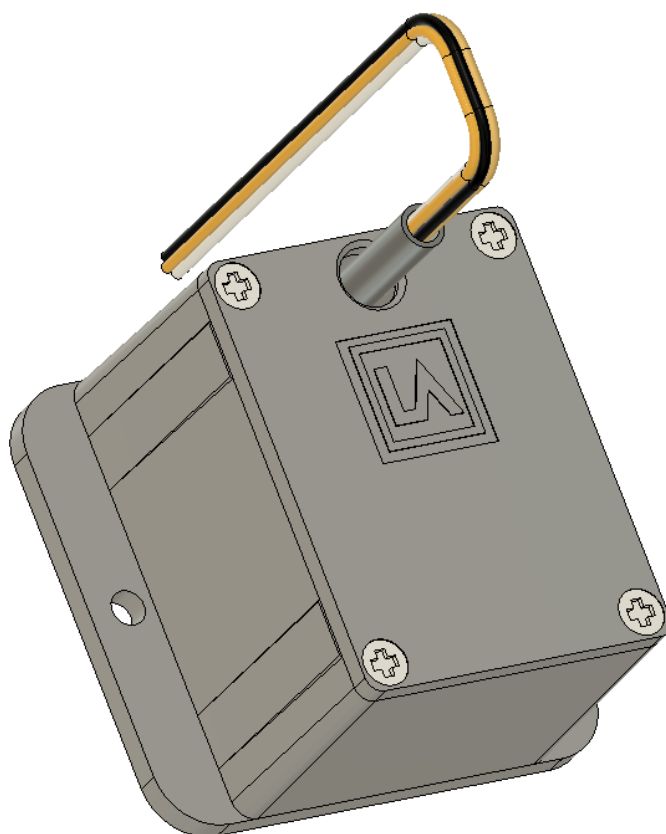


Duty-Voltage Converter

Proportional PWM to analog signal converter



Product description:

The **Duty-Voltage Converter** product is used to convert the dimmer's PWM signal into a proportional analog signal. The output signal varies according to the current PWM cycle in the range of 0V to the current power supply (Vcc-0.8). The use of the product is mainly where we need to externally set the brightness of onboard devices and the target device does not contain a PWM digital input, but only analog input. This control input is often referred to as the "LIGHTING BUS" and is divided into **14V** and **28V** versions. For example, the product can be used in a combination of a **Double Dimmer** and an aviation display panel (Garmin, Denon) for UL aircraft.

Due to its small size and construction, the converter has a simple installation. We will prepare a place for mounting the product in the cockpit under the dashboard. It is necessary to drill 2 holes for the M3 screw (if the product is recessed, a countersunk hole must also be made). The wire output can be crimped to the connector of the display. We connect the supply voltage wires (VCC and GND), PWM, and ANO (Analog Out). Be careful when connecting the product to the panel. Before turning on the product for the first time, make sure that the product is connected to the correct pins of the display input connector. Finally, we fix the product with a screw, a washer, and a nut in the final place.

Electrical parameters:

<i>Parameter</i>	<i>min</i>	<i>Typ</i>	<i>max</i>	<i>unit</i>	<i>note</i>
Power supply voltage	9	12/24	30	VDC	
Power consumption	0,8	<2	10	mA	
PWM voltage	4,5V	VCC	30	V	
PWM frequency	100	122	1k	Hz	
Duty cycle	0	-	100	%	
PWM type	-	positive	-	-	switching +
PWM-ANALOG conversion type	-	linear proportional	-	-	The output signal depends on the magnitude of the supply voltage.
Analog output voltage	0	-	VCC-0,8	V	ANO (ANalog Output) * Output without load
Recommended output load	0	0,2	1,5	mA	
Ripple voltage on analog output		-	120	mV	
Transfer reaction time	-	-	400	msec	Instant jump from 100% to 0%
The input impedance of the target device	-	100/200	-	kΩ	approx. 100k@12V; approx. 200k@24V * Smaller load impedance reduces usable output voltage swing
Number of channels	-	1	-	-	
Overvoltage protection	-	YES	-	-	
Output short circuit protection	-	YES	-	-	Limiting the output current
Reverse polarity protection	-	YES	-	-	
Internal fuse protection	-	50	-	mA	self-resetting fuse

Transfer characteristic:

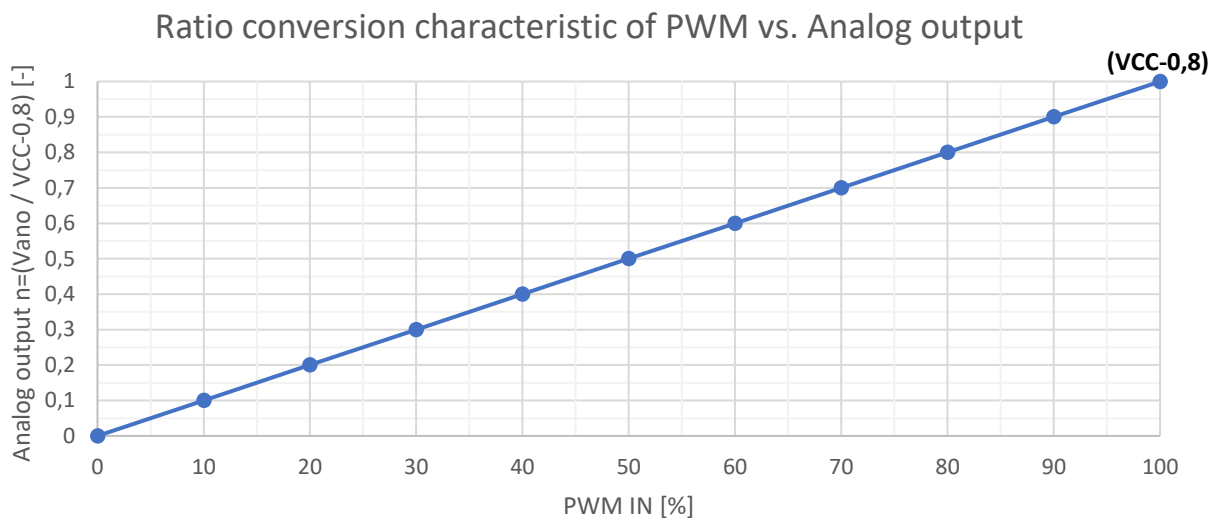


Fig. 1 Product transfer characteristic

Calculation of the analog output value: $V_{ANO}=n*(V_{CC}-0,8)$ eventual $V_{ANO}=PWM_{IN}*(V_{CC}-0,8)$

Mechanical parameters:

Parameter	Value	Unit	Note
Width	41	mm	*See fig. 4 and 5 – device dimension
Depth	44,5	mm	
High	27,5	mm	
Installations holes (diametral)	M3	mm	
Installation gap (optional)	41,5 x 32	mm	
Weight	30	g	
Cable cross-section	0,34	mm ²	22AWG
Cable length	30	cm	

Wire signal marking

Signal	Mark	Wire color
Power supply +	VCC	Yellow
Power supply -	GND	Black
PWM input	PWM IN	White
Analog output	ANO	Orange

Installation schema:

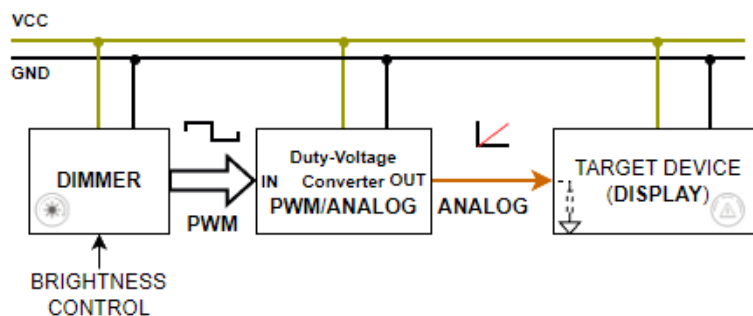


Fig. 2 Drawing diagram

Product view:

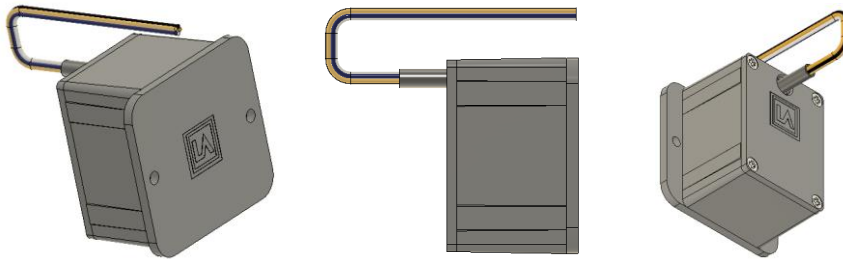


Fig. 3 Product view

Device dimension:

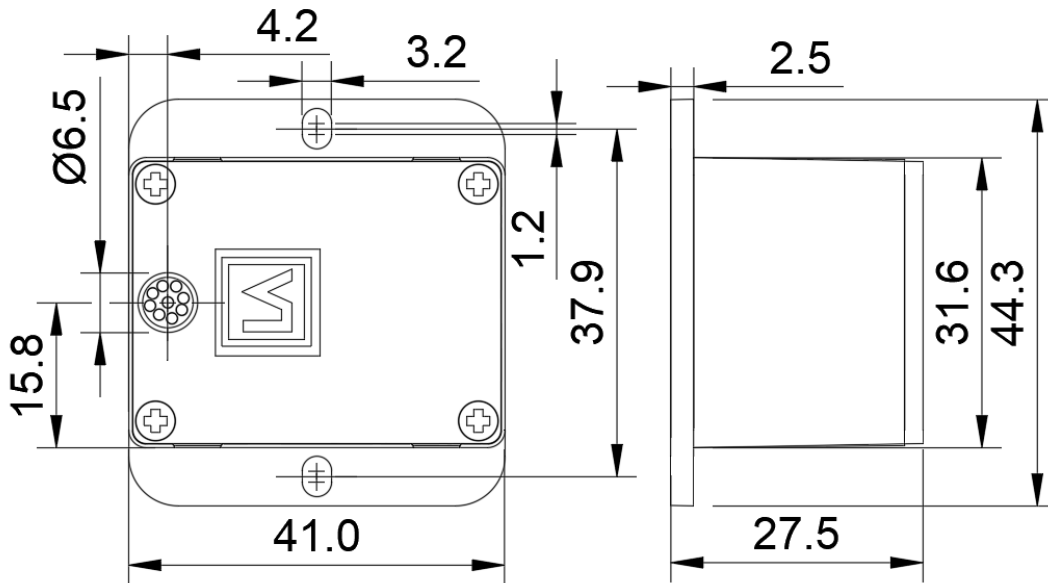


Fig. 4 Box dimension (mm)

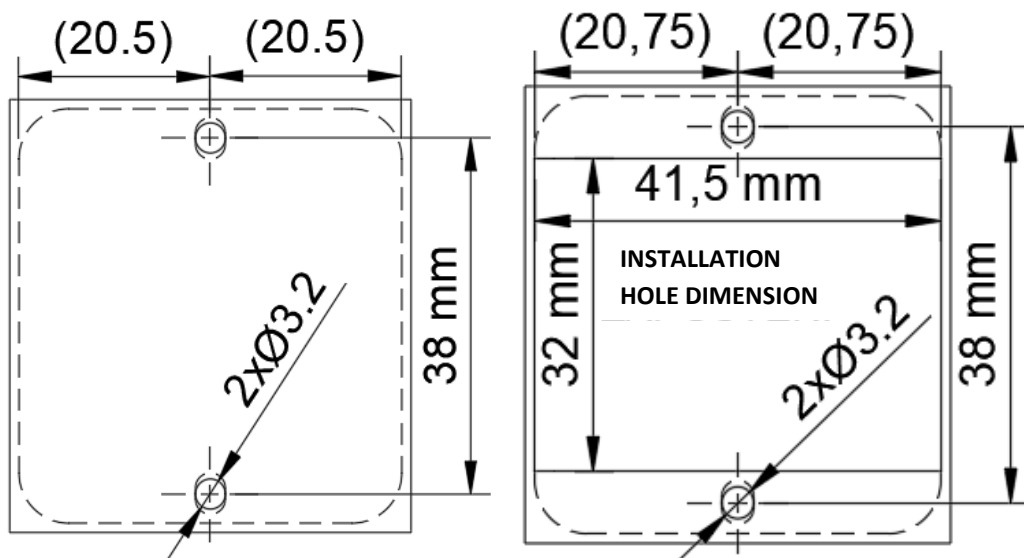


Fig. 5 Installation holes a) to surface b) recessed into the hole

Operating conditions:

<i>parameter</i>	<i>Value</i>	<i>Unit</i>	<i>Note</i>
Operating temperature	-30 ÷ 60	°C	
Operating humidity	20 ÷ 85 %	RH	
Atm. Pressure	800 ÷ 1100	hPa	
IP protection	IP20	-	
Mounting type	By screwing to the surface / into the hole	-	Max. screw M3
Working position	Any	-	

Important notes and warnings

Thank you for purchasing **Duty-Voltage Converter**. For a comfortable and safe use of this product, please pay attention to THE ENTIRE MANUAL, especially the notes and warnings below.

- Although the **Duty-Voltage Converter** has been thoroughly tested to ensure maximum safety in all conceivable situations, THE RIGHT FUNCTIONALITY DEPENDS ON THE RIGHT INSTALLATION AND SETTINGS.
- Therefore, it is **NECESSARY to READ CAREFULLY and UNDERSTAND THIS MANUAL COMPLETELY.**
- Keep this manual printed in an airplane for cases of emergency or change of ownership.
- **THIS PRODUCT IS NOT APPROVED FOR INSTALLING IN CERTIFIED AIRPLANES.**
- The pilot **MUST UNDERSTAND** the control of this product before the first flight. **DO NOT** use the product unless you are sure how it works!
- Do not allow unauthorized persons to handle the installed product.
- After installing the product, before the first flight, turn on ALL possible sources of electromagnetic interference on board the aircraft and ensure that the instrument is functioning properly.
- Use of the device in conflict with this manual, with bad wiring, outside the allowed operating conditions, etc., may cause the device to malfunction or damage and endanger flight safety.
- If the product repeatedly indicates an error, do not use it and turn off the power!
- **AVOID** contact with liquids and chemicals.
- Before installation, check the mechanical integrity of the device and its accessories.
- **DO NOT** disassemble the device!
- After installation, carefully check the functionality of the device and its installation.
- The responsibility for the installation rests entirely on the installer.

- Responsibility for performed control actions based on information indicated by the product is fully with the operator (pilot). The operator must be able to evaluate an incorrect indication even if the product does not indicate an error.
- Ensure regular maintenance of the aircraft main battery.
- If you do not agree to the notes and warnings above, do not use this product.

Company LAMBERT AERODEVICES s.r.o reserves the right to change or improve the product or manual without prior or subsequent notice.

Document revision:

<i>date</i>	<i>Version</i>	<i>Change description</i>	<i>author</i>
12.1.2023	0	Create the document	NEPOR
16.01.2023	1	Parameters update	NEPOR



www.lambert-aerodevices.cz