

DESCRIPTION

Ozone 150W LED drivers are designed to make LED fixture design easy. With universal input voltage, wide range output and a list of exceptional features, they take the trial and error out of LED fixture design.



KEY FEATURES

- 120/220-240/277V_{AC} Input
- Dimmable Output Current (Constant Amplitude or PWM)
- High Efficiency, Compact Design
- Low Harmonic Distortion
- Low Output Ripple Current
- DALI Compatible (IEC 62386)
- Multiple Device Protections and LEDs Over Temp Protection
- Convection Cooled
- Long Life Time
- Field programmable output features via OZONE-Ptools
- RoHS Compliant



APPLICATIONS AND BENEFITS

Ozone 150W is designed for directly powering LEDs in Indoor Lighting for Large Areas, Street & Urban Lighting and Industrial lighting.

Features:

- Intelligent
- Robust Design
- Compact
- WW Safety Approvals

Benefits:

- Easy to use for the final customer with the Ozone Programming Tool, available as option
- Flexible and suitable for several applications
- Communication through DALI protocol
- Easily integrated into the LED Lamp
- Eases Safety Approval Cycle on final lamp

MODEL CODING AND OUTPUT RATINGS

Model Number	Rating						
	Options	Pout Max (W)	Vout Min ¹ (V _{DC})	Vout Max ¹ (V _{DC})	Iout Min ² (mA)	Iout Max ² (mA)	Vout ³ NO Load (V _{DC})
RSOZ150-105-DALI		150	50	100	800	1500	120
RSOZ150-120-DALI		120	60	115	650	1100	120
RSOZ150-180-DALI		150	90	175	400	1050	185
RSOZ150-300-DALI		150	150	295	200	700	310

Base Model Number	
Option Letter	Description
-RF	RFID (wireless) Programming feature embedded

Note 1: The LED Driver Output Voltage Range depends on the current value set (I_{SET}). See also [Current Setting](#) section.

Note 2: The Output current value can be set (I_{SET}) between Iout min and Iout Max (in 50mA step), by using the Ozone Programming Tools (available as optional). See [Ozone Programming Tool](#) section for more details.

Note 3: It represents the Maximum Output Voltage under any condition.

The Purchase Order must specify the Ordering Code showed in the model table.

For example: **RSOZ150-300-DALI For Standard product only**

RSOZ150-300-DALI-RF For the product with RFID (Wireless) programmability embedded


INPUT SPECIFICATIONS

Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
AC Input Voltage	120-250V _{AC} for Europe; 120-277V _{AC} for USA and Canada	108	120/220-240/277	305	V _{AC}
Input Frequency		47	50/60	63	Hz
Input Current	120V _{AC} Rated Load	-	-	1.37	A
	230V _{AC} Rated Load	-	-	0.70	
	277V _{AC} Rated Load	-	-	0.59	
Inrush Current	120V _{AC}	-	58		A _{pk}
	230V _{AC}	-	61		
	277V _{AC}	-	41		
Power Factor	120V _{AC} Rated Load	0.96	-	0.97	
	230V _{AC} Rated Load	0.95	-	0.96	
	277V _{AC} Rated Load	0.92	-	0.93	
THD	120V _{AC} Rated Load	-	-	5	%
	230V _{AC} Rated Load	-	-	7	
	277V _{AC} Rated Load	-	-	12	
Efficiency	120V _{AC} Rated Load	90	-	91	%
	230V _{AC} Rated Load	93	-	94	
	277V _{AC} Rated Load	93	-	94	
DALI Stand by Power Cons.	120V _{AC}	-	-	1.2	W
	230V _{AC}	-	-	1.4	
	277V _{AC}	-	-	1.5	


OUTPUT SPECIFICATIONS

Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
Output Power Rating	Max Power limit, except RSOZ150-120-DALI model (<120W)	-	-	150	W
Output Voltage	RSOZ150-105	50	-	100	V _{DC}
	RSOZ150-120	60	-	115	
	RSOZ150-180	90	-	175	
	RSOZ150-300	150	-	295	
Output Current	RSOZ150-105	800	-	1500	mA
	RSOZ150-120	650	-	1100	
	RSOZ150-180	400	-	1050	
	RSOZ150-300	200	-	700	
Ripple Current	All models measured (I _{out_Pk-pk} /RMS)	-	10		%
Output Regulation		-	±2	-	%I _{out}
Start-up time	With no dimmer connected	-	-	1500	ms


PROTECTION FEATURES

Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
Output Over Voltage	Unit shuts Down and latches off after 4 attempts	-	+2V	-	V
Output Under Voltage	Unit shuts Down and latches off after 4 attempts	-	-2V	-	V _{min}
Output Over Load⁴	For 153W < P _{TOT} < 160W unit reduce the output current. If P _{TOT} > 160W latches off after 4 attempts	71	-	80	W
Output Short-Circuit	Between LED+ and LED-/RTN. Unit latches	-	-	-	-
Output No Load	Unit shuts Down and latches off after 4 attempts				
Over-Temperature Top Case	Power derating (current reduction) and auto Recovery		85		°C
Isolation Primary-to-Secondary	Reinforced/double Insulation meets IEC/EN61347-2-13 Class II				

Note 4: For the model RSOZ150-120, while 122W < P_{TOT} < 130W unit reduce the output current. If P_{TOT} > 130W latches off after 4 attempts

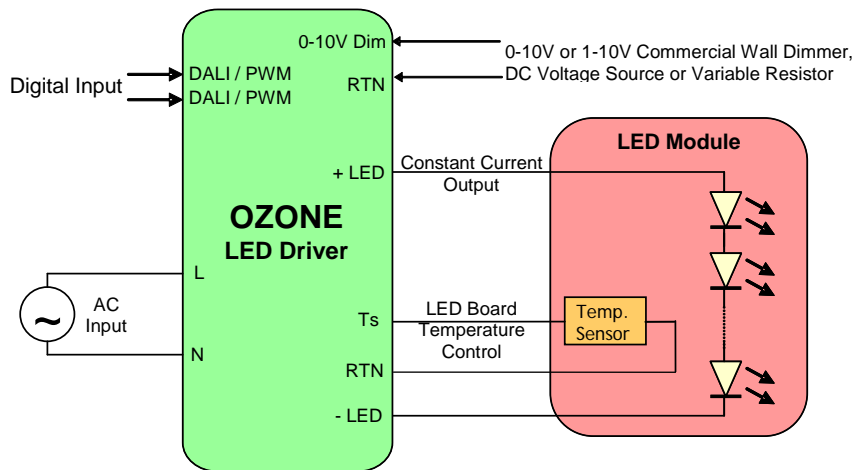
APPLICATIONS AND CONNECTIONS

The OZONE 150W LED driver is designed for powering LED luminaries with standard lighting controls.

The modules operate with:

- Standard Light Switches
- Analog Dimmers (0-10V / 1-10V control)
- DALI/PWM controls (High Voltage also)

The following diagram depicts a typical installation utilizing the OZONE 70W LED driver:



OZONE's versatile control features:

- Settable Output Current. Output current value can be set also by the user
- A 2 wire Dimming input provides 10-100% Iout Dimming function.
- A Temperature sensor (NTC thermistor) protects the LED from over-temperature.
- Digital Input allows direct interface with DALI or PWM input controls.

INPUT/OUTPUT/CONTROL CONNECTORS



Part	Description	# vie
CN1	AC Main Connector (Line, Neutral)	2
CN2	Output Connector and Controls (LEDs; 0-10V Dimming; Temperature Sense)	6
CN3	DALI or PWM Connector (DALI/PWM, DALI/PWM)	2

See Application Note 1 "[AN1_Ozone Wiring Diagram](#)" for wiring and fixing details.

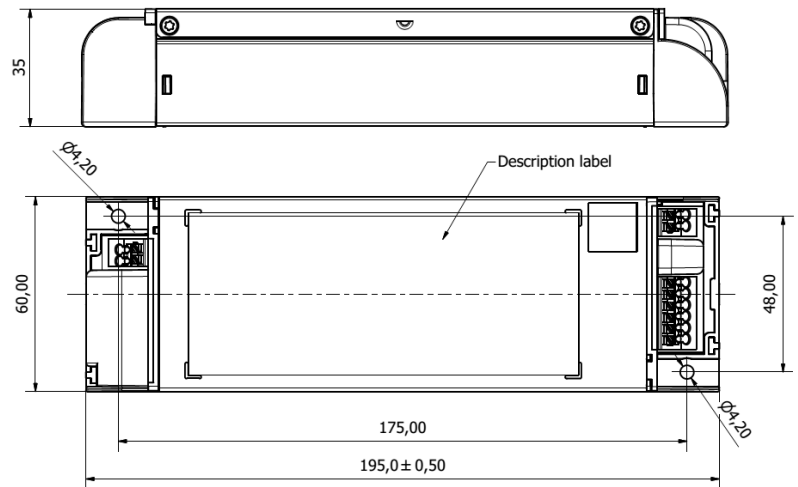
SIGNAL CONNECTIONS

The following table describes the signal connections of the OZONE 150W LED driver.

ANALOG DIMMING	
0-10V/1-10V Dim	<p>The 0-10V Dim is a dimming input that can be used to dim the output current via a standard commercial wall dimmer (0 to 10V_{DC} or 1 to 10V_{DC}, IEC/EN 60929), or an external control voltage source (0 to 10V_{DC} or 1 to 10V_{DC}).</p> <p>The 0-10V Dim input permits dimming from 100% I_{SET} to I_{dim MIN} as specified below: I_{dim MIN}=10% I_{SET}</p> <p>When the interface is set for 1-10V dimming, the output current in I_{dim MIN} when the input is < then 1V When the interface is set for 0-10V dimming, the output turns off when the dimming input is <1V.</p> <p>See Application Note 2 "AN2_Ozone Temperature Sense & 0-10V Dimming" for further details.</p>
Temperature Sense (Ts)	<p>The Temperature sense input may be connected to a thermistor (NTC) to realize a LED Board Over Temperature Protection. The thermistor should be located on the LED assembly to monitor its temperature. If the temperature exceeds a predetermined set point, the output current of the driver is automatically reduced to regulate the temperature of the LED Board at a safe level.</p> <p>See Application Note 2 "AN2_Ozone Temperature Sense & 0-10V Dimming" for further details.</p>
DIGITAL DIMMING	
DALI / PWM	<p>The same Digital Input (DALI/PWM) can be used to control the LED Driver whether DALI Communication or PWM Signal. The selection of the functionality (DALI or PWM) of this input is made by using the Ozone Programming Tools.</p> <p>See also Ozone Programming Tool section.</p> <p>DALI: The DALI input can be used to control the output of the LED Driver. It is compatible with DALI Standard IEC 62386 (LED modules, device type 6).</p> <p>PWM: The PWM input accepts a Pulsed Width Modulated signal. This signal allows a 0% to 100% PWM dimming of the Output Current. This input accepts a Signal compliant to the standard IEC/EN 60929.</p> <p>See Application Note 4 "AN4_Ozone DALI e PWM Dimming" for further details.</p>
PROGRAMMABLE FUNCTION	
Adjustable Dimmer	<p>Ozone can be programmed to execute a custom dimming profile consisting of five periods. Requires the use of an external AC photocell.</p> <p>See "UM1_Ozone Toolset Software Manual" for further details.</p>
Constant Light	<p>The "Constant Light" function guarantees a constant light flux along the entire product life-cycle, compensating the LED's efficiency loss due to the product aging.</p> <p>See "UM1_Ozone Toolset Software Manual" for further details.</p>
Diagnostic	<p>The unit will store historical data about: Short circuit, Overvoltage Undervoltage, LED over-temperature, Internal Over-temperature, Over Power Protection, LED Power Consumption</p>
OPTIONAL FEATURES	
RFID programming	<p>Wireless (RFID) Programmability, available on –RF Models only. Please contact Efore for availability</p>

MECHANICAL DETAILS

Enclosure Material:	Metal with plastic parts
Potting:	Full potted
I/O Connections:	Push in connectors 45deg
Mounting Details:	2x Fixing holes for screws
Ingress Protection:	IP20
Weight:	700g = 1.543lb
Dimensions:	195 x 60 x 35mm (7.67 x 2.36 x 1.37in)

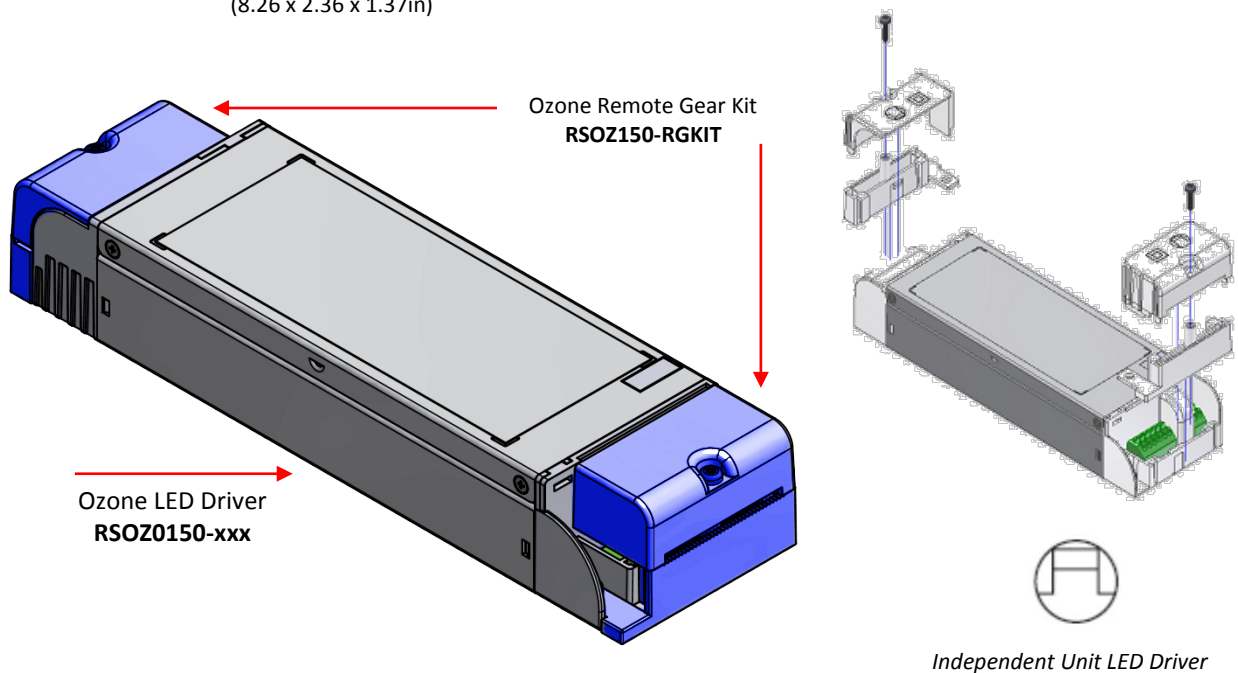


OZONE REMOTE GEAR KIT (AVAILABLE AS OPTIONAL)

Ozone 150W LED Driver is designed for embedded use. Ozone Remote Gear Kit is an accessory that can be mounted on the Ozone LED Driver when an Independent Unit LED Driver is required (according to EN61347-2-13).

The Remote Gear Kit is available as an option and can be ordered separately with the code **RSOZ150-RGKIT**. The kit must be ordered separately. It does not come mounted on the LED Driver.

Dimensions with remote gear kit 210 x 60 x 35mm
(8.26 x 2.36 x 1.37in)




OUTPUT PROGRAMMABILITY

Ozone 150W provides 2 methods to program the output characteristics; wireless and wired. Similar features can be programmed through each method.

Wired: Analog dimming models can also be programmed with the Ozone Programming Tool (RSOZ070-PTOOL) for backward compatibility. Digital dimming models can be programmed using the DALI Tool (RSOZ070-PDALI).



DALI Programming Tool
 Order Code: RSOZ070-PDALI



Ozone Programming Tool
 Order Code: RSOZ070-PTOOL

Wireless (-RF option CODE only): RFID technology is used to enable true wireless programming of the features without the need to energize or connect the driver to test equipment. A compatible RFID reader and OZONE ToolSet software is required. Two pad reader options are available. A single driver pad reader is handheld and suitable to program individual drivers. The multiple driver pad reader will program a box of Ozone 150W drivers simultaneously, without opening the box. **The OZONE -RF option code can be also programmed with the RSOZ070-PDALI programming tool, but it cannot be programmed with the RSOZ070-PTOOL**



Single driver pad reader
 Order Code: ROALSET-Single



Multiple driver pad reader
 Order Code: ROALSET-Multi

OZONE PROGRAMMING TOOL (AVAILABLE AS OPTIONAL)

Ozone 150W LED Drivers can be easily set by the customer, for this reason they are extremely flexible and suitable for several applications. For this purpose an external Module (Ozone Programming Tool) is available as optional and can be ordered separately specifying its Ordering Code (See Note 7).

This external module is designed to be connected to the Ozone LED Driver output. The Programming Tool is powered by a long-life battery; it is safe and easy to use, therefore no particular technical skills are required to set the product.

The Ozone Programming Tool allows you to set the output current value (Current Setting) and to enable other functionalities (Fade Time Setting, DALI/PWM, Adjustable Dimmer, Constant Light Function) (See Note 8). Moreover, if used in combination with the Ozone Graphical User Interface (Ozone ToolSet PC Software), the Programming Tool allows users access to additional software functions.

Please refer to Application Note 3 “AN3_Ozone Setting” and User Manual 1 “UM1_Ozone Toolset Software Manual” for more details.

Note 7: The Ordering Code for the Ozone Programming Tool is **RSOZ070-PTOOL**. The 3-wire programming cable represented in the figure and a USB cable (for PC connection) are included with the Tool.

Note 8: The Constant Light Function is available starting from Ozone firmware revision 1.4. For a whole overview on the software and product revisions consult the User Manual 1 “UM1_Ozone Toolset Software Manual”.

Ozone Programming Tool (RSOZ070-PTOOL):

Dimensions: 80 x 55 x 19mm (3.15 x 2.16x0.75in)

Weight: 75gr (0.165lb)

3-wire Programming Cable, length 750mm (29.5in)



Ozone 150W models can be programmed also via DALI programming tool

DALI Programming Tool (RSOZ070-PDALI):

Dimensions 68 x 35 x 20mm (2.67 x 1.37 x 0.78in)

Weight 75g (0.165lb)

2-wire Programming Cable, length 75mm (29.5in)



Adjustable Dimmer, Constant Light, Driver Diagnostic features can be enabled using either RSOZ070-PTOOL or RSOZ070-PDALI programming tools and the “Ozone Toolset” Software interface. Please refer to “UM1_Ozone_Toolset” for further details.

CURRENT SETTING

The Current value can be easy set also by the customer using the Ozone Programming Tool, by moving 2 rotary switches (R1= Rotary 1, R2=Rotary 2), 10 positions each.

The Table below shows the current set values (Iset) and the LED Driver Output Voltage Range, according to the positions of the Rotary Switches.

Output Current Set		RSOZ150-105		RSOZ150-120		RSOZ150-180		RSOZ150-300	
I _{SET} mA	Rotary Position R1 - R2	V _{out} Min ¹⁰ V _{DC}	V _{out} Max ¹⁰ V _{DC}	V _{out} Min ¹⁰ V _{DC}	V _{out} Max ¹⁰ V _{DC}	V _{out} Min ¹⁰ V _{DC}	V _{out} Max ¹⁰ V _{DC}	V _{out} Min ¹⁰ V _{DC}	V _{out} Max ¹⁰ V _{DC}
200	0-0							150	295
250	0-1							150	295
300	0-2							150	295
350	0-3							150	295
400	0-4					90	175	150	295
450	0-5					90	175	150	295
500⁹	0-6					90	175	150	295
550	0-7					90	175	150	273
600	0-8					90	175	150	250
650	0-9			60	115	90	175	150	231
700	1-0			60	115	90	175	150	214
750	1-1			60	115	90	175		
800	1-2	50	100	60	115	90	175		
850⁹	1-3	50	100	60	115	90	175		
900	1-4	50	100	60	115	90	167		
950	1-5	50	100	60	115	90	158		
1000⁹	1-6	50	100	60	115	90	150		
1050	1-7	50	100	60	115	90	143		
1100	1-8	50	100	60	109				
1150	1-9	50	100						
1200	2-0	50	100						
1250	2-1	50	100						
1300	2-2	50	100						
1350	2-3	50	100						
1400	2-4	50	100						
1450	2-5	50	100						
1500⁹	2-6⁹	50⁹	100⁹						

Note 9: Ozone 150W LED Drivers are factory pre-set to following values:

I_{SET} = **1500mA** for RSOZ150-105
 I_{SET} = **1000mA** for RSOZ150-120
 I_{SET} = **850mA** for RSOZ150-180
 I_{SET} = **500mA** for RSOZ150-300.


ENVIRONMENTAL

Specification	Test Conditions / Notes	Min	Nominal	Max	Units
Top Case Temperature Range	Refer to the Top Case measurement point	-30	-	85	°C
Ambient Temperature Range	Without any derating	-30		50	°C
Ambient Temperature Range with Derating	With derating	-30		70	°C
Storage Temperature		-40	-	85	°C
Cold Start up Ambient		-40			°C
Operating Relative Humidity	Non-condensing	5	-	95	%
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 – 500Hz, 1gRMS (0.02 g ² /Hz), 3 axes, 30 min. Non-Operating: 5 – 500Hz, 2.46gRMS (0.0122 g ² /Hz), 3 axes, 30 min.				
Vibration EN 60068-2-6	Operating Sine, 10 – 500Hz, 1g, 3 axes, 1 oct/min., 60 min.				
MTBF	Full Load, 40°C Ambient, 80% Duty cycle, Telcordia SR-332 Issue 2	-	400.000	-	Hours
Useful Life	Nominal V _{AC} , 40°C Ambient.	50.000		-	Hours






ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

Phenomenon	Conditions / Notes	Standard	Performance Class
Conducted Emission	Test at 230V _{AC}	EN55015	
Radiated Emission	Test at 230V _{AC}	EN55015	
Conducted and Radiated Emission	Test at 120/277V _{AC}	FCC CFR47- part 15/subpart B	Class B
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 Req.		EN 61547	
ESD (Electrostatic Discharge)		EN 61000-4-2	
Radiated Radio-Frequency electromagnetic field		EN 61000-4-3	
Electric Fast Transient / Burst		EN 61000-4-4	
Surge	Level ±6.0kV 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	2.5kV	ANSI C.62.41	Category A

SAFETY AGENCIES APPROVALS

Certification Body	Safety Standards	Category
	UL Recognized ANSI / UL8750, CSA C22.2 No.250. LED Driver suitable for dry and damp location	
	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	
	To obtain the “CE Declaration of Conformity” please contact info@efore.com	
	Independent unit as per EN61347-2-13 with an optional remote gear kit RSOZ150-RGKIT	


OZONE CORRELATED DOCUMENTS

This document is the Ozone LED Driver 150W Datasheet. The file is called "[DS1_Ozone LED Driver 150W](#)".

During the Ozone adoption please consider that, to support you, there are also 4 dedicated Application Notes as showed in the table below.

Please contact EFORE Sales Department or your local Distributor if you do not have them.

Application Note	File Name	Topics
1	AN1_Ozone Wiring Diagram	Wiring Connections and LED Driver fixing
2	AN2_Ozone Temperature Sense & 0-10V Dimming	LED Board Over Temperature protection and 0-10V or 1-10V Dimming
3	AN3_Ozone Setting	LED Driver Settings through the Ozone Programming Tool
4	AN4_Ozone DALI & PWM Dimming	DALI/PWM Digital Input: Control through the DALI standard communication and
User Manual	File Name	Topics
1	UM1_Ozone_Toolset	PC Software User Manual
PC Software	File Name	Topics
1	Ozone Toolset	PC Software (Windows XP SP3/Windows Vista / Windows 7) to define Additional LED Driver Settings, Adjustable Dimming Function, Constant Light Function

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