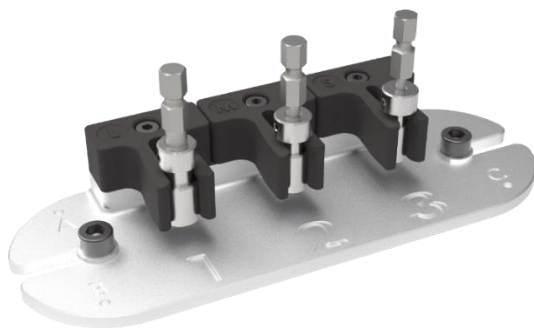




future of assembly



Automatic bit changing station

User manual v0.1 (original, en)



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2 Getting started



DANGER

You must read, understand, and follow all safety information in this manual. You must also follow manuals for all associated equipment, if in use, before initiating robot motion. Failure to comply with safety guidelines could result in death or serious injury.

The Automatic Bit Changer is an expansion for the Spin Robotics screwdrivers, enabling automatic bit changing. The system allows for automatic change between screwdriver bits and supports three individual bits.

2.1 What's in the box

Following parts are included in the package of the Automatic Bit Changer:

- 1 x Aluminum Bit changer base
- 2 x Size S – Bit fixture
- 2 x Size M – Bit fixture
- 2 x Size L – Bit fixture
- 3 x M4x16 screws
- 1 x Hex wrench 3mm for M4 screws
- 6 x Magnetic screw holder (inner diameter $\varnothing 2.5$, $\varnothing 3$, $\varnothing 4$, $\varnothing 4.5$, $\varnothing 5$, $\varnothing 6$)
- 2 x M6x30 screws, facet disc & M6 Nuts
- 1 x Hex wrench 1.5mm
- 4 x Extra grub screws

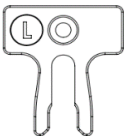


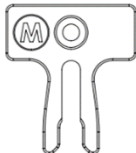

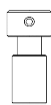

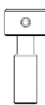
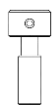
| Supplied bit fixtures and screw holders | | |
|---|--|--|
| Size L – bit fixture | 2x |  |
| Magnetic screw holder | <div> $\varnothing 6$ 1x  </div> | <div> $\varnothing 5$ 1x  </div> |
| Inner diameter [mm] | | |
| Size M – bit fixture | 2x |  |
| Magnetic screw holder | <div> $\varnothing 4.5$ 1x  </div> | <div> $\varnothing 4$ 1x  </div> |
| Inner diameter [mm] | | |
| Size S – bit fixture | 2x |  |
| Magnetic screw holder | <div> $\varnothing 3$ 1x  </div> | <div> $\varnothing 2.5$ 1x  </div> |
| Inner diameter [mm] | | |

Table 1: supplied bit fixtures and screw holders

3 Installation

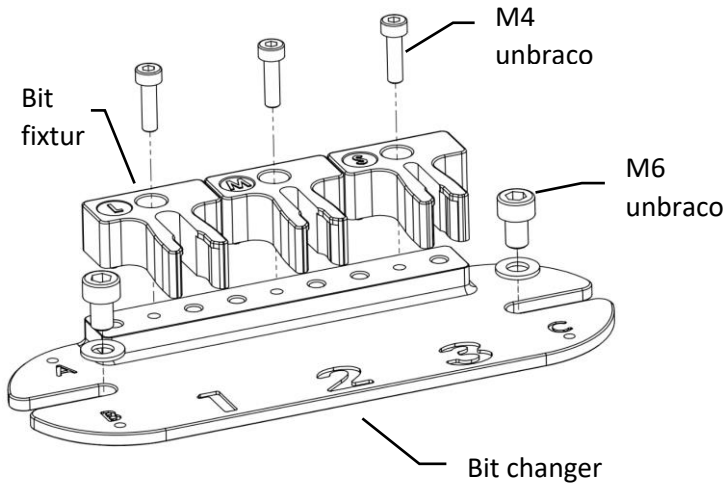


Figure 1: Automatic bit changer station assembly instruction

1. Place the tool changing station on the desired spot on the table, inside the working area of the robot.
 - *Spin Robotics recommend placing the unit as close to the work area as possible to lower cycle time.*
2. Fasten the automatic bit changer with 2 x M6 bolts or similar on a steady surface.
3. Place the bit fixtures in the designated spots, in what order you would like, or see **Error! Reference source not found..**
4. Fasten the bit fixtures with the 3 x M4x16 bolts.

4 Magnetic screw holder

To mount the 'magnetic screw holder' and bit, select the correct magnetic screw holder. To see which bit is correct for screws look at Table 2.

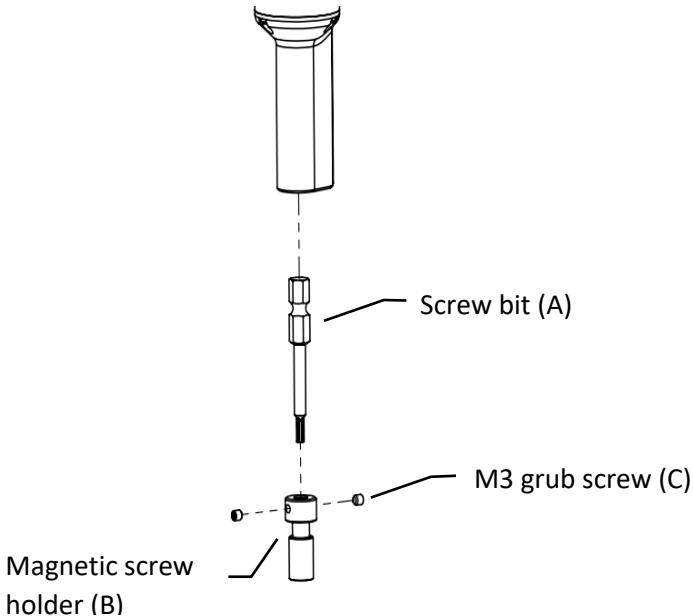


Figure 2: Assembly of Magnetic screw holder and bit

1. Insert your screw bit (A) into the supplied magnetic screw holder (A).
2. Before fastening the bit inside the screw holder, check that the screw surface meets the magnetic ring on the screw holder (see Figure 3).

- a. Make sure that the bit is inserted as far as possible into the screw without resting on the bottom of the slot.
- b. Check that the screw is centered.

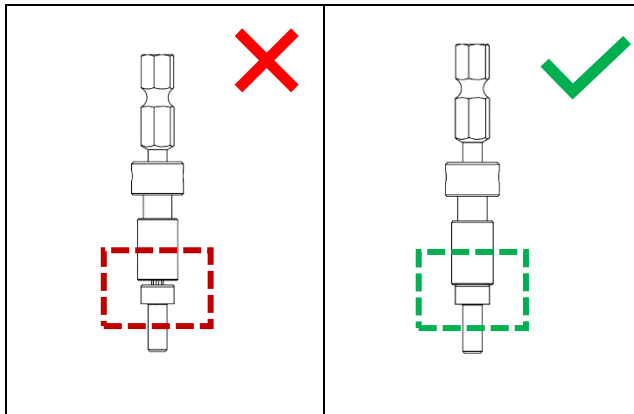


Figure 3: Adjustment of magnetic screw holder

3. Make sure to tighten the two M3 grub screws (C) on the sides. It is recommended to apply a medium strength Loctite to the M3 grub screws for secure assembly.
4. The bit including the magnetic screw holder can now be inserted into the end of the Spin Robotics screwdriver where it is held firm by a locking mechanism.
5. The bit can be released in the Spin Robotics screwdriver tool with a gentle pull.

The tool and the magnetic screw holders are compatible with $\frac{1}{4}$ "/6,35mm bits with a total length of **50mm** and a diameter between **2.5 to 6 mm**. See Figure 4.

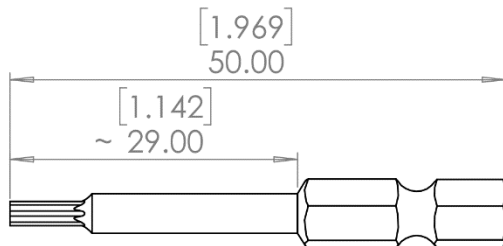


Figure 4 - Compatible bits size



NOTE

The inner diameter (\varnothing d) of the magnetic screw holder, needs to match the outer diameter of the bit shaft for a secure and precise fit.

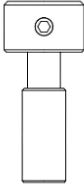
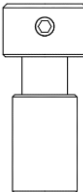





| Magnetic Screw holder size | |  S | |  M | |  L | |
|-------------------------------------|---|--|-----------|--|----------|--|-------------|
| Inner diameter $\varnothing d$ [mm] | | 2.5 | 3 | 4 | 4.5 | 5 | 6 |
| Outer diameter $\varnothing D$ [mm] | | 6 | | 8 | | 10 | |
| Typical screw size | | M 1.6-3 | | M 3-4 | | M 4-5 | |
| Torx |  | | TX 4-9 | TX 10-15 | TX 20 | | TX 25-30 |
| Hex socket |  | | | 2-3 | | 4 | 5-6 |
| Phillips |  | PH 0 | | | PH 1 | | PH 2 |
| Pozidriv |  | | | | PZ 1 | | PZ 2 |

Table 2:Magnetic screw holder and bit compatibility

5 Operation

5.1 Picking the bit

When the Automatic bit changer has been fastened, the tool and robot arm can be given a command to operate and must move to the predetermined location of the bit holder and pick up the correct bit for the screwing process. Illustration of the process can be seen in Figure 5.

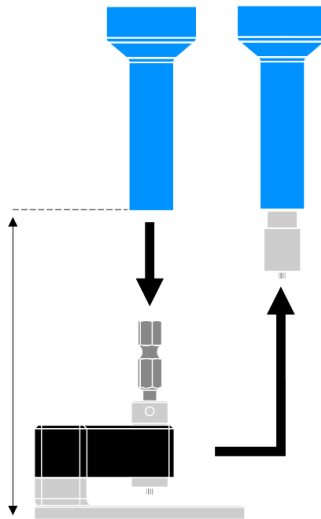


Figure 5- Picking bit operation

5.2 Placing the bit

When the operation of screwing with one size of screw is done, the tool and robot arm can be programmed to move to the predetermined automatic bit changers position and place the bit. Illustration of the process can be seen in Figure 6.

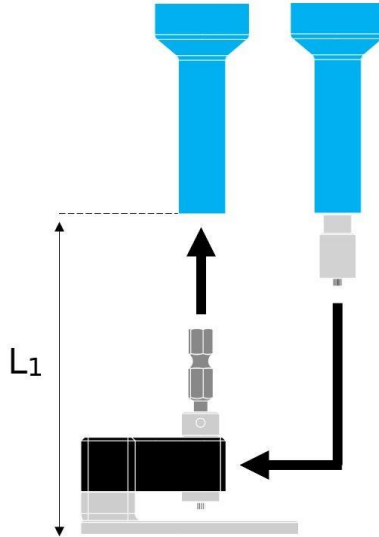


Figure 6 - Placing bit operation

The Automatic Bit Changing Station has three points – [A,B,C] intended for teaching a robot frame/work object. All dimensions and individual distances of the Automatic Bit Changing Station are given in Figure 8.

5.3 Software installation

Please refer to the user manual of Spin Robotics screwdrivers to learn how to use the Automatic bit changing station in your robot program together with Spin robotics screwdriver tools.

6 Mechanical specifications

Attached below in Figure 7 is the dimensions of the automatic bit changer.

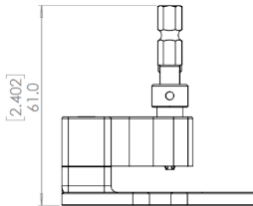


Figure 7 - Mechanical dimension - side view

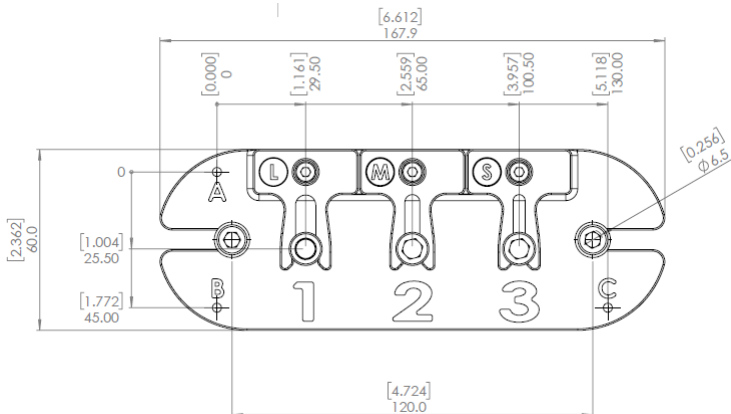


Figure 8: Mechanical dimension - top view

7 Safety

The information in this manual does not cover designing, constructing, and running a complete robot solution, nor does it cover other external equipment that can influence the safety of the complete robot system.

The complete robot system must be designed and installed in accordance with the safety requirements, set forth in the standards and regulations of the country where the robot and tool are installed. The robot integrator or user are responsible for that, including but not limited to:

- a. Performing a risk assessment for the complete robot system e.g., in accordance with ISO12100
- b. Interfacing other machines and additional safety devices if defined by the risk assessment
- c. Setting up appropriate safety settings in the robot software
- d. Ensuring that the user cannot unintentionally modify any safety measures
- e. Validating that the total robot system is designed and installed correctly
- f. Specifying instructions for use
- g. Marking the robot installation with relevant signs and contact information of the integrator
- h. Collecting all documentation in a technical file; including the risk assessment and this manual



Any safety information provided in this manual must not be construed as warranty, by Spin Robotics Aps that the robot application will not cause injury or damage, even if robot application complies with all safety instructions. Spin Robotics Aps disclaims all liability if any of Spin Robotics tools are damaged, changed or modified in any way. Spin Robotics Aps cannot be held responsible for any damages caused to any of Spin Robotics tools, the robot, any other equipment, or humans due to programming errors or malfunctioning of any of Spin Robotics tools.

7.1 Intended use

The Automatic Bit Changer is intended for use in conjunction with industrial and collaborative robots. It is intended to be use only in screwdriving and other fastening applications together with screwdriver tools from Spin Robotics Aps. The Any use or application deviation from intended use is deemed to be impermissible misuse. This includes, but not limited to:

- Use in medical and life critical applications
- Use before performing a risk assessment
- Use outside the permissible operation conditions and specifications

8 Product warranties

Without prejudice to any claim the user (customer) may have in relation to the dealer or retailer, the customer shall be granted a manufacturer's warranty under the conditions set out below:

If a problem occurs with products and the problem is caused by manufacturing defects in material and workmanship, Spin Robotics will, at its discretion replace the Products in accordance with the warranty terms and conditions in accordance with Spin Robotics' Product warranty ("Product Warranty"). The Products are covered under the Product Warranty for i) a period of 12 months after delivery, or ii) a period of 15 months from the date the Products are shipped EXW (Incoterms 2020) from Spin Robotics' principal place of business in Odense, Denmark, or such shipping place as designated by Spin Robotics. As far as applicable laws permit, the Warranty Period will not be extended or renewed due to subsequent exchange, resale, repair, or replacement of the products. Part(s) repaired or replaced during the Warranty Period will be warranted for: (a) the remainder of the original Warranty Period; or (b) 180 days from the date of repair or replacement, whichever is longer. Spin Robotics shall provide the necessary spare parts, while the customer (user) shall provide working hours to replace the spare parts, either replace the part with another part reflecting the current state of the art or repair the said part.

The Warranty does not apply to:



- a. Products subjected to abnormal use or environmental conditions, accident, mishandling, neglect, unauthorized alteration, misuse, tampering improper installation or repair, or improper storage.
- b. Damage resulting from or caused using any attachment, accessory, connection, extension, etc. attached to the Products.
- c. Failure due to customer design, installation, programing and operating the Products outside the guidelines of Spin Robotics.
- d. Products damaged by external conditions including, but not limited to, battery leakage, fire, water, or interruptions in electric power supply.
- e. Down time, work stoppage, business interruption, loss of revenues or loss of anticipated savings, and loss of or damage to or corruption of data, due to Products failure.
- f. Software.

Prior to shipping back, the product to Spin Robotics, the customer must get a Returned Material Authorization (RMA) from Spin Robotics. A Returned Material Authorization (RMA) form can be acquired by contacting the vendor which the tool has been purchased from. Under no circumstances whatsoever shall Spin Robotics be liable to any person, firm, or corporation for any special, indirect, or consequential damages, whether for breach of contract, negligence, misrepresentation or otherwise and whether resulting in lost profits, interest on money borrowed or invested, impairment of goods, work stoppage or otherwise, in any way arising out of the sale of any products or services by Spin Robotics to customer. The liability of Spin Robotics and the exclusive remedy of



customer for any defect or breach or for any action relating to the sale of any products or services by Spin Robotics to customer, whether based in contract, negligence, strict liability, tort, breach of warranty, or otherwise, is limited, at Spin Robotics' option, to repair or replacement of the defective goods or services or refund of the purchase price, therefore. The foregoing shall constitute the sole and exclusive liability of Spin Robotics and the sole and exclusive remedy of customer or anyone claiming on behalf of or through customer.

8.1 Disclaimer

Spin Robotics continues to improve reliability and performance of its products, and therefore reserves the right to upgrade the product without prior warning. Spin Robotics takes every care that the contents of this manual are precise and correct but takes no responsibility for any errors or missing information.

9 Certification

Declarations, certificates and applied standards are listed in this chapter.

Applied standards

Standards applied under development of the product is listed in this section. When an EU Directive number is noted in brackets it indicates that the standard is harmonized under that Directive.

ISO 12100:2010

EN ISO 12100:2010 (E) [2006/42/EC]

Safety of machinery – General principles for design – Risk assessment and risk reduction The product is evaluated according to the principles of these standards.

ISO 10218-2:2011

EN ISO 10218-2:2011(E) [2006/42/EC]

ANSI/RIA R15.06-2012 / CAN/CSA-Z434-14

Robots and robotic devices – Safety requirements for industrial robots Part 2: Robot systems and integration The product is prepared for compliance with robot system requirements defined in these standards.

ISO/TS 15066:2016

RIA TR R15.606

Robots and robotic devices – Safety requirements for industrial robots – Collaborative operation

This is a Technical Specification (TS), **not** a standard. The product is prepared for easy integration in compliance with provisions in this Technical Specification.



FUTURE OF ASSEMBLY

Our mission is to revolutionize screwdriving in assembly through a truly safe employee-robot collaboration.

We aim to close the gap between humans and robots in assembly lines by introducing innovative and smart collaborative tools that improve working conditions among employees while at the same time increase assembly quality and output.

With our tools, we provide benefits for both employees and manufacturers.

Let's work together on the future of assembly!



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