CIELO E 21W

DESCRIPTION

The Cielo series of LED drivers generate one constant current output from an AC input. Dual Dimming allows the Cielo high efficiency drivers to be used with compatible 0-10 V or ELV dimmers. This series is not allowed to work in standby mode and is not intended for no-load operation.

MAIN FEATURES

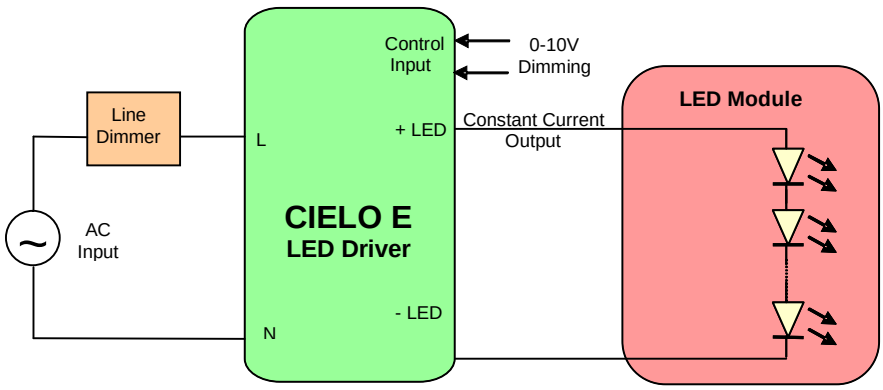
- 220-240 V_{AC} Input
- Dims with ELV dimmers
- Dims with industry standard 0-10 V dimmers
- Max Output Power: 21W
- Efficiency up to 85 %
- 90 °C Top case rated
- THD < 20 %
- PF > 0.9 PF
- Fast start up time
- UL 8750 Approved, LVLE outputs. Class II isolation
- Long Life
- RoHS Compliant
- Compliance with Regulation (EU) 2019/2020 (Ecodesign)

APPLICATIONS AND BENEFITS

Cielo LED drivers are designed for powering LED luminaries using standard lighting controls.
Their discreet size easily fits into the space constrained LED fixtures of today's growing Commercial, Residential and Architectural lighting markets.
The modules operate with:

- Standard Light Switches
- 0-10 V Dimmers
- Electronic Low Voltage Dimmers (Reverse Phase – trailing edge)

The following diagram depicts a typical installation utilizing the Cielo:



CIELO's Dimming Options:

- Analog Dimming (0-10 V) input provides 10-100 % I_{OUT} Dimming
- AC line dimming from ELV dimmers
- Dimming range down to less than 10 % nominal output current

MODEL CODING AND OUTPUT RATINGS

Model Number	P_{OUT} Max (W)	I_{OUT} (mA)	V_{OUT} Min (V_{DC})	V_{OUT} Max (V_{DC})	V_{OUT} No_Load (V_{DC})
RCL030-0500AE	21	500	24	42	50

INPUT SPECIFICATIONS

Specification	Test Conditions / Notes		Min.	Nominal	Max.	Units
AC Input Voltage			198	220-240	264	V_{AC}
Input Frequency			47	50/60	63	Hz
Input Current	230 V_{AC}		-	-	0.35	A
Inrush Current (peak)	230 V_{AC}	Half Value time: 150 µs	-	-	12	A
THD	230 V_{AC} Rated Load		-	-	15	%
Efficiency			-	85	-	%
Power Factor	230 V_{AC} Rated Load		-	0.97	0.98	

OUTPUT SPECIFICATIONS

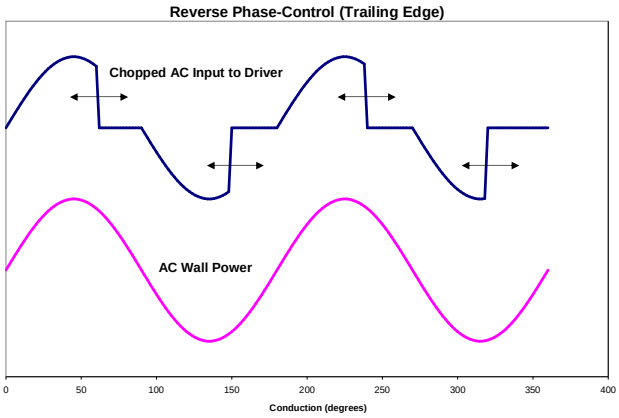
Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
Output Power Rating		-	-	21	W
Output Voltage		24	-	42	V
Output Current		-	500	-	mA
Ripple Current	I_{OUT}_Pk-pk/RMS	-		40	%
Output Regulation		-	-	±5	%I_{OUT}
Start-up time	With no dimmer connected	-	300	500	ms

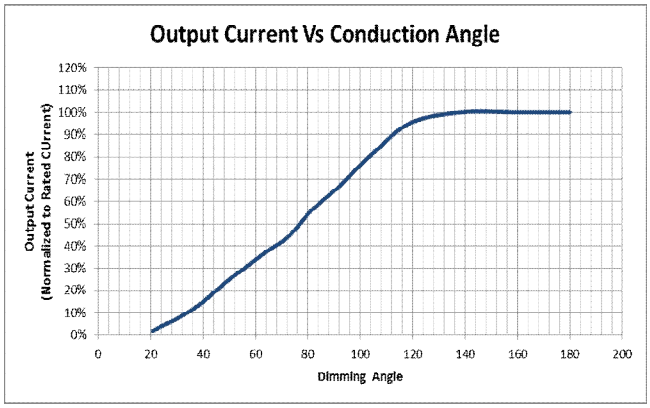
PROTECTION FEATURES

Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
Output Short-Circuit	Hiccup, Auto recovery	-	-	-	-
Over-Temperature Top Case	The output current of the driver will be reduced in order to limit case temperature rise, Auto recovery	-	-	>90	°C
I_{OUT} Over-Shoot	During power ON or power OFF	-	-	10	%
No Load	Unit will not exceed the V_{OUT} Max "V_{OUT} No_Load" rating	-	-	50	V
Isolation Primary-to-Secondary	Reinforced/double Insulation meets IEC/EN61347-2-13 Class II				

LINE DIMMING

Dimming of the driver is possible with ELV dimmers that chop the AC voltage. During the rapid rise time of the AC voltage when the dimmer turns on, the driver does not generate any voltage or current oscillations, and inrush current is controlled. During the on-time of the AC input, the driver regulates the output. The RMS value of the driver output current is proportional to the on-time of the AC input voltage. The RMS output current varies depending upon the conduction angle and RMS value of the applied AC input voltage.



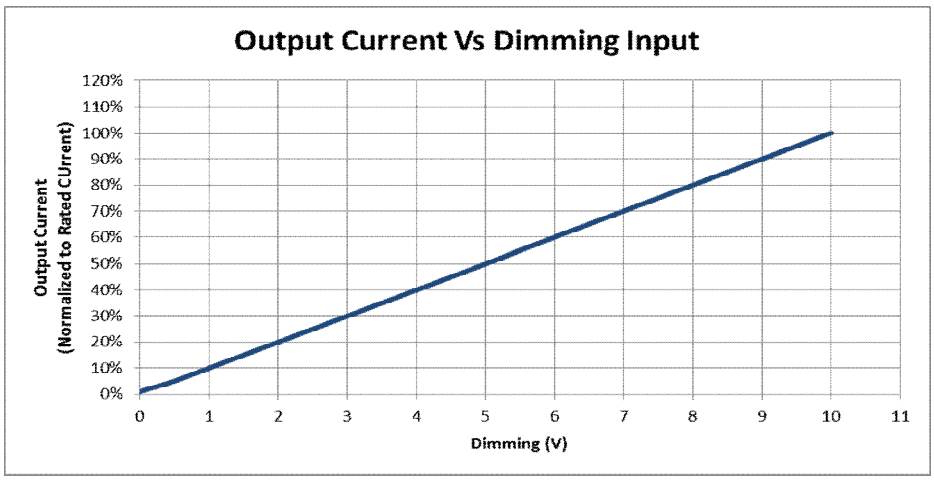


COMPATIBLE LINE DIMMERS:

230 V_{AC} Dimmers	
Manufacturer	**Model**
Lutron	GXI-3104-T-CE-WH
Clipsal	32E450UDM
Clipsal	32E450TM

0-10 V DIMMING

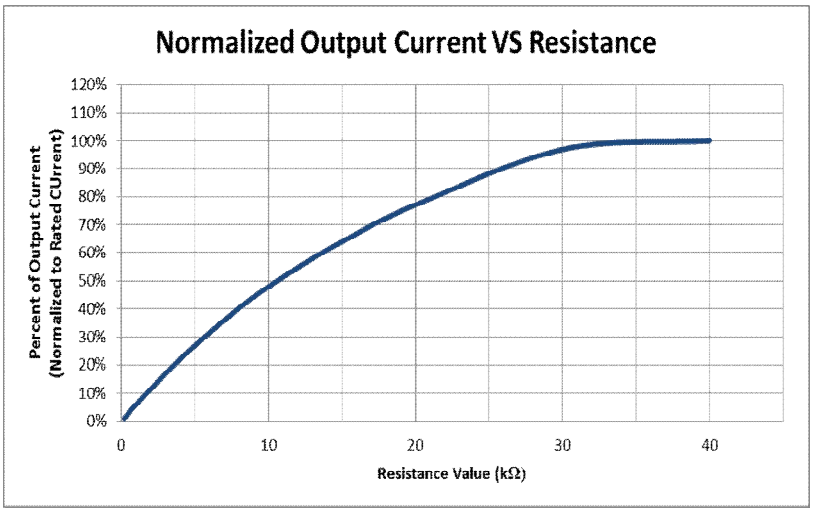
The dimming inputs (purple/pink wires) can be used to adjust the output setting via a standard commercial wall dimmer, an external control voltage source (0 to 10 V_{DC}), or a variable resistor. Any dimmer must capable of sinking 1 mA per driver from the dimming wires. This input, permits 100 % to 1 % dimming. With the dimming input at 1 V, the output will dim to 10 % of nominal current. At a dimming input of 0.1 V, the output current shall decrease to 1 % of nominal current.



Approved 0-10V Dimmers: Lutron (Part Number Nova NFTV); Lutron (Part Number Diva DVTV); Leviton (Illumatech IP710-DL)

RESISTOR DIMMING

The following graphs show the relationship between the value of the resistor connected across the dimming input versus the output current of a single driver.

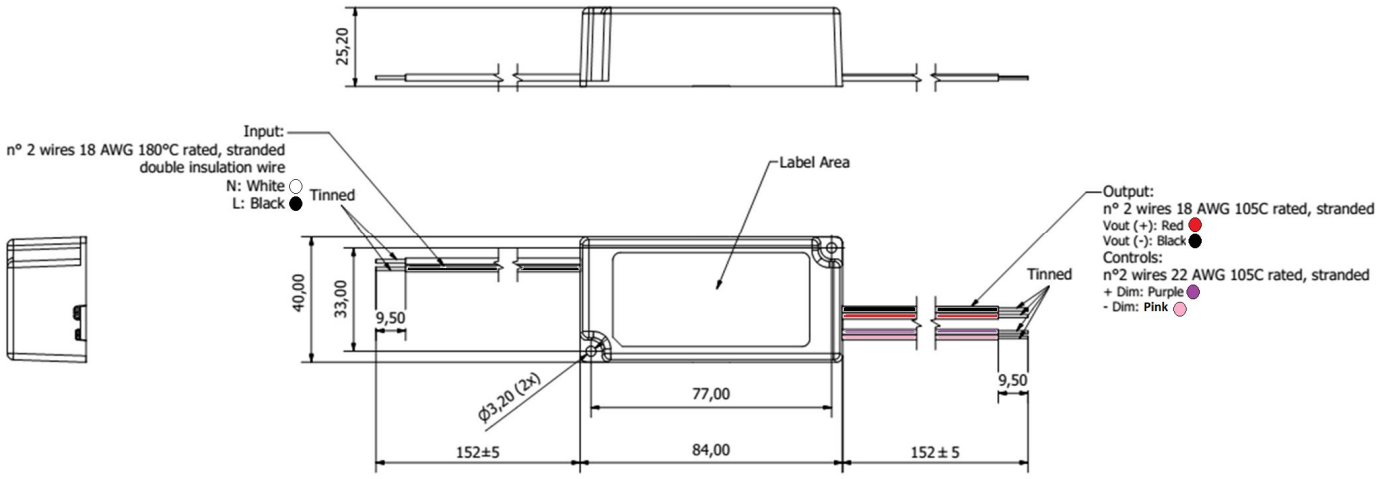


DIMMING NOTES

1. The length of the dimming circuit wiring, wire size and the number of drivers connected to the dimming control must be designed so that the total voltage drop is less than 0.3 V between the drivers and the dimming control.
2. Line dimming and 0-10 V dimming interfaces cannot be used at the same time.
3. Trimming of the output current with the resistor applied on the 0-10 V wires is not permitted when using Line Dimming.

MECHANICAL DETAILS

Enclosure Material:	Plastic, Polycarbonate (PC), white, Sabic - LEXAN 945
I/O Connections:	Flying leads
Ingress Protection:	IP20, UL damp rated
Weight:	154 g (5.4 oz)
Dimensions:	84 x 40 x 25.2 mm (3.30 x 1.57 x 0.99 in)



ENVIRONMENTAL SPECIFICATIONS

Specification	Test Conditions / Notes	Min	Nom	Max	Units
Top Case Temperature Range	Refer to the Top Case measurement point	-30	-	90	°C
Storage Temperature		-40	-	85	°C
Operating Relative Humidity	Non-condensing	5	-	95	%
Surface Temperature	Exposed surfaces temperature under all operating conditions	-	-	90	°C
Cooling	Convection cooled				
Shock EN 60068-2-27	Operating: Half sine, 30 g, 18 ms, 3 axes, 6x each (3 positive and 3 negative). Non-Operating: Half sine, 50 g, 11 ms, 3 axes, 6x each (3 positive and 3 negative).				
Vibration EN 60068-2-64	Operating: 5 – 500 Hz, 1gRMS (0.02 g2/Hz), 3 axes, 30 min. Non-Operating: 5 – 500 Hz, 2.46gRMS (0.0122 g2/Hz), 3 axes, 30 min.				
Vibration EN 60068-2-6	Operating Sine, 10 – 500 Hz, 1g, 3 axes, 1 oct/min., 60 min.				
MTBF	Rated Load, 70 °C Top Case, Bellcore	250k	-	-	Hours
Useful Life	70 °C Top Case.	-	50k	-	Hours

ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

Phenomenon	Conditions / Notes	Standard	Equipment Performance Class
Conducted and Radiated Emission	Test at 230 V_{AC}	EN55015	
Harmonic Current Emissions		EN61000-3-2	Class C
Voltage Changes, Fluctuation and Flicker		EN61000-3-3	

ELECTROMAGNETIC COMPATIBILITY (EMC) – IMMUNITY

Phenomenon	Conditions / Notes	Standard	Note
Equipment for general lighting purposes -EMC Immunity Requirements		EN 61547	
ESD (Electrostatic Discharge)		EN 61000-4-2	
Radiated Radio-Frequency electromagnetic field		EN 61000-4-3	
Electric Fast Transient / Burst	2kV on AC input	EN 61000-4-4	
Surge	Level ±1.5kV L-N	EN 61000-4-5	
Conducted disturbances induced by Radio-Frequency fields		EN 61000-4-6	
Voltage Dips, short interruptions and Voltage Variations		EN 61000-4-11	
Non repetitive damped oscillatory transient, Ring wave		ANSI C.62.41	Category A

SAFETY AGENCIES APPROVALS

Certification Body	Safety Standards	Category
c UL us	UL Recognized ANSI / UL8750, 1st Ed., CSA C22.2 No.250-13, 7th Ed. Models with output voltages <60 V_{DC} include UL and CSA approval (cURus) as LVLE output.	
	LED Driver suitable for dry and damp location	
CE	To obtain the "CE Declaration of Conformity" please contact info@enedopower.com	
	IEC/EN 61347-2-13 electronic control gear for LED Modules IEC/EN 62384 DC or AC supplied electronic control gear for LED modules – Performance Requirements	