DESCRIPTION

The MESO 25W LED drivers are designed to generate one constant current output from an AC input, and work with most industry standard lighting controls in dimming applications.

MAIN FEATURES

- 120-277 V_{AC} Input
- DC Input Rated models available
- Programmable output current via programming tools
- Dimming Options:
  - Analog Dimming Models
    - 1-10V / 0-10V Dim (dims to OFF)
  - DALI Dimming Models
    - DALI/PWM
- Temperature sensor input (NTC) to protect the LED
- UL Approved, ENEC Approved, CE Mark
- Class 2 Output, Class II isolation
- Long Life
- RoHS Compliant

MODEL CODING AND OUTPUT RATINGS

Model Number		Rating				
Base Model Number	Option Letter[1]	Pout Max (W)	Vout Min (V_{DC})	Vout Max (V_{DC})	Iout Set[2] (mA)	Iout Max[2] (mA)
RMLD-500A-P-[3]		25	28	56	250	500
RMLD-500B-P-		12	12	24	250	500
RMLD-700A-P-		25.2	18	36	350	700
RMLD-1000A-P-		24	12	24	500	1000

Table 1: Absolute Maximum Driver Ratings

Note 1: Two characters are required to define the options. See the Option Table for details.
Note 2: The factory set-point for the Analog dimming models (**AA** and **DA**) is the **Iout Set** value, while for Digital dimming models (**AD** and **DD**), the factory set-point is the **Iout Max** value.
Note 3: Model RMLD-500A-X-XX Derated to 450mA between 50V and 56V to limit output power to 25W

Option Table	
Option Letter	Description
AA	AC Input and Analog – 0-10V Dimming
AD	AC Input and Digital – DALI Dimming
DA	AC & DC Input and Analog – 0-10V Dimming
DD	AC & DC Input and Digital – DALI Dimming

Model Number example – 1000mA model with DALI dimming option = **RMLD-1000A-P-AD**

INPUT SPECIFICATIONS

Specification	Test Conditions / Notes		Min.	Nominal	Max.	Units
AC Input Voltage	Device starts and operates at 90 V_{AC} at all load conditions 120-250 V_{AC} for Europe; 120-277 V_{AC} for USA and Canada		90	120-277	305	V_{AC}
DC Input Voltage	150-250 V_{DC} for Europe; 150-400 V_{DC} for USA and Canada		150	-	400	V_{DC}
Input Frequency			47	50/60	63	Hz
Input Current	120 V_{AC} Rated Load		-	-	0.26	A
	230 V_{AC} Rated Load		-	-	0.13	
	277 V_{AC} Rated Load		-	-	0.11	
Inrush Current (peak)	120 V_{AC}	Half Value time: 150µs	-	-	1.5	A
	230 V_{AC}	Half Value time: 150µs	-	-	2.5	
	277 V_{AC}	Half value time: 150µs	-	-	3.5	
THD	120 V_{AC} Rated Load		-	-	16	%
	230 V_{AC} Rated Load		-	-	17	
	277 V_{AC} Rated Load		-	-	20	
Efficiency	120 V_{AC} Rated Load		81	-	85	%
	230 V_{AC} Rated Load		80	-	86	
	277 V_{AC} Rated Load		80	-	85	
Stand by Power Consumption	120 V_{AC}		-	-	0.45	W
	230 V_{AC}		-	-	0.96	
	277 V_{AC}		-	-	1.20	
Power Factor	120 V_{AC} Rated Load		0.97	-	-	
	230 V_{AC} Rated Load		0.95	-	-	
	277 V_{AC} Rated Load		0.94	-	-	
Harmonic Current	Complies with EN-61000-3-2, Class C					

OUTPUT SPECIFICATIONS

Specification	Test Conditions / Notes	Min.	Nom.	Max.	Units
Output Power Rating	check Table 1, Model Coding and Output Ratings table	12	-	25	W
Output Voltage	RMLD-500A	28	-	56	V
	RMLD-500B	12	-	24	
	RMLD-700A	18	-	36	
	RMLD-1000A	12	-	24	
Output Current	RMLD-500A	250	-	500	mA
	RMLD-500B	250	-	500	
	RMLD-700A	350	-	700	
	RMLD-1000A	500	-	1000	
Ripple Current	All models measured (Iout_Pk-pk/RMS)	-	-	40	%
Output Regulation		-	-	±5	$\%I_{OUT}$
Start-up time[2]	With no dimmer connected	-	-	600	ms

Note 2: Turn-on time on Analog models is faster than DALI models.

PROTECTION FEATURES

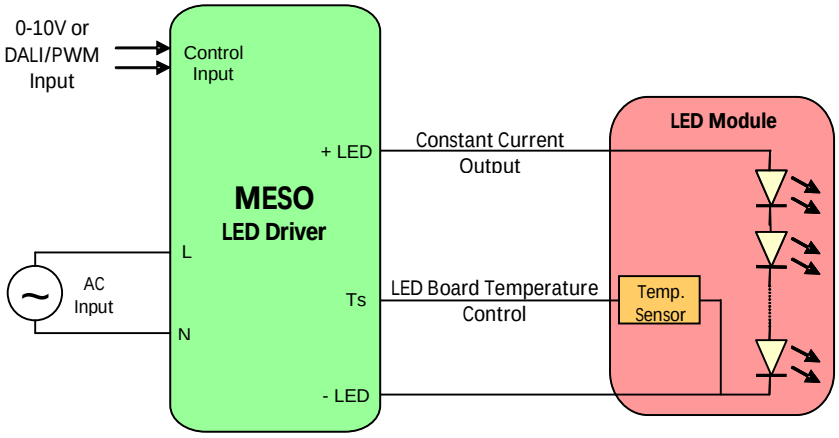
Specification	Test Conditions / Notes	Min.	Nominal	Max.	Units
Output Over Voltage	Unit shuts Down and latches off after 10 attempts	110	-	130	$\%V_{MAX}$
Output Short-Circuit	Unit shuts Down and latches off after 10 attempts	-	-	-	-
Over-Temperature Top Case	Power derating, auto Recovery		85		°C
No Load	Unit shuts Down and latches off after 3 attempts				
Isolation Primary-to-Secondary	Reinforced/double Insulation meets IEC/EN61347-2-13 Class II				

APPLICATIONS AND BENEFITS

MESO is designed for powering LED luminaries with standard lighting controls. The modules operate with:

- Standard Light Switches
- Analog Dimmers (0-10V or 1-10V control)
- DALI controls

The following diagram depicts a typical installation utilizing the MESO 25W:



MESO's versatile control features:

- Settable Output Current. Output current value can be set also by the user
- Dimming Options:
  - ✓ Analog Dimming input provides 10-100% Iout Dimming function and Dim to OFF, includes external Temperature sensor (to 100k NTC thermistor) to protect the LED from over-temperature.
  - ✓ Digital Dimming allows direct interface with DALI controls or PWM input. Includes external Temperature sensor (to 100k NTC thermistor) to protect the LED from over-temperature.

OUTPUT PROGRAMMABILITY AND OPTIONS:

MESO models are available with either analog controls (0-10V / 1-10V dimming) or digital controls (DALI / PWM). Each model can be programmed using a Enedo proprietary tool.

ANALOG CONTROL MODELS (0-10V/1-10V):

The output characteristics of the analog MESO models can be set using the Ozone programming tool, **RSOZ070-PTOOL**. The tool uses a proprietary digital interface so that once programmed, the driver cannot be changed by the ordinary user. The output current is set through 2 rotary switches to between 50% and 100% rating. DIP switches set the fade time and characteristic of the analog dimming.

The following are the features that can be programmed:

1. Adjust Iout from **50%** to 100% in 10mA increments.
2. Fade time of **0**, 2, 5 or 10 seconds.
3. 0–10V (Dim to Off) or **1–10V** (Iout min 10%).

OZONE Programming Tool
Order Code: **RSOZ070-PTOOL**

The Analog control models have 3 signal wires described below:

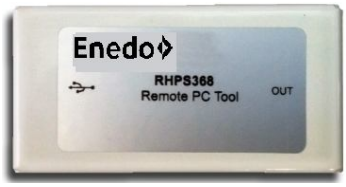
- **Dim (Purple/Grey):** The dimming input can be used to adjust the output setting via a standard commercial wall dimmer, an external control voltage source (1 to 10VDC), or a variable resistor. This input permits 100% to 50% trimming and 100% to 10% dimming. This allows active control of the driver and may be used for trimming and dimming purposes
- **Ts (Orange):** The Temperature Sense input may be connected to a 100k NTC thermistor. 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 module is automatically reduced to regulate the temperature of the LED at a safe level. See Application Notes for details.

DIGITAL CONTROL MODELS (DALI/PWM):

The output characteristics of the digital MESO models can be set using the DALI programming tool (RHPS368)**, RSOZ070-PDALI**. The DALI interface is used to program the MESO driver as well as test the DALI functions. The output current can be set to between 50% and 100% rating.

The following are the features that can be programmed:

1. Adjust Iout from 50% to **100%** in 10mA increments.
2. Set for **DALI** or PWM enabled.



DALI Programming Tool
Order Code: **RSOZ070-PTOOL**

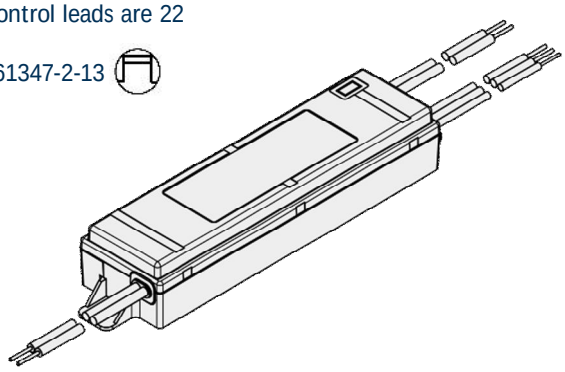
The Digital control models have 3 signal wires described below:

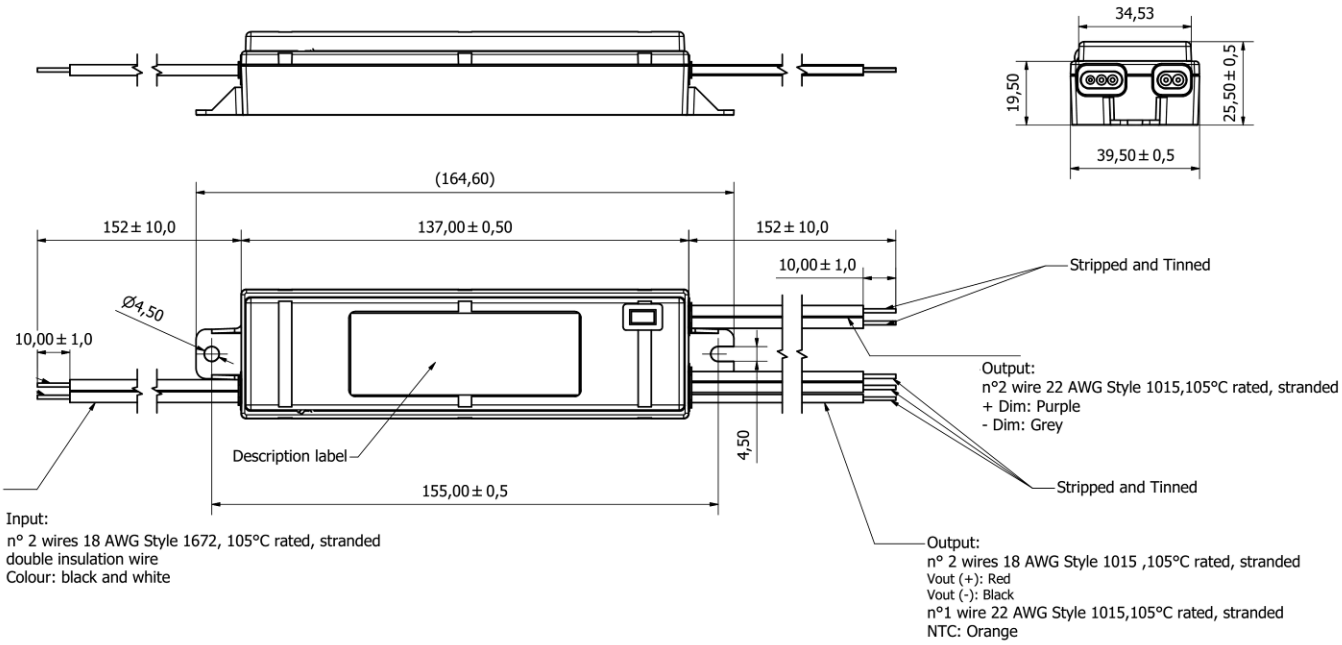
- **DALI or PWM Input (yellow/yellow):** When DALI enabled, controls the output of the driver through the DALI interface that is compatible with IEC62386. When PWM enabled, the input accepts a pulse width modulated signal. This permits a 0% to 100% dimming of the output current and is compliant with EN 60929.
- **Ts (orange):** The Temperature Sense input may be connected to a 100k NTC thermistor. 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 module is automatically reduced to regulate the temperature of the LED at a safe level. See Application Notes for details.

See **Application Note 3**, MESO Settings, for details on the programming features.

MECHANICAL DETAILS

Enclosure Material:	Polycarbonate (PC), UL 94 V-0, Temperature index 120°C.
I/O Connections:	Flying leads, 152mm long, 105°C Rated, Stranded, Stripped by approximately 10mm and tinned. Input and output leads are 18AWG, control leads are 22 AWG. 5 leads max for DC output and signals. Meet the requirements of an Independent Unit as per EN61347-2-13
Mounting Details:	Molded mounting feet
Ingress Protection:	IP20
Environmental rating:	Rated for Damp Locations
Dimensions:	165 x 40 x 26 mm (Including mounting feet) **(6.48 x 1.58 x 1.02 in)** 137 x 40 x 26 mm (**Not** including mounting feet) **(5.39 x 1.58 x 1.02 in)**
Weight:	156 g (0.34 lb)





Drawing shows model with 0-10 Dimming. With DALI option, the Purple and Grey wires are replaced with Yellow wires.

ENVIRONMENTAL SPECIFICATIONS

Specification	Test Conditions / Notes	Min	Nom	Max	Units
Top Case Temperature Range	Refer to the Top Case measurement point	-30	-	85	°C
Ambient Temperature Range		-30		55	°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 – 500Hz, 1gRMS (0.02 g2/Hz), 3 axes, 30 min. Non-Operating: 5 – 500Hz, 2.46gRMS (0.0122 g2/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	-	800k	-	Hours
Useful Life	Nominal V_{AC}, Rated load, 40°C Ambient.	-	44k	-	Hours

ELECTROMAGNETIC COMPATIBILITY (EMC) – EMISSIONS

Phenomenon	Conditions / Notes	Standard	Equipment Performance Class
Conducted Emission	Test at 230V_{AC}	EN55015	
Conducted Emission	Test at 120/277V_{AC}	EN55032	Class B
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 ±1.0kV 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
c UL us	UL Recognized ANSI / UL8750, CSA C22.2 No.250. Include UL and CSA approval (cURus) as Class 2 output. 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	
CE	To obtain the "CE Declaration of Conformity" please contact info@enedopower.com	
	Independent unit as per EN61347-2-13	