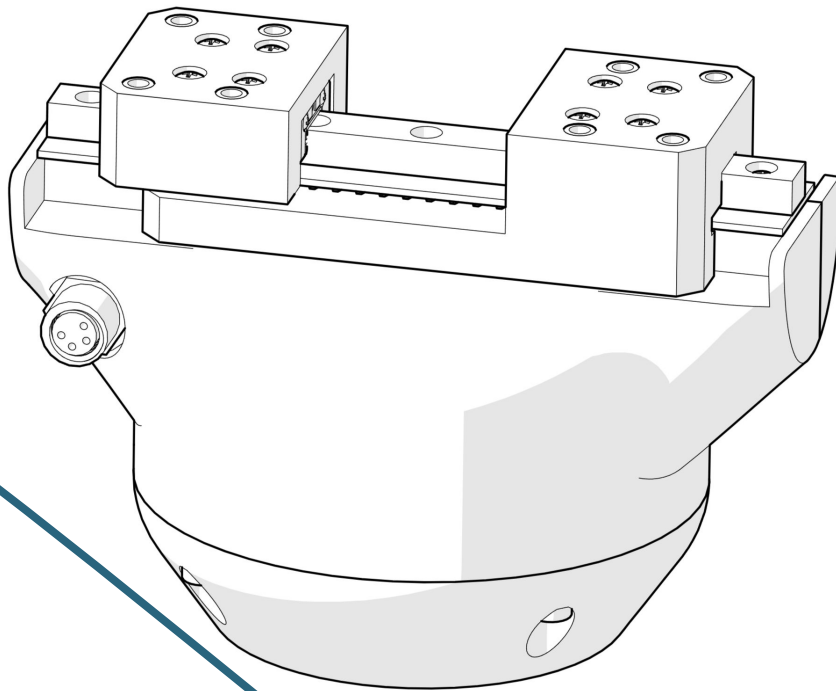


SSG-48 Adaptive gripper assembly manual



Version 1.1, rev1, date 2.21.2024

Disclaimer important notice

The SSG-48 adaptive electric gripper and its associated part are specifically intended for engineering development, demonstration, or evaluation purposes. They are not considered to be a final product suitable for general consumer use. Individuals handling these products must have proper electronics and robotics training and adhere to good engineering practices. It should be noted that these goods may not fulfill all the required design, marketing, and manufacturing-related protective measures, including product safety and environmental considerations typically found in finished products. The SSG-48 adaptive electric gripper is not compliant with the European Union directives concerning electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE, or UL. Consequently, it may not meet the technical requirements outlined in these directives or other related directives.

The user assumes full responsibility and liability for the correct and safe handling of the robot. Additionally, the user agrees to indemnify the Source Robotics team against any claims arising from the use or handling of the products. Given the open construction of the product, it is the user's responsibility to take all necessary precautions.

EXCEPT FOR THE INDEMNITY DESCRIBED ABOVE, NEITHER PARTY SHALL BE HELD LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Disclaimer important notice

Before building this gripper please read the whole manual! This machine can cause harm to you and people around you. It can burn, electrocute and physically hurt you if you are not careful. Please read these instructions carefully!



Assembly manual

Welcome to the SSG-48 adaptive electric gripper assembly manual. SSG-48 adaptive electric gripper is a gripper based on Spectral micro BLDC drivers. It is a gripper capable of controlling its gripping force, making it perfect for assembly tasks and human-robot collaboration.

It is made by Source Robotics, designed by Petar Crnjak

All additional information can be found here:

- Github project repository - [most up to date BOM, parts, docs, manuals...](#)
- Docs page - [latest documentation on PAROL software](#)
- Official product page - [Source robotics](#)

You can also ask help and advice from community:

- Official discord server: [link](#)
- Or send us an email at: info@source-robotics.com

And you can follow us on social media:



All screws shown are same size and only for reference. For correct size read the instructions stated on the page what screw to use.

This document only shows assembly manual, all other files like BOM, printing table, STL files can be found on GitHub page of the project.

All parts should be printed with PETG material. Reference printing table for optimal infills and printing settings.

Wires are not shown but detailed instructions are given on how to route the wires.

This window shows what parts you will need on this page.

This window show building instructions.

This window shows tips and notes.

Assembly manual - Print preparation

Some parts need to be printed with support. Before using those parts make sure to clean all support material.

Printer settings we used:

- Printer: Prusa MK2S
- Material: PETG
- Layer height:
- Support: Reference printing table
- Infill: Reference printing table

Assembly manual - Needed tools

Tools you will need to assemble this robot:

- Screwdriver set
- Drill
- Soldering iron
- Imbus wrench (Allen key / HEX key) set
- Torque screwdriver
- Rubber hammer
- Hammer
- Pliers

For screwing we recommend using an electric screwdriver and then precision torque screwdriver or last few turns by hand. If you use drill or electric screwdriver for all the parts you risk destroying your threads.

Assembly manual - Needed consumable items

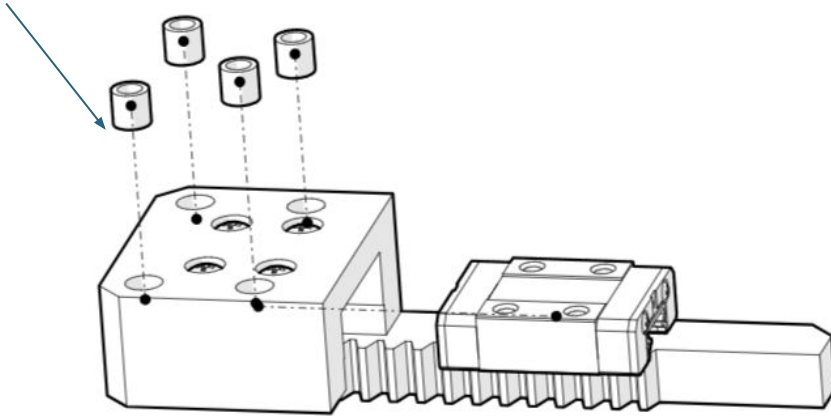
- Blue threadlocker
- Lithium grease
- Solder
- Heat shrink tube

Gripper assembly

Video assembly manual can be found here:

<https://www.youtube.com/watch?v=127zXHKuqlg>

4 x Brass insert 5mm

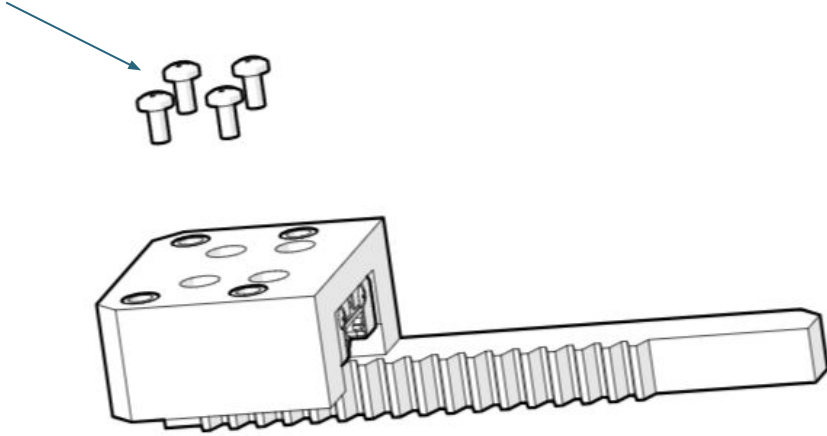


2 x Jaw
2 x MGN7C slider
8 x Brass insert 5mm

Use soldering iron or special tool to insert brass inserts into printed part. Place MGN7C inside the designated place inside the jaw part.

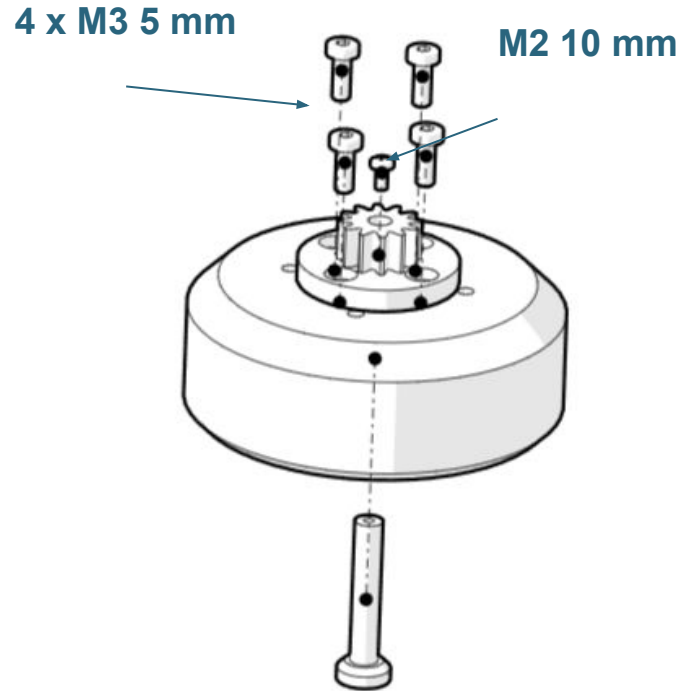
You will need to assemble 2 jaws! Instructions are the same for both.

4 x M2 4 mm



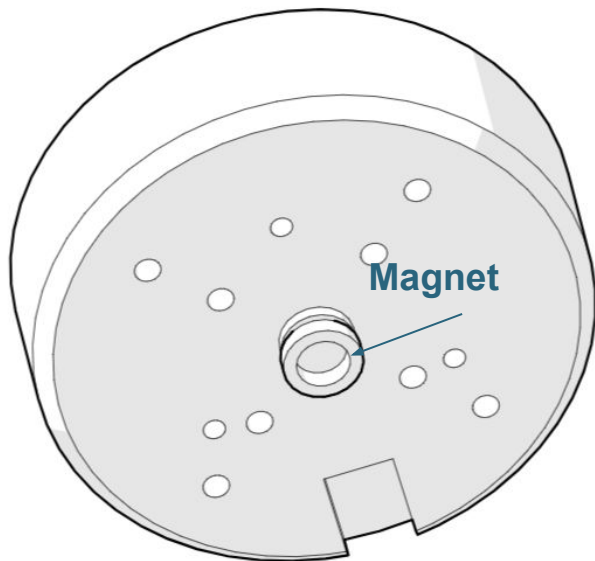
8 x M2 4 mm

Secure the MGN7C to the jaw part using 4 M2 4mm screws. You can use threadlocker here if needed.



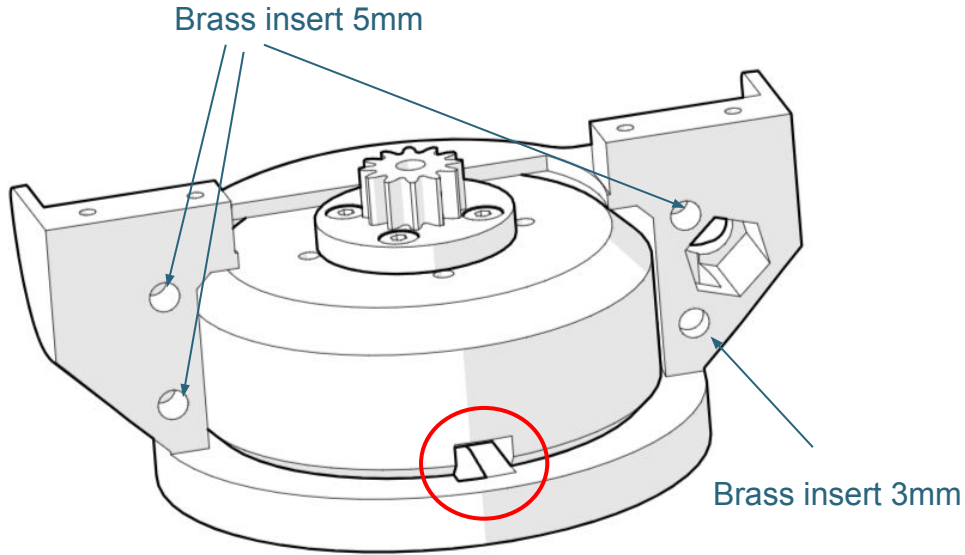
Gripper gear
Magnet shaft
BLDC Motor
4 x M3 5 mm cheese head
1 x M2 10 mm

First attach gripper gear to the motor using 4 M3 5mm screws. Now attach magnet shaft to the gripper gear using M2 10mm screw.



Magnet

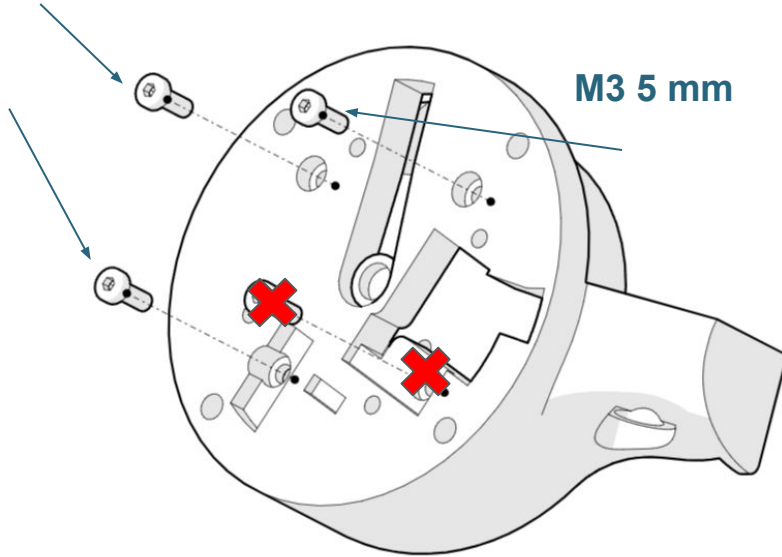
Attach the magnet to the shaft. If it is too loose use super glue to secure it.



Main body
3 x Brass insert 5mm
1 x Brass insert 3mm

Slide the motor with all assembled parts to the main body like shown in the image. Note the orientation where motor wires are, Indicated with red circle. Attach brass inserts like shown with arrows.

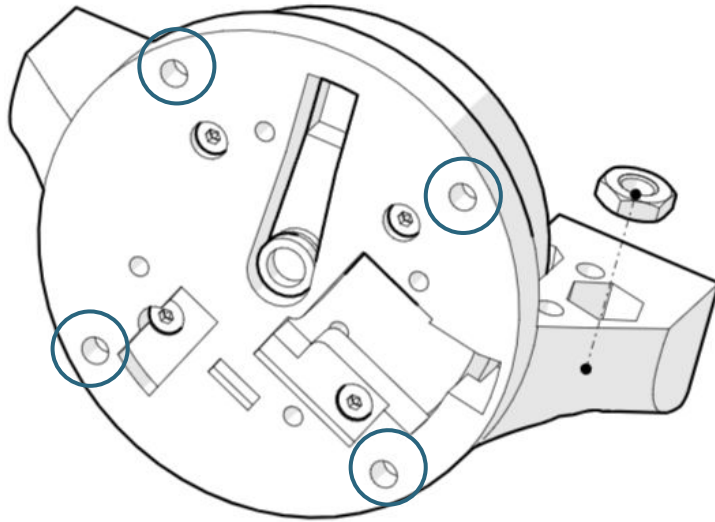
2 x M3 8 mm



M3 5 mm

2 x M3 8 mm cheese head
1 x M3 5 mm cheese head

Secure motor to the main body by using defined screws. Note screw and the hole marked with red cross are not needed. That hole will later be used for Motor temperature thermistor

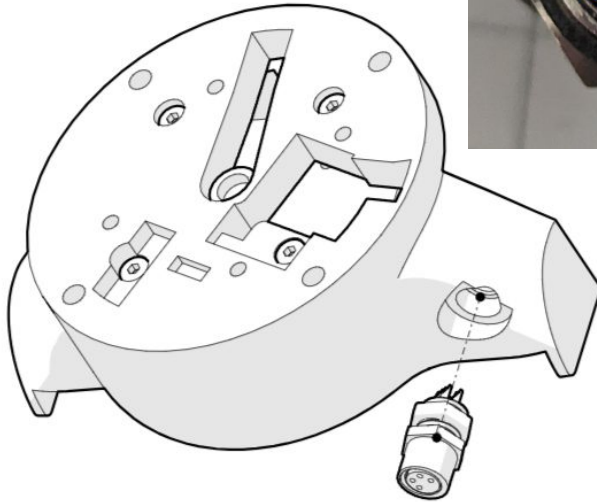


Nut from 4 pin connector
4 x Brass insert 5mm

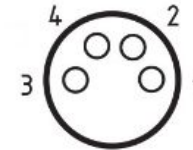
Add brass inserts to the holes circled in the image. Place nut for 4 pin connector in the indicated spot.



4 pin connector
4 x 100mm wires, 2 wires need
to be twisted pair (Used for
CAN bus connection)

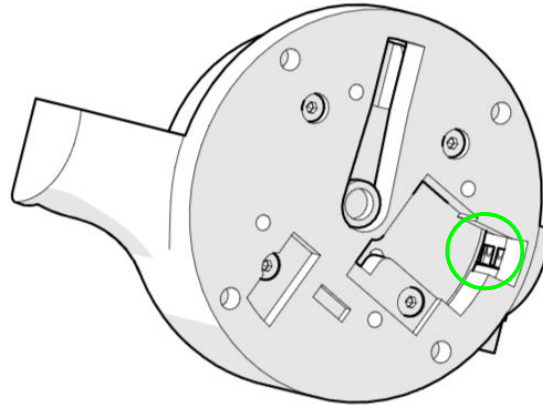
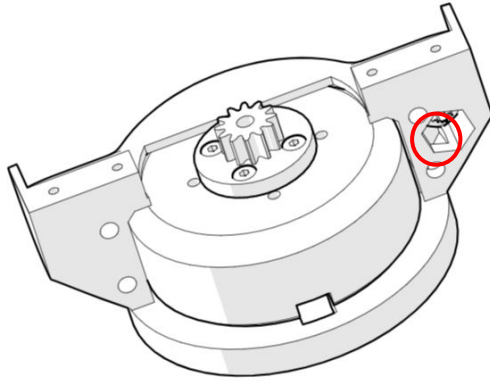


Solder 4 wires to 4 pin connector. Use this
pinout:

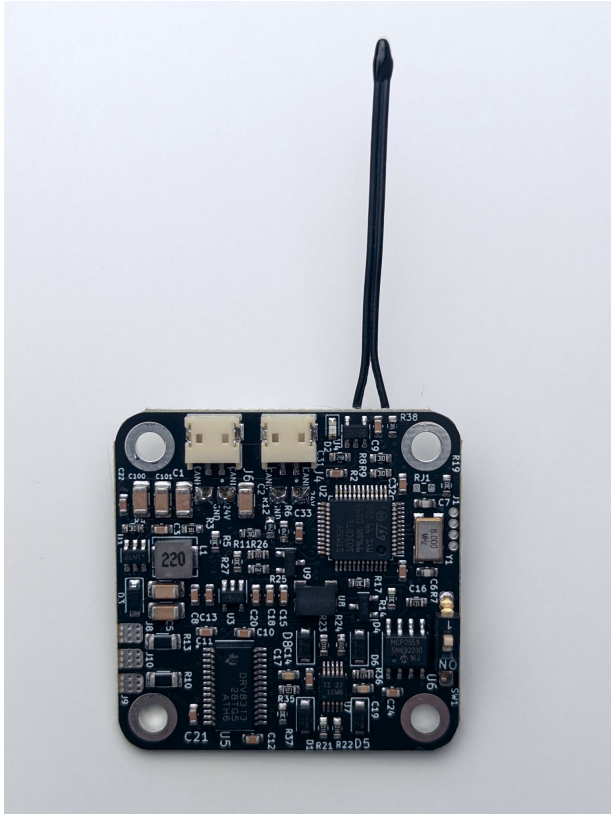


1- 24V
2- CANL
3 - GND
4 -CANH

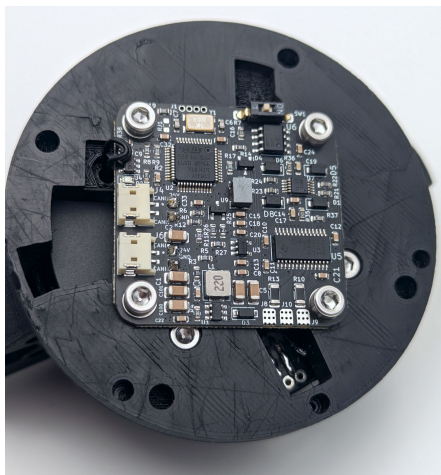
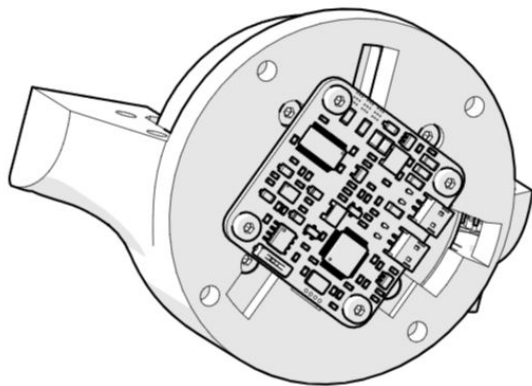
Use heat shrink on the solder joints. After
you solder the wires pull them thru the hole
and the nut. Screw in the 4 pin connector.



First pull the wires thru the hole marked in red. After that wires need to exit thru the green hole. Now solder the CAN and power connectors for spectral controller. You can also crimp them if you have the tools.



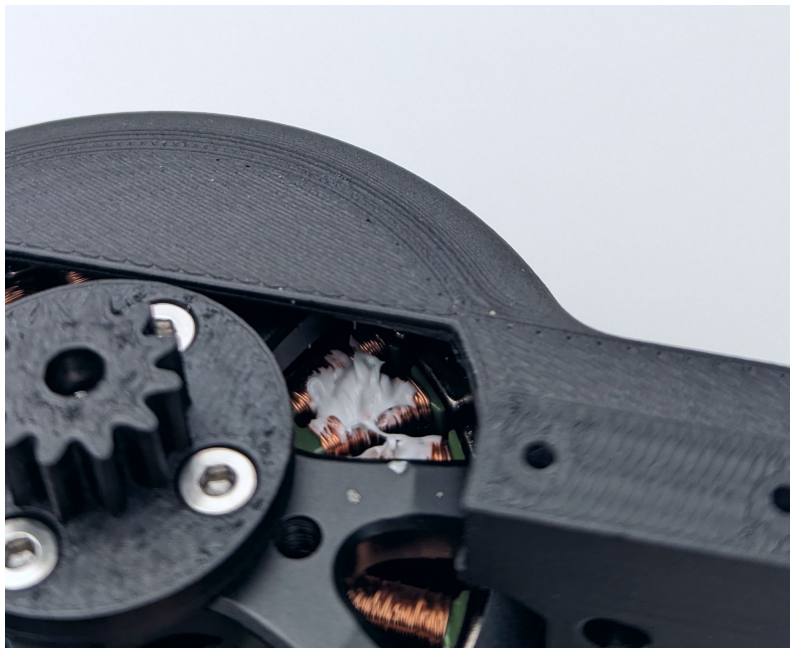
Prepare Spectral BLDC
by soldering thermistor to
it. Its length needs to be
around 35mm.



Spectral micro BLDC driver
4 x M3 8 mm cheese head
3 x 20 mm wires

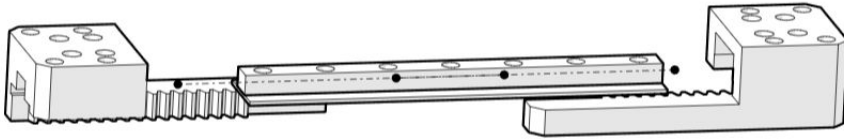
Solder the wires to the motor contacts. You can bend them upwards if you find it hard. Secure spectral micro BLDC driver to the main body using 4 M3 8 mm screws. Note the orientation of controller. You can now connect power and CAN connector to the controller.
Note that you need to pull thermistor to the motor coils.

Position thermistor like shown in the image.
Apply thermal cement to it and let it dry.



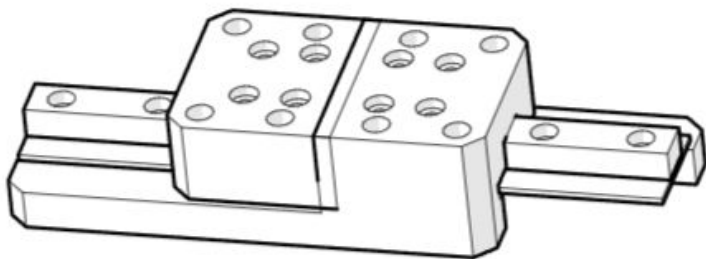
Now is the time to calibrate your BLDC controller.
Go to [this link](#) and follow the instructions.

After you calibrated your motor controller you will need to configure your motor controller to act as a gripper. Follow the instructions on the following link under:
[Spectral driver config](#)

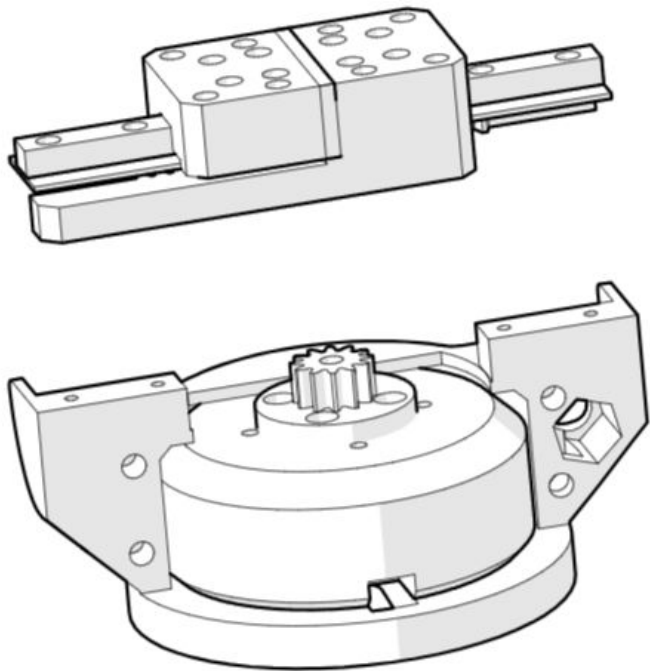


Linear guide
Guide cover

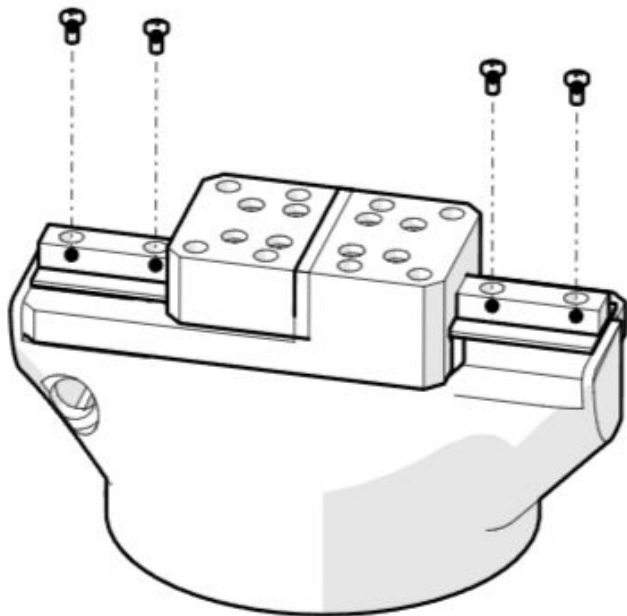
Slide both jaws to the linear guide and guide cover. Apply lithium grease to the jaws.



Make sure the jaws are closed and both
equally spaced from both sides.

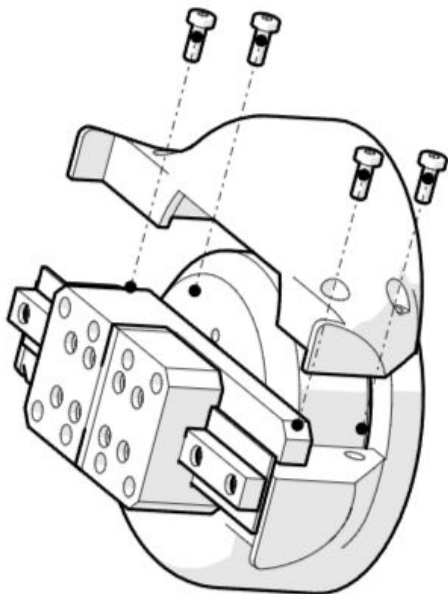


Attach the previous assembly to the main body. Make sure that your jaws have the same amount of travel on both sides.



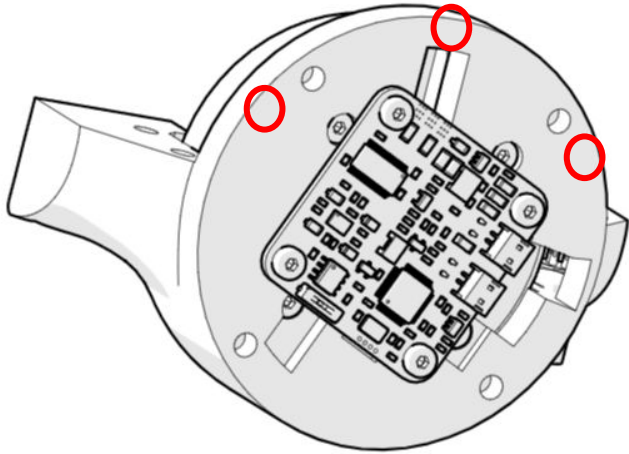
4 x M2.5 8 mm

Secure the linear guide with 4 x M2.5 8mm screws.



Main body lid
4 x M3 12 mm

Secure the main body lid to the main body
with 4 x M3 12 mm screws.

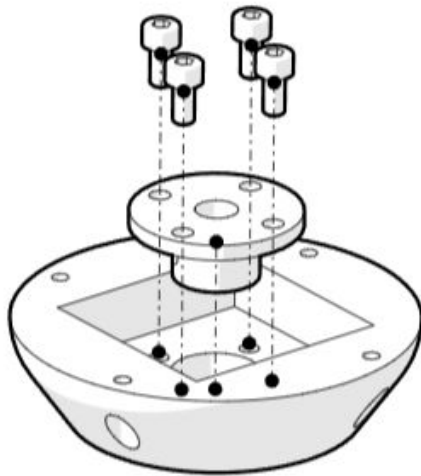


3 x M2 10 mm screws

Optional step!

You will need to perform this step if there is large gap between two shells. Reasons for this can be a poor print quality of you parts.

Secure Lid to main body with 3 M2 screws on the spots marked with red circles.



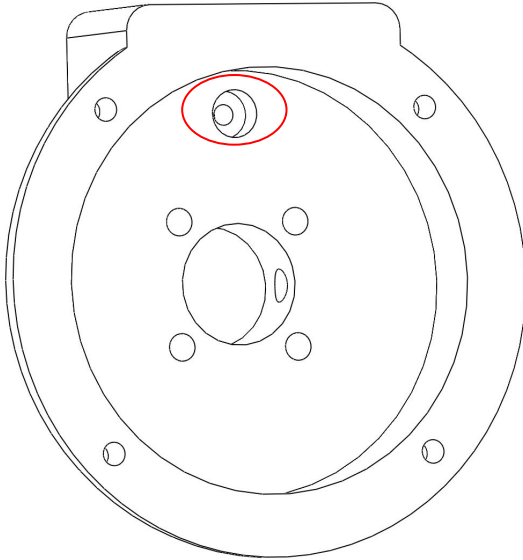
Shaft coupler

4 x M4 20 mm

Connector coupler (generic)

if using parol6 robot arm use:
"Connector coupler parol6" in the
github folder

Attach shaft coupler to connector coupler using 4 M4 20mm screws. Note the orientation of the holes on the side of the shaft coupler. This image shows the generic connector. You can modify it for your robot application. You can find connectors for PAROL6 robot arm on github.

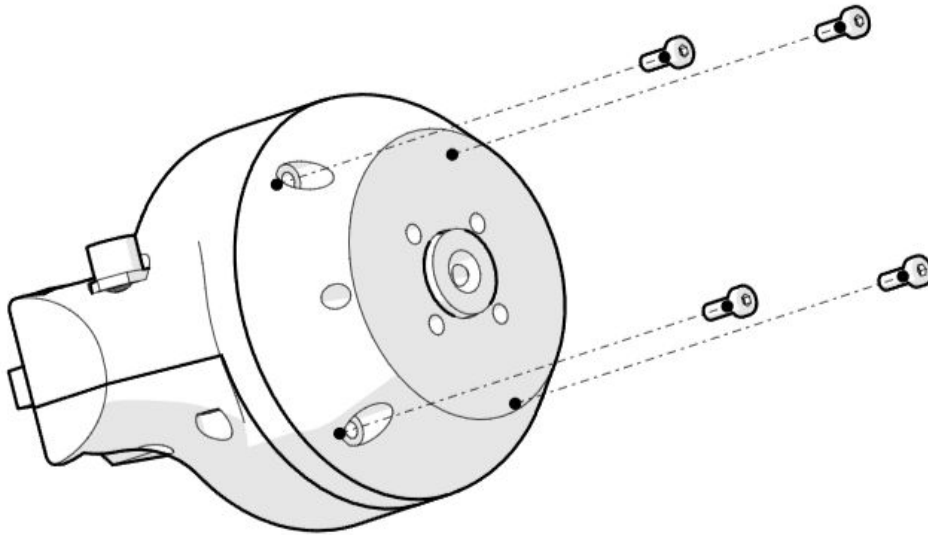


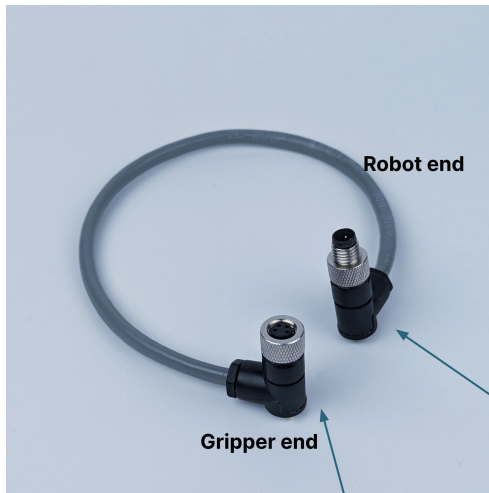
In case you are using the gripper with PAROL6 robot you will also need to use one M3 x 12mm screw and place it in the hole marked with circle. This will be used to home the robot.

*Note the part on the image is how "Connector coupler parol6" will look

4 x M3 10 mm

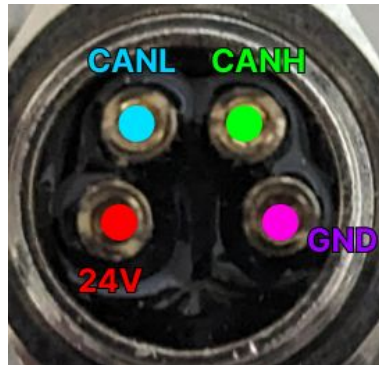
Secure the Connector coupler using 4 M3
10mm screws.

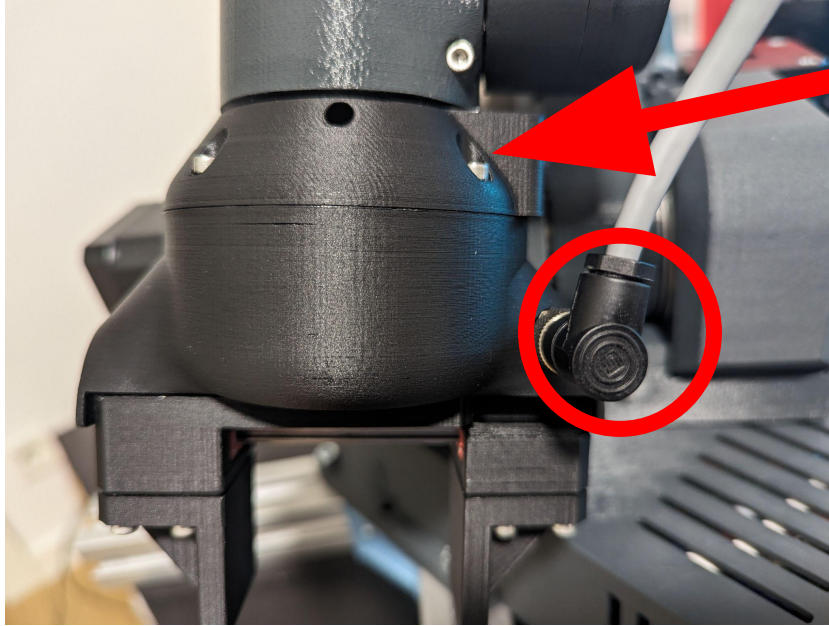




Cable assembly

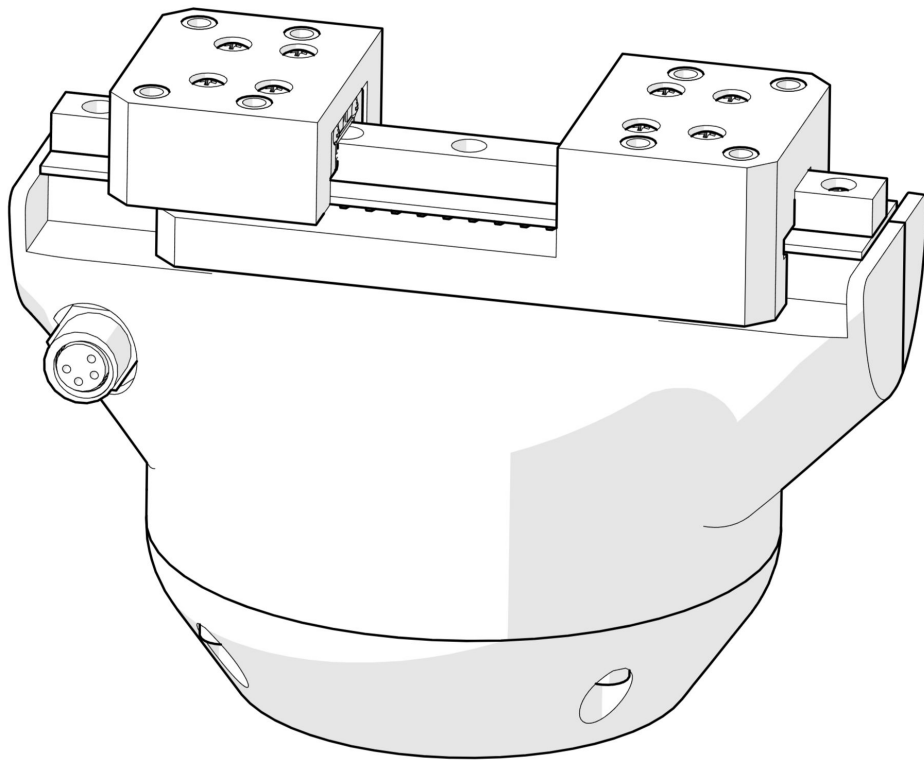
Solder twisted pair wires to the connector located inside the parts marked with arrows like shown on the image.





If using the gripper for PAROL6 it needs to have a homing tab on the side as shown with the arrow. Also note that the tab needs to be on the same side where the cable connector is

Congrats you are done!



Go to the docs to get your gripper up and running!

https://source-robotics.github.io/SSG48-gripper-docs/page1_about_the_gripper/