



User Manual

control4log (Part no. 190424-002)

Table of Revisions

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1	Correction failure DIP Switches AO1 and -2	18.04.2023



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1 Introduction

This manual concerns information regarding the handling and maintenance of the control4log.

1.1 Warning Symbols

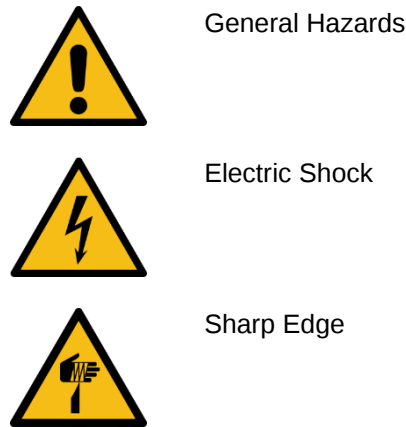


Fig. 1: Warning Symbols

1.2 Mandatory Action Symbols

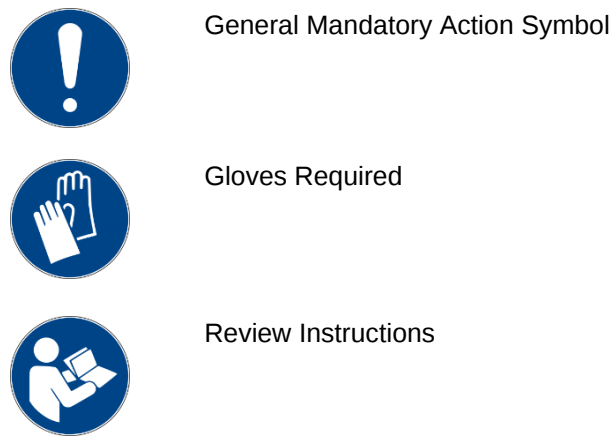


Fig. 2: Mandatory Action Symbols

2 Safety Guidelines

2.1 Intended Use

Please read the user manual carefully and completely before using the device for the first time. The device may only be operated by trained personnel. Any damage resulting from failure to observe the user manual instructions is exempt from any liability.



The device may only be used in the manner described in the operating instructions. Using the device in a manner other than that for which it was designed may result in danger and risks personal safety.



Only use the measuring device when environmental conditions (temperature, air humidity, etc.) are within the limit values specified in the instructions. Do not expose the device to extreme temperatures, direct sunlight, extreme humidity, or moisture.



Do not subject the device to shocks or strong vibrations.



The device housing may only be opened by qualified personnel and no technical changes may be made to the device.



Only use the device if it is attached to a DIN rail with the mounting device provided.



The device should only be cleaned with a cloth. Do not use abrasive or solvent-based cleaning agents.



Check the housing of the device for visible damage before use. If there is any visible damage, the device must not be used.



The device may not be used in an explosion-prone atmosphere.



The measuring range specified in the instructions must not be exceeded under any circumstances.



Only connect the device, and all its encompassing interfaces and connection ports, to a low-voltage system.



General knowledge in the field of automation technology and low-current-switching technology is necessary for understanding.



If the safety instructions are not observed, the device may be damaged and the operator may be injured.



The device may not be integrated with the signal-doubling function into signal circuits that actively perform, or may assume, a safety-related function.

We assume no liability for misprints or content errors in these instructions. We expressly refer to our general warranty conditions, which can be found in our General Terms and Conditions. For questions or concerns, please contact TECHDOCK GmbH. The contact details can be found in these instructions.

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2.2 Customer Service

TECHDOCK GmbH
Paradiesstr. 34
CH – 4102 Binningen
Email: info@techdock.ch



Fig. 3: QR-Code

2.3 Hazards



Use gloves when attaching the device to, or removing it from, the DIN rail, as cuts and injuries from sharp edges of adjacent parts can occur.



Only install the device when the system / control cabinet is switched off and/or disconnected from the power. An electric shock can be caused by adjacent live parts or devices.

3 Description

The control4log is a data logger that can be freely configured. The inputs and outputs of the hardware are based on the GPIO of a Raspberry 4. The Raspberry Pi OS runs on the Raspberry Pi.



Always store this manual near the device.

4 Specifications

4.1 Rules and Regulations

The control4log is a device for audio/video, information, and communication technology in accordance with EN 62368. For a complete overview of the guidelines and standards applied, please consult the declaration of conformity, included in the packaging of every device supplied.



In Switzerland, the device is considered a "special low-voltage product" according to NEV 734.26, Section 2, Article 13, Paragraph 1.

4.2 Nameplate

The following information can be found on the nameplate:

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Article No.	190424-002
Serial No.	C4L0-2104-0000-0001
Password:	*****
Input:	DC 24V
Amb. Temp:	0C°...+40C°

Fig. 4: Image Nameplate



The password is a randomly generated code on <https://passwordsgenerator.net/>. TECHDOK GmbH can only recall and understand the password based on the printed serial number.

4.3 Operating System

Logging on to the Raspberry Pi OS can be achieved in various ways, such as VNC, X11, SSH, or directly on the desktop. The easiest way is directly via the desktop of the Raspberry Pi OS by connecting a mouse and keyboard to the USB Type A ports and using a screen via the HDMI Micro Type D connector. To log in, the sudo-login and nameplate password must be used. The password for the sudo-login can be changed after successful login.



There is no second login with standard password. If the password from the sudo-login has already been changed by the user and is lost or forgotten, TECHDOCK GmbH cannot reset the password. In this case, the only option is for the TECHDOCK customer service to reset the device to factory settings, in which all custom user settings will be lost.



The password gives sudo rights to the Raspberry Pi OS, which could damage the function of the operating system and the application. In this case, the only option is for the TECHDOCK customer service to reset the device to factory settings, in which all custom user settings will be lost



Updates from the operating system on the Raspberry Pi OS could damage the function of the operating system and the application. Only security updates should be installed with the Raspberry.



Any device that has access to the Internet is at risk and must be protected accordingly through settings, security updates, and security software. When opting to connect the device to the Internet, it is recommended to seek appropriate professional help and advice.



Always protect all devices in the same network with secure passwords, such as those that can be generated at <https://passwordsgenerator.net/>

It is always up to the owner of the device to implement their own applications and projects on the Raspberry Pi OS. Access to the database is unrestricted.



Adapting and changing the devices on the operating system and application level may only be at the user's own risk. In the event of a defect, the only option is for the TECHDOCK customer service to reset the device to factory settings, in which all custom user settings will be lost

4.4 Applications

The installed applications and software products are all licensed with open source; the exact licenses can be viewed in the respective project.

The application saves the current values of the input and output signals according to the configuration.



When storing data points, it should always be noted that the stored data may contain conclusions about persons and sensitive data and are therefore subject to the locally applicable data protection law.

4.5 Connections & Ports

All connections and interfaces are clearly engraved on the housing.

- ai Analog Input
- ao Analog Output
- di Digital Input
- nc Relay Opener
- co Relay Root
- no Relay Closer
- 24 VDC +24 VDC Voltage
- GND 0 VDC Voltage
- terminal USB-Terminal Port (future option)
- usb USB-Port Typ A
- eth Ethernet-Port RJ45
- hdm HDMI-Micro Port Typ D



Fig. 5: Image Housing

4.6 Voltage Supply

- Input Voltage Range: 6 to 30 VDC
- Typical Energy Use at 24 VDC: 5 W

Terminal	Description
24 VDC	Voltage Supply (10 to 24V DC, max. 30V DC without damage, includes reverse polarity protection)
GND	
ao1	2 x Analog Outputs (4-20mA or 0-10V DC, Resolution DAC 14 Bit)
GND	
ao2	
GND	
ai1	2 x Analog Inputs (4-20mA or 0-10V DC, Resolution ADC 16 Bit)
GND	
ai2	
GND	
nc1	4 x Digital Outputs (Relay contact, maximum allowed load 24V DC / 100mA)
co1	
no1	
nc1	
co1	
no1	
nc1	
co1	
no1	
nc1	
co1	
no1	
di1	4 x Digital Inputs (24V DC, max. 30V DC, Resolution ADC 12 Bit)
GND	
di2	
GND	
di3	
GND	
di4	
GND	
usb1	2 x USB 2 (Typ-A Port)
usb2	
usb3	2 x USB 3 (Typ-A Port)
usb4	
usb-c	1 x USB-C Port *
eth0	1 x Ethernet RJ45 Port (1000BASE-T)
eth1	2 x Ethernet RJ45 Port (10BASE-T)
eth2	
hdmi1	2 x HDMI Micro * (Typ D)
hdmi2	
jack	1 x Audio Output * (3.5mm / 4 Pol)

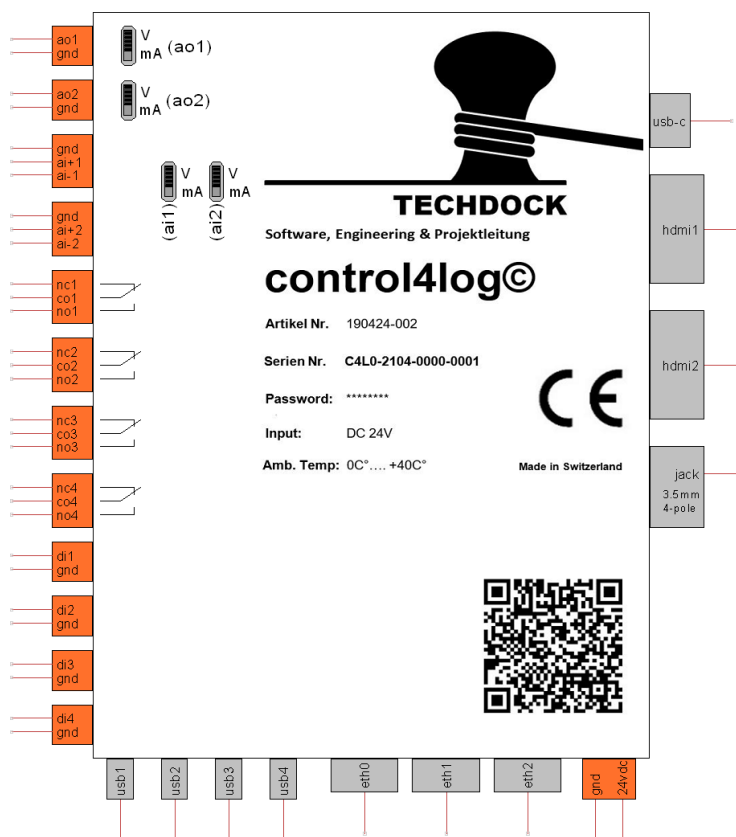


Fig. 6: Image Connections & Ports

* Can be found under a cover that must be demounted

4.7 Terminals

The connectors are equipped with spring-loaded terminals; ferrules are not necessary. Finely stranded and solid conductors from 0.14mm² to 1.5mm² can be used.



4.8 Housing

The housing fulfills the intrusion protection IP 2XB according to EN 60529.

4.9 Environmental Conditions

In operation:	0°C to 40 °C, without condensation
In storage:	-40 °C to 70 °C, without condensation
In operation Altitude:	Up to 2000 m above sea level

4.10 Mass and Weight

Width:	60 mm
Height:	140 mm
Depth:	120 mm
Weight:	600 gr.

4.11 Analog Outputs

Each analog output has a data point list that can store up to 1,000,000 values. When the data point list is full, it becomes a ring memory, and the oldest values are automatically overwritten.

Each analog input can process either "0 to 20mA" or "0 to 10V DC" via a jumper.

The working range from bottom to top is not implemented via the hardware, but rather using the associated parameter set. The resolution for the entire range is "0 to 20mA" or "0 to 10V DC".

A damping with averaging is freely adjustable via a specific parameter. Since the operating system is not a real-time operating system, the sample number / time may not correspond to the parameter specifications, especially if the time is set too low. In this case, however, there is always a pause before a sample is made so that the output value is not 0.

Each analog output can generate the following events:

- AOn too high
- AOn high
- AOn low
- AOn too low

4.12 Analog Inputs

Each analog input has a data point list that can store up to 1,000,000 values. When the data point list is full, it becomes a ring memory, and the oldest values are automatically overwritten.

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Each analog input can process either "0 to 20mA" or "0 to 10V DC" via a jumper.

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A damping with averaging is freely adjustable via a specific parameter. Since the operating system is not a real-time operating system, the sample number / time may not correspond to the parameter specifications, especially if the time is set too low. In this case, however, there is always a pause before a sample is made so that the output value is not 0.

Each analog input can generate the following events:

- AIn too high
- AIn high
- AIn low
- AIn too low

4.13 Digital Inputs

Each digital input has a data point list that can store up to 1,000,000 values. When the data point list is full, it becomes a ring memory, and the oldest values are automatically overwritten.

The digital inputs can operate from 0 to 24V DC, are resolved with 13 bits, and can withstand up to 30V DC without defects or damage. Each digital input can also be used as a counter and can count a maximum of 30 pulses per second (30Hz).

The level for logical 1 is not implemented via the hardware but based on the associated parameter. There is an unsafe range which can be up to 10% of the set range, depending on the set level for logic 1.

For each nominal level 1 set according to the parameter, it must theoretically be possible to count at 30 Hz with a pulse/pause ratio of 1/1, even if the operating system is not a real-time operating system.

Therefore, at 30 Hz, a pulse duration of 33.3 ms must theoretically be recognized as true 16.6 ms and false 16.6 ms

Each digital input can generate the following events:

- DIn true
- DIn false

4.14 Digital Outputs

Each digital output has a data point list that can store up to 1,000,000 values. When the data point list is full, it becomes a ring memory, and the oldest values are automatically overwritten.

The digital outputs are potential-free with resolution relays. Each output consists of a changeover contact. In this way, each output can be used potential-free. The changeover contact can be charged with 24V DC and a maximum of 100mA.

Via a parameter each digital output can also be used as a pulse with a minimum of 1Hz.

At 1 Hz, a pulse duration of 1 s must therefore theoretically be recognized as true 0.5 s and false 0.5 s. The hardware can be designed accordingly.

The way in which each input is to be evaluated is set using the corresponding parameter set.

When starting the hardware, the outputs are not toggled. When the boot process is complete and the operating system knows in which state (true / false) the digital outputs are to be brought, according to the parameter list, they are toggled.

Each digital output must be able to follow a digital input, adjustable via a parameter set. This must be directly possible ($DI = 1 \rightarrow DO = 1$) or inverted ($DI = 1 \rightarrow DO = 0$).

Each digital output can generate the following events:

- DOn true
- DOn false

5 Installation

5.1 Installation

The device is equipped with a mounting device for 35mm DIN rails according to DIN EN 50022. The metal housing is equipped with the appropriate threads so that the DIN rail mounting device can be attached on three sides.



Only install the device when the system / control cabinet is switched off and/or disconnected from the power supply. An electric shock can be caused by live adjacent parts or devices.



When using a torque wrench, the maximum permitted torque of 0.12 Nm must not be exceeded, otherwise the thread may be destroyed.



Use gloves when attaching the device to the DIN rail and when removing it. Cuts and injuries from sharp edges of adjacent parts can occur.

Installation:

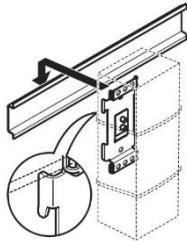


Fig. 7: Image Installation on DIN rail

Removal:

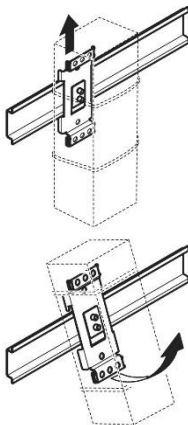


Fig. 8: Image Removal from DIN rail

5.2 Spacing

The distances $a = 10 \text{ mm}$ / $b = 50 \text{ mm}$ must be observed when installing neighboring parts on the DIN rail.

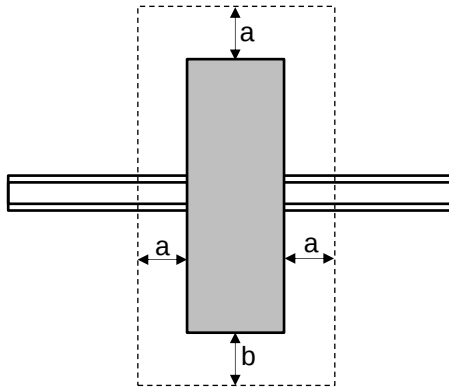


Fig. 9: Image Spacing on DIN rail upright mounting

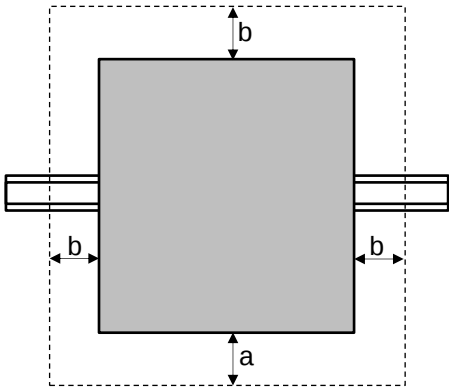


Fig. 10: Image Spacing on DIN rail recumbent mounting

5.3 Power Supply

The device can be supplied with a voltage on the two terminals 24 VDC & GND, as described in the Specifications chapter.



CH: The limit values for low-voltage systems are $\leq 2 \text{ A}$ and $< 120 \text{ VDC}$.

6 Operation

The device can be configured with a normal USB stick. To do this, proceed as follows:

As soon as a USB mass storage device formatted as FAT32 is recognized by the operating system, the following options are possible using a text file on the USB mass storage device:

- Download (from device) data list

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- Download (from device) Parameter
- Upload (to device) Parameter *
- Download (from device) Text Parameter
- Upload (to device) Text Parameter *

* *In order to upload to the device, the password from parameter PA52 must be included in the "passwd.csv" file. The password is not encrypted and **only** protects against accidental overwriting of the parameters.*

6.1 Configuration

If the USB mass storage device contains the correct folder according to the parameters, and the "paradown" file is also present, the "confdown.csv" file with the parameters is downloaded from the device.

If the USB mass storage device contains the correct folder according to the parameters, and it contains the "paraup" file, the device is configured according to the "confup.csv" file.

6.2 Text

If the USB mass storage device contains the correct folder according to the parameters, and it contains the "textdown" file, the "textdown.csv" file with the text is downloaded from the device.

If the USB mass storage device contains the correct folder according to the parameters, and it contains the "textup" file, the device is configured according to the "textup.csv" file.

6.3 Data Point Lists

If the USB mass storage device contains the correct folder according to the parameters, and it contains the "data" file, the device downloads according to the "dataXY.csv" file. XY stands for DI1 to -4, DO1 to -4, AI1 to 2 and AO1 to -2, VA1 to -n.

7 Disposal

We accept the return our devices. They are either recycled by us or disposed of by a recycling company in accordance with legal requirements. Alternatively, old devices may also be disposed of at designated collection points.

8 Tables

For an overview of the tables, use the software specification, which can be downloaded from the TECHDOCK GmbH website.

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