

CoolLED

PRO

LED DRIVERS

CLi40 (40 watt)

DALI/Touch/Corridor Dimmable

40W (up to 1400mA)

The all new CLi LED driver range from Harvard uses uniquely developed technology solutions to achieve high dimming accuracy, safety and reliability in an ultra slim compact format.

This new addition to the CoolLEDpro range offers very low dimming to 0.1%.

A new soft on and soft off operation coupled with a range of programmable dimming features, achieves an ideal lighting performance.

The exceptionally low flicker performance over the full operating range means the CLi range can suit the most demanding applications.

- Small - Fits through a 56mm hole
- Support for most COB modules/lamps up to 5000 lumens (typical)
- Support for 1-18 LEDs
- Isolated output
- Programmable current at Harvard or customer site
- Loop through terminals for easy installation
- RFID Programming
- Smooth dimming to 0.1%
- Mains tolerant DALI dimming
- Touch-dim function as standard
- Switch-dim (corridor function) as standard
- Low inrush current
- Exceptionally low LED flicker. Near perfect light quality
- Passes IEC61010:2015
- Designed for Health and Wellbeing/Human Centric Lighting
- Equals or exceeds the efficiency of many single stage designs
- Power Factor corrected
- Wireless version using Harvard EyeNut dimming control is available
- IOT, dimming and programming options are available, please enquire.
- Bespoke requirements: Please enquire
- 1-10V/0-10V analog dimming version available. See separate data sheet
- Designed and Manufactured in the U.K.



Technical Highlights

- Fully programmable in 1mA step increments
- Less than 1% flicker at 100Hz/120Hz - Meets IEC61010:2015 'No Effect' Region 1Hz to greater than 3kHz
- Minimum dimming of 350µA - 25 bit dimming resolution
- Small size 22mm x 55.5mm x 137mm (175mm remote version)
- Input voltage range 220-240V
- Remote mount version (order end clamps separately)
- Up to 15 Years Operation (See Driver lifetime graph for more details)
- Less than 500mW standby power
- Up to 89% efficiency
- Power factor corrected (0.98)
- Operation up to 50°C ambient
- Supports a large LED string voltage range, 2.5V to 38V or 4.5V to 52V (model dependent)

- Self-resetting thermal trip
- Mains to LED output: Reinforced insulation 3kV
- DALI to Mains: Basic insulation 1.5kV
- DALI to LED output: Reinforced insulation 3kV
- DALI control standard EN62386
- 100% - 0.1% dimming
- Standby mode
- 16 DALI groups, 16 DALI scenes
- DALI LED lamp fault reporting
- Auto selection of DALI/Touch-Dim/Corridor modes
- Surge protection 2kV Differential, 4kV Common mode



Technical Specification

	CLi40-D01-240			CLi40-D02-240		
AC input Voltage	220 to 240VAC Nominal					
Input Frequency	0/50/60Hz					
Input Current	0.25A Max					
Input Power	47W Max					
Input Power Factor	0.98					
Input Current THD	8% typical @ full load					
Input Harmonics	IEC/EN61000-3-2 Class C limit, Table 2					
DC Input Voltage	220 - 240V Nominal / 176 -280V Operational range					
Emergency Supply Currents	@220VDC - 224mA (±10%) / @240VDC - 210mA (±10%)					
Driver emergency output factor (EOF _i)	1.00 (Light output on AC or DC supply is identical)					
Inrush Current	25A peak decaying to zero over 30µs (0.1R + 100µH mains impedance)					
Number of Drivers per MCB (maximum typical)	B6	B10	B16	C6	C10	C16
	10	17	27	13	21	35
Input Surge Protection	4kV common-mode 2kV differential-mode					
Input Output Isolation	3kV AC rms					
Output Current Programme Range	100-1400mA			100-1050mA		
Output Voltage Range	2.5-38V			4.5-52V		
Dimming Range	100 - 0.1% (350µA Minimum)					
Dimming Method	LED current dimming (No PWM dimming)					
Dimming Control	Dali / Touch Dim / Switch (corridor) Dim, autoselection of mode.					
100/120 Hz Ripple	<1%					
Flicker	IEEE1789:2015 compliant with NO RISK category					
Output Protection	Overvoltage, short, reverse polarity. Auto re-start					
Off Load Peak Voltage	<45V			<58V		
"Cold" start time	600ms typical (as per Dali requirements)					
Dali Response Time	<50ms (Time to go from standby to on)					
Switch-on output current ramp time	typical 100ms to 100%					
Standby power	<0.5W					
Touch Current	0.28mA (spec limit is 0.7mA) @ 240V mains EN60990					
Dimming Port Classification	FELV (DALI) / LV (Switch + Touch Dim)					
Ambient Temperature	-25°C to 50°C					
Maximum Case T _c Temperature	85°C					
Thermal Control	Light reduction above 90°C (Self-resetting)					
Humidity	85% max non-condensing					
EMC Emissions	Meets EN55015:2013. Conducted (9kHz-30MHz), Radiated (30MHz-300MHz)					
Terminal Blocks	45° Push fit connectors, 3.5mm pitch					
Loop in/out Terminals	Maximum load 2A (8 units in series)					
Earth Terminal	For earth termination or loop in/out (Not required for driver safety or operation)					
Wire Sizes	0.5mm ² to 1.5mm ²					
Enclosure	White polycarbonate UL94-V0 rated					

Case Style	Dimensions	Weight	Box Quantity	IP Rating
Integral	137mm x 22mm x Ø55.5mm	159g	18	IP20
With cable clamps	175mm x 22mm x Ø55.5mm	190g	18	IP40

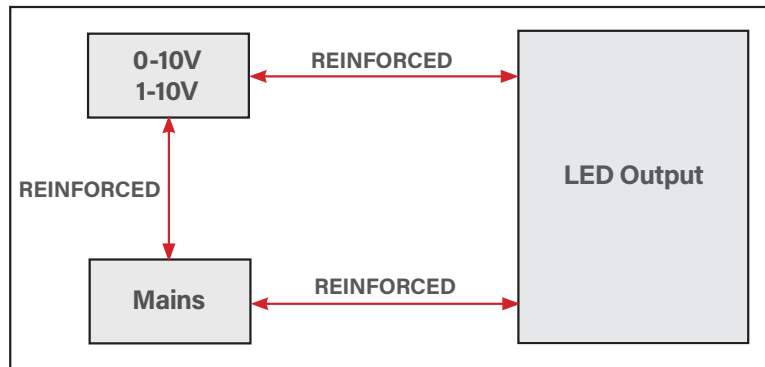


Operation

*Drivers are suitable for DC & AC operation at 0/50/60 Hz and compliant to EN50172.
The operation is compliant to EN 60598-2-22 except with the 'high risk task lighting' applications.

Insulation classes for isolated circuits

CLi analogue model isolation barrier definition

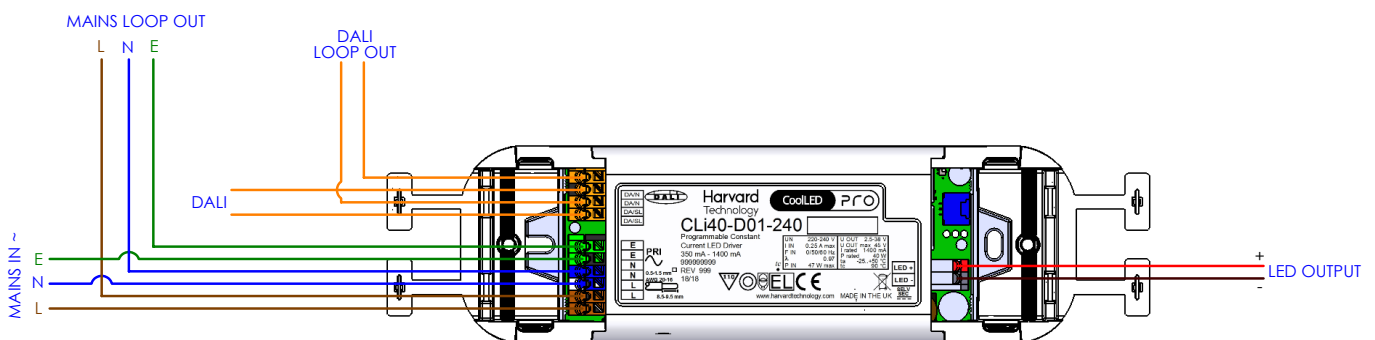


Dimming Information / Diagrams

The driver is primarily a DALI dimming product, but two other functions; Touch Dim and Switch dim (corridor) are included as standard. Selection of the three different dimming modes is automatic and depends upon the nature of the signals present on the terminal block marked 'DA/N' and 'DA/SL'.

DALI mode

At mains power-on, the driver looks for DALI signals. If present, DALI mode is locked. To reset, interrupt mains supply for 15 seconds.



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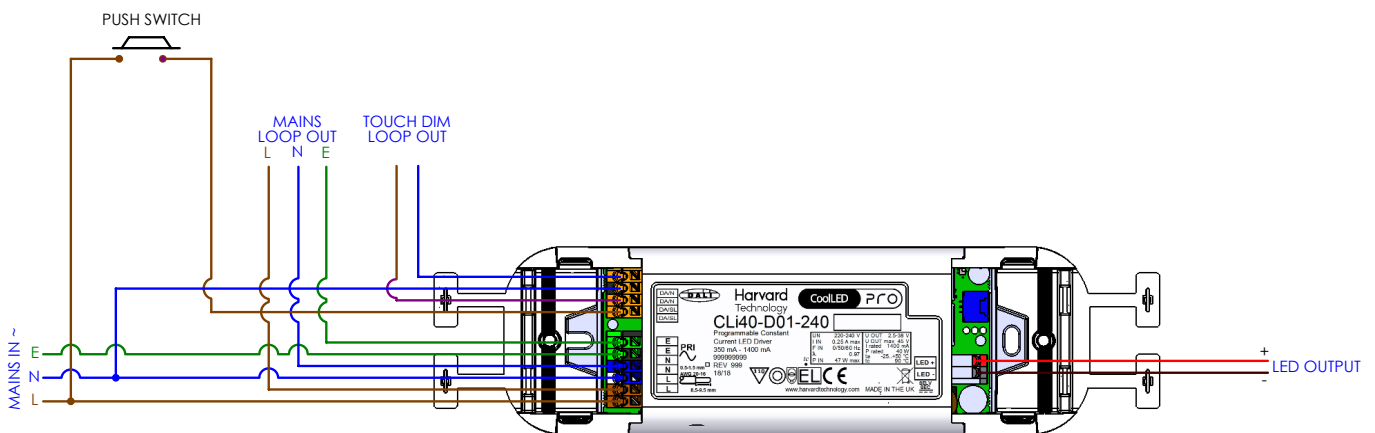


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Touch Dim: Dimming by pushing and releasing a momentary contact mechanical switch

Automatically activated.

Touch Dim Operation	Contact Duration	Driver response
Very short push	0 to 0.04s	Ignore
Short push	0.04 to 0.4s	Toggle on/off
Long push	0.4 to 10s	Dim up or down. Release switch to set light intensity
Reset push	More than 10s	Driver reset (Light goes to 50%)



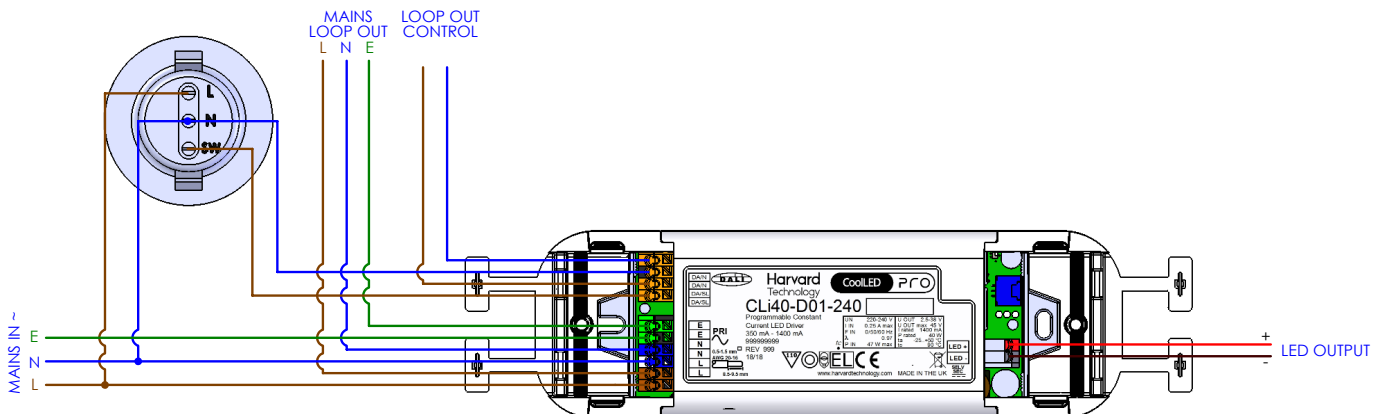
Switch Dim (Corridor): Light control between two levels by means of an electronic proximity sensor

To activate, apply signal from the sensor for at least 4 minutes (Note light will dim to minimum then after 10 seconds go to 50%). After 4 minutes, the driver is locked into Switch Dim mode.

Normal operation: With no signal present, output is 10%. When requested by the sensor, the output will quickly rise to 100%. When an off signal is received from the sensor, the output will slowly fade back to 10%.

For custom settings, please enquire (www.harvardps.com).

Note Should a driver accidentally get into Switch Dim mode on a Touch Dim system, then 3 very brief button presses in less than 2 seconds will clear the driver back to Touch Dim mode.



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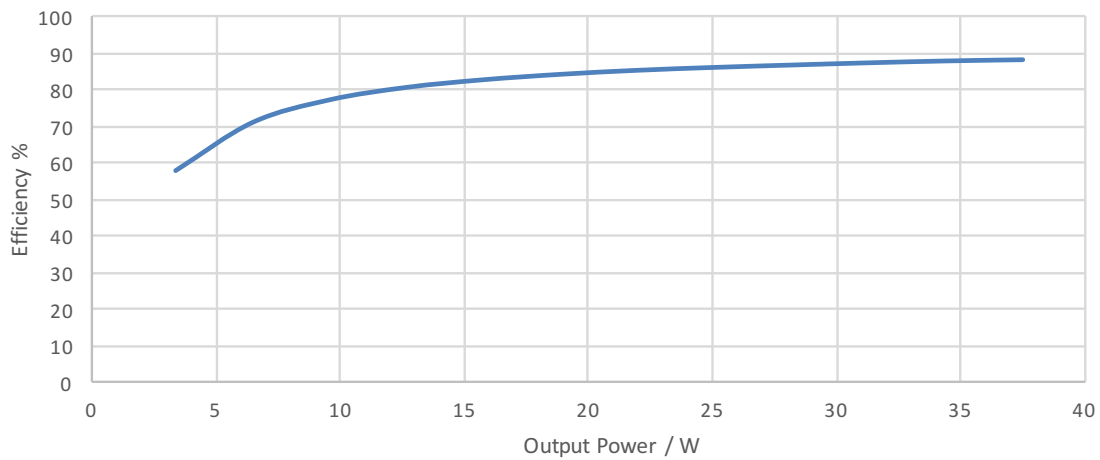
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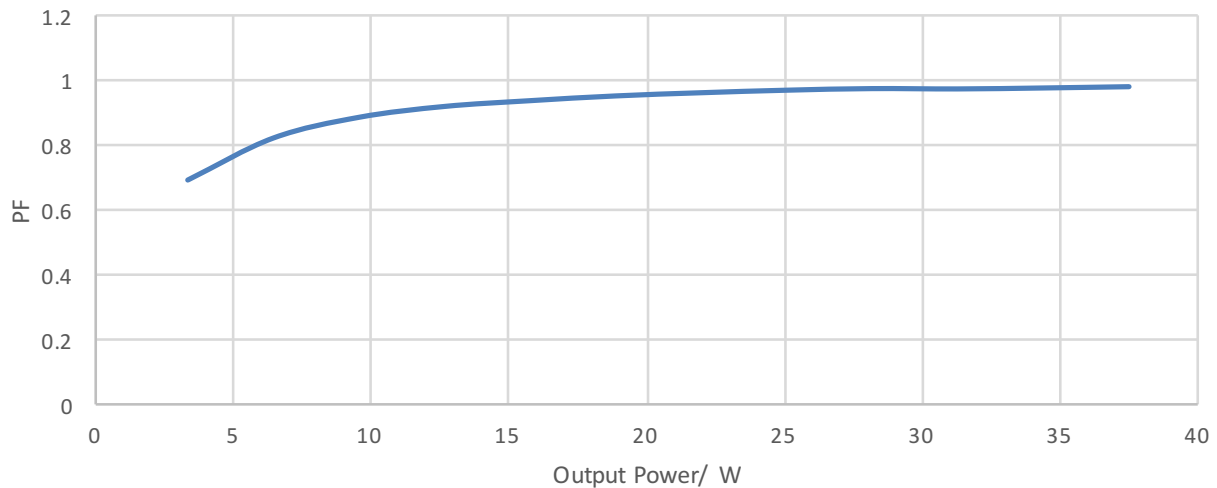


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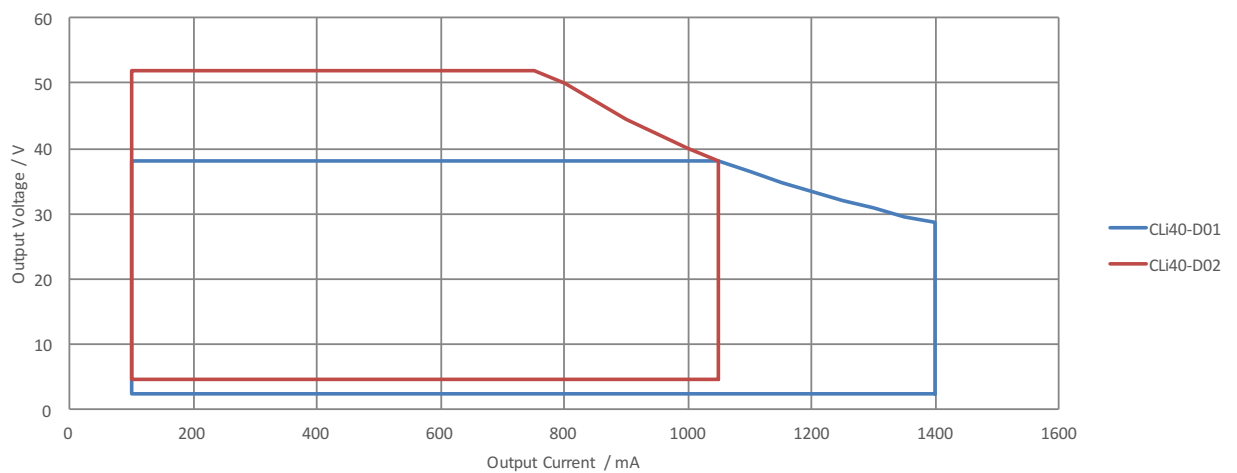
Efficiency



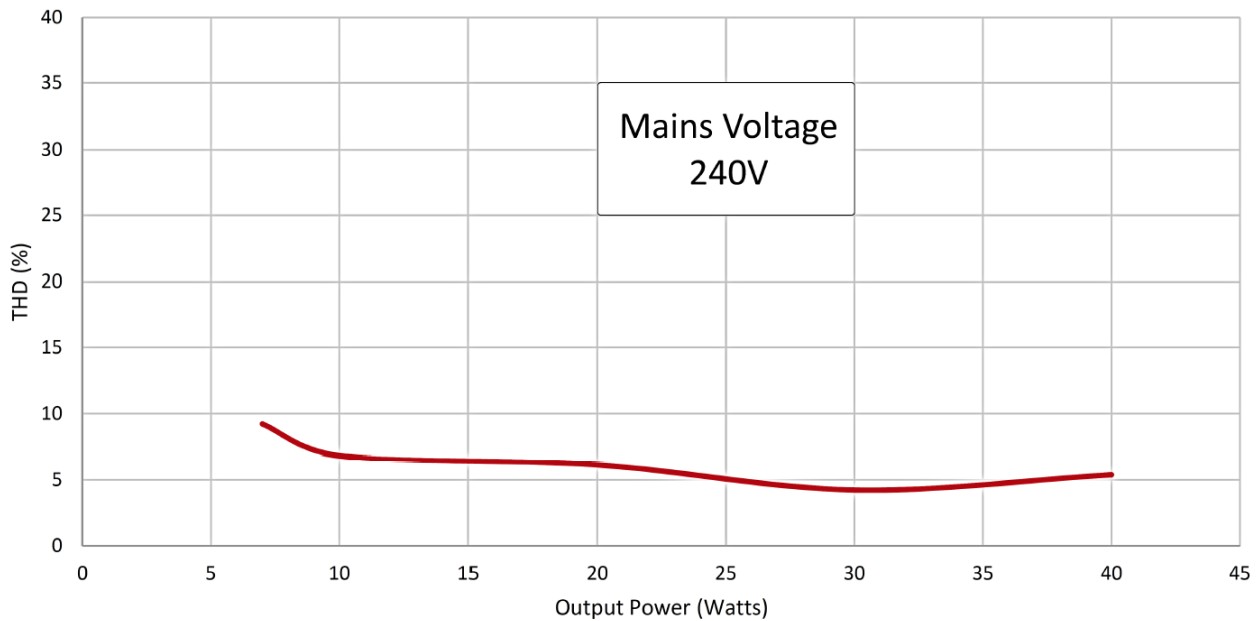
Power Factor



Operating Range (undimmed)

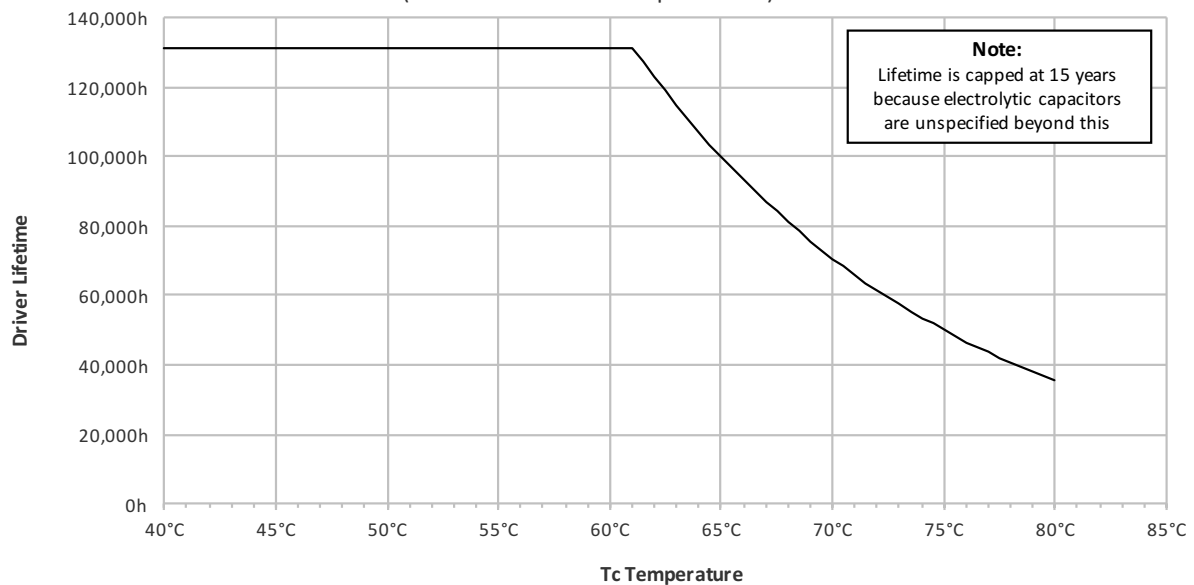


THD vs Output Power



Driver Lifetime with Temperature at Full Load

(with failure rate <0.1% per 1000h)

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Variants

Part number	Programmable Current Range	LED String Voltage	Max. Tc Temperature	Ambient Temperature Range	Maximum Power	Power factor at full load	Efficiency at full load
CLi40-D01-240/xxxx	100 - 1400mA* (±5%)	2.5V to 38V	85°C	-25 - 50°C	40W	0.98	87%
CLi40-D02-240/xxxx	100 - 1050mA* (±5%)	4.5V to 52V	85°C	-25 - 50°C	40W	0.98	88%

To order, customer replace xxxx with the required LED current in mA
Order Examples: CLi40-D02-240/350

*Minimum dimmed current is 350µA

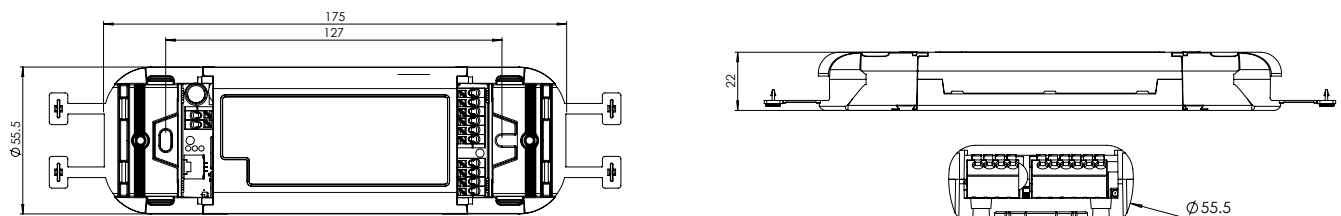
Dimensions

Integral style



Cable clamps (remote) style

For remote mount, cable clamps are required
Order CLi40 clamp kit part number: SA-MF25-1 (One per driver required)



Compliance

Designed to meet the following:

Approval	Standards
CE (Europe)	LVD:2014/35/EU, EMC:2014/30/EU, RoHS:2011/65/EU, ECOD/2009/125/EC
ENEC (Europe)	EN61347-1:2015, EN61347-2-13+A1:2017+ANNEX J, EN62384+A1:2009
CB (International)	IEC61347-1:2015, IEC61347-2-13+A1:2016+ANNEX J, IEC62384+A1:2009
RCM (Australia/NZ)	AS/NZS61347.1:2016, AS/NZS61347.2.13:2013, AS/NZS-CISPR15, AS/NZS4417.1:2012
BIS (India)	IS 15885 (Part 2/Sec.13) Amd
DALI dimming	EN62386-101, EN62386-102, EN62386-207



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