
MDU13

PWM DIMMER



Operating Instructions

ASTEL
MARINE

CONTENTS

Preface	3
Features	3
Precautions	3
Controls and Connectors.....	4
PWM Dimmer MDU13	4
Installation	5
Controls.....	7
Appearance.....	8
Technical Specifications.....	8
Warranty.....	9
Declaration of Conformity.....	10



PREFACE

The MDU13 is a PWM Dimmer designed to use with single color Equator series and with single or three-color of Conus, Convex and Plaque series underwater LED lights. The 3 control outputs enable the dimming of different series of underwater LED lights by using of one push-button switch.

FEATURES

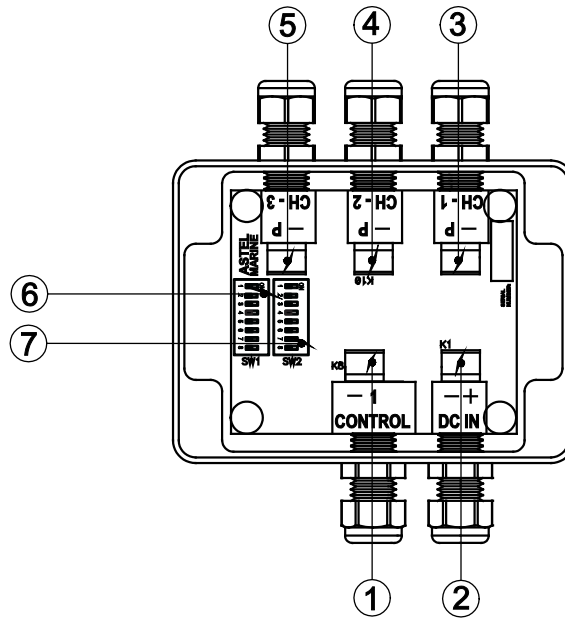
- 3 Control Outputs
- Adjustable PWM Frequency
- Wide Range Power Supply
- Low Power Consumption
- Polarity Protection
- Transient Protection
- Short Circuit Output Protection
- Simple Installation

PRECAUTIONS

- The PWM Dimmer has to be installed and used in accordance with the instructions of this manual only.
- The power supply has to be disconnected before installation.
- Avoid installing the PWM Dimmer in extremely hot places and near appliances generating strong magnetic fields.
- Do turn power off immediately and refer servicing to qualified service personnel if the PWM Dimmer does not operate normally following the operating instructions.

CONTROLS AND CONNECTORS

PWM Dimmer MDU13



(1) CONTROL

The 2-pole terminal block connector to connect push-button switch to operate with dimming function.

(2) DC IN

Terminal-block connector to connect 12-24Vdc power supply.

(3) CH-1

Control output to connect the +Control (P) and GND Control (-) wires of single-color Equator / Conus / Convex / Plaque series.

The control output to connect the +Control (P) and GND Control (-) wires of RED or WHITE color of three-color Conus / Convex / Plaque series.

(4) CH-2

Control output to connect the +Control (P) and GND Control (-) wires of single-color Equator / Conus / Convex / Plaque series.

The control output to connect the +Control (P) and GND Control (-) wires of GREEN color of three-color Conus / Convex / Plaque series.

(5) CH-3

Control output to connect the +Control (P) and GND Control (-) wires of single-color Equator / Conus / Convex / Plaque series.

The control output to connect the +Control (P) and GND Control (-) wires of BLUE color of three-color Conus / Convex / Plaque series.

(6) SW1

DIP-switch to select single or three-color models and to adjust the PWM frequency of dimming for different series of underwater LED lights.

(7) SW2

DIP-switch to adjust minimal dimmer value.

INSTALLATION

The PWM Dimmer kit consists of the following components:

- PWM Dimmer MDU13
- 2 x cable gland M12
- Operating Instructions with Declaration of Conformity and Warranty conditions

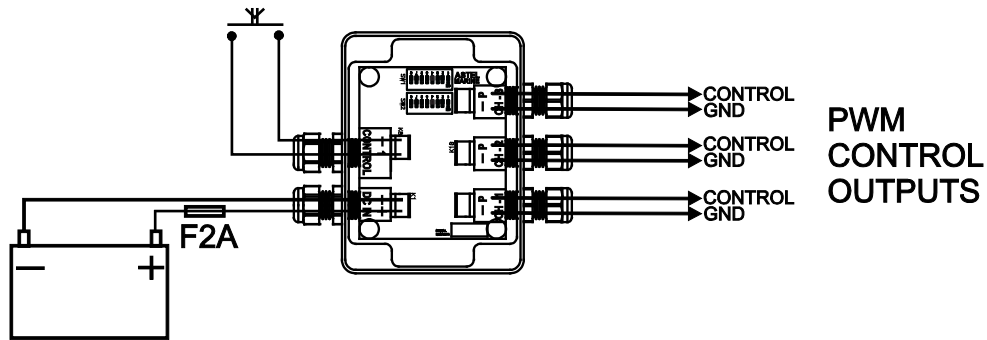
The MDU13 has to be installed on suitable location inside of the vessel.

Avoid the installation in extremely hot places and near appliances generating strong magnetic fields.

The installation has to be realized by a qualified personnel.

Note:

- ***The main DC power supply of the vessel has to be switched off before installation.***



Power supply connection

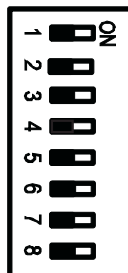
The power supply has to be connected through the switch (not included) and protected by a fuse (not included) to the DC IN terminal-block connector with correct polarity. The power supply voltage has to be from 10 - 30Vdc.

PWM control outputs connection

The 2 control wires of single-color LED lights have to be connected to the one of CH-1 to CH-3 terminal-block connectors.

The 6 control wires of three-color LED lights have to be connected to the CH-1, CH-2 and CH-3 terminal-block connectors.

Depend on the LED lights series, the DIP-switches have to be adjusted as described in the table below:



To select single or three-color models and to adjust the PWM frequency of dimming for different series of underwater LED lights:

SW1 switches	Function	SW1 ON	SW1 OFF
1	Model	Single-color	Three-color
2	Not used	No function	No function-
3	CH-1	Single-color EQUATOR MSR1280 and MSR36240 series	Single-color EQUATOR MSR0640 and CONUS/CONVEX/PLAQUE series
4			
5	CH-2		
6			
7	CH-3		
8			

To adjust minimal dimmer value:

SW2 switches	EQUATOR series	CONUS / CONVEX / PLAQUE series
1	ON	ON
2	ON	ON
3	ON	ON
4	ON	OFF
5	ON	OFF
6	OFF	OFF
7	OFF	OFF
8	OFF	OFF

Note:

- *To connect more than 1 group of the LED lights to the control outputs the appurtenant caps should be removed from the casing and enclosed cable glands M12 should be inserted.*

CONTROLS

Single-color models

The push-button switch is used to turn-on and turn-off the underwater light and to control the luminosity.

Turning on / off

Press the push-button switch momentary.

Dimming

When the light is on, press the push-button switch longer until the desired power is achieved.

Turning on minimum

When the light is off, press the push-button switch longer (e.g. one second or more) until the light is turned on at minimum power.

Set default

Press the push-button switch for min. 40 seconds or until the light is turned off.

Three-color models

The push-button switch is used to turn-on and turn-off the underwater light and to control the mode of lighting and luminosity.

When the light is turned-off the color or mode of lighting can be changed sequentially by pressing the push-button switch for 2 seconds:

Sequence of lighting
Custom Color
Full RGB
Cool White
Bluish White
Red
Green
Blue
Rainbow Color Spectrum

Turning on /off

Press the push-button switch momentary.

Changing the color or mode of lighting

When the light is turned-off press the push-button switch for 2 seconds.

Setting the Custom Color

At the selected Rainbow Color Spectrum mode press the push-button switch momentary to turn the light off. After that press the push-button switch for 5 seconds or until the light is switched to the selected color and then the Custom Color is set and selected.

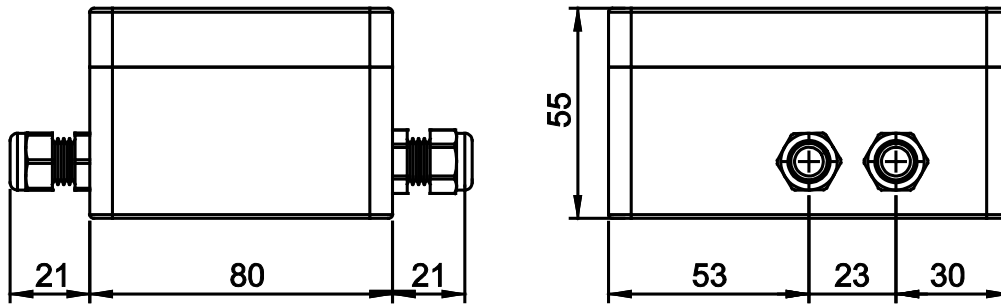
Dimming

When the light is turned-on press the push-button switch until the desired illumination is achieved. By another pressing of the push-button switch the luminosity will increase to the maximum illumination.

Set default

Press the push-button switch for min. 40 seconds or until the light is turned off.

APPEARANCE



TECHNICAL SPECIFICATIONS

Input voltage	12-24 Vdc
Consumption	max. 10 mAdc
Operating temperature	-10°C - +50°C
Casing	ABS
Protection	IP 65
Dimensions	max. 106x122x55.5mm
Weight	0.2 kg

Design and specifications subject to change without notice.

WARRANTY

1. The equipment manufactured by ASTEL d.o.o. is warranted to be free from defects in workmanship and materials under normal use and service.
2. This Warranty is in effect for of two years from the date of purchase by the user. Proof of purchase must be included, to establish that it is inside the warranty period.
3. This Warranty is transferrable and covers the product for the specified time period.
4. In case any part of the equipment proves to be defective, other than those parts excluded in paragraph 5 below, the owner should do the following:
 - (a) prepare a detailed written statement of the nature and circumstances of the defect, to the best of the Owner's knowledge, including the date of purchase, the place of purchase, the name and address of the installer, and the Purchaser's name, address and telephone number;
 - (b) the Owner should return the defective part or unit along with the statement referenced in the preceding paragraph to the warrantor, ASTEL d.o.o., or an authorized distributor, postage/shipping prepaid and at the expense of the Purchaser;
 - (c) if upon the Warrantor's or authorized distributor's examination, the defect is determined to result from defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense;
 - (d) no refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. Prior to refund of the purchase price, Purchaser must submit a statement in writing from a professional boating equipment supplier that the installation instructions of the Operating Instructions manual have been complied with and that the defect remains;
 - (e) warranty service shall be performed only by the Warrantor, or an authorized distributor, and any attempt to remedy the defect by anyone else shall render this warranty void.
5. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specially designed as waterproof.
6. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any person or persons, or damage to property, loss of income or profit, or any other consequential or resulting damage or cost which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure or malfunction of the equipment, or part thereof.
7. The Warrantor assumes no liability for incidental or consequential damages of any kind including damages arising from collision with other vessels or objects.

DECLARATION OF CONFORMITY

according to IEC Guide 22 and EN 45014

Manufacturer's Name: ASTEL, Podjetje za projektiranje, proizvodnjo in trgovino, d.o.o.

Manufacturer's Address: Dutovlje 138
6221 Dutovlje
Slovenija

declares that the products

Item, Product Name and Model Number: 1. PWM Dimmer MDU13

conform to the following Product Specifications:

EMC: EN 55103-1:2009+A1:2012

Safety: EN 62368-1:2014

Supplementary Information:

The products herewith comply with the requirements of the following Directives and carry the CE-marking accordingly:

- the Low Voltage Directive 2014/35/EU
- the EMC Directive 2014/30/EU
- the RoHS Directive (EU)2015/863

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Dutovlje, 7th November 2016

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