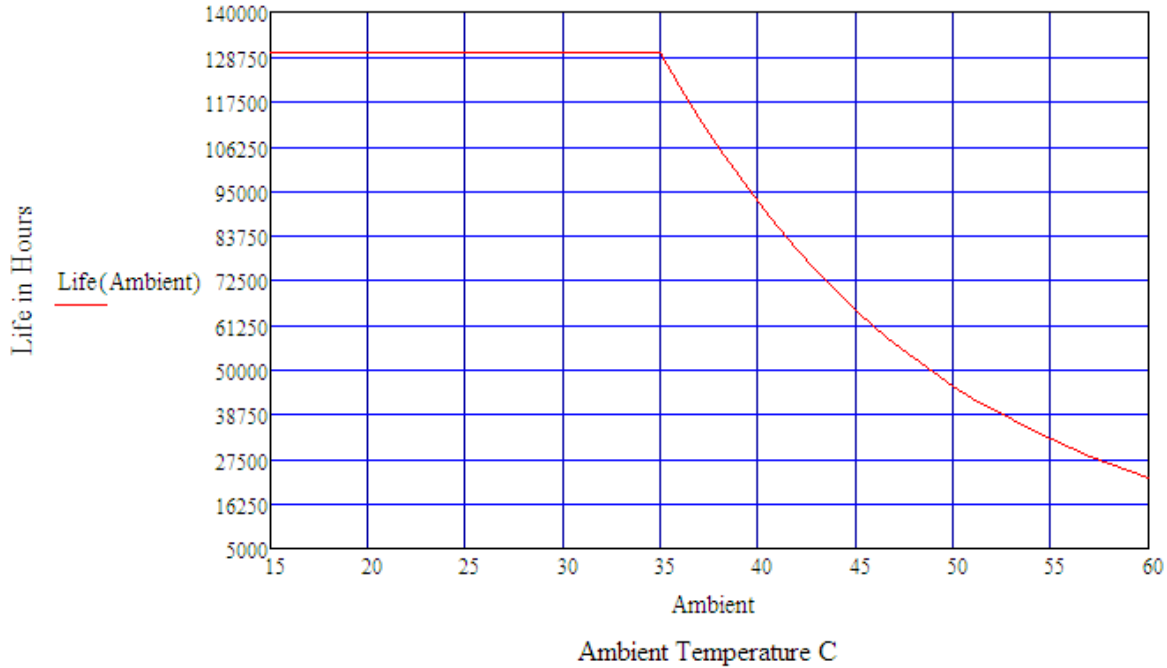
LED Optimized Drivers

96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

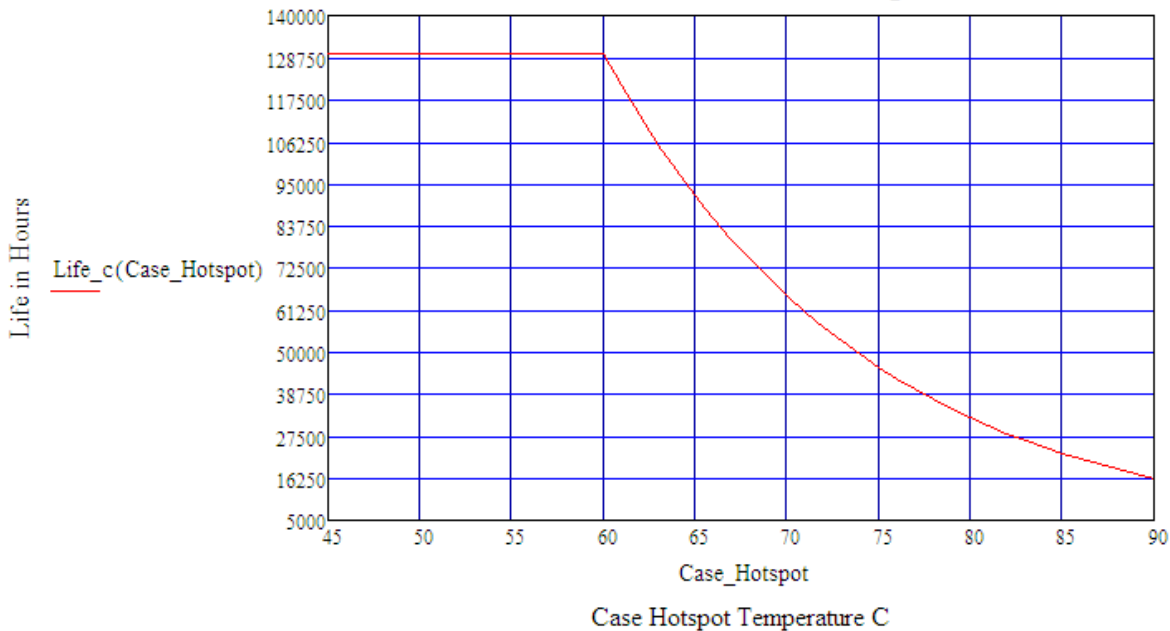
Life vs. Ambient Temperature

LP96W Estimated Life Full Load @ 120Vac



Life vs. Case (Tc) Temperature

LP96W Estimated Life Full Load @ 120Vac





LED Optimized Drivers

96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

DIMMING
LP96W Series
96W

Revision History

REV - Change Date	Description of Changes		
	Items	Changed From	Changed To
REV B - 11/01/2020	Initial preliminary spec release	REV A1.3	REV B Output & Dim lead positions changed
REV B - 06/18/2021	DIM Wire Colors	PURPLE/GREY	VIOLET/PINK, per NEMA 100
REV B - 12/20/2021	Inrush Current Page 1 & 5	Old Values	Corrected to proper values

96W

LP96W Series

DIMMING



LED Optimized Drivers

96 Watt - LP96W Series

CONSTANT VOLTAGE OR CONSTANT CURRENT LED DRIVER WITH DIMMING

