LTECH

LM-60-24-U2D2
LM-60-12-U2D2

DALI Push DIM/CCT

Intelligent Tunable White LED Driver (Constant Voltage)

- Small size and light weight. The housing is made from V0 flame retardant PC materials from SAMSUNG/COVESTRO.
- 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.
- Color temperature range: 2700-6500K.
- Adopt constant power program design and it keeps the same brightness in color temperature adjustment.
- With soft-on and fade-in dimming function, enhancing your visual comfort.
- High frequency exemption level.
- Dimming from 0~100%, down to 0.1%.
- 2-CH SELV output channel with common anode.
- DALI bus standard IEC62386-101, 102, 209.
- 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 intelligently protects the power life.
- 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).

DALI 2

DIM / CT

Flicker-Free
IEEE 1789

Dimmable:
0.1%-100%

c UL us
Type TL 85/72.3°C

Use only within an enclosure.

RoHS SELV Class 2

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

DALI PUSH

Overheat protection

Over voltage protection

Overload protection

Short circuit protection

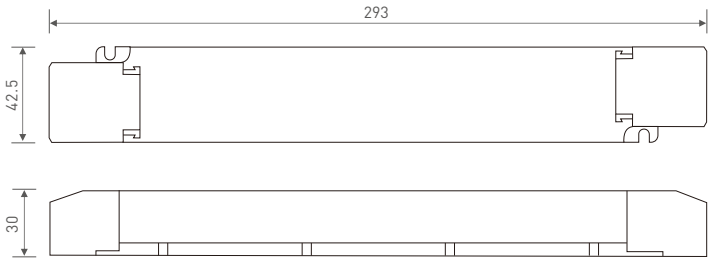
Technical Specs

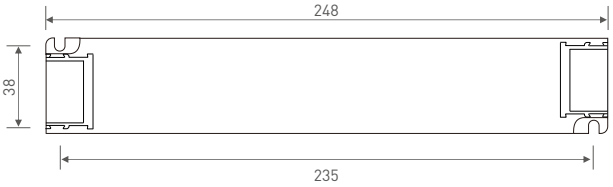
Model		LM-60-24-U2D2	LM-60-12-U2D2
OUTPUT	Output Voltage	24Vdc	12Vdc
	Output Voltage Range	24Vdc±0.5Vdc	12Vdc±0.5Vdc
	Output Current	Max. 2.5A	Max. 5A
	Output Power	Max. 60W	
	Output Power Range	0-60W	
	Strobe Level	High frequency exemption level	
	PWM Frequency	3600Hz	
	Dimming Range	0~100%, down to 0.1%	
	Overload Power Limitation	≥102%	
	Ripple & Noise	Switch ripple≤100mV, noise≤200mV	Switch ripple≤200mV, noise≤400mV
INPUT	Dimming Interface	DALI-2 DT6/DT8, Push DIM/CCT	
	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/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°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

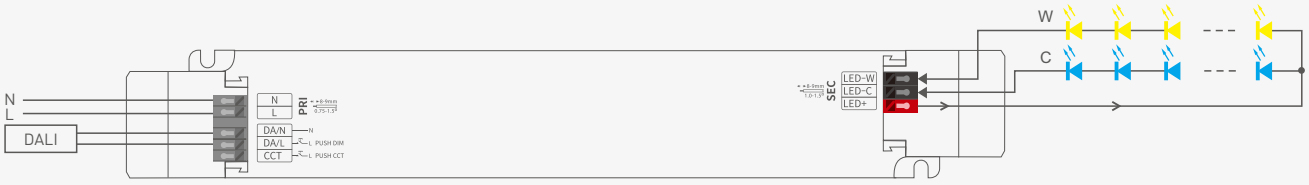
Unit: mm





Wiring Diagram

DALI Connection

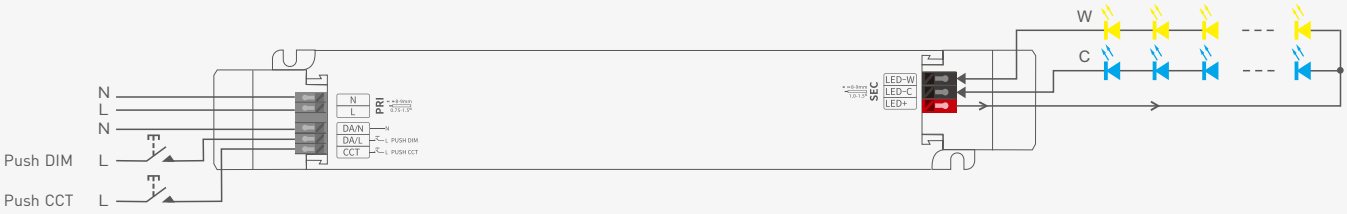


Wire diameter: 0.75-1.5² (20-16AWG)
Strip length: 8-9mm

Wire diameter: 1.0-1.5² (18-16AWG)
Strip length: 6-7mm

DIM: 0~100% dimming range
CCT: 2700-6500K

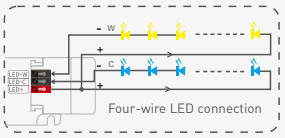
Push DIM/CCT Connection



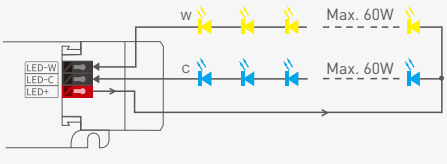
DIM: 0~100% dimming range
CCT: 2700-6500K

* Push DIM is invalid under DC voltage input.

* Dimming interface priority: DALI first , Push DIM/CCT next.



* Adopt constant power program design and it keeps the same brightness in color temperature adjustment. Twice the rated power load can be connected to the driver. A 60W driver can connect to 60W X 2CH load and the total power of the 2 channels will be kept within 60W.



Push DIM/CCT

Reset switch

DIM

- 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.

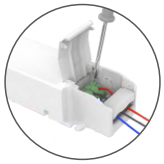
CCT

- Color temperature adjustment: Long press.
- With every other long press, color temperature go to the opposite direction.
- Color temperature memory: Color temperature will be the same as previously adjusted when lights are turned on.

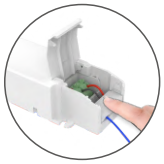
Protective Housing Application Diagram

Tension plate

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

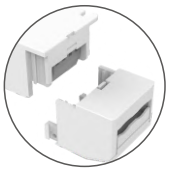


2. Connect to electrical wires with a screwdriver as wiring diagram shows.



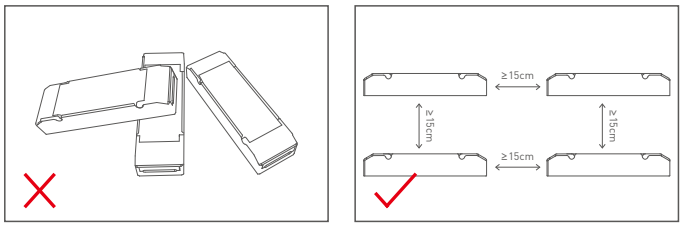
3. Press down the tension plate to fix the the electrical wires, then close the protective housing.

Remove the protective housing

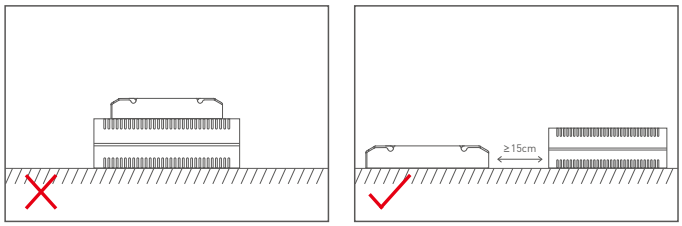


Pull the housing left and right from the bottom to remove it.

Installation Precautions



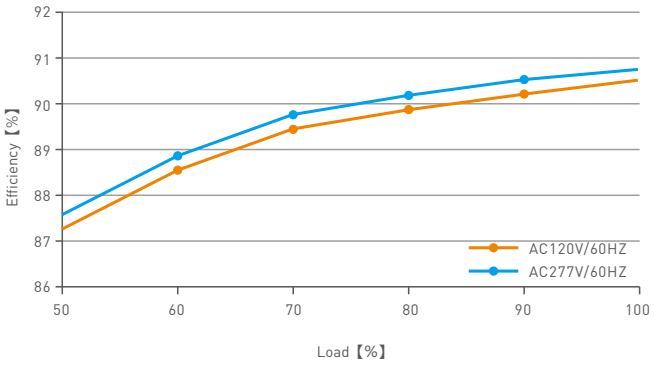
Please do not stack the products. The distance between two products should be ≥15cm so as not to affect heat dissipation and the lifespan of the products.



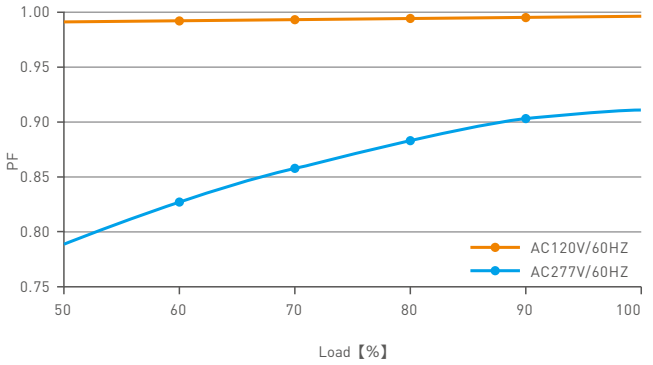
Please not place the products on LED drivers. The distance between the product and the driver should be ≥15cm so as not to affect heat dissipation and shorten the lifespan of the products.

Relationship Diagrams

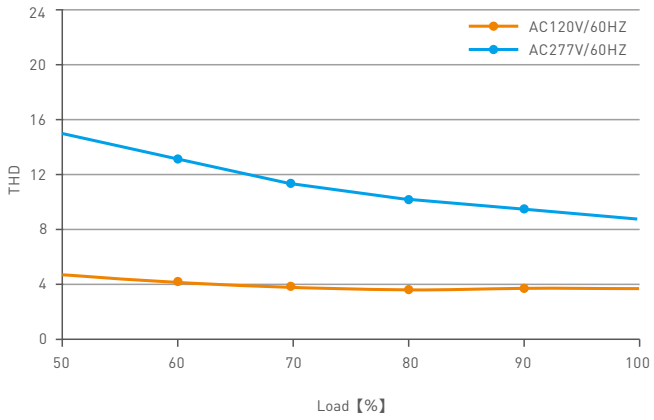
Efficiency vs Load



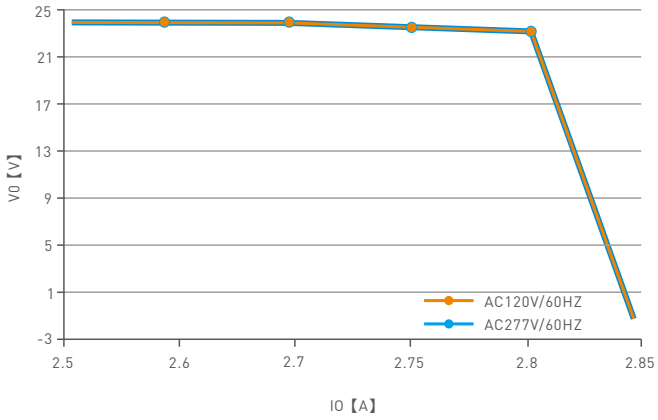
Power Factor Characteristic



THD VS Load

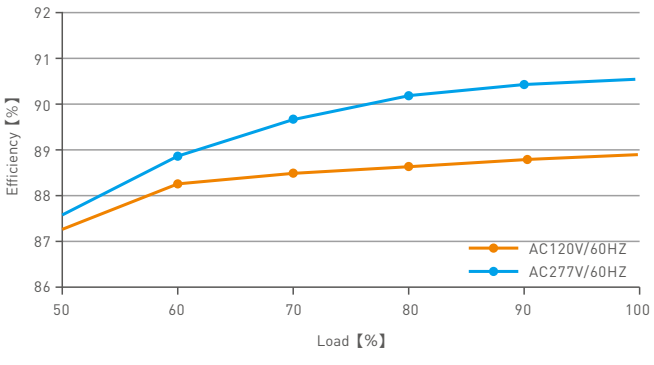


Over Load Diagram

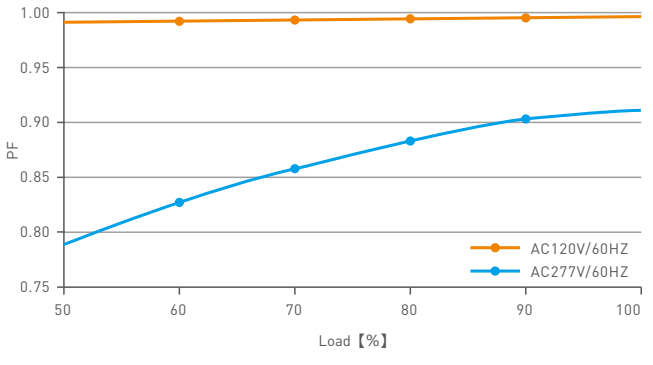


LM-60-24-U2D2

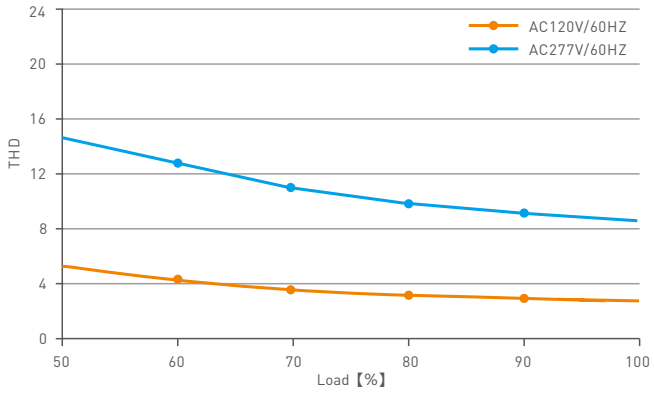
Efficiency vs Load



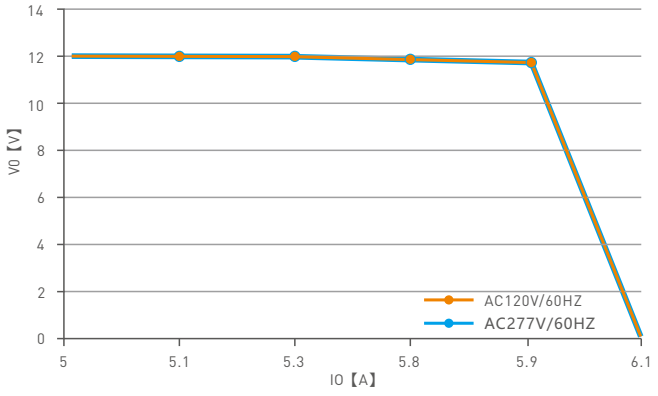
Power Factor Characteristic



THD VS Load



Over Load Diagram



LM-60-12-U2D2

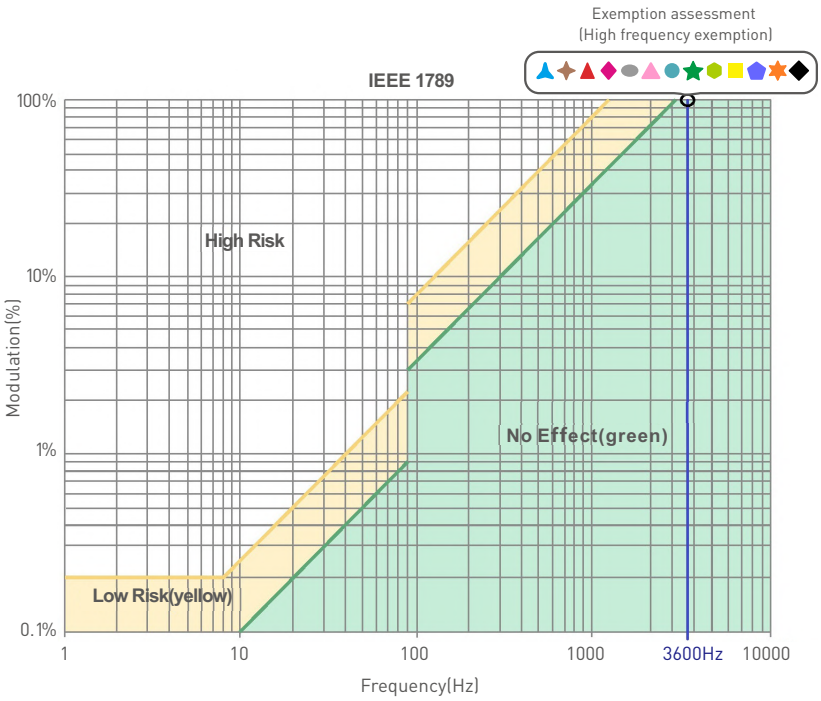
Flicker Test Table

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
A1	2021.12.10	Update product silk screen	Liu Weili
A2	2022.05.07	Update protective housing application diagram	Liu Weili

LTECH

LM-60-24-U2D2
LM-60-12-U2D2

DALI Push DIM/CCT

LED智能色温驱动器 (恒压型)

- 体积小、重量轻; 外壳采用科思创/三星PC阻燃V0级原料
- 免螺丝压线翻盖设计, 可拆卸端盖, 按需调节壳体长度
- 恒功率设计, 调节不同色温保持亮度一致
- 色温调节范围: 2700-6500K
- 带软启动渐亮功能, 让人眼视觉更舒服
- 高频豁免考核级别
- 调光范围0-100%, LED从0.1%开始调光
- 共阳极两路SELV输出通道
- DALI总线标准 IEC62386-101, 102, 209
- 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)

调光调色温

无频闪
IEEE 1789

Dimmable:
0.1%-100%

Type TL 85/72.3°C
Use only within an enclosure.

RoHS SELV Class 2

认证图标仅代表产品正在进行这一系列的认证申请，认证资质以产品实物为准。

DALI PUSH | 过温保护 | 过压保护 | 过载保护 | 短路保护

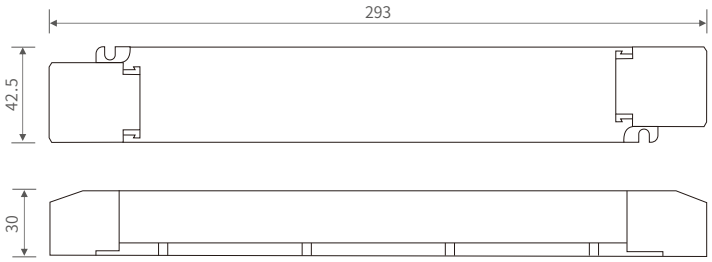
技术参数

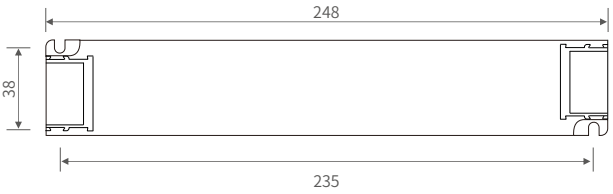
型号		LM-60-24-U2D2			LM-60-12-U2D2
输出	输出电压	24Vdc			12Vdc
	输出电压范围	24Vdc±0.5Vdc			12Vdc±0.5Vdc
	输出电流	Max. 2.5A			Max. 5A
	输出功率	Max. 60W			
	输出功率范围	0-60W			
	频闪级别	高频豁免考核级别			
	PWM频率	3600Hz			
	调光范围	0~100%, 调光深度: 0.1%			
	过功率限制	≥102%			
	纹波与噪声	开关纹波≤100mV, 噪声≤200mV			开关纹波≤200mV, 噪声≤400mV
输入	调光接口	DALI-2 DT6/DT8, Push DIM/CCT			
	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

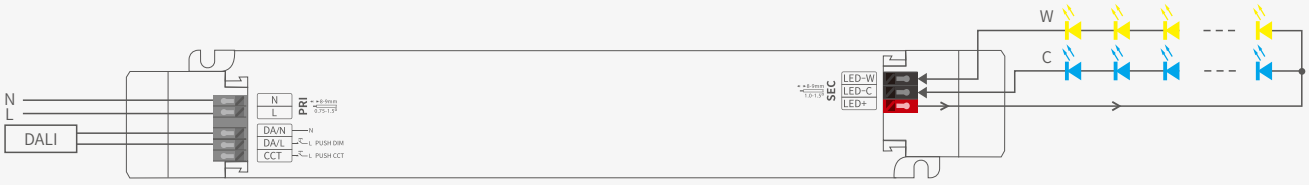
单位: mm





连接应用图

DALI 连接方式



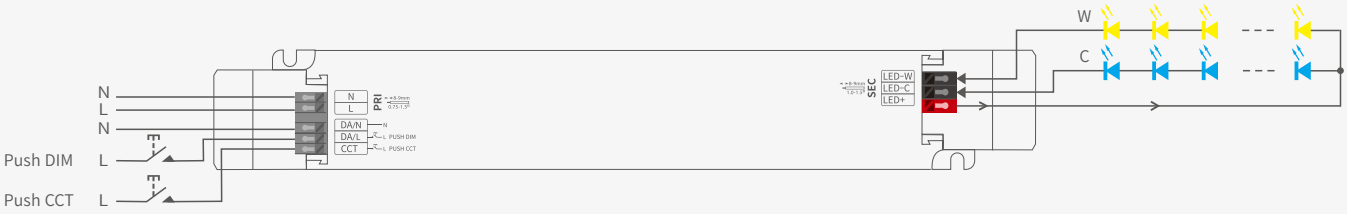
线径: 0.75-1.5㎟ (20-16AWG)
剥线长度: 8-9mm

线径: 1.0-1.5㎟ (18-16AWG)
剥线长度: 8-9mm

DIM: 0~100%调光

CCT: 2700-6500K色温调节

Push DIM/CCT 连接方式

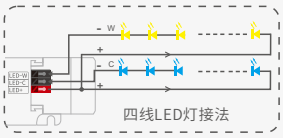


DIM: 0~100%调光

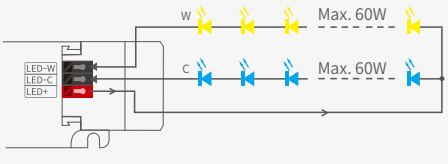
CCT: 2700-6500K色温调节

＊ 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DALI, 然后Push DIM/CCT



＊ 采用恒功率程序设计, 色温调节全程能保持亮度一致, 电源可连接额定功率两倍的负载。
60W电源, 可连接60W×2CH的负载, 两路总功率会保持在60W以内。



Push DIM/CCT

复位开关

DIM

- 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.

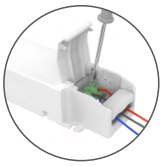
CCT

- 色温调节: 长按.
- 每隔一次长按, 色温会向相反方向调整.
- 色温记忆: 当再次开关时, 灯光会回到先前调整的色温水平.

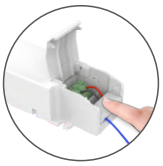
保护盖应用图

压线板

1. 使用工具撬起压线板侧边即可拆下。

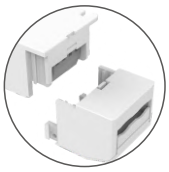


2. 使用螺丝批按照接线图接线。



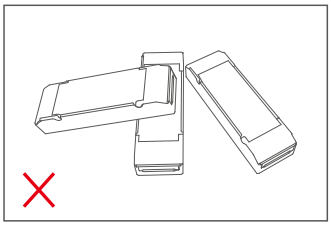
3.向下按压压线板固定住线合上保护盖即可。

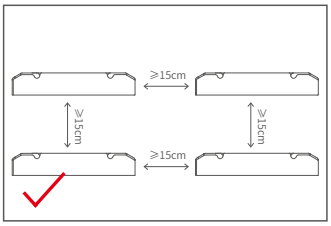
保护盖的拆装



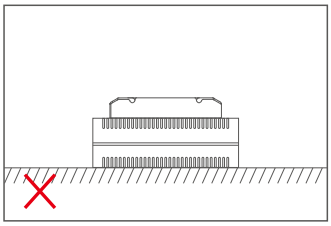
在底部左右掰动，即可将保护盖拆下。

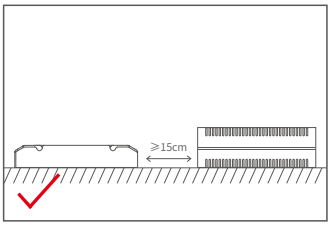
安装注意事项





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

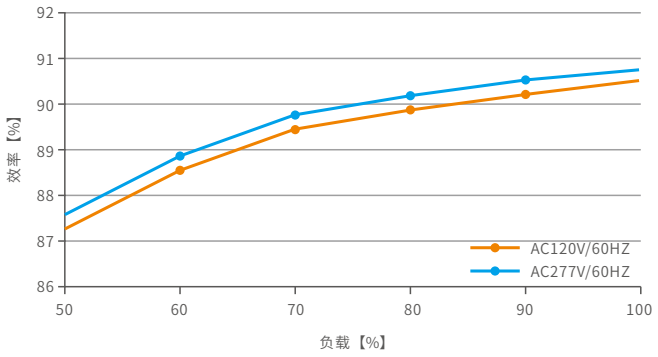




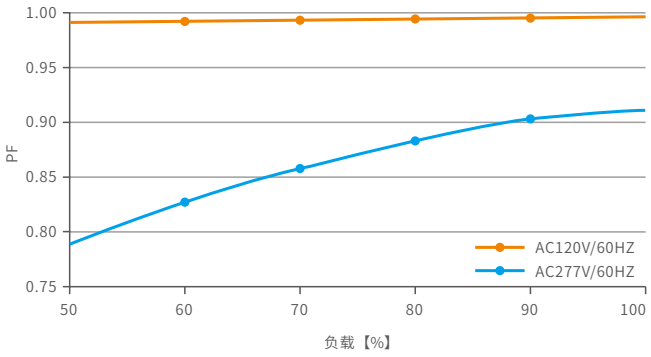
请勿将产品置于电源上方，与电源间隔距离应≥15cm，避免影响产品散热而减少使用寿命。

关系图表

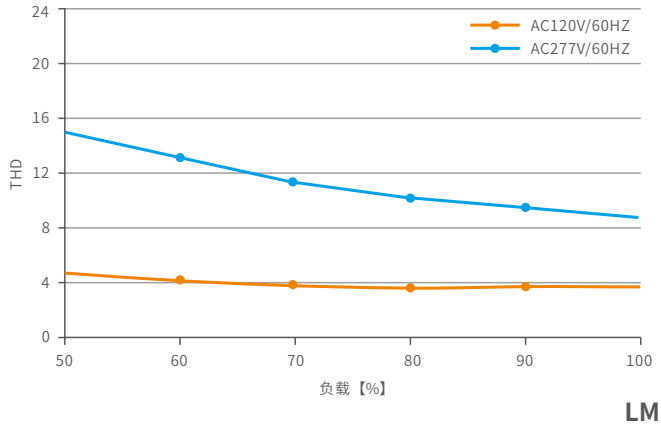
效率与负载关系图



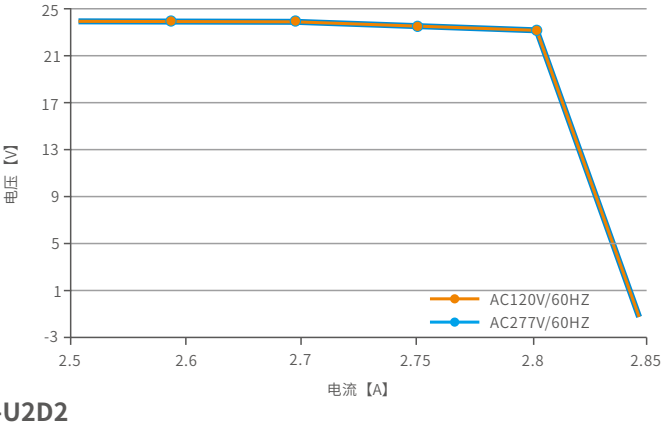
功率因数特征图



THD与负载关系图



过载曲线



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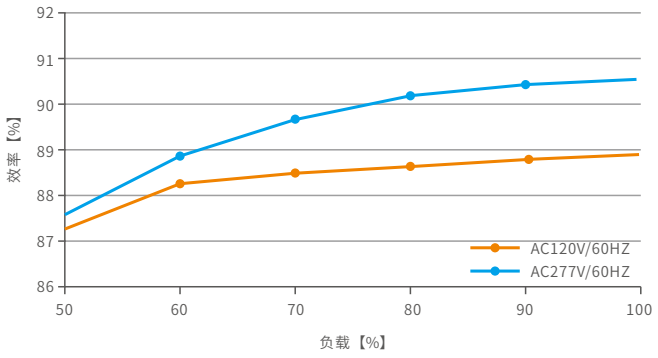
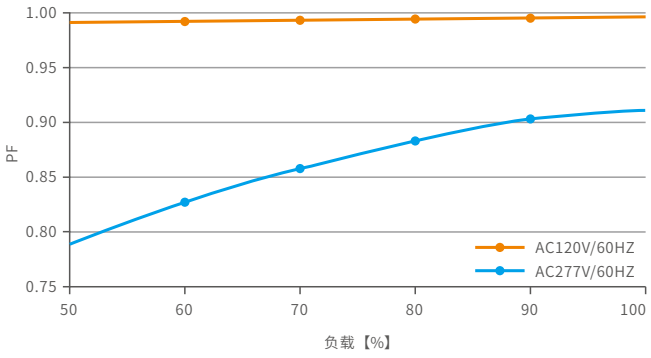
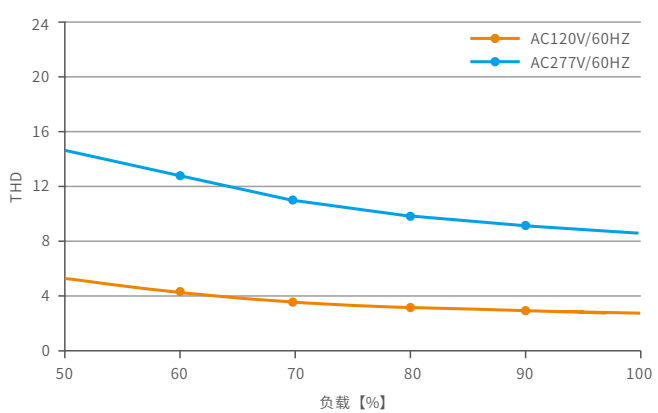
效率与负载关系图



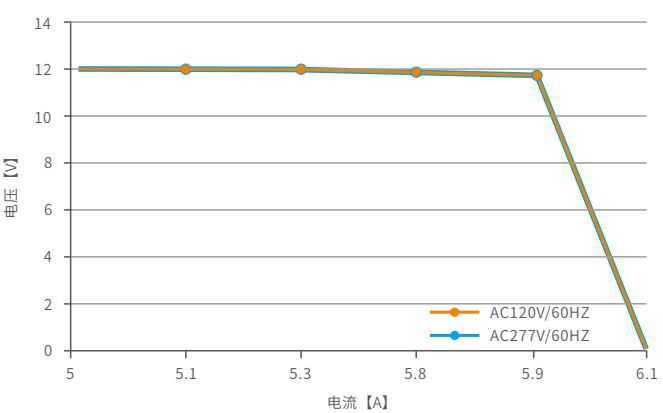
功率因数特征图



THD与负载关系图



过载曲线



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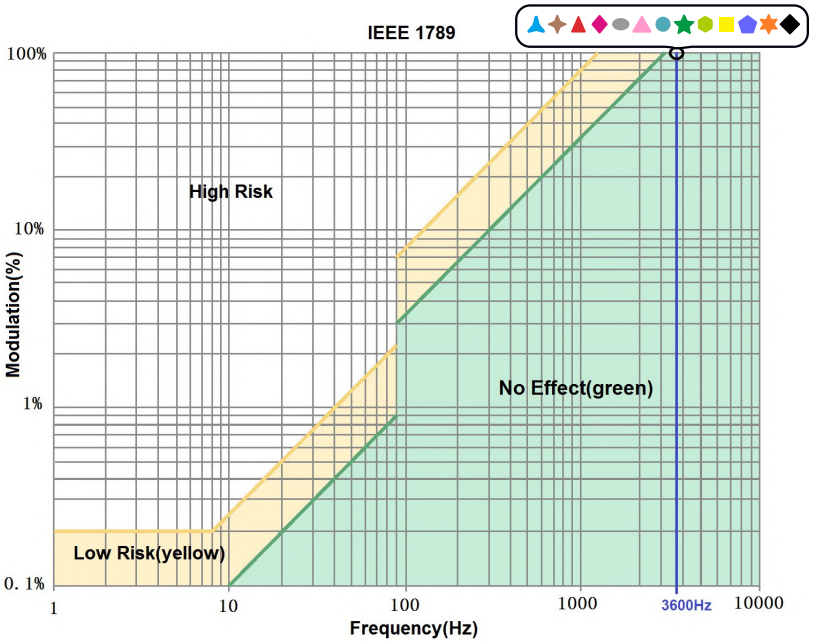
频闪测试表

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 ≤ 8Hz	0.2
8Hz < *f* ≤ 90Hz	0.025 × *f*
90Hz < *f* ≤ 1250Hz	0.08 × *f*
f > 1250Hz	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 ≤ 10Hz	0.1
10Hz < *f* ≤ 90Hz	0.01 × *f*
90Hz < *f* ≤ 3125Hz	(0.08/2.5) × *f*
f > 3125Hz	免除考核 (高频豁免)

亮度
0.1%
1%
5%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

免除考核 (高频豁免)



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足够负载连接的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责任, 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
A1	2021.12.10	更新产品丝印	刘伟丽
A2	2022.05.07	更新保护盖应用图	刘伟丽