

Intelligent LED Driver (Constant Voltage)

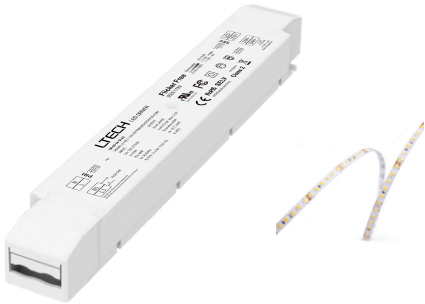
- Small size and light weight. Adopt SAMSUNG/COVESTRO V0 flame resistant polycarbonate protective housings.
- The clamshell design and screwless type for strain-relief. The design of dismountable end cap allows you to adjust the length of housing depending on your needs.
- With soft-on and fade-in dimming function, enhancing your visual comfort.
- Dimming from 0~100%, down to 0.1%.
- High frequency exemption level.
- Automatically recognize 0-10V and 1-10V input signals.
- Ultra-low consumption of 0-10V ports < 0.05mA.
- The secure and reliable design for signal isolation.
- Innovative thermal management technology protects the power life intelligently.
- Overheat, over voltage , overload, short circuit protection and automatic recovery.
- Suitable for indoor light applications of I/II/III type.
- Up to 50,000-hour life time.
- 5-year warranty (Rubycon capacitor).

Flicker-Free
IEEE 1789

Dimmable:
0.1%~100%



Use only within an enclosure.



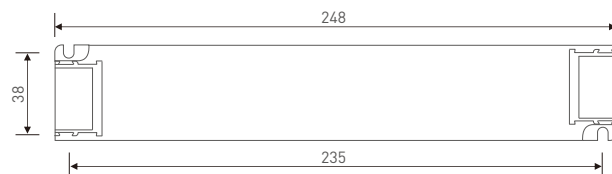
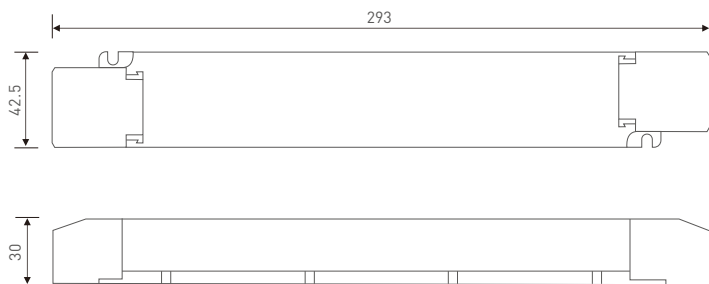
Technical Specs

Model		LM-60-24-U1A2			LM-60-12-U1A2	
OUTPUT	Output Voltage	24Vdc			12Vdc	
	Output Voltage Range	24Vdc±0.5Vdc			12Vdc±0.5Vdc	
	Output Current	Max. 2.5A			Max. 5A	
	Output Power	Max. 60W				
	Output Power Range	0-60W				
	Strobe Level	High frequency exemption level				
	PWM Frequency	3600Hz				
	Dimming Range	0~100%, down to 0.1%				
	Overload Power Limitation	≥102%				
	Ripple & Noise	Switch ripples≤100mV, noise≤200mV			Switch ripple≤200mV, noise≤400mV	
INPUT	Dimming Interface	0-10V[1-10V/10V PWM/RX], Push DIM				
	Input Voltage	120-277Vac				
	Frequency	50/60Hz				
	Input Current	0.6A/120Vac, 0.35A/230Vac, 0.3A/277Vac				
	Power Factor	PF>0.99/120Vac, PF>0.95/230Vac, PF>0.9/277Vac (at full load)				
	THD	120Vac@THD < 5%, 230Vac@THD < 7%, 277Vac@THD < 10% (at full load)				
	Efficiency [typ.]	91%			90%	
	Standby Power Loss	<0.5W				
	Inrush Current	Cold start 45A/230Vac (Test twidth = 840us under 50% Ipeak)				
	Anti Surge	L-N: 2KV				
	Leakage Current	Max. 0.5mA				
	ENVIRONMENT	Working Temperature	ta: -20~50℃ tc: 85℃			
Working Humidity		20-95%RH, non-condensing				
Storage Temperature,Humidity		-40~80℃, 10-95%RH				
Temperature Coefficient		±0.03%/℃[-20~50℃]				
Vibration		10~500Hz, 2G 12min/1cycle, 72 min for X, Y and Z axes respectively				
PROTECTION	Overheat Protection	Intelligently adjust or turn off the output current if the PCB temperature ≥110℃, and recover automatically				
	Overvoltage Protection	Shut down the output when non-load voltage>28V, and recover automatically			Shut down the output when non-load voltage≥14V, and recover automatically	
	Overload Protection	Shut down the output when current load>102%, and recover automatically				
	Short Circuit Protection	Enter hiccup mode if short circuit occurs, and recover automatically				
SAFETY & EMC	Withstand Voltage	I/P-O/P: 3750Vac				
	Isolation Resistance	I/P-O/P: 100MΩ/500VDC/25℃/70%RH				
	Safety Standards	UL	America	UL8750		
		CUL	Canada	CSA C22.2 NO. 250. 13		
		CE	European Union	EN61347-1, EN61347-2-13, EN62384		
	EMC Emission	UL	America	FCC part 15		
		CE	European Union	EN55015, EN61000-3-2, EN61000-3-3, EN61547		
	EMC Immunity	EN61000-4-2,3,4,5,6,8,11, EN61547				
	Strobe Test Standard	IEEE 1789				
OTHERS	Gross weight[G.W]	285g±10g				
	Dimensions	293×42.5×30mm(L×W×H)				
	Package size	296×44×33mm(L×W×H)				
	Carton Size	315×230×215mm(L×W×H) 30pcs/ctn 9.35kg±5%/ctn				

* The driver is suitable for connecting resistor current-limiting LED fixture (e.g. LED strip). The inrush current will be dozens of times increased if connecting built-in constant current IC current-limiting LED fixtures, the driver will activate the overload protection (hiccups flickering). When you order, please remark controlling the constant current LED fixture [e.g. MR16 lamp, underground light, LED wall washer, constant current LED strip, etc.], so that we can prepare them with special procedures.

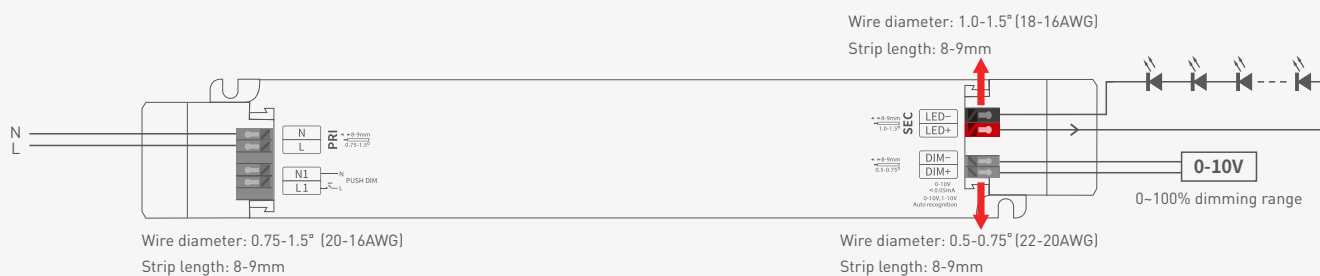
Product Size

Unit: mm

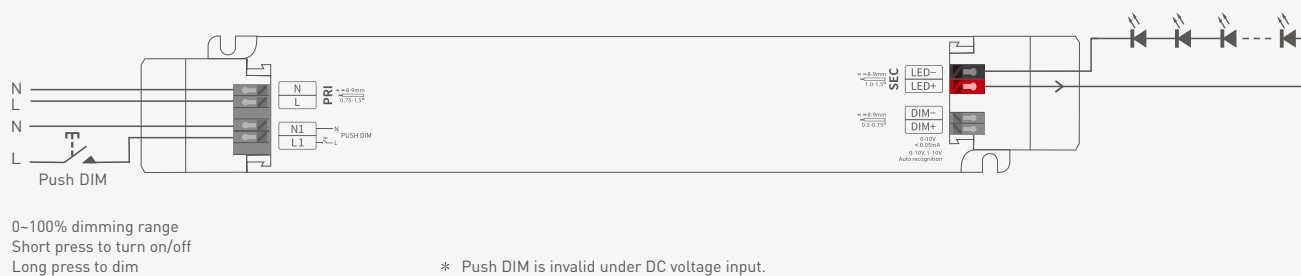


Wiring Diagram

0-10V Connection

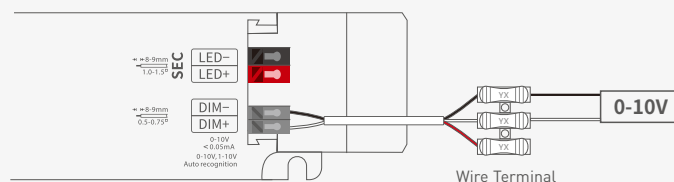


Push DIM Connection



- * Push DIM is invalid under DC voltage input.
- * Dimming interface priority: 0-10V first , Push DIM next.

Wire Terminal Connection (used in signal port only)



Push DIM



Reset switch

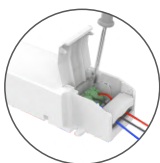
- On/off control: Short press.
- Stepless dimming: Long press.
- With every other long press, the brightness level goes to the opposite direction.
- Dimming memory: Go to the brightness level adjusted previously when lights are turned on.

Protective Housing Application Diagram

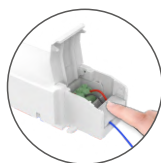
Tension plate



1. Pry up the protecting housing in the side plate position with a tool.

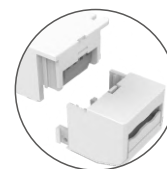


2. Connect to electrical wires with a screwdriver as wiring diagram shows.



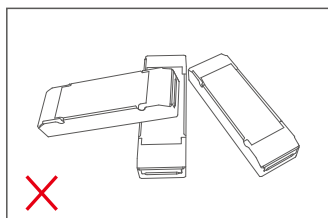
3. Press down the tension plate to fix the the electrical wires, then close the protective housing.

Remove the protective housing

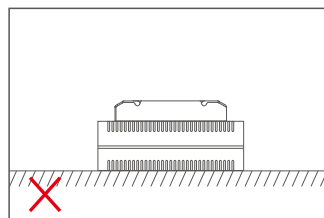
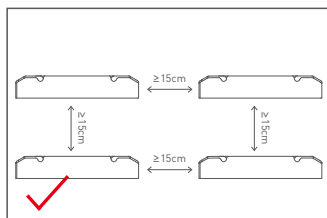


Pull the housing left and right from the bottom to remove it.

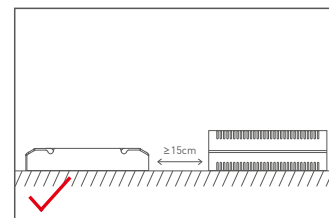
Installation Precautions



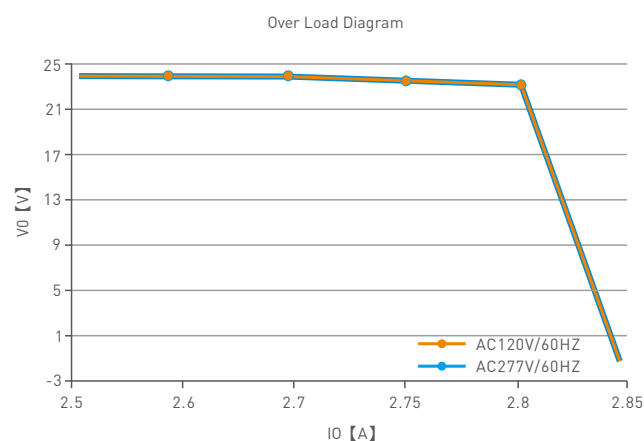
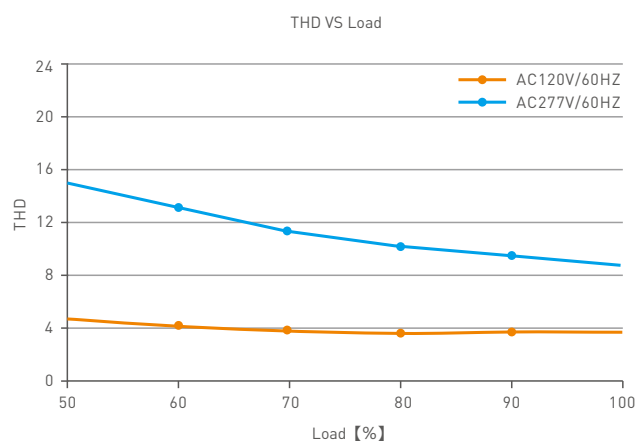
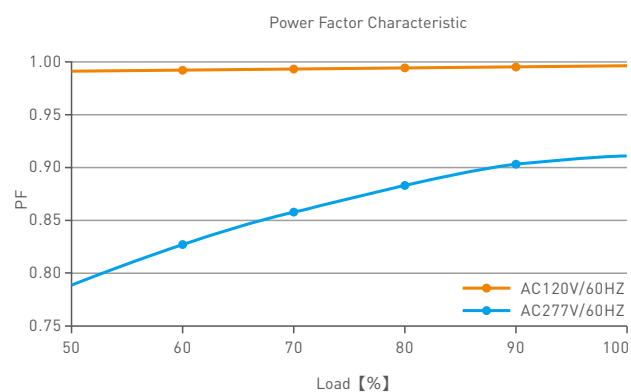
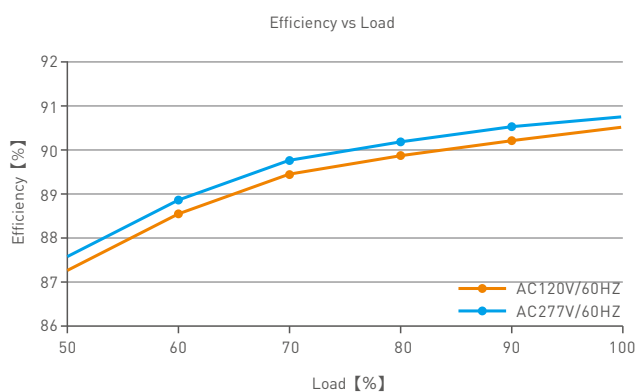
Please do not stack the products. The distance between two products should be $\geq 15\text{cm}$ so as not to affect heat dissipation and the lifespan of the products.



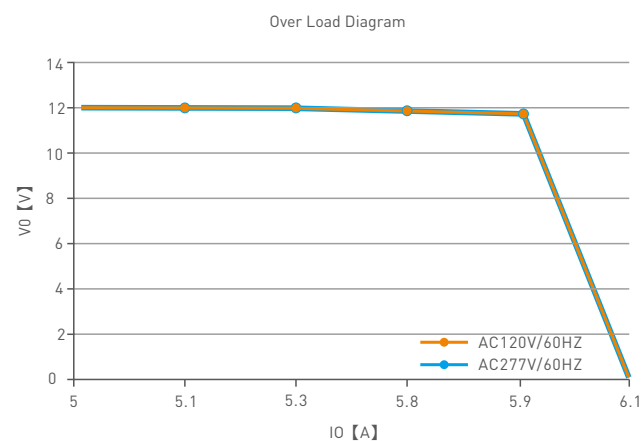
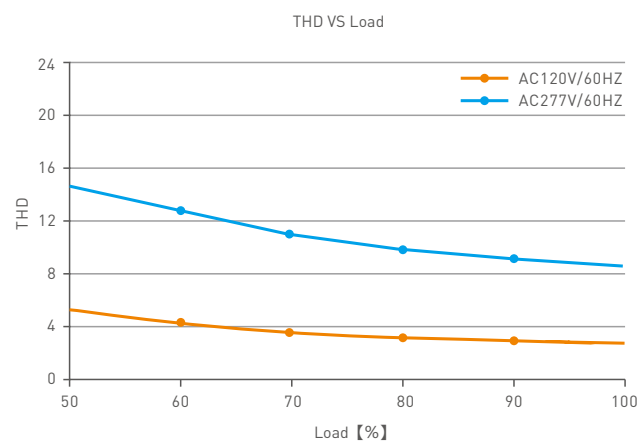
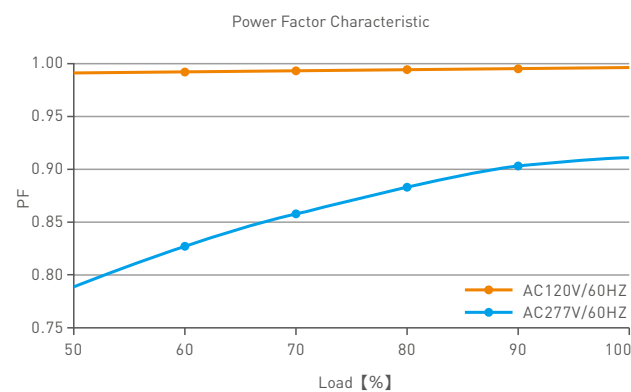
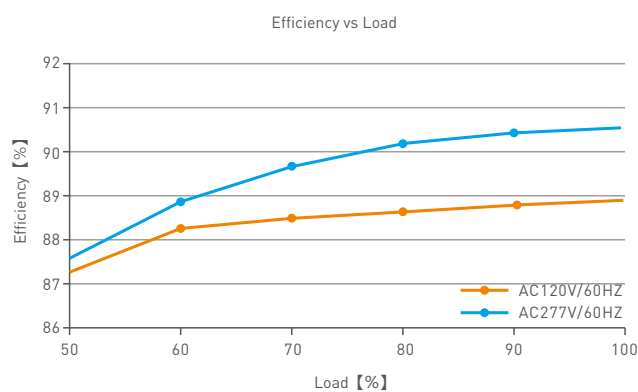
Please not place the products on LED drivers. The distance between the product and the driver should be $\geq 15\text{cm}$ so as not to affect heat dissipation and shorten the lifespan of the products.



Relationship Diagrams



LM-60-24-U1A2



LM-60-12-U1A2

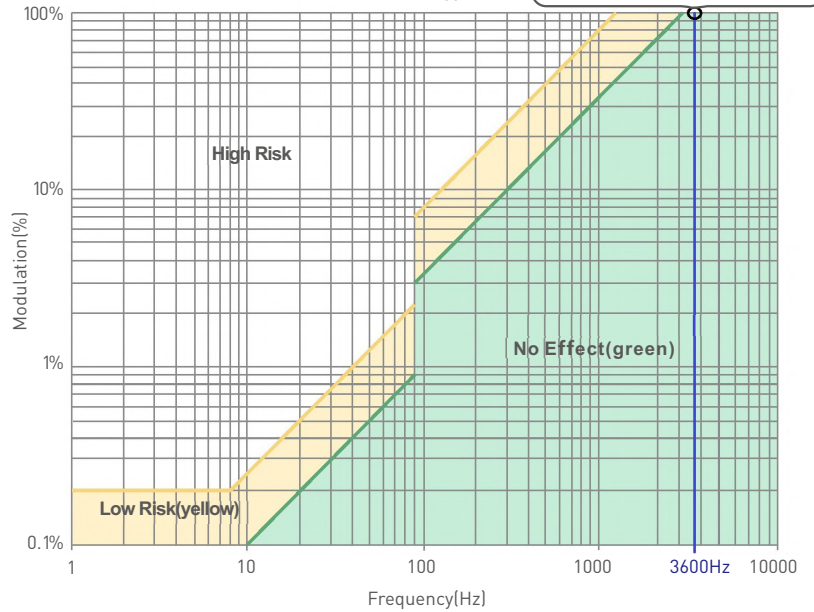
Flicker Test Table

IEEE 1789

Limit Value of Modulation in Low Risk Areas	
Waveform frequency of Optical output (f)	Limit value (%)
$f \leq 8\text{Hz}$	0.2
$8\text{Hz} < f \leq 90\text{Hz}$	$0.025 \times f$
$90\text{Hz} < f \leq 1250\text{Hz}$	$0.08 \times f$
$f > 1250\text{Hz}$	Exemption assessment
Limit Value of Modulation in No Effect Areas	
Waveform frequency of Optical output (f)	Limit value (%)
$f \leq 10\text{Hz}$	0.1
$10\text{Hz} < f \leq 90\text{Hz}$	$0.01 \times f$
$90\text{Hz} < f \leq 3125\text{Hz}$	$(0.08/2.5) \times f$
$f > 3125\text{Hz}$	Exemption assessment [High frequency exemption]

Brightness

- ▲ 0.1%
- ▲ 1%
- ▲ 5%
- ▲ 10%
- 20%
- ▲ 30%
- 40%
- ★ 50%
- 60%
- 70%
- 80%
- ★ 90%
- ◆ 100%



Marks in the right chart are tested results of different current levels. The output frequency is 0Hz in 100% brightness and its corresponding modulation is 0%, which could not be shown in the right chart.

Attentions

- Products shall be installed by qualified professionals.
 - LTECH products are non-waterproof (special models excepted). Please avoid the sun and rain. When installed outdoors, please ensure it is mounted in a water proof enclosure.
 - Good heat dissipation will extend 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.

Update Log

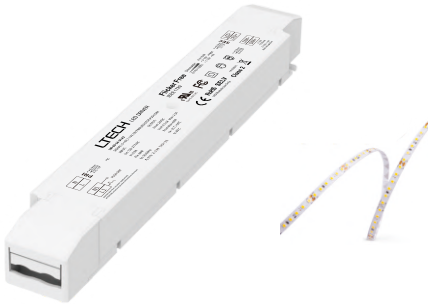
Version	Updated Time	Update Content	Updated by
A0	2021.03.25	Original version	Liu Weili
A1	2021.12.10	Update product silk screen	Liu Weili
A2	2022.04.28	The connection diagram of the terminal with wire is added to the wiring diagram	Liu Weili

LED智能调光驱动器 (恒压型)

- 体积小、重量轻; 采用SAMSUNG/COVESTRO PC V0阻燃保护壳
- 免螺丝压线翻盖设计, 可拆卸端盖, 按需调节壳体长度
- 带软启动渐亮功能, 让人眼视觉更舒服
- 调光范围: 0-100%, LED从0.1%开始调光
- 高频豁免考核级别
- 自动识别0-10V、1-10V输入
- 0-10V端口超低消耗<0.05mA
- 安全可靠的信号隔离设计
- 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
- 适合室内 I、II、III类灯具应用
- 高达50,000小时的额定寿命
- 5年保修期 (采用红宝石电容)

无频闪
IEEE 1789

Dimmable:
■■■■■■■■■■
0.1%-100%



Type TL 85/72.3°C

RoHS

SELV

Class 2

Use only within an enclosure.

0-10V
PUSH DIM

过温保护

过压保护

过载保护

短路保护

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。

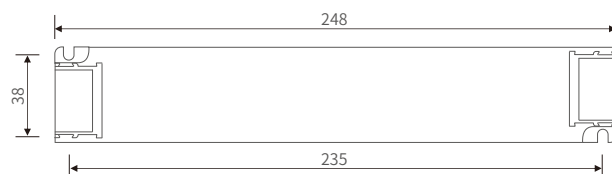
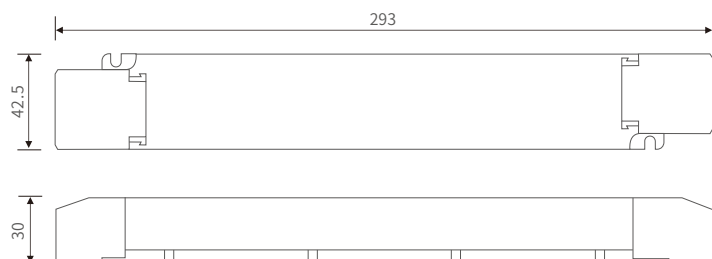
技术参数

型号		LM-60-24-U1A2			LM-60-12-U1A2		
输出	输出电压	24Vdc				12Vdc	
	输出电压范围	24Vdc±0.5Vdc				12Vdc±0.5Vdc	
	输出电流	Max. 2.5A				Max. 5A	
	输出功率	Max. 60W					
	输出功率范围	0-60W					
	频闪级别	高频豁免考核级别					
	PWM频率	3600Hz					
	调光范围	0~100%, 调光深度: 0.1%					
	过功率限制	≥102%					
纹波与噪声	开关纹波≤100mV, 噪声≤200mV				开关纹波≤200mV, 噪声≤400mV		
输入	调光接口	0-10V(1-10V/10V PWM/RX), Push DIM					
	输入电压	120-277Vac					
	频率范围	50/60Hz					
	输入电流	0.6A/120Vac, 0.35A/230Vac, 0.3A/277Vac					
	功率因数	PF>0.99/120Vac, PF>0.95/230Vac, PF>0.9/277Vac (满载)					
	谐波THD	120Vac@THD<5%, 230Vac@THD<7%, 277Vac@THD<10% (满载)					
	效率(Typ.)	91%				90%	
	待机功耗	<0.5W					
	浪涌电流	冷启动45A/230Vac (在50% Ipeak下测试twidth=840us)					
	抗浪涌	L-N: 2KV					
漏电流	Max. 0.5mA						
环境	工作温度	ta: -20~50°C tc: 85°C					
	工作湿度	20-95%RH, 无冷凝					
	储存温度/湿度	-40~80°C, 10-95%RH					
	温度系数	±0.03%/°C(-20~50°C)					
	耐振动	10-500HZ, 2G 12分钟/周期, X, Y, Z轴各72分钟					
保护	过温保护	根据PCB温度超标情况(≥110°C), 智能调节电流输出或关闭, 可自动恢复					
	过压保护	输出电压≥28V, 关闭输出, 可自动恢复				输出电压≥14V, 关闭输出, 可自动恢复	
	过载保护	负载电流≥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	耐压	输入对输出: 3750Vac					
	绝缘阻抗	输入对输出: 100MΩ/500VDC/25°C/70%RH					
	安全规范	UL	美国	UL8750			
		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	UL	美国	FCC part 15			
		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					
频闪测试	IEEE 1789						
其他	产品重量	285g±10g					
	产品尺寸	293×42.5×30mm(L×W×H)					
	包装尺寸	296×44×33mm(L×W×H)					
	外箱规格	315×230×215mm(L×W×H) 30个/箱 9.35kg±5%/箱					

* 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。

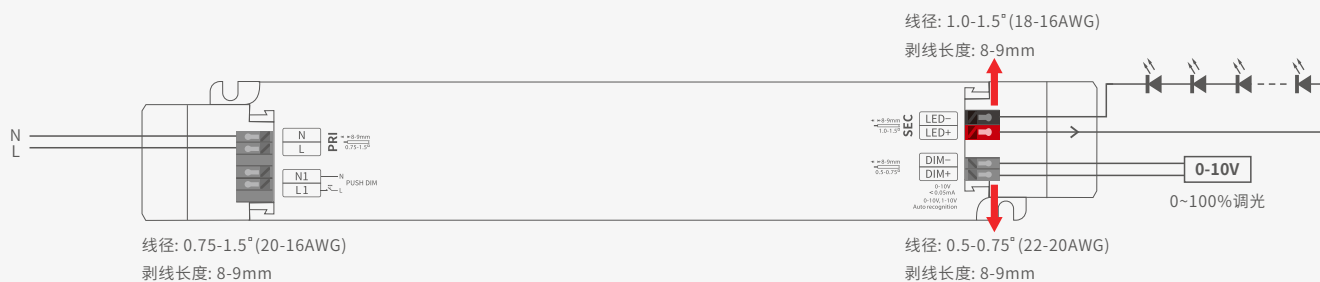
尺寸图

单位:mm

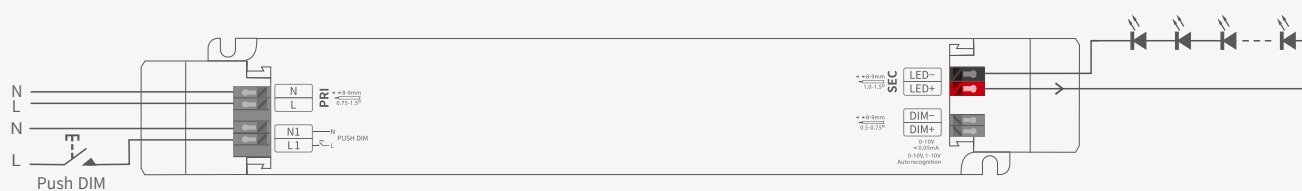


连接应用图

0-10V 连接方式



Push DIM 连接方式



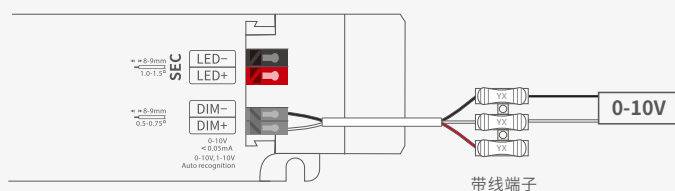
0~100%调光

短按开关, 长按调光

* 在直流电压输入的情况下, 按键调光无效

* 调光接口优先级为: 首先0-10V, 然后Push DIM

带线端子连接示意图 (仅用于信号端)



Push DIM



复位开关

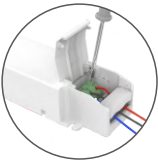
- 开关控制: 短按.
- 无级调光: 长按.
- 每隔一次长按, 亮度会向相反方向调整.
- 调光记忆: 当再次开关时, 灯光会回到先前调整的亮度水平.

保护盖应用图

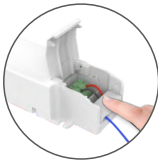
压线板



1. 使用工具撬起压线板侧边即可拆下。

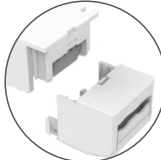


2. 使用螺丝批按照接线图接线。



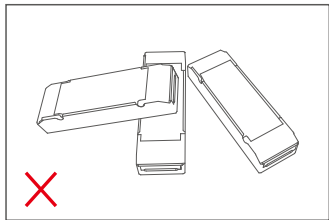
3. 向下按压压线板固定住接线图接线。合上保护盖即可。

保护盖的拆装

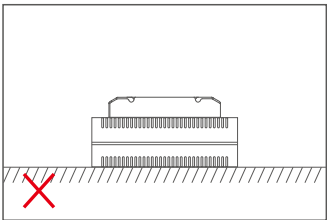
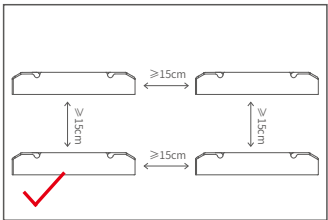


在底部左右掰动, 即可将保护盖拆下。

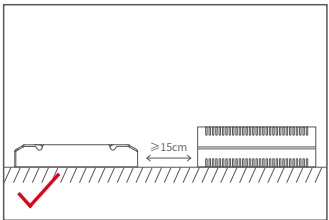
安装注意事项



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。

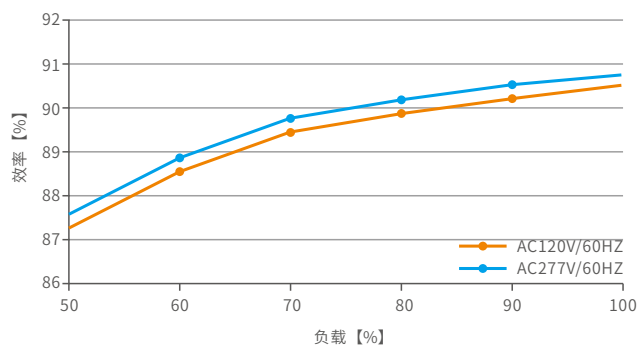


请勿将产品置于电源上方, 与电源间隔距离应 $\geq 15\text{cm}$, 避免影响产品散热而减少使用寿命。

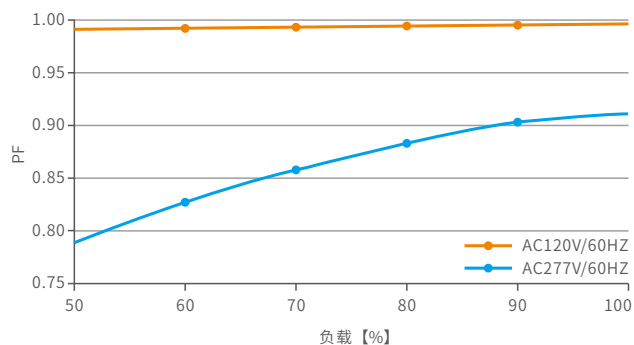


关系图表

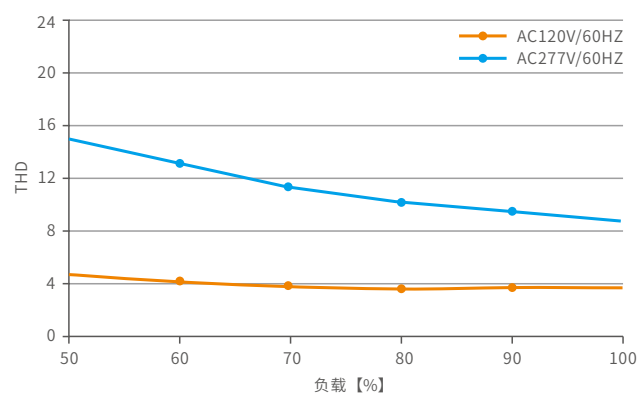
效率与负载关系图



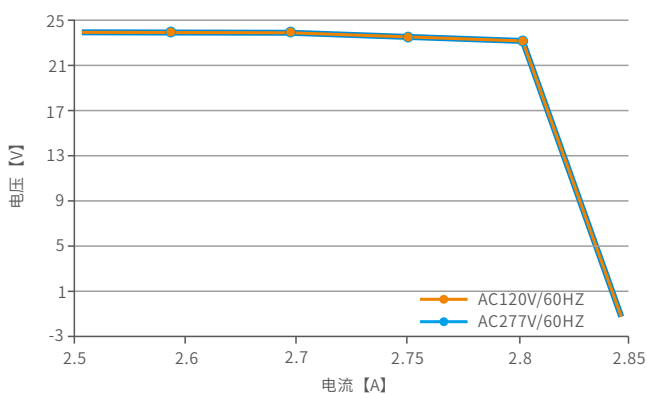
功率因数特征图



THD与负载关系图

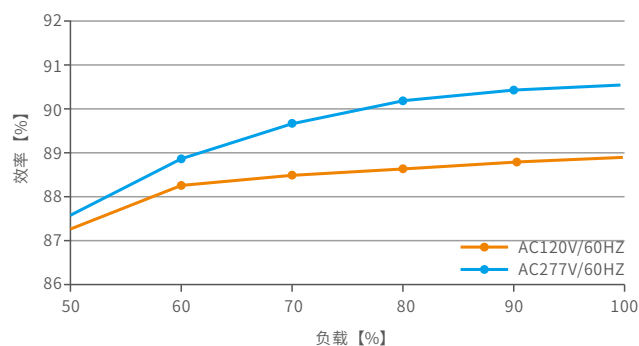


过载曲线

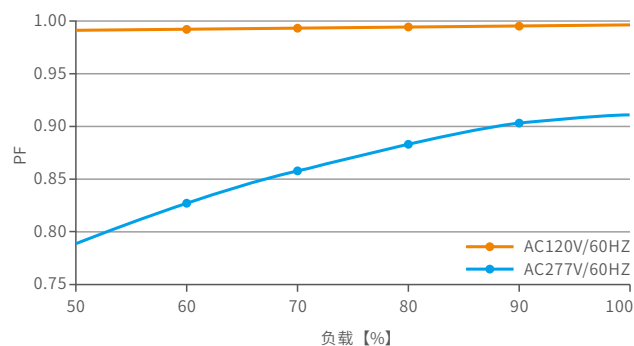


LM-60-24-U1A2

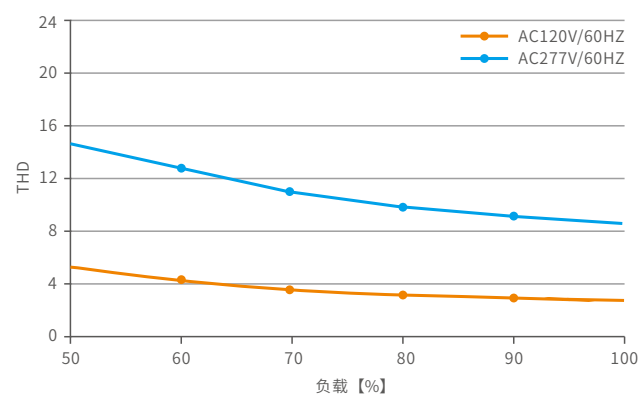
效率与负载关系图



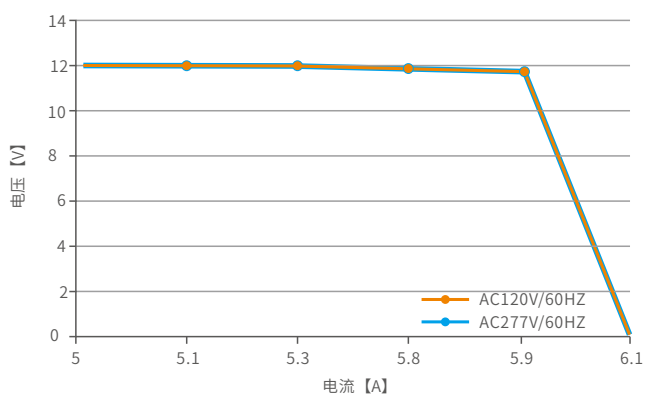
功率因数特征图



THD与负载关系图



过载曲线



LM-60-12-U1A2

频闪测试表

IEEE 1789

低风险区域 (Low Risk) 的波动深度 (Modulation) 限值	
光输出波形频率 f	限值 (%)
$f \leq 8\text{Hz}$	0.2
$8\text{Hz} < f \leq 90\text{Hz}$	$0.025 \times f$
$90\text{Hz} < f \leq 1250\text{Hz}$	$0.08 \times f$
$f > 1250\text{Hz}$	免除考核
无风险区域 (No Effect) 的波动深度 (Modulation) 限值	
光输出波形频率 f	限值 (%)
$f \leq 10\text{Hz}$	0.1
$10\text{Hz} < f \leq 90\text{Hz}$	$0.01 \times f$
$90\text{Hz} < f \leq 3125\text{Hz}$	$(0.08/2.5) \times f$
$f > 3125\text{Hz}$	免除考核 (高频豁免)

- 亮度
- ▲

0.1%
- ◆

1%
- ▲

5%
- ◆

10%
- 20%
- ▲

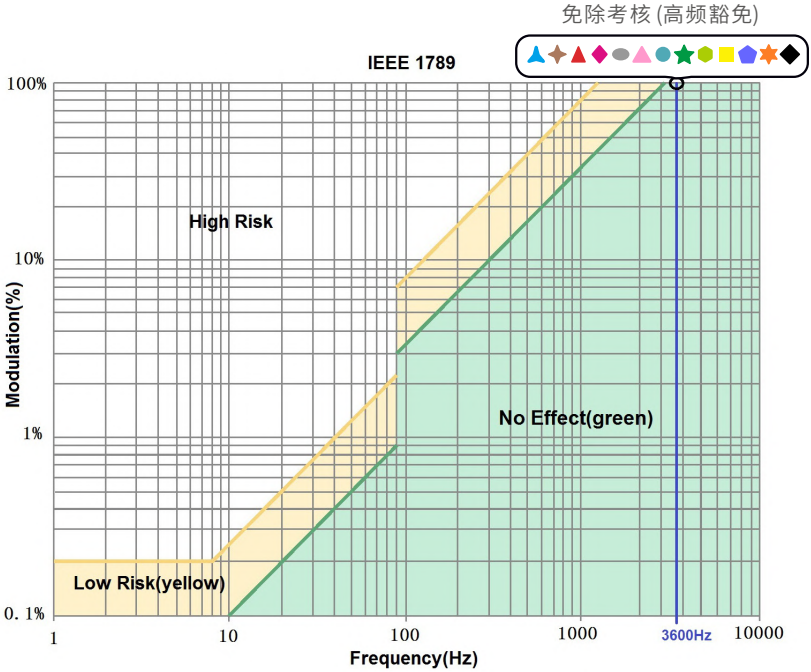
30%
- 40%
- ★

50%
- 60%
- 70%
- ★

80%
- ★

90%
- ◆

100%



右图标识为不同电流档的测试结果。
100%亮度时输出频率为0Hz, 对应波动深度为0%, 无法在右图中示意。

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, 欢迎向我司授权的经销商咨询。

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;
- 无雷特签订的合同或发票凭证。

1. 修理或更换是雷特对客户的唯一补救措施。雷特不承担任何附带引起的损害赔偿責任, 除非在适用法律范围之内。
2. 雷特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。

更新日志

版本	更改日期	更改内容	更改人
A0	2021.03.25	正稿	刘伟丽
A1	2021.12.10	更新产品丝印	刘伟丽
A2	2022.04.28	接线图中增加带线端子连接图	刘伟丽