

WarpCube E10 Scanhead

Users Manual

© 2015-2017 by HALaser Systems

Table Of Contents

- 1 Copyright.....3
- 2 Warranty.....3
- 3 History.....3
- 4 Safety.....3
- 5 Overview.....3
- 6 Features and Technical Data.....4
- 7 Electrical Connections.....4
- 8 Mechanical Specifications.....6

1 Copyright

This document is © by HALaser Systems / OpenAPC Project Group. This document and the described hardware is subject to modifications. Errors expected. This document is subject to change without prior notice.

WarpCube E10 scanheads, their hardware and design are copyright by Laser Control Systems.

2 Warranty

WarpCube E10 scanheads are manufactured by Laser Control Systems. Thus warranty and repair is done via the manufacturer directly. For details please refer to <http://lasercontrols.com/customer-support/> or contact HALaser Systems.

3 History

| Date | Changes in document |
|---------|---------------------------------------|
| | |
| | |
| 10/2017 | Maximum scanning angle added |
| 04/2017 | Recommended working temperature added |
| 01/2017 | Power supply information extended |
| 12/2015 | Type name updated |
| 08/2015 | Technical data extended |
| 07/2015 | Mechanical drawings corrected |
| 06/2015 | Initial version |

4 Safety

The hardware described within this document is designed to control a laser scanner system. Laser radiation may effect a person's health or may otherwise cause damage. Prior to installation and operation compliance with all relevant safety regulations including additional hardware-controlled safety measures has to be secured. The client shall solely be responsible to strictly comply with all applicable and relevant safety regulations regarding installation and operation of the system at any time.

The hardware described here is shipped without prefabricated equipment for electric installation. It is intended to be integrated in machines or other equipment. It is not for use "as is". Prior to operation compliance with all relevant electric / electromagnetic safety regulations including additional hardware-controlled safety measures has to be secured. The client shall solely be responsible to strictly comply with all applicable and relevant regulations regarding installation and operation of the system at any time.

5 Overview

This document describes the WarpCube E10 digital scanhead, its characteristics and usage.

6 Features and Technical Data

WarpCube E10 scanhead offers the following functions and features:

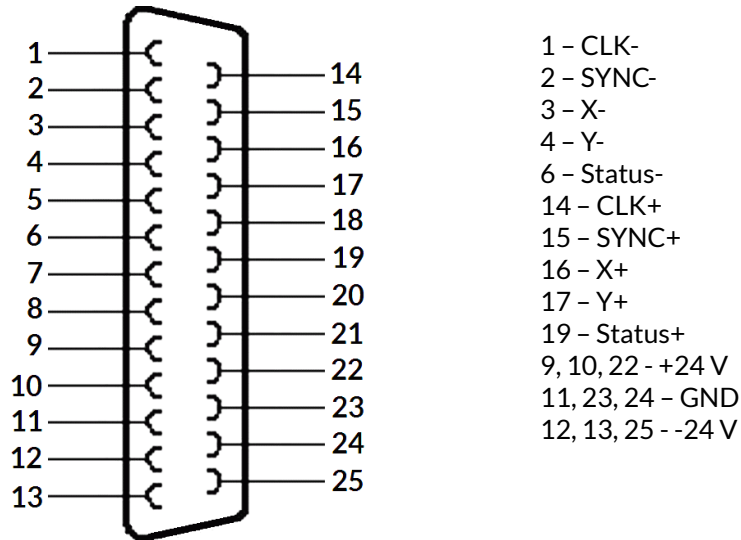
| | |
|---|--|
| Type | fully digital, self tuning |
| Interface | two-channel XY2/100 (2D) |
| Power supply requirements | +24 V / 4 A |
| Idle power consumption (no galvo movements) | < 10 W |
| Mirror size | 10 mm |
| Maximum Laser Power | 50 W (special mirrors required for higher power values ¹⁾) |
| Screw thread for optics | M 85 x1 |
| Positioning speed | up to 20 m/sec |
| Marking speed | up to 6 m/sec |
| Precision writing | 500 cps |
| High quality writing | 1000 cps |
| Resolution | 10 μ rad |
| Total scanning angle | 40 degrees |
| Scanner Lag (Tracking error) | 0,13 msec |
| 1% step response setting to 0,1% fs | 0,28 msec |
| Scale drift | <40 ppm/ $^{\circ}$ C |
| Zero drift | <10 μ rad/ $^{\circ}$ C |
| Linearity | 99,9% |
| Short term repeatability | <8 μ rad |
| Protection class | IP55 |
| Weight | 2,2 kg |
| Ambient temperature | 10 .. 40 $^{\circ}$ C ²⁾ |

¹⁾ at 1064 nm, requires precise central justification of the laser and utilisation of full available mirror surface; customer has to take care the laser does not hit the mounting points of the mirrors, this would lead to damage of the scanhead together with a loss of any kind of warranty. Depending on used pulses and frequency additional cooling of the head may be necessary.

²⁾ Depending on used pulses, frequency and laser power, additional cooling of the head may be necessary also when operated under recommended temperature conditions.

7 Electrical Connections

The scanhead is compatible with the industry standard XY2/100 data interface that is available on several industry-grade scanner controller cards (like E1701D controller). The pin out and voltage supply connections are shown below and require a male D-SUB25 connector:



The power supply needs to support up to 4 A current drain and needs to be a balanced +/- 24 V (+/- 0.25 V tolerance). In case the supply drops below +/- 18 V, the circuits will shut down. Typical idle currents are 130 mA for the -Ve rail and 260 mA for the +Ve rail. The current draw will only exceed 1.0 A average under very heavy driving conditions.



ATTENTION: Power has to be feed into scanhead only but never into connected controller card!



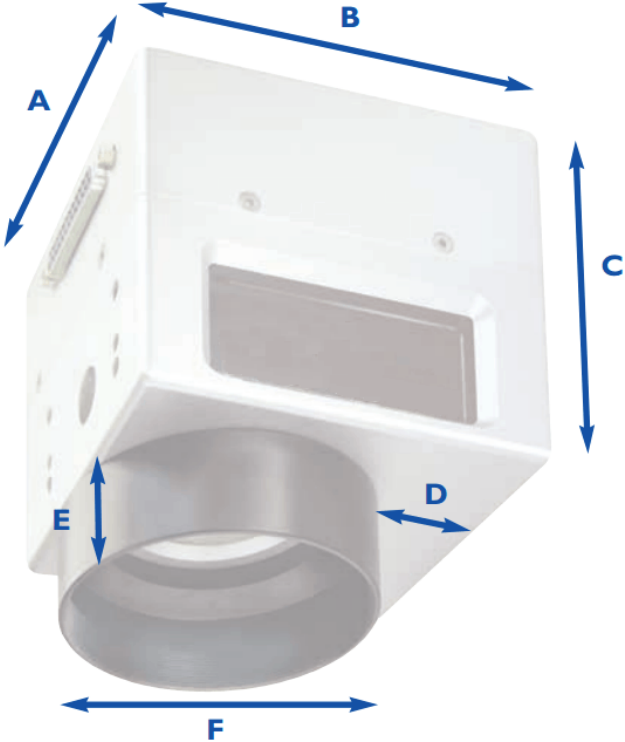
ATTENTION: During operation it has to be ensured the symmetric power with + 24 V and - 24 V is available all the time. Switching off one of both or unplugging the D-SUB25 connector during operation may damage electronics and - as follow up - the mirrors too.

On power up the galvos will be checked by the internal digital signal processors to find the correct tuning parameters required for optimum performance. This sequence can take up to 30 seconds. Afterward the head will be ready for use and will respond to the XY2/100 inputs as required.

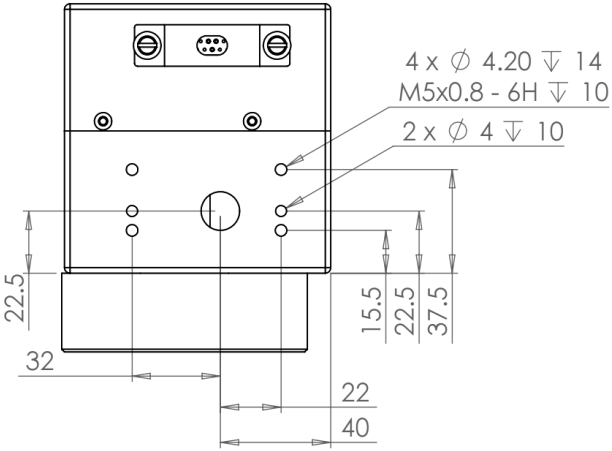
If either of the galvos deflect outside of their maximum marking field, or if the RMS current rises above 2.5 A, or any other illegal operation condition appears, the head will shut down to avoid damages. In this case the X or Y status LED will change from green to red. Normally the operation can be resumed by cycling the power off and on.

8 Mechanical Specifications

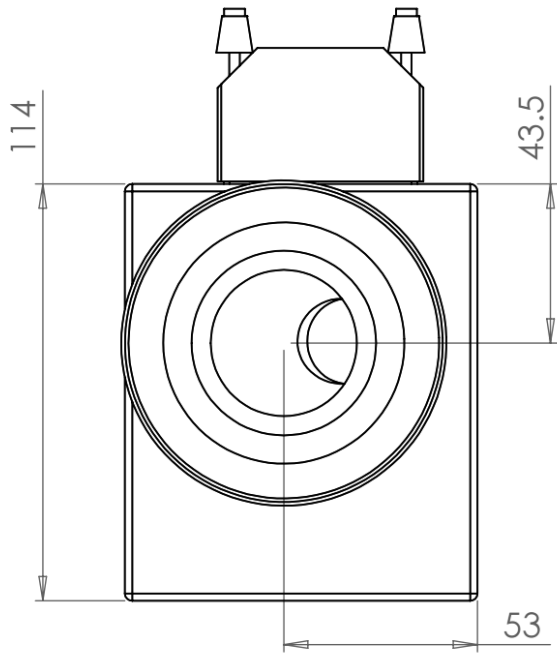
Dimensions:



- A - 97 mm
- B - 115 mm
- C - 97 mm
- D - 15 mm
- E - 30 mm
- F - 90 mm



Drawing Beam Entrance Side



Drawing Beam Exit Side

Alphabetical Index

| | |
|-------------------------------|-----|
| 2 | |
| 2D..... | 4 |
| C | |
| CLK..... | 5 |
| D | |
| Digital signal processor..... | 5 |
| Dimensions..... | 6 |
| E | |
| E1701D..... | 4 |
| L | |
| Linearity..... | 4 |
| M | |
| Maximum Laser Power..... | 4 |
| Mirror size..... | 4 |
| P | |
| Power supply..... | 4f. |
| Protection class..... | 4 |
| R | |
| Resolution..... | 4 |
| S | |
| Scale drift..... | 4 |
| Scanning angle..... | 4 |
| SYNC..... | 5 |
| T | |
| Temperature..... | 4 |
| W | |
| Weight..... | 4 |
| X | |
| XY2/100..... | 4 |
| Z | |
| Zero drift..... | 4 |