THORLABS

SOLIS Controller

DC20
Operation Manual

2018

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Item No.: M0009-510-1059

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Contents

We aim to develop and produce the best solution for your application in the field of optical measurement technique. To help us to live up to your expectations and improve our products permanently we need your ideas and suggestions. Therefore, please let us know about possible criticism or ideas. We and our international partners are looking forward to hearing from you.

Thorlabs GmbH

Warning

Sections marked by this symbol explain dangers that might result in personal injury or death. Always read the associated information carefully, before performing the indicated procedure.

Attention

Paragraphs preceeded by this symbol explain hazards that could damage the instrument and the connected equipment or may cause loss of data.

Note

This manual also contains "NOTES" and "HINTS" written in this form.

Please read these advices carefully!

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1 General Information

The DC20 is a plug & play LED driver that is designed specifically for driving Thorlabs GmbH SOLIS high-power LEDs.

The DC20 circuit design allows it to control all of Thorlabs GmbH SOLIS LEDs. The EEPROM of the connected SOLIS is read-out and the current limit of the DC20 is set to the maximum current of the connected SOLIS.

Attention

Custom LEDs must not be used with the DC20!

1.1 Safety

Attention

The safety of any system incorporating the equipment is the responsibility of the assembler of the system.

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly as it was designed for.

Prior to applying power to the DC20, make sure that the protective conductor of the 3 conductor mains power cord is correctly connected to the protective earth ground contact of the socket outlet! Improper grounding can cause electric shock resulting in damage to your health or even death!

The DC20 must not be operated in explosion endangered environments!

Do not remove covers! Do not obstruct the air ventilation slots in the housing!

Do not open the cabinet, there are no parts serviceable by the operator inside!

Refer servicing to qualified personnel!

Only with written consent from *Thorlabs GmbH* may changes to single components be made or components not supplied by *Thorlabs GmbH* be used.

This precision device is only serviceable if properly packed into the complete original packaging. If necessary, ask for a replacement package prior to return.

Attention

The following statement applies to the products covered in this manual, unless otherwise specified herein. The statement for other products will appear in the accompanying documentation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing Equipment Standard ICES-003 for digital apparatus. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Thorlabs GmbH is not responsible for any radio television interference caused by modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Thorlabs GmbH. The correction of

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interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC and ICES rules.

Attention

Mobile telephones, cellular phones or other radio transmitters are not to be used within the range of three meters of this unit since the electromagnetic field intensity may then exceed the maximum allowed disturbance values according to IEC 61326-1.

This product has been tested and found to comply with the limits according to IEC 61326-1 for using connection cables shorter than 3 meters (9.8 feet).

1.2 Ordering Codes and Accessories

DC20	Driver for SOLIS LED
DSH15	DC20 desktop power supply

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2 Getting Started

2.1 Parts List

Inspect the shipping container for damage.

If the shipping container seems to be damaged, keep it until you have inspected the contents and you have inspected the DC20 mechanically and electrically.

Verify that you have received the following items within the package:

1. DC20 SOLIS LED driver
2. DSH15 desktop power supply

2.2 Operating Elements

1 Turn-Push Knob:
- Turn for LED current adjustment
- Push to switch the LED ON/OFF

2 Status LED:
- Orange: DC20 ready for operation, SOLIS LED OFF.
- Green: SOLIS LED ON
- Red or blinking: Please see the Troubleshooting 7 section for more information.

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2.3 Connecting Elements

3 BNC jack for TTL modulation input

4 SOLIS LED connector

5 DC input

3 Operating Instructions

As the DC20 is a plug & play device, operation is simple:

1. Connect the power supply to the DC input (5). The status LED lights up in red.
2. Connect your SOLIS LED to the appropriate connector (4). The DC20 reads out the SOLIS EEPROM and recognizes the maximum LED current. This value is set as the current limit when turning the adjustment knob to the right stop. The status LED changes to orange.
3. Push the red knob to switch on the LED. The status LED changes to green.
4. Turn the rotary knob clockwise to increase the LED current.

Notes

- You can connect either the SOLIS LED or the power super supply first; the sequence does not matter.
- If you disconnect the SOLIS during operation, the DC20 goes to stand-by.
- Each time a SOLIS is connected, the EEPROM is read-out and the appropriate current limit of the DC20 is set. This way, the LED cannot be damaged.
- Please note that the current will change slowly or remain constant over the area where the rotary knob is close to the left or right stop position. This is normal behavior for the potentiometer used in the DC20.

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4 TTL Modulation

In addition to basic CW mode operation, the DC20 accepts an external low-active TTL signal via the BNC jack 6 (3) to modulate the LED current.

There is no mode switch - just apply the TTL signal and switch on the SOLIS. As long as the TTL input is open or **H**igh, the SOLIS is enabled and supplied with the current that is set by the rotary knob. A TTL **L**ow level disables the SOLIS.

The maximum modulation frequency is actively limited to 1 kHz: If the applied TTL modulation frequency is higher than 1 kHz, the microcontroller of the DC20 limits the modulation frequency and the SOLIS will be modulated at 1 kHz.

5 Maintenance and Service

Protect the DC20 from adverse weather conditions. The DC20 is not water resistant.

Attention

To avoid damage to the instrument, do not expose it to spray, liquids or solvents!

The unit does not need a regular maintenance by the user. It does not contain any modules and/or components that could be repaired by the user himself. If a malfunction occurs, please contact Thorlabs GmbH for return instructions.

Do not remove covers!

6 Troubleshooting

In addition to indicating normal operating conditions (continuous yellow or green), the status LED 5 can also indicate error messages:

Red continuous with SOLIS connected - DC20 hardware error
▶ Please contact Thorlabs for return instructions.

Red blinking - SOLIS EEPROM issue
▶ Check SOLIS for proper connection
▶ If the error persists, please contact Thorlabs.

Green blinking - the DC20 current is out of specification, no risk of damage to the LED.
▶ Switch the LED off and on again - the error should disappear.
▶ If this error persists, please contact Thorlabs for return instructions.

Red-green blinking - the DC20 current is significantly out of specification; the LED might be at risk.
▶ Do not operate the DC20 any more.
▶ Please contact Thorlabs for return instructions.

Red-yellow blinking - the SOLIS LED was switched off due to overheating.
▶ Wait for the LED to cool down.
▶ After the temperature is back to the allowed range, the status LED changes to yellow-green blinking.

Yellow-green blinking - SOLIS was too hot, but cooled down, and the temperature is back to the allowed range.
▶ Push the LED ON/OFF button. The DC20 returns to the READY state (yellow).
▶ Now, the LED can be switched on and off as usual.

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7 Appendix

7.1 Technical Data

Constant Current Mode (CW)	
Max. LED Current	1 to 10 A
Max. LED Forward Voltage	5.0 to 14.0 V
LED Current Limit Accuracy	± (1 % + 25 mA)
Noise and Ripple (1 Hz to 10 MHz, RMS)	typ. < 400 µA
TTL Modulation Mode [1])	
Input Impedance	10 kΩ
Modulation Frequency Range	DC to 1 kHz
Duty Cycle Range	0.2 % to 99.8 % (10 Hz) 2.0 % to 98.0 % (100 Hz) 20 % to 80% (1 kHz)
Modulation Waveform	Square Wave / PWM
TTL Lo Voltage Level	0.0 V to 0.8 V
TTL Hi Voltage Level	2.0 V to 5.0 V
General	
Power Supply	15 V DC
Power Consumption	max. 65 VA
Operating Temperature Range [2])	0 - 40 °C
Storage Temperature Range	-40 to 70 °C
Dimensions (W x H x D)	85.4 mm x 59.6 mm x 100.0 mm (3.36" x 2.35" x 3.94")
Weight	215 g (without power supply) 490 g (with power supply)

[1]) Specifications for TTL Modulation Mode depend on the forward voltage and the capacitance of the connected SOLIS LED.

[2]) non-condensing

All technical data are valid at 23 ± 5°C and 45 ± 15% rel. humidity (non condensing)

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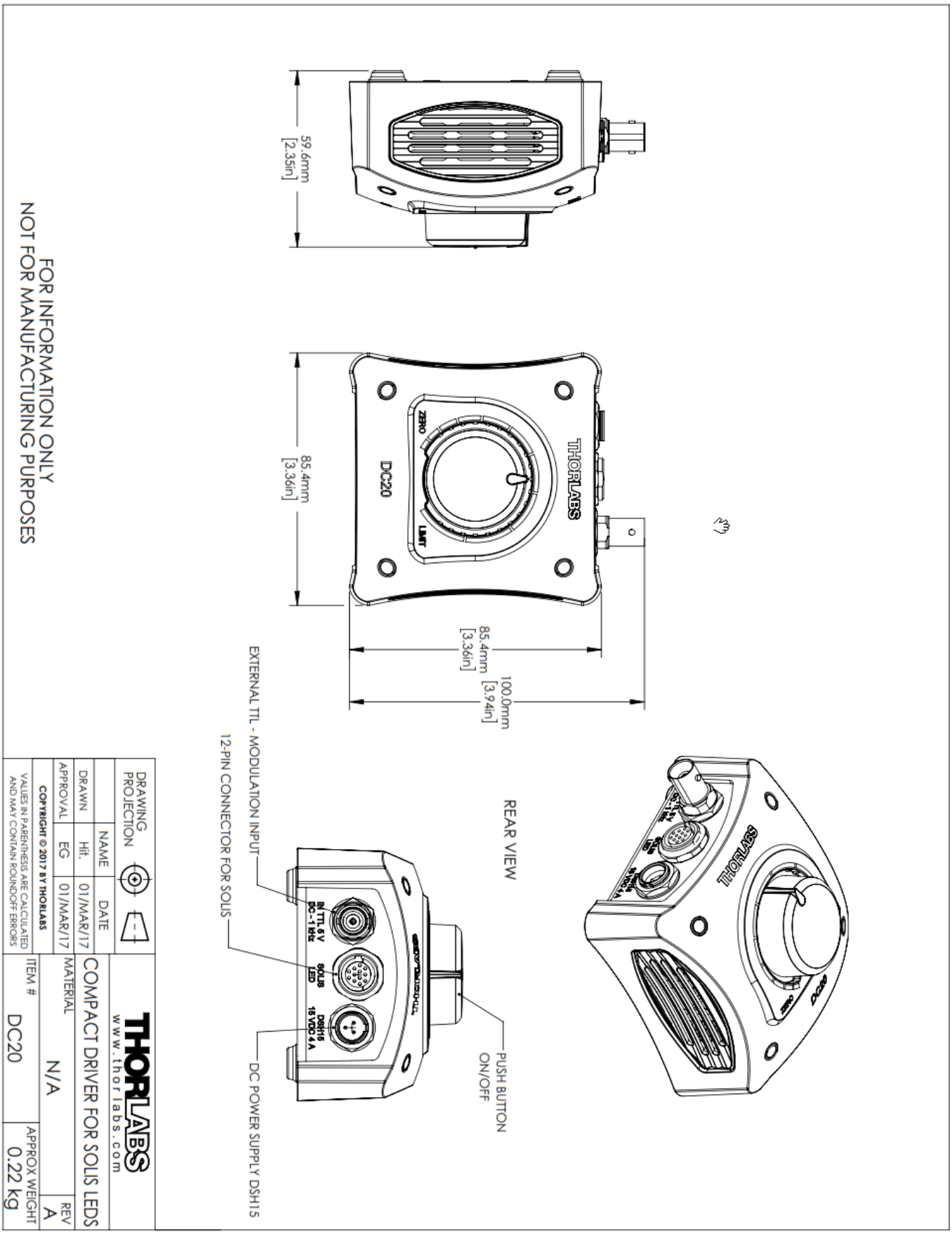
7.2 Dimensions



7.3 Certifications and Compliances

EU Declaration of Conformity

in accordance with EN ISO 17050-1:2010

We: Thorlabs GmbH

Of: Hans-Boeckler-Str. 6, 85221 Dachau/München, Deutschland

in accordance with the following Directive(s):

2014/35/EU	Low Voltage Directive (LVD)
2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:

Model: ***DC20***

Equipment: ***Solis Driver***

is in conformity with the applicable requirements of the following documents:

EN 61010-1	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.	2010
EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

and which, issued under the sole responsibility of Thorlabs, is in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:

does not contain substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed: D. Jennrich *On:* 22 February 2017

Name: Dorothee Jennrich

Position: General Manager

EDC - DC20 -2017-02-22

CE 17

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7.4 Warranty

Thorlabs GmbH warrants material and production of the DC20 for a period of 24 months starting with the date of shipment. During this warranty period Thorlabs GmbH will see to defaults by repair or by exchange if these are entitled to warranty.

For warranty repairs or service the unit must be sent back to Thorlabs GmbH. The customer will carry the shipping costs to Thorlabs GmbH, in case of warranty repairs Thorlabs GmbH will carry the shipping costs back to the customer.

If no warranty repair is applicable the customer also has to carry the costs for back shipment.

In case of shipment from outside EU duties, taxes etc. which should arise have to be carried by the customer.

Thorlabs GmbH warrants the hard- and/or software determined by Thorlabs GmbH for this unit to operate fault-free provided that they are handled according to our requirements. However, Thorlabs GmbH does not warrant a fault free and uninterrupted operation of the unit, of the software or firmware for special applications nor this instruction manual to be error free. Thorlabs GmbH is not liable for consequential damages.

Restriction of Warranty

The warranty mentioned before does not cover errors and defects being the result of improper treatment, software or interface not supplied by us, modification, misuse or operation outside the defined ambient stated by us or unauthorized maintenance.

Further claims will not be consented to and will not be acknowledged. Thorlabs GmbH does explicitly not warrant the usability or the economical use for certain cases of application.

Thorlabs GmbH reserves the right to change this instruction manual or the technical data of the described unit at any time.

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7.5 Copyright and Exclusion of Reliability

Thorlabs GmbH has taken every possible care in preparing this document. We however assume no liability for the content, completeness or quality of the information contained therein. The content of this document is regularly updated and adapted to reflect the current status of the hardware and/or software. We furthermore do not guarantee that this product will function without errors, even if the stated specifications are adhered to.

Under no circumstances can we guarantee that a particular objective can be achieved with the purchase of this product.

Insofar as permitted under statutory regulations, we assume no liability for direct damage, indirect damage or damages suffered by third parties resulting from the purchase of this product. In no event shall any liability exceed the purchase price of the product.

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7.6 Thorlabs 'End of Life' Policy

As required by the WEEE (Waste Electrical and Electronic Equipment Directive) of the European Community and the corresponding national laws, Thorlabs GmbH offers all end users in the EC the possibility to return “end of life” units without incurring disposal charges.

This offer is valid for Thorlabs GmbH electrical and electronic equipment

- sold after August 13th 2005
- marked correspondingly with the crossed out “wheelie bin” logo (see figure below)
- sold to a company or institute within the EC
- currently owned by a company or institute within the EC
- still complete, not disassembled and not contaminated

As the WEEE directive applies to self contained operational electrical and electronic products, this “end of life” take back service does not refer to other Thorlabs GmbH products, such as

- pure OEM products, that means assemblies to be built into a unit by the user (e. g. OEM laser driver cards)
- components
- mechanics and optics
- left over parts of units disassembled by the user (PCB’s, housings etc.).

Waste treatment on your own responsibility

If you do not return an “end of life” unit to Thorlabs GmbH, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

WEEE Number (Germany) : DE97581288

Ecological background

It is well known that waste treatment pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS Directive is to reduce the content of toxic substances in electronic products in the future.

The intent of the WEEE Directive is to enforce the recycling of WEEE. A controlled recycling of end-of-life products will thereby avoid negative impacts on the environment.

Crossed out
"Wheelie Bin" symbol

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7.7 Thorlabs Worldwide Contacts

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