

40 Watt - LP40W-56-PC1500-RD

FLICKER FREE PROGRAMMABLE LED DRIVER WITH 0-10V DIMMING & 12V AUX



PROGRAMMABLE
LP40W
40W

Model: LP40W Series

- Drive Mode: Flicker Free Programmable Constant Current
- Output Voltage: 12 - 56VDC
- Output Current: GUI Programmable
- Programmable Output Current (POC): 300 - 1500mA
- 0-10V Linear or LOG Dim Curves, Dimming 1% - 100%^(B)
- Dim to Zero? YES/NO setting.^(C)
- Soft Start? YES/NO setting.^(D)
- Auxiliary Output: 12V @ 200mA Max.

Environmental

1. Operating temperature: Tc 90C Maximum. Reference -40 to +40°C ambient
2. UL Listed, UL Class P
3. Storage temperature range: -40 to +85°C
4. Humidity (non-condensing): 5% - 90%RH
5. Cooling: Convection
6. Vibration Frequency: 5-55Hz/2g, 30 minutes
7. Impact resistance: 1g/s
8. MTBF@ 25°C: 382,000 hours @ Full Load per MIL-HDBK-217F Notice 2.

Safety and Compliance

1. UL8750, EN61347, CSA 22.2 safety listed, UL Class P
2. FCC, 47CFR Part 15 Class A certified
3. Damp & Dust resistant design IP20 NEMA1, for Dry & Damp Locations.
4. Rectangular style metal case with or without mount studs.
5. Safety Isolation between Primary, Secondary & 0-10V Dim
6. Meets EN61000-3-2 & EN61000-3-3 Class C
7. Protection: Output over-voltage, Output over-current, Output short circuit, Over Temperature, auto-recovery.
8. EN61000-4-5: 2kV/4kV 8/20 μsec transient protection.

Electrical Specifications at 25°C

- Input voltage range: 120-277Vac (Full range 108 to 305Vac)
- Frequency: 47 - 63HZ
- THD%: ≤ 20% at 120/230/277Vac ≥ 20% Load
- Power Factor: ≥ 0.90 at 120/230Vac ≥ 25% Load, 277Vac ≥ 40% Load
- Inrush current: <15A at 25C, 277Vac, cold start, Max. Load
- Input current: 0.41A Maximum @ 120Vac
- Efficiency: 83% typical at 230Vac Full Load
- Constant Current regulation: ± 2% Over Input Line Variation
- Load regulation accuracy: ± 3%
- Leakage current: 700uA Max. @ 277Vac

Programmable Parameters

Programmable Parameter	Programmable Minimum Value	Programmable Maximum Value	Factory Default	GUI Programmable
Output Constant Current (Iout) ^(A)	300mA	1500mA	700mA	YES
Disable Dimming?	NO	YES	NO	YES
Dimming Curves: LINEAR or LOG ^(B)	1% (Min Dim)	N/A Fixed 100%	LIN, 1% (Min Dim)	YES
Dim to Zero? ^(C)	NO	YES	NO	YES
Soft Start? ^(D)	NO	YES	NO	YES
NTC Minimum Ohms ⁽⁴⁾	1K Ω	10K Ω	2K Ω	YES
NTC Minimum %Iout	~ 0%	100%	~ 10%	YES
NTC Maximum Ohms ⁽⁴⁾	2K Ω	10K Ω	6.3K Ω	YES
Constant Lumen Output Lookup Table	1kHours/50% Iout	254k Hours/100%, Max 8 entry Lookup Table	Disabled	YES
End of Life Indicator	1k Hours	254k Hours	Disabled	YES

A. Output Current: Set using EP-PRG-01 USB Programmer interface & EPtronics PC based GUI Software.

Programmable Output Current (POC): 300 - 1500mA Power limited to 40W by Voltage foldback.

B. Minimum Dimming current: If Dim to Zero = NO then Min Dim is 3mA or 1%, or % Set whichever is greater.

C. Dim to Zero?: If YES then will always dim to 0mA at Vdim ≤ 1.00V regardless of Min Dim% Setting.

D. Soft Start?: See page 8. NO, startup <500ms. YES, time to first light (100mA) <500ms, aesthetic fade on to 100% programmed Iout will be ~ 3500ms. Start-up time & Soft Start time are set to meet CA Title 24-2016.

Programmable Constant Current Version



IP20



Part Number ⁽¹⁾	US/CN Class 2	Output Voltage Range	Output Constant Current ⁽³⁾⁽⁴⁾	Current Accuracy	Output Power Maximum ⁽²⁾	Typical Efficiency ⁽²⁾
LP40W-56-PC1500-RD	YES	12 - 56 VDC	300 mA to 1500 mA	± 5%	40W	84%

- Notes:**
1. For alternate case style with 2 each #8-32 Studs add "S" to end of part number: LP40W-56-PC1500-RDS. Refer to drawing on Page 3. Standard case color is Black. For White case add "W" to the end of the part number: LP40W-56-PC1500-RDW or LP40W-56-PC1500-RDSW
 2. Typical efficiency measured at 230VAC input, Iout 1.0A, full load
 3. Keep POC (Programmable Output Current) within 40W Maximum Power Operating Window. Refer to Power Operating Window graph on page 8. Part will foldback output current to maintain power limit.
 4. NTC Minimum value set must not exceed 70% of Maximum value set. See page 9 for NTC graph.

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LED Optimized Drivers

40 Watt - LP40W-56-PC1500-RD

FLICKER FREE PROGRAMMABLE LED DRIVER WITH 0-10V DIMMING & 12V AUX

Mechanical Dimensions: Inches [mm]

Material: Metal Housing
Weight: 7.7 oz (218 grams) Typical
Case must be grounded in end use application

Standard Housing: LP40W-56-PC1500-RD

Standard case color is black.
For white case add "W" to the end of the part number:
LP40W-56-PC1500-RDW

Labeling Example

Programmable LED Optimized Driver
EPtronics, Inc.
www.EPtronics.com
800 643-0688/310 536-0700

Part Number: LP40W-56-PC1500-RD
Input Voltage: 120-277VAC 50/60Hz
Input Current: 0.56 Amp Max
Output Voltage: 12-56 VDC, 25W Max
Output Current (POC): 300-1500 mA (Default 700mA)
Programmable NTC and 0-10V CCR Dimming Curves
UL & cUL Class 2 Output & Class 2 0-10V Dimming
Isolated Class 2 Dim suitable for Class 1 or Class 2 circuit
Suitable for use in Dry & Damp Locations
UL Class P, For Connections use wire rated ≥ 90C (194F)

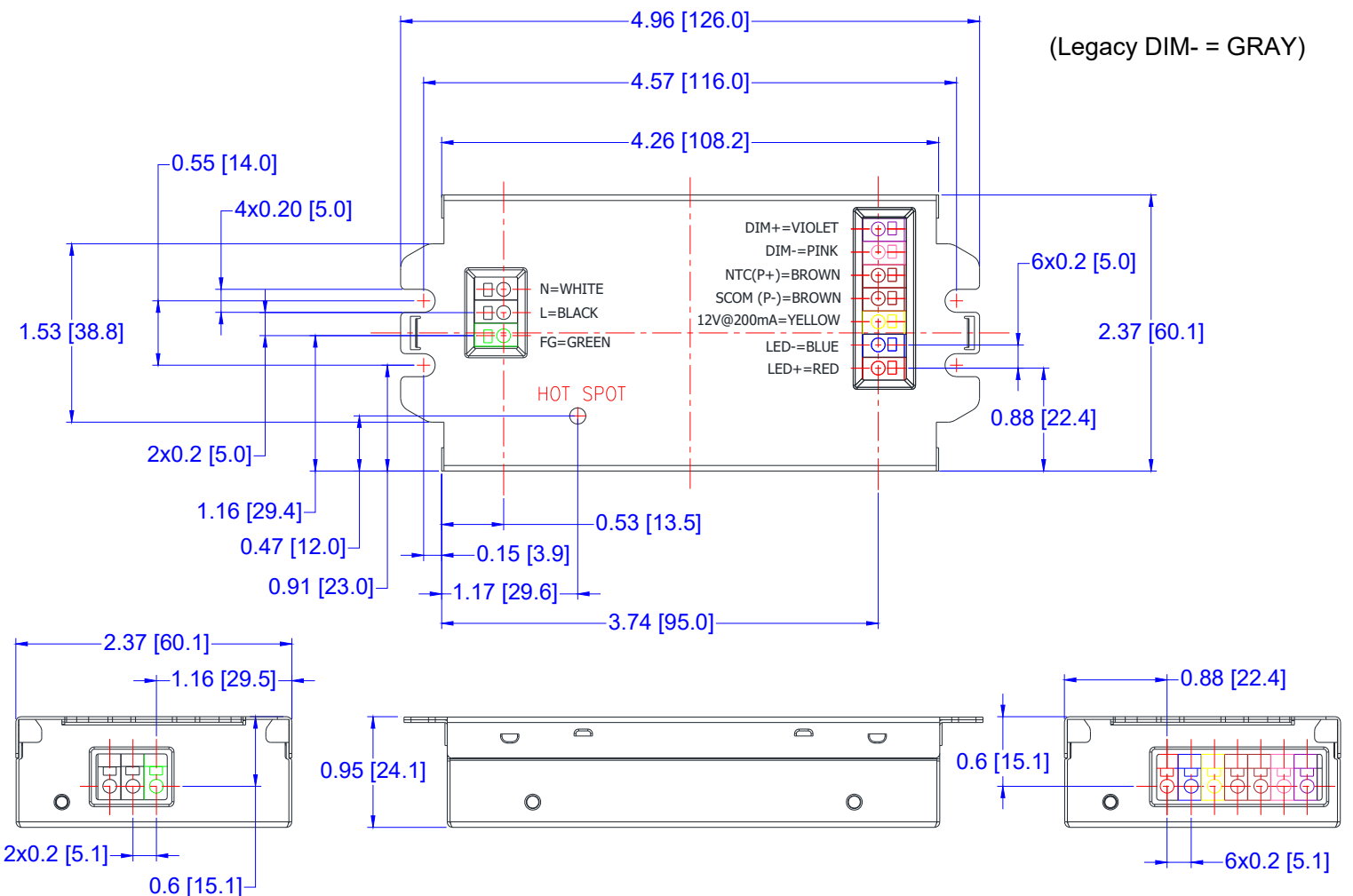
AC INPUT Fg = GREEN
L = BLACK
N = WHITE

OUTPUT & CONTROLS
 LED+ = RED
 LED- = BLUE
 12V@200mA = YELLOW
 SCOM (P-) = BROWN
 NTC (P+) = BROWN
 0-10V DIM- = PINK
 0-10V DIM+ = VIOLET

GROUNDING:
 Driver case must be grounded.
 Connector Wiring:
 Use 18 AWG Solid Wire rated
 ≥300V

FC IP20 **UL** LISTED E325826

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Case Parameter	Inches [mm]
Length	4.96 [126]
Width	2.37 [60.1]
Height	0.95 [24.1]
Connectors	UL, KF253, WAGO 253 Push Pin or equivalent.

LED wiring distance:

Recommended maximum wiring distance:
26.70V@1500mA with ~5% Vout Drop.

AWG	#22	#21	#20	#19	#18	#16
Distance (m)	8.4	10.6	13.4	16.8	21.2	33.8
Distance (ft)	27.6	34.8	43.8	55.3	69.7	110.8

40 Watt - LP40W-56-PC1500-RD

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Mechanical Dimensions: Inches [mm]

Material: Alternate Metal Housing
 Weight: 7.7 oz (218 grams) Typical
 Case must be grounded in end use application
 Includes 2x#8-32 Threaded studs for mounting.
 No side connectors.

Alternate Housing: LP40W-56-PC1500-RDS Includes 2x#8-32 Studs for mounting, No side connectors.

Standard case color is black.
 For white case add "W" to the end of the part number: LP40W-56-PC1500-RDSW

Labeling Example

Programmable LED Optimized Driver
 EPtronics, Inc.
 www.EPtronics.com
 800 643-0688/310 536-0700

Part Number: LP40W-56-PC1500-RDS
 Input Voltage: 120-277VAC 50/60Hz
 Input Current: 0.56 Amp Max
 Output Voltage: 12-56 VDC, 25W Max
 Output Current (POC): 300-1500 mA (Default 700mA)
 Programmable NTC and 0-10V CCR Dimming Curves
 UL & cUL Class 2 Output & Class 2 0-10V Dimming
 Isolated Class 2 Dim suitable for Class 1 or Class 2 circuit
 Suitable for use in Dry & Damp Locations
 UL Class P, For Connections use wire rated $\geq 90C$ (194F)

AC INPUT
 L = BLACK
 FG = GREEN
 N = WHITE

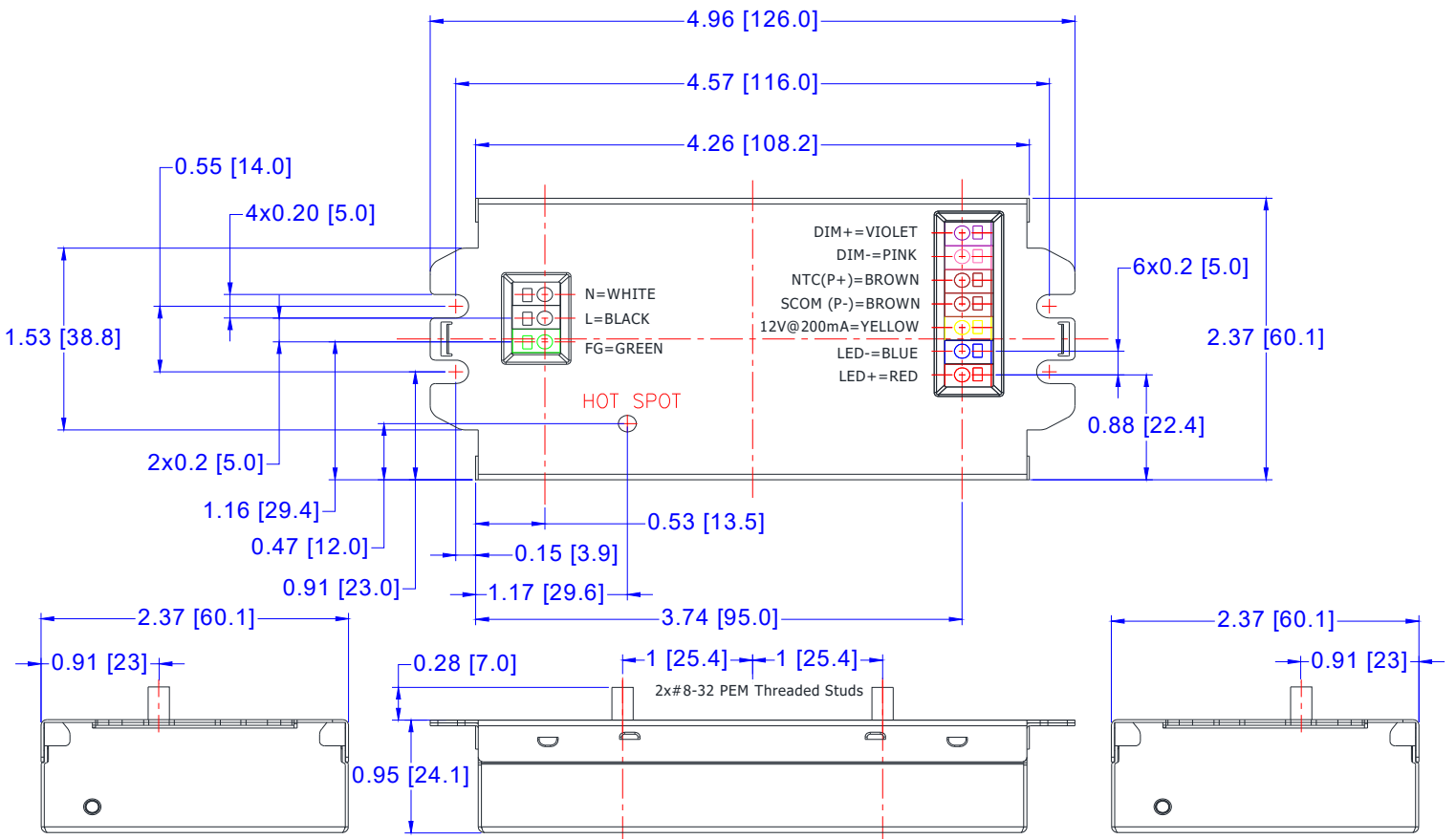
OUTPUT & CONTROLS
 LED+ = RED
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 12V@200mA = YELLOW
 SCOM (P-) = BROWN
 NTC (P+) = BROWN
 0-10V DIM- = PINK
 0-10V DIM+ = VIOLET

GROUNDING:
 Driver case must be grounded.
 Connector Wiring:
 Use 18 AWG Solid Wire rated $\geq 300V$

IP20 **UL LISTED** E325626

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(Legacy DIM- = GRAY)



Case Parameter	Inches [mm]
Length	4.96 [126]
Width	2.37 [60.1]
Height	0.95 [24.1]
Connectors	UL, KF253, WAGO 253 Push Pin or equivalent.

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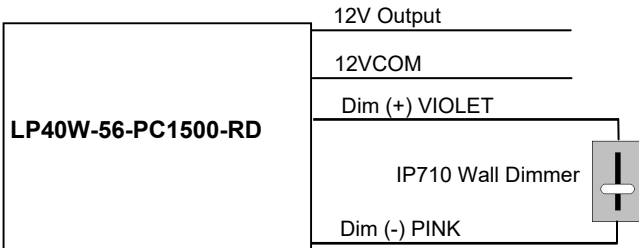
-RD, 0-10V & Resistance Dimming Scheme

Parameters	Minimum	Typical	Maximum
12V Auxiliary Output	11V	12.0V	13.0V
12V Auxiliary Output Source Current	0mA	—	200mA
Absolute Voltage Range on 0-10V Input (VIOLET Wire)	-2.0V	—	+15V
Source Current out of 0-10V Input (VIOLET Wire)	0uA	—	250uA
Dim: Class 2 Isolated from AC input and Outputs	2.5kV	—	—

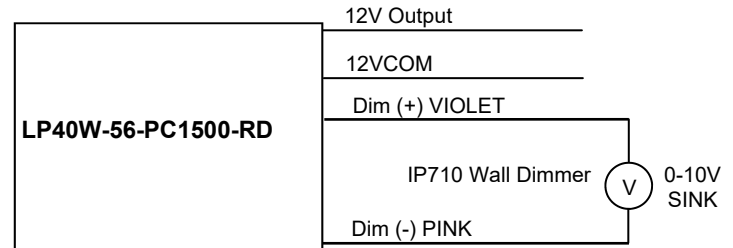
Notes

1. Part comes with 12V auxiliary & 12VCOM. 12V return is connected to 12VCOM. Isolated DIM+, DIM-.
2. Part is compatible with most 0-10V Wall Slide dimmers and direct 0-10V analog signal. Recommended dimmer is Leviton IP710 or equivalent connected between DIM+ VIOLET and DIM- PINK connectors. (Legacy DIM- = GRAY)
3. Output will be 100% with DIM+/DIM- open and Minimum Programmed Value, or OFF with DIM+/DIM- Shorted.
4. Minimum dimming level & Dim to Zero? are programmable with EPtronics LED Driver Interface Programming Tool.

-RD 2-Wire Resistance Dimming Scheme

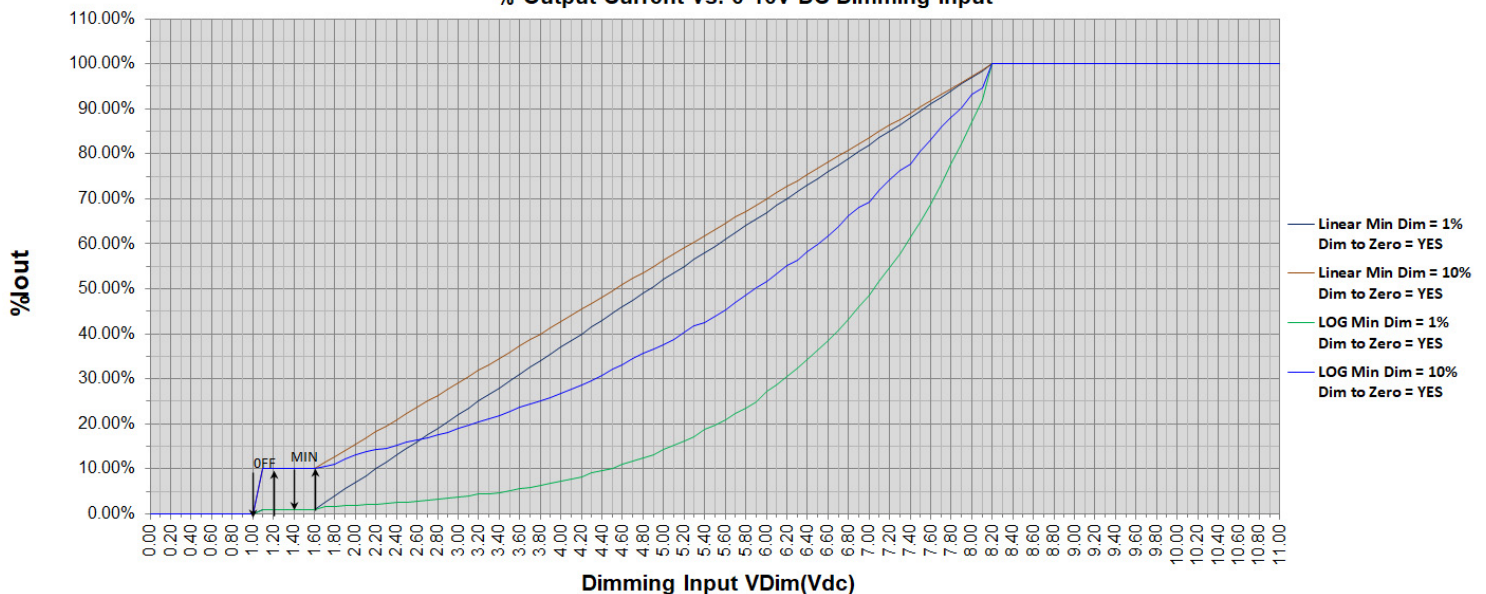


-RD 2-Wire 0-10V Dimming Scheme



Typical Dimming Curves: Dim to Zero? = YES

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



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40W
LP40W

Input Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Input Voltage	108 Vac	—	305 Vac	120, 230, 240, 277 Vac Nominal Values
Input Frequency	47 Hz	—	63 Hz	50/60Hz Nominal
Input AC Current	—	—	0.41 A	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.19 A	Measured at 277Vac/60Hz Input, Output Full load.
Inrush Current (Peak) Ipk 10%Pw <50usec	—	—	5.5 A	Measured at 120Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start
	—	—	15 A	Measured at 277Vac/60Hz Input, Output Full Load, Ta 25°C, Cold Start
Leakage Current	—	—	0.50 mA	Measured at 120Vac/60Hz Input, Output Full load.
	—	—	0.70 mA	Measured at 277Vac/60Hz Input, Output Full load.
THD	—	—	20%	Measured at 120/230/277Vac ≥ 20% Load
Power Factor (PF)	0.90	—	—	Measured at 120/230Vac ≥ 25% Load, 277Vac ≥ 40% Load

Output Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
DC Output Voltage	Per Table	—	Per Table	Per Table on Page 1
DC Output Current (POC)	-5%	Per Table	+5%	Programmable Output Current (POC) POC is set using GUI
Output Power	—	—	41W	Voltage Foldback, See graph on page 8
Ripple & Noise (Vpk-pk)	—	—	3% Vo	20 MHz BW, Full load output in parallel with 0.1 μF ceramic & 10 μF Electrolytic.
Ripple (Ipk-pk)	—	—	5% Io	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 98% of Iout, 120Vac/60Hz Input, Output Full load.
Hold-up Time	—	30 mS	—	Typical @ 277Vac Input, Output Full load.
Auxiliary Output (V)	11	12	13	@ 200mA Maximum

Environmental Specifications

Parameter	Min.	Typ.	Max.	Notes/Conditions
Case Temperature (Tc)	-40 °C	—	+90 °C	Measured at location specified on case.
Operating Temperature (Ta)	-40 °C	—	+40 °C	This is a reference range. Tc controls temperature range.
Storage Temperature (Ts)	-40 °C	—	+100 °C	Non operating temperature range.
Operating Humidity	—	—	90% 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	—	362,000 Hours	—	MIL-HDBK-217F Notice 2, Ta = 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)	—	—	+10% Io	Constant Current Limiting circuit.
Output Over Voltage (OVP)	—	—	+7% Vo	No Damage, Auto recovery after fault is removed.
Output Power Limit (OPL)	—	—	40W	Current Foldback
Over Temp Protection (OTP)	95 °C	—	100 °C	Foldback at Tc ≥ 95C, OFF @ Tc ~110C

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Safety & Compliance

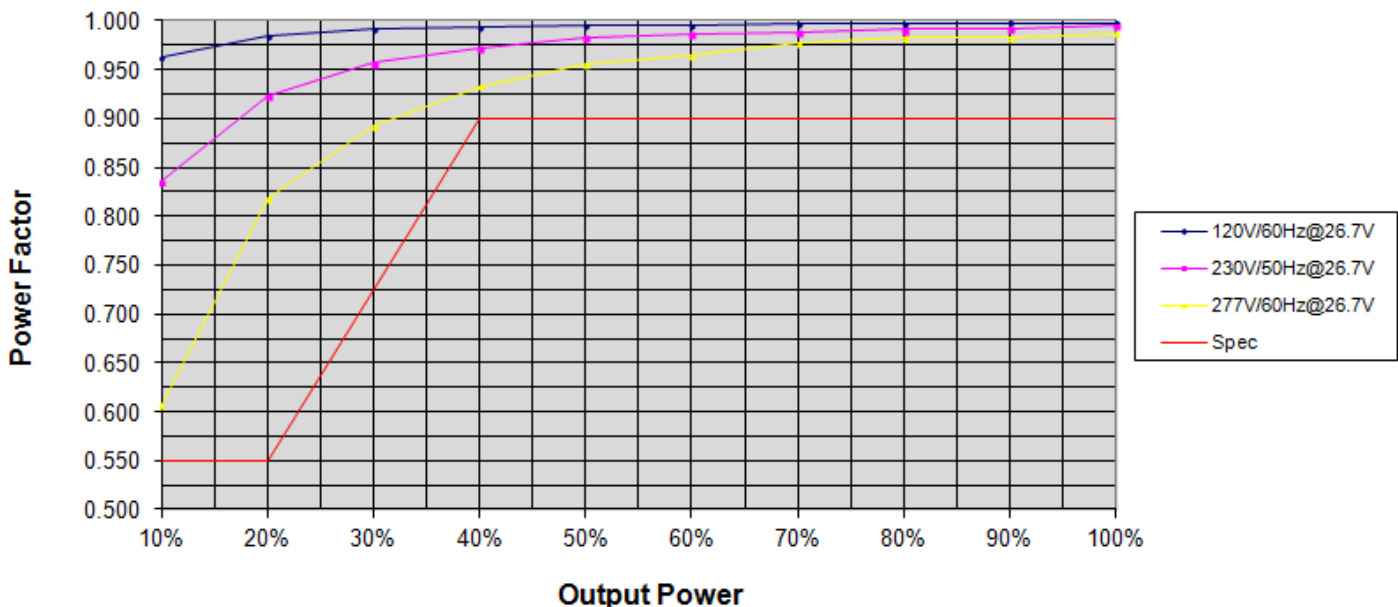
Safety	Notes/Standards
UL/CUL Listed UL Class P	UL8750 & CAN/CSA C22.2 No. 250.13, UL Class P, UL Type HL
CE	EN61347-1, EN61347-2-13, EN62493
Withstand Voltage	Input to Output & DIM: 1610 Vac
Isolation Resistance	Input to Output: >100 MΩ, 500VDC @ 25 °C, 70 % RH
Output to Isolated DIM	Output to Isolated Dimming: 1610 Vac
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

EMC Compliance

Standard	Notes/Conditions
FCC, 47CFR Part 15	ANSI C63.4 Class A
EN 61000-6-4	Emission Standard for industrial environments.
EN 61000-3-2	Part 3-2: Limits for harmonic current emissions Class C, ≥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, 2 kV L-N, 4 kV 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.

Power Factor Curves (Typical)

PF vs. Output Power



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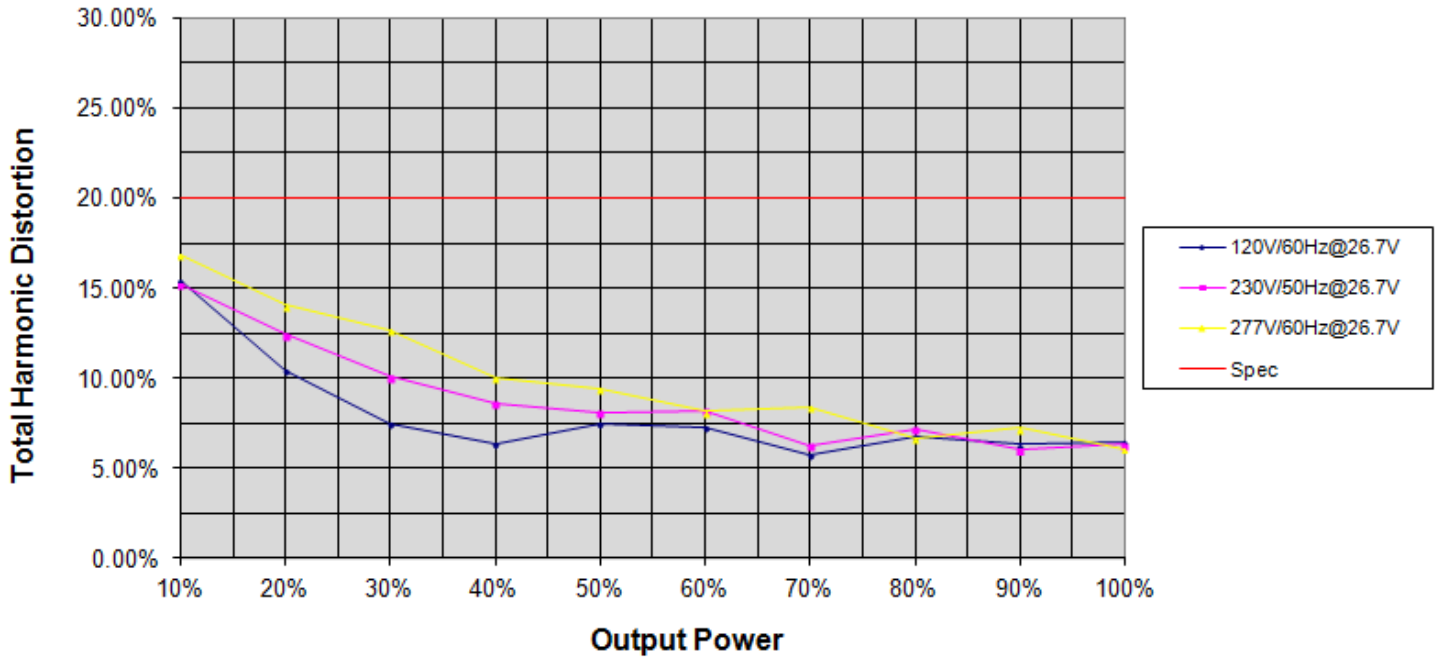
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40W
LP40W

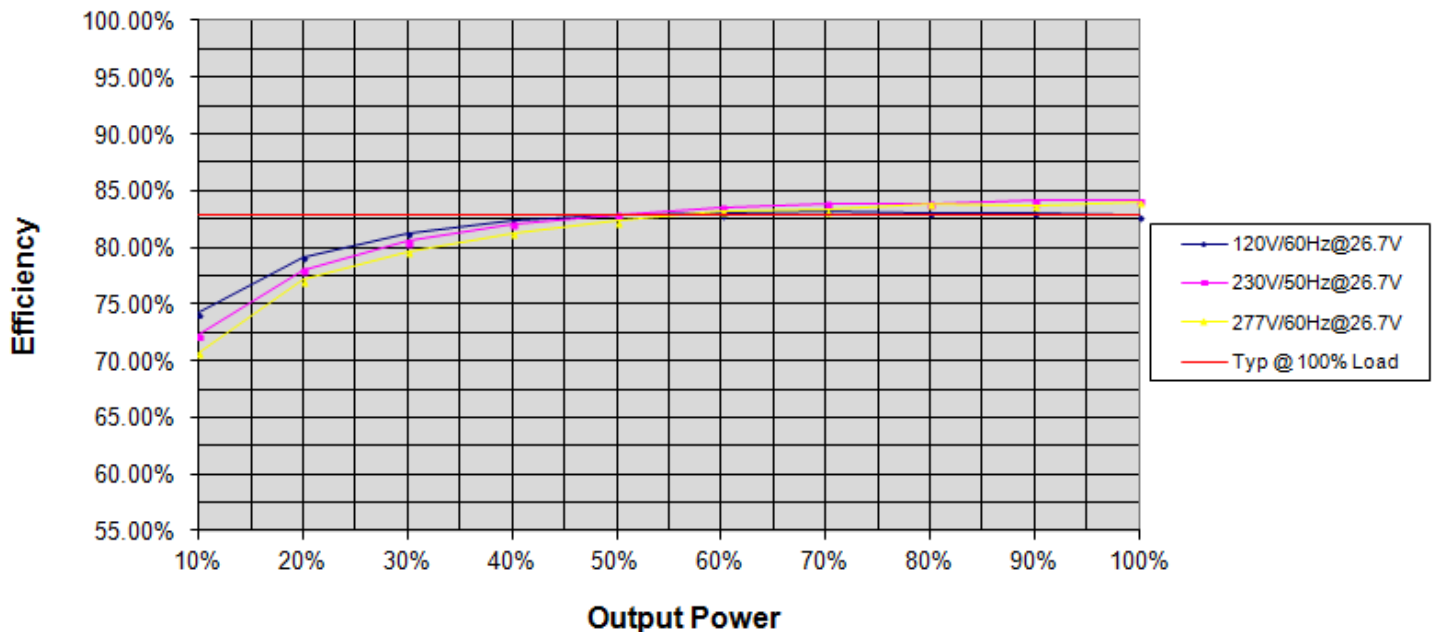
THD Curves (Typical)

THD vs. Output Power



Efficiency Curves (Typical)

Efficiency vs. Output Power



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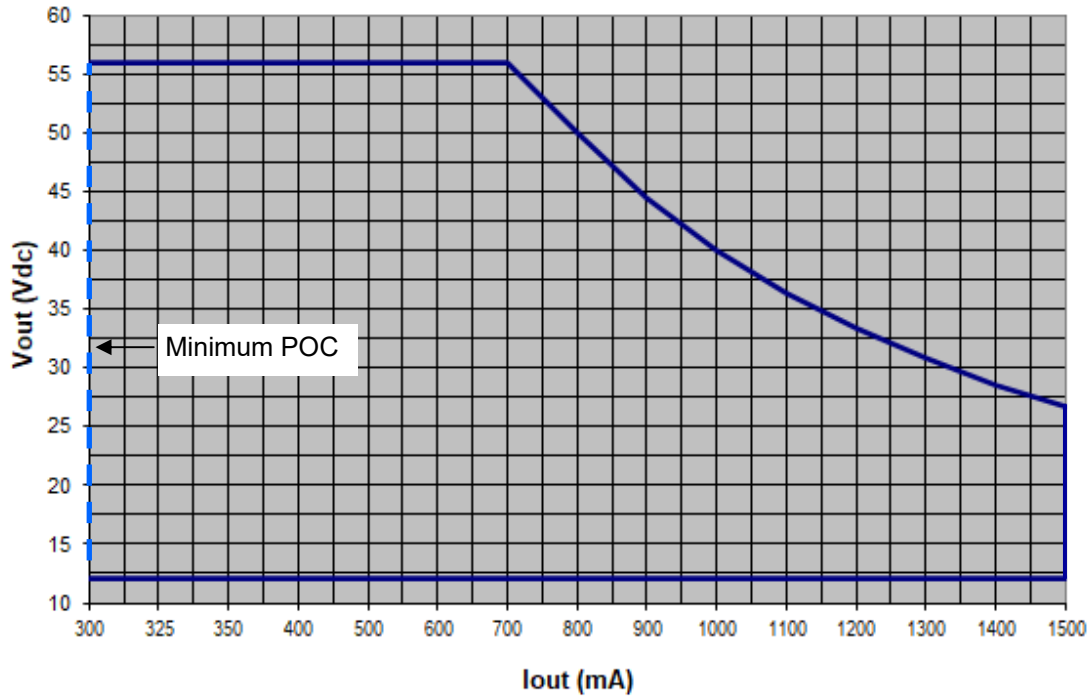
LED Optimized Drivers

40 Watt - LP40W-56-PC1500-RD

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Power Operating Window

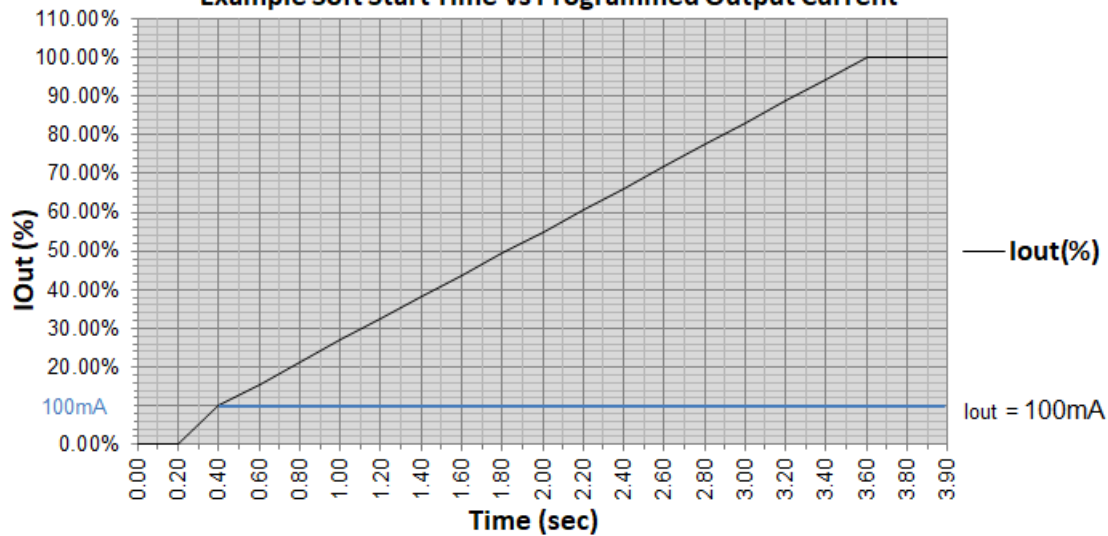
POWER OPERATING WINDOW
Vout (Vdc) vs. Output Current (mA)



Soft Start Operation:

Specification: Time-To-First-Light (100mA) <500ms, Time to 90% Iout ~ 3 Seconds, Time to 100% Iout <4.0 Seconds

Example Soft Start Time vs Programmed Output Current



40 Watt - LP40W-56-PC1500-RD

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40W
LP40W

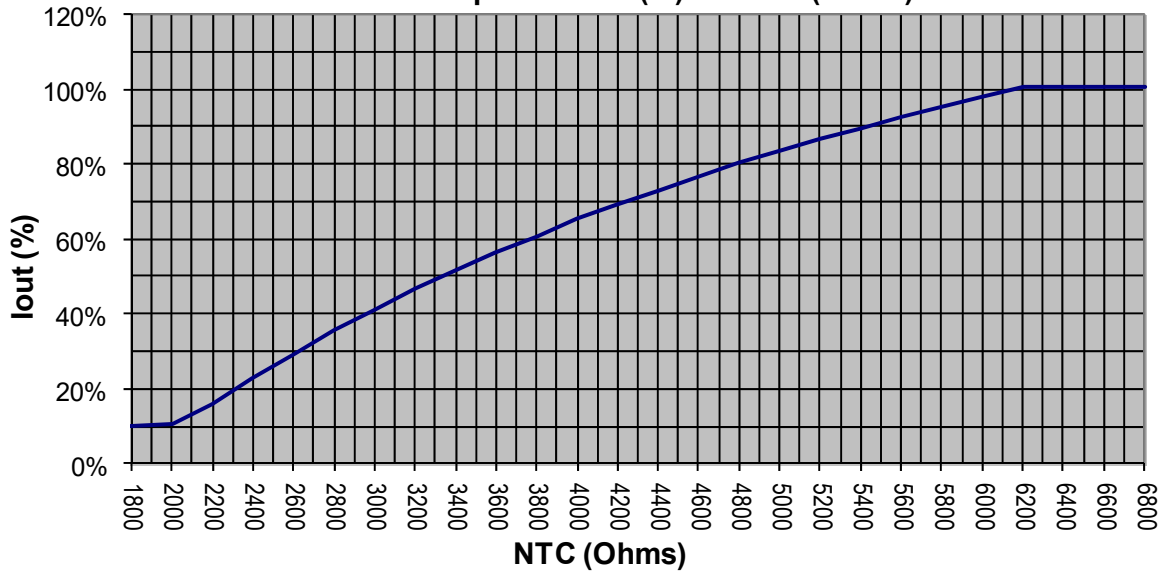
Module Temperature Protection using External NTC

Example: NTC High, NTC Low and NTC Minimum Iout% can be programmed using EP Programmer USB interface & EPtronics PC based GUI Software.

Factory Default Settings: NTC Low = 2.0K \approx 10% Iout, NTC High = 6.3K, 100% Iout

Programmable settings: NTC Minimum Level (%), NTC Minimum Ohms, NTC Maximum Ohms.

Output Current (%) vs. NTC (Ohms)

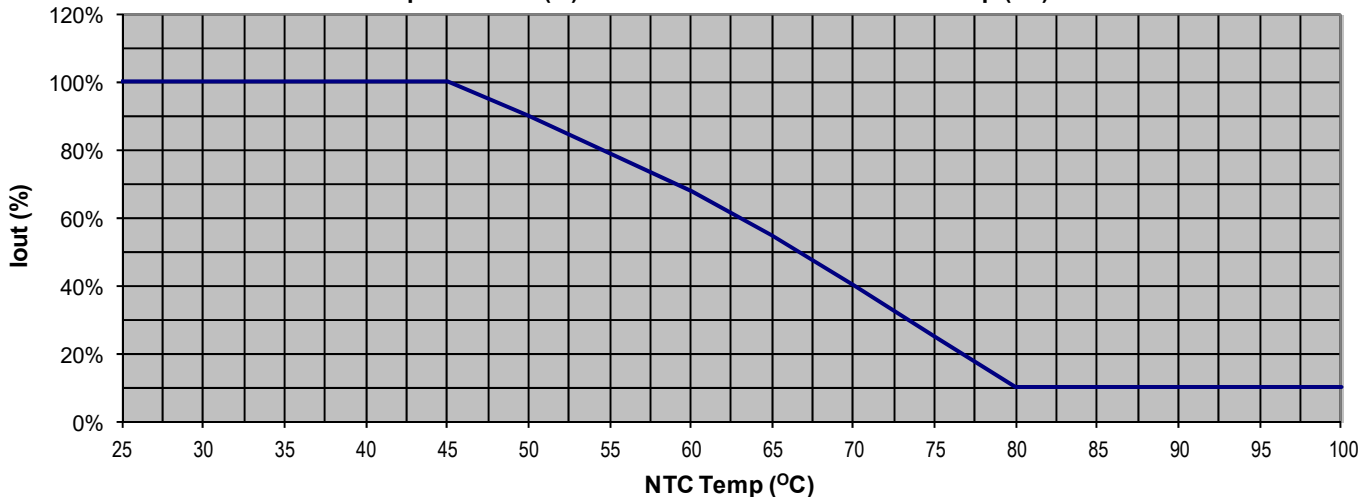


Module Temperature Protection Example

NTC = 805SMD, $R_{25C} = 15K \text{ Ohm} \pm 2\%$, $R_{64C} = 3700$, Vishay Part#: NTCS0805E3153GMT

With part set: NTC Max = 6.3K, NTC MIN = 2.0K, Iout Min = 10%

Output Current (%) vs. NTCS0805E3153GMT NTC Temp (°C)



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EPtronics LED Driver Interface Programming Tool: PC Based Software

Programmable Output Current (POC): Programmable Iout Per table page 1

Programmable NTC settings: NTC Minimum Level (%), NTC Minimum Ohms, NTC Maximum Ohms.

Factory Default: NTC Minimum = 2.0K, \approx 10% Iout, NTC Maximum = 6.3K, 100% Iout

Programmable dimming curve: Linear or LOG

Factory Default: Linear Dimming Curve

Programmable Minimum Dim Level: 1% (Min Dim) to 100% Iout programmed value.

Factory Default: Min dim level 1% (Actual Min Dim per specifications)

Programmable Dim to Zero?: YES or NO. YES will cause 0mA at \leq 1.0V, else will be Minimum Dim Level.

Factory Default: NO

EPtronics LED Driver Interface Programming Tool:

The EPtronics LED Driver Interface Programming Tool is a programming and configuration tool for EPtronics intelligent programmable LED drivers. It consists of the EP Programming Interface (EP-PRG-01) which is connected between the USB port of a computer and the LED driver being programmed, and the EPtronics LED Driver Interface Programming Tool software. The EPtronics LED Driver Interface Programming Tool software is a PC based graphical user interface that allows the user to program and configure the operating parameters of an EPtronics Programmable LED Driver. This interface allows the operator to set the LED drivers output current within its specified range, in the increments specified. It also provides the ability to enable/disable and control features like "Dimming", "Auxiliary Output", "NTC Thermal Protection", "Constant Lumen Module" & "End-of-life indicator" when available in the EPtronics intelligent LED driver being programmed.

EP Programming Interface: (EP-PRG-01)

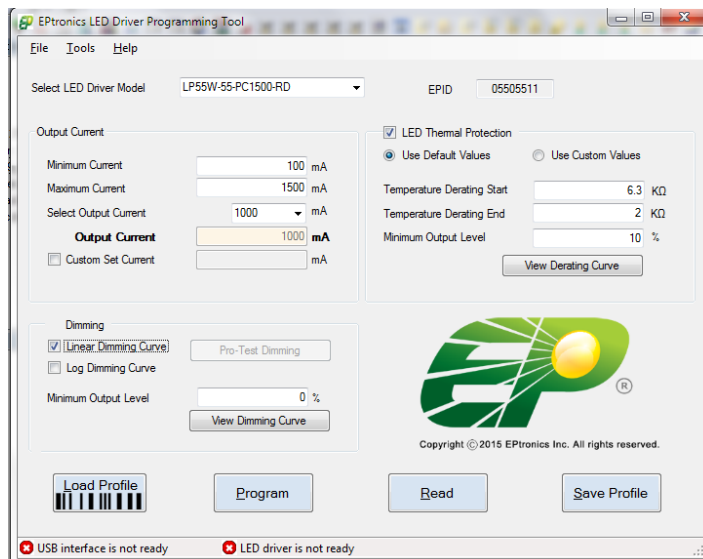
is the physical USB unit connected between the USB port of a computer and the LED driver being programmed. This unit also provides all power required to the LED driver being programmed. No connection to an AC power source is required for programming the LED driver.

EPtronics LED Driver Interface Programming Software:

The EPtronics LED Driver Interface Programming software is the windows based GUI that allows the user to assign custom part numbers to the LED driver being programmed. The user can then save the profile to a computer disk and recall as needed. The user can then use the "Auto Program" feature to quickly program as many LED drivers with the saved profile as is required. Each driver programming simply requires a click of the mouse to program in a single step or the use of an EPtronics Programming Cradle which will auto program upon insertion the an LED driver into the cradle.

The EPtronics LED Driver Interface Programming software supports bar code scanners. The barcode scanner can be used to automate the programming of the attached LED driver. This barcode scanner interface also provides an option to either enable or disable logging of the parameters to an excel file.

Note: The programming of the LED driver does not require the input be connected to an AC power connection. The EP Programming Interface and the required LED driver circuitry will be powered from the EP-PRG-01 module via the USB connection to a computer. For new GUI settings to take effect the AC input must cycled off/on and the USB interface disconnected.

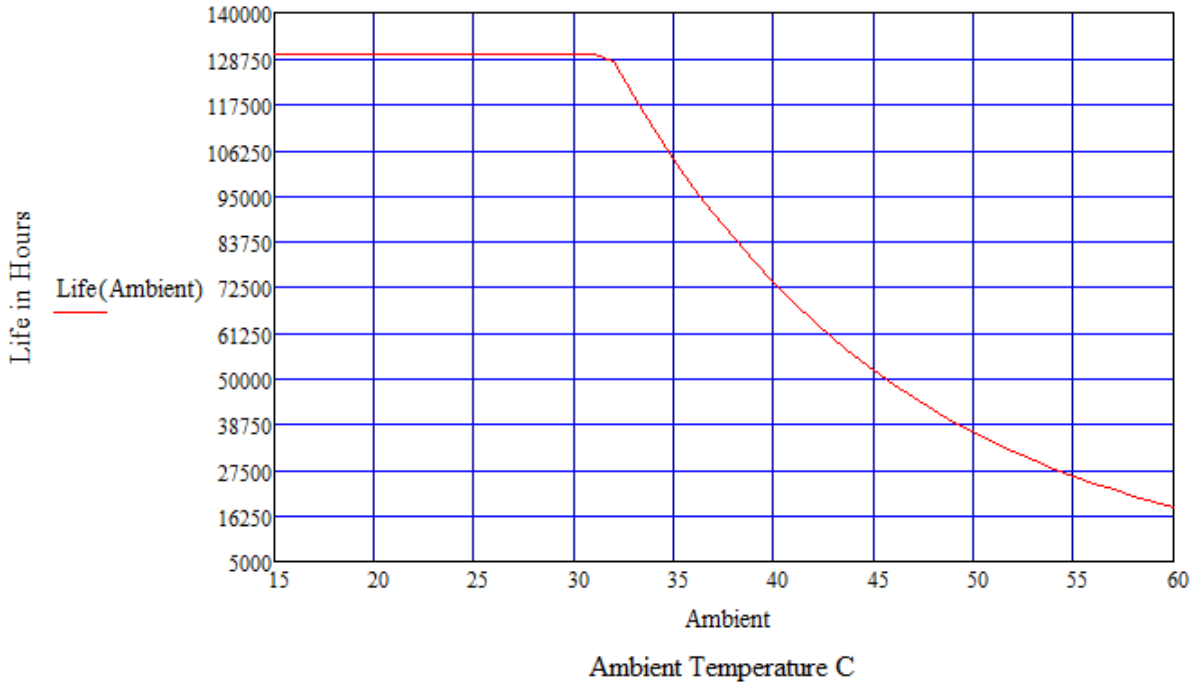


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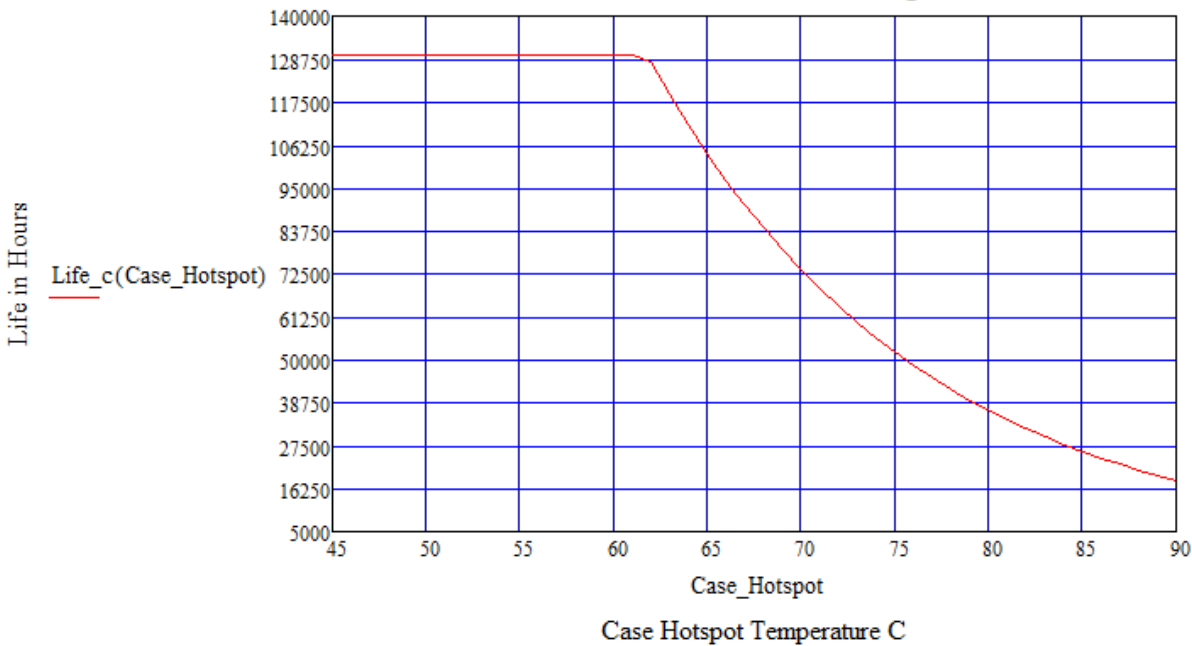
Life vs. Ambient Temperature

LP40W Estimated Life Full Load @ 120Vac



Life vs. Case (Tc) Temperature

LP40W Estimated Life Full Load @ 120Vac



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LED Optimized Drivers

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Revision History

REV - Change Date	Description of Changes		
	Items	Changed From	Changed To
REV D - 03/14/2019	Initial preliminary spec release	N/A	N/A
REV D—04/16/2019	Soft Start	≤5.0 Seconds @ 1300mA, Page 1 Graph on Page 8	≤12.0 Seconds @ 1300mA, Page 1 Updated graph on Page 8
REV D - 06/18/2021	DIM Wire Colors	PURPLE/GREY	VIOLET/PINK, per NEMA 100
REV D - 08/24/2021	CE EMC	EN55015	EN61000-6-4 (=FCCA)
REV D - 01/12/2023	Soft Start	Soft Start Time to first light value 400mA	Soft Start Time to first light value. changed to 100mA