

## Features

- Ultra High Efficiency (Up to 92%)
- Full Power at Wide Output Current Range (Constant Power)
- Thermal Sensing and Protection for LED Module
- 0-10V/PWM Dimming
- Surge Protection:4kV line-line, 6kV line-earth
- All-Around Protection: OVP, SCP, OTP
- Waterproof (IP65) and UL Dry / Damp / Wet Location
- In Wet Locations must be Built-In
- SELV Output



## Description

The *LTP-160W* series is a 160W, constant-current, programmable LED driver that operates from 90-305Vac input with excellent power factor. Created for high bay, industrial LED lamp. 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

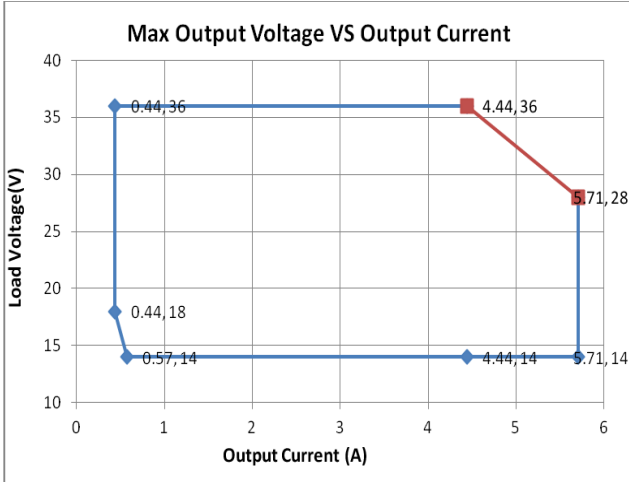
Model Number	Output Current Range	Full-Power current range	Default output current	Input Voltage Range	Output Voltage range	Max output power	Typical Efficiency	Power factor 230V
<b>LTP-160V/M/D036</b>	0.57-5.71A	4.44-5.71A	4.44A	90-305V	14-36Vac	160W	91%	0.96
<b>LTP-160V/M/D062</b>	0.38-3.80A	2.28-3.80A	2.96A	90-305V	21-62Vac	160W	91.5%	0.96
<b>LTP-160V/M114</b>	0.21-2.10A	1.26-2.10A	1.40A	90-305V	38-114Vac	160W	92%	0.96
<b>LTP-160V/M228</b>	0.10-1.05A	0.63-1.05A	0.70A	90-305V	76-228ac	160W	94%	0.96

### Notes:

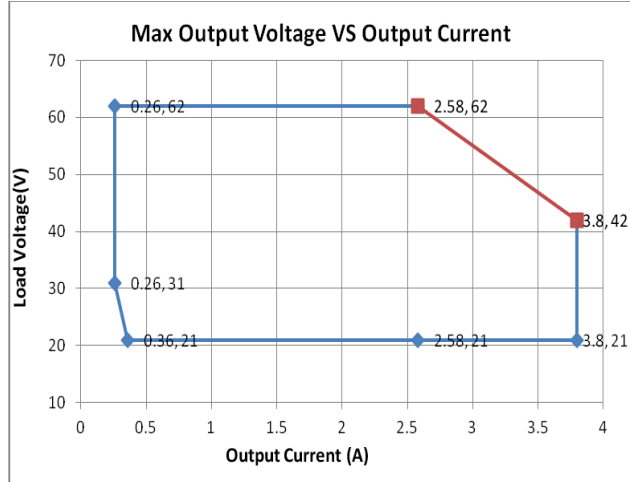
- (1) Output current range with constant power
- (2) Certified input voltage range: 90-305Vac
- (3) Measured at full load and 230Vac input (see below "General Specifications" for details)
- (4) V for no-dimming, M for 0-10V/PWM dimming, D for DALI dimming

**I-V Operating Area**

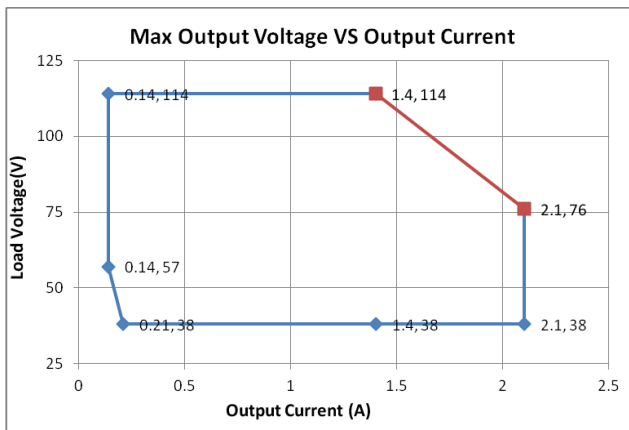
LTP-160V/M/D036



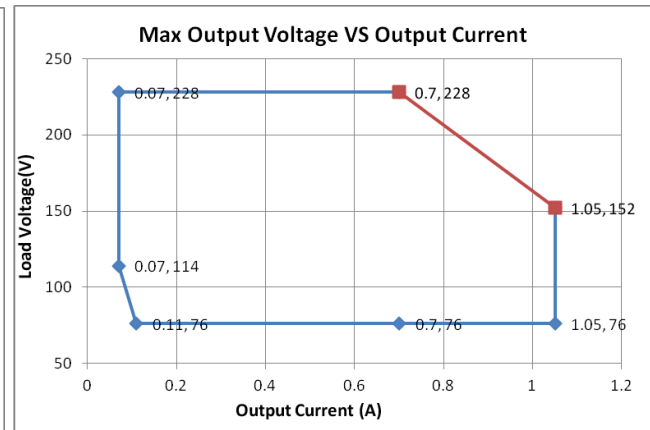
LTP-160V/M/D062



LTP-160V/M0114



LTP-160V/M228



**Input Specifications**

Parameter	Min.	Typ.	Max.	Notes
Input Voltage	90Vac	-	305Vac	
Input Frequency	47 Hz	-	63 Hz	
Leakage Current	-	-	0.75mA	Under 25°C±10°C ambient temperature and 230Vac/50Hz
Input AC current			2.0A	Under 25°C±10°C ambient temperature, rated input and output range
Inrush Current	-	-	60A	Under 25°C±10°C ambient temperature, 230Vac input
PF	0.96	-	-	At 230Vac, 70%-100% Load
THD	-	-	15%	At 230Vac, 70%-100% Load

### Output Specifications

Parameter	Min.	Typ.	Max.	Notes
Output Current Tolerance	-5%loset	-	5%loset	At full load condition
Output Current Setting(loset) Range	0.57A	-	5.71A	
LTP-160V/M036				
LTP-160V/M062	0.38A	-	3.80A	
LTP-160V/M0114	0.21A	-	2.10A	
LTP-160V/M228	0.11A	-	1.05A	
Output Current Setting Range with Constant Power	4.44A	-	5.71A	
LTP-160V/M/D036				
LTP-160V/M/D062	2.2A	-	3.80A	
LTP-160V/M114	1.26A	-	2.10A	
LTP-160V/M228	0.63A	-	1.05A	
Total Output Current Ripple (pk-pk)	-	5%lo max	10%lo max	At full load condition, 20 MHz BW
Output Current Ripple at < 200 Hz (pk-pk)	-	2%lo max	-	At full load condition. Only this component of ripple is associated with visible flicker.
Startup Overshoot Current	-	-	10%lo	At full load condition
No Load Output Voltage				
LTP-160V/M/D036	-	-	50V	
LTP-160V/M/D062	-	-	80V	
LTP-160V/M114	-	-	140V	
LTP-160V/M228	-	-	305V	
Line Regulation	-	-	±0.5%	Measured at full load
Load Regulation	-	-	±1.5%	
Turn-on Delay Time	-	-	0.5s	Measured at 230Vac input.
Temperature Coefficient of loaset	-	-	0.03%/°C	Case temperature = 0°C ~Tc max

**Note:** All specifications are typical at 25°C unless otherwise stated.

**General Specifications**

Parameter	Min.	Typ.	Max.	Notes	
Efficiency at 230Vac input: LTP-160V/M/D036 Io= 4.44A Io= 5.71A	89.0% 88.0%	91.0% 90.0%	-	Measured at full load and steady-state temperature in 25°C ambient; (Efficiency will be about 2.0% lower if measured immediately after startup.)	
LTP-160V/M/D062 Io= 2.2A Io= 3.8A	90.0% 90.0%	91.5% 91.5%	-		
LTP-160V/M114 Io= 2.1A Io= 1.26A	90.0% 90.0%	92.0% 92.0%	-		
LTP-160V/M228 Io =0.63A Io= 1.05A	91.5% 92%	93.5.0 94.0%	-		
MTBF	200,000 Hours		-		Measured at 230Vac input, 80%Load and 25°C ambient temperature (MIL-HDBK-217F)
Lifetime	50,000 Hours		-		Measured at 230Vac input, 80%Load and 70C case temperature with Iaux=100mA; See lifetime vs. Tc curve for the details
Operating Case Temperature for Safety Tc <sub>s</sub>	-40°C	-	+85°C		
Operating Case Temperature for Warranty Tc <sub>w</sub>	-40°C	-	+75°C		
Storage Temperature	-40°C	-	+85°C	Humidity: 5%RH to 100%RH	
Dimensions Millimeters (L × W × H)	152*69.3mm				

**Note:** All specifications are typical at 25°C unless otherwise stated.

### Dimming Specifications

Parameter		Min.	Typ.	Max.	Notes
Absolute Maximum Voltage on the Vdim (+) Pin		-20 V	-	20 V	
Source Current on Vdim (+)Pin		200uA	300 uA	450 uA	Vdim(+) = 0 V
Dimming Output Range	LTP-160V/M/D036 LTP-160V/M/D062 LTP-160V/M114 LTP-160V/M228	10%loset	-	loset	0.57A ≤loset < 4.44A 0.38A ≤loset < 2.2A 0.21A ≤loset < 1.26A 0.11A ≤loset < 0.63A
	LTP-160V/M/D036 LTP-160V/M/D062 LTP-160V/M114 LTP-160V/M228	4.44A 2.2A 1.26A 0.63A	-	loset	4.44A ≤loset ≤ 5.71A 2.2A ≤loset ≤ 3.8A 1.26A ≤loset ≤ 2.1A 0.63A ≤loset ≤ 1.05A
Recommended Dimming Input Range		1V	-	10 V	Default 1-10V dimming mode.
Dim on Voltage		0.55 V	0.7 V	0.85 V	
Hysteresis		-	0.2 V	-	
PWM_in High Level		3 V	-	10 V	Dimming mode set to PWM in PC interface.
PWM_in Low Level		-0.3 V	-	0.6 V	
PWM_in Frequency Range		200 Hz	-	3 KHz	
PWM_in Duty Cycle		1%	-	99%	
PWM Dimming off (Positive Logic)		2%	5%	8%	
PWM Dimming on (Positive Logic)		4%	7%	10%	
PWM Dimming off ( Negative Logic)		92%	95%	98%	
PWM Dimming on ( Negative Logic)		90%	93%	96%	
Hysteresis		-	2%	-	

**Note:** All specifications are typical at 25 °C unless stated otherwise.

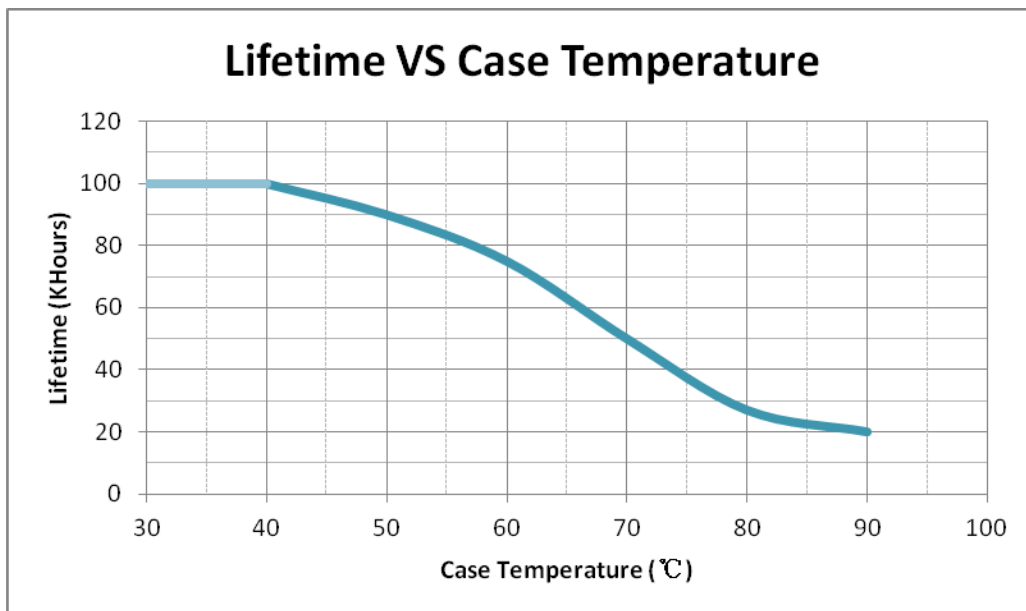
### Safety &EMC Compliance

Safety Category	Standard
UL/CUL	UL8750,CAN/CSA-C22.2 No. 250.13-12
CE	EN 61347-1, EN61347-2-13
EMI Standards	Notes
EN 55015 <sup>(1)</sup>	Conducted emission Test &Radiated emission Test

EN 61000-3-2	Harmonic current emissions
EN 61000-3-3	Voltage fluctuations & flicker
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: line to line 6 kV, line to earth 10 kV <sup>(2)</sup>
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

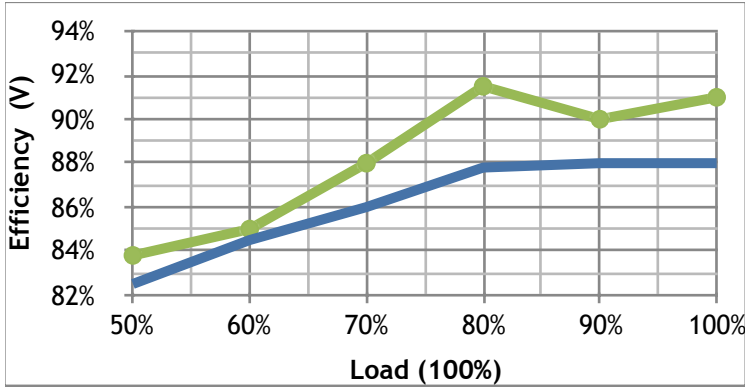
- Note:** 1.This LED driver meets the EMI specifications above, but EMI performance of a luminaire that contains it depends also on the other devices connected to the driver and on the fixture itself.
2. To perform electric strength (hi-pot) testing, the “GDT ground disconnect” (nut and metal lock sheet) on the driver end-cap should be removed temporarily to prevent the internal gas discharge tube from conducting (as allowed by IEC 60598-1 Clause 10.2). After testing is completed, these items must be reinstalled to restore line-to-earth surge protection and secure the end cap.

### Lifetime vs. Case Temperature

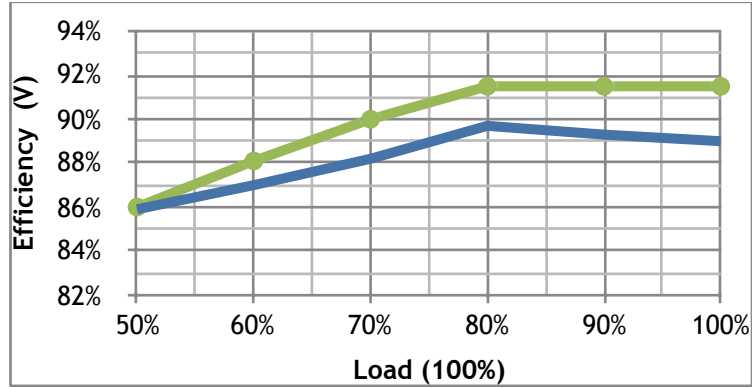


**1. Efficiency vs Load Curve**

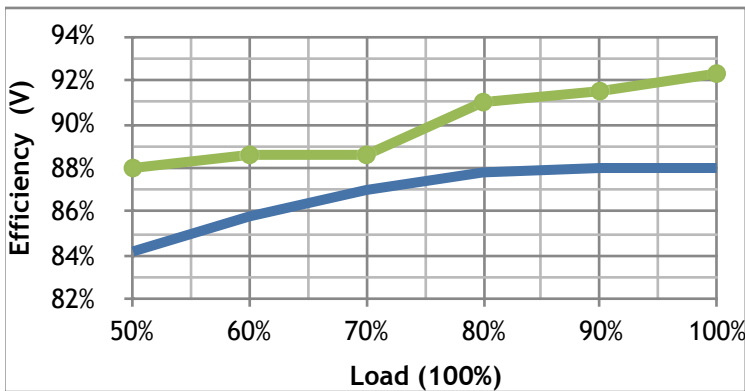
LTP-160V/M/D036  $I_o = 5.71\text{ A}$



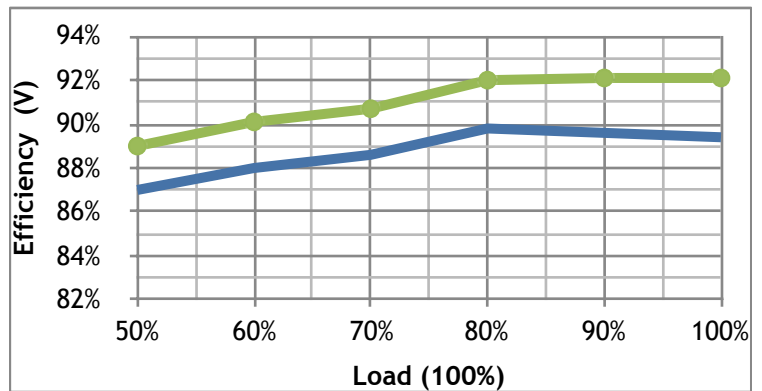
LTP-160V/M/D036  $I_o = 4.44\text{ A}$



LTP-160V/M/D062  $I_o = 3.80\text{ A}$

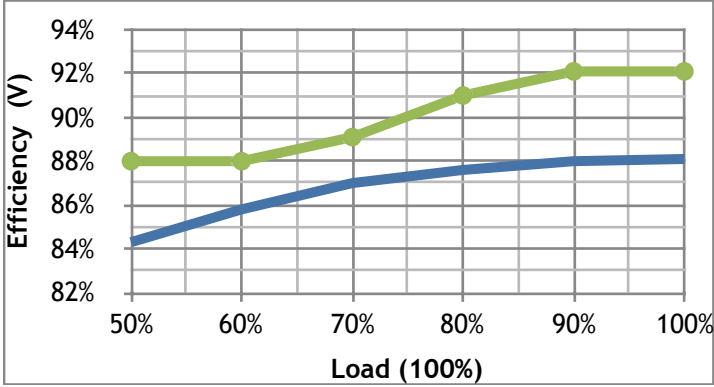


LTP-160V/M/D062  $I_o = 2.58\text{ A}$

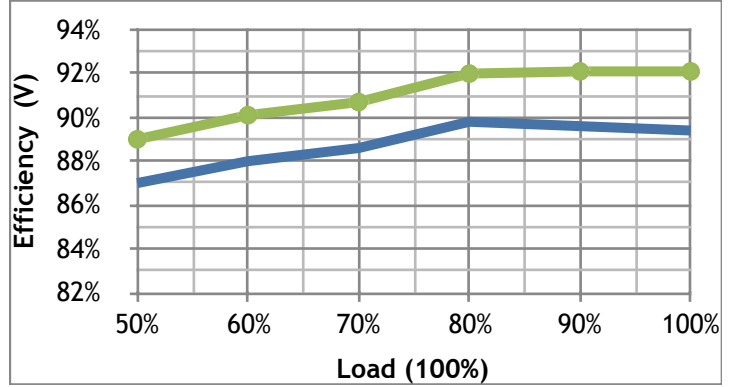




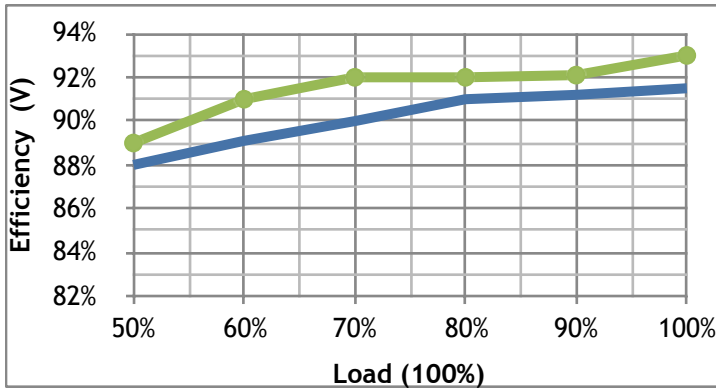
LTP-160V/M114  $I_o = 2.10A$



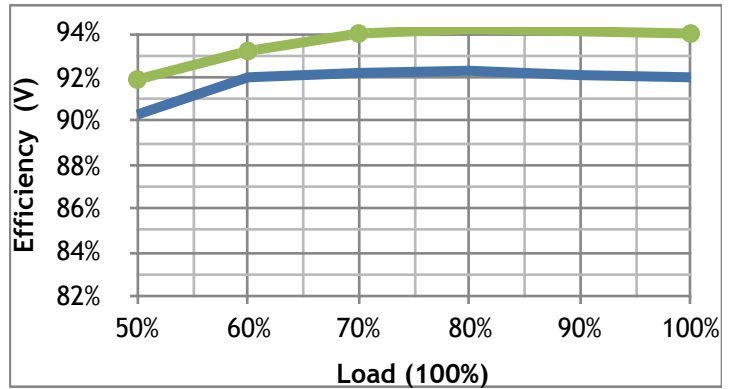
LTP-160V/M114  $I_o = 1.40A$



LTP-160V/M228  $I_o = 1.05A$

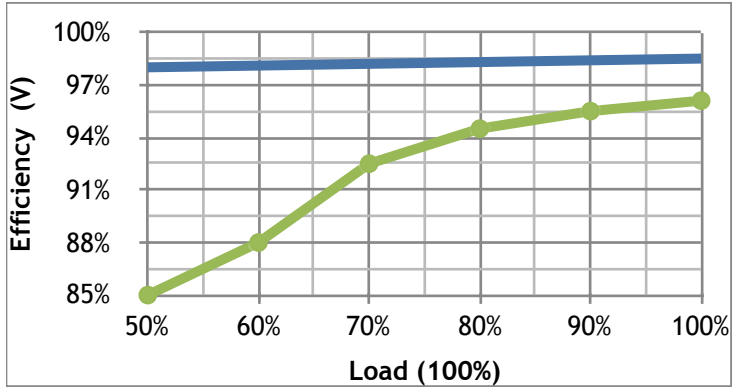


LTP-160V/M228  $I_o = 0.70A$

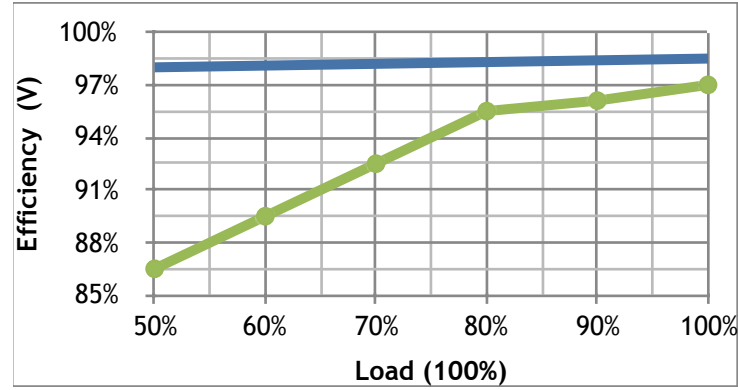


### Power Factor vs Load Curve

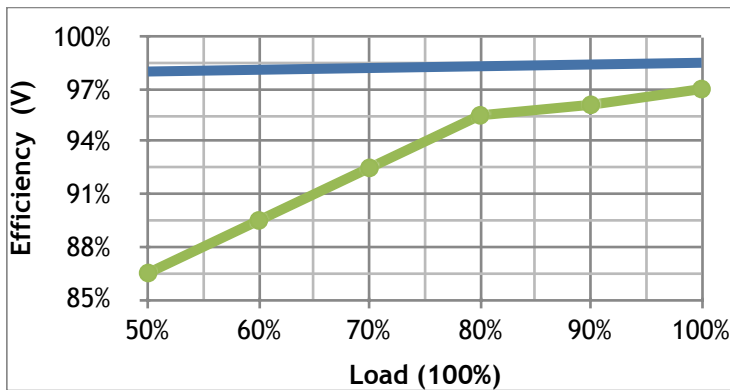
LTP-160V/M/D036



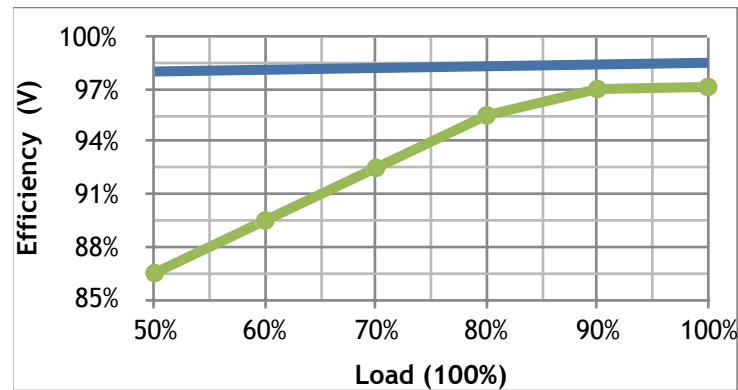
LTP-160V/M/D062



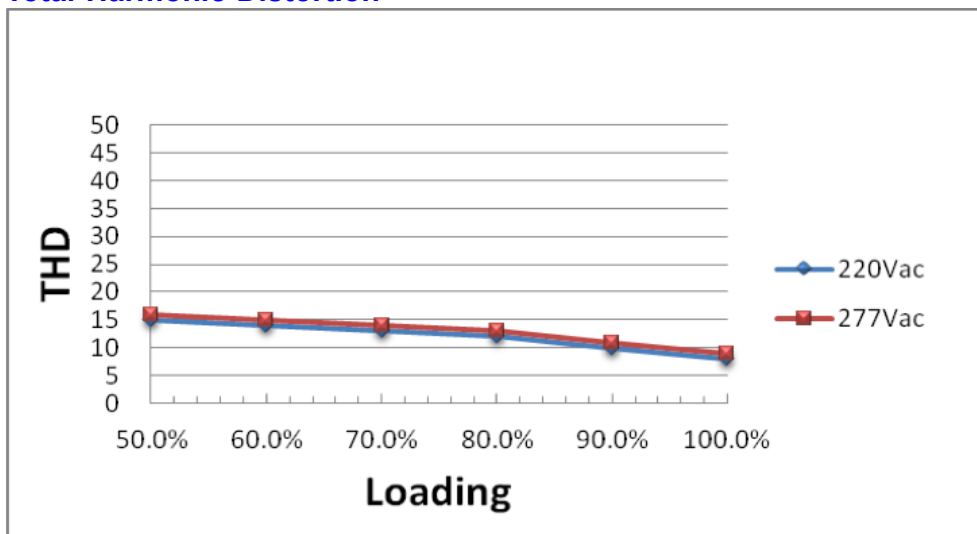
LTP-160V/M114



LTP-160V/M228



**Total Harmonic Distortion**



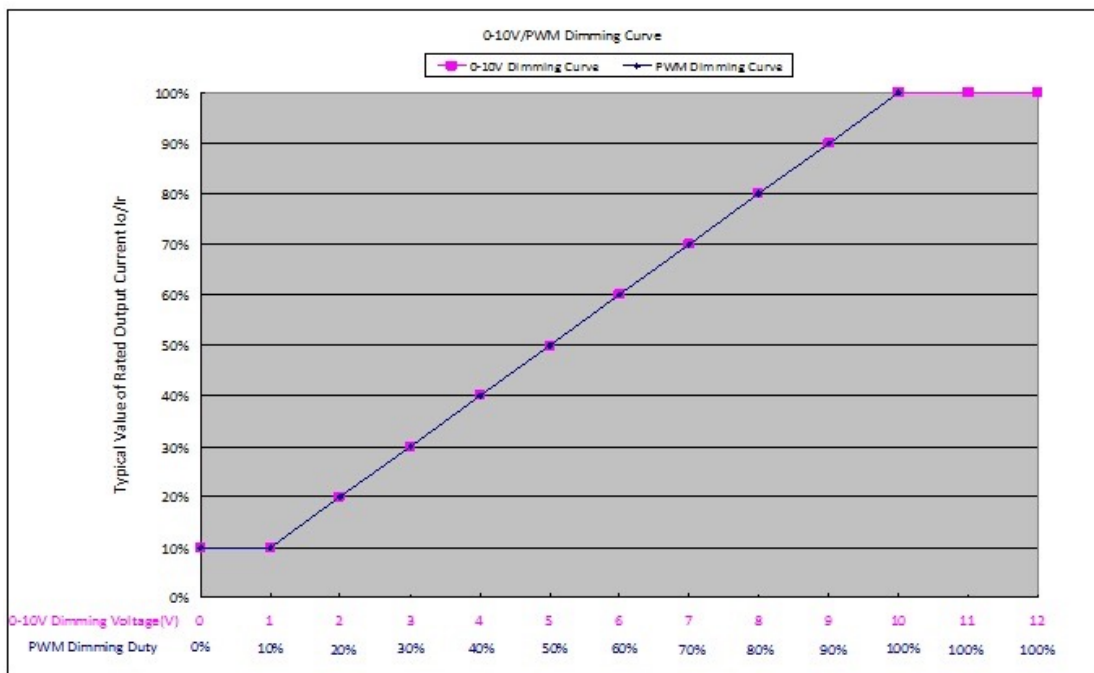
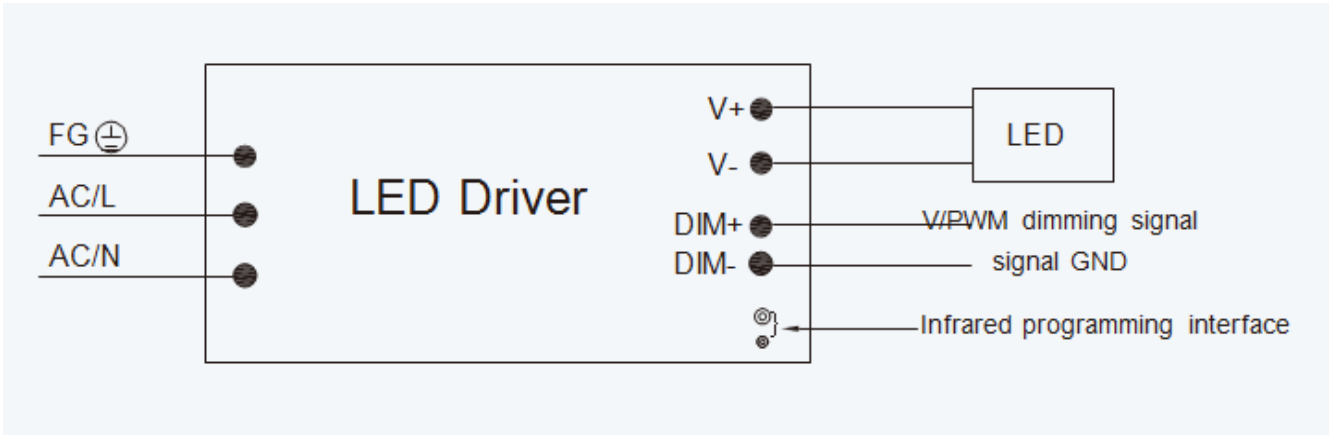
**Protection Functions**

Parameter	Min.	Typ.	Max.	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**

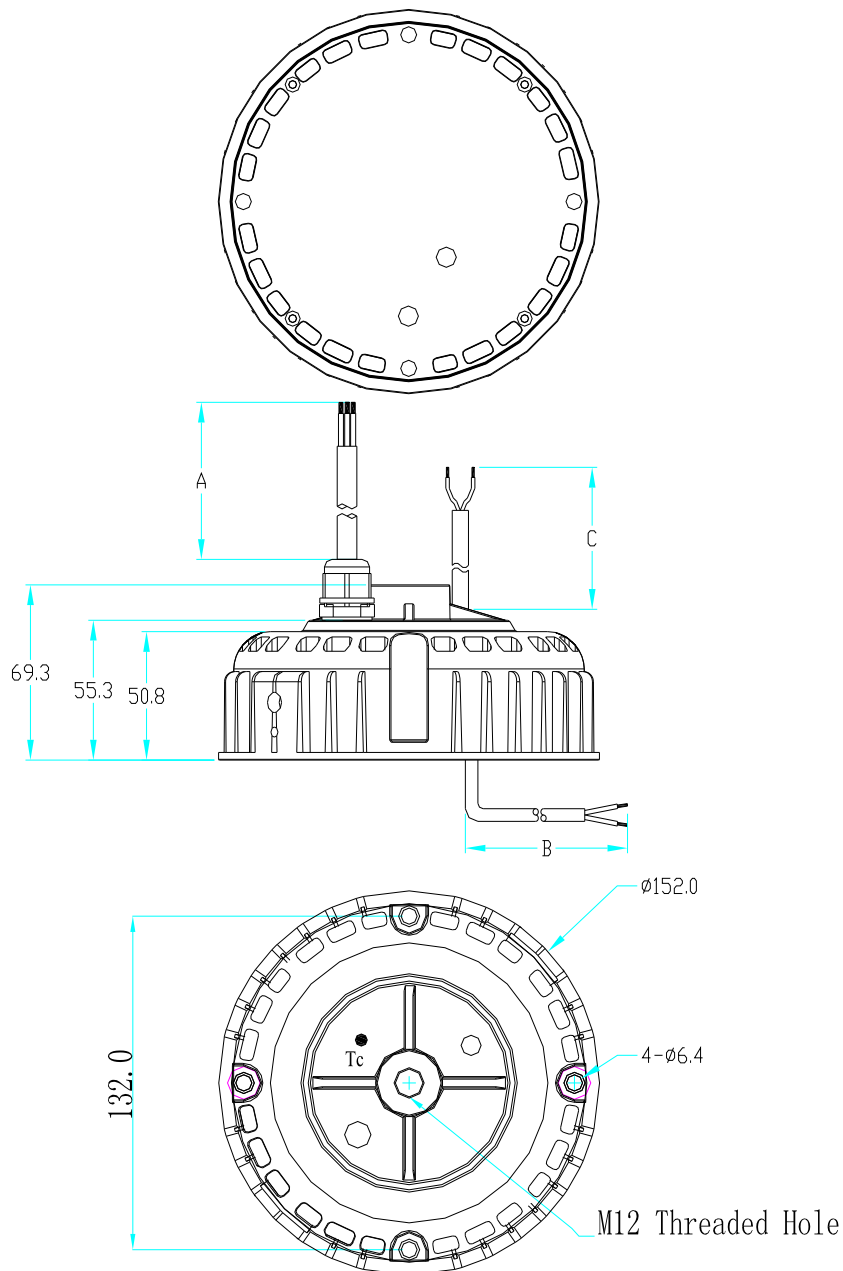
- **0-10V Dimming&PWM dimming**

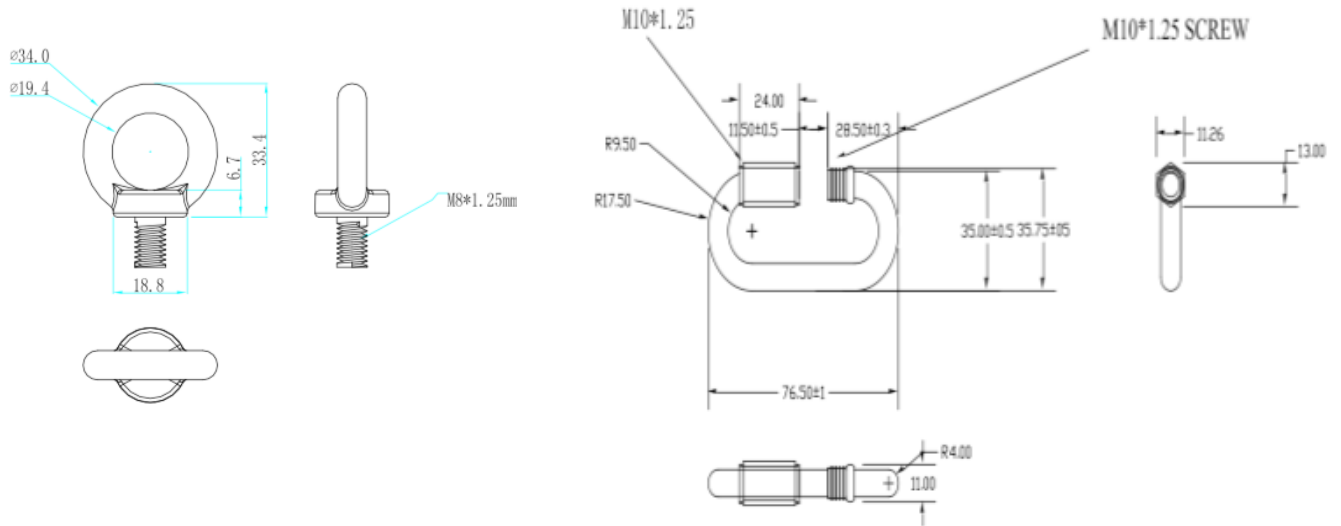
The recommended implementation of the dimming control is provided below.



## Note:

1. The dimmer can also be replaced by an active 0-10V voltage source signal or passive components like resistors and zener.
2. Do NOT connect Dim- to the output V- or V+, otherwise the driver will not work properly.
3. If 0-10V dimming is not used, Dim + should be open.

**Mechanical Outline**

**Optional Accessories :****RoHS Compliance**

Our products comply with the European Directive 2011/65/EC, calling for the elimination of lead and other hazardous substances from electronic product.