NORDBO ROBOTICS

PATENTED

NFS Flexible Spindle Mount

User Manual

Ver. 1.5

Nordbo Robotics A/S
Noatunvej 2
5000 Odense Denmark

info@nordbo-robotics.com
+45 81 81 98 81

NORDBO ROBOTICS

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Warranty

Warranty void if products are opened. The warranty further excludes failure resulting from improper use or installation, normal wear and tear, abuse, accidents, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond Nordbo's control.

Contact

Nordbo Robotics A/S
Noatunvej 2
5000 Odense, Denmark

Phone: +45 81 81 98 81
Mail: info@nordbo-robotics.com

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1. Introduction

1.1. Intended use

The NFS flexible spindle mount is to be used only for the fixation of spindles matching the requirements of the specific models. The product is intended to be fixated either on a table or on a robot. The product must be used with protective equipment in accordance with the Machinery Directive. The manual must be read thoroughly, and a risk assessment of the complete application must be performed before installing and making use of the product.

1.2. Prerequisites

The person executing the instructions of this manual must have basic knowledge and skills related to the use of a spindle and have knowledge of the risks of working with spindles and industrial equipment.

1.3. Safety Warnings

Following instructions must be read thoroughly by anyone intending to use this product.

Warning! This symbol indicates that potentially hazardous, dangerous, or unwanted situations can arise from not following the instructions correctly. If safety instructions are not followed properly it may result in death, personnel injury, or equipment damage.

The user must read and understand the installation guide and potential safety precautions related to the use of the spindle before use. If installing the product on a robot, the robot must by **powered off** before attempting to attach the spindle mount to the robot. Likewise, the spindle must always be **powered off** before attempting to connect it to the flexible spindle mount.

The product may be damaged if dropped on hard surfaces. Be aware that bolts can be damaged or made not usable if the user overtightens the bolts or uses the wrong tool to tighten the bolts. Nordbo Robotics is not liable for any damage or injury resulting from misuse.

Read and understand the manual accompanied by the spindle before installing it into the mount.

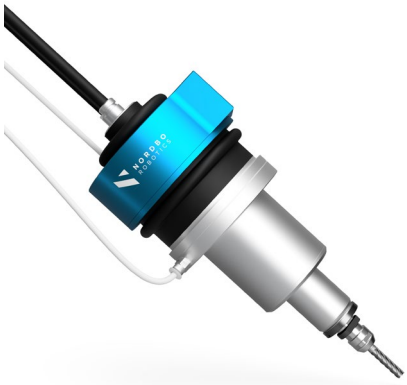
2. Product information

2.1. Product overview

The patented NFS is a robust flexible spindle mount for demanding applications. The product is well suited in applications such as deburring and flash removal but can be used in a variety of applications. The pneumatically controlled force compensation allows the spindle to overcome challenges related to tolerances and surface irregularities. By supplying a constant air pressure to the spindle, the Flexible Spindle Mount enables consistent quality when automating the deburring of inconsistent parts.

NFS-D30/D40

NFS-D30/D40-AQC



NFS-D80

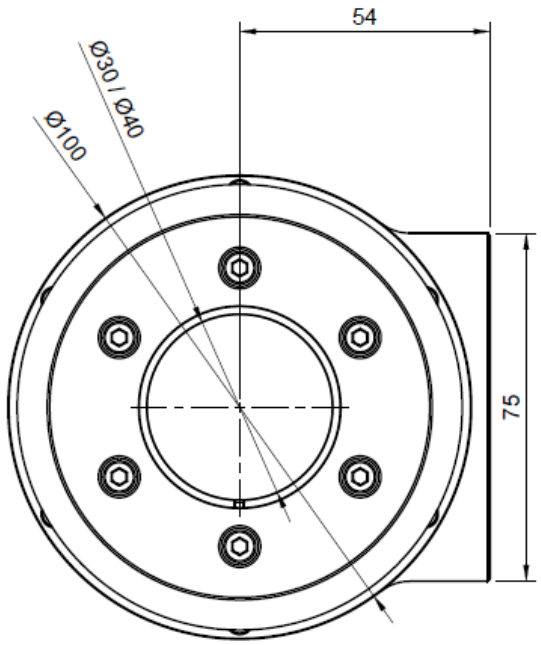
2.2. Technical specifications

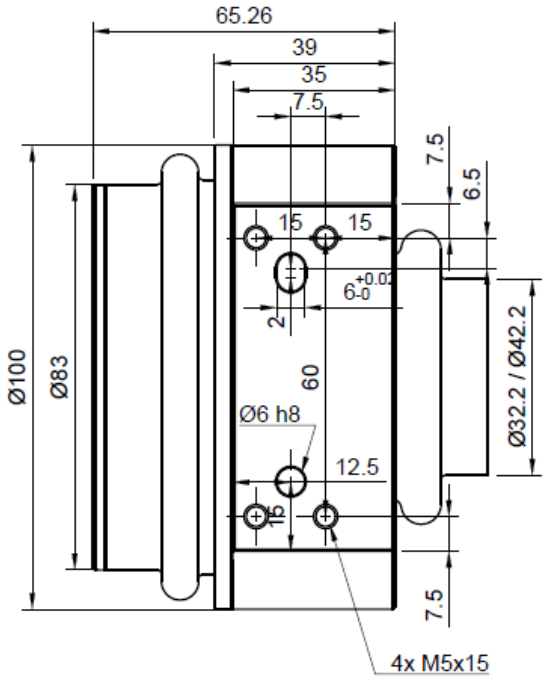


Model	NFS-D30 NFS-D30-AQC	NFS-D40 NFS-D40-AQC	NFS-D80
Diameter Spindle (Ø)	30 mm	40 mm	80 mm
Outer Diameter	100 mm	100 mm	145 mm
Weight	1172 g	1111 g	3200 g
Max. Tilt (x,y)	5°	5°	3°
Move (at max. tilt angle)	360°	360°	360°
Contraction (z)	5 mm	5 mm	5 mm
Mounting Holes*	4x M5	4x M5	8x M5
Air Connection - hose (Ø)	6 mm	6mm	6 mm
Max. Air Pressure	0,7MPa	0,7MPa	0,7 MPa
AQC Mount	4x M5	4x M6	N/A

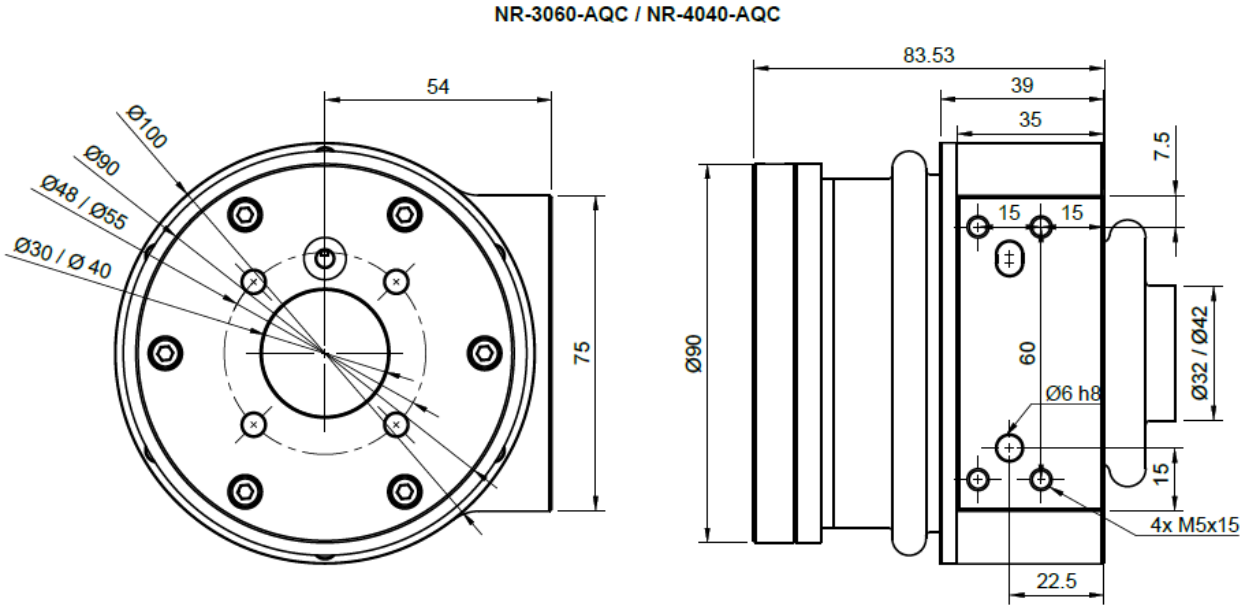
*For mounting the spindle on a flat surface. See Section 2.3. Mechanical specifications.

2.3. Mechanical specifications NFS-D30/D40

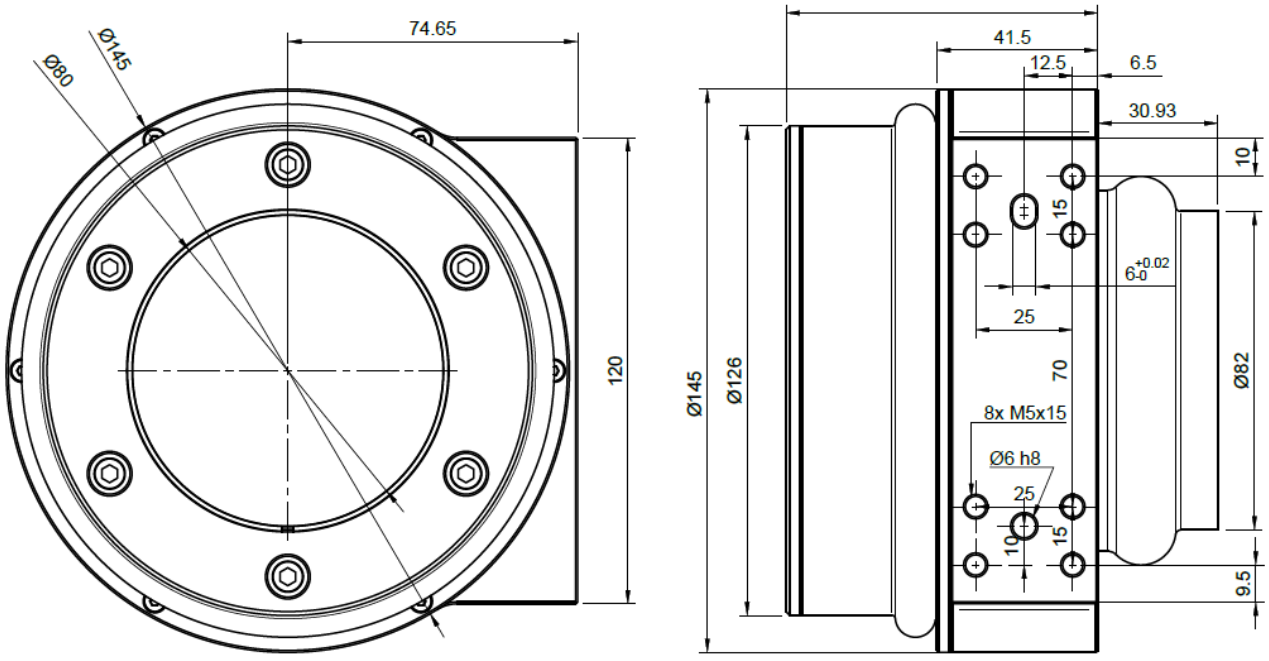




2.4. Mechanical specifications NFS-D30-AQC, NFS-D40-AQC



2.5. Mechanical specifications NFS-D80



3. Installation

The Flexible Spindle Mount is delivered fully assembled without air filters, air regulators and interface plates which are sold separately. These additional items must be obtained before installing the product. The following section describes the procedure for installing a spindle in the mount.

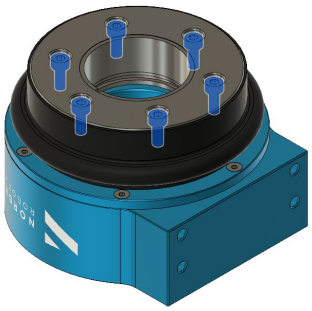
3.1. Installation of the flexible spindle mount

The flexible spindle mount is mounted at the base of the product. If no mounting plate is purchased, a mounting plate will need to be developed by the system integrator or by the owner/user of the product.

Warning! The user verify that the robot is disconnected and moving parts must be fixated during this step. Unintended movement may cause harm to equipment and/or personnel.

3.2. NFS-D30/D40/D80: How to mount the spindle

To mount the spindle in the NFS the user will need a 3 mm hex key to tighten the bolts on the top of the product to clamp the spindle in the holder.

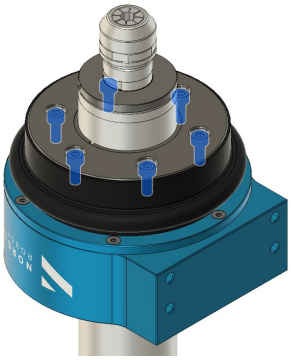


Step 1

Loosen the 6 bolts placed around the endplate.

Step 2

Insert the spindle in the middle of the product until spindle reaches the desired height. Control that the rubber covers the spindle in both ends.



Step 3

When the right position is obtained, cross-tighten all clamping bolts with a torque of 7 Nm**.**

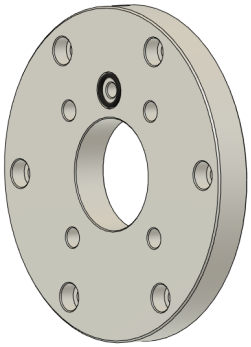
Step 4

Push and pull the spindle in the mount to ensure that it is not moving. If the spindle moves, tighten all bolts again and repeat the action.

3.3. NFS-D30/D40-AQC: How to mount the spindle

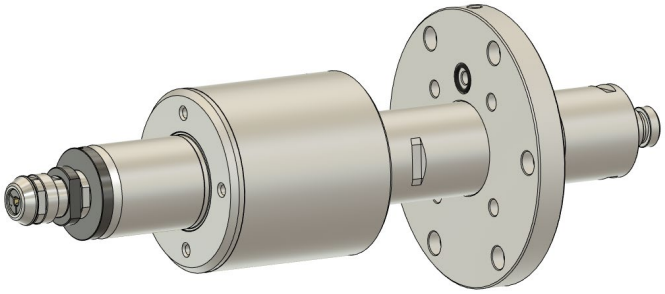
Step 1

Assemble the spindle according to the manual provided by your spindle supplier.



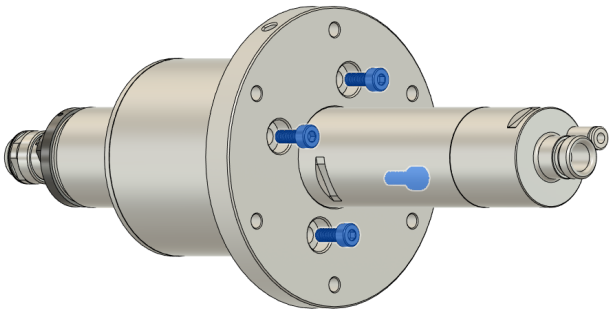
Step 2

Place the sealing ring in the countersunk hole as displayed.



Step 3

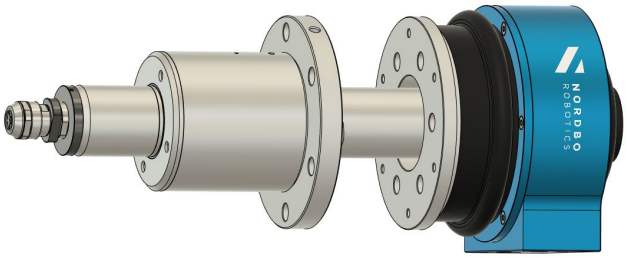
Insert the spindle such that the air connector aligns with the sealing ring.



Step 4

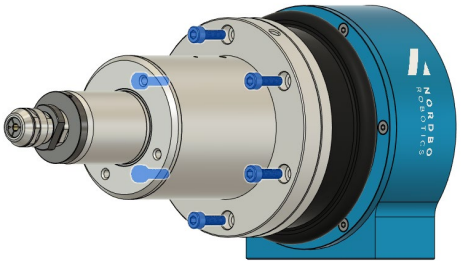
<u>NR 3060 AQC:</u>
Use 4 pcs. M5-10 mm bolts to mount the connecter plate on the spindle.

<u>NR 4040 AQC:</u>
Use 4 pcs. M6-10 mm bolts to mount the connector plate on the spindle.



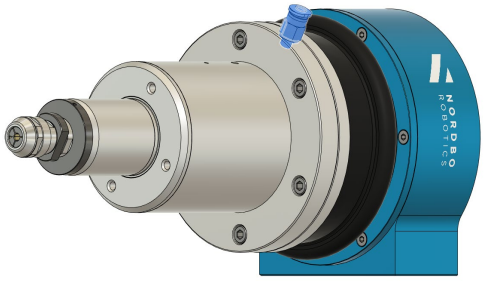
Step 5

Insert the spindle into the flexible spindle mount and align the hole patterns of the two plates.



Step 6

Use 6 pcs. M4-15 mm bolts to clamp the two plates together.



Step 7

Mount the pneumatic fitting on the plate and connect the hose.

Note: This air inlet is used for tool changing.

3.4. How to connect air supply

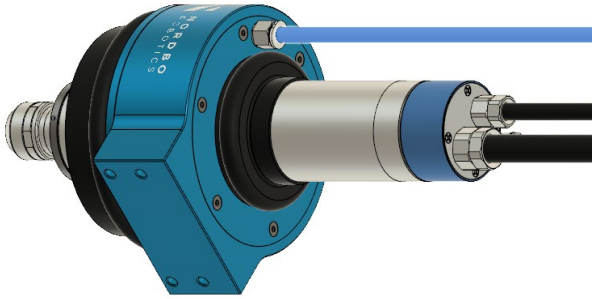
To connect the air supply to the flexible spindle mount, the user will need an air regulator, an air filter and a 6 mm rubber hose. The air regulator and air filter can be separate or combined units.

Warning! The spindle must be disconnected from any electric/air supply during the next steps.

Step 1

To regulate the air pressure, the flexible spindle mount needs to be connected to an air supply through an air-regulator with a built-in filter. Connect a 6 mm tube to the air-regulator.

Obs.! If the air regulator does not have a built-in filter, then a filter must be added between the air regulator and the spindle mount to supply clean air.



Step 2

Connect the air supply to the flexible spindle mount by inserting a 6 mm air hose to the pneumatic push-in fitting.

Note: This air inlet is used to adjust the spindles floating force (See section 3.5).

3.5. Force adjustment by regulating the air supply

To regulate the floating force the user will need to adjust the air pressure accordingly.

Step 1

Connect a hose with clean air from the air filter to the flexible spindle mount.

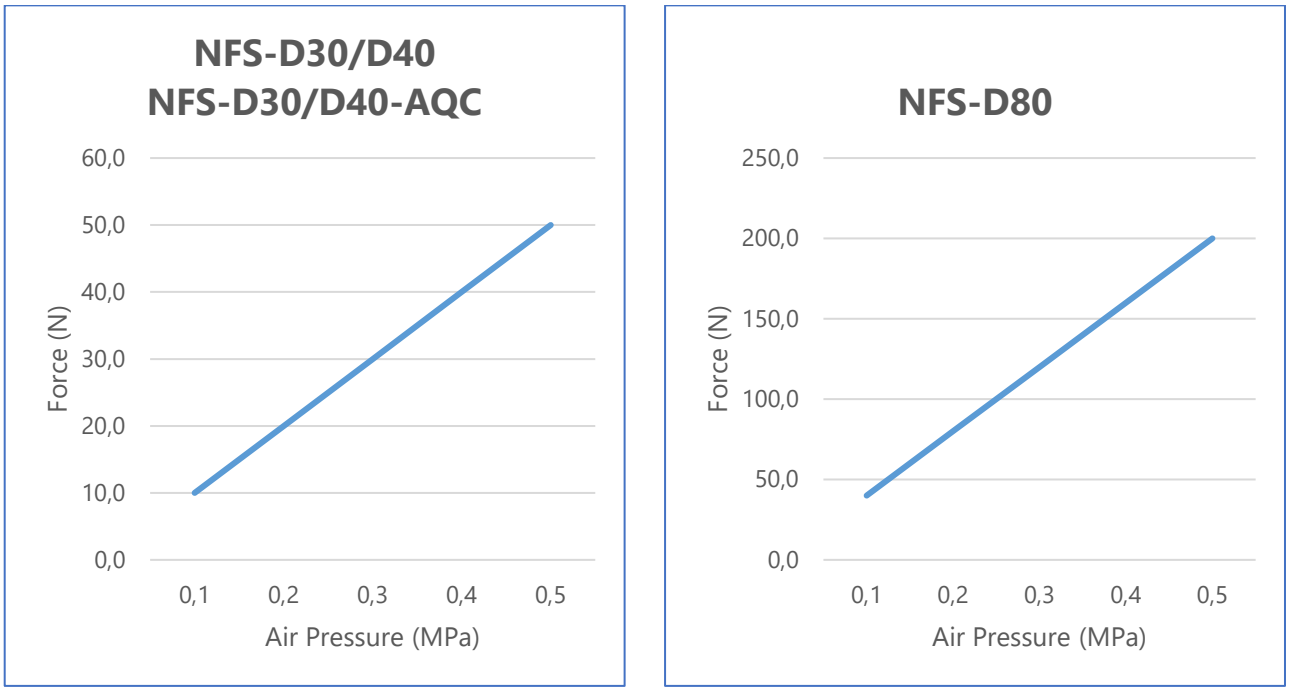
Step 2

Use the air regulator to regulate the air pressure and obtain the desired floating force. Use the graphs to define the required air pressure for a given application.

Step 3 (optional)

If an automatic floating force regulation is desired, it can be achieved with an electropneumatic regulator.

Figure 2. Floating forces based on air pressure



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