

## 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.
- The whole dimming process is flicker-free with high frequency exemption level.
- Dimming from 0~100%, down to 0.1%.
- DALI bus standard IEC62386-101, 102, 207.
- Comply with the EU's ErP Directive, stand-by power consumption<0.5W.
- 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).

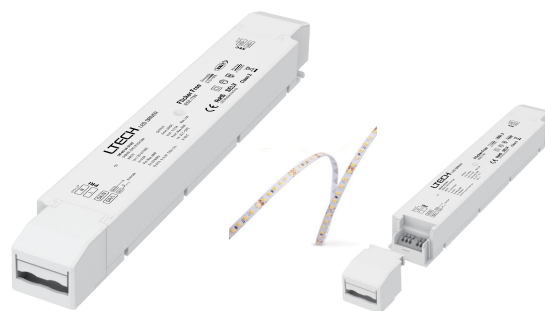


Flicker-free  
IEEE 1789

Dimmable:  
0.1%~100%



The certification icon represents on-going certification applications only, and final certification qualification is subject to actual products.



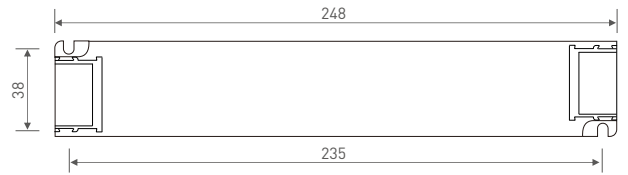
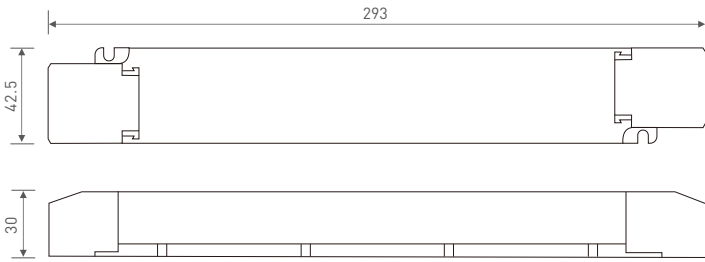
## Technical Specs

| Model                | LM-60-24-U1D2                     | LM-60-12-U1D2  |   |  |
|----------------------|-----------------------------------|--|---|--|
| 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 ripple≤100mV, noise≤200mV   | Switch ripple≤200mV, noise≤400mV  |  |
| INPUT                | Dimming Interface                 | DALI-2, 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°C tc: 85°C  |   |  |
|                      | Working Humidity                  | 20-95%RH, non-condensing   |   |  |
|                      | Storage Temperature, Humidity     | -40~80°C, 10-95%RH   |   |  |
|                      | Temperature Coefficient           | ±0.03%/°C[-20~50°C]  |   |  |
|                      | Vibration                         | 10-500Hz, 2G 12min/1 cycle, 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°C, 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°C/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   |   |  |

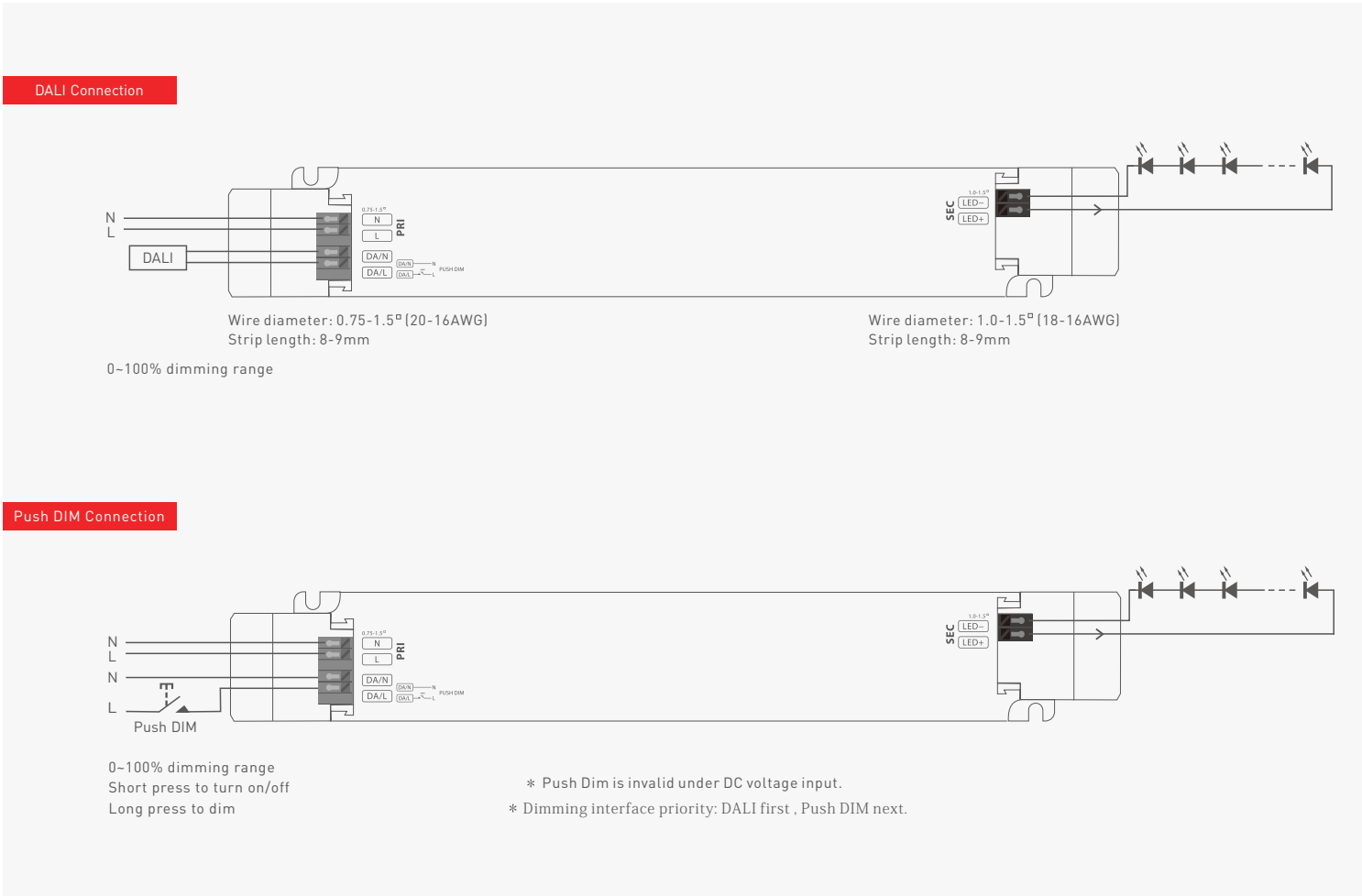
\* The driver is suitable for connecting resistor current-limiting LED fixture (e.g. LED strip). The inrush current will be dozens of times increased if connecting built-in constant current IC current-limiting LED fixtures, the driver will activate the overloaded protection (hiccups flickering). When 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



## Push DIM

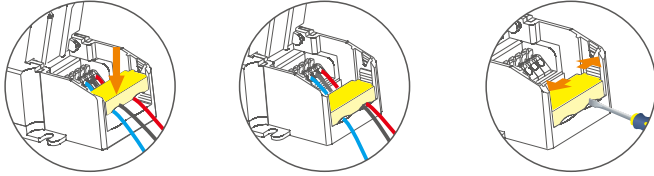


Reset switch

- 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.
- \* Switch on and off within 10 seconds, it will not have the same gradual effect as normal boot, but directly to the most bright level.

## Protective Housing Application Diagram

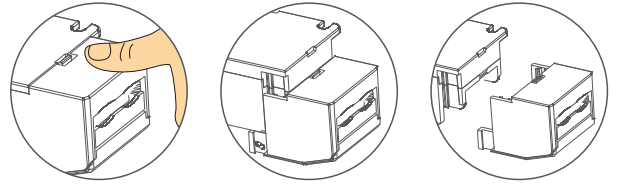
### Tension plate



Push the tension plate down to fix the electric wires.

Push the side plate outwards and remove the tension plate by prying it up with a tool at the same time.

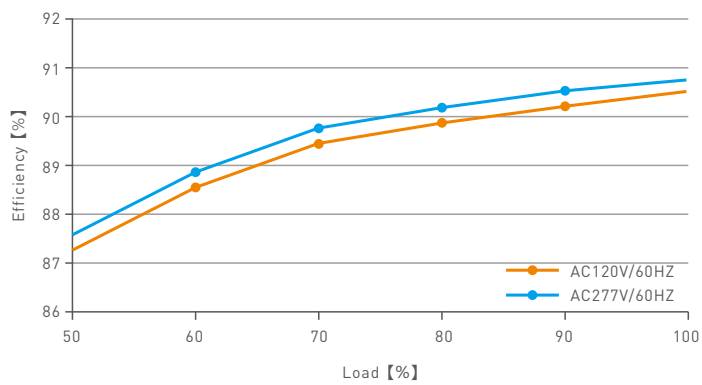
### Remove the protective housing



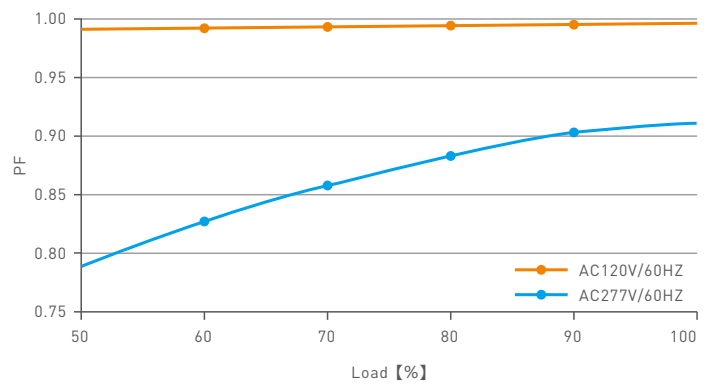
Pull the housing left and right from the bottom to remove it.

## Relationship Diagrams

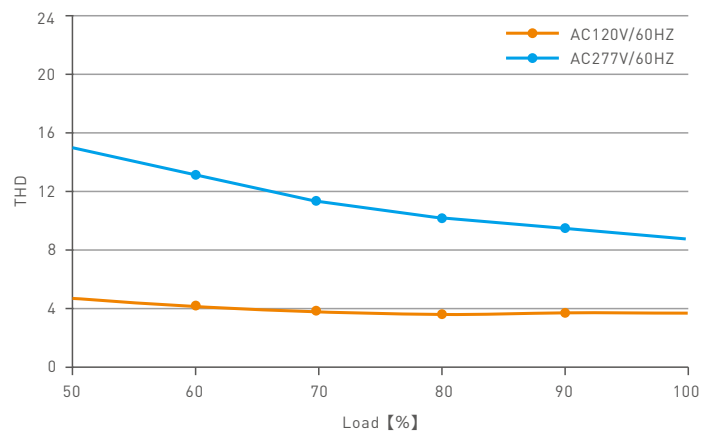
Efficiency vs Load



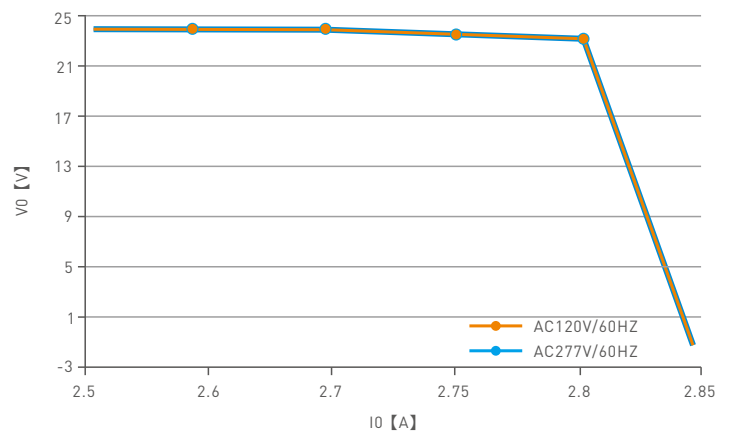
Power Factor Characteristic



THD VS Load

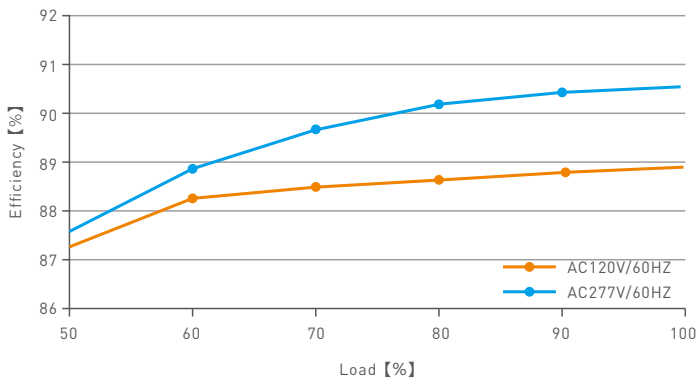


Over Load Diagram

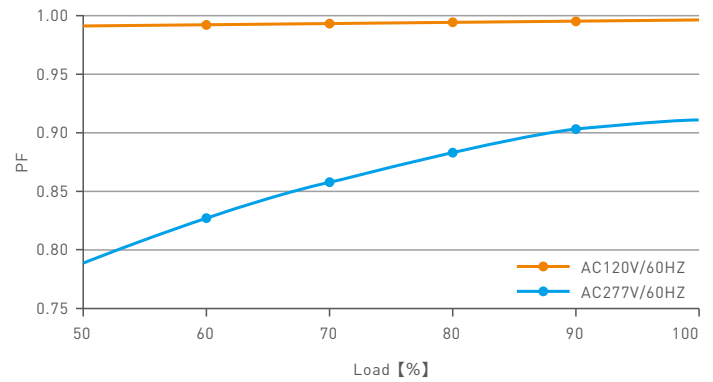


LM-60-24-U1D2

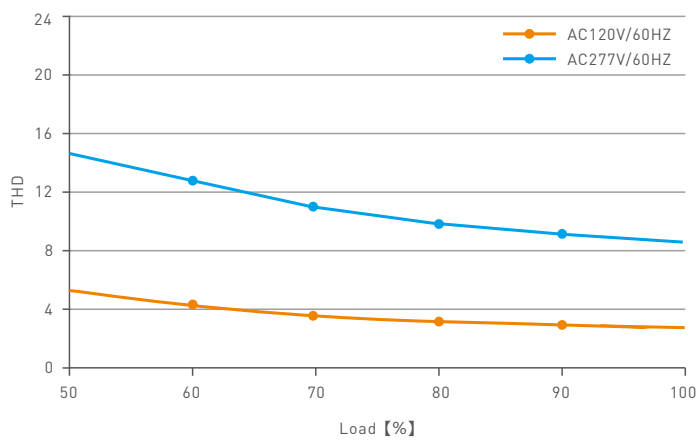
Efficiency vs Load



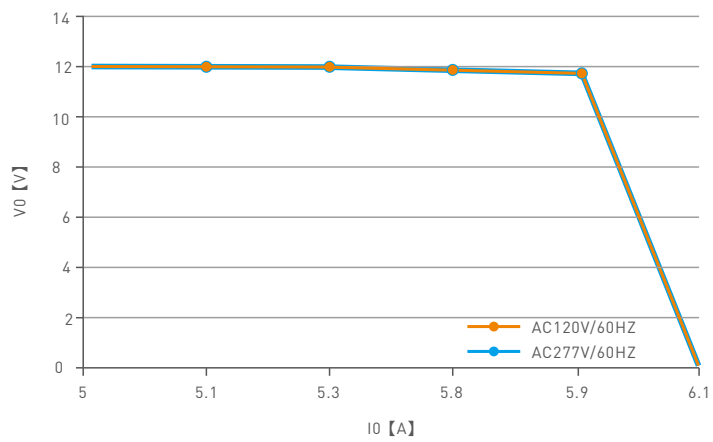
Power Factor Characteristic



THD VS Load



Over Load Diagram



## LM-60-12-U1D2

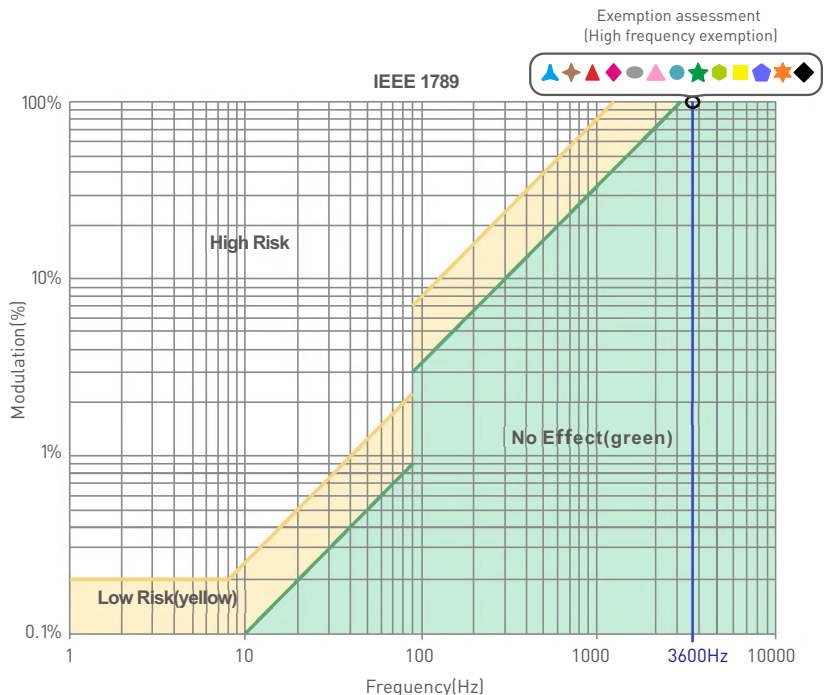
## Flicker Test Table

IEEE 1789

| Limit Value of Modulation in Low Risk Areas  |   |
|--|---|
| Waveform frequency of Optical output (f)     | Limit value (%)                                 |
| f ≤ 8Hz                                      | 0.2   |
| 8Hz < f ≤ 90Hz                               | 0.025 × f                                       |
| 90Hz < f ≤ 1250Hz                            | 0.08 × f  |
| f > 1250Hz                                   | Exemption assessment                            |
| Limit Value of Modulation in No Effect Areas |   |
| Waveform frequency of Optical output (f)     | Limit value (%)                                 |
| f ≤ 10Hz                                     | 0.1   |
| 10Hz < f ≤ 90Hz                              | 0.01 × f  |
| 90Hz < f ≤ 3125Hz                            | (0.08/2.5) × f                                  |
| f > 3125Hz                                   | 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      | 2021.03.29   | Original version | Liu weili  |

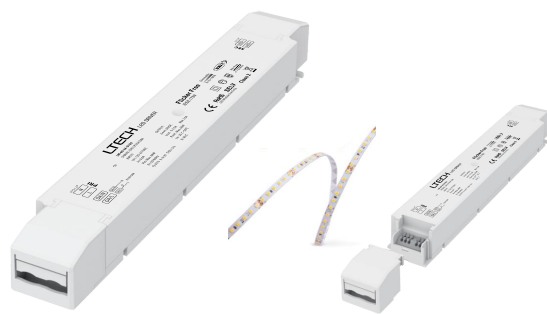
## LED 智能调光驱动器 (恒压型)

- 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, 让人眼视觉更舒适
- 0-100%全程调光无可视频闪, 高频豁免级别
- 调光范围: 0-100%, LED从0.1%开始调光
- DALI总线标准 IEC62386-101, 102, 207
- 符合欧盟能效ERP指令, 待机功耗 < 0.5W
- 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%



RoHS

SELV

Class 2



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。



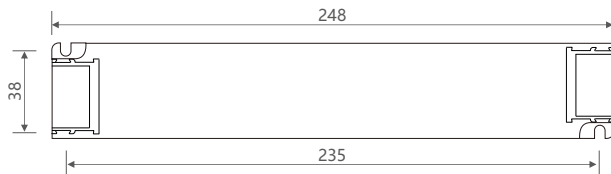
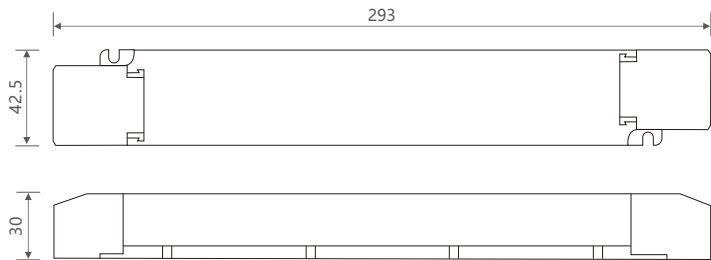
## 技术参数

| 型号      | LM-60-24-U1D2                     | LM-60-12-U1D2   |                       |  |
|---------|-----------------------------------|---|-----------------------|--|
| 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                              | DALI-2 DT6, 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(打嗝模式)。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。

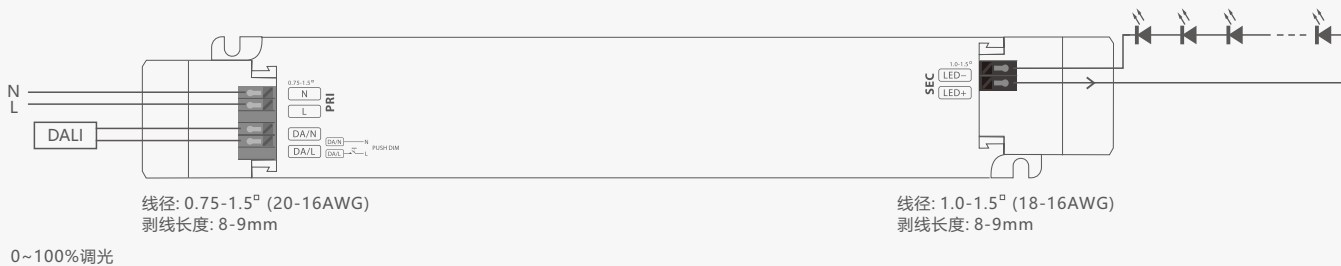
## 尺寸图

单位: mm



## 连接应用图

### DALI 连接方式



### Push DIM 连接方式



## Push DIM

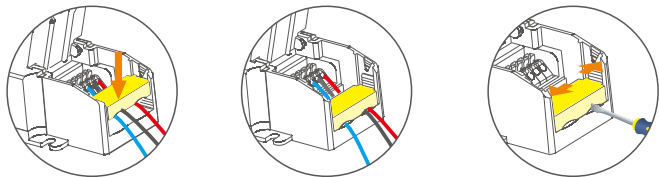


复位开关

- 开关控制: 短按
- 无级调光: 长按
- 每隔一次长按, 明暗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
- \* 在10秒内开关机, 不会像正常开机一样有渐变效果, 而是直接到最亮点。

## 保护盖应用图

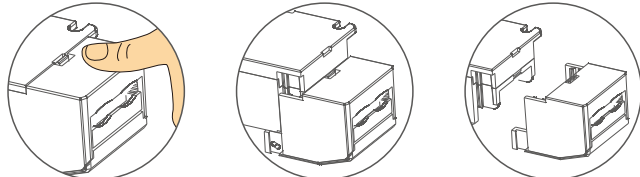
压线板



向下推压线板, 可固定住线。

向外推侧板的同时, 用工具撬即可拆下压线板。

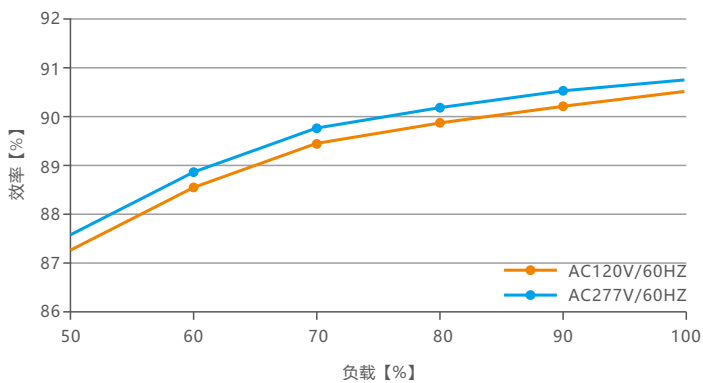
保护盖的拆装



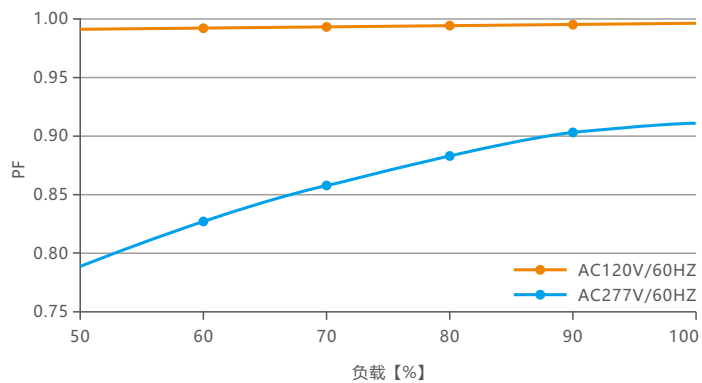
在底部左右掰动, 即可将保护盖拆下。

## 关系图表

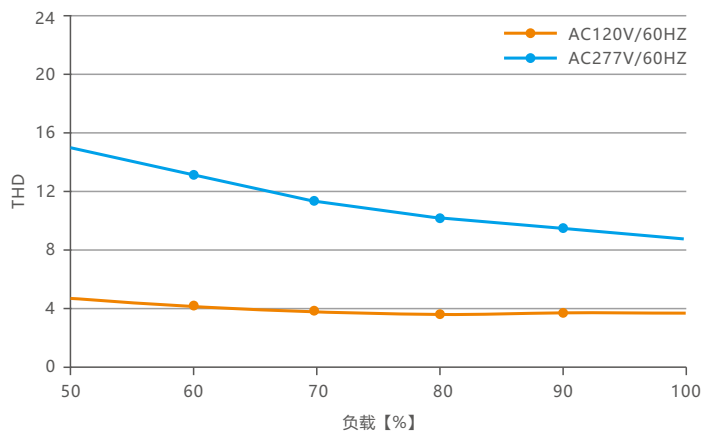
效率与负载关系图



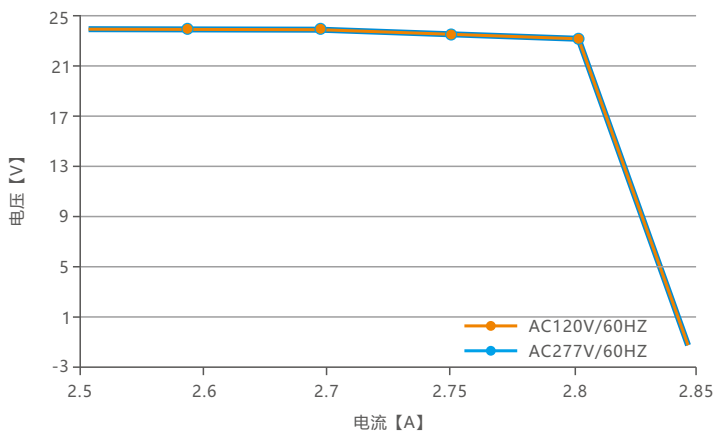
功率因数特征图



THD与负载关系图



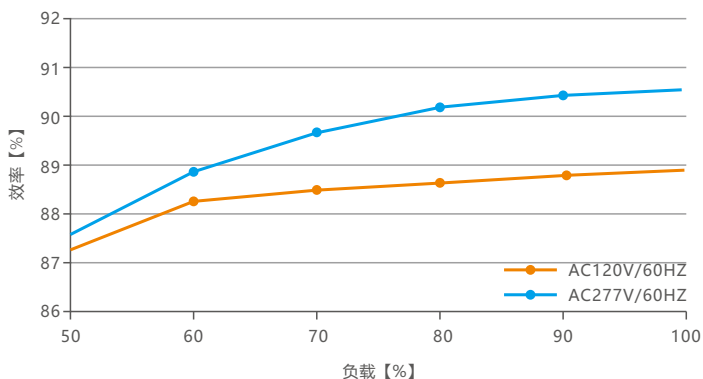
过载曲线



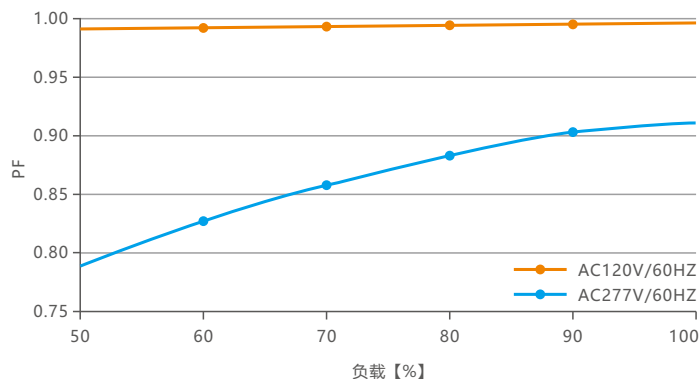
LM-60-24-U1D2



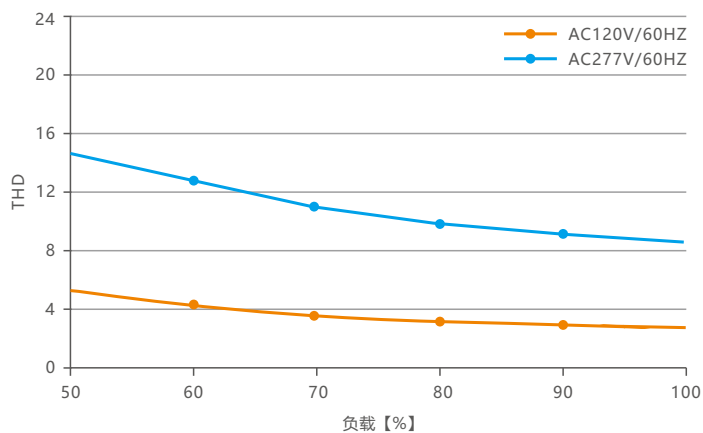
效率与负载关系图



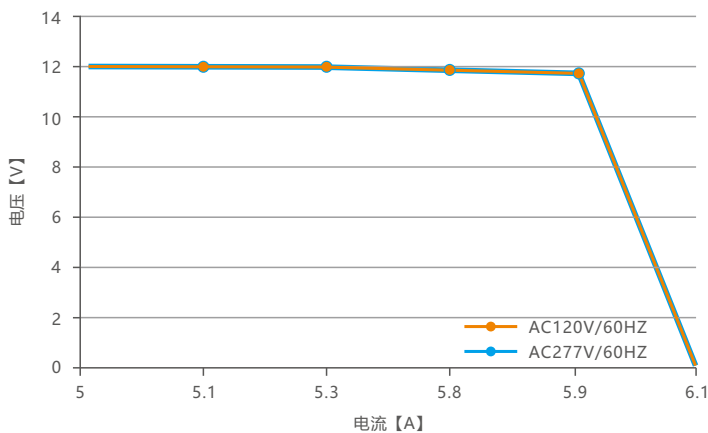
功率因数特征图



THD与负载关系图



过载曲线



## LM-60-12-U1D2

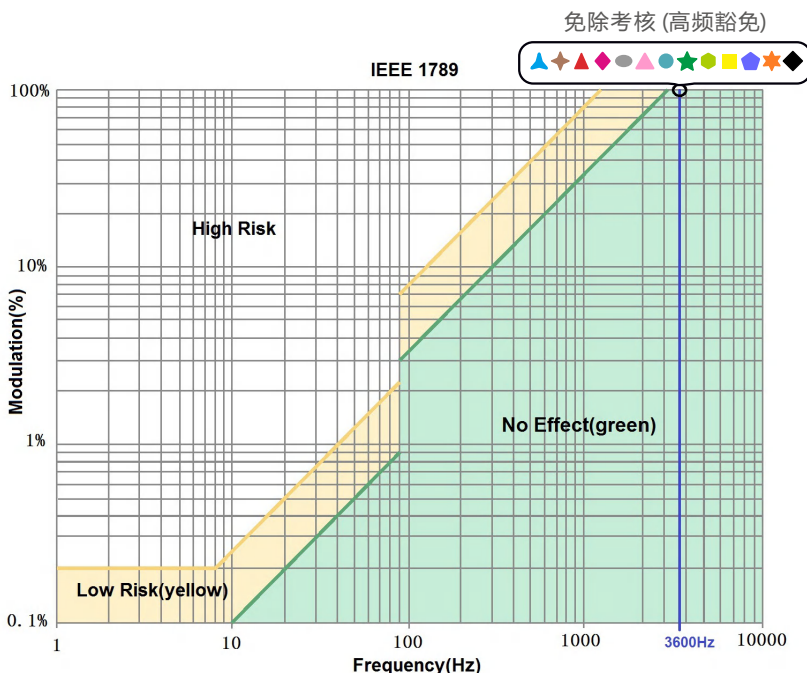
### 频闪测试表

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唯一补救措施。雷特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 |