Labm8

Labm8 Control Unit

Hardware Manual

Version 1.006

DISCLAIMER

The material in this data sheet is for informational purposes only. The products it describes are subject to change without prior notice, due to the manufacturer's continuous development program. This means that there may be changes in form, equipment and technology. Claims can therefore not be made on the basis of this information, illustrations or descriptions in these data sheets. The description for our product specification in this manual does not constitute an integral part of the contract.

The general terms and conditions of Labm8 shall apply. Alternative agreements must be in written form.

Labm8,
info@labm8.io

1 Overview and indexes

1.1 Table of contents

1 Overview and indexes 3

1.1 Table of contents 3

1.2 Change History 4

2 Introduction 5

2.1 Foreword 5

2.2 Symbols and keywords used 5

2.3 Norms and directives 6

2.4 General Description of the Device 6

2.4 General Description of the Device 6

2.5 Intended Use 6

2.6 Reasonably Foreseeable Faulty Application 6

2.7 Safety Advice 6

3 Labm8 control unit 7

3.1 Hardware Operation and Specifications 7

3.2 Getting connected to your device 7

3.3 Physical connections Labm8 control unit V1 8

3.4 Physical connections Labm8 control unit V2 9

4 Transportation and Storage 10

4.1 General information 10

1.2 Change History

V1.002 - *alignment issues and text formatting resolved.*

V1.003 - *addition of the physical connection diagram.*

V1.004 - *added description on connecting heaters, including internal wiring diagram for the heaters.*

V1.005 - Added aditional parameters to the specification sheet

V1.006 - Added more detailed pinout diagram for the back panel V2

2 Introduction

2.1 Foreword

Thank you for your interest in Labm8. With this user manual we would like to support you as well as possible when handeling the device. If you h ave any questions or suggestions, please do not hestitate to contact us.

2.2 Symbols and keywords used

HINT. *Describes practical tips*

IMPORTANT. *Signifies important hints and other useful information that may not result in potentially dangerous or harmful situations.*

ATTENTION. *Indicates a potentially harmfull situation. If it is not avoided the product or something in its environment may be damaged.*

CAUTION**.** Indicates a potentially dangerous situation. If it is not avoided, slight or minor injuries and property damage may result.

2.3 Norms and directives

CE ***Labm8*** *declares under its sole responsibility, that the device complies with the health and safety requirements of the relevant European directives.*

2.4 General Description of the Device

The Labm8 Control unit is used to as a general interface hub to control various modules provided by Labm8, it also provides a web interface (WIFI, point acces mode) to connect with a PC or other web enabled mobile device. It allows for the connection of a motion system to be used in a laboratory setting for laboratory expeirments.

2.5 Intended Use

The intended use is a connection hub / general interface to connect motion systems to be used in laboratory experiments. Various devices can be connected to the hub and we highly advice to use the Labm8 control unit with the laboratory devices developed by Labm8. However, due to the modularity of our system we also aim to provide a system too which custom modules can be attached. Attaching these modules, however should be done following best practices and will void any warranty from Labm8. The systems build with this module are intended for laboratory research use only.They are not intended for use in medical / diagnostic procedures.

2.6 Reasonably Foreseeable Faulty Application

Using our equipment, for applications outside of its intended purpose may lead to dangerous situations and should be omitted.

CAUTION. *The unit must not be used as as medical device or for medical purposes.*

2.7 Safety Advice

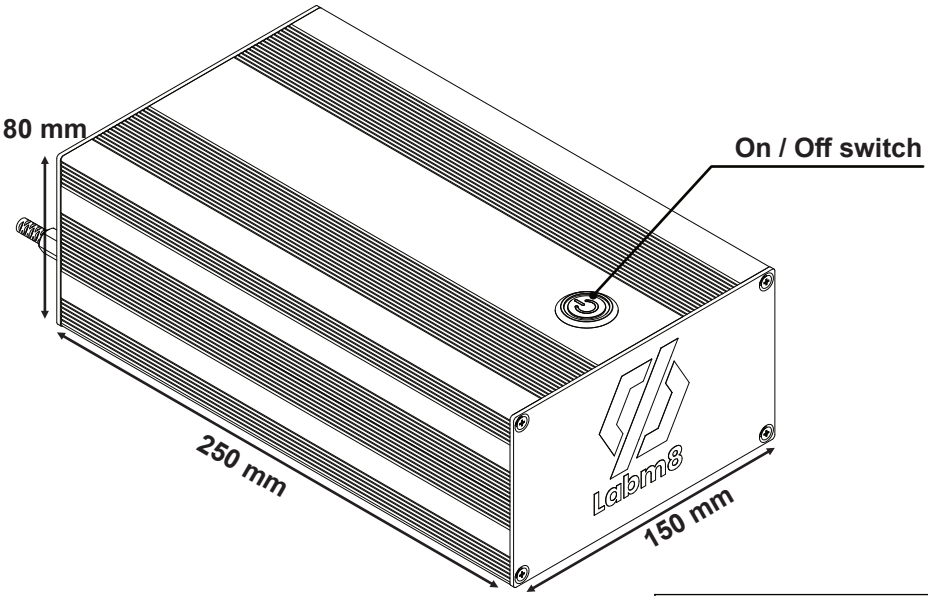
For the safe operation of the Labm8 control unit, please read through all the corresponding hard- and software manuals.

IMPORTANT. *Please read this manual as well as the corresponding software manual carefully and completly before putting your system into operation.*

ATTENTION. *Do not place the control unit directly on top of other electronic devices. Do not put the syringe pumps or other modules directly on top of it.*

3 Labm8 control unit

3.1 Hardware Operation and Specifications



Labm8 control unit - M8001.1	
Enclosure	Anodized aluminium
Connectivity	Wifi
Operating altitude	2000 m
Pollution degree	2 Normally no pollution or only dry polution occurs. The pollution has no influence. Ocasionally however, a temperory conductivy caused by condensation may be expected.
Operating temperature	0 - 35 °C
Preservation temperature	0 - 45 °C
Ambient operating humidity	<80%RH no condensation
Ambient storage humidty	<80%RH no condensation
Range of use	Indoors only

Labm8 control unit - M8001.1	
Programming language	Gcode (reprap)
Supportted axis	5
Max supported axis with expansion	7
Supported heaters	3
Power requirements	100-240, 47-63 Hz AC 1.07A, with an output of 24V DC 3.75A. Power Supply Installation Category: CAT II (Line voltage in appliance and to wall outlet) Instrument Installation Category: CAT I (Mains isolated). Use only with the provided power supply.

Notes

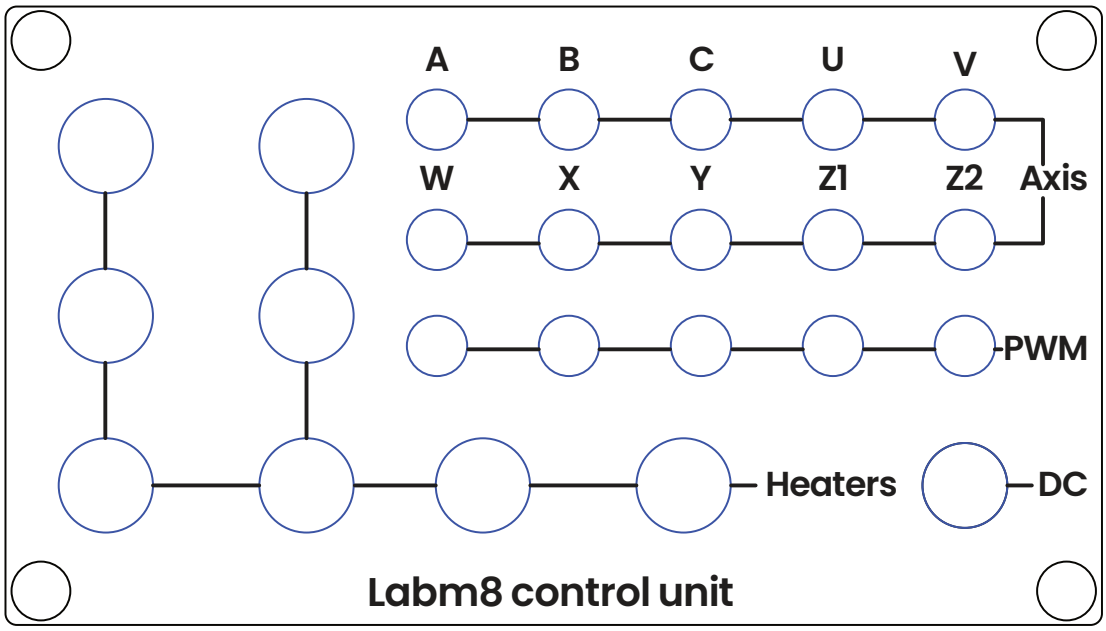
Labm8 should not be placed on top of other electronic devices or vise versa. The control unit is controlled over wifi and runs in the browser. We advice to use google chrome as this is the browser that was used during development of the software. Keep the control unit away from corrosive gases and liquids.

3.2 Getting connected to your device

Plug in the DC power supply into the DC barrel jack, located at the back of the control unit. Switch the device on by pressing the On / Off button once, a blue led light will indicate it's status. The device will now show up in your PC wifi list, the name, password and IP-addres of the device can be found on the type plate, which is located at the bottom of the device. After a succesful network login to the device, you have to open a web browser (Google Chrome is preferred) and type the corresponding IP-adress in the search bar. This should open up Labm8 Web Control. Here you are asked for a password which is: LABM8. For further instructions on how to use the software, please use the Labm8 - Software Manual.

3.3 Physical connections Labm8 control unit V1

The layout for Labm8 control unit V1 is depicted below. Recent firmware updates allow for the Axis D to be used. This is curently not refleced on the enclosures which only states Z2.



The axis on the back panel V1 are prewired while the heaters have GX12 - 4 pin connectors. These connectors can be connected to common temperature sensors/ heater cartridges. For heater cartridges, 50 Watts, 24V or lower should be used. Do not use 12V heater cartridges, as the system is running on 24v. Pin 1 and 2 on the connectors are used for the heater cartridge while pin 3 and 4 are used for the temperature sensor. When connecting heaters, we strongly advice to place a thermal fuse in series with the heater, connected to the heated part.

ATTENTION. *Please follow best practices when connecting and designing heated modules. We strongly recommend installing a thermal fuse in series with the heater, connected to the heated object.*

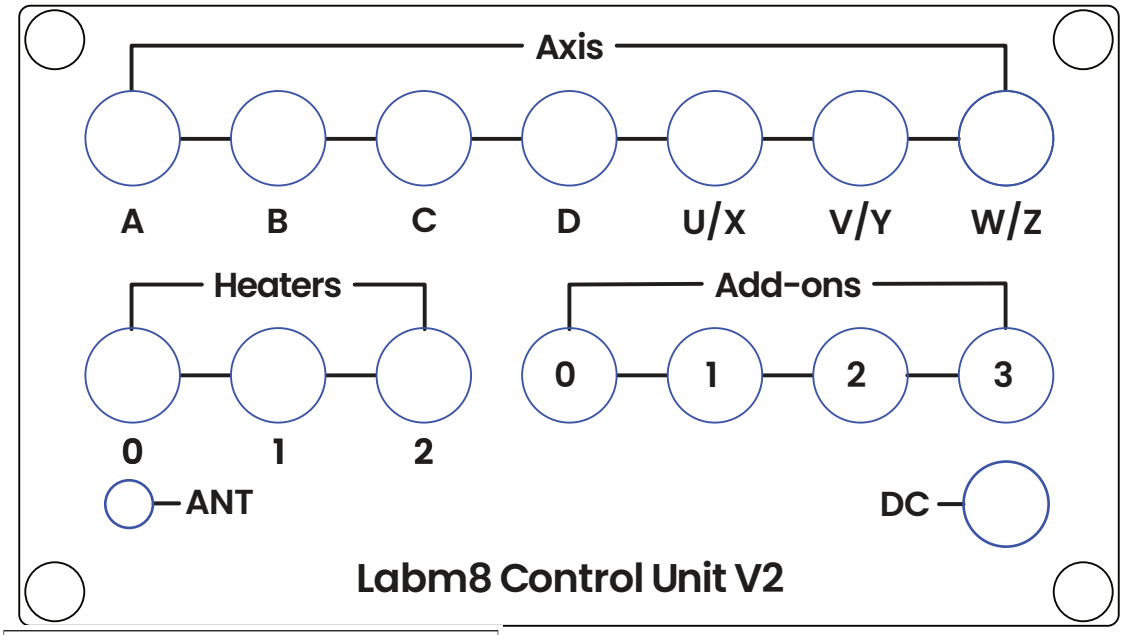
ATTENTION. *After installation, the system needs to be properly tuned before use, please refer to https://docs.duet3d.com/User_manual/Connecting_hardware/Heaters_tuning for guidance on tuning the heaters. Do not leave the machine unattendend while performing the tuning.*

ATTENTION. *When using heaters, allow them to warm up one at a time, to reduce the overal current load. Do not hot plug the heater connectors and Do not leave the machine unsupervised when performing heated experiments.*

ATTENTION. *Do not use heater cartridges that exceed the rated current (2.5 amperes) for the connectors, wires and power supply. Prior to shipping, our Labm8's are tested with 24V 50W heater cartridges using 100 K ohm NTC thermistors.*

IMPORTANT. *The software limits the maximum heater temperature to 100°C, see config.g file.*

3.4 Physical connections Labm8 control unit V2



Heaters			
pin	**reactor 0**	**reactor 1**	**reactor 2**
1	out + (24v)	out1 + (24v)	out2+ (24v)
2	out -	out2 -	out2-
3	temp0 vssa	temp1 vssa	temp2 vssa
4	temp0-	temp1 -	temp2 -
5	not connected	out5+ (24v)	out6+ (24v)
6	not connected	out5-	out6-

Add On													
0				1				2		3			
GX12 2 or 4 pin				gx12 2 or 4 pin				gx12 2pin		gx12 4pin			
1	2	3	4	1	2	3	4	1	2	1	2	3	4
out3-	V-OUTLC1+	out4.tach	gnd	out4-	V-OUTLC1+	out4.tach	gnd	can_L	can_H	IO_6 GND	O6 3.3V_EX	io6.in	not connected
jumper set to Vin (24v)													

ATTENTION. *Please follow best practices when connecting and designing heated modules. We strongly recommend installing a thermal fuse in series with the heater, connected to the heated object.*

ATTENTION. *After installation, the system needs to be properly tuned before use, please refer to https://docs.duet3d.com/User_manual/Connecting_hardware/Heaters_tuning for guidance on tuning the heaters. Do not leave the machine unattendend while performing the tuning.*

ATTENTION. *When using heaters, allow them to warm up one at a time, to reduce the overal current load. Do not hot plug the heater connectors or any other connectors and Do not leave the machine unsupervised when performing (heated) experiments.*

ATTENTION. *Do not use heater cartridges that exceed the rated current (2.5 amperes) For the connectors, wires and power supply. Prior to shipping, our Labm8's are tested with 24V 50W heater cartridges using 100 K ohm NTC thermistors.*

IMPORTANT. *The software limits the maximum default heater temperature to 100°C, see config.g file.*

4 Transportation and Storage

4.1 General information

The device(s) should not be transported or lifter in the plugged-together state. Transportation and or shipping of the device(s) should be performed using the original packaging. Please find the conditions for storage in the chapter “technical data”.

CAUTION. *Risk of damaging the device. Do not transport the modules plugged-together.*

5 Maintance and Care

4.1 General information

The control unit is, if used in accordance with its intended purpose, maintenance-free. In case of a failure despite this, which can not resolved by yourself, please contact Labm8 to coordinate further actions and or instructions.

Software-related troubles are dealt with in the software Manual.

The device can be cleaned by rubbing the surface gently with a soft, damp cloth, with cleaning alchol. Make sure the cloth is not too wet, because this could lead to damage by liquid entering the control unit.