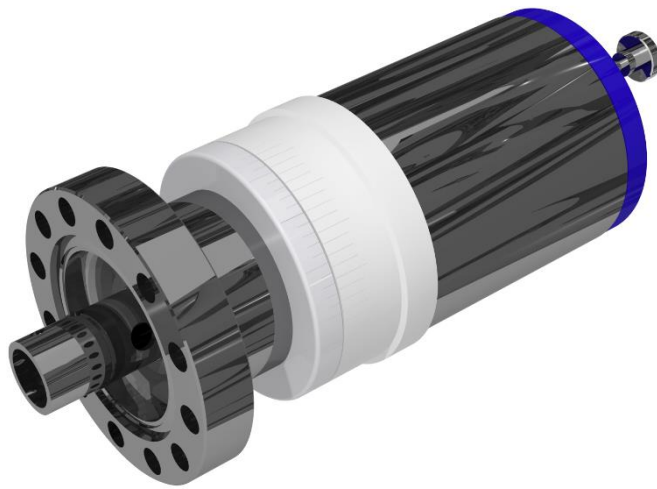


FERROVAC

ULTRA HIGH VACUUM TECHNOLOGY

Rotary Feedthrough DN40CF



Operating Instructions

Version [1.0]

[August, 2022]

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**Important!**

It is the sole responsibility of all users to carefully read the operating instructions and keep them safe. Read and follow all safety instructions carefully before using the product described in this document. Ferrovac declines any and all responsibility and liability for any damage/injuries resulting from incorrect use/adjusting/controlling or programming of the product.

Warranty for defects

The Purchaser shall have the obligation to inspect the Products upon their delivery. This inspection shall occur in a manner which allows the Purchaser to identify apparent defects (offensichtliche Mängel) of the Products. Following the inspection, the Purchaser shall promptly notify Ferrovac AG of any apparent defects found. Such inspection and notification shall occur within a reasonable time from delivery of the Products and in any case within 4 days from delivery. Ferrovac AG shall have no obligation to correct any apparent defects that have not been notified to Ferrovac AG within the aforementioned period.

Should (i) an apparent defect (provided that such apparent defect has been properly notified to Ferrovac AG) or (ii) a hidden defect (versteckter Mangel) arise within the warranty period, then the Purchaser shall have the right to request that Ferrovac AG corrects such defects. Such correction may be effected, at Ferrovac AG sole discretion, by repairing the relevant Products or by delivering replacement Products. Should Ferrovac AG choose to repair the Products, the Purchaser shall organize the transportation of the Products to Ferrovac AG in accordance with clause "Duties of the Purchaser in Connection with returning Products to Ferrovac AG" of these Terms and Conditions. Any reasonable costs incurred in connection with such transportation shall be borne by Ferrovac AG. These costs must be quantified and confirmed in advance by Ferrovac AG.

The Purchaser shall under no circumstances have a right to reduce the price of the Products or to cancel this Agreement as a result of such defects. The warranty set out in this clause as well as the liability according to clause "Liability" shall be excluded if a defect is due to (i) a usage of the Products outside of or contrary to the proper usage described in the Product Documentation (in particular the usage outside of the operating conditions set out in the Product Documentation), (ii) unauthorized modification of the Products or (iii) unauthorized maintenance of the Products.

Any further warranty is excluded.

Liability

If the Purchaser suffers damages caused by defective Products or by any action of Ferrovac AG personnel when fulfilling this or related Agreements, Ferrovac AG shall be liable for those damages according to this clause "Warranty for defects", unless Ferrovac AG can prove that Ferrovac AG or its personnel did not act negligently when causing the damages. The liability for damages to the property of the Purchaser is limited to the amount equivalent to the purchase price agreed upon in the Agreement.

Any further liability of Ferrovac AG, including in particular any liability for indirect damages (including losses, lost profits, savings that could not be realized, claims of third parties, costs that result from the non-availability of the Products and expenditures of the Purchaser), is entirely excluded. Duties of the Purchaser in Connection with returning Products to Ferrovac AG The Purchaser shall ensure that the Products are packaged properly when shipping any Products to Ferrovac AG for whatever reason. The Purchaser shall further ensure that the shipment is adequately insured. The Purchaser is fully liable for all import and export formalities of the purchasers country. Unless this Agreement expressly provides otherwise, all costs associated with the shipment of the Products from the Purchaser to Ferrovac AG shall be borne by the Purchaser. Any damages to the Products which occur due to the improper packaging of the Products when sending Products to Ferrovac AG, including all associated costs, shall entirely be borne by the Purchaser.

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1. General Information

This manual covers all important information about installation, commissioning and operation of your RF40. It also provides essential safety information, maintenance- and fault finding procedures.

The product described was manufactured in accordance with the applicable national standards and guidelines. The information in this document represents the state of the product at the date of print. Technical changes may be made without notice. Ferrovac makes no warranties or representations with respect to accuracy or completeness of the contents of this publication. Figures and photos are not binding. The product names used are for identification purposes and may be trademarks of their respective companies.

1.1. Designated Use

The product described in this document may only be used for its designated application. Designated use of the product is defined by the following rules:

The product is:

- Used with original cable sets supplied by Ferrovac which are explicitly specified for the use with the product described in this publication.
- Used in an indoor research laboratory environment or an industrial production or processing facility.
- Operated by personnel qualified for operation of delicate scientific equipment.
- Used in accordance with all related manuals.



Important!









Carefully read all safety instructions and relevant manuals before using the product and any related equipment!

1.2. Non Designated Use

Non-designated use is defined if any of the following are true:

- The product is used with other equipment not explicitly acknowledged by Ferrovac in writing.
- The product is used outdoors or at ambient conditions exceeding the values given in the product specification.
- The product is used by non-qualified persons.
- Operation of the product in disregard of the safety instructions.
- Operation of the product with disabled, modified, removed or damaged safety equipment and devices.

2. Terms and Symbols

Symbol	Term	Meaning
	Danger!	Risk of mortal danger when not observed
	Warning!	Risk of severe injury or danger to life when not observed
	Caution!	Slight risk of injury or damage to product when not observed
	High voltage!	Potentially lethal voltages are present
	Caution, hot surface!	Potential burn hazard if safety precautions are not followed
	Cryogenic Substances!	Potential cold burn hazard if safety precautions are not followed
	Important!	Important information for proper operation of the product
	Info, hint!	Useful hints, tips and clues

3. General Safety Information

Read the safety instructions very carefully. All safety precautions must be strictly observed at all times while using the product described in this manual and any associated instrumentation.

Study this document to learn how to operate your product correctly. Keep this instruction manual in a safe place close to the described product and inform all other users of the manual's location. Always include this manual when handing the product over to third party persons.

Responsible body is the individual or group of persons that are responsible for the proper use and maintenance of the product, ensuring that the product is operated within its specifications and operating limits. The responsible body must ensure that users of the product are adequately trained.

Operators use the product for its intended purpose. Users must be trained in electrical safety and adequate use of the instrument. They must be protected from electric shock and other potentially dangerous situations.

Maintenance Personnel perform routine tasks on the product to keep it in proper operating conditions, i.e. setting up the line voltage or replacing consumables. Maintenance procedures described in this manual must be followed.

Service Personnel are trained to work on live circuits as well as perform fault finding measurements and repair work to the product. Only fully trained service personnel qualified to handle potentially lethal voltages may perform servicing and repair.

Shock hazard: The American National Standards Institute states that a shock hazard exists when voltage levels are greater than 30 V RMS, 42.2 V peak or 60 VDC. A good safety practice is to assume that hazardous voltages are present in any unknown circuitry.



Warning!

Always check for correct mains voltage before connecting any equipment!
Mains supply voltage fluctuation must not exceed $\pm 10\%$ of the nominal voltage.



Warning!

- Always observe and strictly follow the safety notes and regulations given in this document
- Always use the originally delivered cables with the product for all electrical connections.
- Always switch off the device before disconnecting cables.
- Never operate the device outside its dedicated environment.
- DO NOT OPEN the device unless you fulfill the requirements of a fully trained service personnel and you are familiar with live circuits and potentially lethal voltages.



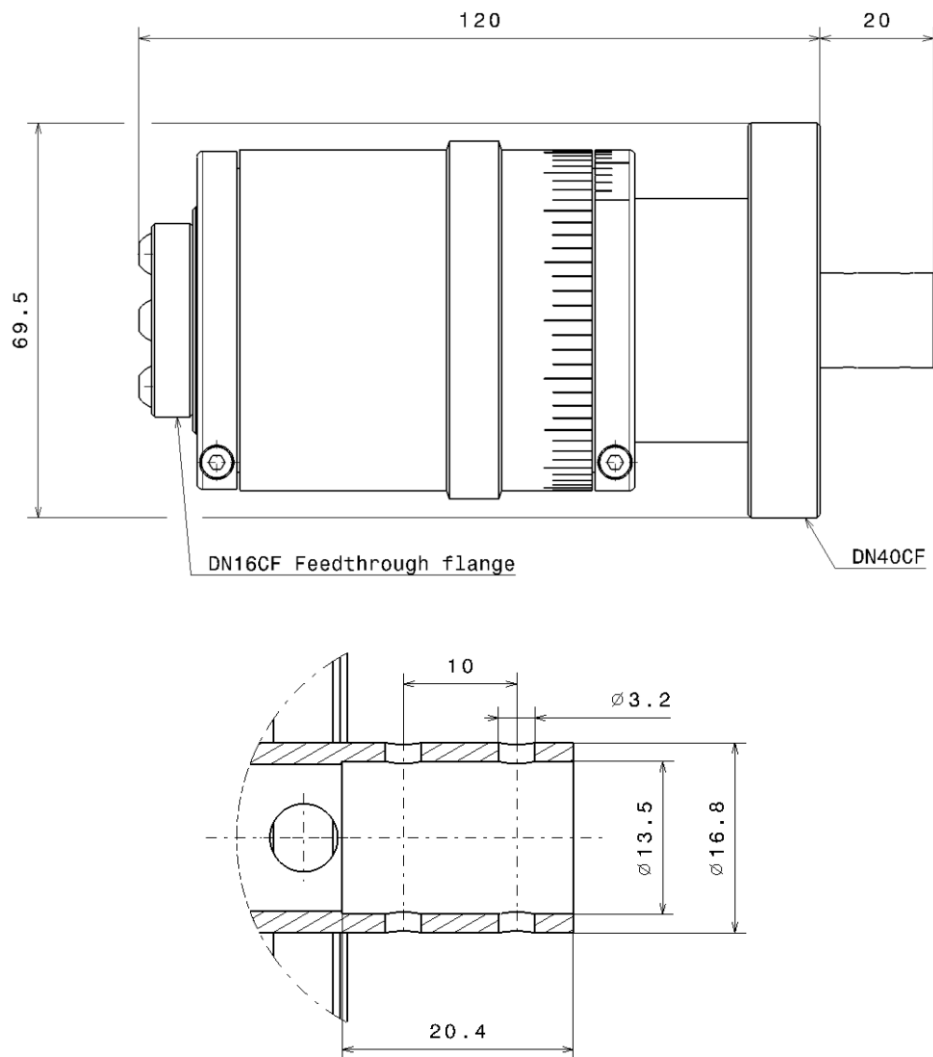
Important! Ambient conditions and environment:

This product is only to be used indoors, in locations meeting the following requirements:

- Room temperature lies between 5°C/41°F and 40°C/104°F
- Humidity up to maximum of 80%
- Altitudes up to 2000m
- Pollution Degree 2 environments

4. About

4.1 Dimensions



4.2 Specifications

- Maximum torque: 10 Nm
- Maximum axial load: 500 N
- Maximum radial load: 300 N
- Scale accuracy: $\pm 0.5^\circ$



Caution!

The specification may change if upgrades or accessories are mounted to the main product.

5. Unpacking and Installation

Before unpacking, optically inspect the parcel. If any damage is found, take pictures of the parcel and send them to Ferrovac immediately. Compare content with the delivery note. Any damage or missing items must be reported to Ferrovac **within one week of delivery**.



Caution!

- Ensure enough workspace on a clean table for unpacking and inspection
- Some Ferrovac products are shipped under UHV! Sudden uncontrolled venting can cause damage to pumps and valves
- Read manuals carefully before using any device
- Never expose any component of the product/system to physical shock or aggressive chemicals
- CF-Flange knife edges and edge-welded bellows are particularly vulnerable, any damage to these parts may result in a complete failure of the vacuum integrity

5.1 Product Specific Unpacking and Installation Instructions



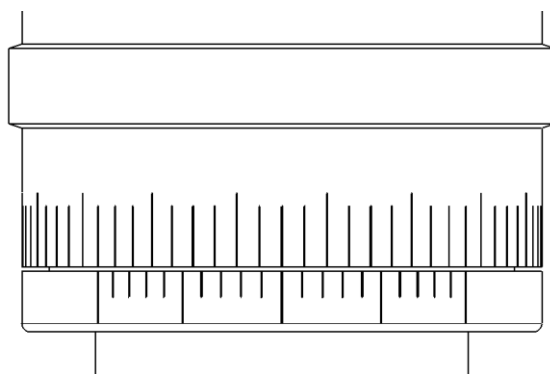
Caution!

This product is designed for use in a UHV environment and therefore is cleaned to UHV standards.

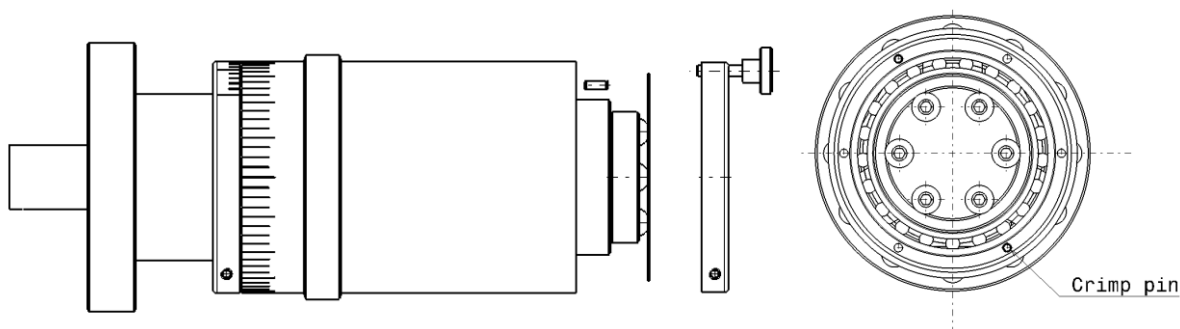
- Never touch the product with bare hands or unclean gloves.
- Only place the product on adequately clean surfaces and only use clean tools to work on the product.
- Do not leave the product out of a vacuum environment unprotected for a prolonged period of time.

6. Operation

The standard version of the rotary feedthrough is turned by hand. A knurled locking screw can be used to fix the position in place. The outer rotating body is equipped with a vernier scale. The scale ring can be zeroed by holding the rotating body and turning the knurled ring to match with the vernier ring. The vernier ring allows accuracy to the nearest 0.5°.



A rotation limit can be set using crimped pins in the back of the magnetic coupling. The angle can be set by Ferrovac during assembly, but can also be changed by a customer should they wish to. To change the angle limit, remove the rear blue ring from the rotary feedthrough, and move the crimp pin to the required limit. The possible limit settings are 50°, 110°, 170°, 230°, 290°, and 350°. For endless rotation, the pins can be removed entirely, or the knurled lock screw can be turned out of the blue ring far enough to allow a pin to pass by.



7. Options and Upgrades

The rotary feedthrough can be upgraded with motorization, including options for an encoder.

The rotary feedthrough hollow-shaft can be used in conjunction with a CF16 electrical feedthrough or CF16 manipulator such as the MD16 for additional linear/rotary motion.