

FERROVAC GMBH

ULTRA HIGH VACUUM TECHNOLOGY

DRVRMDMOTL

Motorized Linear Drive

DRVMDMOTLR

Motorized Linear and Rotary Drive

Instruction Manual

Version 1.2

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Warranty

Ferrovac GmbH warrants this product to be free of defects in material and workmanship for a period of 12 months from the date of shipment.

In case of proof of any defective parts in the product, we will at our option, either repair the product or replace it.

Warranty Limitations

The warranty for this product does not apply to defects resulting from the following:

- non-observance of operational- and safety instructions
- natural wear of components
- modifications to our products without our written consent
- misuse of any product or part of the product

This warranty stands in place of all other warranties, implied or expressed, including any warranty of merchantability implied or fitness for a particular use. The remedies provided herein are buyer's sole and exclusive remedies.

Neither the company Ferrovac GmbH nor any of its employees shall be liable for any direct, indirect, incidental, consequential or special damages arising out of the use of its products, even if the company Ferrovac GmbH has been advised in advance of the possibility of such damages. Such excluded damages shall include but are not limited to: Costs of removal and installation, losses sustained as the result of injury to any person, or damage to property.

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Terms and Symbols

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



A triangle with explanation mark indicates a passage in the manual with information that is crucial for the operator. **READ THESE PARAGRAPHS CAREFULLY** or the product might be damaged by misuse.

CAUTION! The CAUTION heading in a manual explains hazardous situations that could damage the product. Such damage may invalidate warranty.

Normal Use

The product described in this manual must always be used:

- With original accessories supplied by Ferrovac which are explicitly specified for the use with the product described in this publication.
- In an indoor research laboratory environment.
- By personnel qualified for operation of delicate scientific equipment.
- In accordance with this and all related manuals.



CAREFULLY READ THE SAFETY INFORMATION AND ALL RELEVANT MANUALS BEFORE USING THE PRODUCT AND ANY RELATED INSTRUMENTATION!

1. Introduction

1.1. *DRVMDMOTL*

Motorized linear and manual rotary drives are designed to operate linear/rotary feedthroughs and optionally attached sample holding mechanisms. The retrofittable DRVMDMOTL linear drive is compatible with MD40 and MD16 feedthroughs. For these sample feedthroughs, a variety of Ferrovac sample receivers and carriers are available. The motorized linear drive still allows for manual rotation of the shaft for fine rotation of your sample holder or to sensitively trigger a mechanism. Rotation can be locked using a thumbscrew.

1.2. *DRVMDMOTLR*

Motorized linear and rotary drives are designed to operate linear/rotary feedthroughs and optionally attached sample holding mechanisms. The retrofittable DRVMDMOTLR linear and rotary drive is compatible with MD40 and MD16 feedthroughs. For these sample feedthroughs, a variety of Ferrovac sample receivers and carriers are available. Single rotation and linear movement is completely motorized. Thus triggering of a mechanism or rotation of your sample carrier is easily done from your workstation.

2. Unpacking and Inspection

Assembled motorized feedthroughs are shipped clean and ready to use in UHV. Prepare a sufficiently clean workspace and wear surgical gloves when unpacking and inspecting the device. Check for any visible damage of the package, manipulator and accessories. Compare the contents of the package with the delivery note. Any damage or missing items must be reported to Ferrovac **within 48 hours after delivery**.

CAUTION!

- **Always** use powder-free examination gloves during unpacking to avoid contamination.
- **Please** ensure enough working space for unpacking and inspection.
- **Please** clean the working table/surface and cover it with Aluminium foil or household foil.
- **Never** hit the knife edge nor the bellows.
- **Never** expose the motorization and feedthrough to physical shocks (**brittle magnets!!!**).
- **Never** bend the tube nor the shaft.

3. Overview

The main purpose of MD40 and MD16 feedthrough with motorization is to transfer samples over short and inter-mediate distances. For example: It is perfectly suitable for sample transfer from a load lock into the main chamber. Single shaft linear/rotary feedthroughs can serve for carrying a movable sample storage platform or a stack of receptacles. If used with a port aligner and one of our key adapters, they may also be used to tighten a screw or engage a sample locking mechanism at a specific position...and all this can be done fully automated.

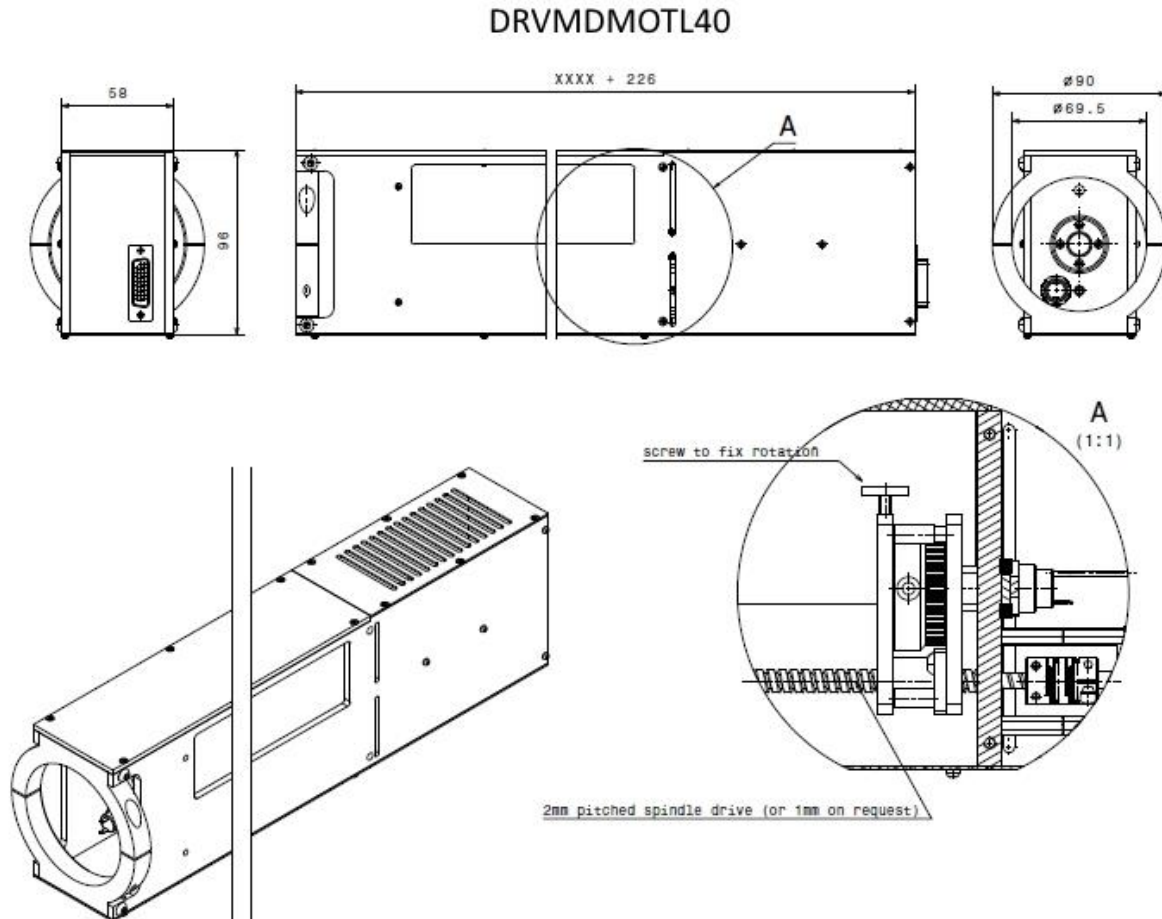


Fig. 1: Linear Motorization DRVMDMOTL40 for MD40-XXXX-YYYY Feedthrough

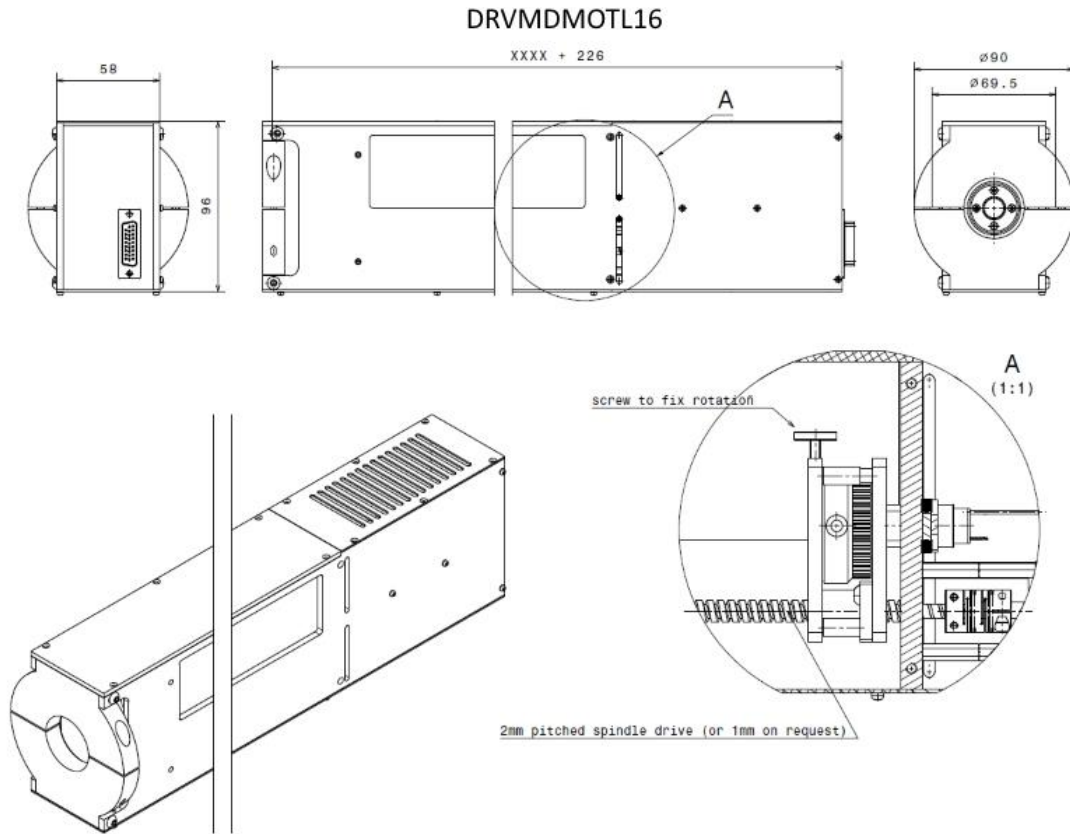


Fig. 2: Linear Motorization DRVMDMOTL16 for MD16-XXXX-YYYY Feedthrough

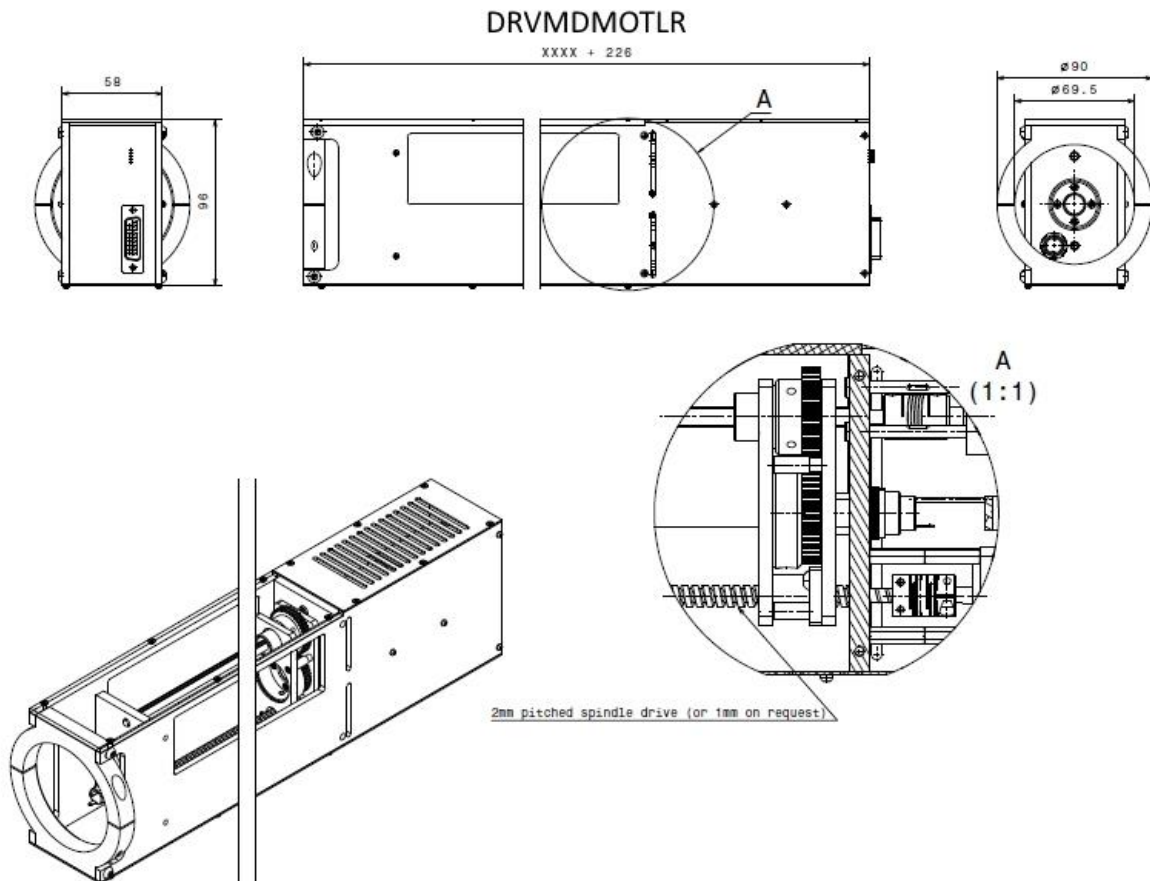


Fig. 3: Linear And Rotary Motorization DRVMDMOTLR40 for MD40-XXXX-YYYY Feedthrough

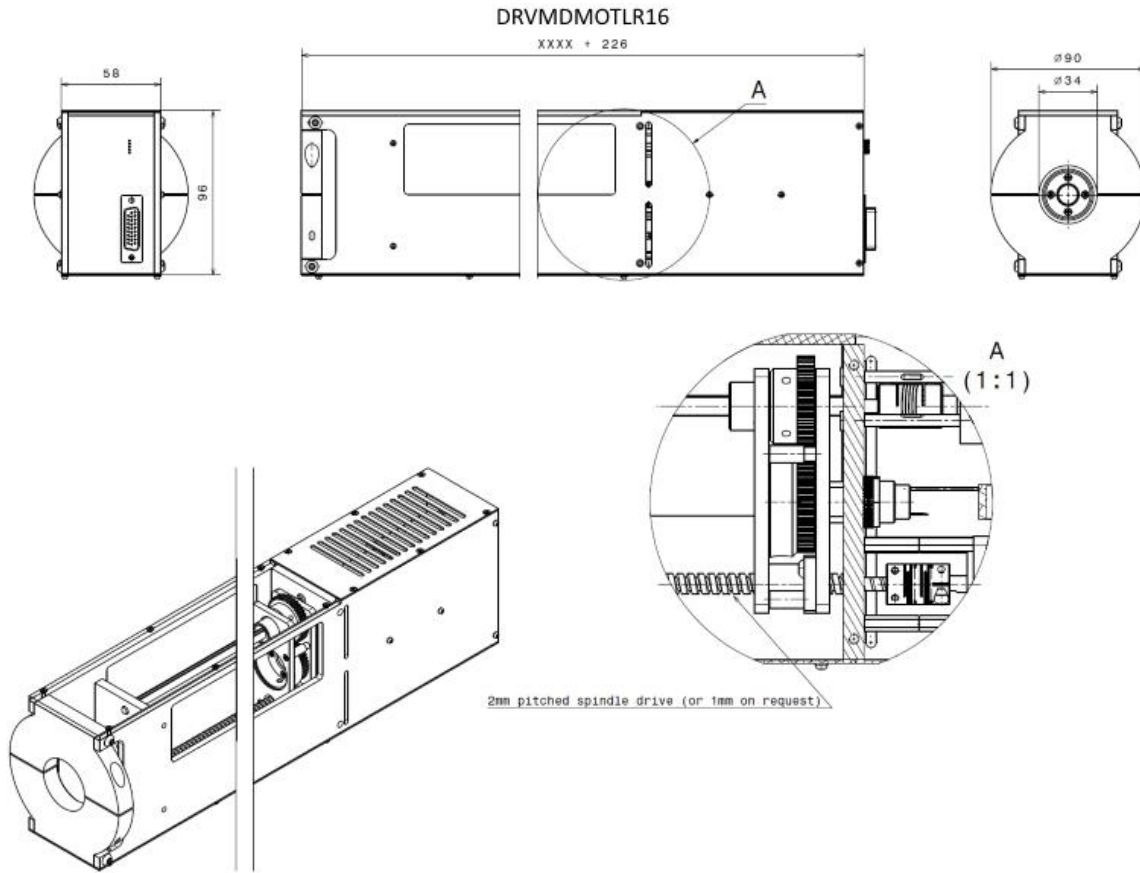


Fig. 4: Linear And Rotary Motorization DRVMDMOTLR16 for MD16-XXXX-YYYY Feedthrough

3.1. Nomenclature

The main parts of the linear motorization DRVRMOTL are named as follows:

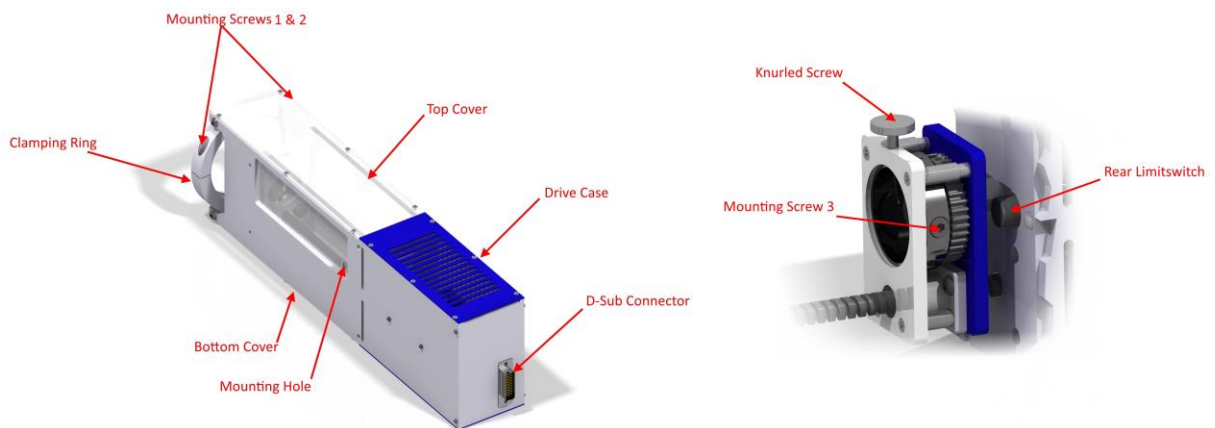


Fig. 5: DRVMDMOTL Nomenclature

The main parts of linear and rotary motorization DRVMDMOTLR are named as follows:

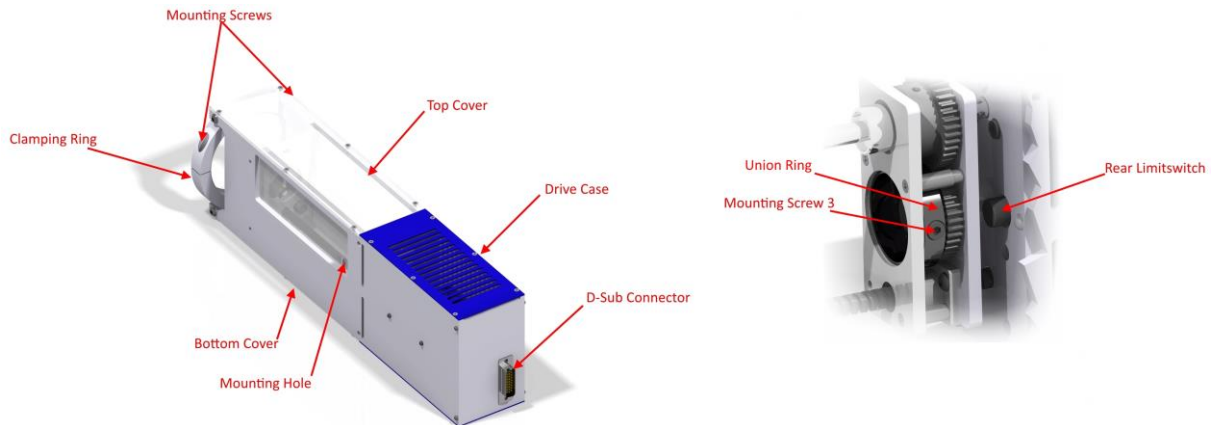


Fig. 6: DRVMDMOTLR Nomenclature

3.2. Handling Of the Limit Switches

3.2.1. Front Limit Switch

All motorizations for Ferrovac linear/rotary have a fixed front and rear limit switch, which defines your max. extended/reduced length of the sample transporter.

The front limit switch of all feedthrough motorizations (DRVMDMOTL, DRVMDMOTLR) is connected to pins 17 and 25 on the 26P D-Sub connector.

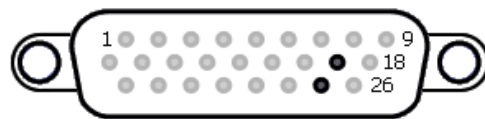


Fig. 7; Front Limit Switch

This switch is normally closed wired and opened by the switch action (position is reached).

3.2.2. Rear Limit Switch

You find the rear limit switch at the rear end of the motorization (directly near the spindle unit). The position of it is not adjustable.

The rear limit switch of all feedthroughs motorizations (DRVMDMOTL, DRVMDMOTLR) is connected to pins 7 and 8 on the 26P D-Sub connector.

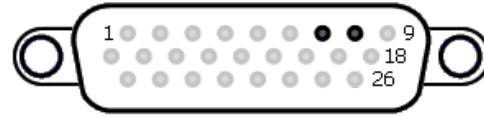


Fig. 8: Rear Limit Switch

This switch is normally closed wired and opened by the switch action (position is reached).



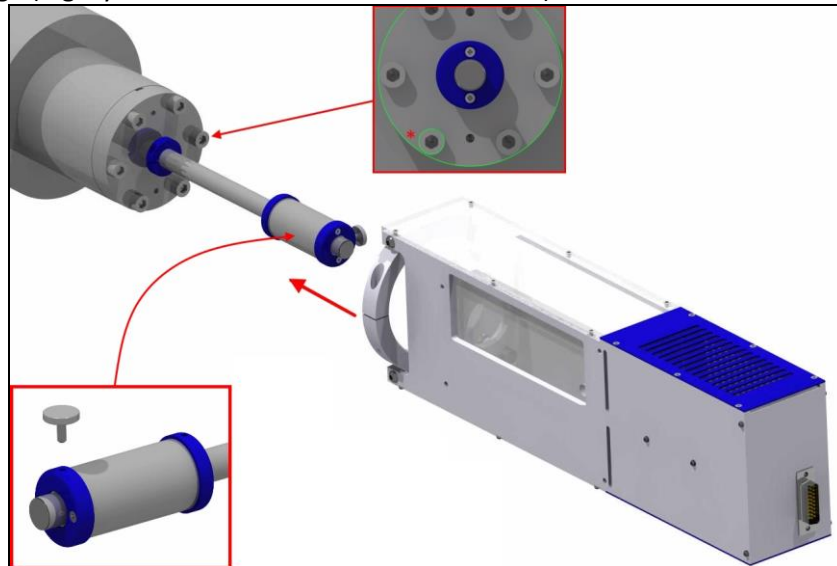
CAUTION: Risk of squashing/crushing!
Never touch the motorized sample transporter during movement!

4. Setup and Installation

4.1. Mounting

In delicate situations, the mounting procedure exposes the feedthrough and the motorization to the risk of being damaged. Please follow the warning notes and the illustrated instructions.

1. Mount the feedthrough on you chamber.
 - * Select the screws for your flange so that the screw heads do not reach over the flange edge (e.g. cylinder head screws without washers)

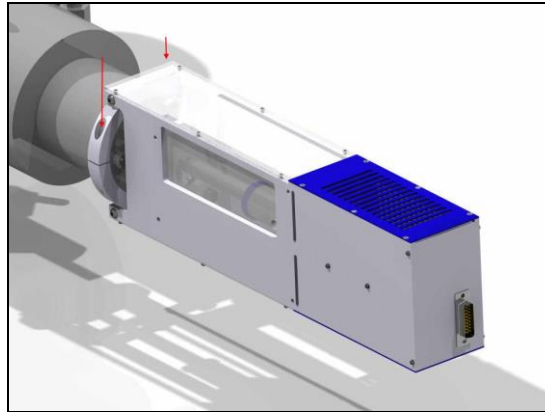


Remove the knurled screw of your MD40/MD16 feedthrough.

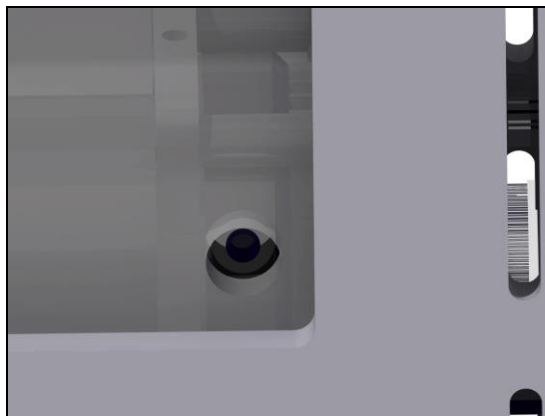
CAUTION!

- **Always** use powder-free examination gloves during mounting to avoid contamination.
- **Never** expose the Sample Transporter to physical shocks (**brittle magnets!!!**).
- **Never** bend the tube nor the shaft.
- **Never** hit the knife edge.

2. Before you slide the DRVMDMOTL(R) on open up the "mounting screw 1 & 2". You may also need to loosen the four screws holding the clamp.
3. Now slide it carefully over the feedthrough flange. Pay attention that you never bend the tube! Fasten the "mounting screw 1 & 2" after positioning the motorization.



4. Align the thread of the magnetic coupling, where the knurled screw was, with the hole of the "union ring"



On both sides of the motorization you find a mounting hole in the PMMA "Top Cover". Through this hole you can fasten the "mounting screw 3".

4.2. RGB LED's

The feedthrough motorizations have **two** integrated RGB LED's, which the customer can individually use for status indication.

Parameter per LED [at 25°C]	Hyper Red	Blue	Green	Units
Power dissipation	75	120	102.5	mW
DC Forward Current	30	30	25	mA
Peak Forward Current 0.1ms	185	150	150	mA
Reverse Voltage	5			V

D-Sub Pin	Function
6	RED
15	GND
16	Green
24	BLUE

The two LED's are connected in parallel.

4.3. Bakeout

The motorization is not bakeable! Follow these steps to remove it:

1. Remove the "mounting screw 3".
2. Loosen the "mounting screw 1 & 2"
3. Pull off the complete motorization carefully, allong the axis of the feedthrough.

CAUTION!

- **Never** expose the feedthrough to physical shocks (**brittle magnets!!!**).
- **Never** bend the tube nor the shaft.

All UHV feedthroughs (including the MD40 & MD16), **without motorization**, are bakeable up to 150°C. Do not remove the magnetic coupling for the bakeout procedure.

In order to minimize formation of residual gas, it is helpful to move the coupling back and forth during cooldown of the UHV system after bakeout.



CAUTION! **Never** remove the magnetic coupling for the bakeout procedure. Make sure it's temperature **never** exceeds **150°C!**

5. Operation & Control

The requirements in our market are very varied. Every customer/institute works with their own system with very different interfaces. Therefore Ferrovac motorisations are based on standard stepper motors which can be controlled with most commonly available stepper motor controllers on the marketplace. We don't sell controllers and don't do system integration.

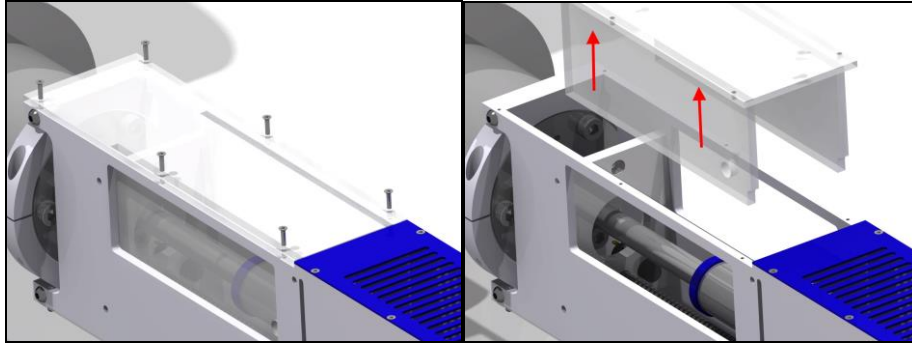


CAUTION: Ferrovac rejects all liability in case of incorrect use, incorrect programming, non compatible controllers or other user errors.

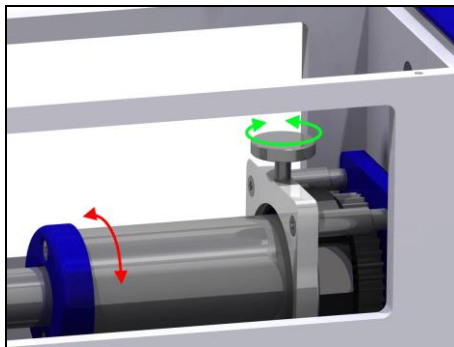
5.1. manual rotation DRVMDMOTL

Following the few steps to control the rotation manually of you feedthrough motorization DRVMD-MOTL:

1. remove the "Top Cover" by removeing the six screws on the top of the motorization.



2. Loosen the knurled screw to unlock the rotation. Choose you new position and refasten the knurled screw to relock the rotation.



CAUTION: Risk of squashing/crushing!
Never touch the motorized feedthrough during movement or operate without the "Top Cover"!

6. Problem solving

If you have any issues with our feedthroughs, please carefully read the MD instruction manual. It can be found as a PDF on our website www.ferrovac.com.

6.1. Factory overhaul

The slide bearings are the only parts of the feedthrough that wear out. A great many bakeout periods can lead to slight deformation of the slide bearings. This can result in reduced motion smoothness and probably higher outgassing rates. We offer an allover factory overhaul for inner and outer bearings and readjustment of any style of pincer grips. Please have a look on our website for more information or contact us directly.

6.2. Declaration of decontamination

In case of returning the motorization or feedthrough to us, it is necessary to complete a declaration of decontamination and send it to us. Please contact us for this.

6.3. Download

This manual can be downloaded from our website. It can be found in the specifications of each listed feedthrough motorization.