

Intelligent LED Driver(Constant Voltage)

- Metal casing for easy heat dissipation.
- Supports 0-10V/1-10V/10V PWM/RX dimming, as well as leading-edge (Triac) and trailing-edge (ELV) dimming. It features strong compatibility and is compatible with various American-standard dimmers such as Lutron and Legrand.
- Power parameters can be modified via mobile APP using NFC, enabling driver data interaction function.
- Dimming range: 0~100%, and the LED can start dimming from 0.01%.
- Soft-on and fade-in dimming function enhances your visual comfort.
- The dimming interface is equipped with photoelectric isolation, complies with the latest safety standards, and is more safe and reliable.
- When the signal is floating, it outputs at full load and can be used as a LED driver.
- Innovative thermal management technology intelligently protects the service life of the power supply.
- Overheat, over voltage, overload, short circuit protection and automatic recovery.
- IP20, suitable for indoor LED lighting fixtures.
- Complies with Type HL, and can be used in North American Class 1, Division 2 environments, such as gas stations, chemical plants, sewage treatment plants, etc.
- Normal service life can reach 100,000 hours.
- Certified to UL Class 2 and Class P.
- Complies with IEEE 1789 and UL 8750 standards.
- 5-year warranty(adopting Nippon Chemi-Con capacitors).

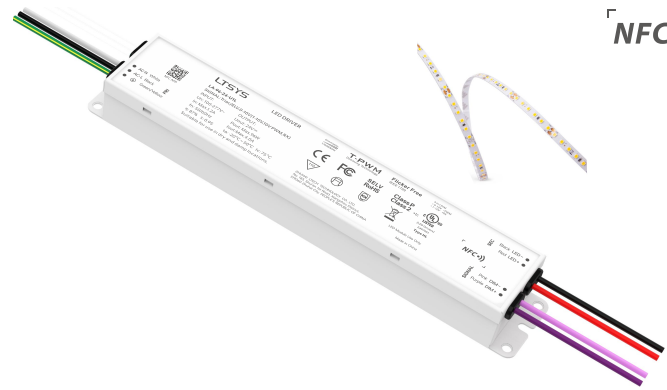
6-in-1 Dimming
Triac
ELV
0-10V
1-10V
10V PWM
RX



T-PWM
Dimming Technology

Flicker Free
IEEE1789

Dimmable:
■■■■■■■■■■
1:10000MAX



NFC

Technical Specs

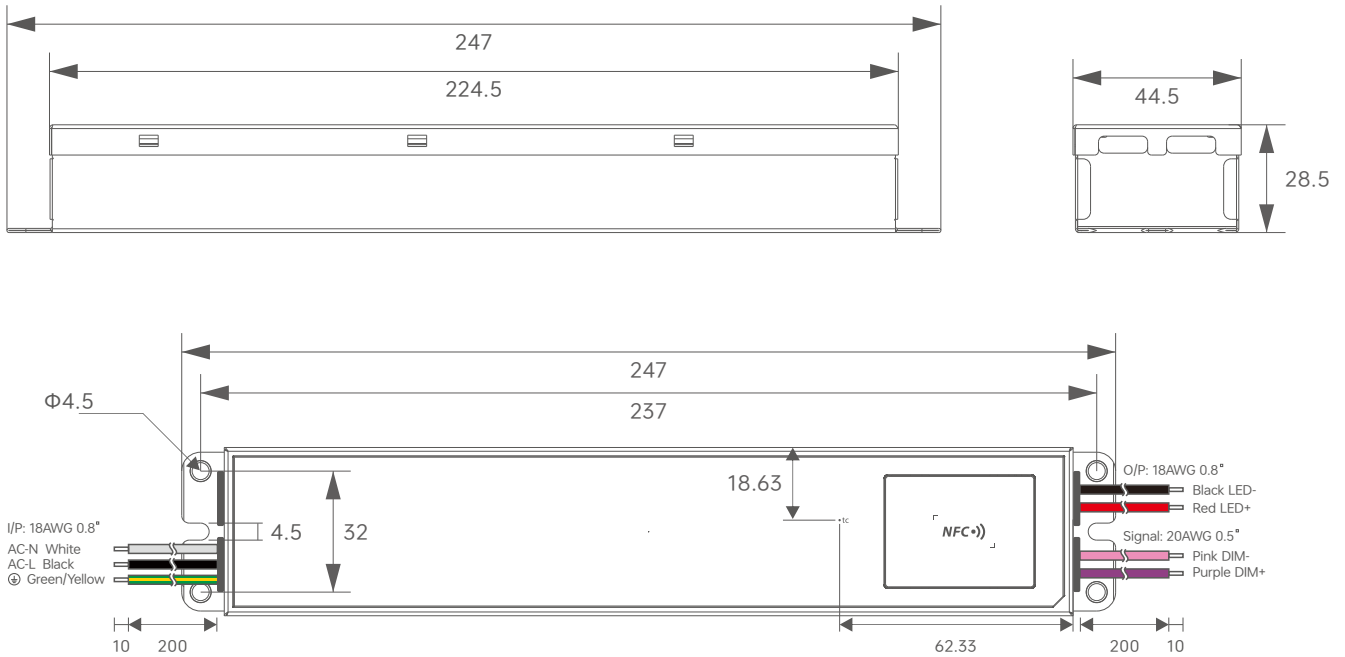
Model	LA-60-24-U1L		LA-96-24-U1L	
OUTPUT	Output Voltage	24V $\overline{\text{=}}$		
	Output Voltage Range	24V $\pm$ 0.5V $\overline{\text{=}}$		
	Output Current	Max. 2.5A	Max. 4.0A	
	Output Power	Max. 60W	Max. 96W	
	Output Power Range	0~60W	0~96W	
	Strobe Level	High frequency exemption level/IEEE1789		
	Dimming Range	0~100%, down to 0.01%		
	Overload Power Limitation	$\geq 102\%$		
	Ripple	Switch ripple $\leq 120\text{mV}$, noise $\leq 500\text{mV}$		
	PWM Frequency	300-22000Hz		
INPUT	Dimming Interface	Triac/ELV,0-10V(1-10V/10V PWM/RX)		
	Input Voltage	100-277V~		
	DC Voltage Range	220-250V $\overline{\text{=}}$		
	Frequency	0/50/60Hz		
	Input Current	Max. 0.77A/100V~, 0.35A/230V~, 0.32A/277V~(at full load)	Max. 1.2A/100V~, 0.52A/230V~, 0.46A/277V~(at full load)	
	Power Factor	PF>0.95/100V~, PF>0.9/230V~, PF>0.85/277V~(at full load)	PF>0.95/100V~, PF>0.95/230V~, PF>0.9/277V~(at full load)	
	THD	100V~@THD<6%, 230V~@THD<18%, 277V~@THD<30% (at full load)	100V~@THD<6%, 230V~@THD<15%, 277V~@THD<25% (at full load)	
	No-load Power Consumption	< 4.5W@230V~		
	Efficiency (Typ.)	83%/100V~, 87%/230V~, 87%/277V~	84%/100V~, 89%/230V~, 89%/277V~	
	Inrush Current	Cold start 27A(Test twidth=340us tested under 50% Ipeak)/230V~	Cold start 29A(Test twidth=340us tested under 50% Ipeak)/230V~	
ENVIRONMENT	Anti Surge	L-N: 2KV, L,N-FG: 4KV		
	Leakage Current	Max. 0.5mA		
	Working Temperature	ta: -20 ~ 50°C tc: 75°C		
	Working Humidity	20 ~ 95%RH, non-condensing		
	Storage Temperature/Humidity	-40 ~ 80°C, 10~95%RH		
PROTECTION	Temperature Coefficient	$\pm 0.03\%/^{\circ}\text{C}$ (-20 ~ 55°C)		
	Vibration	10~500Hz, 2G 12min/1cycle, 72 min for X, Y and Z axes respectively		
	Overheat Protection	Intelligently adjust or turn off the output current if the PCB temperature $\geq 110^{\circ}\text{C}$, and recover automatically		
	Overload Protection	Shut down the output when rated power $\geq 102\%$, auto recovers		
	Short Circuit Protection	Enter hiccup mode if short circuit occurs, and recover automatically		
SAFETY & EMC	Overvoltage Protection	Shut down the output when no-load voltage $\geq 28\text{V}$, and recover automatically		
	Withstand Voltage	I/P-O/P: 3750V~/1min/ < 5mA, I/P-FG: 1500V~/1min/ < 5mA, O/P-FG: 500V~/1min/ < 5mA, Signal-FG: 500V~1min/ < 5mA		
	Insulation Resistance	I/P-O/P: 100M Ω /500V~/1min/25°C/70%RH		
	SafetyStandards	UL	America	UL8750, UL1310, Class P
		CUL	Canada	CSA C22.2 No.250.13
		CE	European Union	EN61347-1, EN61347-2-13, EN62384
	EMC Emission	FCC	America	FCC part15B
		CE	European Union	EN55015, EN61000-3-2, EN61000-3-3, EN61547
	EMC Immunity	EN61000-4-2,3,4,5,6,8,11,EN61547		
OTHERS	Strobe Test	IEEE1789		
	Weight(N.W.)	600g $\pm$ 10g		
	Dimensions	247 $\times$ 44.5 $\times$ 28.5mm(L $\times$ W $\times$ H)		

*This driver is suitable for connecting LED lighting fixtures with resistance current limiting (e.g., LED light strips). If connected to fixtures with built-in constant current IC for current limiting, it will generate an instantaneous inrush current dozens of times higher than normal, causing the driver to activate overload protection (manifested as hiccup and strobing). When placing an order, it is necessary to specify such fixtures with built-in constant current IC for current limiting (e.g., MR16 bulbs, underground lights, wall washers, constant current hard light strips, etc.), so that a special program can be flashed into the driver.

*The product complies with the harmonic emission requirements.

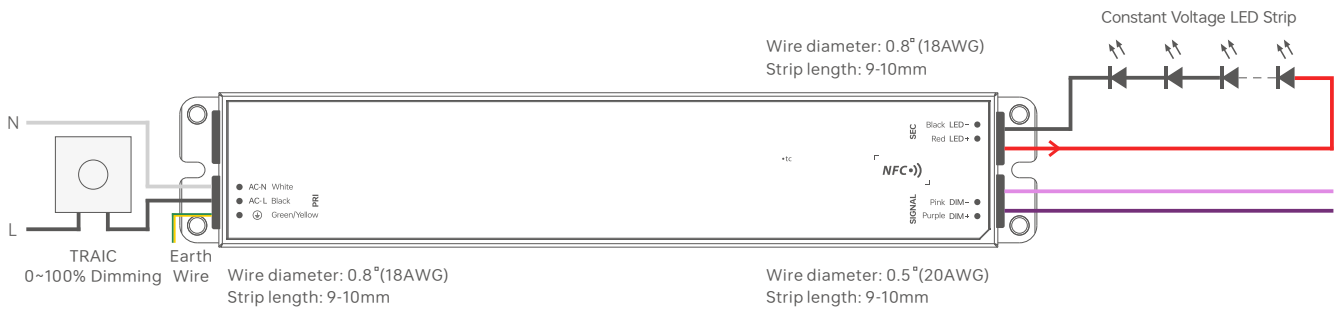
Product Size

Unit:mm



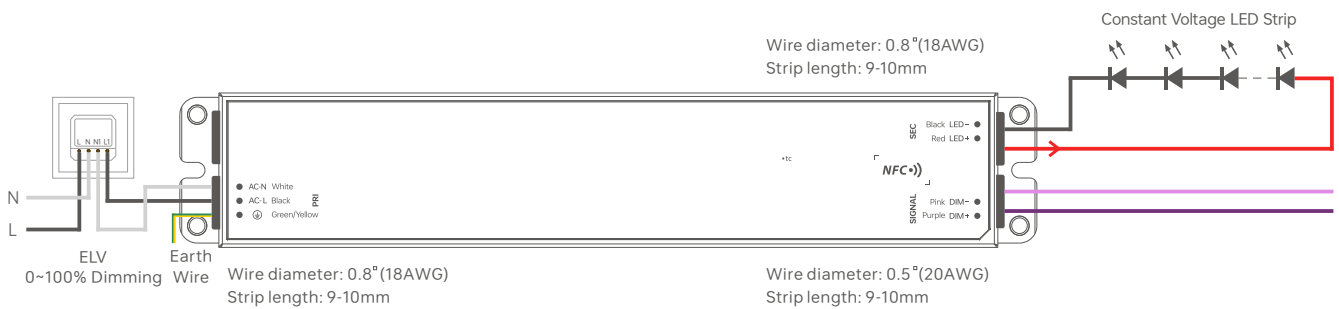
Wiring Application Diagram

Triac Connection Method



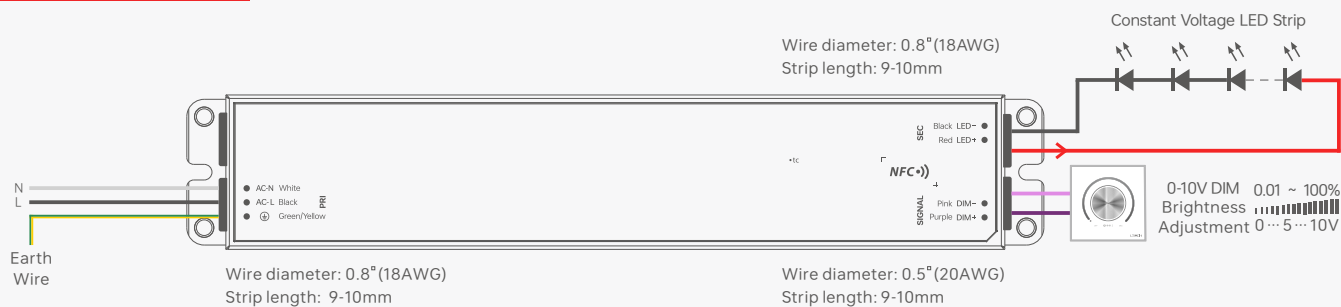
- * When using TRIAC dimming, the 0-10V signal must not be short-circuited or grounded; otherwise, the dimming function will be affected.
- * The 0-10V dimmer and the TRIAC dimmer must not be connected simultaneously.

ELV Connection Method



- * When using TRIAC dimming, the 0-10V signal must not be short-circuited or grounded; otherwise, the dimming function will be affected.
- * The 0-10V dimmer and the TRIAC dimmer must not be connected simultaneously.

0-10V Connection Method



* The 0-10V dimmer and the TRIAC dimmer must not be connected simultaneously.

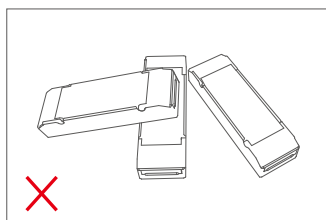
* In the same 0-10V dimmer circuit, it is recommended to use only products of the same specification and model to achieve better consistent dimming performance.

Recommended TRIAC-Compatible Dimmers

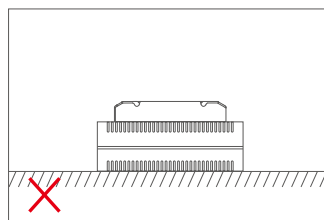
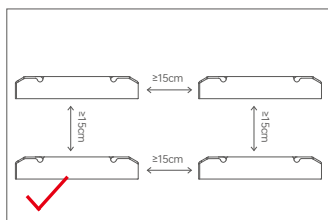
Manufacturer	Lutron	Lutron	Lutron	Lutron	MAXXIMA	Legrand	Legrand
Model	DNG-600P	MACL-153M	DVCL-253P	SCL-153P-WH	DM620	WSCL450W	LS600

* The above list contains recommended dimmers for TRIAC testing. For TRIAC dimmers not included in the recommended list, they can only be used after actual testing confirms no abnormalities; there are no compatibility issues with 0-10V dimmers.

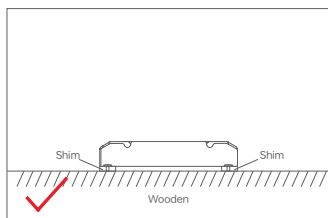
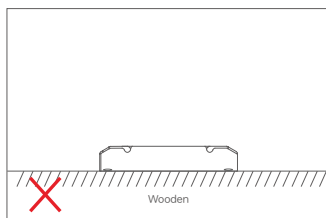
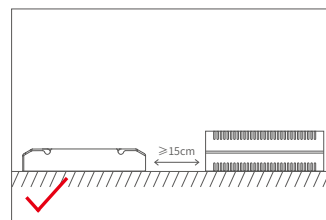
Installation Precautions



Please do not stack the products. The distance between two products should be $\geq 15\text{cm}$ so as not to affect heat dissipation and the lifespan of the products.

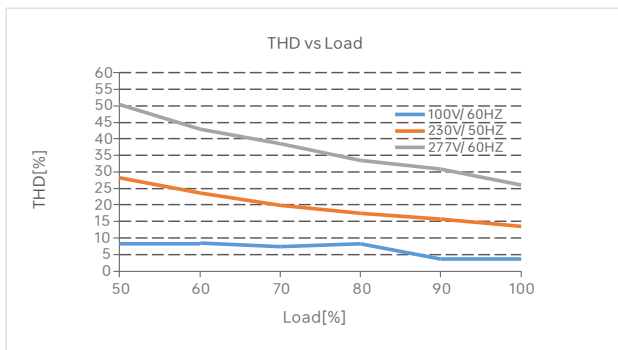
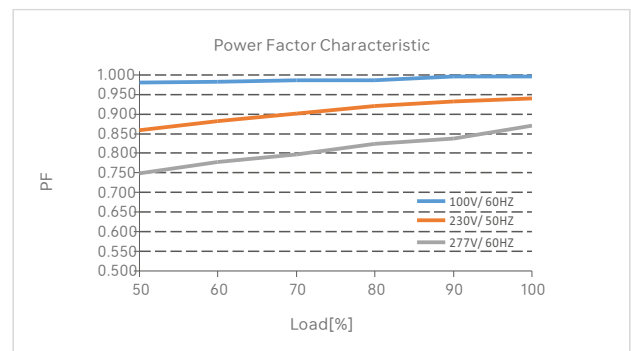
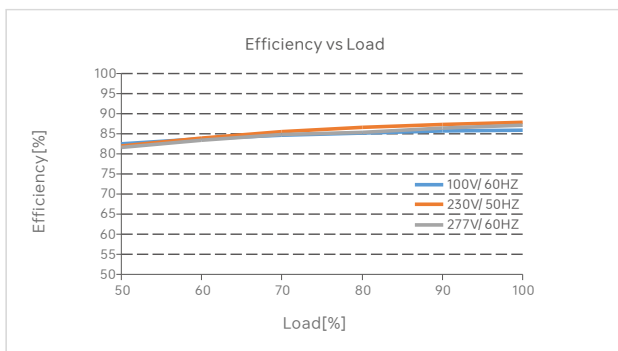
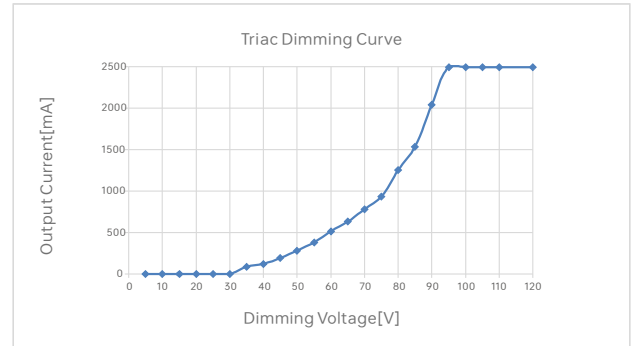
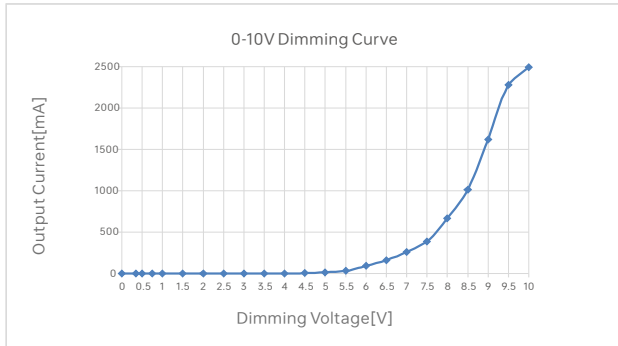


Please not place the products on LED drivers. The distance between the product and the driver should be $\geq 15\text{cm}$ so as not to affect heat dissipation and shorten the lifespan of the products.

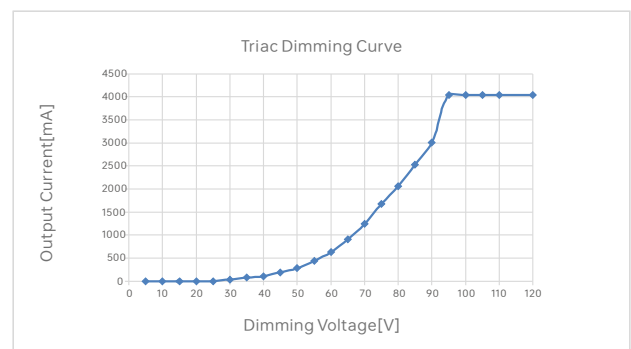
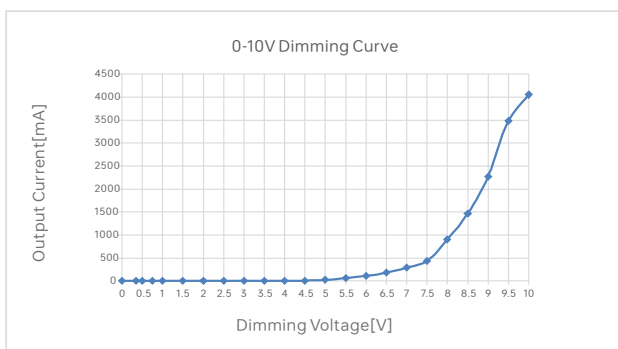


Please do not fasten the product screws tightly against the wooden board. Instead, add a washer of $\geq 7\text{mm}$ under the fixing screws. Leaving a gap can effectively dissipate heat, preventing any impact on the product's heat dissipation and service life.

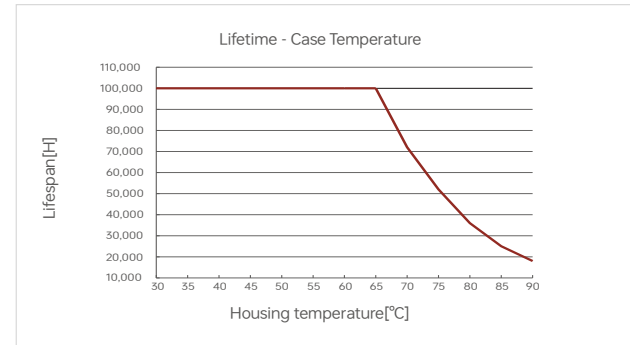
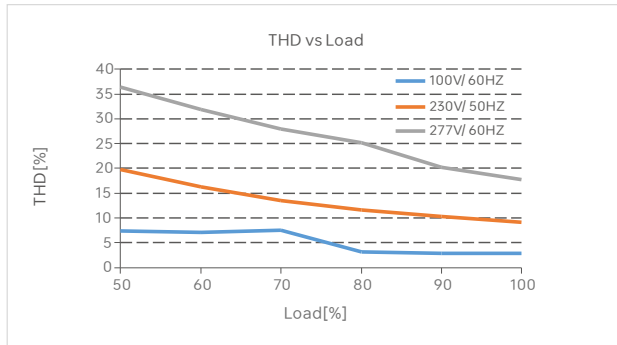
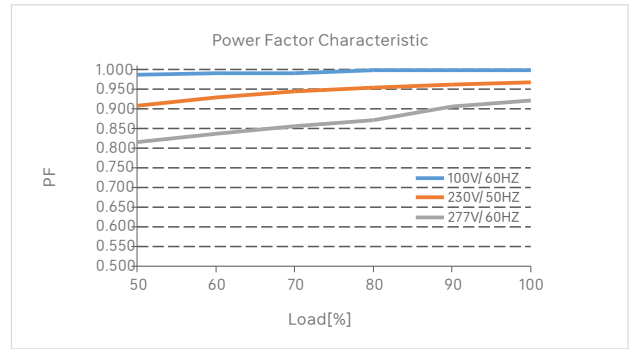
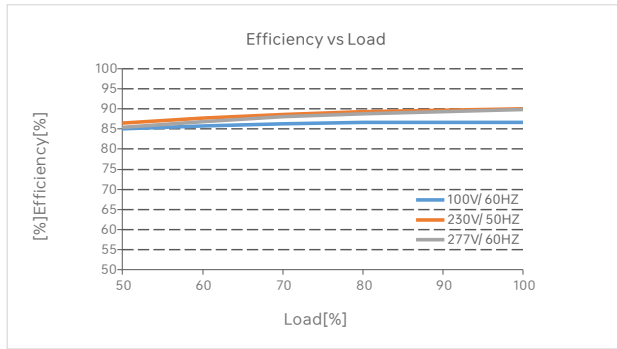
Relationship Diagrams



LA-60-24-U1L



LA-96-24-U1L



LA-96-24-U1L

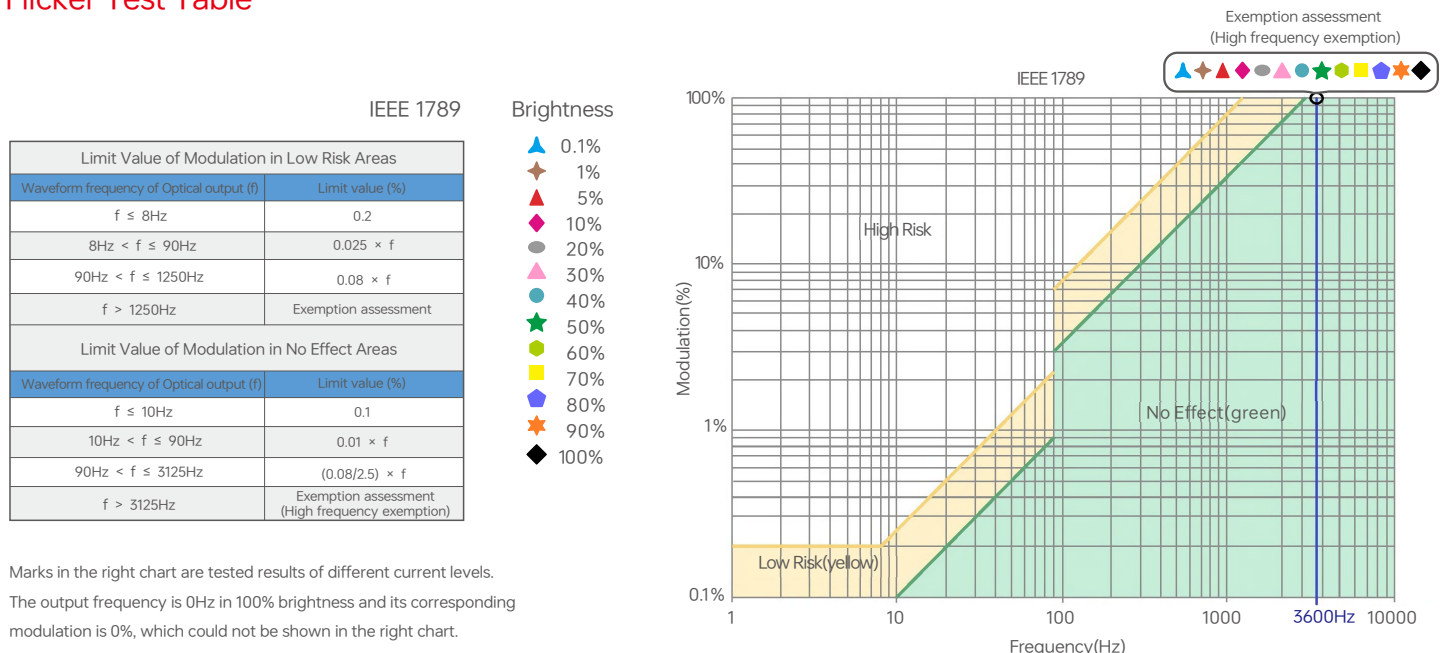
Surge Current & Corresponding Miniature Circuit Breaker (MCB) Load Capacity Table

MCB Model	B10	B13	B16	B20	B25	C10	C13	C16	C20	C25	D10	D13	D16	D20	D25
Maximum Load Capacity	20	26	32	40	50	23	30	37	47	58	27	34	42	53	66

Remarks:

1. Test Conditions: Cold start 27A(Test twidth=340us tested under 50% Ipeak)/230V~(LA-60-24-U1L), Cold start 29A(Test twidth=340us tested under 50% Ipeak)/230V~(LA-96-24-U1L),
2. The number of supported drivers may vary depending on the brand and model of the MCB.
- 3.It is recommended not to exceed the specified load capacity during on-site installation. The actual load should be determined based on field conditions.
- 4.If the ambient temperature exceeds 30°C or multiple MCBs are installed side by side, the number of installed drivers must be reduced and recalculated accordingly.
- 5.Electricians typically use Type B MCBs for residential lighting and Type C MCBs for commercial lighting applications.
- 6.Different testing equipment may yield variations in measured current peaks and pulse widths. Always use professional-grade instruments for accurate testing.

Flicker Test Table



Use the NFC Lighting APP

Scan the QR code below with your mobile phone and follow the prompts to complete the APP installation (According to performance requirements, you need to use a NFC-capable Android phone, or an iPhone 8 and later that are compatible with iOS 13 or higher).



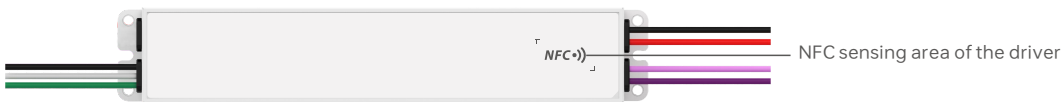
* Before you begin setting the parameters of the driver, please make sure the driver is powered off .

Read/Write the LED driver

Use your NFC-capable phone to read LED driver data, then edit the parameters and they can be directly written to the driver.

1.Read the LED driver

On the APP home page, click 【Read/Write LED driver】 , then keep the programmer's sensing area close to the NFC logo of the driver to read the driver parameters.

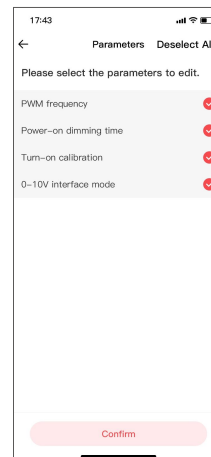
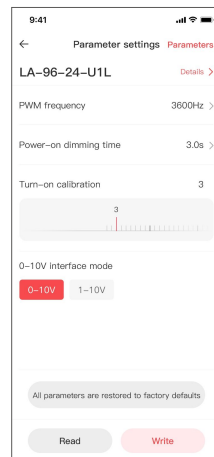
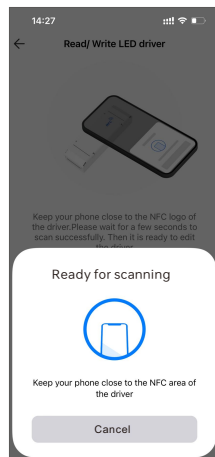
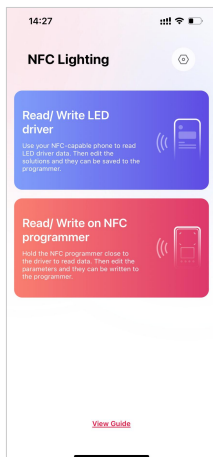


2.Edit the parameters

Click 【Parameter settings】 to edit more advanced parameters such as PWM frequency, power-on dimming time, turn-on calibration, and 0-10V interface mode.

3.Write to the driver

After completing the parameter settings, click 【Write】 in the upper right corner, and keep the programmer's sensing area close to the NFC sensing area of the driver, so the parameters can be written to the driver.



Packaging specification

Model	LA-60-24-U1L/LA-96-24-U1L
Package box size	273×60×35mm (L×W×H)
Packing carton size	290×200×145mm (L×W×H)
Quantity	5PCS per layer; 2 layers per box; 10PCS per box
Weight	0.65kg/PCS;7kg±5%/carton

Packaging style drawing



Inner packaging box



Full box packaging

Transportation and Storage

1. Transportation

Products can be shipped via vehicles, boats and planes.

During transportation, products should be protected from rain and sun. Please avoid severe shock and vibration during the loading and unloading process.

2. Storage

The storage conditions should comply with the Class I Environmental Standards. The products that have been stored for more than six months are recommended to be re-inspected and can be used only after they have been qualified.

Attentions

- Products shall be installed by qualified professionals.
 - LTECH products are and not lightningproof non-waterproof (special models excepted). Please avoid the sun and rain. When installed outdoors, please ensure they are mounted in a water proof enclosure or in an area equipped with lightning protection devices.
 - Good heat dissipation will prolong the working life of products. Please ensure good ventilation.
 - Please check if the working voltage used complies with the parameter requirements of products.
 - The diameter of wire used must be able to load the light fixtures you connect and ensure the firm wiring.
 - Before you power on products, please make sure all the wiring is correct in case of incorrect connection that causes damage to light fixtures.
 - If a fault occurs, please do not attempt to fix products by yourself. If you have any question, please contact your suppliers.
- * This manual is subject to changes without further notice. Product functions depend on the goods. Please feel free to contact our official distributors if you have any question.

Warranty Agreement

- Warranty periods from the date of delivery: 5 years.
- Free repair or replacement services for quality problems are provided within warranty periods.

Warranty exclusions below:

- Beyond warranty periods.
- Any artificial damage caused by high voltage, overload, or improper operations.
- Products with severe physical damage.
- Damage caused by natural disasters and force majeure.
- Warranty labels and barcodes have been damaged.
- No any contract signed by LTECH.

1. Repair or replacement provided is the only remedy for customers. LTECH is not liable for any incidental or consequential damage unless it is within the law.

2. LTECH has the right to amend or adjust the terms of this warranty, and release in written form shall prevail.

ZHUHAI LTECH TECHNOLOGY CO., LTD.

LED智能调光驱动器(恒压型)

- 金属外壳，易于散热；
- 支持0-10V/1-10V/10V PWM/RX调光，支持前沿(Triac)，后沿(ELV)调光，兼容性强，可兼容路创、罗格朗等多种美观调光器；
- 使用手机APP通过NFC可更改电源参数，实现驱动器数据交互功能；
- 调光范围0~100%，LED从0.01%开始调光；
- 带软启动渐亮功能，让人眼视觉更舒服；
- 调光接口具备光电隔离，符合最新的安规标准，更安全可靠；
- 信号悬空时，满载输出，可作为电源使用；
- 创新的热管理技术，智能保护电源寿命；
- 过温、过压、过载、短路保护，可自动恢复；
- IP20，适用于室内LED灯具；
- 符合Type HL，可用于北美Class 1，Division 2的场合，如加油站、化工厂、污水处理厂等；
- 常规使用下寿命可达10万小时；
- 通过了UL Class 2，Class P认证；
- 符合IEEE1789、UL8750标准；
- 5年保修期（采用黑金刚电容）；

6合1调光
Triac
ELV
0-10V
1-10V
10V PWM
RX

调光

T-PWM
超深度调光技术

无频闪
IEEE1789
高频豁免考核级别

Dimmable:
1:10000MAX



认证图标仅代表产品正在进行一系列的认证申请，认证资质以产品实物为准。

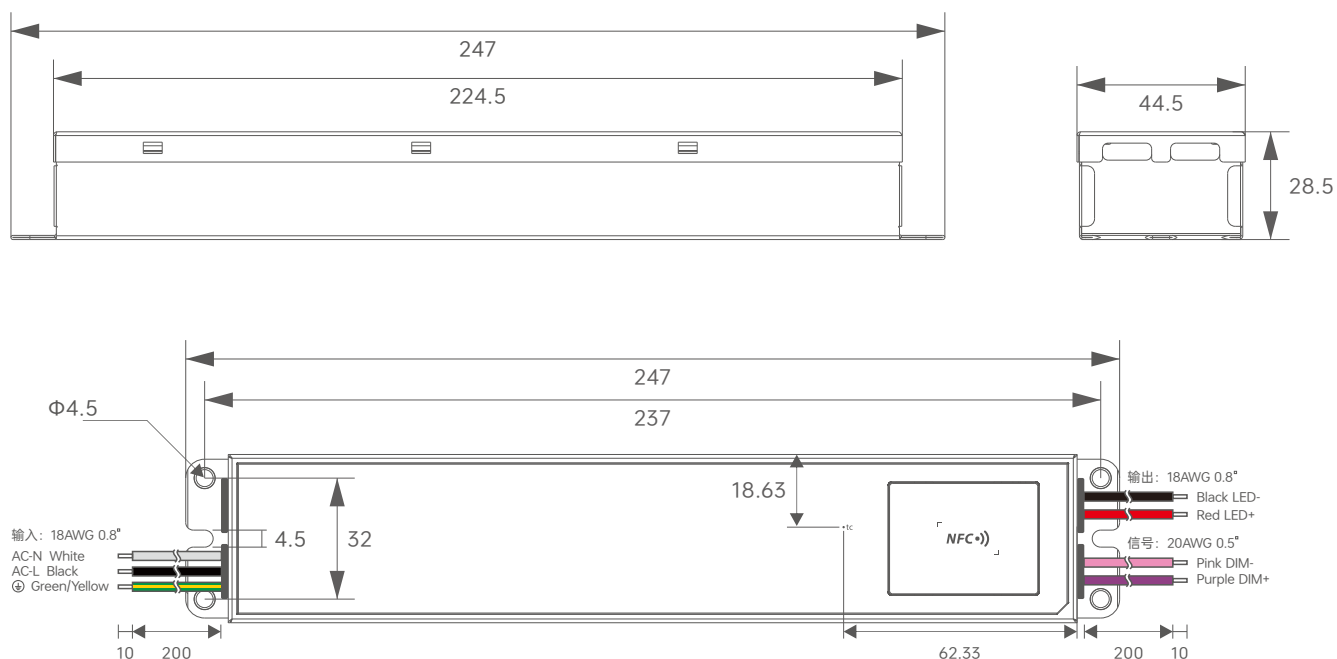
技术参数

型号	LA-60-24-U1L		LA-96-24-U1L	
输出	输出电压	24V $\overline{\text{m}}$		
	输出电压范围	24V $\pm$ 0.5V $\overline{\text{m}}$		
	输出电流	Max. 2.5A	Max. 4A	
	输出功率	Max. 60W	Max. 96W	
	输出功率范围	0~60W	0~96W	
	频闪级别	高频豁免考核级别/IEEE1789		
	调光范围	0~100%，调光深度：0.01%		
	过功率限制	$\geq 102\%$		
	纹波与噪声	开关纹波 $\leq 120\text{mV}$ ，噪声 $\leq 500\text{mV}$		
输入	PWM调光频率	300-22000Hz		
	调光接口	Triac/ELV,0-10V(1-10V/10V PWM/RX)		
	输入电压	100-277V~		
	输入直流电压	220-250V $\overline{\text{m}}$		
	频率范围	0/50/60Hz		
	输入电流	Max. 0.77A/100V~，0.35A/230V~，0.32A/277V~(满载)	Max. 1.2A/100V~，0.52A/230V~，0.46A/277V~(满载)	
	功率因数	PF>0.95/100V~，PF>0.9/230V~，PF>0.85/277V~(满载)	PF>0.95/100V~，PF>0.95/230V~，PF>0.9/277V~(满载)	
	总谐波失真THD	100V~@THD<6%，230V~@THD<18%，277V~@THD<30% (满载)	100V~@THD<6%，230V~@THD<15%，277V~@THD<25% (满载)	
	空载功耗	< 4.5W@230V~		
	效率(Typ.)	83%/100V~，87%/230V~，87%/277V~	84%/100V~，89%/230V~，89%/277V~	
	浪涌电流	冷启动，27A/(在50%Ipeak下测试twidth=340us)/230V~		冷启动，29A/(在50%Ipeak下测试twidth=340us)/230V~
环境	抗浪涌	L-N: 2KV，L,N-FG: 4KV		
	漏电流	Max. 0.5mA		
	工作温度	ta: -20 ~ 50°C tc: 75°C		
	工作湿度	20 ~ 95%RH, 无冷凝		
	储存温度/湿度	-40 ~ 80°C, 10~95%RH		
保护	温度系数	$\pm 0.03\%/^{\circ}\text{C}$ (-20 ~ 55°C)		
	耐振动	10-500HZ, 2G 12分钟/周期，X，Y，Z轴各72分钟		
	过温保护	根据PCB温度超标情况($\geq 110^{\circ}\text{C}$)，智能调节电流输出或关闭，可自动恢复		
	过载保护	负载电流 $\geq 102\%$ ，关闭输出，可自动恢复		
	短路保护	输出线路短路进入打嗝模式，可自动恢复		
安规和电磁规格	过压保护	空载电压 $\geq 28\text{V}$ ，关闭输出，可自动恢复		
	耐压	输入对输出：3750V~/1min/ < 5mA，输入对地(FG)：1500V~/1min/ < 5mA，输出对地(FG)：500V~/1min/ < 5mA，信号对地(FG)：500V~/1min/ < 5mA		
	绝缘阻抗	输入对输出：100M Ω /500V~/1min/25°C/70%RH		
	安全规范	UL	美国	UL8750，UL1310，Class P
		CUL	加拿大	CSA C22.2 No.250.13
		CE	欧盟	EN61347-1，EN61347-2-13，EN62384
	电磁兼容发射	FCC	美国	FCC part15B
		CE	欧盟	EN55015，EN61000-3-2，EN61000-3-3，EN61547
	电磁兼容抗扰度	EN61000-4-2,3,4,5,6,8,11,EN61547		
其他	频闪测试	IEEE1789		
	产品重量	600g $\pm$ 10g		
	产品尺寸	247 $\times$ 44.5 $\times$ 28.5mm(L $\times$ W $\times$ H)		

本款驱动器适合连接电阻限流的LED灯具(如LED灯条)。如果连接内置恒流IC限流的灯具，会产生几十倍的瞬间浪涌电流，导致驱动器会执行过载保护(打嗝频闪)。下单时这类内置恒流IC限流的灯具需要注明(如MR16灯杯、地埋灯、洗墙灯、恒流硬灯条等)，以便烧写特殊程序。

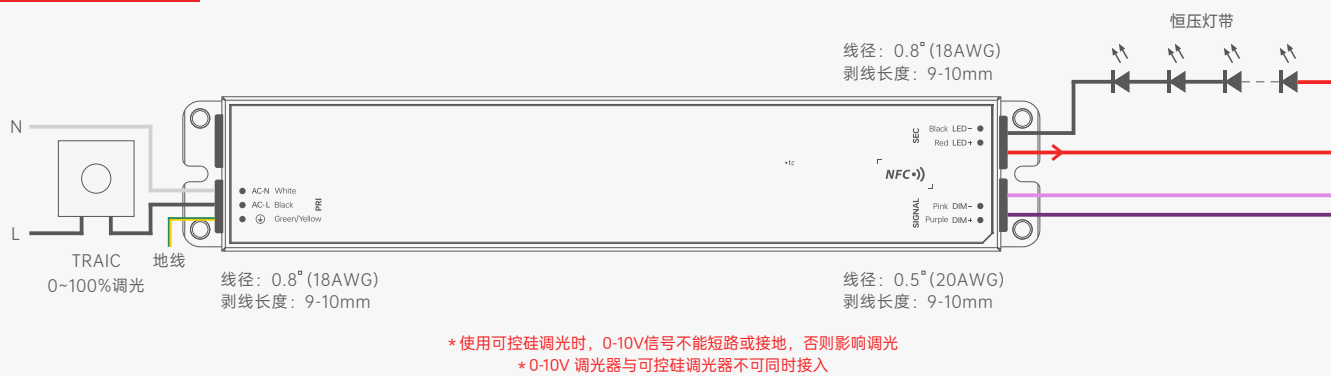
尺寸图

单位: mm

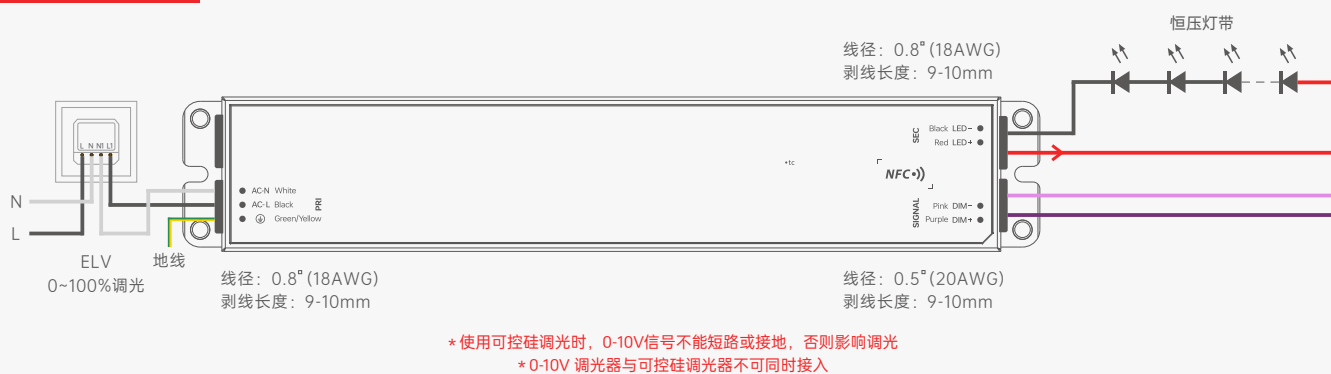


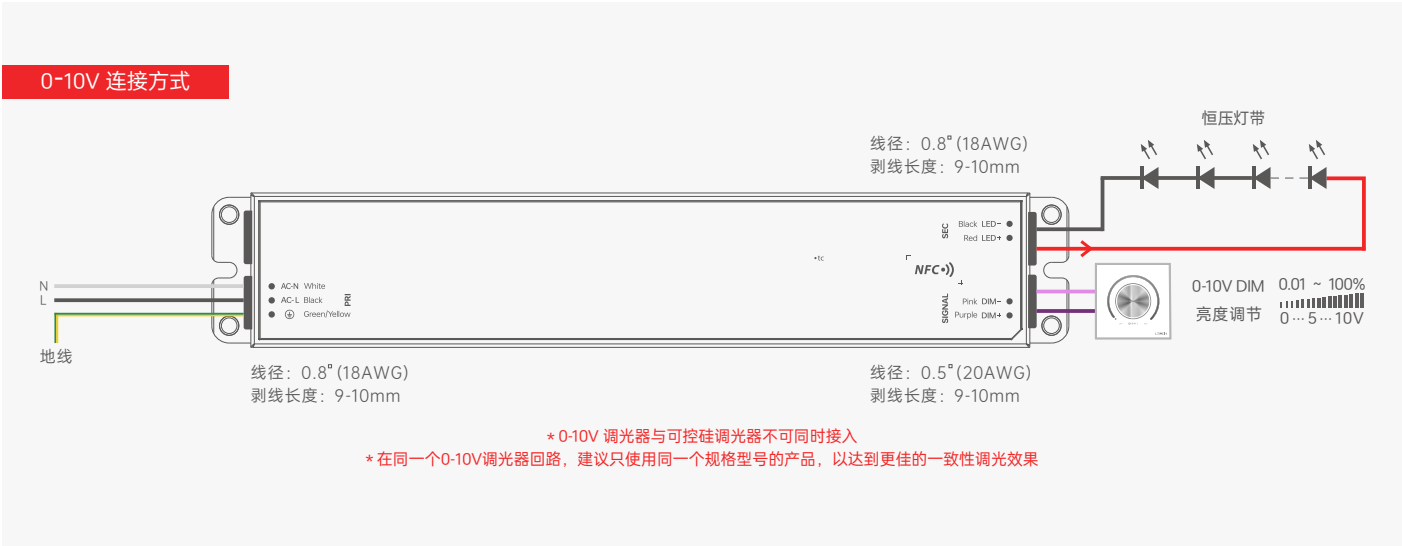
接线应用图

Triac 连接方式



ELV 连接方式





可控硅适配调光器推荐

制造商	路创	路创	路创	路创	MAXXIMA	罗格朗	罗格朗
型号	DNG-600P	MACL-153M	DVCL-253P	SCL-153P-WH	DM620	WSCL450W	LS600

* 以上清单为可控硅测试推荐调光器, 未推荐的可控硅调光器需根据实际测试确认无异常后使用; 0-10V无兼容性问题。

安装注意事项

❌

✅

❌

✅

❌

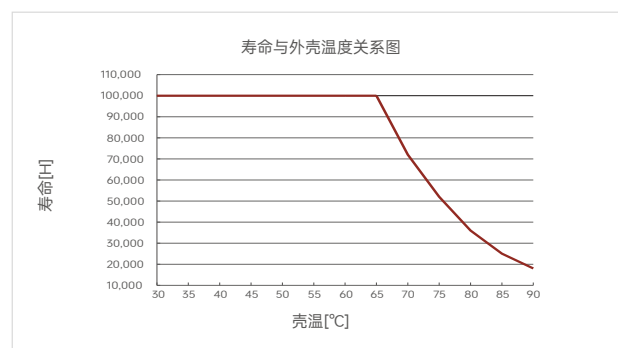
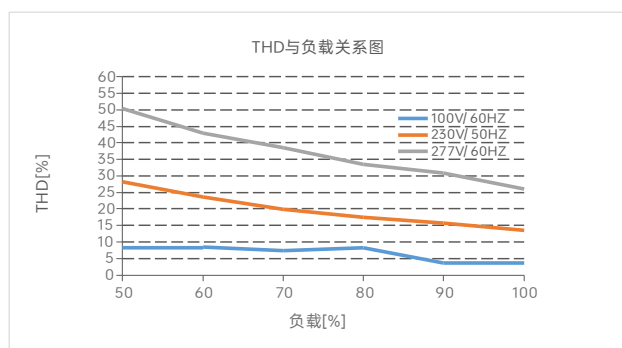
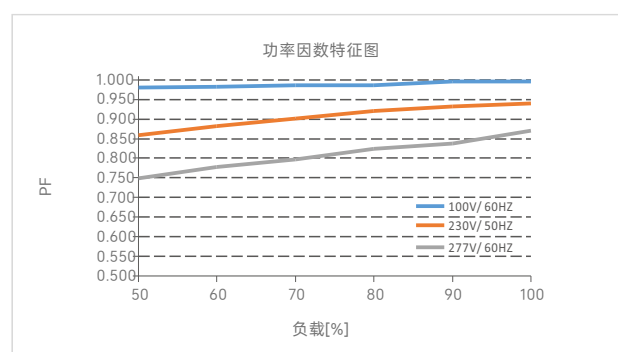
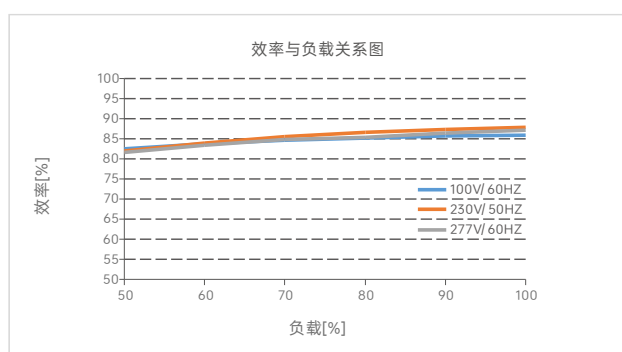
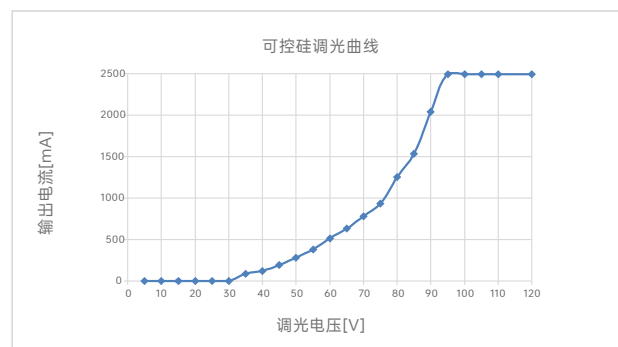
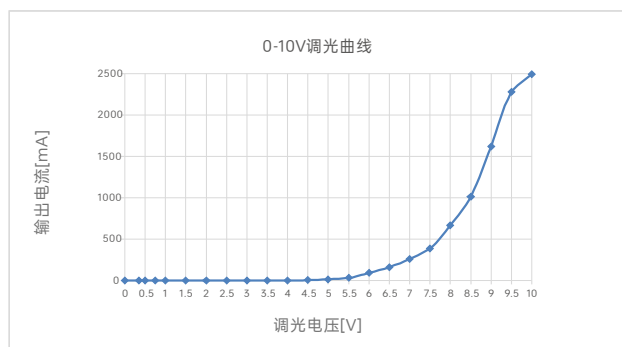
✅

请勿将产品堆叠摆放, 产品与产品间隔距离应 $\geq 15\text{cm}$, 避免影响产品散热和使用寿命。

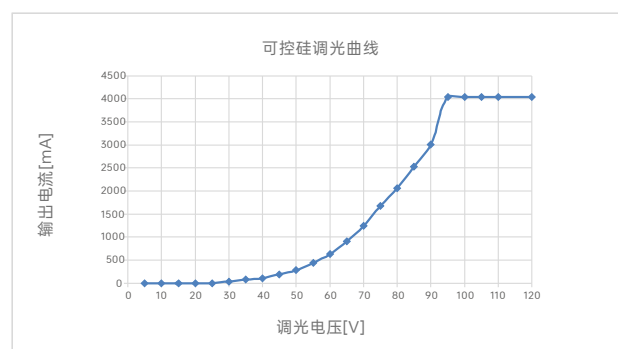
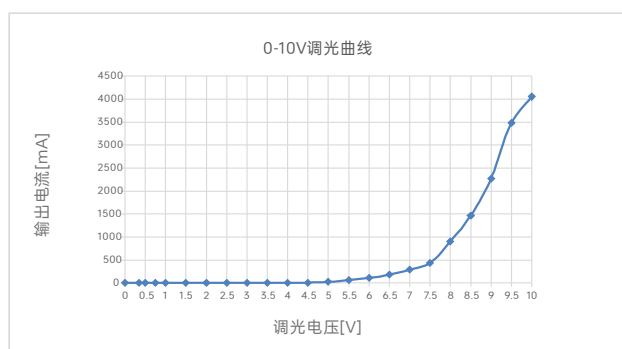
请勿将产品置于电源上方, 与电源间隔距离应 $\geq 15\text{cm}$, 避免影响产品散热而减少使用寿命。

请勿将产品螺丝固定紧贴于木板, 应在固定螺丝下增加 $\geq 7\text{mm}$ 的垫片, 留点空隙可以有效散热, 避免影响产品散热和使用寿命。

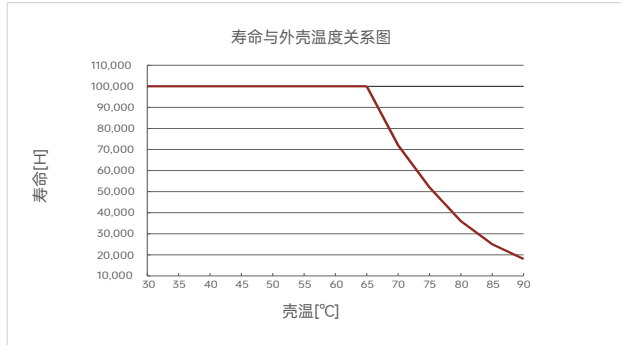
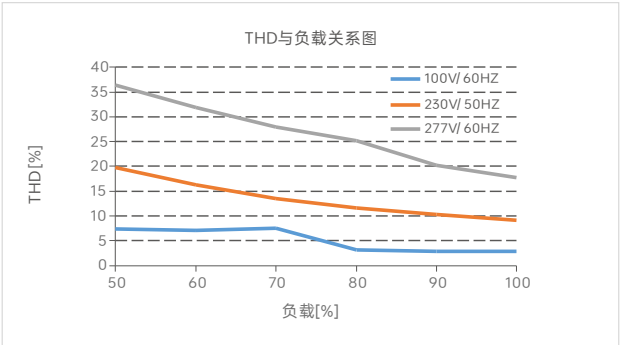
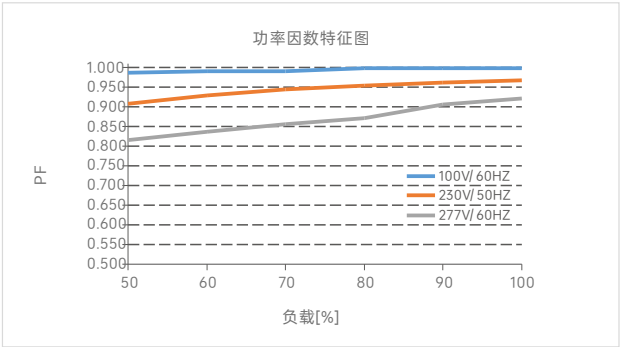
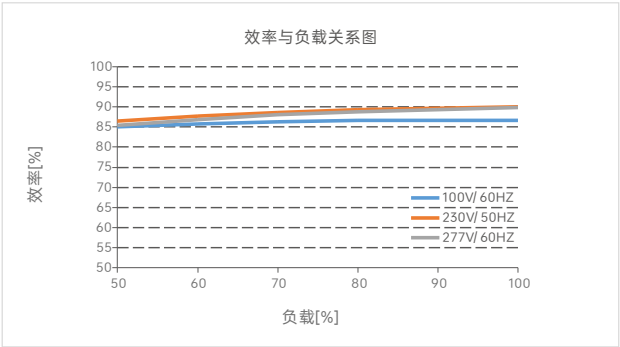
关系图表



LA-60-24-U1L



LA-96-24-U1L



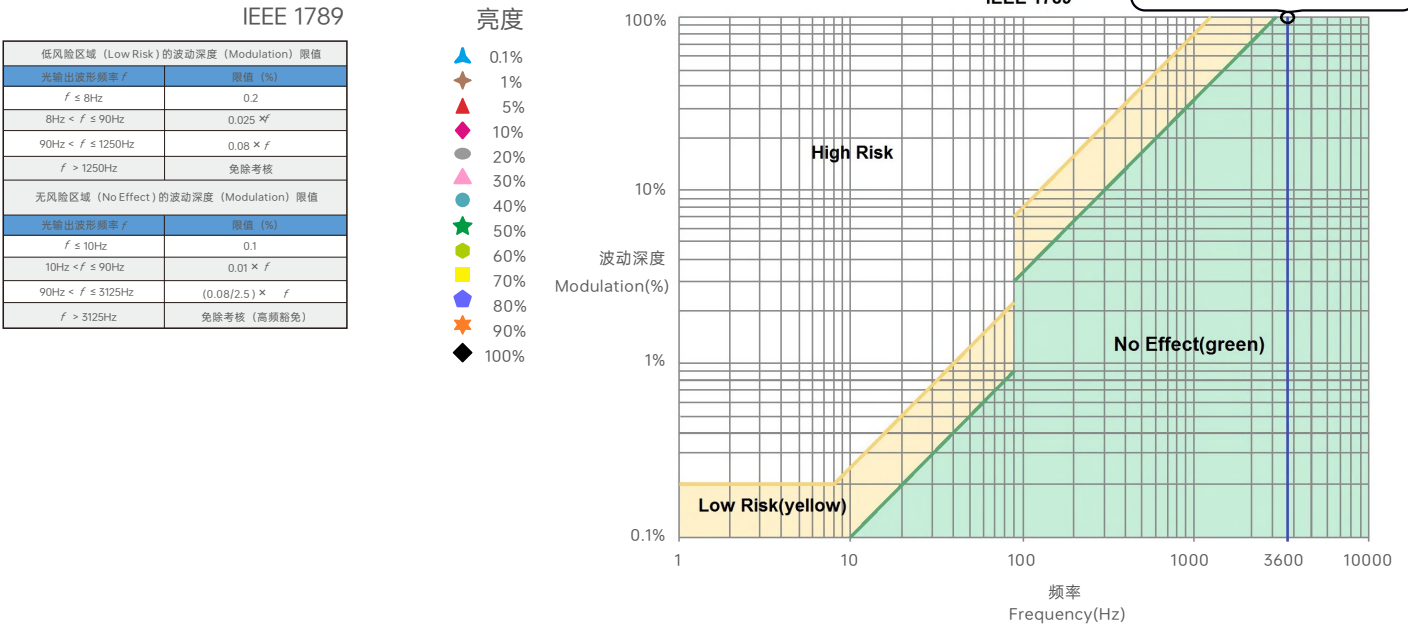
LA-96-24-U1L

浪涌电流&对应的微型断路器(MCB)下挂载的数量对应表

微型断路器型号	B10	B13	B16	B20	B25	C10	C13	C16	C20	C25	D10	D13	D16	D20	D25
最大带载数量	20	26	32	40	50	23	30	37	47	58	27	34	42	53	66

- 备注:
1. 本数据测试条件: 冷启动, 27A(在50%Ipeak下测twidth=340us)@230V~(LA-60-24-U1L); 冷启动, 29A(在50%Ipeak下测twidth=340us)@230V~(LA-96-24-U1L)
 2. 对于不同品牌和型号的微型断路器, 驱动器的数量会有所不同;
 3. 现场安装时建议不要超过上述数量, 具体负载量以现场安装为准;
 4. 当微型断路器的安装环境温度超过30°C或多个微型断路器并排安装时, 安装的驱动器数量将减少, 这需要重新计算;
 5. 电工通常考虑将B型MCB用于家用照明, 将C型MCB用于商业照明;
 6. 不同仪器设备测试出来的电流峰值和脉冲宽度有差异, 请使用专业仪器设备测试;

频闪测试表



搭配 NFC Lighting APP 使用

通过手机扫描下方二维码，按提示完成APP安装。

(因性能需求，要求手机型号苹果：iPhone 8及以上、且操作系统iOS13及以上； 安卓：具备NFC功能机型)



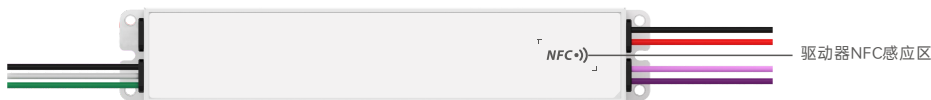
* 设置驱动器参数时，必须在驱动器断电情况下进行操作。

读/写智能电源

使用手机，通过NFC读取驱动器信息，根据需求设置参数后，可直接写入驱动器。

1. 读取驱动器

在APP“首页”点击【读/写智能设备】，将手机感应区域靠近驱动器NFC感应区，读取驱动器参数。



2. 编辑参数

点击【参数管理】可编辑PWM频率、通电渐变时间、起亮校准、0-10V接口方式等更多高级参数。

3. 写入驱动器

参数设置完成后，点击右上角【写入】，将手机感应区域靠近驱动器NFC感应区，即可写入驱动器成功修改参数。



包装规格

型号	LA-60-24-U1L/LA-96-24-U1L
包装盒尺寸	273×60×35mm (L×W×H)
包装箱尺寸	290×200×145mm (L×W×H)
数量	5个/层; 2层/箱; 10个/箱
重量	0.65kg/个; 7kg±5%/箱

包装样式图



包装盒



整箱包装

运输和贮存

1. 运输

产品适用车、船、飞机交通运输工具运输。

在运输中，应使用遮蓬进行防雨和防晒，并保持文明装卸，不应有剧烈振动、撞击等。

2. 贮存

贮存符合I类环境的规定。贮存期限超过6个月的产品建议重新检验，合格后方可使用。

注意事项

- 请由具有专业资格的人员进行调试安装。
- 雷特产品（专有型号除外）不能防水，需避免日晒雨淋，如安装在户外，请用防水箱。
- 良好的散热条件会延长产品的使用寿命，请把产品安装在通风良好的环境。
- 请检查使用的工作电压是否符合产品的参数要求。
- 使用的电线直径大小必须能够负载连接的LED灯具，并确保接线牢固。
- 通电调试前，应确保所有接线正确，以避免因接线错误而导致灯具损坏。
- 如果发生故障，请勿私自维修；如果有疑问，请联系供应商。

* 本说明书的内容如有变更，恕不另行通知。若内容与您使用的功能有所不同，则以实物为准。如有疑问，请与供应商联系。

保修条例

- 自出厂之日起保修服务期为5年。
- 在保修服务期内出现产品质量问题雷特科技将给予免费修理或更换服务。

非保修条例：

属下列情况不在免费保修或更换服务范围之内：

- 已经超出保修服务期；
- 过高电压、超负载、操作不当等人为造成的损坏；
- 产品外形严重损坏或变形；
- 自然灾害以及人力不可抗拒原因造成的损坏；
- 产品保修标签和产品唯一条形码损坏；
- 无雷特科技签订的合同或发票凭证。

1. 修理或更换是雷特科技对客户的一补救措施。雷特科技不承担任何附带引起的损害赔偿，除非在适用法律范围之内。

2. 雷特科技享有修正或调整本保修条款的权利，并以书面形式发布为准。

珠海雷特科技股份有限公司

地址：珠海市香洲区水岸一路183号

网址：www.ltech.cn