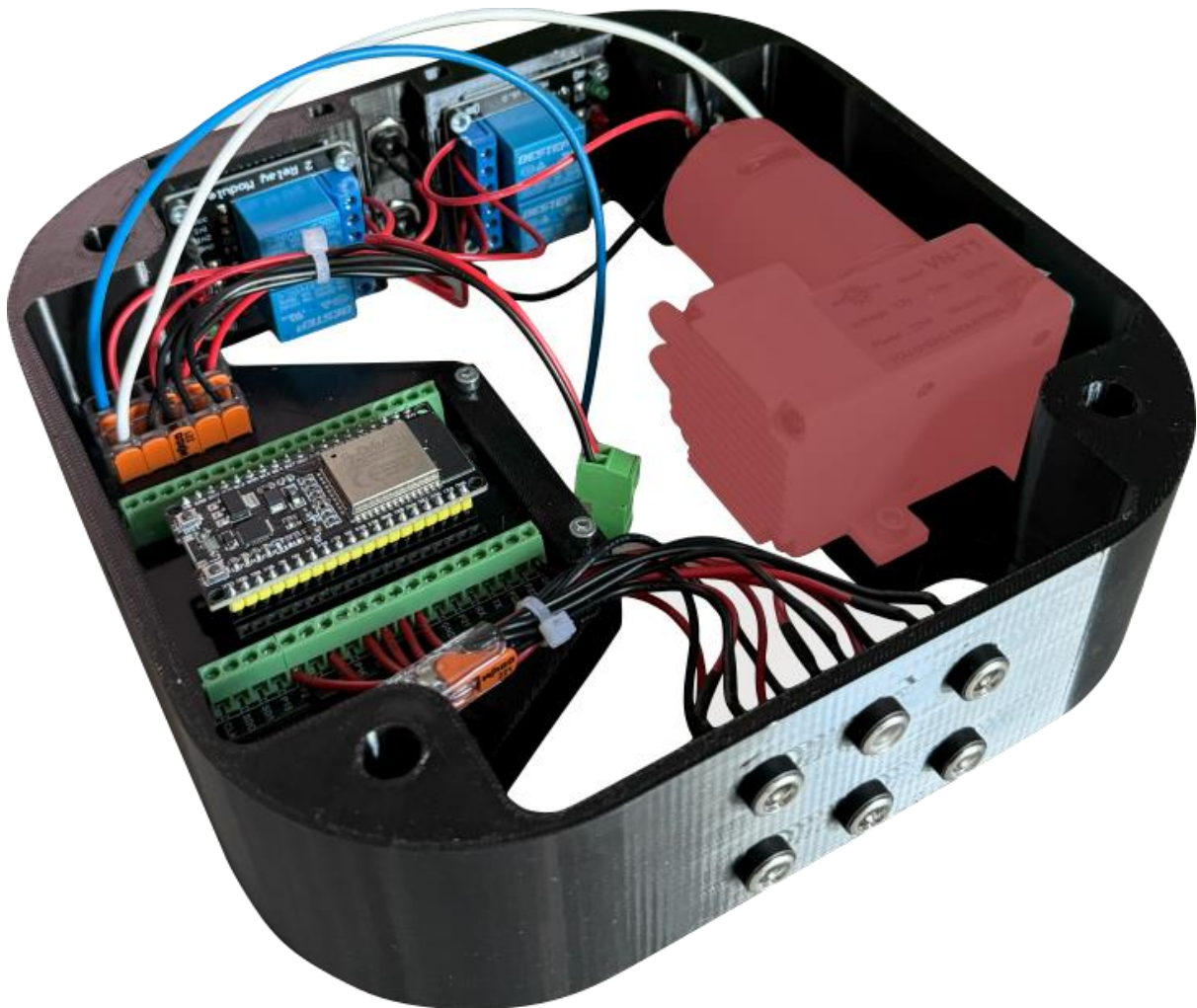


Assembly guide:

IO-box



Version 1.0

Date: 26-7-2024



Revision:

REV	Date	Description
1	2-7-2024	First release



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1: Introduction

This document will describe how to assemble the IO box of the Miko-1 robot arm. Because this is the first version of the assembly guide, there might be some imperfections. We will try to resolve these as soon as possible. We apologize for any inconvenience you may encounter. If you find any mistakes in this document, please let us know by emailing us info@mikobots.com.

Instructions on how to use the IO-box can be found in the manual of the Miko-1 robot arm. This manual is not ready at the time of this document's release. Using the robot before you have read the Miko-1 manual is at your own risk.

To ensure the safe operation of the robot arm, you need to have sufficient knowledge of electronics. If you are unsure how to proceed, please do not attempt it and ask a professional.

All measurements in this document are in millimeters (mm) or specified otherwise.

This document is not finished, we share it so you can start buying the parts needed.



2: Print files

In this chapter you will find all the parts that you need to print for the Miko-1 robot arm. We recommend using PETG filament because it has a higher glass transition temperature than PLA and is still easy to print.

The general print settings that we have used for the parts are:

- Layer height: 0.2mm
- Walls: 2
- Infill: 20%

The tolerances used are as tight possible to achieve the best results. This means that sometimes you may need to use a little bit of force to assemble some parts. The given tolerance for certain parts, such as bearings, depends on the layer direction of the part. We have created a test part to check if your printer can print the parts with the given tolerances. If you encounter problems with the tolerance of any part, please let us know.

We will also release parts with larger tolerances if needed, as we want to ensure that almost every printer can print this robot arm.

If you want access to the 3D files you will have to buy the digital files, or a kit.



List 3D printed parts	
Name: IO-Box	
Date: 26-7-2024	
Revision: 000	
	Art. name: IO_BOX_01
	Revision: 000
	Quantity: 1
	Infill: 20%
	Walls: 2
	Comments: Colour: Black
	Art. name: IO_BOX_02
	Revision: 000
	Quantity: 1
	Infill: 20%
	Walls: 2
	Comments: Colour: Black



3: BOM

In this chapter, you will find all the parts that you need to buy for the robot arm. If you see any mistakes or have any questions, you can email us at info@mikobots.com or ask the question in the Discord server. We have tried to provide a link to a shop for each component, but these links could change or become invalid. We will try to update the links regularly.

Please remember that you are solely responsible for ensuring the parts meet the safety requirements for your country.

If you don't want to source the components yourself, you can buy one of our kits. The kits will be available on our web shop in September/October 2024.

Besides the parts in the BOM you also need some tyrap and some heat shrink tubing.

Before ordering the parts, it's recommended to first read the whole document.

Please note the vacuum pump is not included in this BOM but can be found in the BOM of the vacuum tool



Bill of materials (BOM)

Name IO box
Revision 000
Date 23-7-2024

Electronics

Name	QTY.	Description	shop
ELECTRONICS_003	1	Breakout board esp32	Link
ELECTRONICS_004	1	ESP32 38 pin	Link
ELECTRONICS_013	8	5.5 x 2.1 mm jack with cable 20 cm	Link
ELECTRONICS_015	1	Micro usb cable 1.5m	
ELECTRONICS_016	2	Relay 3.3V 2 channel	Link
ELECTRONICS_019	8	DC jack male Ø5.5 x 2.1	Link
ELECTRONICS_020	2	Wago 221-415	Link
ELECTRONICS_021	1	Wago 221-2411	Link
ELECTRONICS_024	1	15EDGRK 3.81 02P Male and female screw	Link

Fasteners

Name	QTY.	Description	shop
DIN 912 M3x10	8	Hexagon socket Head Cap Screws M3x10	
DIN 912 M3x16	2	Hexagon socket Head Cap Screws M3x16	
DIN 912 M8x80	4	Hexagon socket Head Cap Screws M8x80	
ISO 4032 M3	10	Hexagon regular nut M3	

Cables

Name	QTY.	Description	shop
CABLE_01	20 cm	Cable 2 wire, 22 AWG/ 0.34 mm2	Link
CABLE_05	20 cm	Cable 0,75 mm2 white	
CABLE_06	20 cm	Cable 0,75 mm2 blue	
CABLE_07	8	Dupont cable Female – Male 20 cm	Link

Important note

- It is your own responsibility to ensure that the components meet the safety requirements in your country.



4: Schematic and wiring

In this chapter, you will find all the information regarding the schematic and electronics of the robot arm.

Please remember that you are working with electronics, and even though the robot arm operates at only 24V, there are still potential dangers. Incorrect wiring or mishandling of components can lead to short circuits, electric shocks, or damage to the robot arm and its parts. Always double-check your connections and follow safety guidelines. If you are not confident in your knowledge of electronics, please seek assistance from a professional to ensure safe assembly and operation.

You can find the schematic in the appendix.


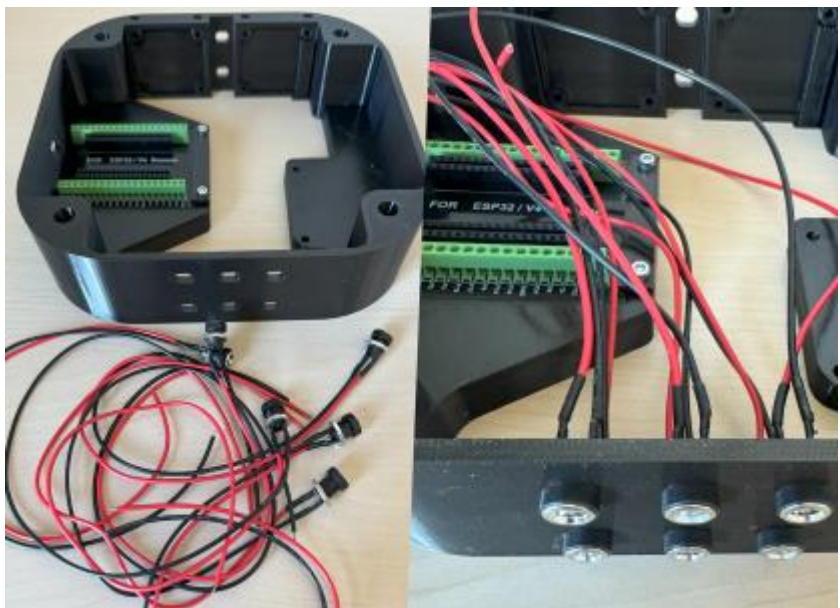


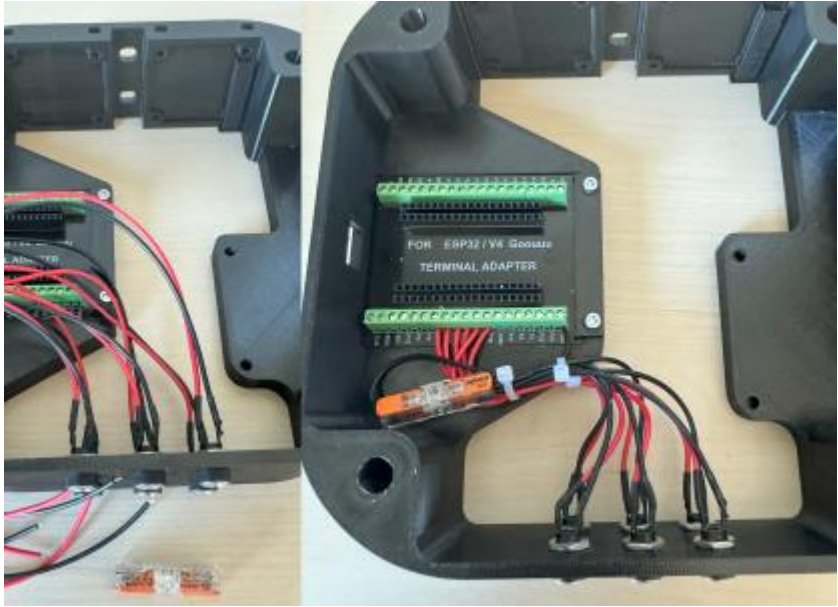
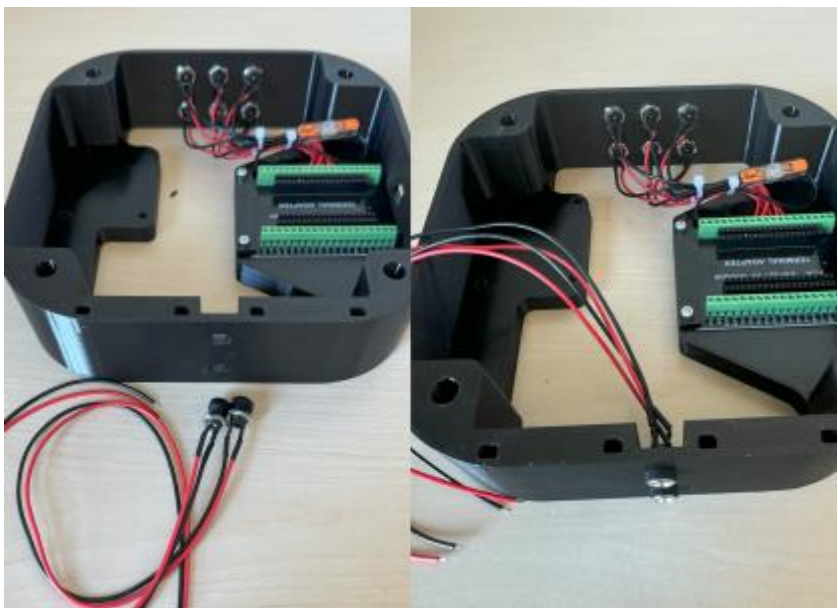



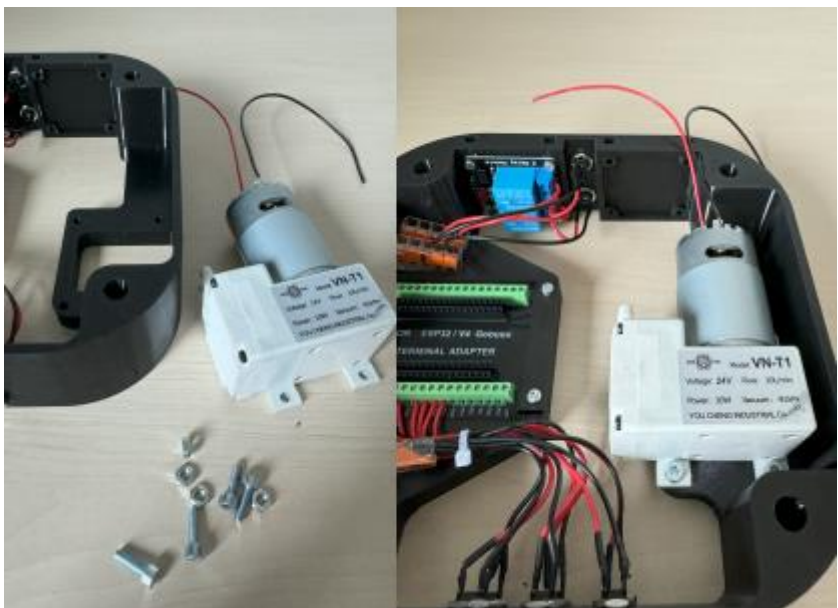
5: Assembly instructions

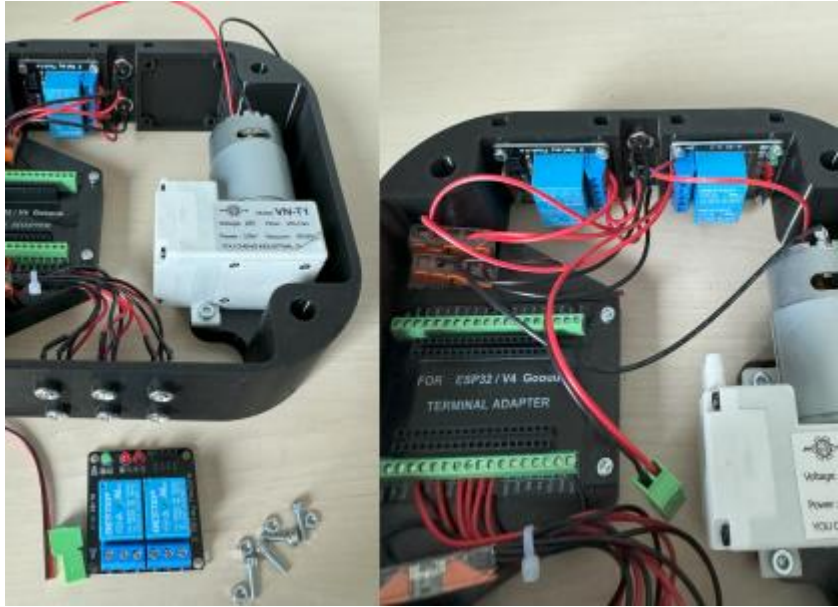
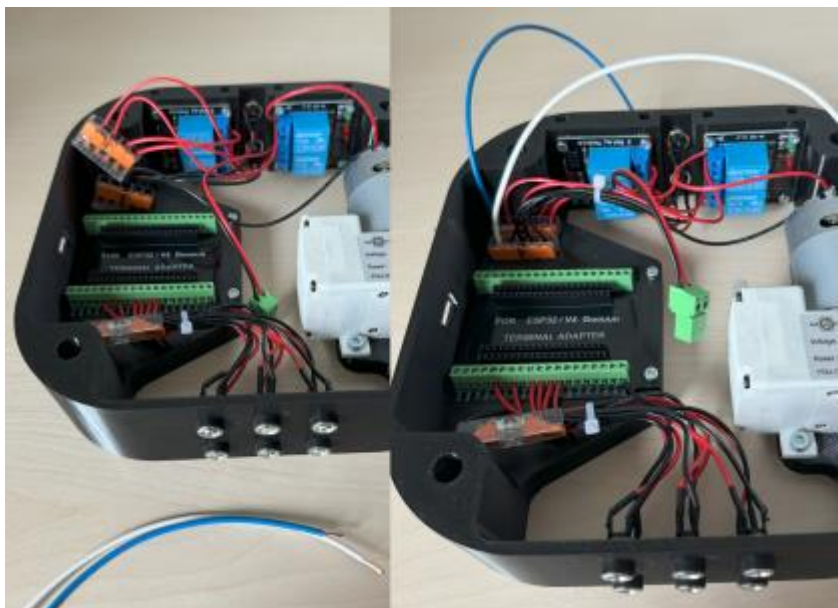
The instructions are written with care to include every step of the assembly process.

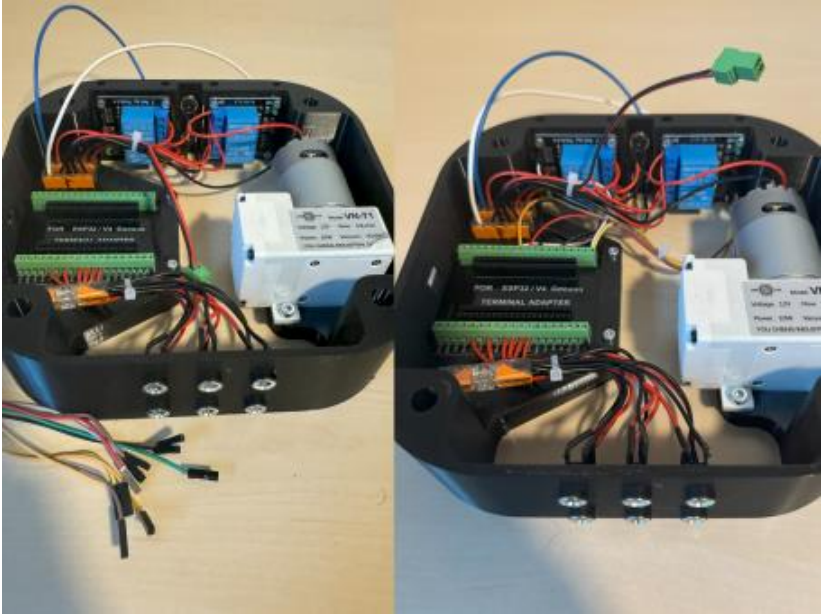
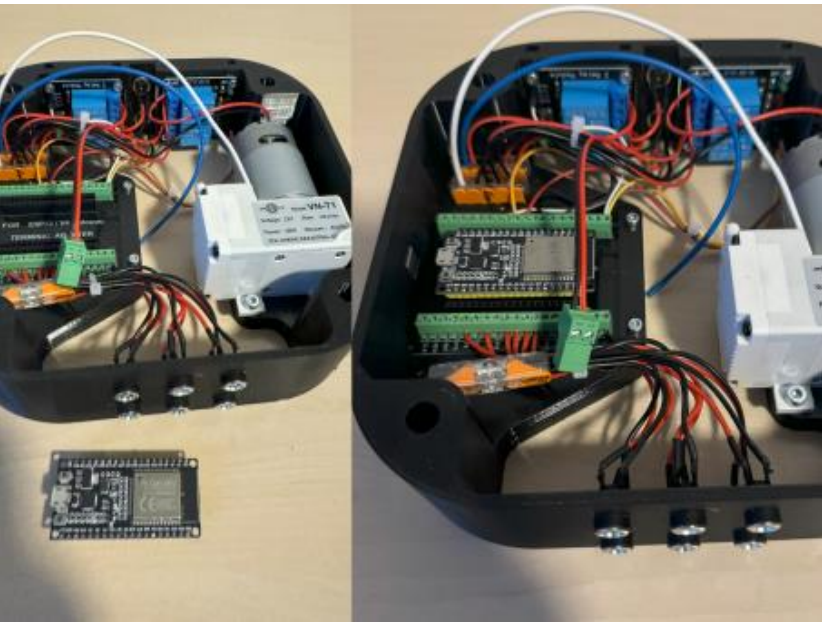
This chapter is not completely finished yet, and we will try to make some steps clearer for easier assembling.

Items		Step 1
1x	IO_BOX_01	
1x	IO_BOX_02	
2x	DIN 912 M3 x 16	
2x	ISO 4032 M3	
Items		Step 2
6x	ELECTRONICS_013	

Items		Step 3
1x	ELECTRONICS_021	
Items		Step 4
2x	ELECTRONICS_013	

Items		Step 5
2x	ELECTRONICS_020	
1x	ELECTRONICS_016	
4x	DIN 912 M3 x 10	
4x	ISO 4032 M3	
Items		Step 6
1x	ELECTRONICS_011	<p>These parts are not included in the IO box kit but in the vacuum tool kit</p> 
4x	DIN 912 M4 x 16	
4x	ISO 4032 M4	

Items		Step 7
1x	ELECTRONICS_016	
1x	ELECTRONICS_024	
4x	DIN 912 M3 x 10	
4x	ISO 4032 M3	
Items		Step 8
1x	CABLE_05	
1x	CABLE_06	

Items		Step 9
8x	CABLE_07	
Items		Step 10
1x	ELECTRONICS_004	



6: Firmware installation

Coming soon...



7: Appendix

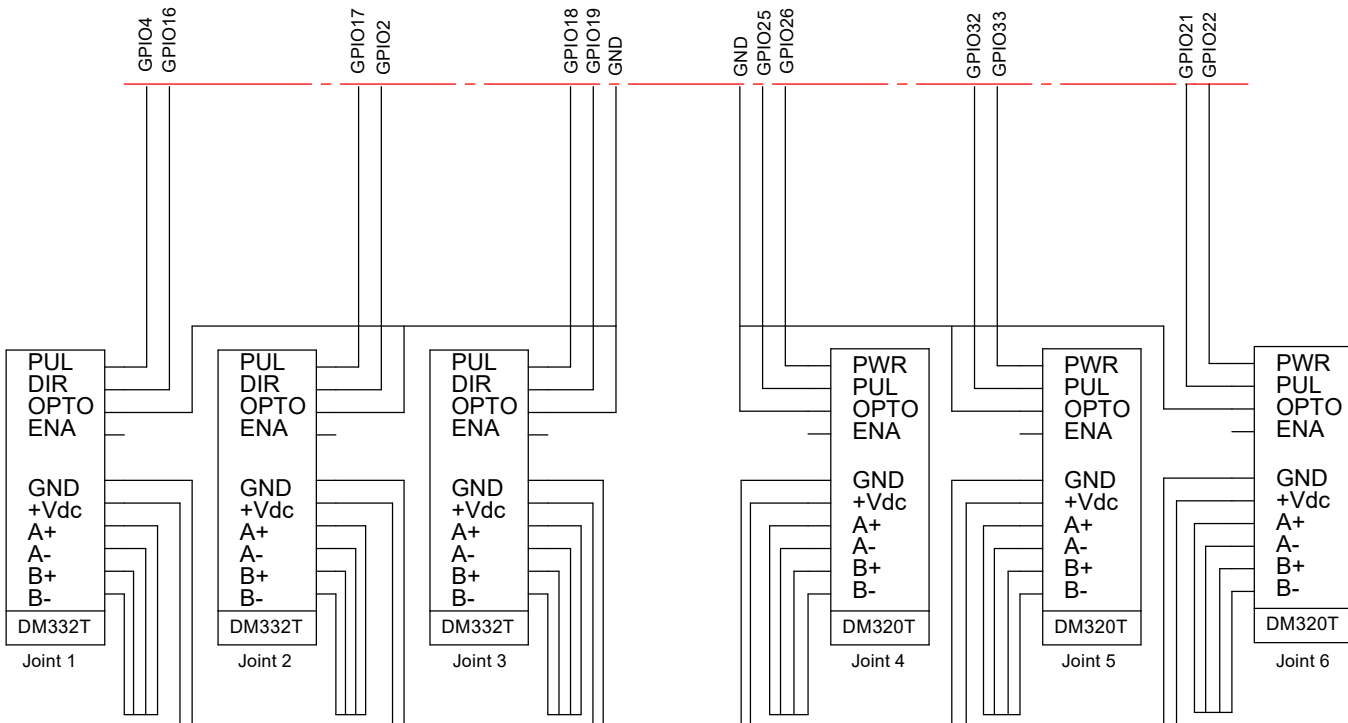
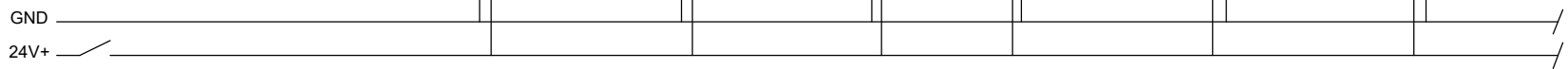
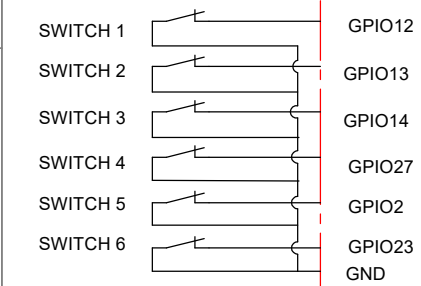
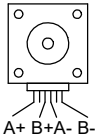
In the appendix you can find the following documents.

- Schematic of MiKo-1 with IO box

General Table

GPIO	Comment	Robot
GPIO1		
GPIO2		SWITCH 6
GPIO3		
GPIO4		PUL 1
GPIO5		DIR 2
GPIO6		
GPIO7		
GPIO8		
GPIO9		
GPIO10		
GPIO11		
GPIO12		SWITCH 1
GPIO13		SWITCH 2
GPIO14		SWITCH 3
GPIO15		
GPIO16		DIR 1
GPIO17		PUL 2
GPIO18		PUL 3
GPIO19		DIR 3
GPIO20		
GPIO21		PUL 6
GPIO22		DIR 6
GPIO23		SWITCH 4
GPIO24		
GPIO25		PUL4
GPIO26		DIR 4
GPIO27		SWITCH 5
GPIO28		
GPIO29		
GPIO30		
GPIO31		
GPIO32		PUL 5
GPIO33		DIR 5
GPIO34		
GPIO35		
GPIO36		
GPIO37		
GPIO38		

Color code motors				
Motor	A+	A-	B+	B-
Nema 23 L56 - J1	Black	Green	Red	Blue
Nema 23 L76 - J2,3	Black	Green	Red	Blue
Nema 17 L45 - J4	Black	Blue	Green	Red
Nema 17 L45 - J4	Black	Blue	Green	Red

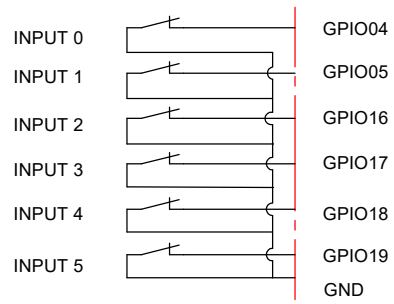
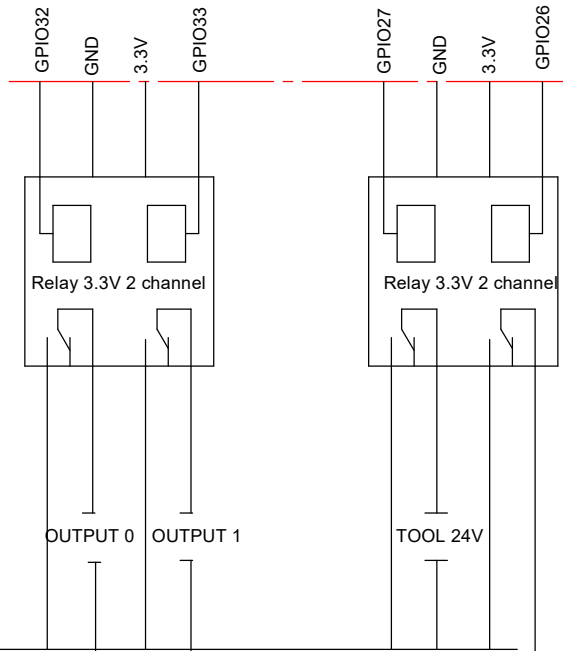


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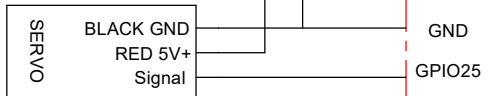
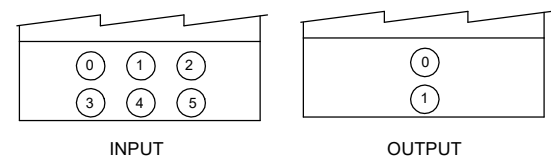
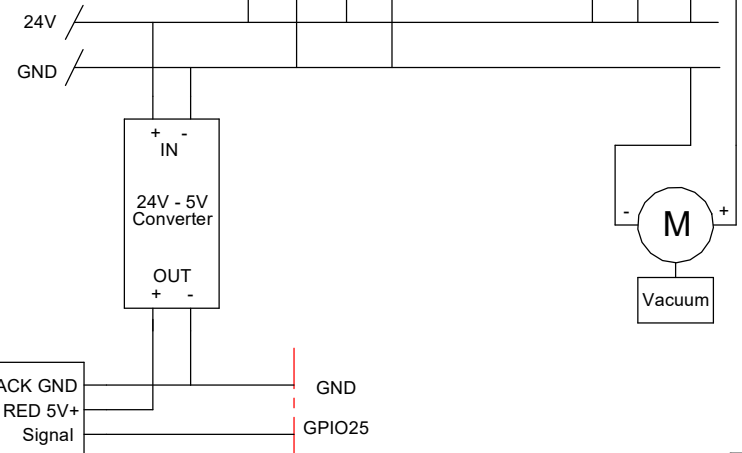
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DISCRIPTION: Schematic MiKo-1 with IO box		TOL. CLASS: m
SCALE: 1:2	UNIT OF MEASURE: MM	Sheet 1 of 2
FORMAT: A2	DRAWING NR.: Schematic Miko-1 with IO	REV: 000


GPIO	Comment	Robot
GPIO1		
GPIO2		
GPIO3		
GPIO4		INPUT 0
GPIO5		INPUT 1
GPIO6		
GPIO7		
GPIO8		
GPIO9		
GPIO10		
GPIO11		
GPIO12		
GPIO13		
GPIO14		
GPIO15		
GPIO16		INPUT 2
GPIO17		INPUT 3
GPIO18		INPUT 4
GPIO19		INPUT 5
GPIO20		
GPIO21		
GPIO22		
GPIO23		
GPIO24		
GPIO25		SERVO
GPIO26		VACUUM
GPIO27		TOOL 24V
GPIO28		
GPIO29		
GPIO30		
GPIO31		
GPIO32		OUTPUT 0
GPIO33		OUTPUT 1
GPIO34		
GPIO35		
GPIO36		
GPIO37		
GPIO38		

ESP 32



See schematic MiKo-1 IO





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TOLERANCE : Algemene toleranties volgens ISO 2768-2		TOL. CLASS : m
DISCRIPTION : Vormtoleranties volgens ISO 2768-1		TOL. CLASS : m
Schematic MiKo-1 with IO box		
SCALE : 1:2	UNIT OF MEASURE : MM	Sheet 2 of 2
FORMAT : A2	DRAWING NR. : Schematic Miko-1 with IO	REV. : 000
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