

## Motion And Manipulation

### Rotary Motion



**Bellows sealed** - Our range of high torque rotary motion feedthroughs are designed to operate at temperatures as high as 250°C and rotational torque up to 1.766Nm.

Feedthroughs are constructed from black anodized aluminium and stainless steel, with only stainless steel faces being exposed to the vacuum environment.

In-vacuum bearings are dry-film lubricated with tungsten-disulphide, while air side bearings are lubricated with high-temperature Krytox® lubricant. The rotational shaft is sealed with an AM-350 edge welded bellows.



**Elastomer sealed** - Our elastomer sealed rotary motion feedthroughs have several revolutionary features that have received tremendous response from the vacuum industry. The 6.35mm shaft is supported by two ball bearings for smooth, friction-free operation at a relatively low cost. The 9.23mm & 12.7mm feedthroughs utilize bronze bearings to support the shaft. The shaft is sealed by a preloaded Viton® o-ring. The greatest feature of this feedthrough is that the o-ring may be regreased or serviced by removing and replacing all components from the air side of the feedthrough, in only a few seconds and without the need for any tools.



**Ferro-fluid sealed** - Ferro fluid seals are based on the formation of liquid o-rings which create a hermetic seal on the shaft of the feedthrough. This is accomplished by the retention of magnetic fluid (ferro-fluid) by powerful magnetic fields created by precise placement of high energy magnets within the body of the feedthrough. With the seals in place the smooth rotation and higher numbers of rotations per minute are possible because of a precise roller bearing spindle design.



### Linear Motion

**Bellows sealed** - Our range of high torque linear motion feedthroughs are designed to operate at temperatures as high as 250°C. Linear movement is measured in 0.001" (0.254mm) increments on the rotary barrel scale and 1mm increments on the linear body scale, which are laser etched into the black anodised aluminium finish.

Feedthroughs are constructed from black anodized aluminium and stainless steel, with only stainless steel faces being exposed to the vacuum environment.

In-vacuum bearings are film lubricated with a UHV compatible Krytox® lubricant. The linear shaft is sealed with an AM-350 edge welded bellows.

**Sample Manipulation, Transfer and Transport**

**Magnetically coupled** - The quality and performance of our magnetically driven wobblestick manipulators and linear-rotary drives is unique in the field of ultra high vacuum technology. In the past ten years these wobblesticks have set the new benchmark for convenient and reliable sample handling and transfer solutions. We have pincers, forks, receptors and carriers for most types of sample holder and can provide solutions for heating, cooling, applying magnetic field and much more. We supply a vast range of customer designed positioning and manipulation devices.



**Wobblesticks**

Magnetically coupled wobblesticks provide a combination of linear travel coupled with angular movement and rotation allowing in-vacuum sample manipulation in all planes. Dual shaft versions also allow for pincer grip of samples. A variety of pincer grips and forks are available to allow you to integrate these products within existing OEM equipment. Cooled or heated sample holders or pincers are also available.



**Combined Linear and Rotary Motion**

Magnetically coupled combination linear and rotary motion feedthroughs are available in a variety of sizes and configurations allowing you to manipulate samples within your vacuum system along and about the axis of the linear motion. Dual shaft versions also allow for pincer grip of samples. A variety of pincer grips and forks are available to allow you to integrate these products within existing OEM equipment. Cooled or heated sample holders or pincers are also available.



**Fast Entry Load Locks**

Our fast entry locks are designed to facilitate for the fast and clean introduction of samples, STM tips or crucibles into a UHV system. They can handle samples typically up to 35mm in diameter. Samples are loaded through a o-ring sealed door at one end of the load lock, usually onto a M-MD16 magnetically driven linear-rotary feedthrough. Typically four CF ports are provided: mounting flange (rotatable); pumping port (rotatable); viewport flange (fixed, tapped M6); vacuum gauge port (fixed, tapped M6). On request, the fast entry load lock can be supplied with a suitable gate valve, ion gauge, viewport, and turbo molecular pump.



**X-Y-Z Translators**

Translators are available as single, dual and triple axis variants, providing solutions to many manipulation requirements within vacuum systems. Our range of translators employ edge welded bellows seals to ensure vacuum integrity and precision cross roller bearings for rigidity and accuracy of movement. Motion is controlled by either basic leadscrews or precision micrometers dependant upon the customers required level of accuracy and repeatability. Please contact our sales office for further details of the available range of X, X-Y & X-Y-Z translators.



**Stepper Motors and Controllers**

In-vacuum stepper motors are very well suited for achieving precise movements of the most delicate in-vacuum transport systems and samples. In-vacuum motors can achieve considerable cost savings over the use of external motors and expensive motion feedthroughs and motion systems. Our stepper motors have very low particulate generation, as they have no moving metal to metal surfaces, they also demonstrate favourable outgassing properties, making them the ideal choice for sensitive semiconductor applications along with many other in-vacuum uses.

Rotary Feedthroughs - Bellows Sealed



Specifications:

Materials

Body	St.St.
Housing	Anodized aluminium
Bellows, edge welded	AM-350

Vacuum Range

CF flanged	atm to 1x10 <sup>-10</sup> mbar
KF flanged	atm to 1x10 <sup>-8</sup> mbar

Temperature Range\*

CF flanged	-196 to 250°C
KF flanged (Viton® seals)	-20 to 150°C

Load

Torque	1.766Nm max
Axial	2.7kg max
Lateral	4.5kg max

Speed

Rotary	1000rpm max
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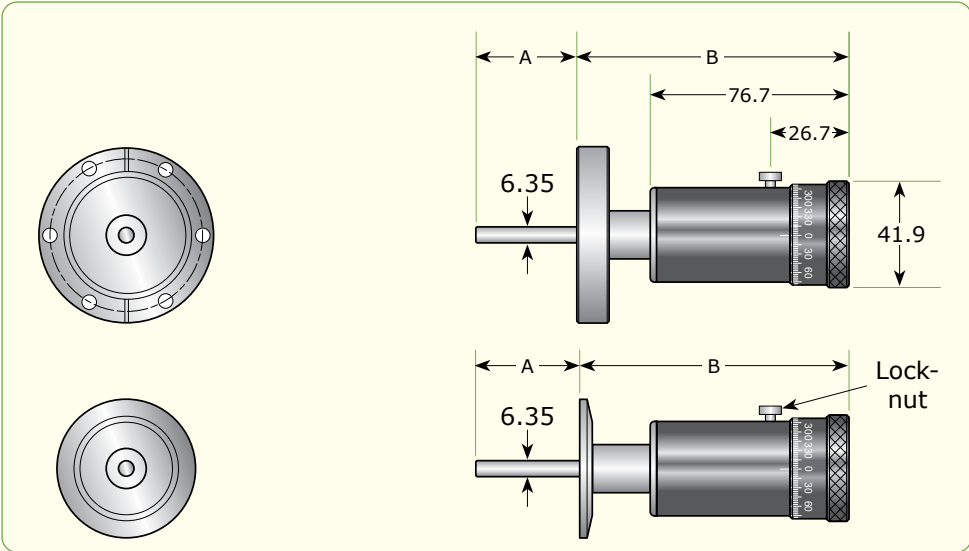
Resolution

Rotary scale	5°
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Features:

- All precision bearings.
- Improved shaft coupling designed for high torque, rated to 1.766Nm.
- High temperature rated to 250°C.
- UHV compatible construction.
- Welded bellows seal.
- Manual actuator.
- Continuous rotary motion.
- Rotary position lock.
- Optional stepper motor or air actuator.

\* - Assembly rating must be reduced to that of lowest rated component.



All dimensions are nominal in millimetres unless otherwise specified

CF Flanged



Flange	A	B	Part Code	Price £	Price €
DN16CF	39.9	105.9	M-BRM16CF	£571	€657
DN40CF	39.9	105.9	M-BRM40CF	£580	€667

KF Flanged

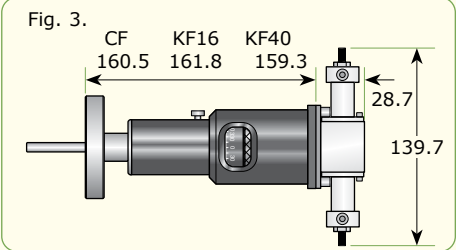
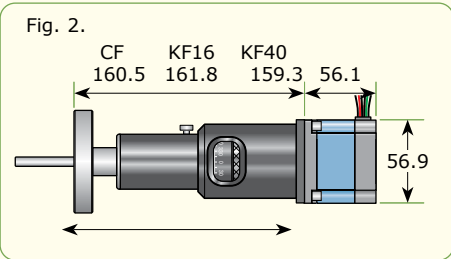
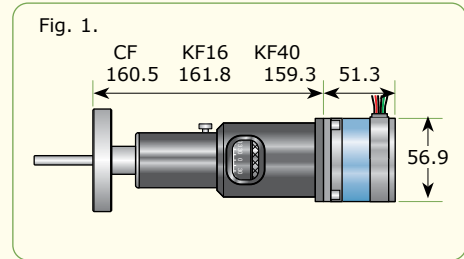


Flange	A	B	Part Code	Price £	Price €
DN16KF	38.6	107.2	M-BRM16KF	£571	€657
DN40KF	41.1	104.6	M-BRM40KF	£580	€667

Actuator Options



Description	Fig.	Part Code	Price £	Price €
DC stepper motor actuation	1	Add -SM	£662	€762
High torque DC stepper motor actuation	2	Add -HTSM	£662	€762
90° pneumatic actuator with solenoid valve	3	Add -PN	£774	€891
Cylinder speed control for pneumatic actuator (pair)	-	M-PASCS	£108	€125



Please see pages 8.14 - 8.17 for details of actuator options and specifications.

All dimensions are nominal in millimetres unless otherwise specified

Rotary Feedthroughs - Bellows Sealed



Features:

- Economic alternative to bellows seal.
- Continuous 360° angular rotation.
- HV compatible construction.
- Custom versions available on request.

Specifications:

Materials

Body / Shaft	304 St.St.
Actuator	Anodized 2011 aluminium
Shaft seal	Viton®

Vacuum Range

CF flanged	atm to 1x10 <sup>-8</sup> Torr
KF flanged	atm to 1x10 <sup>-8</sup> Torr

Temperature Range\*

CF flanged	-20 to 150°C
KF flanged (Viton® seals)	-20 to 150°C

Load

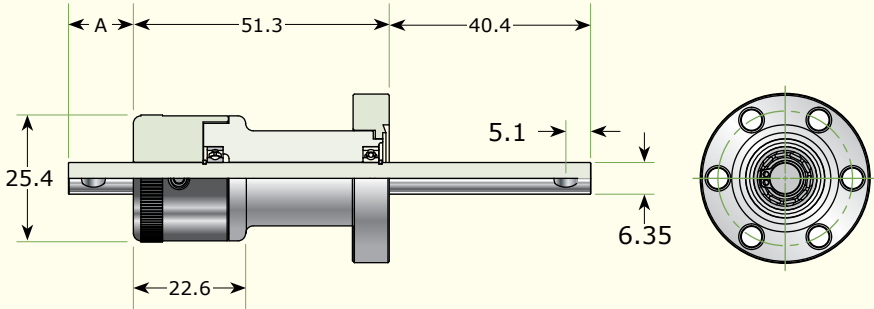
Axial	2.25kg max
Lateral	2.25kg max @ 50mm extension

\* - Assembly rating must be reduced to that of lowest rated component.

They are constructed of black-anodized aluminum and stainless steel. In vacuum bearings are dry-film lubricated with tungsten-disulfide, while are side bearings are lubricated with high-temperature Krytox® lubricant. The rotation shaft is sealed with a Viton® elastomer O-ring located at end opposite vacuum mounting flange.

Standard rotary feedthroughs are fitted with a manual actuator, and are also available with an air-side shaft extension for added drive flexibility.

Fig. 1.



All dimensions are nominal in millimetres unless otherwise specified

CF Flanged



Flange	Fig.	A	Part Code	Price £	Price €
DN16CF	1	-	M-ERMA-16CF	£268	€309
DN40CF	1	-	M-ERMA-40CF	£282	€325
DN16CF	1	12.9	M-ERMA-ES-16CF	£268	€309
DN40CF	1	12.9	M-ERMA-ES-40CF	£282	€325

KF Flanged

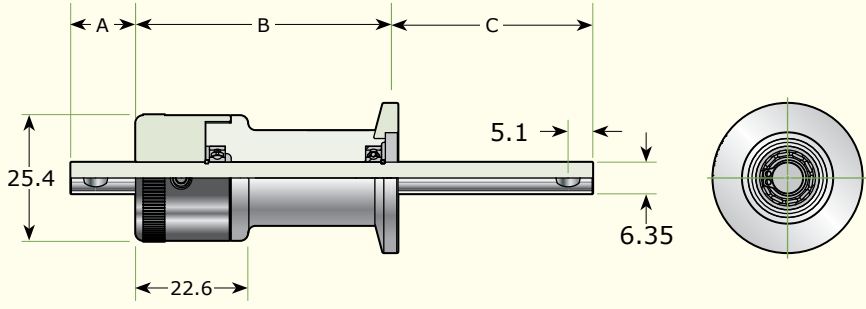


Flange	Fig.	A	B	C	Part Code	Price £	Price €
DN16KF	2	-	52.6	39.1	M-ERMA-16KF	£2689	€3093
DN40KF	2	-	50.0	41.7	M-ERMA-40KF	£278	€320
DN16KF	2	12.9	52.6	39.1	M-ERMA-ES-16KF	£268	€309
DN40KF	2	12.9	50.0	41.7	M-ERMA-ES-40KF	£278	€320

Service Kit

Description	Part Code	Price £	Price €
Service kit for M-ERMA style rotary motion feedthrough	M-ERMA-SKIT	£120	€138

Fig. 2



All dimensions are nominal in millimetres unless otherwise specified



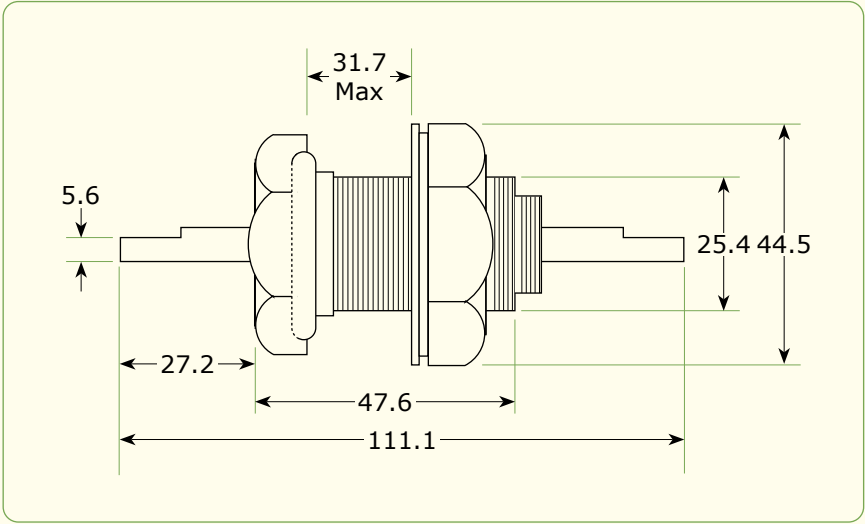
Rotary Feedthroughs - Elastomer Sealed



Features:

- 6.35mm shaft has ball bearings for smooth operation.
- 9.53mm & 12.7mm shaft has bronze bearings.
- Temperature rated to 100°C.
- UHV compatible construction.
- Manual actuator.
- Continuous rotary motion.

\* - Assembly rating must be reduced to that of lowest rated component.



Specifications:

Materials

Body	St.St. or Aluminium
Shaft	St.St.
Seal	Viton®

Vacuum Range

Bolt fitting	atm to 1x10 <sup>-8</sup> mbar
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Temperature Range\*

Bolt fitting (Viton® seals)	-20 to 100°C
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Load

Torque	11.3Nm max
Axial	1.1kg max
Lateral	2.3kg max

Speed

Rotary	500rpm max
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1" Bolt Mount



Material	Shaft dia (mm)	Part Code	Price £	Price €
Aluminium	6.35	M-ERM-A-B	£243	€280
Stainless steel	6.35	M-ERM-S-B	£439	€505
Aluminium	9.53	M-ERM-A-B-9.53	£296	€341
Stainless steel	9.53	M-ERM-S-B-9.53	£503	€579
Aluminium	12.7	M-ERM-A-B-12.7	£296	€341
Stainless steel	12.7	M-ERM-S-B-12.7	£503	€579

Spares

Description	Part Code	Price £	Price €
Replacement bearings and O-ring for M-ERM 6.35mm shaft	M-ERM-125-BK	£33	€38
Replacement brass nut (1-14) for ERM	M-ERM-BN	POA	POA
Replacement brass washer for ERM	M-ERM-BW	POA	POA
Replacement stainless nut (1-14) for ERM	M-ERM-SN	POA	POA
Replacement stainless steel washer for ERM	M-ERM-SW	POA	POA
Replacement knurled cap for M-ERM 6.35mm shaft	M-ERM-125-KC	POA	POA

Rotary Feedthroughs - Ferro-fluid Sealed



Features:

- Hermetically sealed with the Rigaku SuperSeal® ferro-fluid technology.
- Very low stray magnetic fields.
- No magnets in vacuum environment.
- High torque capacity.
- Krytox/fomblin blended lubricant.
- Continuous rotary motion.
- Multiple connection options.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

Body & shaft 17-4 PH St.St.

Vacuum Range

Operating pressure atm to 1x10<sup>-8</sup>mbar

Max pressure differential 2.5atm

Helium leak tested to <5x10<sup>-9</sup> std.cc/sec

Temperature Range\*

up to 80°C

Drag Torque

@ Breakaway 0.077Nm

@100rpm 0.042Nm

@1000rpm 0.064Nm

Speed

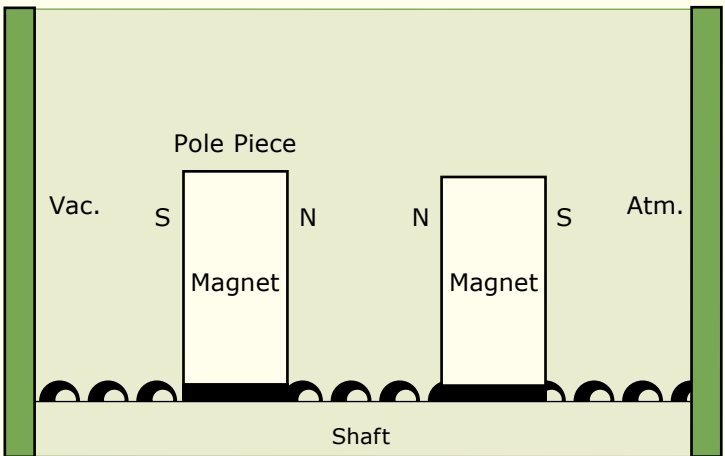
Rotary 5000rpm max

Load

Static 138kg max

Dynamic 261kg max

Ferrofluid forms liquid o-rings with the help of strong, high-energy magnets



Baseplate Connection



Flange	Fig.	Shaft dia	Part Code	Price £	Price €
1" Baseplate	1	6.35	M-FRM-6.35-BP	£488	€562
1" Baseplate	1	9.53	M-FRM-9.53-BP	£488	€562

KF Flanged



Flange	Fig.	Shaft dia	Part Code	Price £	Price €
DN25KF	2	6.35	M-FRM-6.35-25KF	£488	€562
DN25KF	2	9.53	M-FRM-9.53-25KF	£544	€626

CF Flanged



Flange	Fig.	Shaft dia	Part Code	Price £	Price €
DN16CF	3	6.35	M-FRM-6.35-16CF	£544	€626
DN40CF	4	6.35	M-FRM-6.35-40CF	£599	€689
DN40CF	4	9.53	M-FRM-9.53-40CF	£655	€754

Fig. 1.

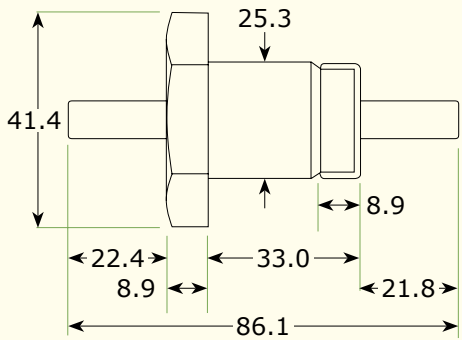


Fig. 2.

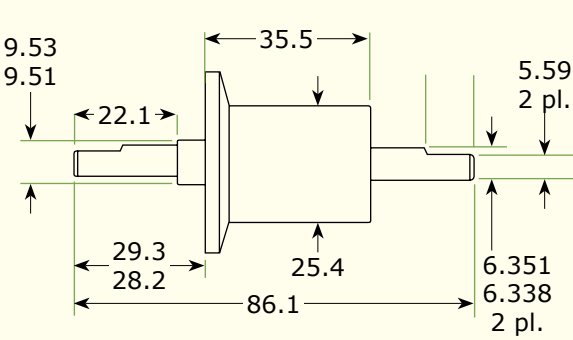


Fig. 3.

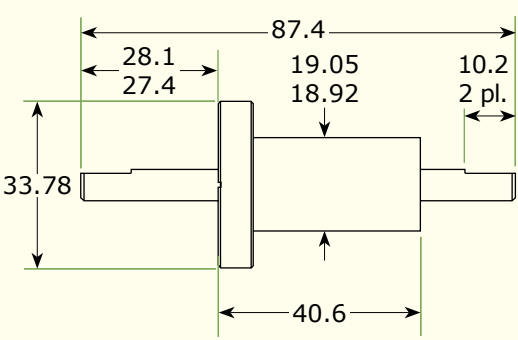
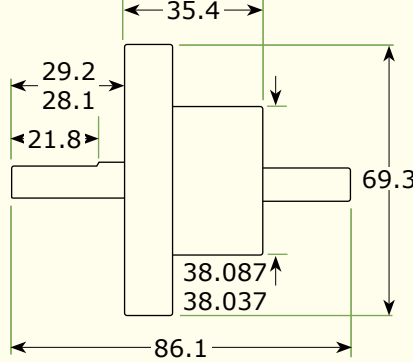


Fig. 4.



All dimensions are nominal in millimetres unless otherwise specified

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Rotary Feedthroughs - Magnetically Coupled DN16CF



Features:

- Continuous rotation.
- Fully UHV compatible materials.

Specifications:

Shaft Length

Flange face to tip 35mm.

Mounting Flange DN16CF

Temperature Range\*

Bakeout up to 200°C

Torque

Standard 0.5Nm

HT version 1.0Nm

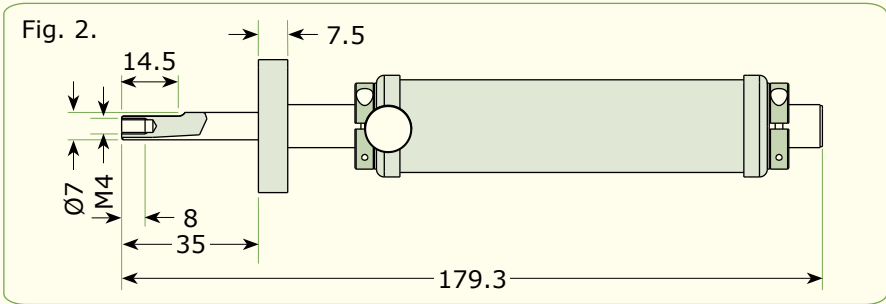
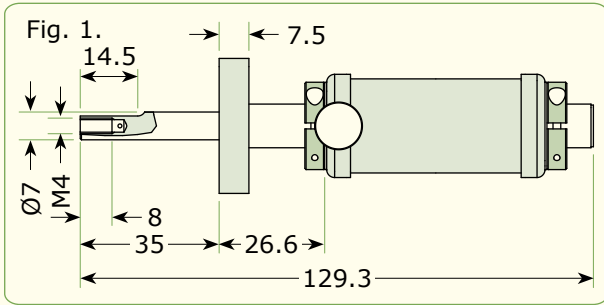
\* - Assembly rating must be reduced to that of lowest rated component.

M-RD16## is our new miniature rotary feedthrough with a 0.5 Nm torque (1.0Nm for HT version). It can be used wherever a smooth rotary motion has to be performed. Due to its high torque of 0.5Nm, considerable torque can be transferred to any gear inside vacuum if necessary. For maximum durability, all ball bearings are Diconite™ (W-disulfide) dry lube coated.

DN16CF Flanged



Description	Part Code	Price £	Price €
Magnetically couple rotary feedthrough (0.5Nm) DN16CF (Fig. 1)	M-RD16-0035	POA	POA
Magnetically couple rotary feedthrough (1.0Nm) DN16CF (Fig. 2)	M-RD16HT-0035	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Rotary Feedthroughs - Magnetically Coupled DN40CF



The airside length of the M-RD40## can be customized for easier access and handling depending on the layout of your system.

Features:

- Continuous rotation.
- Fully UHV compatible materials.
- Shaft length, 50mm, customisable up to 250mm.
- Air side length, 99mm, can be increased depending upon layout of syour system.

Specifications:

Shaft Length

Flange face to tip 50-250mm.

Mounting Flange DN40CF

Temperature Range\*

Bakeout up to 200°C

Torque

Standard ~5Nm

HT version 1.0Nm

\* - Assembly rating must be reduced to that of lowest rated component.

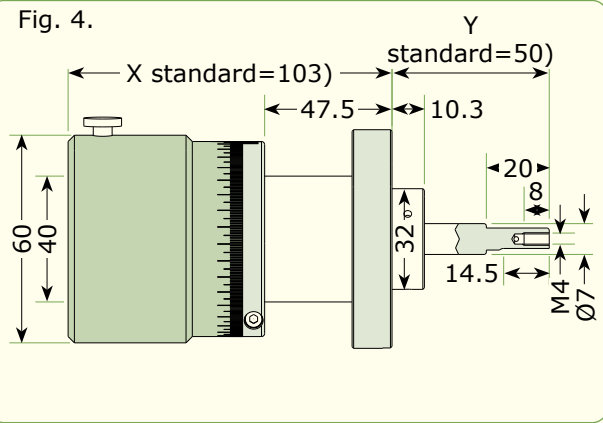
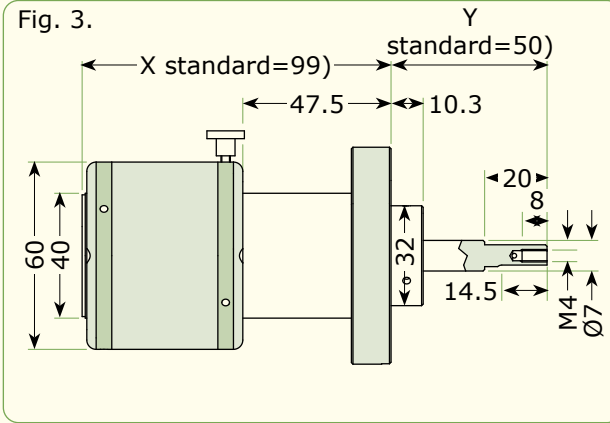
The Magnetically driven Rotary Feedthrough M-RD40 can be used wherever a smooth rotary motion has to be performed. Due to its high torque of 5Nm, considerable force can be transferred to any in-vacuum gear if necessary. For maximum durability, all ball bearings are Diconite™ (W-disulfide) dry lube coated.

On M-RMDSC A laser etched 360 deg scale with a vernier allows for 0.1 deg readout precision. Options include motorization, with or without encoder.

DN40CF Flanged



Description	Part Code	Price £	Price €
Magnetically couple rotary feedthrough (5.0Nm) DN40F Xmm airside length, Ymm in vacuum length (Fig. 3)	M-RD40-X-Y	POA	POA
Magnetically couple rotary feedthrough (5.0Nm) with precision scale DN40F Xmm airside length, Ymm in vacuum length (Fig. 4)	M-RD40SC-X-Y	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

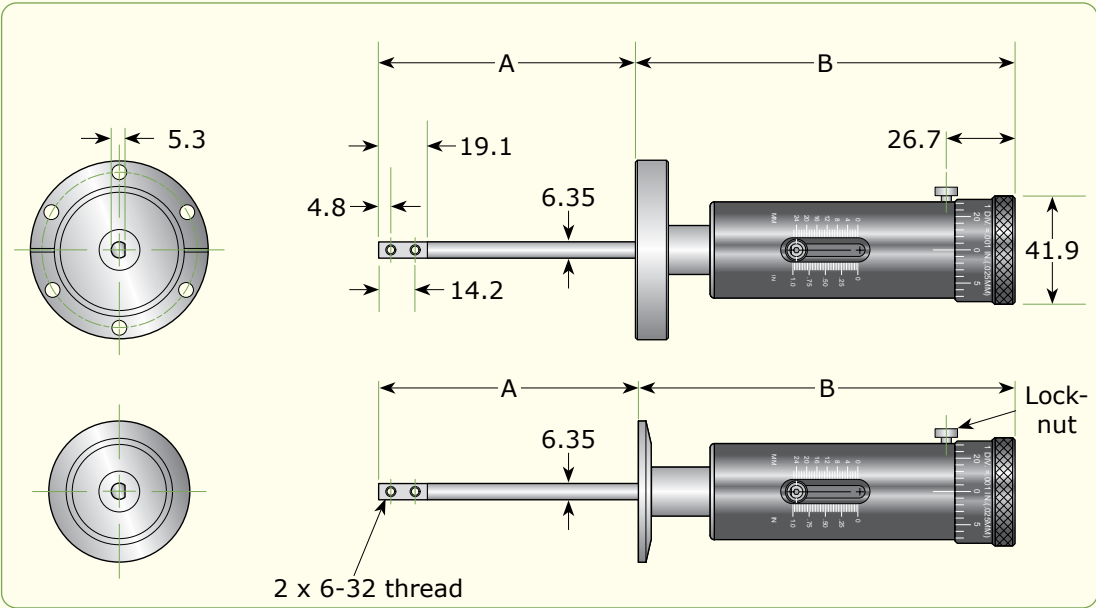
Linear Feedthroughs - Bellows Sealed



Features:

- All precision bearings.
- 25.4, 50.8 & 101.6mm travel.
- High temperature rated to 250°C.
- UHV compatible construction.
- Welded bellows seal.
- Manual actuator.
- Linear position lock.
- Optional stepper motor actuator.

\* - Assembly rating must be reduced to that of lowest rated component.



Supplied complete with 2 x 6-32 screws to suit tapped holes in shaft.

Specifications:

Materials

Body	St.St.
Housing	Anodized aluminium
Bellows, edge welded	AM-350

Vacuum Range

CF flanged	atm to 1x10 <sup>-10</sup> mbar
KF flanged	atm to 1x10 <sup>-8</sup> mbar

Temperature Range\*

CF flanged	-196 to 250°C
KF flanged (Viton® seals)	-29 to 150°C

Load

Axial	2.2kg max
Lateral (at 50.8mm extension)	2.2kg max

Resolution

Linear scale	1mm
Rotary scale	0.025mm

CF Flanged



Flange	Linear travel	A	B	Part Code	Price £	Price €
DN16CF	25.4	90.2 - 115.5	139.7	M-BLM25-16CF	£560	€644
DN40CF	25.4	90.2 - 115.5	139.7	M-BLM25-40CF	£570	€656
DN16CF	50.8	90.2 - 140.9	175.3	M-BLM50-16CF	£704	€810
DN40CF	50.8	90.2 - 140.9	175.3	M-BLM50-40CF	£713	€820
DN16CF	101.6	90.2 - 191.8	243.1	M-BLM100-16CF	£991	€1140
DN40CF	101.6	90.2 - 191.8	243.1	M-BLM100-40CF	£1000	€1150

KF Flanged

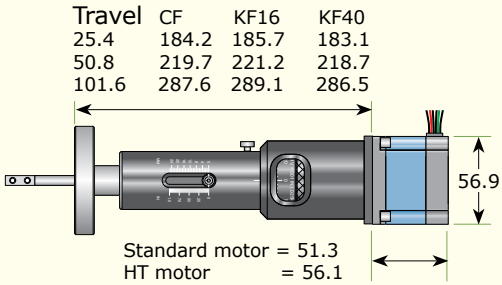


Flange	Linear travel	A	B	Part Code	Price £	Price €
DN16KF	25.4	88.9 - 114.3	141.2	M-BLM25-16KF	£575	€662
DN40KF	25.4	91.4 - 116.8	138.7	M-BLM25-40KF	£584	€672
DN16KF	50.8	88.9 - 139.7	176.8	M-BLM50-16KF	£727	€837
DN40KF	50.8	91.4 - 142.2	174.2	M-BLM50-40KF	£734	€845
DN16KF	101.6	92.7 - 194.3	244.6	M-BLM100-16KF	£986	€1134
DN40KF	101.6	95.2 - 196.8	242.0	M-BLM100-40KF	£991	€1140

Actuator Options



Description	Part Code	Price £	Price €
Speed knob winding handle	M-SPKN	£91	€105
DC stepper motor actuation	Add -SM	£662	€762
High torque DC stepper motor actuation	Add -HTSM	£662	€762



Please see pages 8.14 - 8.17 for details of actuator options and specifications.



Linear Feedthroughs - Push-pull - Bellows Sealed



Specifications:

Materials

Body	St.St.
Housing	Anodized aluminium
Bellows, edge welded	AM350

Vacuum Range

CF flanged	atm to 1x10 <sup>-10</sup> mbar
KF flanged	atm to 1x10 <sup>-8</sup> mbar

Temperature Range\*

CF flanged	-196 to 250°C
KF flanged (Viton® seals)	-20 to 150°C

Load

Axial	2.2kg max
Lateral (at 50.8mm extension)	2.2kg max

Resolution

Linear scale	1mm
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Features:

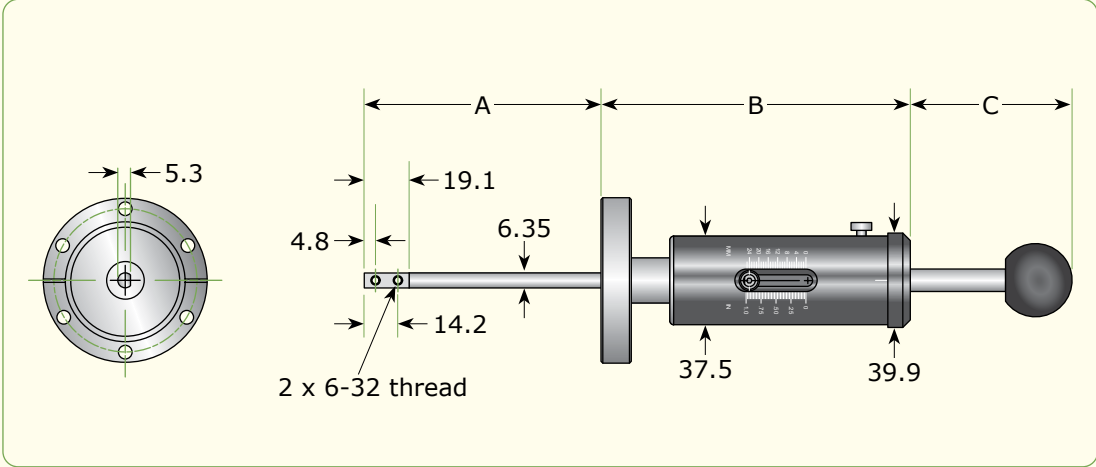
- All precision bearings.
- 25.4mm & 50.8mm travel.
- High temperature rated to 250°C.
- UHV compatible construction.
- Welded bellows seal.
- Manual actuator.
- Linear position lock.

\* - Assembly rating must be reduced to that of lowest rated component.

CF Flanged



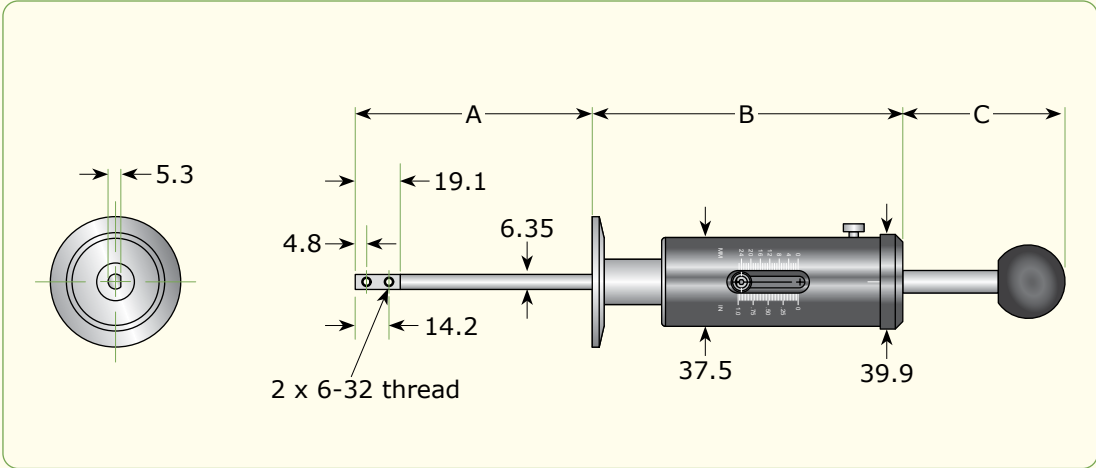
Flange	Linear travel	A	B	C	Part Code	Price £	Price €
DN16CF	25.4	90.2-115.6	127.0	66.5-91.9	M-PPLM25-16CF	£613	€705
DN40CF	25.4	90.2-115.6	127.0	66.5-91.9	M-PPLM25-40CF	£623	€717
DN16CF	50.8	90.2-141.0	162.6	63.5-114.3	M-PPLM50-16CF	£7573	€8709
DN40CF	50.8	90.2-141.0	162.6	63.5-114.3	M-PPLM50-40CF	£766	€881



KF Flanged



Flange	Linear travel	A	B	C	Part Code	Price £	Price €
DN16KF	25.4	88.9-114.3	128.5	66.5-91.9	M-PPLM25-16KF	£613	€705
DN40KF	25.4	91.4-116.8	126.0	66.5-91.9	M-PPLM25-40KF	£623	€717
DN16KF	50.8	88.9-139.7	164.1	63.5-114.3	M-PPLM50-16KF	£757	€871
DN40KF	50.8	91.4-142.2	161.5	63.5-114.3	M-PPLM50-40KF	£766	€881



Supplied complete with 2 x 6-32 screws to suit tapped holes in shaft.

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Motion Feedthrough Actuator Options

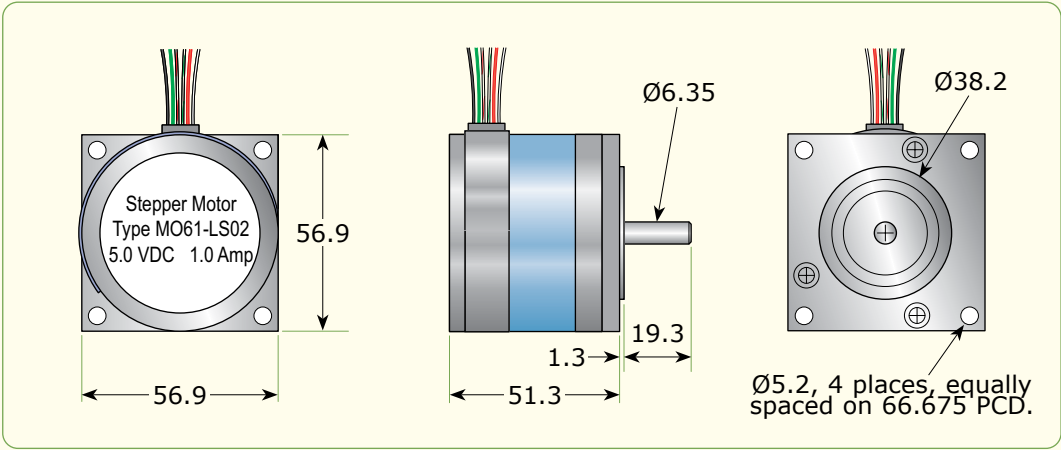


Features:

- NEMA standards 23D frame size.
- ±3%non cumulative step accuracy.
- 48-50 tooth pitch.
- 6 wire leads.
- For unipolar operation, contact sales office.

Specifications:

Connections	
Type	Leads
Number of leads	6
Input Voltage	5 VDC
Input Current	0.7A
Temperature Range	-40°C to 65°C
Steps Per Revolution	200
Torque	
Holding with 2 phases on	0.52Nm
Residual	0.007Nm
Rotor Inertia	0.005kg/m²
Overhang Load	6.8kg
Thrust Load	11.3kg
Weight	0.7kg



DC Stepper Motor option

Description	Part Code	Price £	Price €
DC stepper motor actuation	Add - SM	£662	€762

Motion Feedthrough Actuator Options

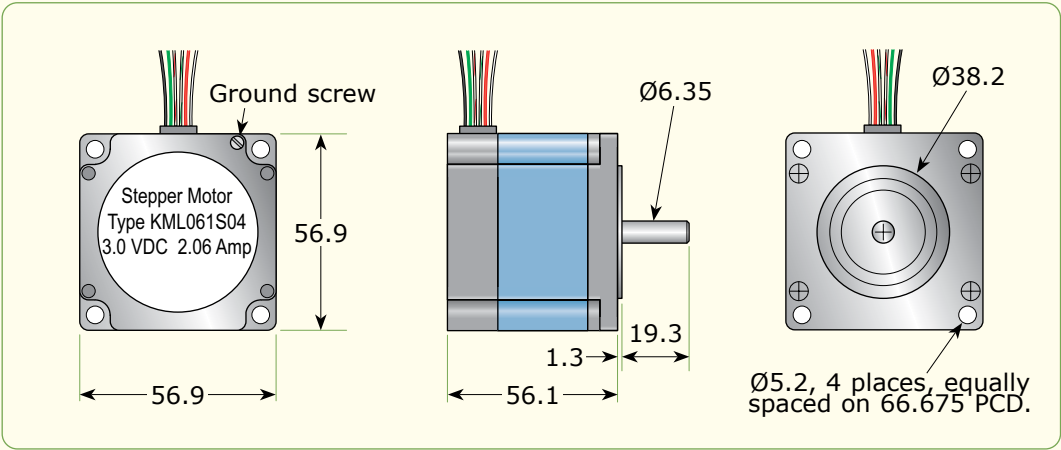


Features:

- NEMA standards 23D frame size.
- ±2%non cumulative step accuracy.
- Full step, 1.8° or half step 0.9° increments.
- Microstepped to 0.0072°.
- Up to 20,000 steps/second (6000rpm).

Specifications:

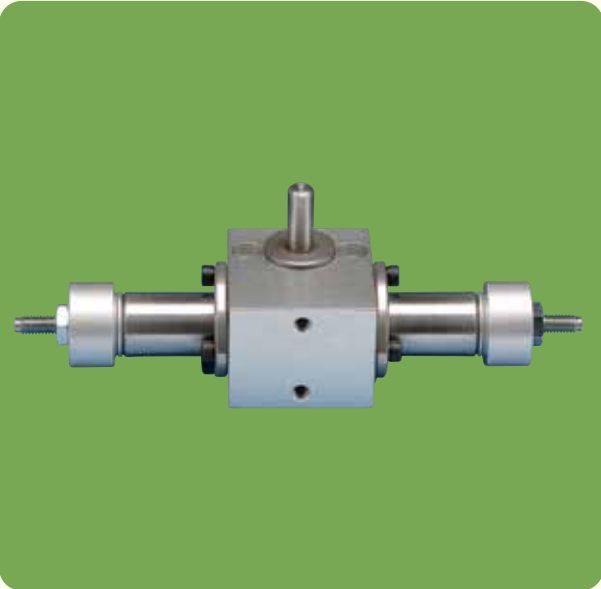
Connections	
Type	Leads
Number of leads	6
Input Voltage	3 VDC
Input Current	2A
Temperature Range	-40°C to 65°C
Steps Per Revolution	200
Torque	
Holding with 2 phases on	1.2Nm
Residual	0.007Nm
Rotor Inertia	0.0004kg/m²
Overhang Load	6.8kg
Thrust Load	11.3kg
Weight	0.7kg



High Torque DC Stepper Motor option

Description	Part Code	Price £	Price €
High torque DC stepper motor actuation	Add - HTSM	£632	€727

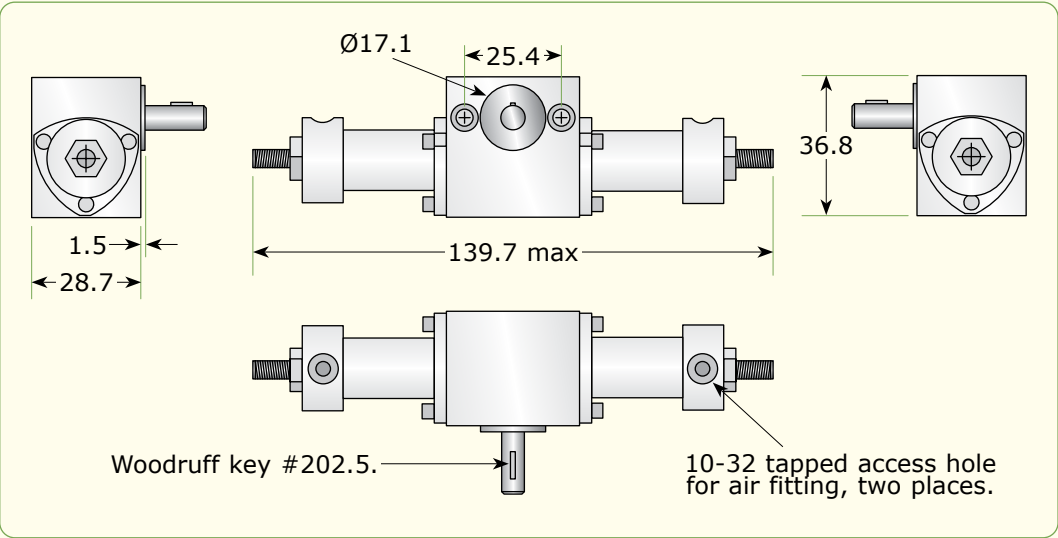
Motion Feedthrough Actuator Options



<b>Specifications:</b>	
Air Connections	10-32
Air Pressure	150 psi max
Torque Capacity	0.007Nm/psi
Temperature Range	-29°C to 90°C
Rotation Angle	90° max
Stop Adjustment	30° both ends
Weight	0.2kg

Features:

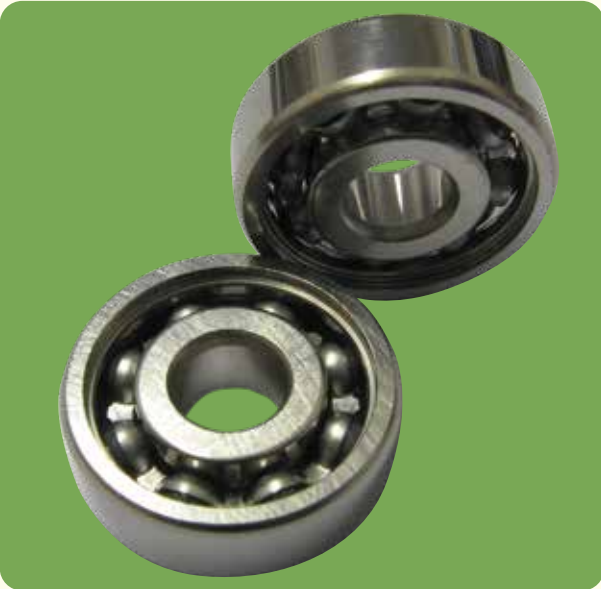
- Drives two-position in-vacuum rotary devices, such as shutters.
- 90° Rotation.
- 30° adjustment at each end of travel.
- Includes air control solenoid, air fittings and air lines.
- 150psi maximum operating pressure.



Pneumatic Actuator

Description	Part Code	Price £	Price €
90° pneumatic actuator with 12VDC solenoid valve	Add - PN	£766	€881
Cylinder speed control for pneumatic actuator	M-PASCS	£108	€125

Precision Bearings



Precision bearings are available in a variety of sizes. They are available with either stainless steel balls or for more demanding UHV applications ceramic balls are used. As standard bearings are supplied with Dicronite™ dry lubricant coating. Non lubricated, bearings can be supplied to special order. Please contact our sales office for further details.

Features:

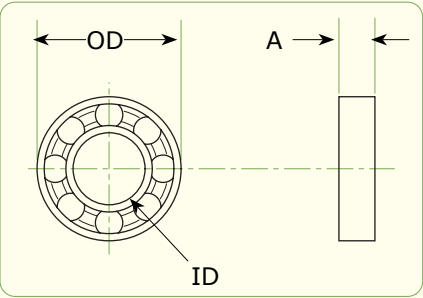
- Dicronite™Lubricated bearings bakeable to 150°C
- Ceramic balls available on request.
- Long life

Precision Bearings - Stainless Steel Balls With Dicronite™ Coating



Please note, these bearings may be subject to minimum order quantities. Please check with our sales office.

ID	OD	A	Part Code	Price £	Price €
1.5	4.0	1.2	M-PBSD1.5-4	POA	POA
3.0	6.0	2.0	M-PBSD3-6	POA	POA
3.0	10.0	4.0	M-PBSD3-10	POA	POA
4.0	7.0	2.0	M-PBSD4-7	POA	POA
4.0	9.0	2.5	M-PBSD4-9	POA	POA
4.0	13.0	5.0	M-PBS4-13	POA	POA
5.0	8.0	2.0	M-PBSD5-8	POA	POA
5.0	8.0	3.0	M-PBSD5-8-3	POA	POA
5.0	11.0	3.0	M-PBSD5-11	POA	POA
5.0	16.0	5.0	M-PBSD5-16	POA	POA
6.0	13.0	3.5	M-PBSD6-13	POA	POA
6.0	13.0	5.0	M-PBSD6-13-5	POA	POA
6.0	16.0	5	M-PBDS6-16	POA	POA
6.35	12.7	3.18	M-PBSD1/4-1/2	£44	€51
7.0	11.0	2.5	M-PBSD7-11-2.5	POA	POA
7.0	14.0	3.5	M-PBSD7-14	POA	POA
8.0	12.0	2.5	M-PBSD8-12	POA	POA
8.0	16.0	4.0	M-PBSD8-16	POA	POA
8.0	22.0	7.0	M-PBSD8-22	POA	POA
10.0	15.0	3.0	M-PBSD10-15-3	POA	POA
10.0	15.0	5.0	M-PBSD10-15	POA	POA
10.0	22.0	6.0	M-PBDS10-22	POA	POA
10.0	26.0	8.0	M-PBSD10-26	POA	POA
12.0	28.0	8.0	M-PBSD12-28	POA	POA
17.0	40.0	12.0	M-PBSD17-40	POA	POA
20.0	25.0	4.0	M-PBSD20-25	POA	POA
20.0	42.0	12.0	M-PBSB20-42	POA	POA
25.0	32.0	4.0	M-PBDS25-32	POA	POA



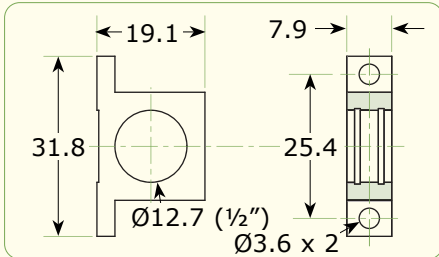


Rotary & Linear Motion Accessories

LewVac rotary & linear motion accessories for 6.35mm (1/4") are an assortment of in-vacuum hardware components to assist the user when installing motion feedthroughs. Various types of drive shaft components are provided, including bellows couplings, universal joints, extension couplings, bearings, bearing mounts, ground shaft and collars.

For custom solutions, please contact our sales office.

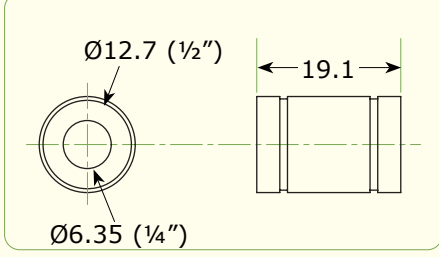
Radial Bearing Mount



Part Code	Price £	Price €
M-RBM	£63	€73

Manufactured from aluminium, these mounts are designed to hold bearings with 12.7mm (1/2") OD x 3.18mm (1/8") wide (see previous page). The bearing is held in place with 2 x C clips.

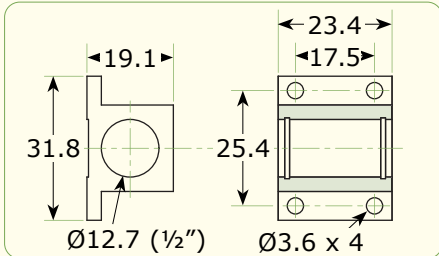
Linear Bearing



Part Code	Price £	Price €
M-LB	£120	€138

Linear bearing for 6.35mm (1/4") shaft with UHV compatible dry lubricant.

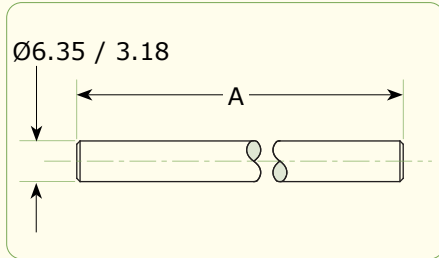
Linear Bearing Mount



Part Code	Price £	Price €
M-LBM	£77	€89

Manufactured from aluminium, these mounts are designed to hold bearings with 12.7mm (1/2") OD x 19.1mm (3/4") long. The bearing is held in place with 2 x C clips.

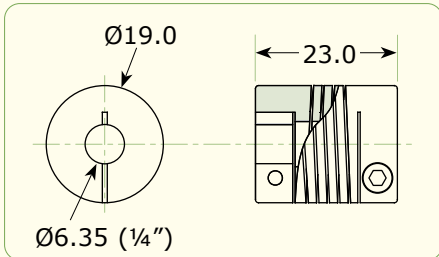
Precision Ground Shaft



A/Ø	Part Code	Price £	Price €
152.4/6.35	M-PGS-025-152	£15	€18
304.8/6.35	M-PGS-025-304	£20	€23
609.6/6.35	M-PGS-025-609	£34	€40
152.4/3.18	M-PGS-0125-152	£20	€23

Precision ground shaft, 6.35mm (1/4") & 3.18mm (1/8") dia..

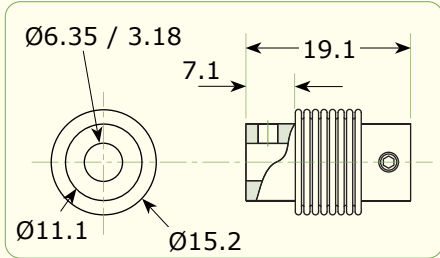
Flexible Coupling



Part Code	Price £	Price €
M-FLEXC-025	£101	€117

Flexible coupling to suit 6.35mm (1/4") dia. shafts.  
Max torque = 0.35Nm.  
Max angle = 5°

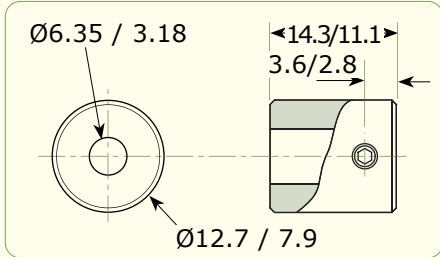
Bellow Coupling



Part Code	Price £	Price €
M-BELC-025	£201	€232
M-BELC-0125	POA	POA

Bellows coupling to suit 6.35mm (1/4") & 3.18mm (1/8") dia. shafts. Has 6-32 set screws. Max torque = 0.35Nm.  
Max angle = 5°

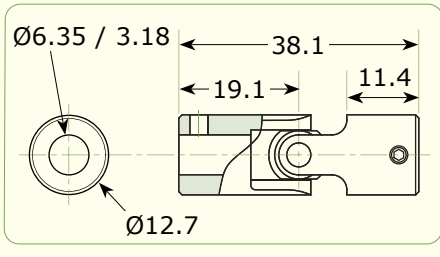
Sleeve Coupling



Part Code	Price £	Price €
M-SC-025	£29	€34
M-SC-0125	£34	€40

Sleeve coupling to suit 6.35mm (1/4") & 3.18mm (1/8") dia. shafts. Has 2 x 6-32 set screws.

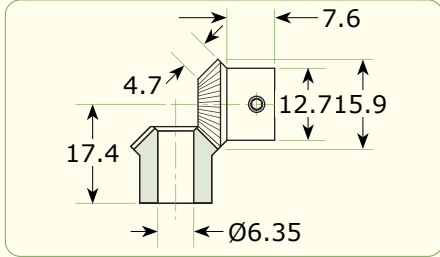
Universal Joint



Part Code	Price £	Price €
M-UJ-025	£201	€232
M-UJ-0125	£201	€232

Universal joint to suit 6.35mm (1/4") & 3.18mm (1/8") dia. shafts. Up to 30° angular displacement. Has 2 x 6-32 set screws.

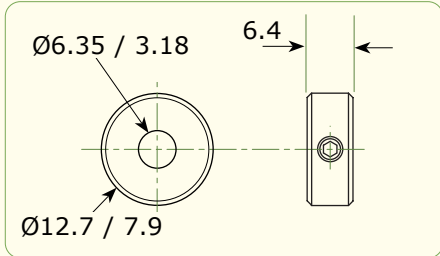
Mitre & Bevel Gear



Part Code	Price £	Price €
M-MBG-025	£163	€188
M-MBG-0125	£163	€188

Mitre & bevel gears to suit 6.35mm (1/4") & 3.18mm (1/8") dia. shafts. These allow output motion at 90° to input motion to be achieved. Has 2 x 6-32 set screws. (Call for dimensions for M-MBG-0125)

Set Screw Collar



Part Code	Price £	Price €
M-CS-025	£20	€23
M-CS-0125	£24	€28

Collar to suit 6.35mm (1/4") & 3.18mm (1/8") dia. shafts. Often used as an end stop. Has 1 x 6-32 set screw.

All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified



Fixed Length Wobblesticks



Specifications:

Materials

Rod & flanges	St.St.
Bellows	AM350 St.St.

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
KF flanged	atm to 1x10 <sup>-8</sup> mbar

Temperature Range\*

CF flanged	up to 250°C
KF flanged	up to 150°C

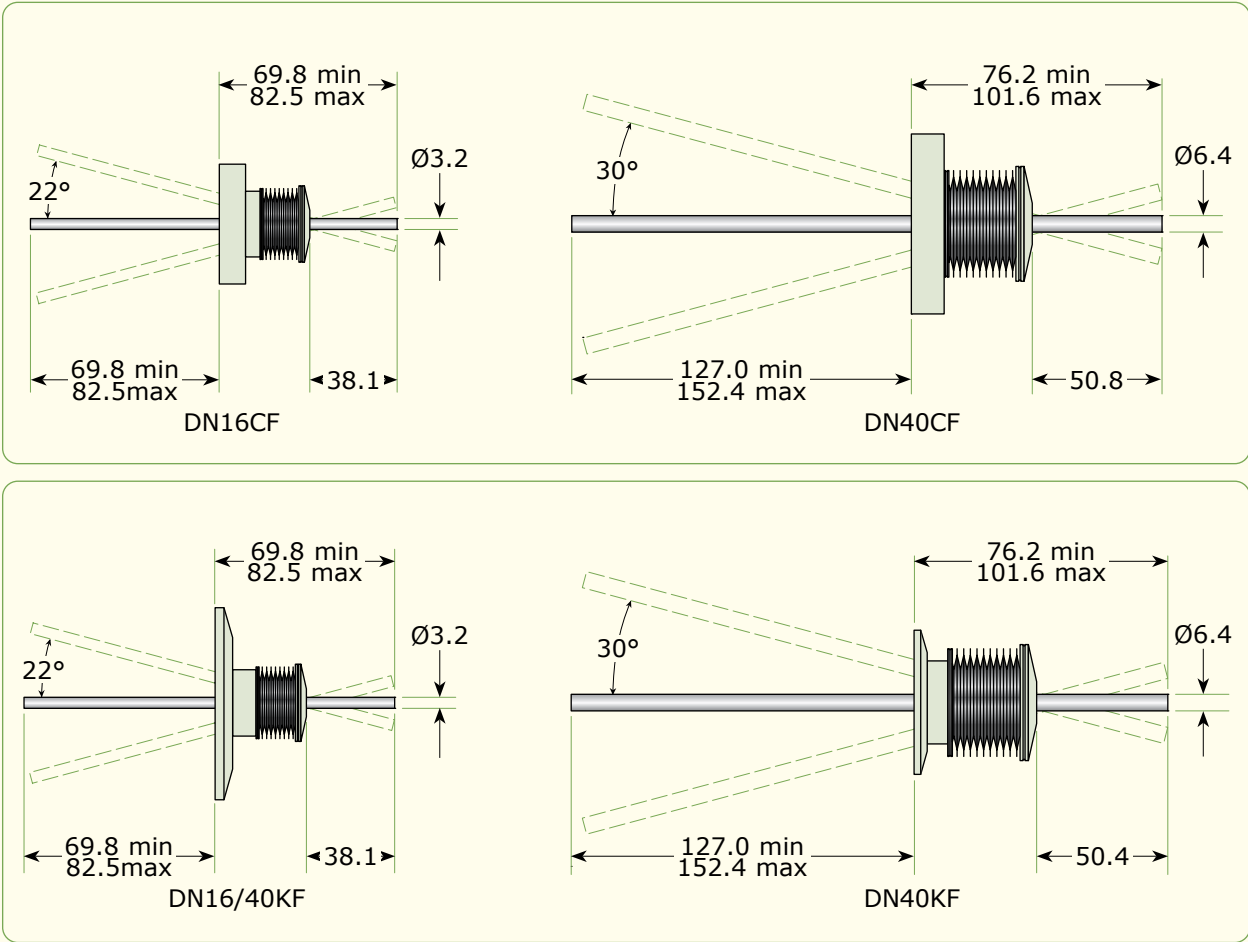
Load

Axial	2.2kg
Lateral	2.2kg at 50mm extension

\* - Assembly rating must be reduced to that of lowest rated component.

Features:

- 12.7mm or 25.4mm linear travel.
- 44° or 60° angular motion.
- UHV compatible construction.



All dimensions are nominal in millimetres unless otherwise specified

Wobblestick - CF flange



Flange	Angular Deflection	Linear Travel	Part Code	Price £	Price €
DN16CF	±22°	12.7	M-WS12-16CF	£294	€339
DN40CF	±30°	25.4	M-WS25-40CF	£345	€397

Wobblestick - KF flange



Flange	Angular Deflection	Linear Travel	Part Code	Price £	Price €
DN16KF	±22°	12.7	M-WS12-16KF	£307	€354
DN40KF	±22°	12.7	M-WS12-40KF	£331	€381
DN40KF	±30°	25.4	M-WS25-40KF	£345	€397

All dimensions are nominal in millimetres unless otherwise specified

Magnetically Coupled Wobblesticks Single Shaft



Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load - standard versions

Linear force 30N typical

Torque 0.5Nm typical

Load - High torque version

Linear force 75N typical

Torque 1.0Nm typical

Angular Deflection

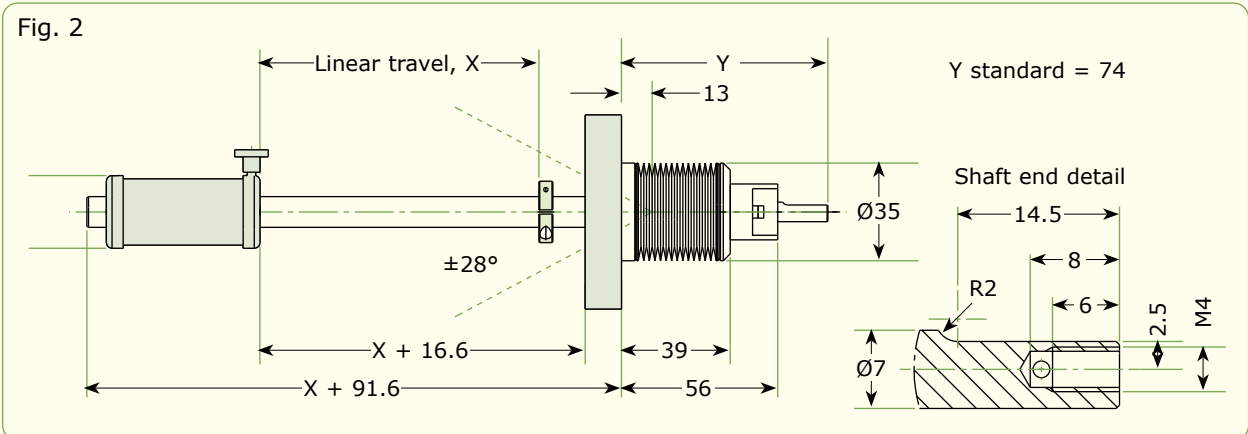
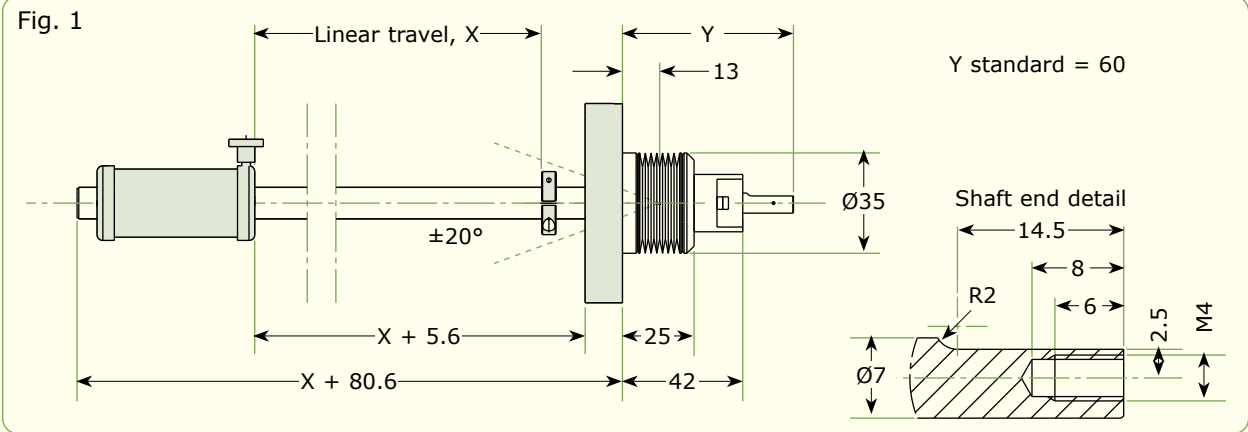
Standard version ±20°

Wide Angle -WA version ±28°

Features:

- Magnetically coupled.
- Rotatable shaft.
- Forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- Choice of angular deflection.
- High linear force and torque rated.

\* - Assembly rating must be reduced to that of lowest rated component.



All dimensions are nominal in millimetres unless otherwise specified

Single Shaft Wobblestick



Flange	Fig.	Angular Deflection	Linear Travel (X) / Shaft (Y)	Part Code	Price £	Price €
DN40CF	1	±20°	100	M-WM40-100	POA	POA
DN40CF	1	±20°	150	M-WM40-150	POA	POA
DN40CF	1	±20°	200	M-WM40-200	POA	POA
DN40CF	1	±20°	X/Y	M-WM40-X-Y	POA	POA

Please note: External support for wobble stick must be ordered separately.

Single Shaft Wide Angle Wobblestick

Flange	Fig.	Angular Deflection	Linear Travel (X) / Shaft (Y)	Part Code	Price £	Price €
DN40CF	2	±28°	X/Y	M-WM40-WA-X-Y	POA	POA

Please note: External support for wobble stick must be ordered separately.

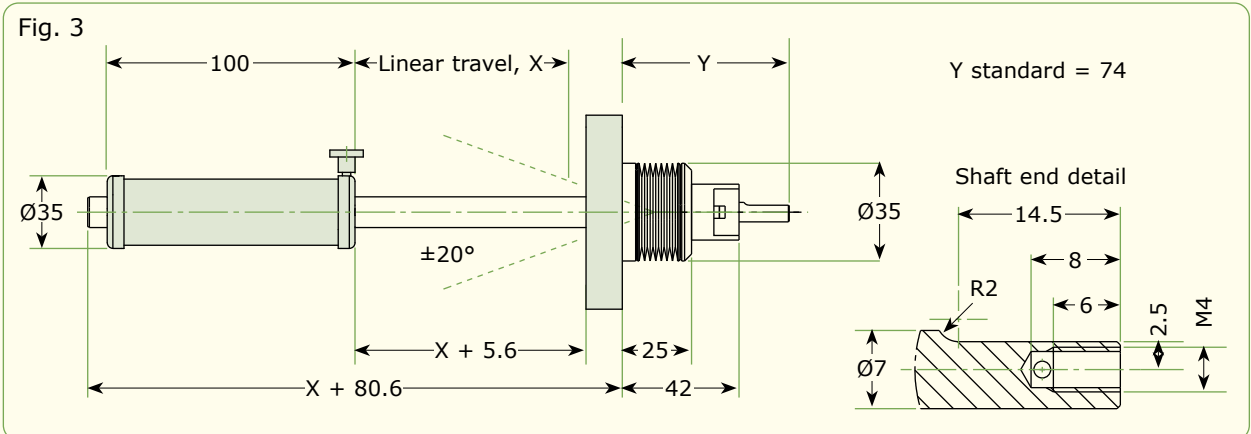
Single Shaft High Torque Wobblestick

Flange	Fig.	Angular Deflection	Linear Travel (X) / Shaft (Y)	Part Code	Price £	Price €
DN40CF	3	±20°	100	M-WM40HT-100	POA	POA
DN40CF	3	±20°	150	M-WM40HT-150	POA	POA
DN40CF	3	±20°	X/Y	M-WM40HT-X-Y	POA	POA

Please note: External support for wobble stick must be ordered separately.

Pincer Grips & Accessories

In addition to the above range of wobblesticks, we also offer a wide range of standard pincer grips, forks, other accessories and spare parts to suit. Pincer grips are available in many designs, including drop-in replacements for Omicron style pincers. For further information and pricing, please contact our sales office.



All dimensions are nominal in millimetres unless otherwise specified

Magnetically Coupled Wobblesticks Dual Shaft



Features:

- Magnetically coupled.
- Rotatable shafts.
- Pincer grip and forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- Choice of angular deflection.
- High linear force and torque rated.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load

Linear force 23N typical

Torque 0.4Nm typical

Angular Deflection

Standard version ±20°

Wide Angle -WA version ±28°

Please note, that the pictured pincer grip is not included in the standard price shown.

Dual Shaft Wobblestick



Flange	Fig.	Angular Deflection	Linear Travel	Part Code	Price £	Price €
DN40CF	1	±20°	100	M-WMG40-100	POA	POA
DN40CF	1	±20°	150	M-WMG40-150	POA	POA
DN40CF	1	±20°	200	M-WMG40-200	POA	POA
DN40CF	1	±20°	250	M-WMG40-250	POA	POA
DN40CF	1	±20°	300	M-WMG40-300	POA	POA
DN40CF	1	±20°	X/Y	M-WMG40-X-Y	POA	POA

Please note: External support for wobble stick must be ordered separately.

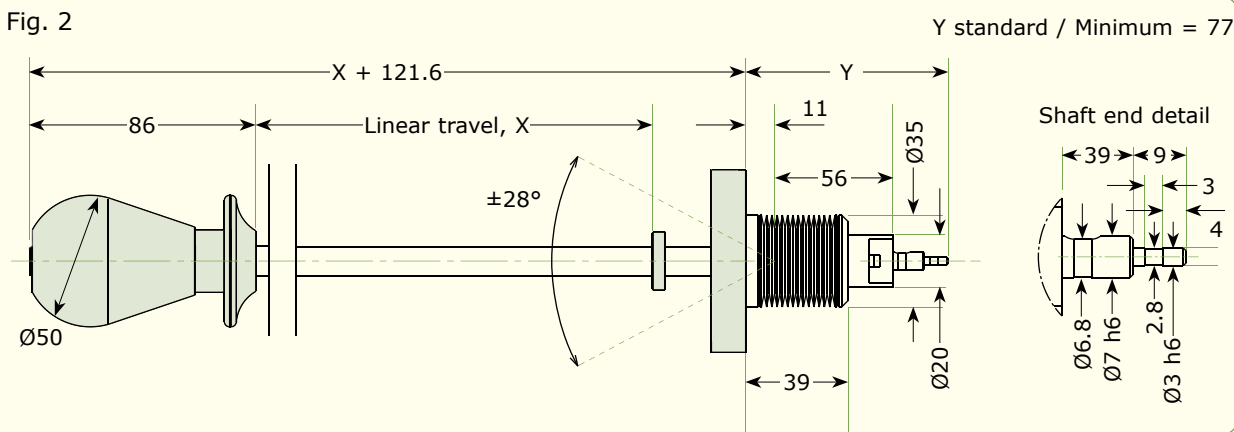
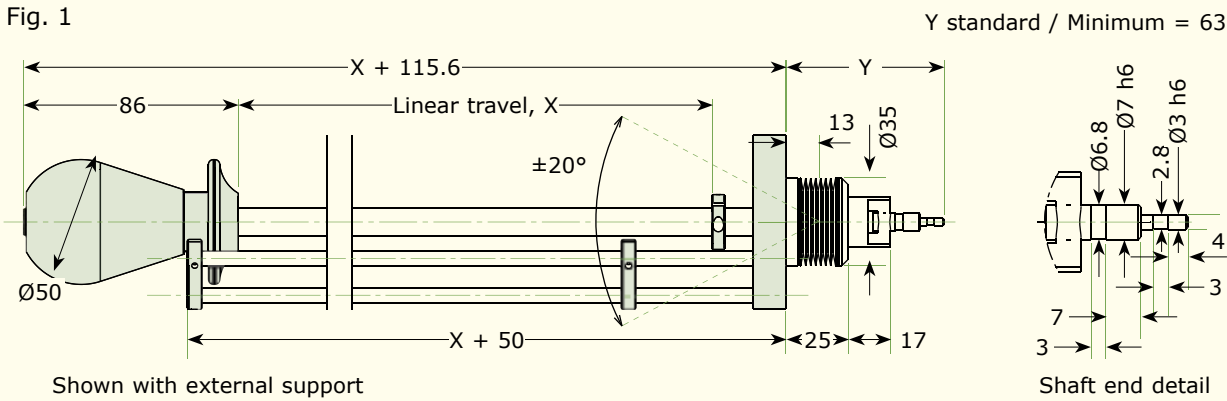
Dual Shaft Wide Angle Wobblestick

Flange	Fig.	Angular Deflection	Linear Travel	Part Code	Price £	Price €
DN40CF	2	±28°	X/Y	M-WMG40-WA-X-Y	POA	POA

Please note: External support for wobble stick must be ordered separately.

Pincer Grips & Accessories

In addition to the above range of wobblesticks, we also offer a wide range of standard pincer grips, forks, other accessories and spare parts to suit. Pincer grips are available in many designs, including drop-in replacements for Omicron style pincers. For further information and pricing, please contact our sales office.



All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified

Magnetically Coupled Wobblesticks Dual Shaft, High Precision Actuator



Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load

Linear force 23N typical

Torque 0.4Nm typical

Angular Deflection

Standard version ±20°

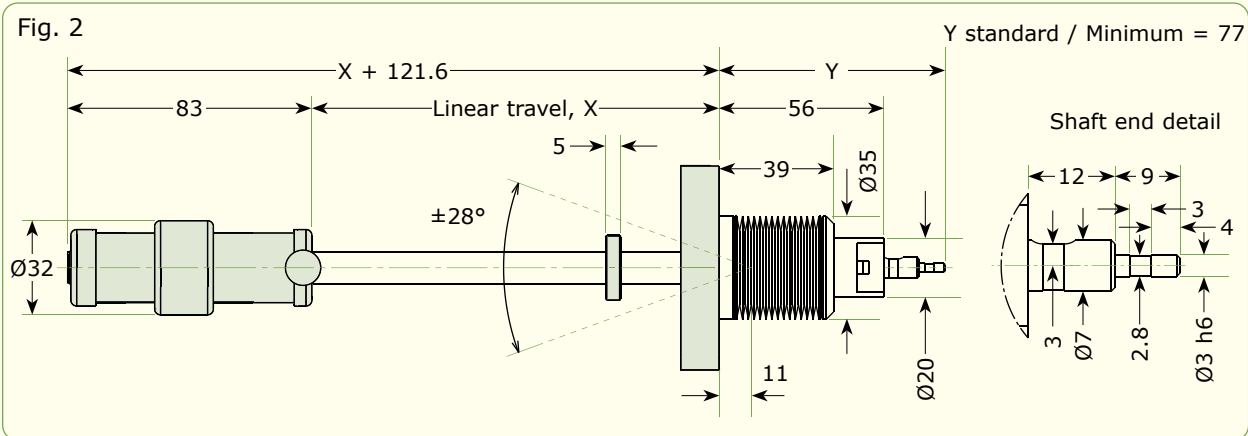
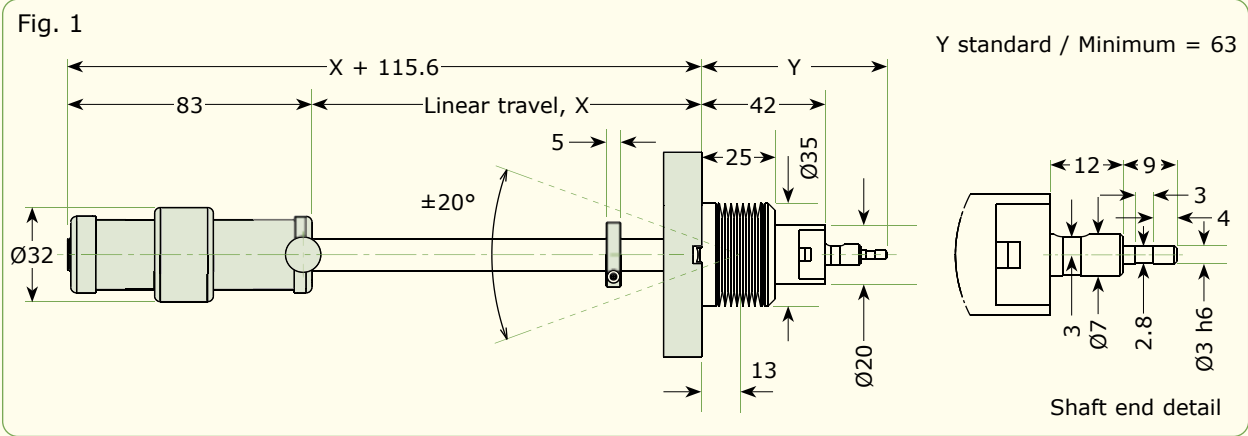
Wide Angle -WA version ±28°

Features:

- Magnetically coupled.
- Rotatable shafts.
- Pincer grip and forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- Choice of angular deflection.
- High linear force and torque rated.

Please note, that the pictured pincer grip is not included in the standard price shown

\* - Assembly rating must be reduced to that of lowest rated component.



All dimensions are nominal in millimetres unless otherwise specified

Dual Shaft Wobblestick, High Precision Actuator



Flange	Fig.	Angular Deflection	Linear Travel	Part Code	Price £	Price €
DN40CF	1	±20°	100	M-WMGHP40-100	POA	POA
DN40CF	1	±20°	150	M-WMGHP40-150	POA	POA
DN40CF	1	±20°	200	M-WMGHP40-200	POA	POA
DN40CF	1	±20°	X / Y	M-WMGHP40-X-Y	POA	POA

Please note: External support for wobble stick must be ordered separately.

Dual Shaft Wide Angle Wobblestick, High Precision Actuator

Flange	Fig.	Angular Deflection	Linear Travel	Part Code	Price £	Price €
DN40CF	2	±28°	X / Y	M-WMGHP40-WA-X-Y	POA	POA

Please note: External support for wobble stick must be ordered separately.

Pincer Grips & Accessories

In addition to the above range of wobblesticks, we also offer a wide range of standard pincer grips, forks, other accessories and spare parts to suit. Pincer grips are available in many designs, including drop-in replacements for Omicron style pincers. For further information and pricing, please contact our sales office.

All dimensions are nominal in millimetres unless otherwise specified



Pincer Grips

LewVac Pincer grips are intended for use with LewVac wobblesticks. Further details of these pincer grips can be found on our website [www.lewvac.co.uk](http://www.lewvac.co.uk). For custom solutions, please contact our sales office.

Straight Pincer Grips With Plain Jaws



Description	Part Code	Price £	Price €
Basic straight pincer without grooves	M-PGWMS	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Straight Pincer Grips For M-SHOM Plates



Description	Part Code	Price £	Price €
Straight pincer grip for M-SHOM flag style sample plates	M-PGWMS(OM)	POA	POA
Hard grip straight pincer grip for M-SHOM flag style sample plates	M-PGWMS(OMH)	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Long Straight Pincer Grips For M-SHOM Plates



Description	Part Code	Price £	Price €
Long straight pincer for M-SHOM flag style sample plates	M-PGWMSL(OM)	POA	POA
Hard grip Long straight pincer for M-SHOM flag style sample plates	M-PGWMSL(OMH)	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Pincer Grip For VG-STUB Sample Holders



Description	Part Code	Price £	Price €
Straight pincer grip for VG-STUB sample holders	M-PGWMS(VGS)	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Grabber For M-SHOM plates



Description	Part Code	Price £	Price €
Grabber tool ID 7mm for M-SHOM flag style sample plates	M-GRABSHOM7	POA	POA

Please note: Requires single shaft wobblestick for operation.

All dimensions are nominal in millimetres unless otherwise specified

Orthogonal Pincer Grip For M-SHOM plates



Description	Part Code	Price £	Price €
Orthogonal pincer for M-SHOM flag style sample holders	M-PGWMO(OM)	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Straight Pincer Grip For Wafer



Description	Part Code	Price £	Price €
Straight pincer high force version for wafer	M-PGHFWMWAF	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Parallel Pincer Grip For M-SHOM Plates



Description	Part Code	Price £	Price €
Parallel pincer for M-SHOM flag style sample plates	M-PGWMP(OM)	POA	POA
Hard grip parallel pincer for M-SHOM flag style sample plates	M-PGWMP(OMH)	POA	POA
Parallel pincer with isolated jaws	M-PGWMP(DC)	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Ultra Slim Pincer for M-SHOM plates



Description	Part Code	Price £	Price €
Straight pincer ultra slim LT AFM for M-SHOM flag style sample plates	M-PGWMS(OMUSLIMLT)	POA	POA

Please note: Requires dual shaft wobblestick for operation.

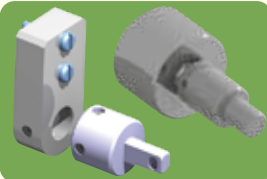
Pincer for JY-STM V3 & 4



Description	Part Code	Price £	Price €
Pincer grip for JT-STM V3	M-PGWMSJTAFM3	POA	POA
Pincer grip for JT-STM V4	M-PGWMSJTAFM4	POA	POA

Please note: Requires dual shaft wobblestick for operation.

Adapters For Omicron Pincers



Description	Part Code	Price £	Price €
Adapter for Omicron pincer grip SA02-1862 (STM1)	M-ADOMO	POA	POA
Adapter for Omicron pincer grip GA02-1810 / GA02-1119	M-ADOMO2	POA	POA
Adapter for Omicron pincer grip GA02-182	M-ADOMS	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

Sample plates & Holders etc.

LewVac sample plates and holders are intended for use with LewVac wobblesticks fitted with pincer grips et.  
Further details of these sample plates & holders can be found on our website [www.lewvac.co.uk](http://www.lewvac.co.uk).  
For custom solutions, please contact our sales office.

Sample Plates



1



2



3



4



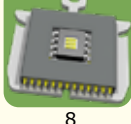
5



6



7



8



9



10

Description	Part Code	Price £	Price €
Stainless steel flag style sample plate (1)	M-SHOM	POA	POA
OFHC copper flag style sample plate (1)	M-SHOM-CU	POA	POA
CuBe2 flag style sample plate (1)	M-SHOM-CB	POA	POA
Titanium flag style sample plate (1)	M-SHOM-TI	POA	POA
Molybdenum flag style sample plate (1)	M-SHOM-MO	POA	POA
Tantalum flag style sample plate (1)	M-SHOM-TA	POA	POA
AL203 flag style sample plate (1)	M-SHOM-AL203	POA	POA
SHAPAL-M flag style sample plate (1)	M-SHOM-SH	POA	POA
Tungsten flag style sample plate (1)	M-SHOM-W	POA	POA
Silicon carbide flag style sample plate (1)	M-SHOM-SiC	POA	POA
Stainless steel flag style sample plate with 3 slits (2)	M-SHOM3S(ST)	POA	POA
Copper flag style sample plate with 3 slits (2)	M-SHOM3S(CU)	POA	POA
CuBe2 flag style sample plate with 3 slits (2)	M-SHOM3S(CUBE)	POA	POA
Titanium flag style sample plate with 3 slits (2)	M-SHOM3S(Ti)	POA	POA
Molybdenum flag style sample plate with 3 slits (2)	M-SHOM3S(MO)	POA	POA
Tantalum steel flag style sample plate with 3 slits (2)	M-SHOM3S(TA)	POA	POA
SHAPAL-M flag style sample plate with 3 slits (2)	M-SHOM3S(SH)	POA	POA
Tungsten flag style sample plate with 3 slits (2)	M-SHOM3S(W)	POA	POA
Silicon carbide flag style sample plate with 3 slits (2)	M-SHOM3S(SiC)	POA	POA
Stainless steel flag style sample plate - straight through model (3)	M-SHOS	POA	POA
Molybdenum flag style sample plate - straight through model (3)	SHOS(MO)	POA	POA
Stainless steel (304L) flag style sample plate with 5 X M1.4 tapped holes (4)	M-SHOMT(MO)	POA	POA
Molybdenum flag style sample plate with 5 X M1.4 tapped holes (4)	M-SHOMT(MO)	POA	POA
M1.4x1 Stainless steel slotted cheese head screw, pack of 12	M-FA18101401PK12	POA	POA
M1.4x1 Titanium slotted cheese head screw, pack of 12	M-FA18201401PK12	POA	POA
M1.4x1 Molybdenum slotted cheese head screw, pack of 12	M-FA18301401PK12	POA	POA
M1.4x1 Tantalum slotted cheese head screw, pack of 12	M-FA18401401PK12	POA	POA
Flat spring 4.4mm / 6mm / 8.6mm long for sample holding on M-SHOMT(#), Various materials, pack of 12*	M-SHFS(#)/PK12*	POA	POA
Molybdenum flag style sample plate for round or quadratic single crystal, diameter 10mm thickness 1mm (5)	M-SHOMTCH(MO)-10-01-09	POA	POA
Molybdenum flag style sample plate for rectangular single crystals, aperture 7X7mm thickness 1mm (6)	M-SHOMTCHR(MO)-07-07-01	POA	POA
Sample holder 13 electrical contacts, CuBe2 including temperature sensor (7)	M-SHOMEC13(CB-DT)	POA	POA
Sample holder 13 electrical contacts, molybdenum including temperature sensor (7)	M-SHOMEC13(MO-DT)	POA	POA
Sample holder out of molybdenum with 13 electrical contacts (8)	M-SHOMEC13(MO)	POA	POA
Molybdenum sample plate for direct current heating with central opening for optical access from the rear (9)	M-SHOMDCRA	POA	POA
Moly/ceramic flag style sample plate for direct current heating (both terminals isolated from plate) (9)	M-SHOMDC	POA	POA
Moly/ceramic flag style sample plate for direct current heating (both terminals isolated from plate) (9)	M-SHOMDC(N)	POA	POA
Sample holder for 1 Inch wafers (10)	M-SHUPSCH	POA	POA

\* - Various lengths & materials available - See website or contact sales office for details

All dimensions are nominal in millimetres unless otherwise specified

Sample Plate Receivers etc. For Sample Plates



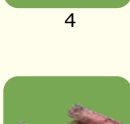
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2



3



4



5



6



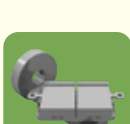
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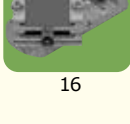
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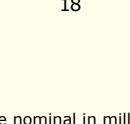
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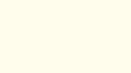
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13



14



15



16

Description	Part Code	Price £	Price €
Drawer style receiver for M-SHOM sample plates stainless steel with ruby spheres (1)	M-RECOM(ST)	POA	POA
Drawer style receiver for M-SHOM sample plates beryllium copper with ruby spheres (1)	M-RECOM(CB)	POA	POA
Drawer style receiver for M-SHOM sample plates titanium with ruby spheres (1)	M-RECOM(TI)	POA	POA
Drawer style receiver for M-SHOM sample plates molybdenum with ruby spheres (1)	M-RECOM(MO)	POA	POA
Side mount drawer for M-SHOM sample plates (2)	M-RECOM(SM2ST)	POA	POA
Stack of receptacles for M-SHOM plates X slots, Y spacer height (3)	M-RECOMSTACK(XHYS)K	POA	POA
Stack of receptacles for M-SHOM plates X slots, Y spacer height, inversely mounted(3)	M-RECOMSTACK(XHYS)H	POA	POA
Stainless steel receptacle for M-SHOMEC13 with 13 electrical contacts (4)	M-RECOMEC13(ST)	POA	POA
CuBe receptacle for M-SHOMEC13 with 13 electrical contacts (4)	M-RECOMEC13(CB)	POA	POA
Three point contact receiver for M-SHOM sample plates (ST-ST) with ruby spheres (5)	M-RECOM3S(ST)	POA	POA
Three point contact receiver for M-SHOM sample plates (CuBe) with ruby spheres (5)	M-RECOM3S(CB)	POA	POA
Three point contact receiver for M-SHOM sample plates (molybdenum) with ruby spheres (5)	M-RECOM3S(MO)	POA	POA
Three point contact receiver for M-SHOM sample plates (tantalum) with ruby spheres (5)	M-RECOM3S(TA)	POA	POA
Three point contact receiver for M-SHOM sample plates (titanium) with ruby spheres (5)	M-RECOM3S(TI)	POA	POA
Receiver for M-SHOM sample Plates, Low Temperature version, Gold Plated Copper (6)	M-RECOMLT(CUAU)	POA	POA
Receiver for M-SHOM sample Plates, Low Temperature version, molybdenum (6)	M-RECOMLT(MO)	POA	POA
Sample receiver with two high current electrical contacts for DC heating of M-SHOMDC sample holders (7)	M-RECOMDC	POA	POA
Sample receiver with two high current electrical contacts for DC heating of M-SHOMDC sample holders with central opening for optical access from the rear (7)r	M-RECOMDCRA	POA	POA
Receptacle for M-SHOM plates housing & springs molybdenum, ruby spheres fits directly onto M-HTR1001 (8)	M-RECOMHTR1001S	POA	POA
Receptacle with rear access for M-SHOM sample plates stainless steel (9)	M-RECOMRA(ST)	POA	POA
Receptacle with rear access for M-SHOM sample plates molybdenum (9)	M-RECOMRA(MO)	POA	POA
Stage of numbered receptacles for 20X Double spaced slots for M-SHOM plates (10)	M-RECOMSTAGE(4X05H04S)N	POA	POA
Receptacle for RM-SHOM on VG-OMNIA X E-beam heater (11)	M-RECOMZEBH	POA	POA
Drawer style receiver for large flag style plates holding 1 Inch wafers (12)	M-RECUPS	POA	POA
Revolving sample carrier for 2X block style holders (13)	M-RSC2BS	POA	POA
Revolving sample carrier for 2X M-SHOM sample plates (14)	M-RSC2OM	POA	POA
Revolving sample carrier for small block style holders (15)	M-RSC4BSK	POA	POA
Flat revolving sample carrier for M-SHOM sample plates (16)	M-RSCFL4OM	POA	POA
Revolving sample carrier for 3X M-SHOM sample plates (17)	M-RSCL3OM	POA	POA
Revolving sample carrier for 4X block style holders (18)	M-RSCL4BS	POA	POA
Spacer plate for sample plate receivers (19)	M-ADRECSP(ST)-X	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

Wobblestick Accessories

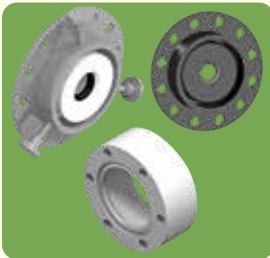
LewVac wobblestick accessories are intended for use with LewVac wobblesticks. Further details of these accessories can be found on our website [www.lewvac.co.uk](http://www.lewvac.co.uk). For custom solutions, please contact our sales office.

External Support / Parking Rail etc.



Description	Part Code	Price £	Price €
External wobblestick support straddled bolt holes	M-WM-TS	POA	POA
External wobblestick support - in-line bolt holes	M-WM-TSIL	POA	POA
Parking / protection rail for M-WM DN40CF vertical	M-TSWMV-X	POA	POA
Locking ring for support /parking rails DN40CF	M-TSWMLR	POA	POA
Parking / protection rail for wobblesticks DN40CF also for non horizontal usage	M-TSWMF-X	POA	POA

Aligner, Deflection Limiter & Bellow Protection



Description	Part Code	Price £	Price €
Aligner for wobblesticks	M-TSWMA	POA	POA
Deflection limiter (3 deg.) for wobblesticks DN40CF	M-TSWMDL(3)	POA	POA
Bellow protection for wobble sticks*	M-BP40	POA	POA

\* - Can also be used for mounting a wobblestick on a port with undersized tube.

Forks



Description	Part Code	Price £	Price €
Straight forks for block style holders	M-FRKBS	POA	POA
Short forks for block style holders	M-FRKBSDM340	POA	POA

Hex Key & Nut Adapters



Description	Part Code	Price £	Price €
1.5mm Hex key adapter for M-WM wobblestick	M-HEXKEY-M1.5	POA	POA
2.0mm Hex key adapter for M-WM wobblestick	M-HEXKEY-M2	POA	POA
2.5mm Hex key adapter for M-WM wobblestick	M-HEXKEY-M2.5	POA	POA
3.0mm Hex key adapter for M-WM wobblestick	M-HEXKEY-M3	POA	POA
4.0mm Hex key adapter for M-WM wobblestick	M-HEXKEY-M4	POA	POA
5.0mm Hex key adapter for M-WM wobblestick	M-HEXKEY-M5	POA	POA
3/32 Inch hex key adapter for FOR M-WM wobblestick	M-HEXKEY-I-3/32	POA	POA
1/8 Inch hex key adapter for M-WM wobblestick	M-HEXKEY-I-1/8	POA	POA
5/32Inch hex key adapter for M-WM wobblestick	M-HEXKEY-I-5/32	POA	POA
3/16 Inch hex key adapter for M-WM wobblestick	M-HEXKEY-I-3/16	POA	POA
Hex nut drive for M1.5 nut for M-WM wobblestick	M-HEXNUT-M1.5	POA	POA
Hex nut drive for M2.0 nut for M-WM wobblestick	M-HEXNUT-M2	POA	POA
Hex nut drive for 1/8 Inch nut for M-WM wobblestick	M-HEXNUT-I-1/8	POA	POA
Hex nut drive for 3/32 Inch nut for M-WM wobblestick	M-HEXNUT-I-3/32	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

Service Kits



Description	Part Code	Price £	Price €
Service kit for M-WM40 with 7mm shaft	M-SERKWM40	POA	POA
Service kit for M-WM40 with 5mm shaft	M-SERKWM40(S5)	POA	POA

Factory Overhaul, Customisation



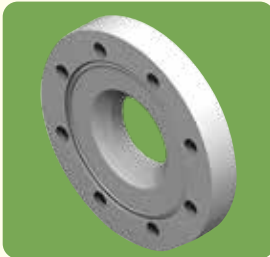
Description	Part Code	Price £	Price €
Factory overhaul of M-WMG wobblestick	M-SERFWMG40	POA	POA
Factory change of retracted length for M-WMG wobblestick	M-SERFWMG40DY-X-Y-Z	POA	POA

Shaft End Adapters



Description	Part Code	Price £	Price €
Adapter M-WM40 with D=5mm shaft from M3 to M4 internal thread	M-ADWMS5(M4I)	POA	POA
Adapter M-WM40 with D=7mm shaft from M4 to M3 internal thread	M-ADWMS7(M3I)	POA	POA
Adapter M-WM40 with D=7mm shaft from M4 TO M6 internal thread	M-ADWMS7(M6I)	POA	POA
PEEK Adapter for M-WM40 end piece D=7mm /L=16mm	M-ADWMS7(70L16PEEK)	POA	POA

Zero Length Adapter



Description	Part Code	Price £	Price €
ZEero length reducing flange CF63 to CF40 for wobblesticks	M-ZLCF63CF40WM	POA	POA

All dimensions are nominal in millimetres unless otherwise specified



Magnetically Coupled Single / Dual Shaft Linear & Rotary Feedthroughs



Features:

- Magnetically coupled.
- Fixed or rotatable shafts.
- Grabber, Pincer grip or forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- High linear force and torque rated.
- Position limits.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load

Linear force, MD version 30N typical

Linear force, MD(HT) version 60N typical

Linear force, MDG version 23N typical

Torque, MD version 0.5Nm typical

Torque, MD(HT) version 1Nm typical

Torque, MDG version 0.4Nm typical

Retracted Shaft Length

Single shaft 30mm

Dual shaft 30mm

Fig 1

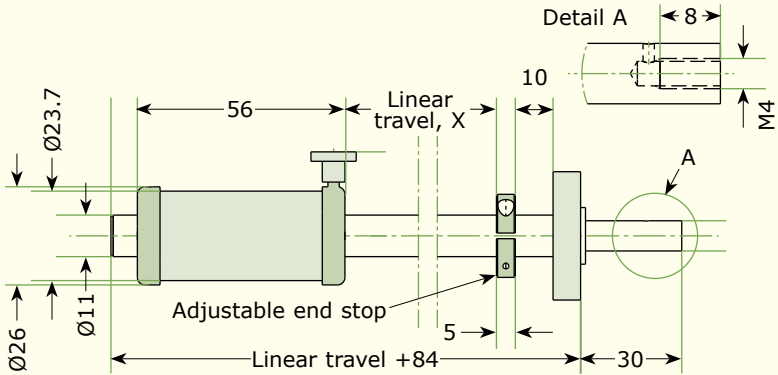
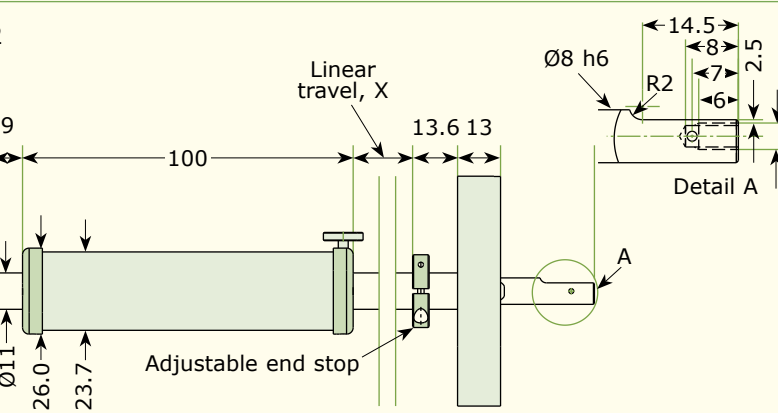


Fig 2



All dimensions are nominal in millimetres unless otherwise specified

Single Shaft Linear & Rotary



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN16CF	1	11	100	M-MD16-100	POA	POA
DN16CF	1	11	200	M-MD16-200	POA	POA
DN16CF	1	11	300	M-MD16-300	POA	POA
DN16CF	1	11	400	M-MD16-400	POA	POA
DN16CF	1	11	X	M-MD16-X-Y	POA	POA
DN40CF	1	11	100	M-MD40-100	POA	POA
DN40CF	1	11	200	M-MD40-200	POA	POA
DN40CF	1	11	300	M-MD40-300	POA	POA
DN40CF	1	11	400	M-MD40-400	POA	POA
DN40CF	1	11	X	M-MD40-X-Y	POA	POA

Single Shaft Linear & Rotary - High Torque



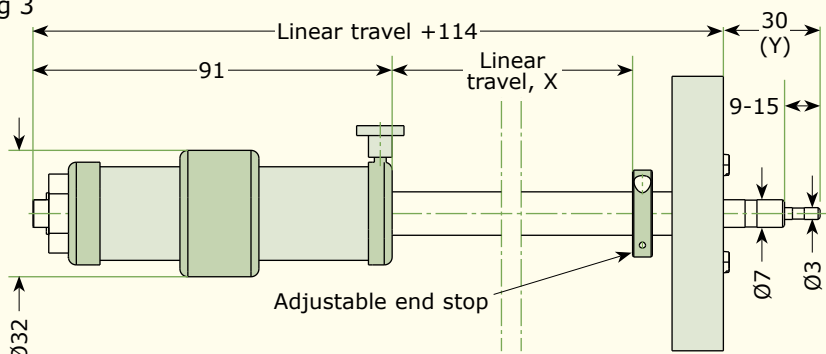
Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN16CF	2	11	100	M-MD16(HT)-100-30	POA	POA
DN16CF	2	11	200	M-MD16(HT)-200-30	POA	POA
DN16CF	2	11	300	M-MD16(HT)-300-30	POA	POA
DN16CF	2	11	400	M-MD16(HT)-400-30	POA	POA
DN16CF	2	11	500	M-MD16(HT)-500-30	POA	POA
DN16CF	2	11	X	M-MD16(HT)-X-Y	POA	POA
DN40CF	2	11	100	M-MD40(HT)-100-30	POA	POA
DN40CF	2	11	200	M-MD40(HT)-200-30	POA	POA
DN40CF	2	11	300	M-MD40(HT)-300-30	POA	POA
DN40CF	2	11	400	M-MD40(HT)-400-30	POA	POA
DN40CF	2	11	500	M-MD40(HT)-500-30	POA	POA
DN40CF	1	11	X	M-MD40(HT)-X-Y	POA	POA

Dual Shaft Linear & Rotary



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	3	11	100	MDG40-100-30	POA	POA
DN40CF	3	11	150	MDG40-150-30	POA	POA
DN40CF	3	11	200	MDG40-200-30	POA	POA
DN40CF	3	11	250	MDG40-250-30	POA	POA
DN40CF	3	11	300	MDG40-300-30	POA	POA
DN40CF	3	11	X	MDG40-X-Y	POA	POA

Fig 3



All dimensions are nominal in millimetres unless otherwise specified



Magnetically Coupled Single Shaft Linear & Rotary Transporters



Features:

- Magnetically coupled.
- Fixed or rotatable shaft.
- Sliding bearings
- Grabber, Pincer grip or forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- High linear force and torque rated.
- Position limits.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load

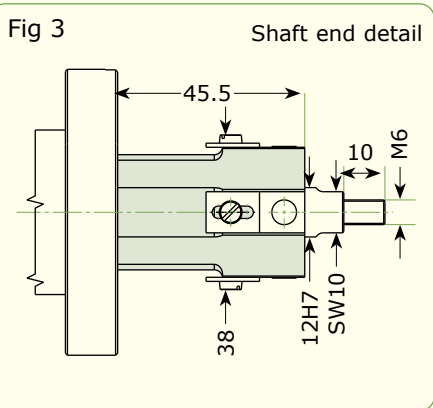
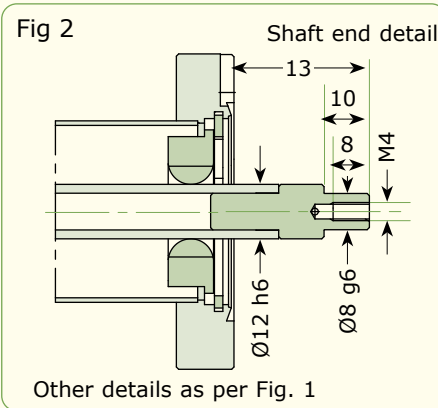
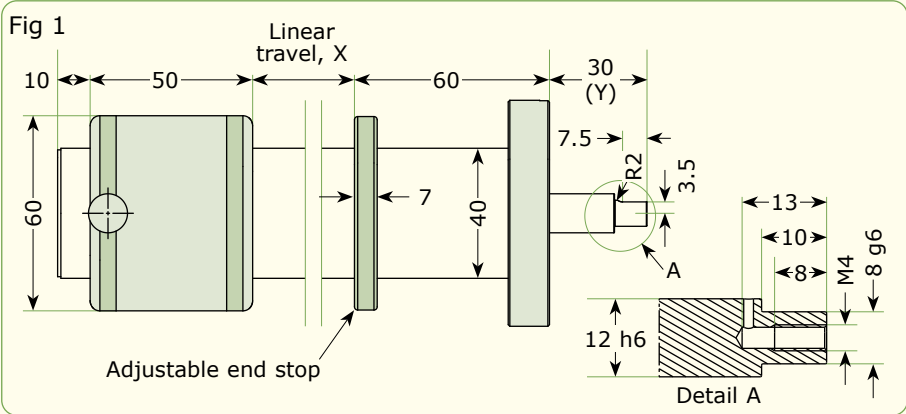
Linear force 70N typical

Torque 5Nm typical

Retracted Shaft Length

Single shaft 30mm

The M-RM40 is a simple, all metal sealed, linear-rotary feedthrough for ultra high vacuum applications. It's main purpose is to transport samples in between UHV chambers. A set of rare earth magnets on the air and vacuum side provides the necessary force to ensure a rigid coupling from the handle to the inner shaft. Slide bearings guarantee for smooth operation even after numerous bakeout cycles. Hollow Shaft, version, in vacuum brake & belt drive versions also available.



All dimensions are nominal in millimetres unless otherwise specified

Single Shaft Linear & Rotary



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	1	40	500	M-RM40-500-30	POA	POA
DN40CF	1	40	750	M-RM40-750-30	POA	POA
DN40CF	1	40	1000	M-RM40-1000-30	POA	POA
DN40CF	1	40	1250	M-RM40-1250-30	POA	POA
DN40CF	1	40	X	M-RM40-X-Y	POA	POA

Single Hollow Shaft Linear & Rotary



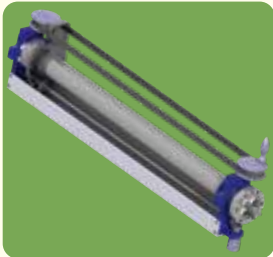
Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	2	40	X	M-RMHS40-X-Y	POA	POA

Single Hollow Shaft Linear & Rotary With In-Vacuum Brake

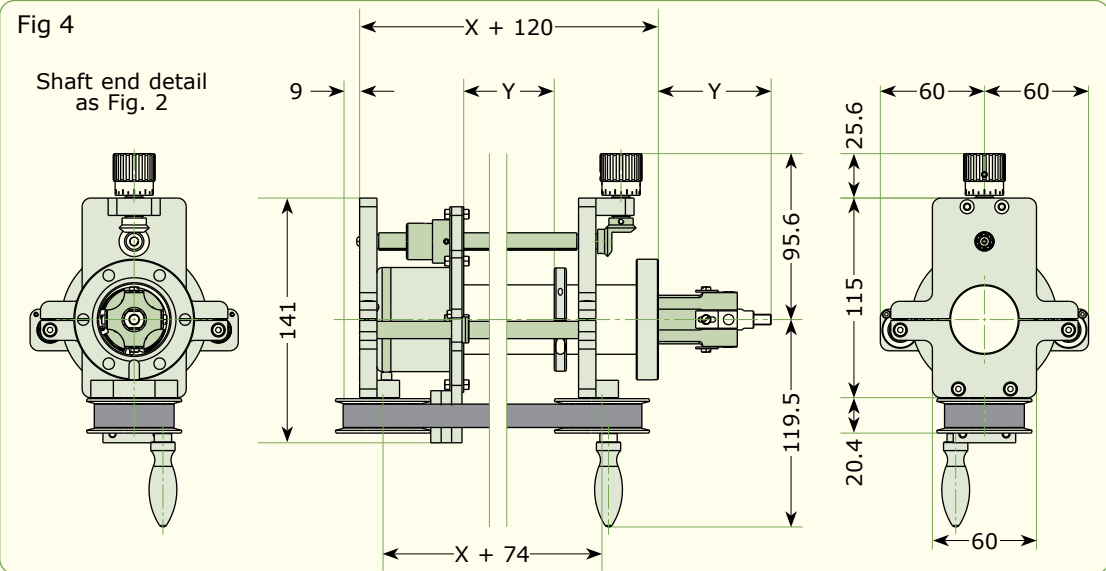


Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	3	40	X	M-RMHS40-X-Y-IVBR	POA	POA

Single Hollow Shaft Linear & Rotary With In-Vacuum Brake & Belt Drive



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	4	40	X	M-RMHS40-X-Y-IVBR-TSRMBD	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Magnetically Coupled Dual Shaft Single Rotary Linear & Rotary Transporters



Features:

- Magnetically coupled.
- Outer shaft fixed, inner shaft rotatable.
- Dicronite coated ball bearings
- Grabber, Pincer grip or forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- High linear force and torque rated.
- Position limits.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load

Linear force 70N typical

Torque 5Nm typical

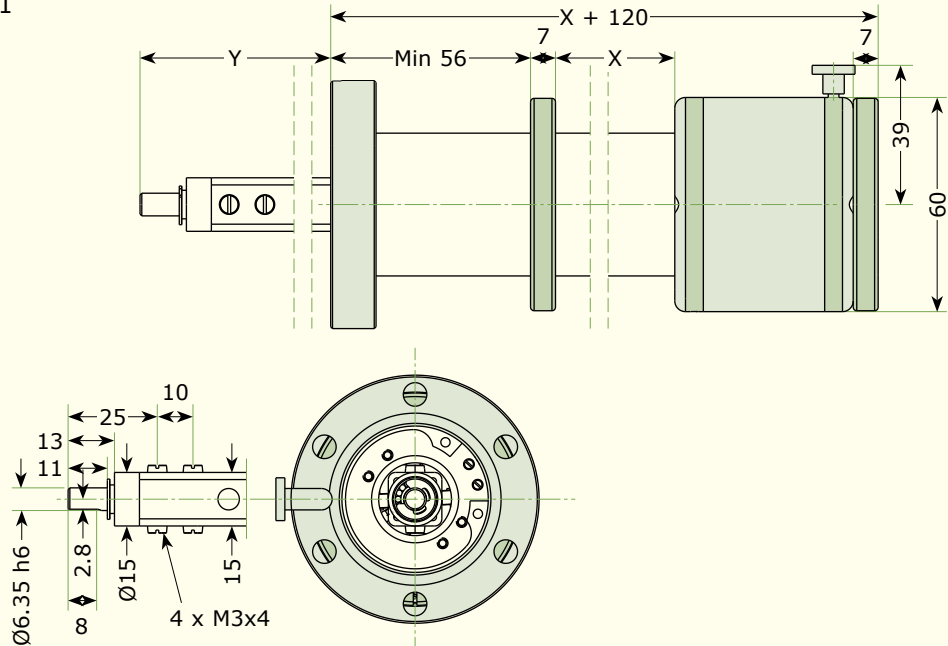
Retracted Shaft Length

Dual shaft 50mm

The M-RMD40 is an all metal sealed,linear-rotary feedthrough with independent rotation of the inner shaft. It's main purpose is to transport samples between UHV chambers. The independent rotary motion can be used to operate a sample locking mechanism or to rotate the sample carrier platform. The square shaft makes this feedthrough especially sturdy. A set of rare earth magnets on the air and vacuum side provides the necessary force to ensure a rigid coupling from the handle to the shaft. All ball bearings are Dicronite (W-disulfide) dry lube coated. On request, the M-RMD can be built with SiC ceramic hybrid ball bearings.

Pincer grips fitted to the M-RMD40 are oriented vertically. For horizontal orientation of the pincer, see M-RMD40(H).

Fig 1



All dimensions are nominal in millimetres unless otherwise specified

Dual Shaft Single Rotary



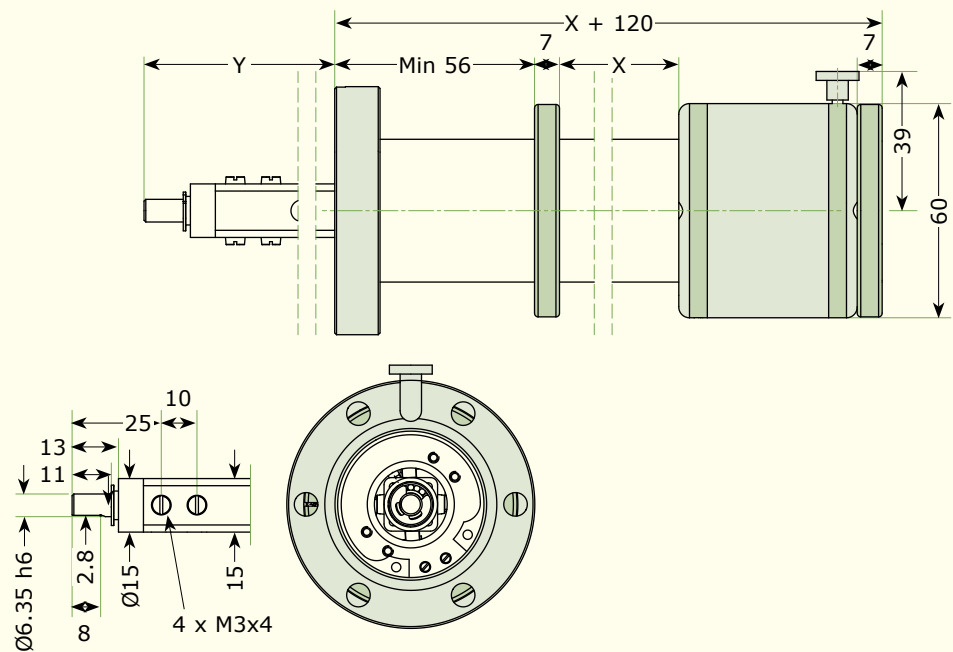
Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	1	40	300	M-RMD40-300-50	POA	POA
DN40CF	1	40	500	M-RMD40-500-50	POA	POA
DN40CF	1	40	750	M-RMD40-750-50	POA	POA
DN40CF	1	40	1000	M-RMD40-1000-50	POA	POA
DN40CF	1	40	X	M-RMD40-X-Y	POA	POA

Dual Shaft Single Rotary (Horizontal)



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	2	40	300	M-RMD40(H)-300-50	POA	POA
DN40CF	2	40	500	M-RMD40(H)-500-50	POA	POA
DN40CF	2	40	750	M-RMD40(H)-750-50	POA	POA
DN40CF	2	40	1000	M-RMD40(H)-1000-50	POA	POA
DN40CF	2	40	X	M-RMD40(H)-X-Y	POA	POA

Fig 2



All dimensions are nominal in millimetres unless otherwise specified

Magnetically Coupled Dual Rotary Shaft Linear & Rotary Transporters



The M-RMDG40 is an all metal sealed,linear-rotary feedthrough with independent rotation of the inner as well as the outer shaft. It's main purpose is to transport samples between UHV-chambers. The independent rotary motion of each shaft enhances operation of sample locking mechanisms and sample carrier platforms by being able to drive and also rotate them. Two sets of rare earth magnets on the air- and vacuum side provide the necessary force to ensure a rigid coupling from the handle to the shaft. All ball bearings are Dicronite™ (W-disulfide) dry lube coated. On request, the RMDG can be built with SiC ceramic hybrid ball bearings.

Features:

- Magnetically coupled.
- Outer and inner shafts rotatable.
- Dicronite coated ball bearings
- Grabber, Pincer grip or forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- High linear force and torque rated.
- Position limits.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load

Linear force 70N typical

Torque 5Nm typical

Retracted Shaft Length

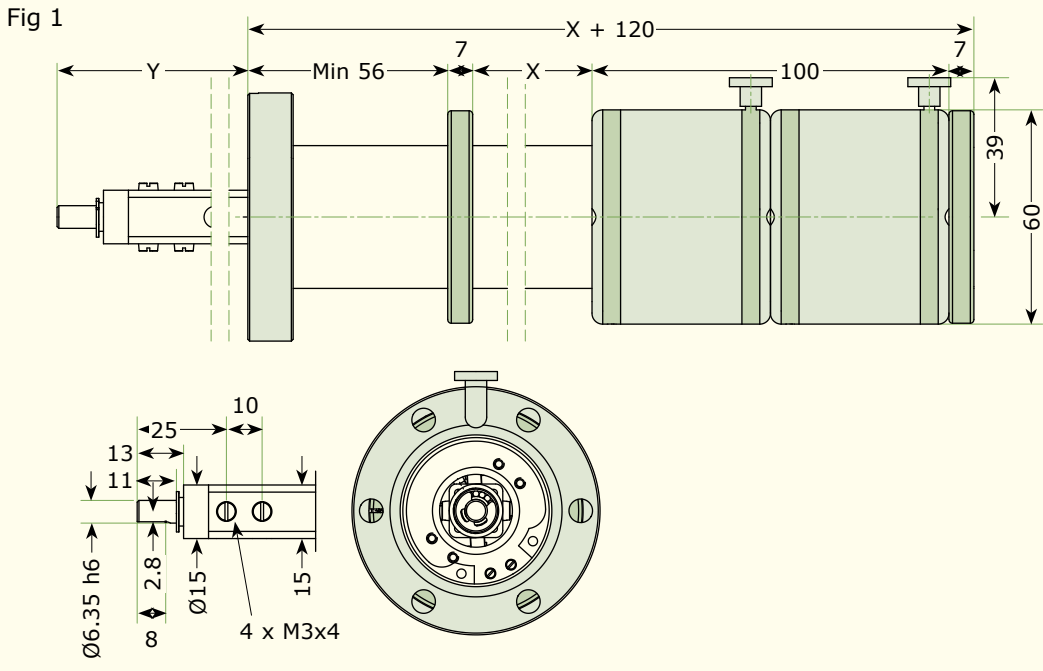
Dual shaft 50mm

All dimensions are nominal in millimetres unless otherwise specified

Dual Rotary Shaft



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	1	40	300	M-RMDG40-300-50	POA	POA
DN40CF	1	40	500	M-RMDG40-500-50	POA	POA
DN40CF	1	40	750	M-RMDG40-750-50	POA	POA
DN40CF	1	40	1000	M-RMDG40-1000-50	POA	POA
DN40CF	1	40	X	M-RMDG40-X-Y	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Magnetically Coupled Dual Shaft Single Rotary Transporters - Slide Bearings



Features:

- Magnetically coupled.
- Outer shaft fixed, inner shaft rotatable.
- Slide bearings
- Grabber, Pincer grip or forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- High linear force and torque rated.
- Position limits.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged -196 to 150°C

Load

Linear force 70N typical

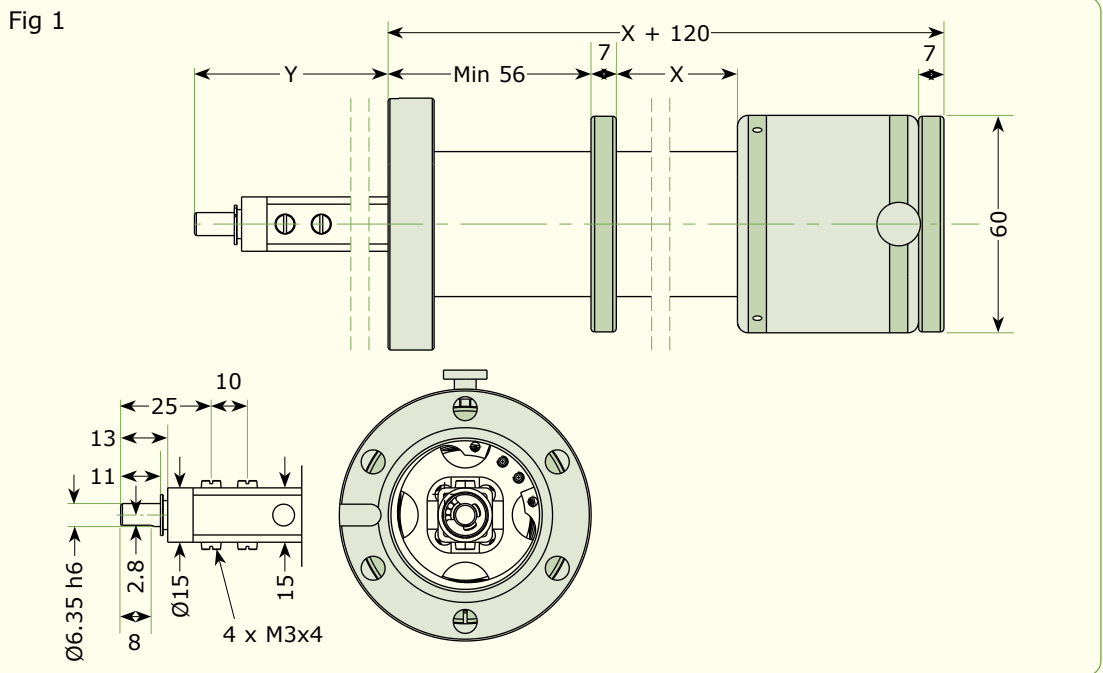
Torque 5Nm typical

Retracted Shaft Length

Dual shaft 50mm

The M-RMJ40 is an all metal sealed, linear-rotary feedthrough with independent rotation of the inner shaft. It's main purpose is to transport samples between UHV-chambers. The independent rotary motion can be used to operate a sample locking mechanism or to rotate a sample carrier platform. The square shaft makes this feedthrough especially sturdy. A set of rare earth magnets on the air- and vacuumside provides the necessary force to ensure a rigid coupling from the handle to the shaft. It's main bearings are of the sliding type, which ensures durability and smooth operation, even over the course of numerous bake out cycles.

Pincer grips fitted to the M-RMJ40 are oriented vertically. For horizontal orientation of the pincer, see M-RMJ40(H).



All dimensions are nominal in millimetres unless otherwise specified

Dual Shaft Single Rotary



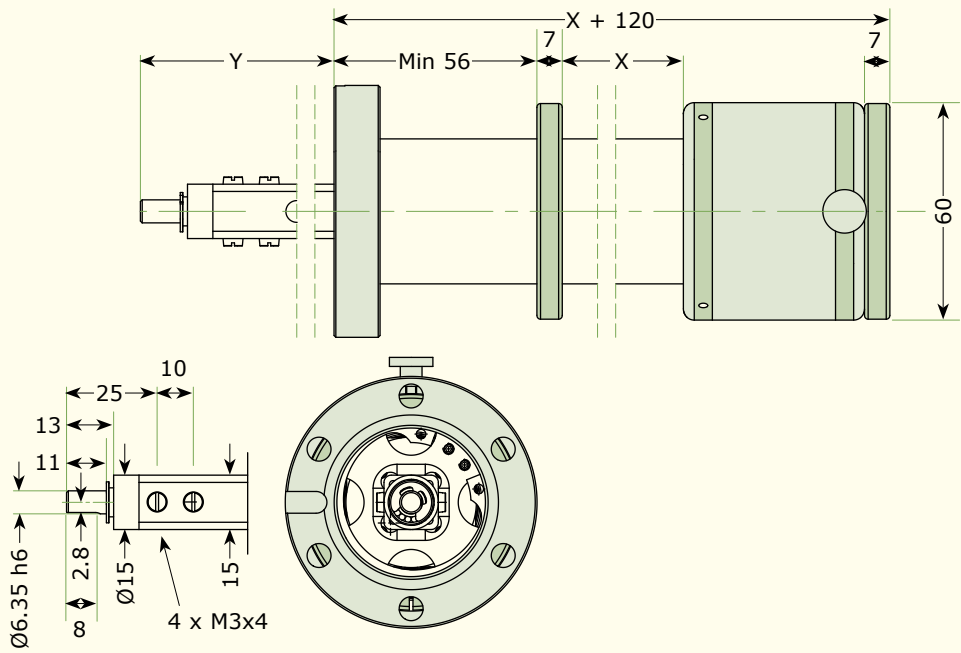
Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	1	40	300	M-RMJ40-300-50	POA	POA
DN40CF	1	40	500	M-RMJ40-500-50	POA	POA
DN40CF	1	40	750	M-RMJ40-0750-50	POA	POA
DN40CF	1	40	1000	M-RMJ40-1000-50	POA	POA
DN40CF	1	40	X	M-RMJ40-X-Y	POA	POA

Dual Shaft Single Rotary (Horizontal)



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	2	40	300	M-RMJ40(H)-300-50	POA	POA
DN40CF	2	40	500	M-RMJ40(H)-500-50	POA	POA
DN40CF	2	40	750	M-RMJ40(H)-0750-50	POA	POA
DN40CF	2	40	1000	M-RMJ40(H)-1000-50	POA	POA
DN40CF	2	40	X	M-RMJ40(H)-X-Y	POA	POA

Fig 2



All dimensions are nominal in millimetres unless otherwise specified



Magnetically Coupled Dual Rotary Shaft Transporters - Slide Bearings



Features:

- Magnetically coupled.
- Outer and inner shafts rotatable.
- Slide bearings
- Grabber, Pincer grip or forks available.
- Standard or custom lengths available.
- UHV compatible construction.
- High linear force and torque rated.
- Position limits.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged                      atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged                      -196 to 150°C

Load

Linear force                      70N typical

Torque                              5Nm typical

Retracted Shaft Length

Dual shaft                              30mm

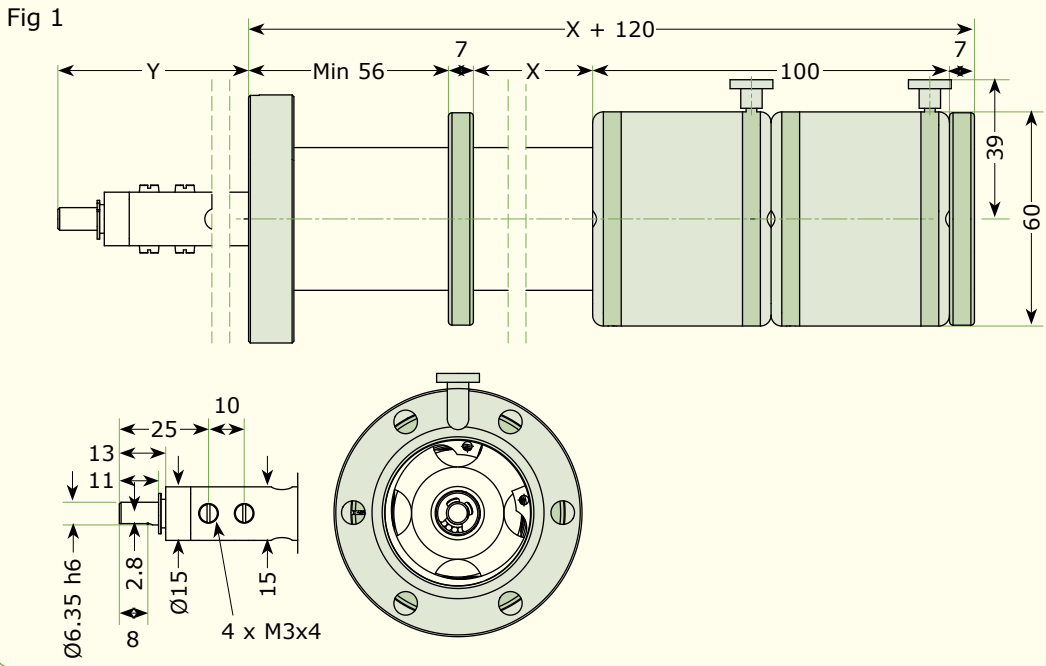
The M-RMJG40 is a simple, all metal sealed, linear-rotary feedthrough with independent rotation of the inner as well as the outer shaft. It's main purpose is to transport samples between UHV-chambers. The independent rotary motion of each shaft enhances operation of sample locking mechanisms and sample carrier platforms by being able to drive and also rotate them. Two sets of rare earth magnets on the air and vacuum side provide the necessary force to ensure a rigid coupling from the handle to the shaft. Slide bearings for linear motion throughout guarantee for smooth operation even after numerous bakeout cycles.

All dimensions are nominal in millimetres unless otherwise specified

Dual Rotary Shaft



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	1	40	300	M-RMJG40-300-50	POA	POA
DN40CF	1	40	500	M-RMJG40-500-50	POA	POA
DN40CF	1	40	750	M-RMJG40-0750-50	POA	POA
DN40CF	1	40	1000	M-RMJG40-1000-50	POA	POA
DN40CF	1	40	X	M-RMJG40-X-Y	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Magnetically Coupled Single Non Rotary Shaft Linear Transporters



The M-RMDS40 is an all metal sealed, linear feedthrough. It's main purpose is to transport samples between UHV-chambers. The square shaft makes this feedthrough especially sturdy. A set of rare earth magnets on the air- and vacuum side provides the necessary force to ensure a rigid coupling from the handle to the shaft. All ball bearings are Dicronite (W-disulfide) dry lube coated. On request, the RMDS can be built with SiC ceramic hybrid ball bearings.

Features:

- Magnetically coupled.
- Single shaft non-rotatable.
- Dicronite coated ball bearings
- Accessories available.
- Standard or custom lengths available.
- UHV compatible construction.
- High linear force and torque rated.
- Position limits.

\* - Assembly rating must be reduced to that of lowest rated component.

Specifications:

Materials

All UHV compatible

Vacuum Range

CF flanged                      atm to 1x10<sup>-11</sup>mbar

Temperature Range\*

CF flanged                      -196 to 150°C

Load

Linear force                      70N typical

Torque                              5Nm typical

Retracted Shaft Length

Dual shaft                              30mm

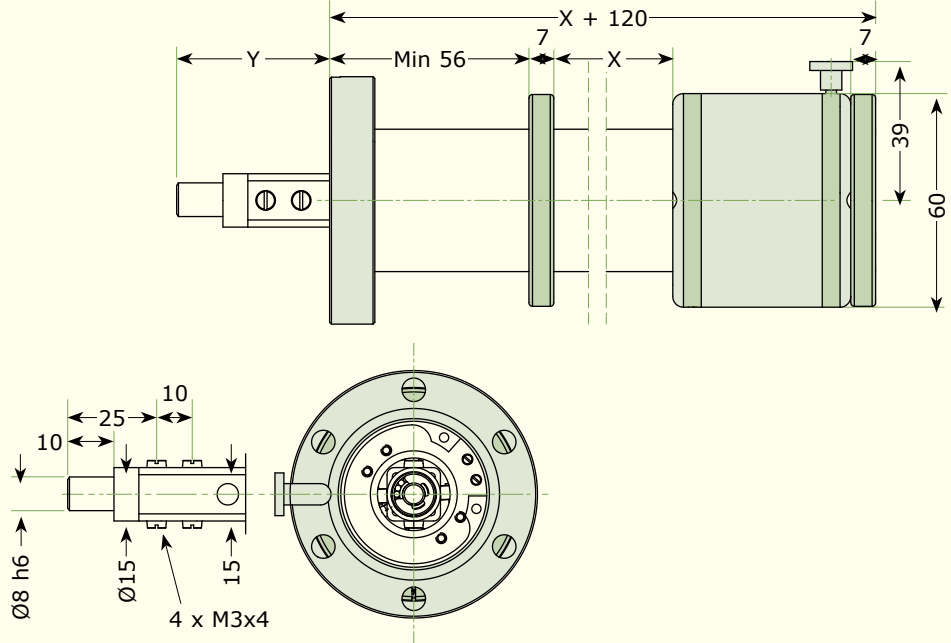
All dimensions are nominal in millimetres unless otherwise specified

Dual Rotary Shaft



Flange	Fig.	Tube OD	Linear travel, X	Part Code	Price £	Price €
DN40CF	1	40	300	M-RMDS40-300-50	POA	POA
DN40CF	1	40	500	M-RMDS40-500-50	POA	POA
DN40CF	1	40	750	M-RMDS40-750-50	POA	POA
DN40CF	1	40	1000	M-RMDS40-1000-50	POA	POA
DN40CF	1	40	X	M-RMDS40-X-Y	POA	POA

Fig 1



All dimensions are nominal in millimetres unless otherwise specified

Linear / Rotary Feedthrough & Transporter Accessories

LewVac Linear / Rotary Feedthrough & Transporter Accessories are intended for use with LewVac Linear / Rotary Feedthrough & Transporters  
Further details of these accessories can be found on our website [www.lewvac.co.uk](http://www.lewvac.co.uk).  
For custom solutions, please contact our sales office.

Tube supports



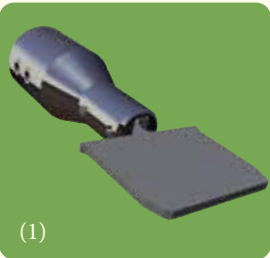
Description	Part Code	Price £	Price €
Tube support for M-MD16/40-XXX (double sided) (M-ADCF16TS required for DN16CF version)	M-TSMD-X	POA	POA
Tube support for M-MD16/40-XXX (single sided) (M-ADCF16TS required for DN16CF version)	M-TSMDH-X	POA	POA
Support tube adapter for DN16CF flanges	M-ADCF16TS	POA	POA
Tube support with pivot mounted shafts OD=10mm (up to 1000mm length)	M-TSRMB-X	POA	POA
Tube support with pivot mounted shafts OD=16mm (up to 1800mm length)	M-TSRMBS-X	POA	POA

General Accessories

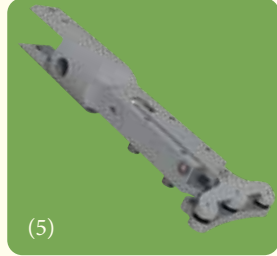
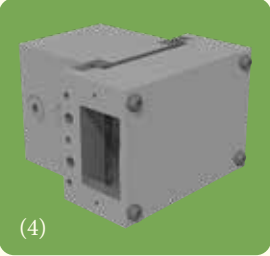
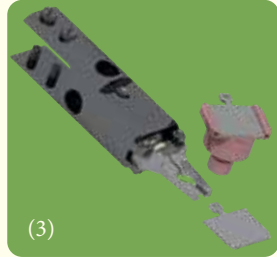


Description	Part Code	Price £	Price €
Lock ring tube support bracket S (for 40mm tubes)	M-LRRMTSBS	POA	POA
Lock ring with quick fastener (for 40mm tubes)	M-LRBR	POA	POA
Magnetic coupling with rotation stop For M-RMDG	M-MKRMDGRS	POA	POA
Upgrade for Sample Transporters to 3 3/8" OD CF flanges (DN50CF)	M-UPGRADEU50-X	POA	POA

Grab, Pincers & Forks



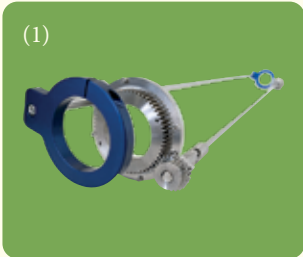
Description	Part Code	Price £	Price €
Grabber tool for M-SHOM flag style sample plates (ID=8mm for use with MD/RM/GMD transporters) (1)	M-GRABSHOM	POA	POA
Pincer for M-SHOM flag style plates (2)	M-PGRMS(OMH)	POA	POA
Pincer with customized jaws for sample transporters (3)	M-PGRMS(CUSTOM)	POA	POA
Wafer lifting device (4)	M-FRKLIFT	POA	POA
Pincer for wafer handling (5)	M-PGRMWAF	POA	POA



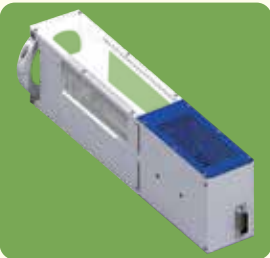
All dimensions are nominal in millimetres unless otherwise specified

Drive options

Description	Part Code	Price £	Price €
Extension shaft for remote manipulation (1)	M-TSRMKG-X	POA	POA
Manual Linear Drive with Handwheel (2)	M-DRVRM-X	POA	POA
Belt Drive with Hand Wheels (Linear & Rotary) for Sample Transporters (3)	M-TSRMBD-X	POA	POA
In-Vacuum Brake for Single Shaft Sample Transporters (4)	M-IVBR-X	POA	POA



Motorised Drive options



Description	Part Code	Price £	Price €
Motorised linear drive for M-MD16 feedthrough (feedthrough purchased separately)	M-DRVMDMOTL16-X	POA	POA
Motorised linear and rotary drive for M-MD16 feedthrough (feedthrough purchased separately)	M-DRVMDMOTLR16-X	POA	POA
Motorised linear drive for M-MD40 feedthrough (feedthrough purchased separately)	M-DRVMDMOTL-X	POA	POA
Motorised linear and rotary drive for M-MD40 feedthrough (feedthrough purchased separately)	M-DRVMDMOTLR-X	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

Fast Entry Locks



Specifications:

Materials

St.St.

Vacuum Range

CF flanged                      atm to 1x10<sup>-11</sup>mbar

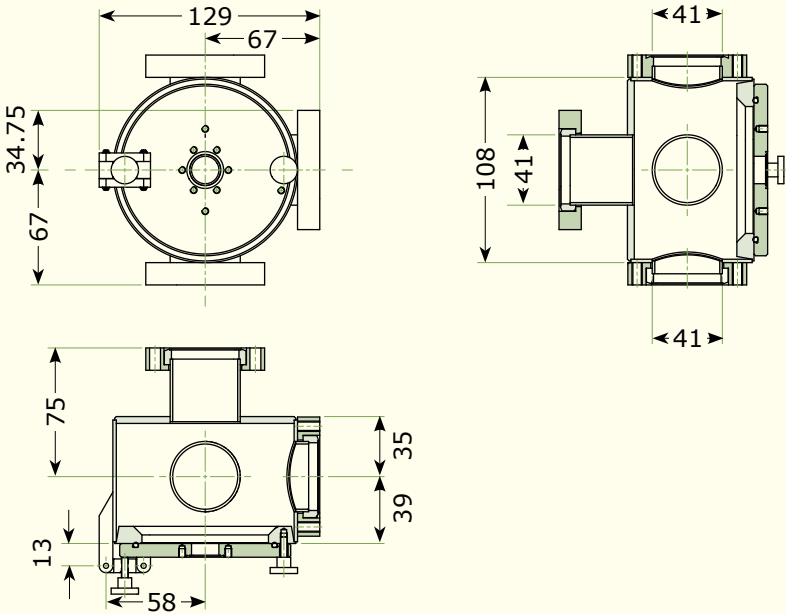
Temperature Range\*

CF flanged                      -20 to 150°C

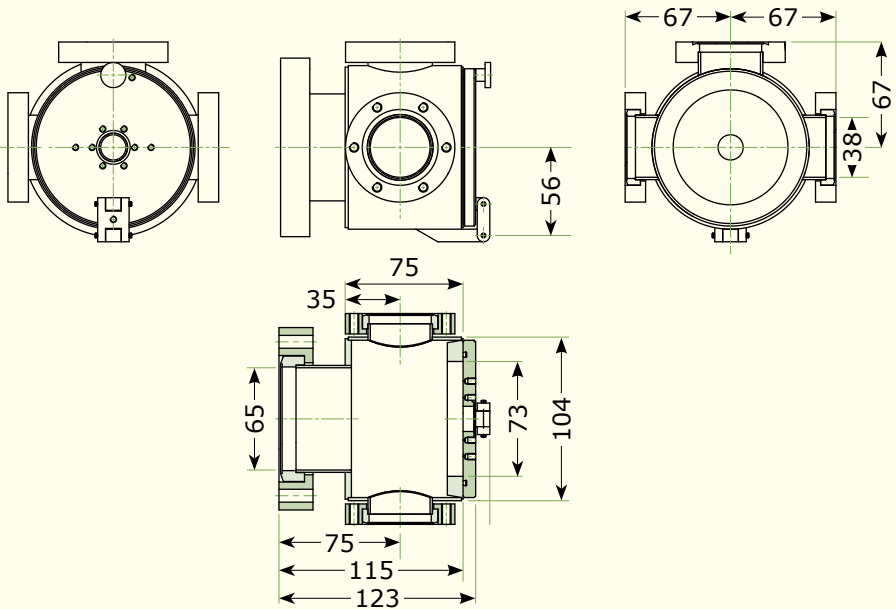
\* - Assembly rating must be reduced to that of lowest rated component.

Please contact our sales office for further details of chambers and available manipulator options

M-KS40



M-KS63



All dimensions are nominal in millimetres unless otherwise specified

With DN40CF Mounting Flange



Description	Part Code	Price £	Price €
FEL chamber DN40CF mount	M-KS40	POA	POA
FEL DN40CF mount with mag transport Xmm with M-TSMD tube support	M-KS40-MD16-TSMD-X	POA	POA

With DN63CF Mounting Flange



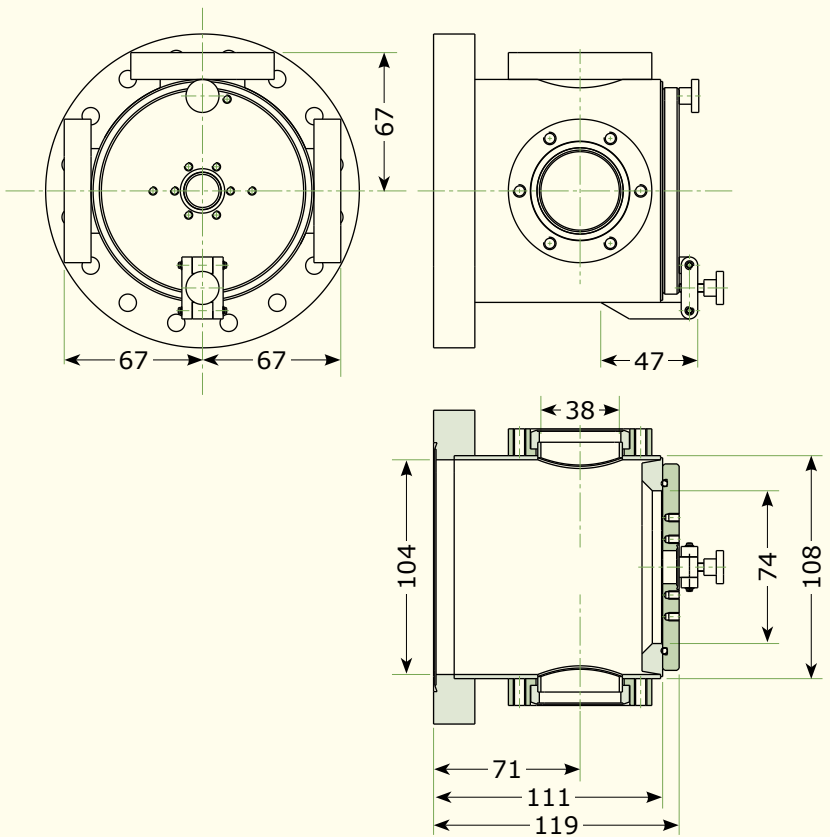
Description	Part Code	Price £	Price €
FEL chamber DN63CF mount	M-KS63	POA	POA
FEL DN63CF mount with mag transport Xmm with M-TSMD tube support	M-KS63-MD16-TSMD-X	POA	POA

With DN100CF Mounting Flange



Description	Part Code	Price £	Price €
FEL chamber DN100CF mount	M-KS100	POA	POA
FEL DN100CF mount with mag transport Xmm with M-TSMD tube support	M-KS100-MD16-TSMD-X	POA	POA

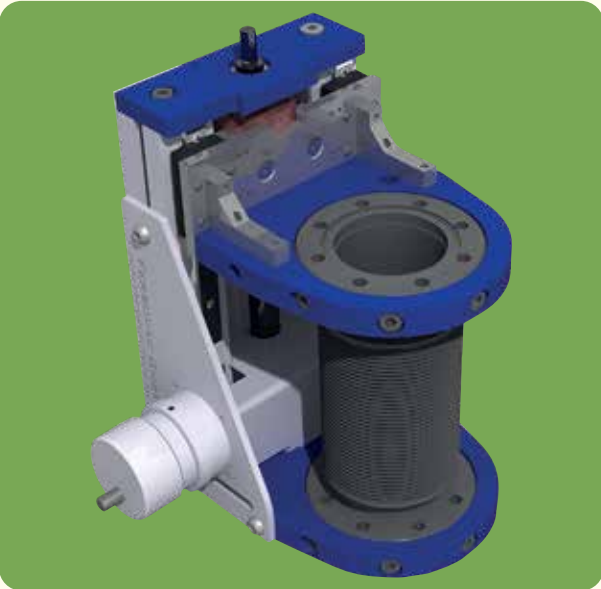
M-KS100



All dimensions are nominal in millimetres unless otherwise specified



Boomerax Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 150°C
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\* - Assembly rating must be reduced to that of lowest rated component.

The Boomerax Z-drives offer a sturdy yet compact construction for accurate linear motion while their highest quality edge welded bellows fulfil the strictest requirements in terms of leak tightness and durability. Short as well as long versions of the MZ40 have a continuous free bore, as the supports of their bellows are mounted externally. Boomerax Z-drives are commonly combined with our Boomerax XY-Manipulators and differentially pumped rotary platforms to form a complete XYZR manipulator.

Please see our website for furtehr deetails and available options etc.

Accessories

A comprehensive range of accessories are available for Z stages including:-

- Alternative base flanges.
- Alternative travellig flanges.
- Reducing / expanding nipples for base / travelling flanges.
- Motorization using stepper motors.
- Limit switches.
- Optical encoders
- Optional load compensation constant force springs.
- Multiport feedthrough mini chambers.
- In vacuum tube supports

All dimensions are nominal in millimetres unless otherwise specified

With DN40CF Flanges



Description	Part Code	Price £	Price €
Boomerax Z stage 100mm stroke 38mm bore DN40CF base, DN40CF top flanges both with clearance bolt holes	M-BZ100-40CF	POA	POA
Boomerax Z stage 200mm stroke 38mm bore DN40CF base, DN40CF top flanges both with clearance bolt holes	M-BZ200-40CF	POA	POA

With DN63CF Flanges



Description	Part Code	Price £	Price €
Boomerax Z stage 100mm stroke 65mm bore DN63CF base, DN63CF top flanges both with clearance bolt holes	M-BZ100-63CF	POA	POA
Boomerax Z stage 200mm stroke 65mm bors DN63CF base, DN63CF top flanges both with clearance bolt holes	M-BZ200-63CF	POA	POA
Boomerax Z stage 300mm stroke 65mm bore DN63CF base, DN63CF top flanges both with clearance bolt holes	M-BZ300-63CF	POA	POA
Boomerax Z stage 500mm stroke 65mm bore DN63CF base, DN63CF TOP top flanges both with clearance bolt holes	M-BZ500-63CF	POA	POA
Boomerax Z stage 750mm stroke 65mm bore DN63CF base, DN63CF top flanges both with clearance bolt holes	M-BZ750-63CF	POA	POA
Boomerax Z stage 1000mm stroke 65mm bore DN63CF base, DN63CF top flanges both with clearance bolt holes	M-BZ1000-63CF	POA	POA

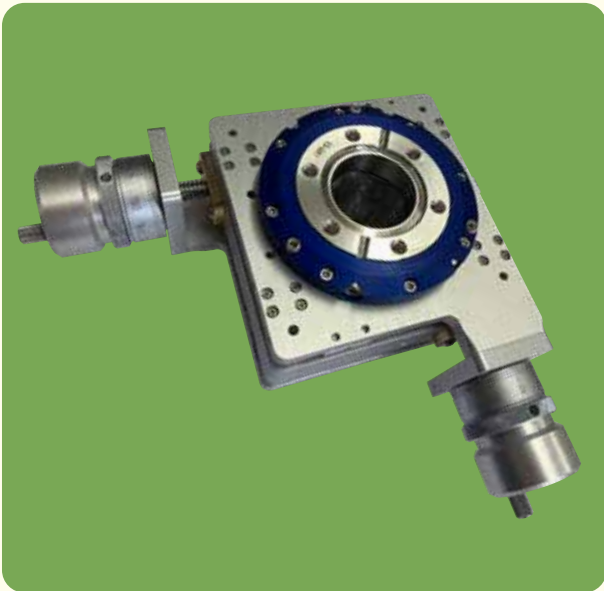
With DN160CF Flanges



Description	Part Code	Price £	Price €
Boomerax Z stage 200mm stroke 65mm bore DN160CF base, DN160CF top flanges flkanges both with clearance bolt holes	M-BZ200-160CF	POA	POA
Boomerax Z stage 200mm stroke 65mm bore DN160CF base, DN160CF top flanges flkanges both with clearance bolt holes	M-BZ300-160CF	POA	POA
Boomerax Z stage 200mm stroke 65mm bore DN160CF base, DN160CF top flanges flkanges both with clearance bolt holes	M-BZ400-160CF	POA	POA
Boomerax Z stage 200mm stroke 65mm bore DN160CF base, DN160CF top flanges flkanges both with clearance bolt holes	M-BZ500-160CF	POA	POA
Boomerax Z stage 200mm stroke 65mm bore DN160CF base DN160CF top flanges flkanges both with clearance bolt holes	M-BZ600-160CF	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

Boomerax X-Y Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 150°C
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\* - Assembly rating must be reduced to that of lowest rated component.

Offering smooth and exceptionally precise 2-axis adjustment while their highest quality edge welded bellows fulfil the strictest requirements in terms of leak tightness and durability, our sturdy UHV Boomerax XY-Manipulators, commonly combined with our Boomerax Z-axis shift modules and rotary platforms allow to set up a complete XYZR manipulator.

Features:

- Large OD micrometers with vernier scale, 2 micron resolution.
- 2° adjustable tilt.
- Adjustable mechanical end stops.
- Optional motorization.
- Optional optical encoders or incremental encoders.
- Optional adjustable limit switches.
- Optional load compensation constant force springs.

Accessories

A comprehensive range of accessories are available for Z stages including:-

- Alternative base flanges.
- Alternative travelling flanges.
- Reducing / expanding nipples for base / travelling flanges.
- Motorization using stepper motors.
- Limit switches.
- Optical encoders
- Optional load compensation constant force springs.
- Multiport feedthrough mini chambers.
- In vacuum tube supports

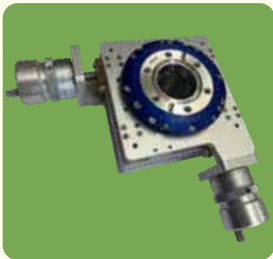
All dimensions are nominal in millimetres unless otherwise specified

X Translation Only



Description	Part Code	Price £	Price €
DN16CF single axis X-translator, +/-3mm travel	M-MX16TX3	POA	POA
DN16CF single axis X-translator, +/-3mm travel, micrometer centrally mounted	M-MX16TX3C	POA	POA

X-Y Translation



Description	Part Code	Price £	Price €
Boomerax XY stage DN40CF +/-10mm travel 2° tilt 38mm bore	M-BXY10-38-40CF	POA	POA
Boomerax XY stage DN63CFT / DN40CFT +/-12.5mm travel 2° tilt 38mm through bore	M-BXY12.5-38-63/40CF	POA	POA
Boomerax XY stage DN63CFT / DN63CFT +/-12.5mm travel 2° tilt 65mm through bore	M-BXY12.5-65-63CF	POA	POA
Boomerax XY stage DN100CFT / DN63CFT +/-12.5mm travel 2° tilt 65mm through bore	M-BXY12.5-65-100/63CF	POA	POA
Boomerax XY stage DN100CFT / DN63CFT +/-25mm travel 2° tilt 65mm through bore	M-BXY25-65-100/63CF	POA	POA
Boomerax XY stage DN100CFT / DN100CFT +/-12.5mm travel 2° tilt 102mm through bore	M-BXY12.5-102-100CF	POA	POA
Boomerax XY stage DN100CFT / DN100CFT +/-25mm travel 2° tilt 102mm through bore	M-BXY25-102-100CF	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Boomerax X-Y & Z Accessories

Change Of Flange Size / Type



Description	Part Code	Price £	Price €
Base flange upgrade for M-BXY Boomerax from CF40T to CF40	M-UPGMXY40BASECF40	POA	POA
Base flange upgrade for M-BXY Boomerax from CF40T to CF63	M-UPGMXY40BASECF63	POA	POA
Base flange upgrade for M-BXY Boomerax from CF40T to CF63T	M-UPGMXY40BASECF63T	POA	POA
Base flange upgrade for M-BXY Boomerax from CF63T to CF100T	M-UPGMXYBASECF100T	POA	POA
Base flange upgrade for M-BXY Boomerax from CF100T to CF160T	M-UPGMXYBASECF160T	POA	POA
Travel flange upgrade for M-BXY Boomerax from CF40T to CF63T	M-UPGMXYTRAV/CF63T	POA	POA
Travel flange upgrade for M-BXY Boomerax from CF63T to CF100T	M-UPGMXYTRAV/CF100T	POA	POA
DN40CF through hole adapter, one flange rotatable	M-UPFRADEMXY40 (+STCF40CF40RL50)	POA	POA
DN63CF, DN40CF through hole adapter, one flange rotatable	M-UPGRADEMXY40 (+RNCF63CF40RL50)	POA	POA
DN63CF through hole adapter, one flange rotatable	M-UPGRADEMXY63 (+STCF63CF63RL70)	POA	POA
DN100CF, DN63CF through hole adapter, one flange rotatable	M-UPGRADEMXY63 (+RNCF100CF63RL70)	POA	POA
DN100CF through hole adapter, one flange rotatable	M-UPGRADEMXY100 (+STCF100CF100RL70)	POA	POA
DN160CF, DN100CF through hole adapter, one flange rotatable	M-UPGRADEMXY100(+RNCF160CF100RL70)	POA	POA

Stepper Motorization Upgrade



Description	Part Code	Price £	Price €
Stepper motor kit, NEM14 and max. 0.23Nm torque	M-MOTN14T0.23-X	POA	POA
Stepper motor kit, NEM17 and max. 0.7Nm torque	M-MOTN17T0.7-X	POA	POA
Stepper motor kit, NEM23 and max. 1.9Nm torque	M-MOTN23T1.9-X	POA	POA
Stepper motor kit, NEM24 and max. 3Nm torque	M-MOTN24T3-X	POA	POA
Upgrade from manual to motorized version of MX16-3 single axis X-translator	M-UPGRADEMX16-3(+MOT)	POA	POA

Limit Switches & Optical encoders



Description	Part Code	Price £	Price €
Limit switch kit for Boomerax M-BXY-40 stage, one axis	M-UPGMXY40+MXLIMELKIT	POA	POA
Limit switch kit for Boomerax M-BXY-63 stage, one axis	M-UPGMXY63+MXLIMELKIT	POA	POA
Limit switch kit for Boomerax M-BXY-100 stage, one axis	M-UPGMXY100+MXLIMELKIT	POA	POA
Limit switch kit for Boomerax Z-shift manipulators	M-MZLIMELKIT	POA	POA
Linear absolute optical encoder kit for M-BX translator, 50mm scale	M-UPGMXY100+MXENCK50	POA	POA
Linear absolute optical encoder kit for M-BZ translator, 100mm scale	M-UPGMZ40+MZENCLAK100	POA	POA
Linear absolute optical encoder kit for M-BZ translator, 200mm scale	M-UPGMZ40+MZENCLAK200	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

Cable Carrier



Description	Part Code	Price £	Price €
Cable carrier for Boomerax M-BZ stage	M-UPGMZ63(+MZECH)-X	POA	POA

Load Compensation For X-Y Stages



Description	Part Code	Price £	Price €
Load compensation upgrade for Boomerax M-BXY stage DN40, one axis	M-UPGMXY40+MXYFS22	POA	POA
Load compensation upgrade for Boomerax M-BXY stage DN63, one axis	M-UPGMXY63+MXYFS47	POA	POA
Load compensation upgrade for Boomerax M-BXY stage DN100, one axis	M-UPGMXY100+MXYFS74	POA	POA

Weight Support For Z Translators



Description	Part Code	Price £	Price €
Weight support for M-BZ manipulators 147N version (eff. 165N-290N)	M-MZS147-X-Y	POA	POA
Weight support for M-BZ manipulators 74N version (eff. 81N-156N)	M-MZS74-X-Y	POA	POA

Feedthrough Chambers for Boomerax



Description	Part Code	Price £	Price €
DN63CF-DN40CFT feedthrough chamber for boomerax manipulators 5 X DN16CF ports A=60mm	M-MZFC63/40T5X16T	POA	POA
DN63CF-DN40CFT feedthrough chamber for boomerax manipulators 5 X DN16CF ports A=65mm	M-MZFC63/40T5X16TH55	POA	POA
DN63CF-DN40CFT feedthrough chamber for boomerax manipulators 5 X DN16CF ports @ 30°	M-MZFC63/40T5X16T30D	POA	POA
DN63CF-DN63CF feedthrough chamber for boomerax manipulators 5 X DN16CF ports	M-MZFC63/63X16T	POA	POA
DN63CFT-DN63CFT feedthrough chamber for boomerax manipulators 5 X DN16CF ports	M-MZFC63T/63T5X16T	POA	POA
DN63CF double sided flange feedthrough chamber for boomerax manipulators 5 X DN16CF ports (radial)	M-MZFDS63T5X16T	POA	POA

Support Tube



Description	Part Code	Price £	Price €
In vacuum tube support for M-BZ manipulators DN63CF	M-IVTSMZ63-X	POA	POA

All dimensions are nominal in millimetres unless otherwise specified



Compact & Mini Z Translators



This range of DN16CF Z translators has cantilevered flange supports with wrap around flange brackets (see drawing). A total of six locking screws (three for each flange) hold the flanges within the brackets. The advantage of this design is that these screws can be loosened, even while the translator is installed, and the actuator portion of the translator can be repositioned radially around the flange. This allows positioning of the translator to clear other equipment. The guide rods and actuation screw are set back from the flange to give maximum access to the flange bolts. Despite their modest price, these will provide years of trouble-free service, especially if the simple maintenance is performed. Bearings are lubricated with MoS<sub>2</sub> grease for low friction and long life. All parts are field replaceable. All translators are also available with long strokes, motor drives, linear encoders, tapped flanges and special height. Standard specifications are shown here, special versions can be made to suit your individual requirements. Please contact our sales office for further information.

Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

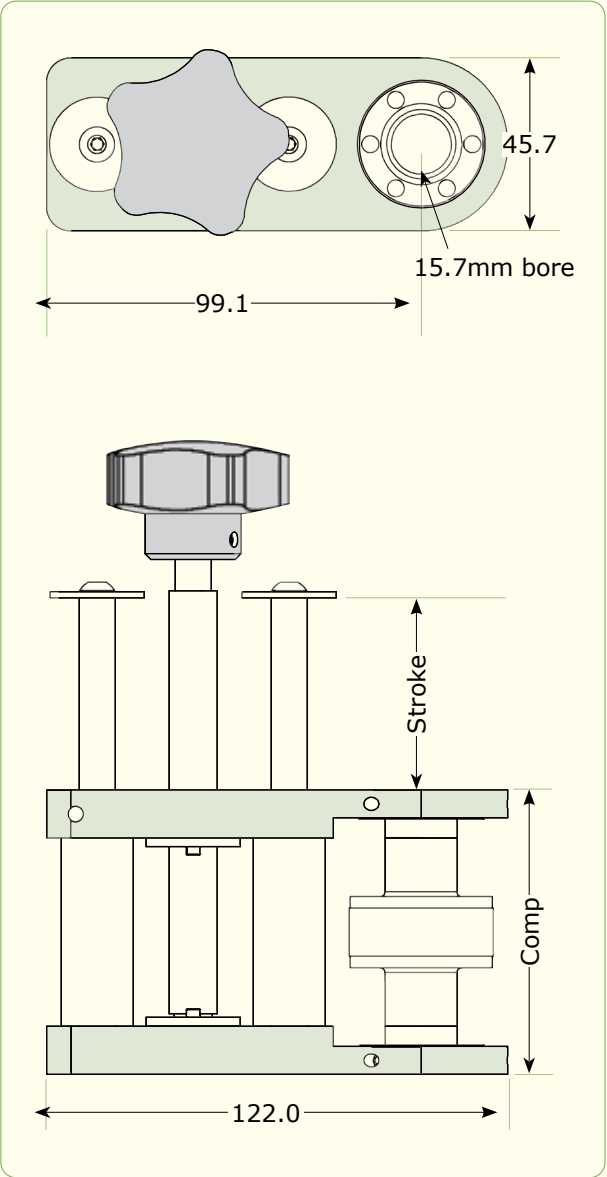
CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
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\* - Assembly rating must be reduced to that of lowest rated component.

(Photo shows special version with special micrometer in place of standard hand wheel).



All dimensions are nominal in millimetres unless otherwise specified

With Rotatable Flanges



Flange	Stroke	Comp	H	Part Code	Price £	Price €
DN16CF	25.4	62.5	131.1	M-CZ25R-16CF	POA	POA
DN16CF	50.8	75.2	169.2	M-CZ50R-16CF	POA	POA
DN16CF	76.2	87.4	206.8	M-CZ76R-16CF	POA	POA
DN16CF	101.6	100.1	244.9	M-CZ101R-16CF	POA	POA
DN16CF	152.4	124.5	320.1	M-CZ152R-16CF	POA	POA

Mini Z - With Fixed Flanges

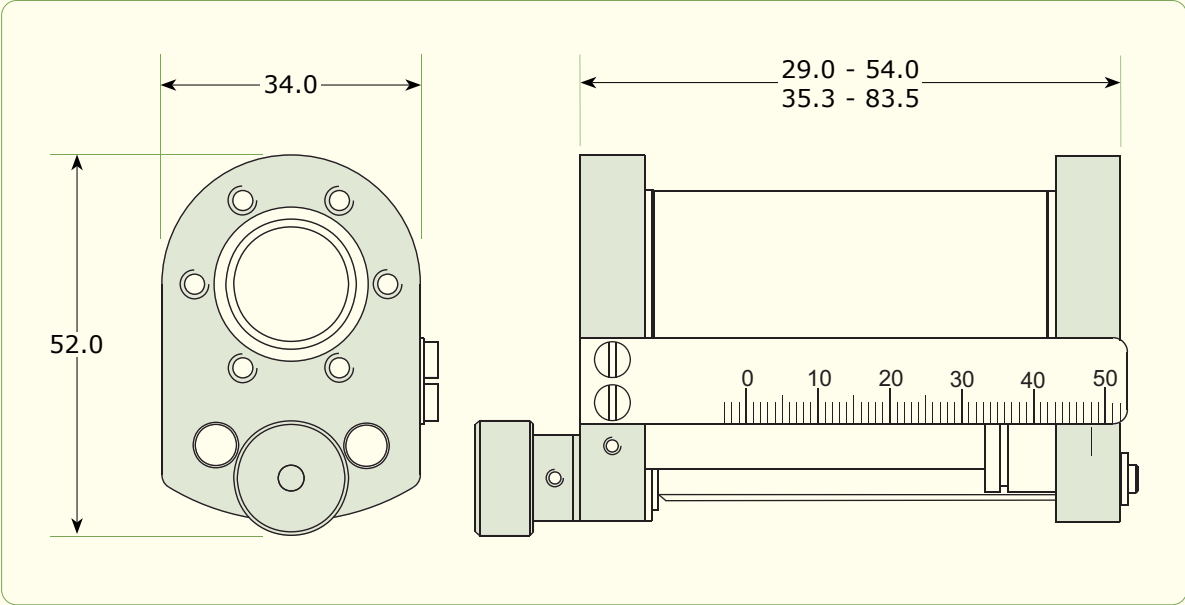


Description	Part Code	Price £	Price €
Mini Z translator 25mm stroke 14mm bore DN16CF	M-MZ25-16CF	£574	€661
Mini Z translator 48mm stroke 14mm bore DN16CF	M-MZ48-16CF	£796	€916

Features:

(Details on facing page do not apply to the Mini Z translators).

- UHV compatible construction with edge welded bellows.
- Bakeable to 230°C.
- 25mm or 48mm travel.
- Tapped flanges.



All dimensions are nominal in millimetres unless otherwise specified



Compact Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
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\* - Assembly rating must be reduced to that of lowest rated component.

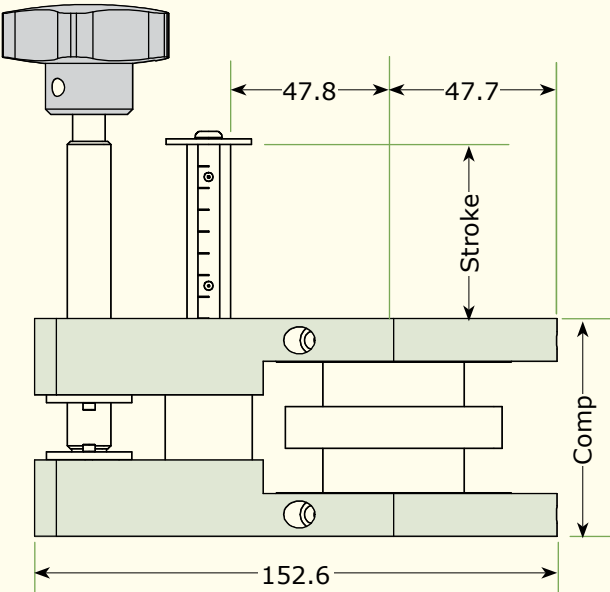
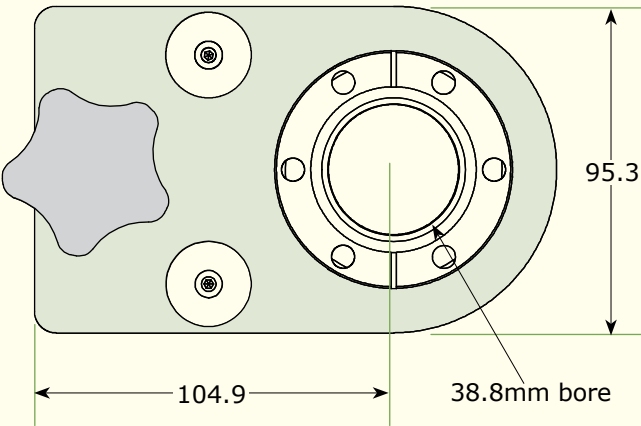
This range of DN40CF Z translators has cantilevered flange supports with wrap-around flange brackets (see drawing). A total of six locking screws (three for each flange) hold the flanges within the brackets. The advantage of this design is that these screws can be loosened, even while the translator is installed, and the actuator portion of the translator can be repositioned radially around the flange. This allows positioning of the translator to clear equipment. The guide rods and actuation screw are set back from the flange to give maximum access to the flange bolts. Despite their modest price, these will provide years of trouble-free service, especially if the simple maintenance is performed. The ball bearings are lubricated with MoS<sub>2</sub> grease for low friction and long life. All parts are field replaceable. All translators are also available with long strokes, micrometer actuation, tapped flanges and special height. Standard specifications are shown here, special versions can be made to suit your individual requirements. Please contact our sales office for further information.

All dimensions are nominal in millimetres unless otherwise specified

With Rotatable Flanges



Flange	Stroke	Comp	Part Code	Price £	Price €
DN40CF	50.8	63.5	M-CZ50R-40CF	POA	POA
DN40CF	76.2	69.9	M-CZ76R-40CF	POA	POA
DN40CF	101.6	73.7	M-CZ101R-40CF	POA	POA
DN40CF	152.4	88.9	M-CZ152R-40CF	POA	POA
DN40CF	203.2	101.6	M-CZ203R-40CF	POA	POA



Both flanges have clearance bolt holes

All dimensions are nominal in millimetres unless otherwise specified

Compact Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

This range of DN40CF Z translators has cantilever brackets (see drawing) bolted to the side of the flange. The advantage here is that the cantilever brackets leave 75% of the circumference of the flange unobstructed. This allows the translator to be mounted in very close quarters without interfering with other, nearby flanges.

The bottom (or fixed) flange of the translator is available with an optional 12-hole pattern for further flexibility. Since the actuator cannot be repositioned relative to the bolt holes, the 12-hole feature allows the user more options in mounting orientation. Despite the modest price, these translators will provide years of trouble-free service, especially if the simple maintenance is performed.

All Z translator lead screws use ball bearings. The lead screws are dry lubricated with baked-on molybdenum disulphide and the bearings are lubricated with molybdenum disulphide grease for low friction and long life. All parts are field replaceable, including the bellows. All translators are also available with long strokes, motor drives, linear encoders, tapped flanges and special heights.

Standard specifications are shown here, special versions can be made to suit your individual requirements.

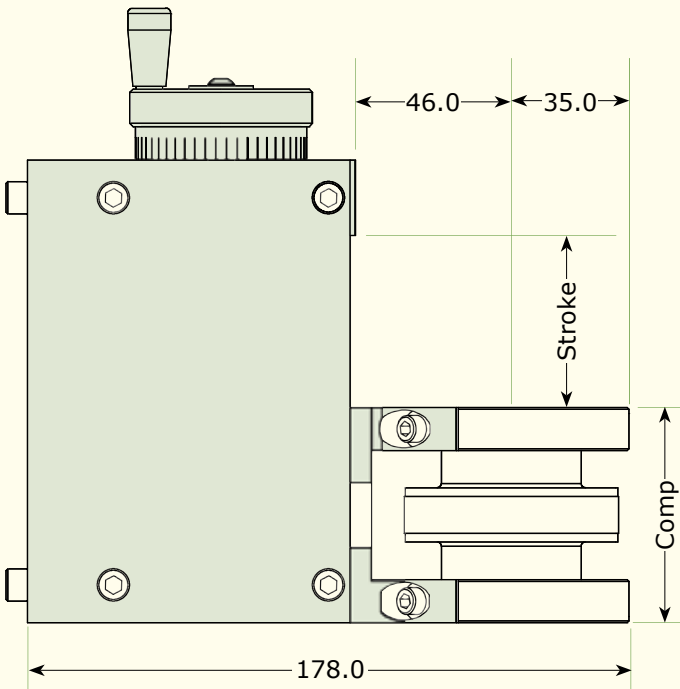
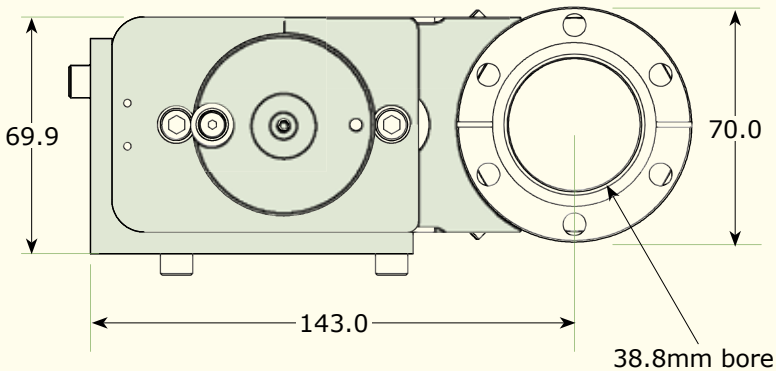
Please contact our sales office for further information.

All dimensions are nominal in millimetres unless otherwise specified

With Fixed Flanges



Flange	Stroke	Comp	Part Code	Price £	Price €
DN40CF	50.8	66.1	M-CZ50-40CF	POA	POA
DN40CF	76.2	69.9	M-CZ76-40CF	POA	POA
DN40CF	101.6	73.7	M-CZ101-40CF	POA	POA
DN40CF	152.4	81.3	M-CZ152-40CF	POA	POA
DN40CF	203.2	88.9	M-CZ203-40CF	POA	POA
DN40CF	254.0	96.6	M-CZ254-40CF	POA	POA
DN40CF	304.8	104.2	M-CZ304-40CF	POA	POA
DN40CF	406.4	119.4	M-CZ406-40CF	POA	POA
DN40CF	508.0	134.9	M-CZ508-40CF	POA	POA
DN40CF	609.6	149.9	M-CZ609-40CF	POA	POA



Both flanges have clearance bolt holes

All dimensions are nominal in millimetres unless otherwise specified

Compact Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

This range of DN63CF Z translators has cantilever brackets (see drawing) bolted to the side of the flange. The advantage here is that the cantilever brackets leave 75% of the circumference of the flange unobstructed. This allows the translator to mount in very close quarters without interfering with other, nearby flanges.

The bottom (or fixed) flange of the translator is available with an optional 16-hole pattern for further flexibility. Since the actuator cannot be repositioned relative to the bolt holes, the 16-hole feature allows the user more options in mounting orientation. Despite the modest price, these translators will provide years of trouble-free service, especially if the simple maintenance is performed.

All Z translator lead screws use ball bearings. The lead screws are dry lubricated with baked-on molybdenum disulphide and the bearings are lubricated with molybdenum disulphide grease for low friction and long life. All parts are field replaceable, including the bellows.

All translators are also available with long strokes, motor drives, linear encoders, tapped flanges and special heights.

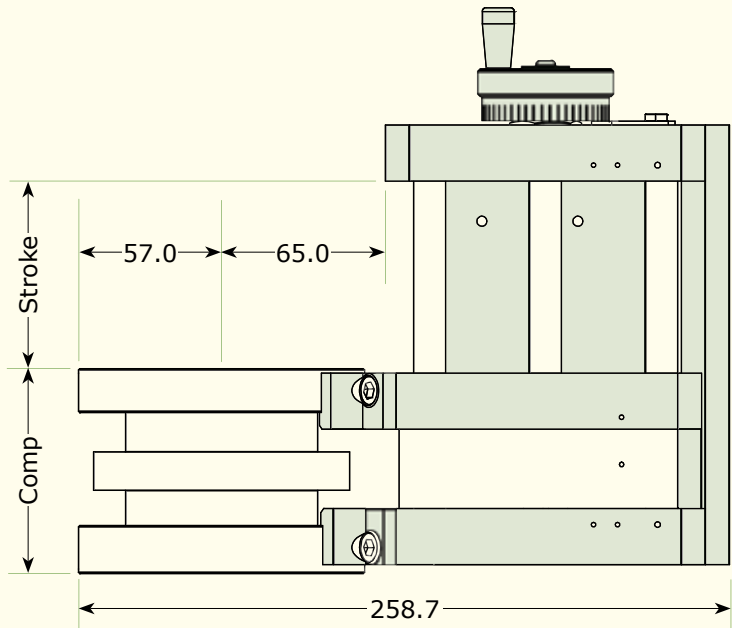
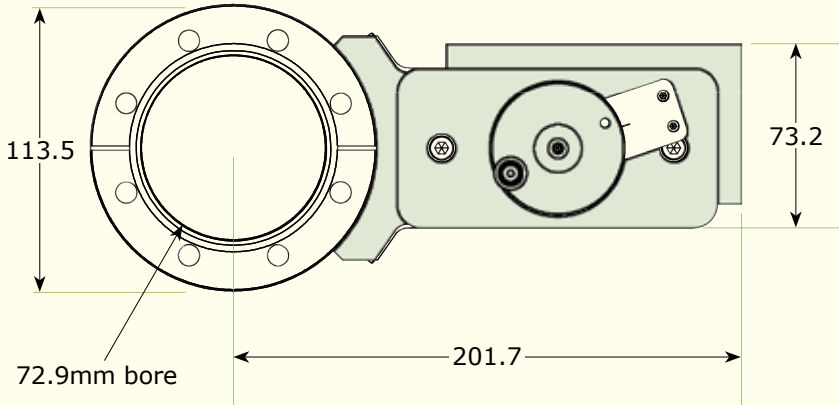
Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

With Fixed Flanges



Flange	Stroke	Comp	Part Code	Price £	Price €
DN63CF	50.8	81.3	M-CZ50-63CF	POA	POA
DN63CF	76.2	85.1	M-CZ76-63CF	POA	POA
DN63CF	101.6	88.9	M-CZ101-63CF	POA	POA
DN63CF	152.4	96.5	M-CZ152-63CF	POA	POA
DN63CF	203.2	104.2	M-CZ203-63CF	POA	POA
DN63CF	304.8	119.4	M-CZ304-63CF	POA	POA
DN63CF	406.4	134.6	M-CZ406-63CF	POA	POA
DN63CF	609.6	165.1	M-CZ508-63CF	POA	POA



Both flanges have clearance bolt holes

All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified

Z Translators



These Z translators can be used either as a stand-alone Z axis translator or in combination with an XY platform to produce a long travel XYZ manipulator that is both rigid and cost effective. Despite their modest price, these Z translators will provide years of trouble-free service, especially if the simple maintenance is performed.

These Z translators feature precision ground guide rods that are fully supported the entire length of travel. This feature is not found on many other brands. This provides even greater stability and rigidity, especially on long travel models. Z translators with strokes of up to 152cm (60") are available, and can be mounted either horizontally or vertically.

The lower flange can be fitted with support

guides for long sample probes. This significantly reduces sag and vibrations in things like long, slim LN<sub>2</sub> dewars, sample holders and intro rods. The support bearings are vented and allow clearance for thermocouple and power wires.

Options include both stepper motors and DC motors. Both motor options include limit switches. The DC motor option includes a hand held forward/reverse switch and a variable speed control. These Z translators have been designed to allow motors to be easily added in the field, thereby avoiding time consuming and costly factory returns. Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

With DN40CF Base & Top Flanges

Stroke	Comp	A	Part Code	Price £	Price €
152.4	63.5	35.0	M-Z152-40/40CF	POA	POA
203.2	73.7	35.0	M-Z203-40/40CF	POA	POA
304.8	94.0	35.0	M-Z304-40/40CF	POA	POA
406.4	114.3	35.0	M-Z406-40/40CF	POA	POA
508.0	134.6	35.0	M-Z508-40/40CF	POA	POA
609.6	157.5	35.0	M-Z609-40/40CF	POA	POA
762.0	185.4	35.0	M-Z762-40/40CF	POA	POA
914.4	215.9	35.0	M-Z914-40/40CF	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

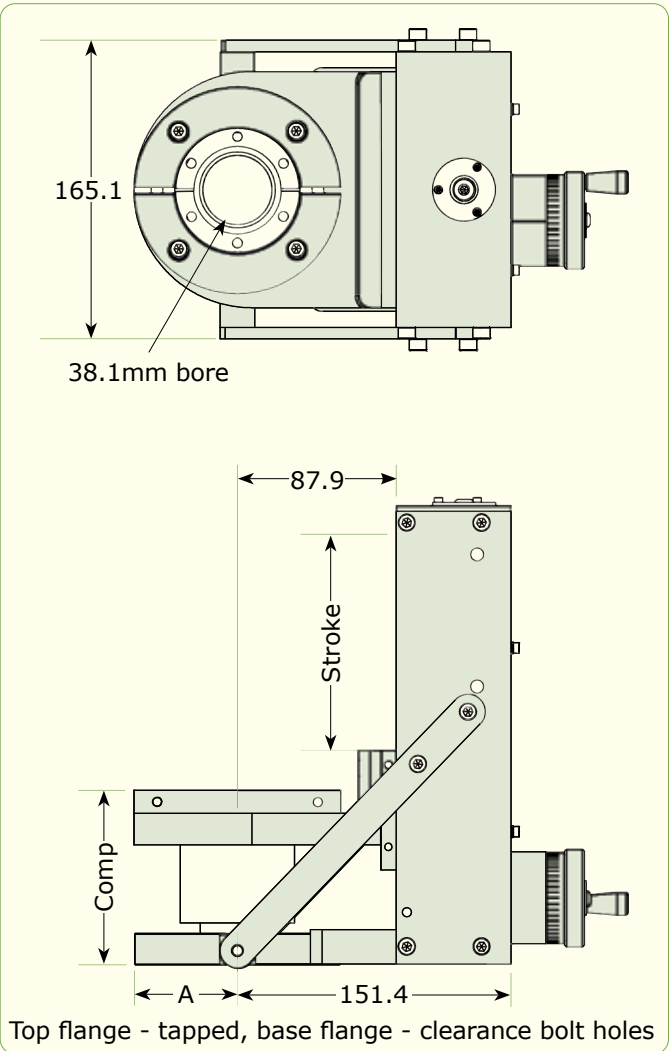
With DN63CF Base Flange & DN40CF Top Flange



Stroke	Comp	A	Part Code	Price £	Price €
152.4	63.5	57.0	M-Z152-63/40CF	POA	POA
203.2	73.7	57.0	M-Z203-63/40CF	POA	POA
304.8	94.0	57.0	M-Z304-63/40CF	POA	POA
406.4	114.3	57.0	M-Z406-63/40CF	POA	POA
508.0	134.6	57.0	M-Z508-63/40CF	POA	POA
609.6	157.5	57.0	M-Z609-63/40CF	POA	POA
762.0	185.4	57.0	M-Z762-63/40CF	POA	POA
914.4	215.9	57.0	M-Z914-63/40CF	POA	POA

With DN100CF Base Flange & DN40CF Top Flange

Stroke	Comp	A	Part Code	Price £	Price €
152.4	63.5	76.0	M-Z152-100/40CF	POA	POA
203.2	73.7	76.0	M-Z203-100/40CF	POA	POA
304.8	94.0	76.0	M-Z304-100/40CF	POA	POA
406.4	114.3	76.0	M-Z406-100/40CF	POA	POA
508.0	134.6	76.0	M-Z508-100/40CF	POA	POA
609.6	157.5	76.0	M-Z609-100/40CF	POA	POA
762.0	185.4	76.0	M-Z762-100/40CF	POA	POA
914.4	215.9	76.0	M-Z914-100/40CF	POA	POA



Top flange - tapped, base flange - clearance bolt holes

All dimensions are nominal in millimetres unless otherwise specified



Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

These Z translators can be used either as a stand-alone Z Axis translator or in combination with an XY platform to produce a long travel XYZ manipulator that is both rigid and cost effective. Despite their modest price, these Z translators will provide years of trouble-free service, especially if the simple maintenance is performed.

These Z translators feature precision ground guide rods that are fully supported the entire length of travel. This feature is not found on many other brands. This provides even greater stability and rigidity, especially on long travel models. Z translators with strokes of up to 152cm (60") are available, and can be mounted either horizontally or vertically.

The lower flange can be fitted with support guides for long sample probes. This significantly reduces sag and vibrations in things like long, slim LN<sub>2</sub> dewars, sample holders and intro rods. The support bearings are vented and allow clearance for thermocouple and power wires.

Options include both stepper motors and DC motors. Both motor options include limit switches. The DC motor option includes a hand held forward/reverse switch and a variable speed control. These Z translators have been designed to allow motors to be easily added in the field, thereby avoiding time consuming and costly factory returns. Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

All dimensions are nominal in millimetres unless otherwise specified

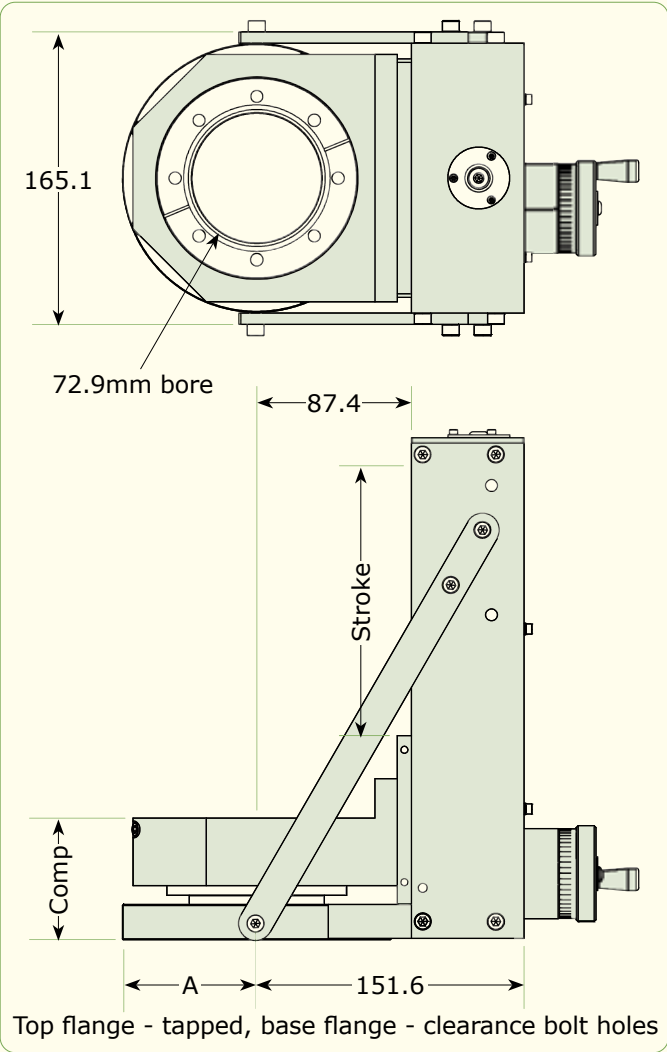
With DN63CF Base Flange & DN63CF Top Flange



Stroke	Comp	A	Part Code	Price £	Price €
152.4	73.7	57.0	M-Z152-63/63CF	POA	POA
203.2	81.3	57.0	M-Z203-63/63CF	POA	POA
304.8	99.1	57.0	M-Z304-63/63CF	POA	POA
406.4	119.4	57.0	M-Z406-63/63CF	POA	POA
508.0	139.7	57.0	M-Z508-63/63CF	POA	POA
609.6	160.0	57.0	M-Z609-63/63CF	POA	POA
762.0	190.5	57.0	M-Z762-63/63CF	POA	POA
914.4	221.0	57.0	M-Z914-63/63CF	POA	POA

With DN100CF Base Flange & DN63CF Top Flange

Stroke	Comp	A	Part Code	Price £	Price €
152.4	73.7	76.0	M-Z152-100/63CF	POA	POA
203.2	81.3	76.0	M-Z203-100/63CF	POA	POA
304.8	99.1	76.0	M-Z304-100/63CF	POA	POA
406.4	119.4	76.0	M-Z406-100/63CF	POA	POA
508.0	139.7	76.0	M-Z508-100/63CF	POA	POA
609.6	160.0	76.0	M-Z609-100/63CF	POA	POA
762.0	190.5	76.0	M-Z762-100/63CF	POA	POA
914.4	221.0	76.0	M-Z914-100/63CF	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

These Z translators can be used either as a stand-alone Z Axis translator or in combination with an XY platform to produce a long travel XYZ manipulator that is both rigid and cost effective. Despite their modest price, these Z translators will provide years of trouble-free service, especially if the simple maintenance is performed.

These Z translators feature precision ground guide rods that are fully supported the entire length of travel. This feature is not found on many other brands. This provides even greater stability and rigidity, especially on long travel models. Z translators with strokes of up to 152cm (60") are available, and can be mounted either horizontally or vertically.

The lower flange can be fitted with support guides for long sample probes. This significantly reduces sag and vibrations in things like long, slim LN<sub>2</sub> dewars, sample holders and intro rods. The support bearings are vented and allow clearance for thermocouple and power wires.

Options include both stepper motors and DC motors. Both motor options include limit switches. The DC motor option includes a hand held forward/reverse switch and a variable speed control. These Z translators have been designed to allow motors to be easily added in the field, thereby avoiding time consuming and costly factory returns. Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

All dimensions are nominal in millimetres unless otherwise specified

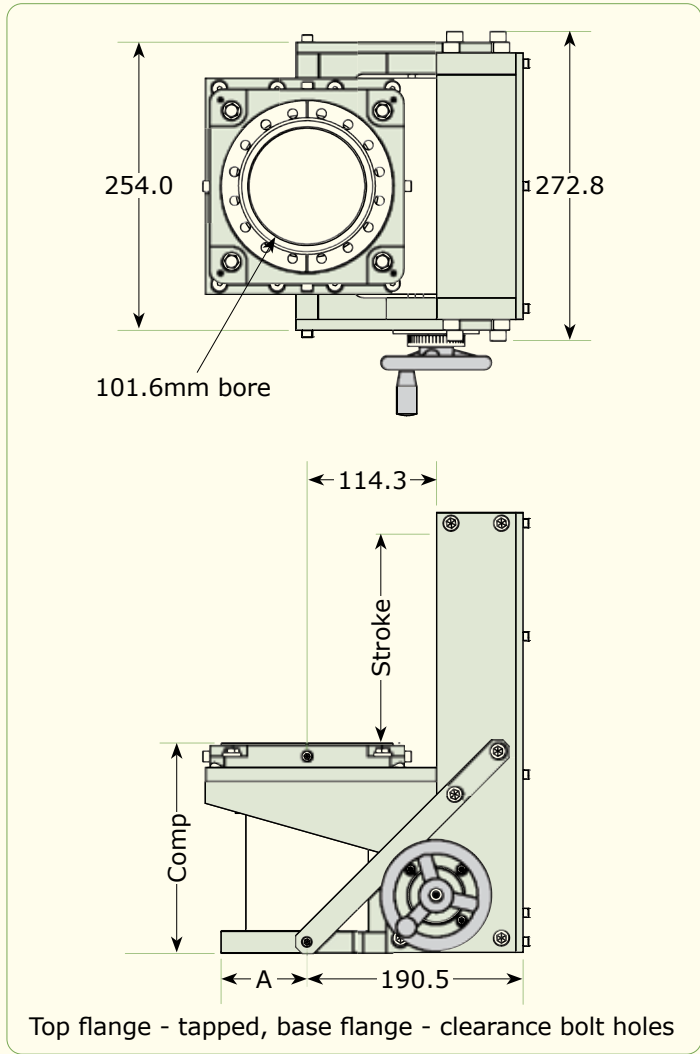
With DN100CF Base Flange & DN100CF Top Flange



Stroke	Comp	A	Part Code	Price £	Price €
152.4	185.4	76.0	M-Z152-100/100CF	POA	POA
203.2	185.4	76.0	M-Z203-100/100CF	POA	POA
304.8	185.4	76.0	M-Z304-100/100CF	POA	POA
406.4	185.4	76.0	M-Z406-100/100CF	POA	POA
508.0	190.5	76.0	M-Z508-100/100CF	POA	POA
609.6	213.4	76.0	M-Z609-100/100CF	POA	POA
762.0	251.5	76.0	M-Z762-100/100CF	POA	POA
914.4	289.6	76.0	M-Z914-100/100CF	POA	POA

With DN160CF Base Flange & DN100CF Top Flange

Stroke	Comp	A	Part Code	Price £	Price €
152.4	185.4	101.6	M-Z152-160/100CF	POA	POA
203.2	185.4	101.6	M-Z203-160/100CF	POA	POA
304.8	185.4	101.6	M-Z304-160/100CF	POA	POA
406.4	185.4	101.6	M-Z406-160/100CF	POA	POA
508.0	190.5	101.6	M-Z508-160/100CF	POA	POA
609.6	213.4	101.6	M-Z609-160/100CF	POA	POA
762.0	251.5	101.6	M-Z762-160/100CF	POA	POA
914.4	289.6	101.6	M-Z914-160/100CF	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Heavy Duty Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

Despite its modest price, these heavy duty Z translators will provide years of trouble-free service, especially if simple maintenance is performed. Due to the three jacking-screw pattern (see drawing), these Z translators provide the maximum rigidity of any translator on the market and is capable of holding axial loads in excess of 68 kilograms with no deflection problems. A total of six locking screws (three for each flange) hold the flanges within the brackets. The advantage of this design is that the screws can be loosened, even while the translator is installed, and the actuator portion of the translator can be repositioned radially around the flange. This feature allows re-positioning of the mechanism to clear other equipment. Standard specifications are shown here, special versions can be made to suit your individual requirements. Please contact our sales office for further information.

With DN40CF Flanges



Fig.	Stroke	Comp	Part Code	Price £	Price €
1	50.8	63.5	M-HDZ50-40CF	POA	POA
1	76.2	69.9	M-HDZ76-40CF	POA	POA
1	101.6	76.2	M-HDZ101-40CF	POA	POA
1	152.4	88.9	M-HDZ152-40CF	POA	POA
1	203.2	101.6	M-HDZ203-40CF	POA	POA

With DN63CF Flanges

Fig.	Stroke	Comp	Part Code	Price £	Price €
2	50.8	73.7	M-HDZ50-63CF	POA	POA
2	76.2	81.3	M-HDZ76-63CF	POA	POA
2	101.6	86.4	M-HDZ101-63CF	POA	POA
2	152.4	96.5	M-HDZ152-63CF	POA	POA
2	203.2	109.2	M-HDZ203-63CF	POA	POA

Fig. 1.

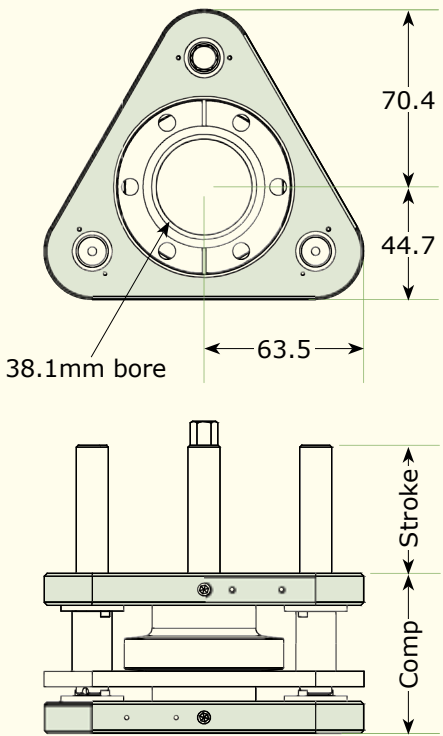
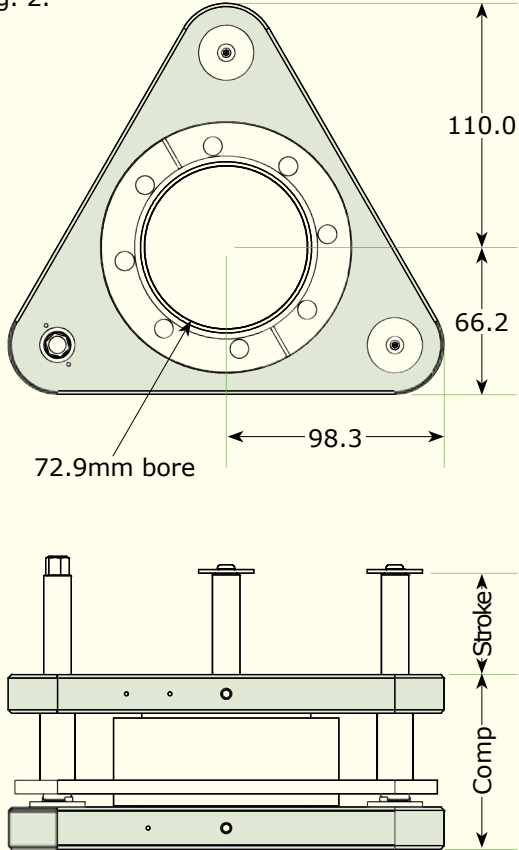


Fig. 2.



Both flanges have clearance bolt holes

All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified



Heavy Duty Z Translators



Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Lead screw	St.St.
Bushing	Bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
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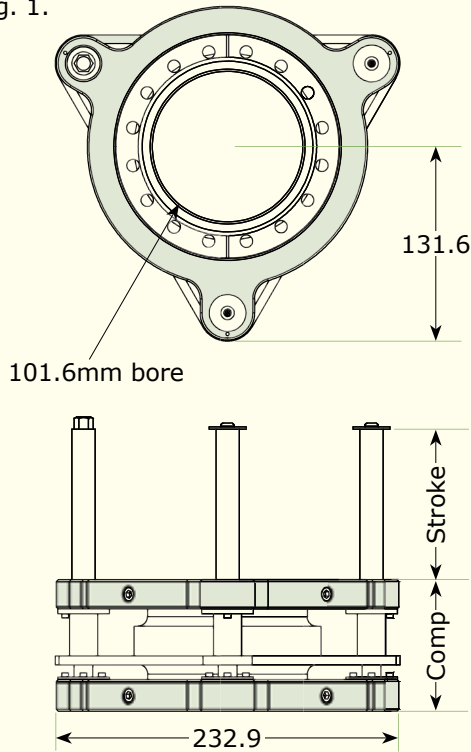
\* - Assembly rating must be reduced to that of lowest rated component.

Despite its modest price, these heavy duty Z translators will provide years of trouble-free service, especially if the simple maintenance is performed. These Z translators use double ball bearings on the jacking screws. The screws and bearings are lubricated with MoS2 for low friction and long life. All parts are field replaceable. The traveling flange is supported by three jacking screws and aligned by three guide rods (see drawing). All translators are also available with long strokes, motor drives, linear encoders, tapped flanges and special heights.

These Z translators need only minimal maintenance. The linear bearings are bronze, and the guide rods need only be kept lightly lubricated and free from dirt, dust and debris. The jacking screws and bearings do, however, need periodic lubrication. Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

Fig. 1.



All dimensions are nominal in millimetres unless otherwise specified

With DN100CF Flanges



Fig.	Stroke	Comp	Part Code	Price £	Price €
1	50.8	86.4	M-HDZ50-100CF	POA	POA
1	76.2	90.2	M-HDZ76-100CF	POA	POA
1	101.6	94.0	M-HDZ101-100CF	POA	POA
1	152.4	101.6	M-HDZ152-100CF	POA	POA
1	203.2	109.2	M-HDZ203-100CF	POA	POA
1	254.0	116.8	M-HDZ254-100CF	POA	POA

With DN160CF Flanges



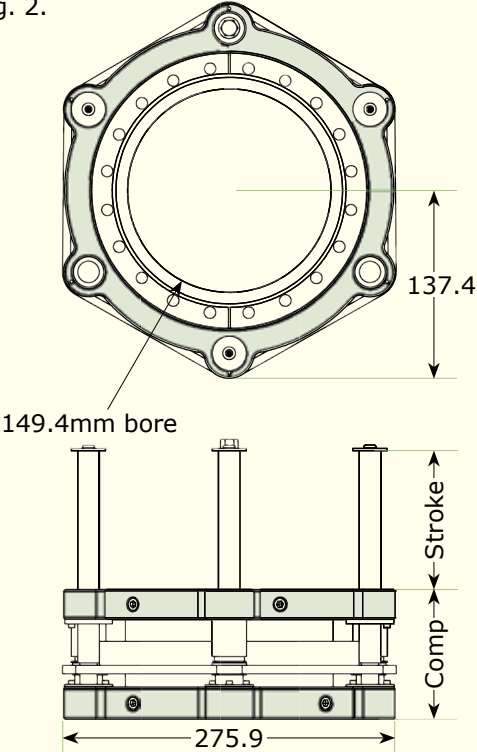
Fig.	Stroke	Comp	Part Code	Price £	Price €
2	50.8	91.4	M-HDZ50-160CF	POA	POA
2	76.2	95.5	M-HDZ76-160CF	POA	POA
2	101.6	99.8	M-HDZ101-160CF	POA	POA
2	152.4	108.2	M-HDZ152-160CF	POA	POA
2	203.2	116.6	M-HDZ203-160CF	POA	POA
2	254.0	125.0	M-HDZ254-160CF	POA	POA
2	304.8	133.4	M-HDZ304-160CF	POA	POA

With DN200CF Flanges



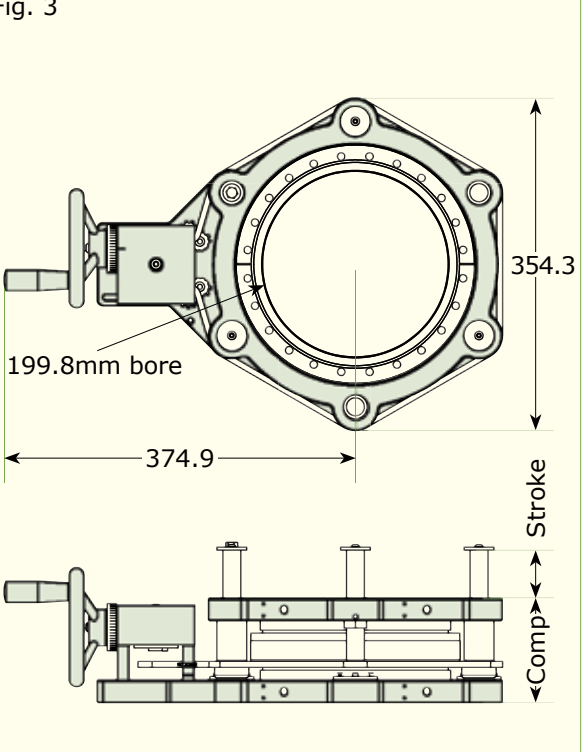
Fig.	Stroke	Comp	Part Code	Price £	Price €
3	50.8	111.8	M-HDZ50-200CF	POA	POA
3	76.2	121.9	M-HDZ76-200CF	POA	POA
3	101.6	132.1	M-HDZ101-200CF	POA	POA
3	152.4	152.4	M-HDZ152-200CF	POA	POA
3	203.2	172.7	M-HDZ203-200CF	POA	POA
3	254.0	193.0	M-HDZ254-200CF	POA	POA
3	304.8	213.4	M-HDZ304-200CF	POA	POA

Fig. 2.



All dimensions are nominal in millimetres unless otherwise specified

Fig. 3





Precision X-Y Manipulator Stages



Our range of X-Y stages combine extremely high rigidity, a large working bore and affordable cost. They are available in both  $\pm 25.4\text{mm}$  ( $\pm 1$  inch) and  $\pm 12.7\text{mm}$  ( $\pm 1/2$  inch) travel, circular pattern, with both manual and stepper motorized versions. In fact, conversion from micrometers to stepper motors can be done in 15 minutes at the user's site. Both sizes have features not found on translators available elsewhere, such as tilt adjustment on the top flange as standard.

One distinct advantage of these stages is the cost savings when long Z axis strokes are required. Since only the bellows in the XY portion needs to be larger than the probe, the user can extend the Z axis stroke using a smaller diameter (less costly) bellows that just clears the probe running through it. Simply select the model from the tables that best suits your needs.

For horizontal mounting, i.e., with the flange faces vertical, dual constant force counterbalance springs are available that compensate for gravitational loads. If required, this feature can be added in the field, after the user accurately determines the weight of the devices to be mounted.

To make your selection, add the total travel required in either the X or Y axis to the maximum diameter of the device that will pass through the stage. This sum determines the minimum bellows inside diameter (clear ID).

Next, select the bottom flange that best mates to your chamber or other equipment. While the most common size is DN100CF, either tapped or non-tapped flange sizes of DN63CF, DN100CF, DN160CF and larger are

available. Standard specifications are shown here, special versions can be made to suit your individual requirements. Please contact our sales office for further information.

Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Bearings	St.St.

Resolution

With small micrometers (standard)	$>10\mu\text{m}$
With large micrometers	$>2.5\mu\text{m}$

Repeatability

With small micrometers (standard)	$>5\mu\text{m}$
With large micrometers	$>1.25\mu\text{m}$

Vacuum Range

CF flanged	atm to $1 \times 10^{-11}\text{mbar}$
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Temperature Range\*

CF flanged	$-20$ to $210^\circ\text{C}$
------------	------------------------------

\* - Assembly rating must be reduced to that of lowest rated component.

Options:

- DN40CF versions also available.
- Clearance hole flanges available on both top & bottom flanges, (Height, H increases).
- Large micrometers.
- Stepper motor actuation.
- Horizontal mount kit.
- Additional axis.

All dimensions are nominal in millimetres unless otherwise specified

With DN40CF Flanges



X-Y Travel	Clear ID	A	B	C	H	Part Code	Price £	Price €
$\pm 12.7$	38.0	202.7	129.5	267.5	114.3	M-XY12-38-40CF	POA	POA

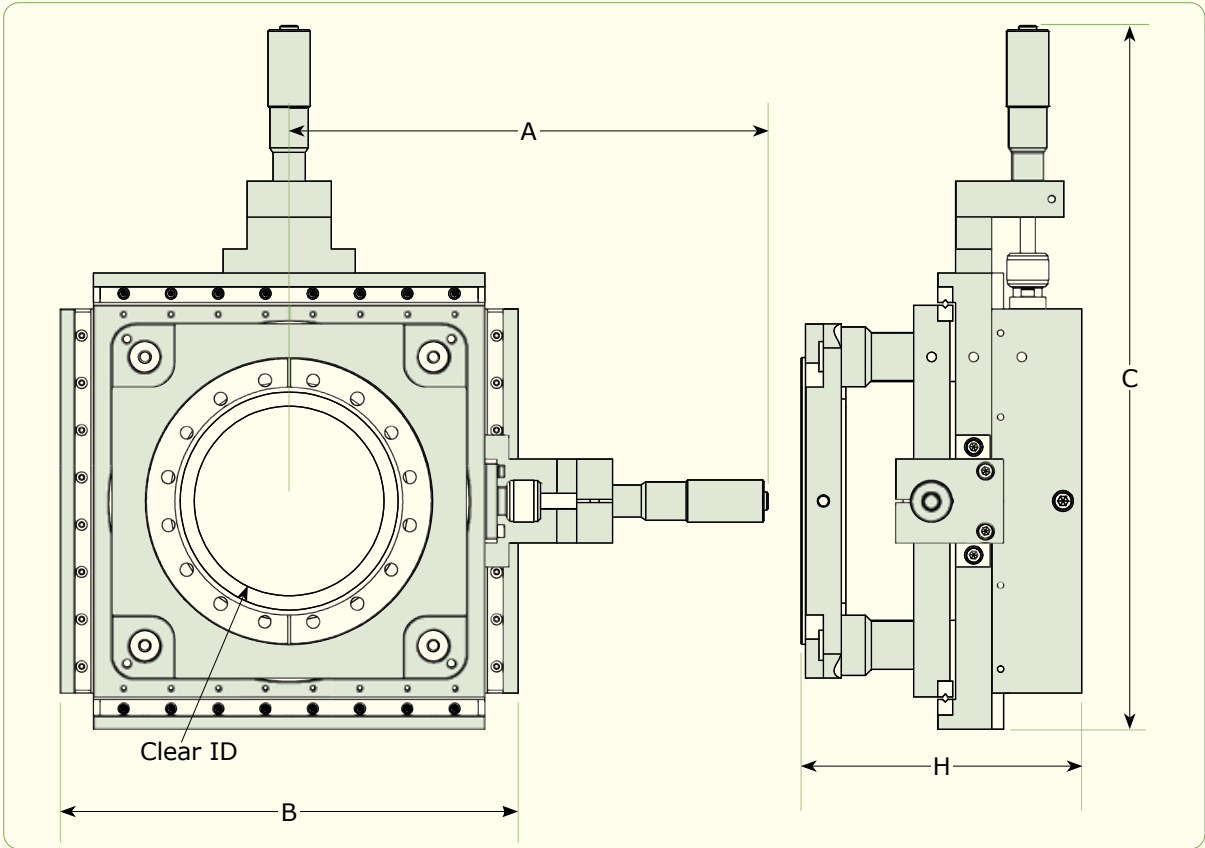
H distance shown in the table is based on the stage having tapped flanges top & bottom. Clearance flanges available if required, please call sales office for further details.

With DN63CF Flanges



X-Y Travel	Clear ID	A	B	C	H	Part Code	Price £	Price €
$\pm 12.7$	72.0	226.8	182.6	316.2	117.4	M-XY12-72-63CF	POA	POA
$\pm 25.4$	72.0	297.4	208.0	401.4	142.7	M-XY25-72-63CF	POA	POA

H distance shown in the table is based on the stage having tapped flanges top & bottom. Clearance flanges available if required, please call sales office for further details.



All dimensions are nominal in millimetres unless otherwise specified

Precision X-Y Manipulator Stages



Our range of X-Y stages combine extremely high rigidity, a large working bore and affordable cost. They are available in both  $\pm 25.4\text{mm}$  ( $\pm 1$  inch) and  $\pm 12.7\text{mm}$  ( $\pm 1/2$  inch) travel, circular pattern, with both manual and stepper motorized versions. In fact, conversion from micrometers to stepper motors can be done in 15 minutes at the user's site. Both sizes have features not found on translators available elsewhere, such as tilt adjustment on the top flange as standard.

One distinct advantage of these stages is the cost savings when long Z axis strokes are required. Since only the bellows in the XY portion needs to be larger than the probe, the user can extend the Z axis stroke using a smaller diameter (less costly) bellows that just clears the probe running through it. Simply select the model from the tables that best suits your needs.

For horizontal mounting, i.e., with the flange faces vertical, dual constant force counterbalance springs are available that compensate for gravitational loads. If required, this feature can be added in the field, after the user accurately determines the weight of the devices to be mounted.

To make your selection, add the total travel required in either the X or Y axis to the maximum diameter of the device that will pass through the stage. This sum determines the minimum bellows inside diameter (clear ID).

Next, select the bottom flange that best mates to your chamber or other equipment. While the most common size is DN100CF, either tapped or non-tapped flange sizes of DN63CF, DN100CF, DN160CF and larger are

available. Standard specifications are shown here, special versions can be made to suit your individual requirements. Please contact our sales office for further information.

Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Bearings	St.St.

Resolution

With small micrometers (standard)	$>10\mu\text{m}$
With large micrometers	$>2.5\mu\text{m}$

Repeatability

With small micrometers (standard)	$>5\mu\text{m}$
With large micrometers	$>1.25\mu\text{m}$

Vacuum Range

CF flanged	atm to $1 \times 10^{-11}\text{mbar}$
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Temperature Range\*

CF flanged	$-20$ to $210^{\circ}\text{C}$
------------	--------------------------------

\* - Assembly rating must be reduced to that of lowest rated component.

Options:

- DN40CF versions also available.
- Clearance hole flanges available on both top & bottom flanges, (Height, H increases).
- Large micrometers.
- Stepper motor actuation.
- Horizontal mount kit.
- Additional axis.

All dimensions are nominal in millimetres unless otherwise specified

With DN100CF Flanges



X-Y Travel	Clear ID	A	B	C	H	Part Code	Price £	Price €
$\pm 12.7$	72.0	253.5	242.3	374.7	120.7	M-XY12-72-100CF	POA	POA
$\pm 25.4$	72.0	253.5	242.3	374.7	146.1	M-XY25-72-100CF	POA	POA
$\pm 12.7$	100.3	253.5	242.3	374.7	127.0	M-XY12-101-100CF	POA	POA
$\pm 25.4$	100.3	253.5	242.3	374.7	155.4	M-XY25-101-100CF	POA	POA

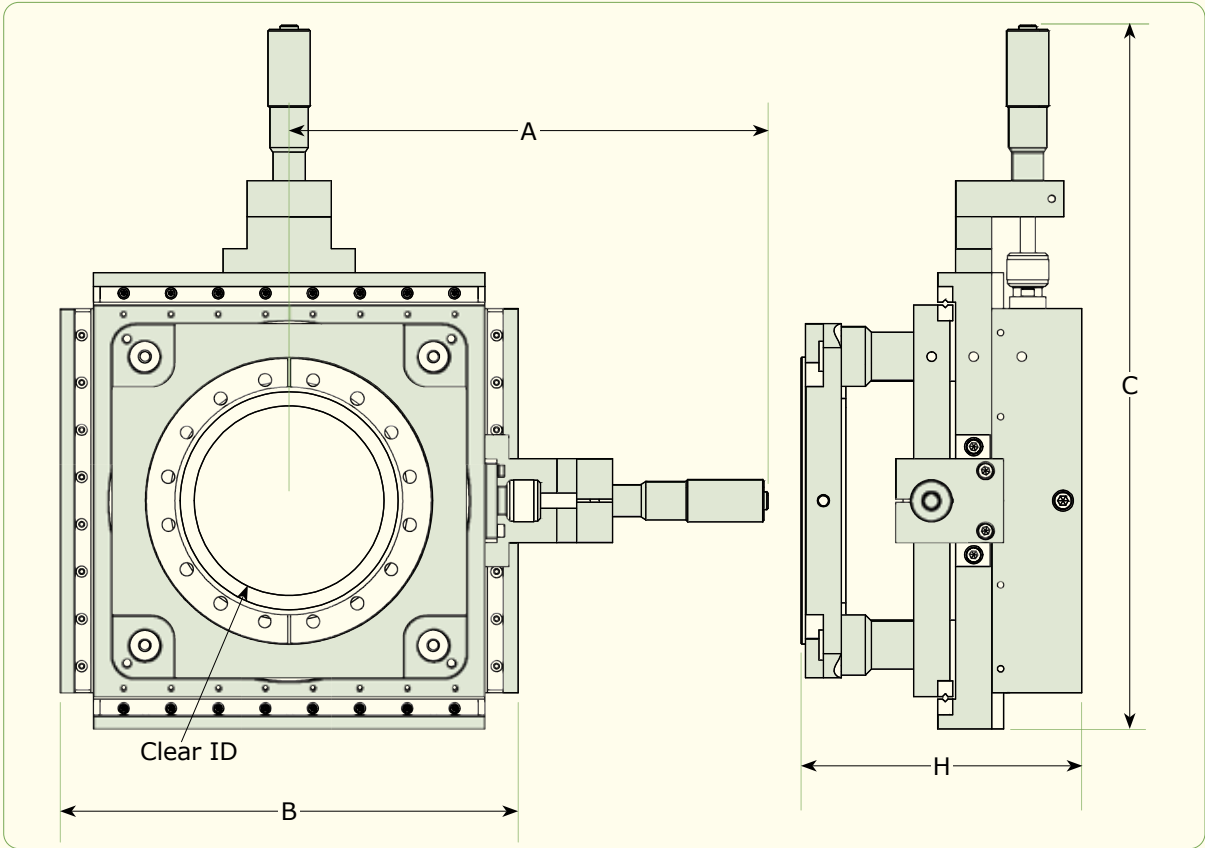
H distance shown in the table is based on the stage having tapped flanges top & bottom. Clearance flanges available if required, please call sales office for further details.

With DN160CF Flanges



X-Y Travel	Clear ID	A	B	C	H	Part Code	Price £	Price €
$\pm 12.7$	149.1	330.2	292.1	476.3	165.1	M-XY12-150-160CF	POA	POA
$\pm 25.4$	149.1	330.2	292.1	476.3	TBA	M-XY25-150-160CF	POA	POA

H distance shown in the table is based on the stage having tapped flanges top & bottom. Clearance flanges available if required, please call sales office for further details.



All dimensions are nominal in millimetres unless otherwise specified

Precision X-Y-Z Manipulator Stages



This range of precision XYZ manipulators is in our opinion, the best value for money manipulator on the market today. In terms of features, quality, possible configurations and cost, they set the standard.

Standard features and benefits include;

- Adjustable, crossed roller bearings for extra rigidity,
- Bellows ID of 35.3mm (1.39") giving  $\pm 12.7\text{mm}$  ( $\frac{1}{2}$ ") movement in a circular pattern or 48.0mm (1.89") giving  $\pm 12.7\text{mm}$  ( $\frac{1}{2}$ ") in a square pattern.
- Compact, rugged design with full Z axis frame provides extra rigidity to allow strokes to 300mm (12"). No flimsy, unsupported guide rods!
- Tilting top flange; 2° tilt angle.

These manipulators can be in-the-field converted to stepper motor actuation in 15 minutes. All models are pre-threaded for limit switches.

Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

Note : Photo shows model with large micrometers, tilting top flange & DN100CF base flange with 5 off DN16CF ports

Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Bearings	St.St.

Resolution X & Y

X & Y with small micrometers (standard)	>10 $\mu\text{m}$
X & Y with large micrometers	>2.5 $\mu\text{m}$
Z	>25 $\mu\text{m}$

Repeatability

X & Y with small micrometers (standard)	>5 $\mu\text{m}$
X & Y with large micrometers	>1.25 $\mu\text{m}$
Z	>12.5 $\mu\text{m}$

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> mbar
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

Options:

- Tapped holes in top flange, Clearance holes in bottom flange.
- Alternative base flange sizes, DN40CF, DN63CF, DN160CF & DN200CF.
- Additional DN16CF ports on base flange.
- Large micrometers.
- Stepper motor actuation.
- Horizontal mount kit.

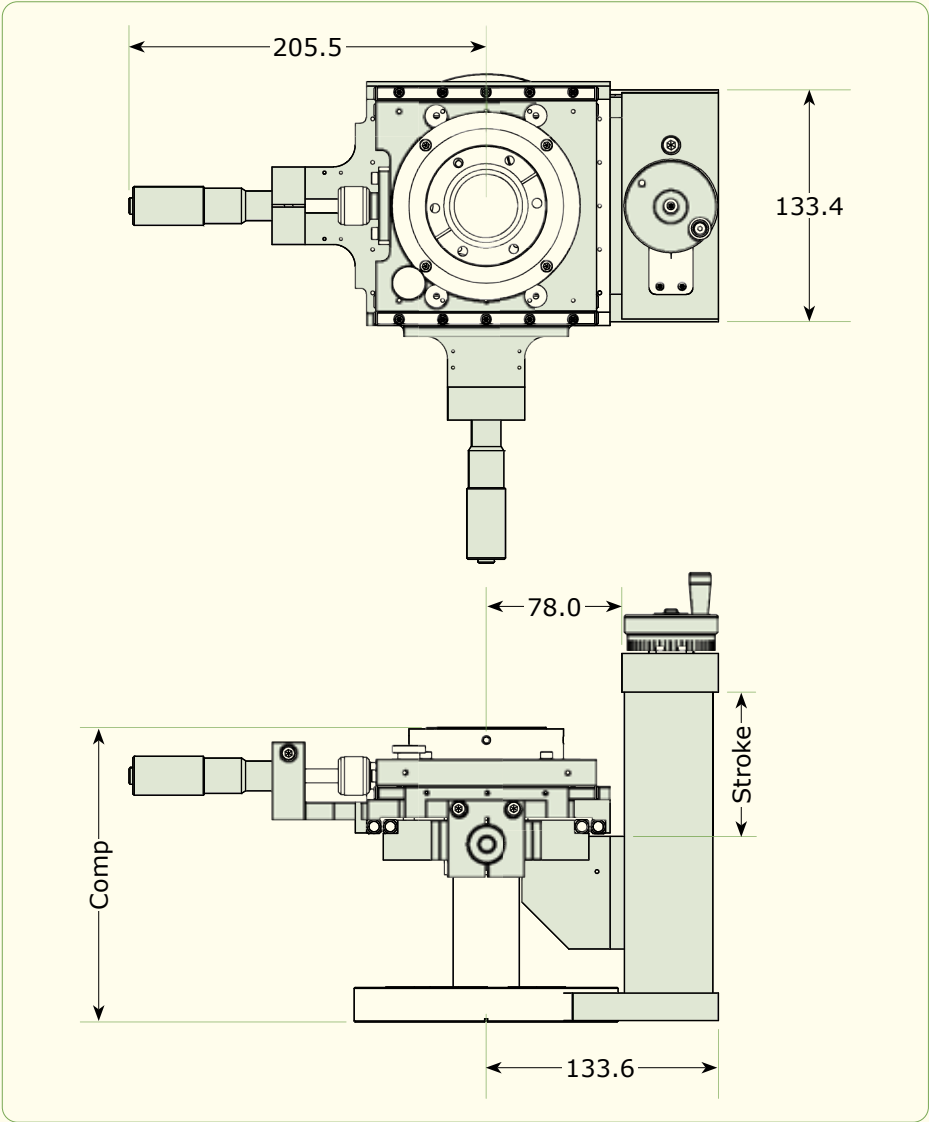
Please contact our sales office for further details of the above options.

With DN100CF Base Flange, DN40CF Top Flange



X-Y Travel	Clear ID	Stroke	Comp	Part Code	Price £	Price €
$\pm 12.7$	38.0	50.8	Call sales office for details of compressed heights between flanges.	M-XYZ-12S-50-100/40CF	POA	POA
$\pm 12.7$	38.0	101.6		M-XYZ-12S-101-100/40CF	POA	POA
$\pm 12.7$	38.0	152.4		M-XYZ-12S-152-100/40CF	POA	POA
$\pm 12.7$	38.0	203.2		M-XYZ-12S-203-100/40CF	POA	POA
$\pm 12.7$	38.0	254.0		M-XYZ-12S-254-100/40CF	POA	POA
$\pm 12.7$	38.0	304.8		M-XYZ-12S-304-100/40CF	POA	POA

Above X-Y travel measured in square pattern.



All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified



Precision X-Y-Z Manipulator Stages



This range of precision XYZ manipulators is in our opinion, the best value for money manipulator on the market today. In terms of features, quality, possible configurations and cost, they set the standard.

Standard features and benefits include:

- Adjustable, crossed roller bearings for extra rigidity.
- Bellows ID of 72.9mm (2.87") giving  $\pm 12.7\text{mm}$  ( $\frac{1}{2}$ ") or  $\pm 25.4\text{mm}$  (1") movement in a circular pattern.
- Compact, rugged design with full Z axis frame provides extra rigidity to allow strokes to 914mm (36"). No flimsy, unsupported guide rods!
- Tilting top flange; 2° tilt angle.

These manipulators can be in-the-field converted to stepper motor actuation in 15 minutes. All models are pre-threaded for limit switches.

Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Bearings	St.St.

Resolution X & Y

X & Y with small micrometers (standard)	$>12.5\mu\text{m}$
X & Y with large micrometers	$>2.5\mu\text{m}$
Z	$>25\mu\text{m}$

Repeatability

X & Y with small micrometers (standard)	$>5\mu\text{m}$
X & Y with large micrometers	$>1.25\mu\text{m}$
Z	$>12.5\mu\text{m}$

Vacuum Range

CF flanged	atm to $1 \times 10^{-11}\text{mbar}$
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Temperature Range\*

CF flanged	-20 to 210°C
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\* - Assembly rating must be reduced to that of lowest rated component.

Options:

- Tapped holes in top flange, Clearance holes in bottom flange.
- Alternative base flange sizes, DN100CF, DN160CF & DN200CF.
- Large micrometers.
- Stepper motor actuation.
- Horizontal mount kit.

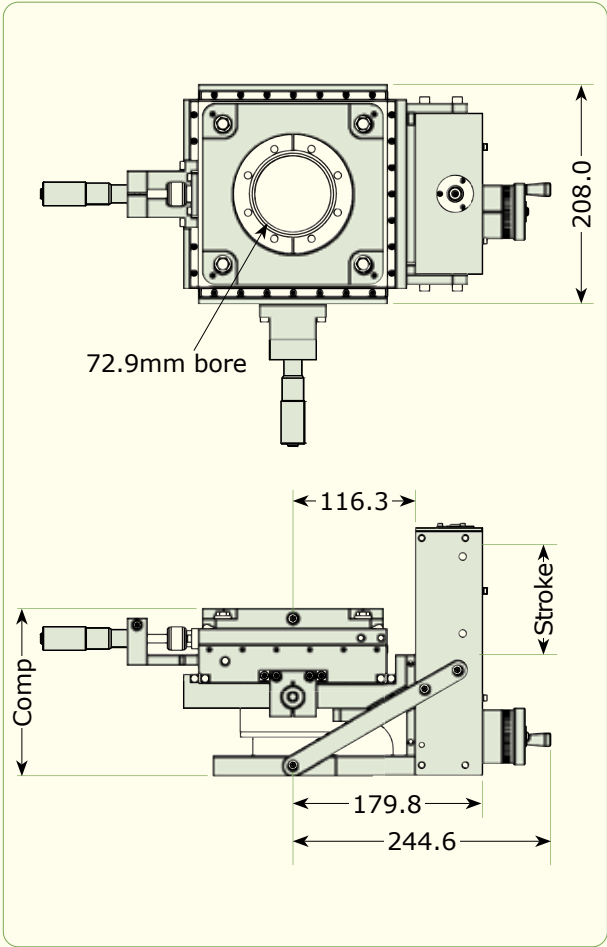
Please contact our sales office for further details of the above options.

With DN63CF Flanges



XY Travel	Stroke	Comp	Part Code	Price £	Price €
$\pm 12.7$	101.6	Call sales office for details of compressed heights between flanges.	M-XYZ-12-101-63CF	POA	POA
$\pm 12.7$	152.4		M-XYZ-12-152-63CF	POA	POA
$\pm 12.7$	203.2		M-XYZ-12-203-63CF	POA	POA
$\pm 12.7$	254.0		M-XYZ-12-254-63CF	POA	POA
$\pm 12.7$	304.8		M-XYZ-12-304-63CF	POA	POA
$\pm 12.7$	406.4		M-XYZ-12-406-63CF	POA	POA
$\pm 12.7$	508.0		M-XYZ-12-508-63CF	POA	POA
$\pm 12.7$	609.6		M-XYZ-12-609-63CF	POA	POA
$\pm 25.4$	101.6		M-XYZ-25-101-63CF	POA	POA
$\pm 25.4$	152.4		M-XYZ-25-152-63CF	POA	POA
$\pm 25.4$	203.2		M-XYZ-25-203-63CF	POA	POA
$\pm 25.4$	254.0		M-XYZ-25-254-63CF	POA	POA
$\pm 25.4$	304.8		M-XYZ-25-304-63CF	POA	POA
$\pm 25.4$	406.4		M-XYZ-25-406-63CF	POA	POA
$\pm 25.4$	508.0		M-XYZ-25-508-63CF	POA	POA
$\pm 25.4$	609.6		M-XYZ-25-609-63CF	POA	POA

Above X-Y travel measured in circular pattern.





Precision X-Y-Z Manipulator Stages



These larger precision X-Y-Z manipulators provide unmatched performance at an exceptional price.

The rugged construction is designed to withstand the heaviest loads from both atmosphere as well as from scientific instruments.

- Bellows I.D. 101mm (4") (circular pattern).
- Compact, rugged design with full Z axis frame provides extra rigidity to allow strokes in excess of 914mm (36").
- Adjustable, crossed roller bearings for extra rigidity.
- XY travel  $\pm 12.7\text{mm}$  (0.5") or  $\pm 25.4\text{mm}$  (1.0") circular pattern.
- Z travel 101.6mm - 914mm (4" -36").
- Field conversion to stepper motors in 15 minutes. Top flange may be either tapped or non-tapped to suit your equipment.
- Top flange tilt of  $\pm 2^\circ$  for alignment.

Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.

Specifications:

Materials

Bellow & flanges	St.St.
Mounting brackets	Anodised Al
Bearings	St.St.

Resolution X & Y

X & Y with small micrometers (standard)	$>10\mu\text{m}$
X & Y with large micrometers	$>2.5\mu\text{m}$
Z	$>25\mu\text{m}$

Repeatability

X & Y with small micrometers (standard)	$>5\mu\text{m}$
X & Y with large micrometers	$>1.25\mu\text{m}$
Z	$>12.5\mu\text{m}$

Vacuum Range

CF flanged	atm to $1 \times 10^{-11}\text{mbar}$
------------	---------------------------------------

Temperature Range\*

CF flanged	-20 to $210^\circ\text{C}$
------------	----------------------------

\* - Assembly rating must be reduced to that of lowest rated component.

Options:

- Tapped holes in top flange, Clearance holes in bottom flange.
- Alternative base flange sizes, DN160CF & DN200CF.
- Large micrometers.
- Stepper motor actuation.
- Horizontal mount kit.

Please contact our sales office for further details of the above options.

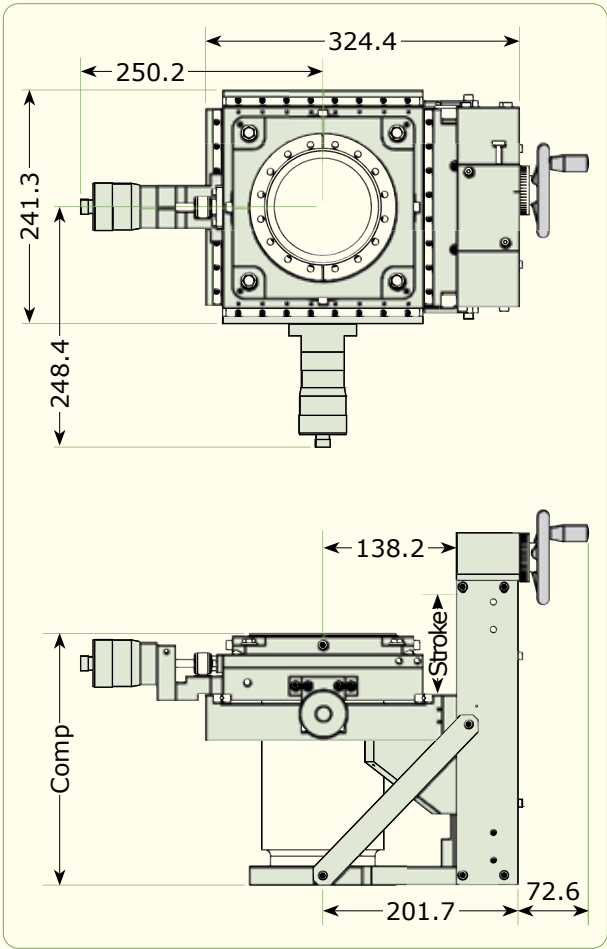
All dimensions are nominal in millimetres unless otherwise specified

With DN100CF Flanges



XY Travel	Stroke	Comp	Part Code	Price £	Price €
$\pm 12.7$	101.6	Call sales office for details of compressed heights between flanges.	M-XYZ-12-101-100CF	POA	POA
$\pm 12.7$	152.4		M-XYZ-12-152-100CF	POA	POA
$\pm 12.7$	203.2		M-XYZ-12-203-100CF	POA	POA
$\pm 12.7$	254.0		M-XYZ-12-254-100CF	POA	POA
$\pm 12.7$	304.8		M-XYZ-12-304-100CF	POA	POA
$\pm 12.7$	406.4		M-XYZ-12-406-100CF	POA	POA
$\pm 12.7$	508.0		M-XYZ-12-508-100CF	POA	POA
$\pm 12.7$	609.6		M-XYZ-12-609-100CF	POA	POA
$\pm 25.4$	101.6		M-XYZ-25-101-100CF	POA	POA
$\pm 25.4$	152.4		M-XYZ-25-152-100CF	POA	POA
$\pm 25.4$	203.2		M-XYZ-25-203-100CF	POA	POA
$\pm 25.4$	254.0		M-XYZ-25-254-100CF	POA	POA
$\pm 25.4$	304.8		M-XYZ-25-304-100CF	POA	POA
$\pm 25.4$	406.4		M-XYZ-25-406-100CF	POA	POA
$\pm 25.4$	508.0		M-XYZ-25-508-100CF	POA	POA
$\pm 25.4$	609.6		M-XYZ-25-609-100CF	POA	POA
$\pm 25.4$	762.0		M-XYZ-25-762-100CF	POA	POA
$\pm 25.4$	914.4		M-XYZ-25-914-100CF	POA	POA

Above X-Y travel measured in circular pattern.



All dimensions are nominal in millimetres unless otherwise specified

Two Stage Differentially Pumped Rotary Platforms



Features:

- 360° continuous rotation.
- Includes fine adjust drive and 0.1° vernier scale.
- Extra large bore for maximum clearance.
- Exclusive bearing seal reduces costly maintenance and prolongs life.
- Standard, full depth threads need no special fasteners.
- Optional integral half nipple saves time, money & space.
- Internal seals lubricated with Krytox® grease.

Specifications:

Materials

Flanges	St.St.
Mounting brackets	Anodised Al
Seals	Elastomer
Worm & gear	St.St & bearing bronze

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> Torr
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

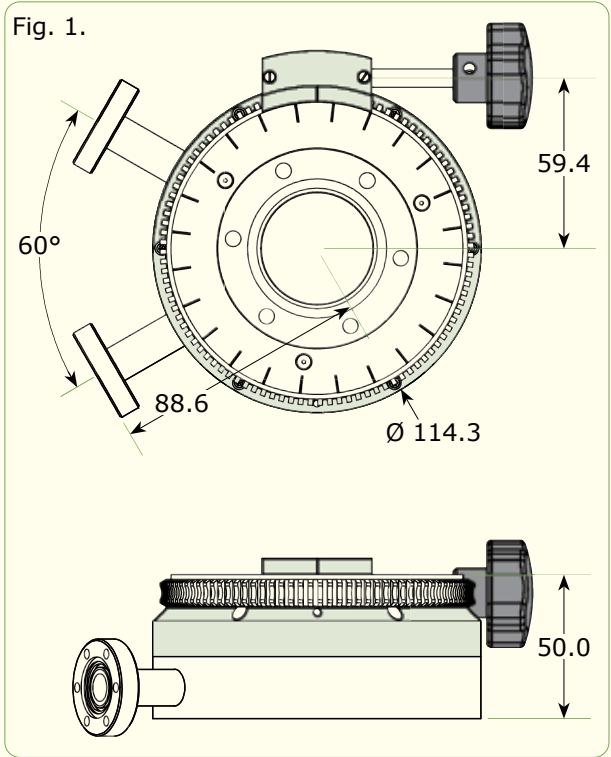
The excellent performance of our rotary platform coupled with a simple, low maintenance design gives maximum value. The fine adjust worm drive has bearings at both ends, thereby eliminating deflection and inaccuracies. Worm gear backlash is reduced to <0.05 degrees. The bolt holes on both flanges are tapped full depth for use with standard length flange hardware. This means no need to shorten standard fasteners. Fluorocarbon seals are double-differentially pumped to provide base pressures in the 10<sup>-11</sup> Torr range and will withstand bakeouts up to 210 degrees C.

An integral half-nipple option, for mounting to an existing tapped flange, saves space, hardware, time and money. Stepper motor drives are also available.

Standard specifications are shown here, special versions can be made to suit your individual requirements. Please contact our sales office for further information.

Cross-over Manifold

When using both differentially-pumped volumes, it is necessary to rough the high vacuum volume before starting the HV pump. A cross-over manifold allows this. Call sales office for further details

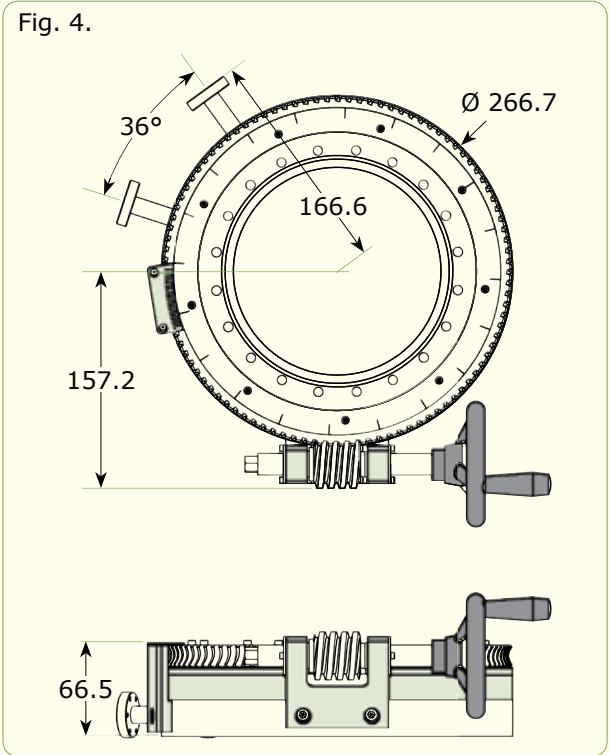
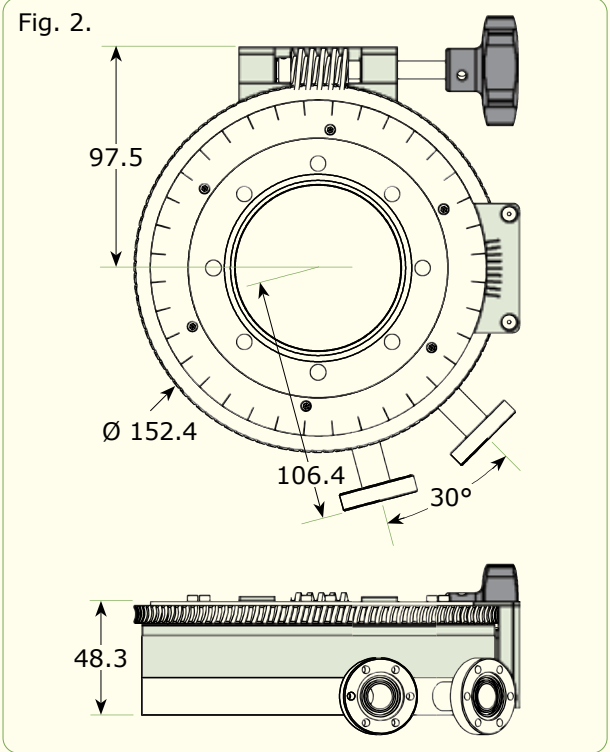


All dimensions are nominal in millimetres unless otherwise specified

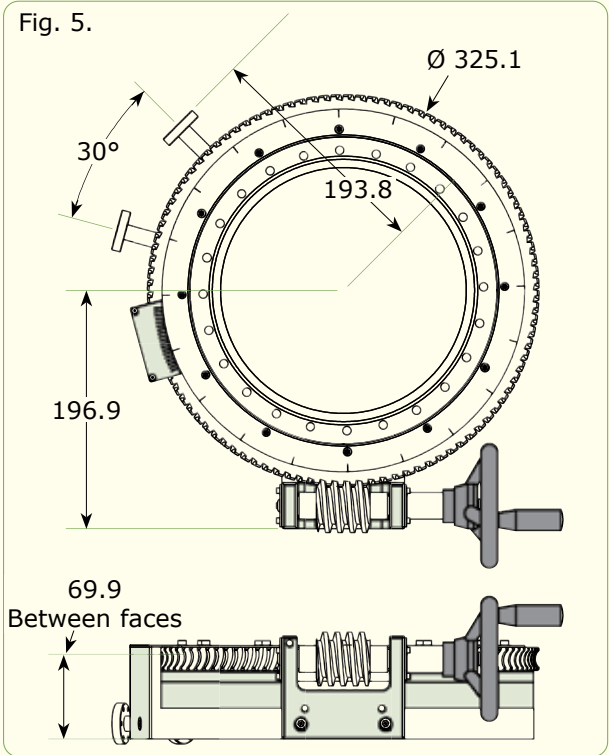
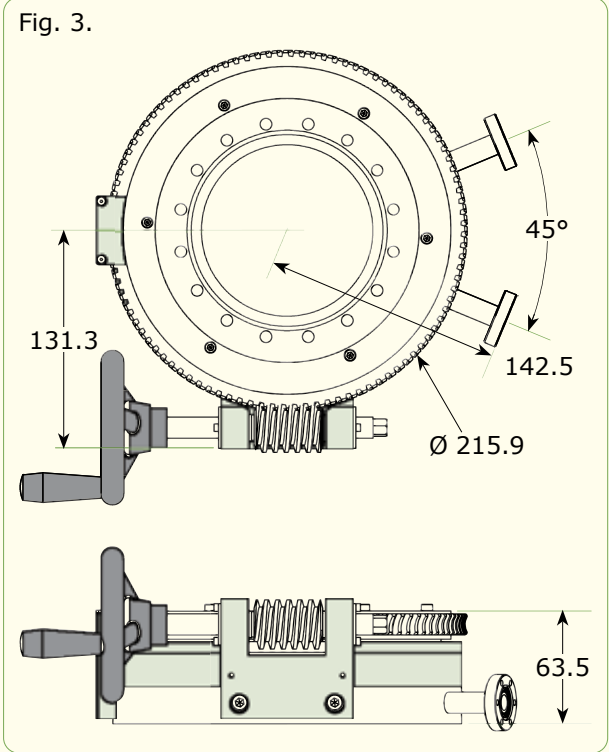
Two Stage Differentially Pumped Rotary Platforms



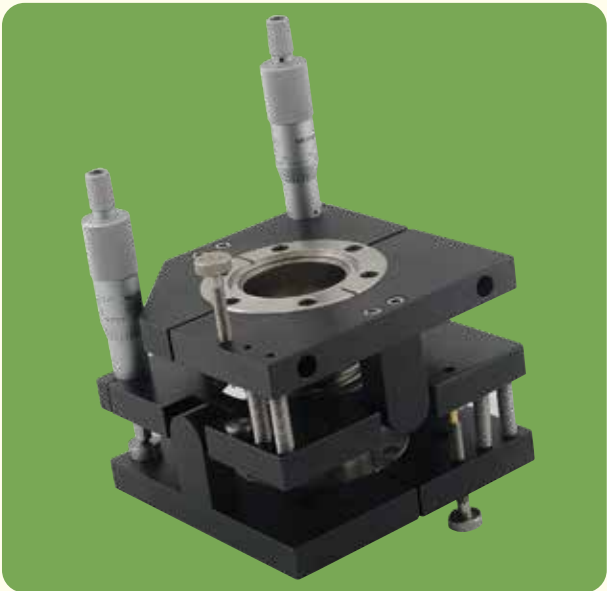
Fig.	Flange	ID	Max Axial Load	Part Code	Price £	Price €
1	DN40CF	38.8	68kg	M-RP-40CF	POA	POA
2	DN63CF	72.9	122kg	M-RP-63CF	POA	POA
3	DN100CF	102.8	204kg	M-RP-100CF	POA	POA
4	DN160CF	153.6	270kg	M-RP-160CF	POA	POA
5	DN200CF	204.4	545kg	M-RP-200CF	POA	POA



All dimensions are nominal in millimetres unless otherwise specified



Precision Tilt Port Aligners



Features:

- Bellows included.
- ±10° tilt in both axes.
- Tilt position lock.
- Precision micrometer adjustment.
- Extra large bore for maximum clearance.
- Self lubricating bearings.
- Short length.

Specifications:

Materials

Flanges & bellows	St.St.
Mounting brackets	Anodised Al

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> Torr
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Temperature Range\*

CF flanged	-20 to 210°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

Often a probe or other device mounted on a chamber flange is not precisely aligned with a specified point inside the chamber. This can be due to the mass on the end bending the device and/or inaccuracies of chamber port alignments. Using a precision tilt port aligner mounted between the device and the chamber port, this problem can be easily and accurately overcome.

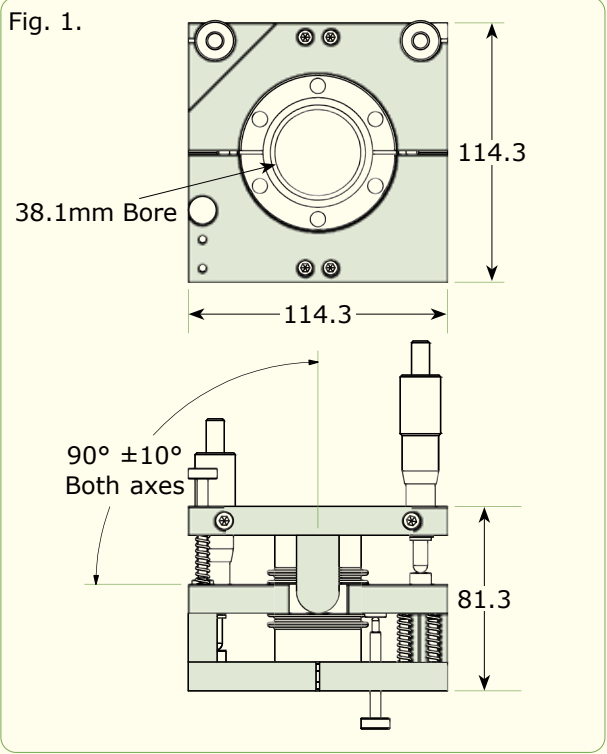
Our range of precision tilt port aligners are the finest 2-axis tilt stages available. From the self lubricating pivot bearings to the rugged construction, everything speaks of quality. These aligners have the shortest overall height of any similar gimbal on the market. The clear inside diameter is the largest possible to clear obstructions and tilt angle is greater. Motorized and extra heavy duty versions are also available.

Tilt port aligners are offered in 5 standard sizes, ranging from DN40CF to DN200CF. Custom sizes are also available. All versions are fully bakeable to 210°C.

Tilt port aligners with DN63CF and larger flanges use welded bellows. This further minimizes the overall height and provides maximum clear ID, without increasing the cost. All of the tilt port aligners have a total angular movement of 20° (±10°) in both axes.

Standard specifications are shown here, special versions can be made to suit your individual requirements.

Please contact our sales office for further information.



All dimensions are nominal in millimetres unless otherwise specified

Precision Tilt Port Aligners

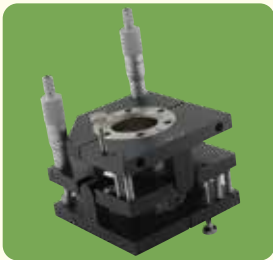
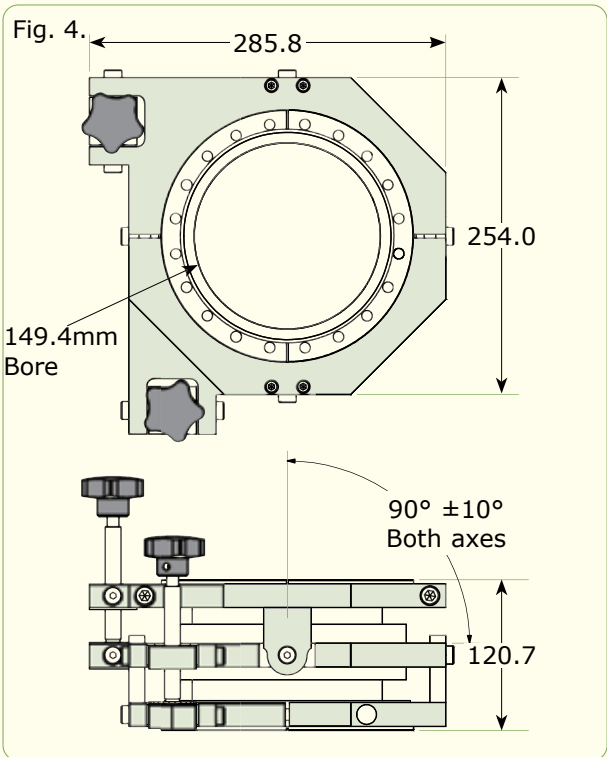
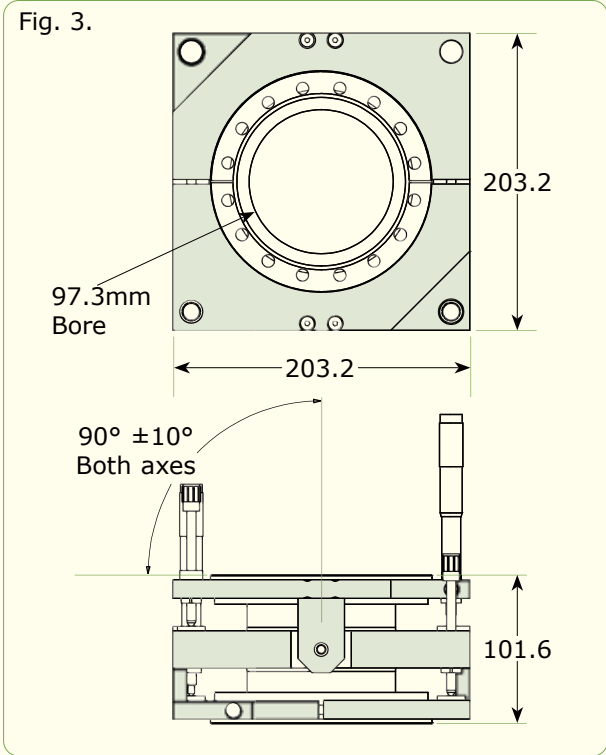
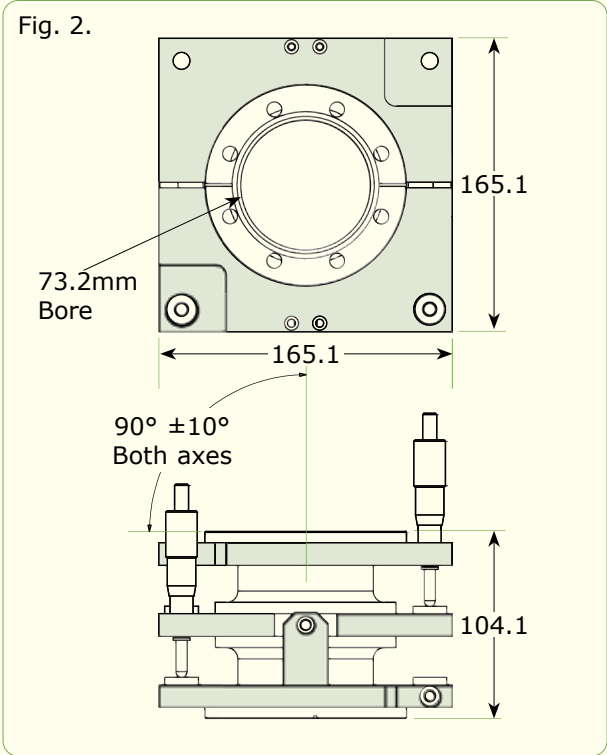
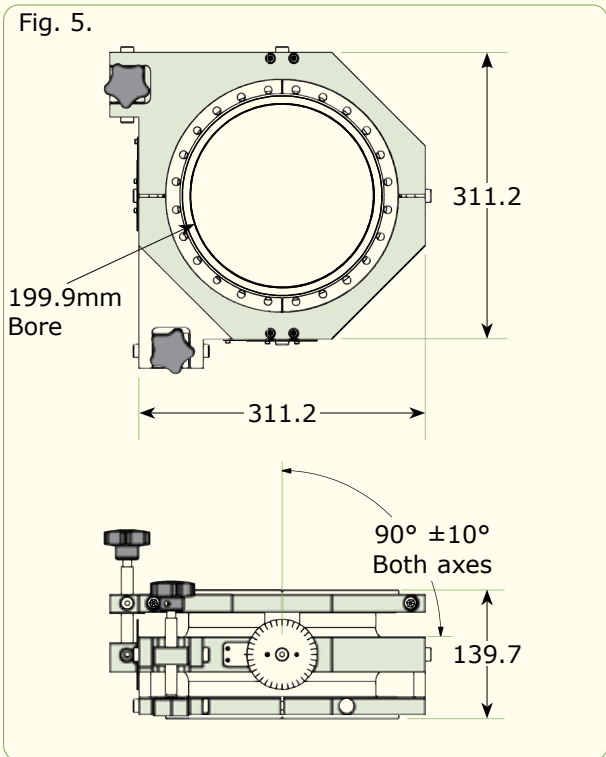


Fig.	Flange	ID	Part Code	Price £	Price €
1	DN40CF	38.1	M-TPA-40CF	POA	POA
2	DN63CF	73.4	M-TPA-63CF	POA	POA
3	DN100CF	102.8	M-TPA-100CF	POA	POA
4	DN160CF	153.6	M-TPA-160CF	POA	POA
5	DN200CF	204.4	M-TPA-200CF	POA	POA

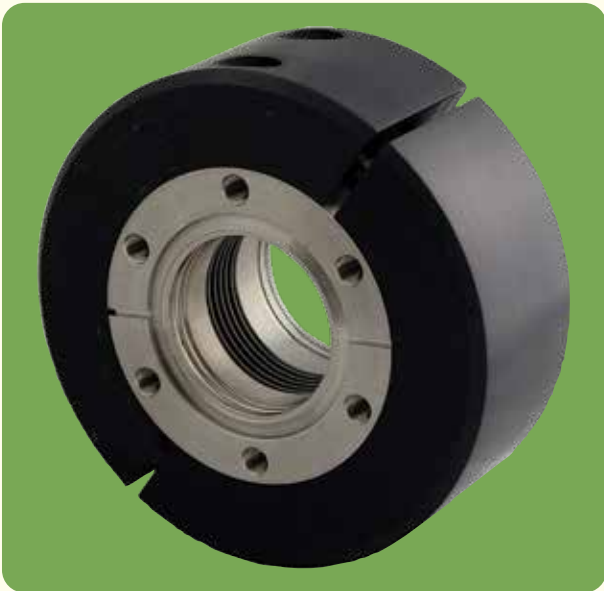


All dimensions are nominal in millimetres unless otherwise specified





Port Aligners



Specifications:

Materials

Flanges & bellows	St.St.
Clamping brackets	Anodised Al

Vacuum Range

CF flanged	atm to 1x10 <sup>-11</sup> Torr
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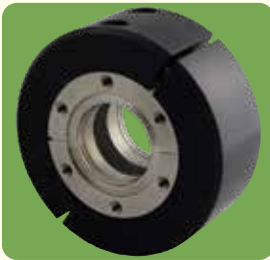
Temperature Range\*

CF flanged	-20 to 210°C
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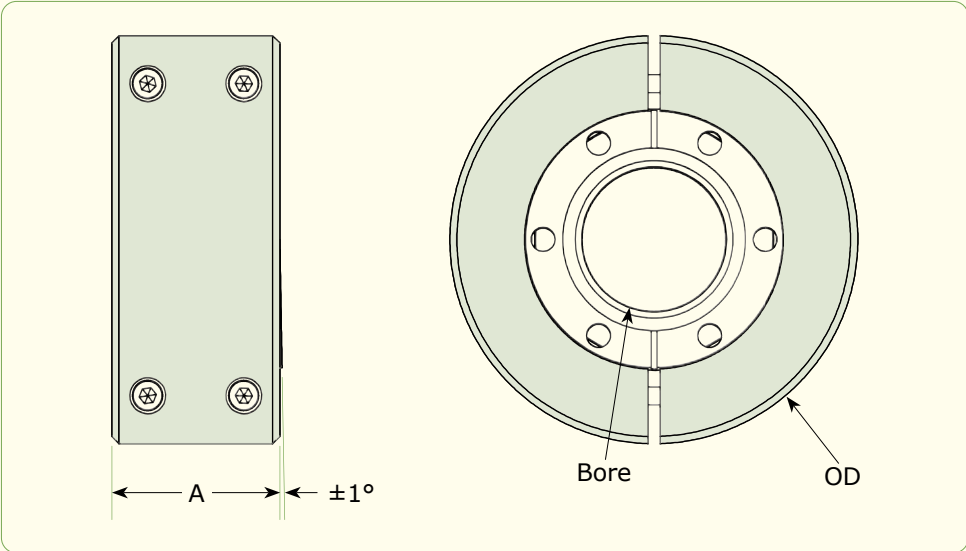
\* - Assembly rating must be reduced to that of lowest rated component.

Sometimes a port on the vacuum chamber just doesn't quite point where it should. The MPA' port aligner solves this with two UHV flanges connected by a short section of welded bellows and a sturdy clamping mechanism. The bellows allows the flanges to tilt ± 1 degrees, total. This makes for easy alignment of long devices like magnetic introduction and sample transfer rods. An arc of 2 degrees subtends a chordal distance of more than 25mm (1") at a distance of 750mm (30"), giving lots of adjustment range.

Port Aligners



Flange	A	Bore	OD	Part Code	Price £	Price €
DN40CF	44.5	38.1	108.0	M-PA-40CF	POA	POA
DN63CF	66.8	72.8	146.1	M-PA-63CF	POA	POA



All dimensions are nominal in millimetres unless otherwise specified

Port Aligners With Pivot Mounts



Specifications:

Materials

	St.St.
--	--------

Vacuum Range

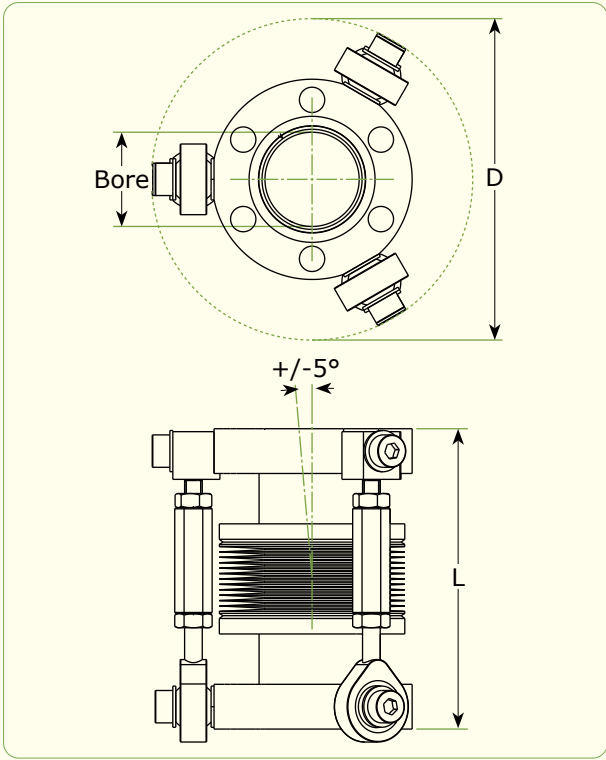
CF flanged	atm to 1x10 <sup>-11</sup> Torr
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Temperature Range\*

CF flanged	-20 to 200°C
------------	--------------

\* - Assembly rating must be reduced to that of lowest rated component.

Three left/right threaded hexnuts allow for angular as well as linear adjustment. The alignment screws are equipped with pivot mounts on one end and are bolted to the CF Flange on the other end. The bellows allows the flanges to tilt ± 5 degrees, total. This makes for easy alignment of long devices like magnetic introduction and sample transfer rods.



Port Aligners With Pivot Mounts



Flange	L	Bore	D	Part Code	Price £	Price €
DN16CF	51.0 +/- 6.0	16.0	55.0	M-PA-16CF-F5	POA	POA
DN40CF	90.0 +/- 5.0	38.0	94.0	M-PA-40CF-F5	POA	POA
DN63CF	100.0 +/- 5.0	65.0	156.0	M-PA-63CF-F5	POA	POA
DN100CF	100.0 +/- 5.0	104.0	195.0	M-PA-100CF-F5	POA	POA

All dimensions are nominal in millimetres unless otherwise specified



Hexapod Port Aligners



Specifications:

Materials

Flanges & bellows St.St.

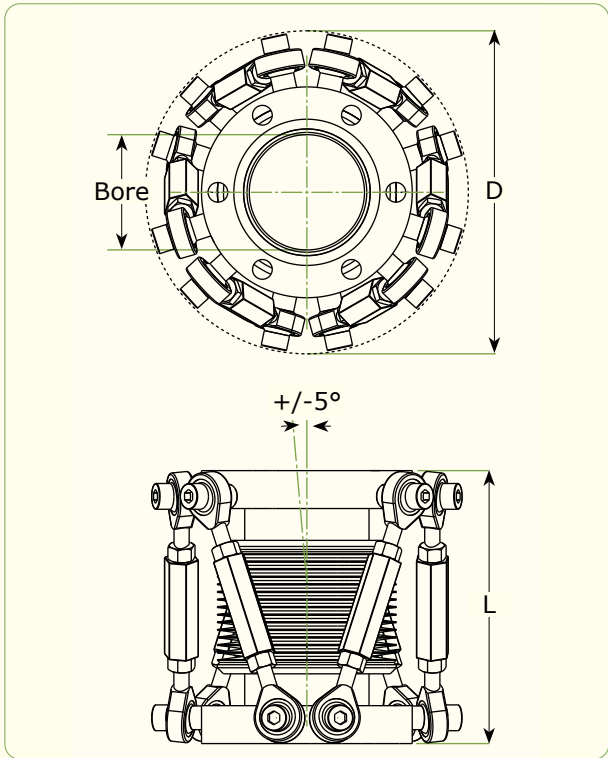
Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>Torr

Temperature Range\*

CF flanged -20 to 200°C

\* - Assembly rating must be reduced to that of lowest rated component.



This port aligner has six alignment screws instead of the usual three. Left/right threaded hexnuts allow for angular, linear and lateral (off axis) adjustment. The alignment screws are equipped with pivot mounts on both ends. The hexagonal geometry adds additional sturdiness. The bellows allows the flanges to tilt ± 5 degrees, total. This makes for easy alignment of long devices like magnetic introduction and sample transfer rods.

Hexapod Port Aligners



Description	Part Code	Price £	Price €
HEXAPOD port aligner DN40CF angular +/-5° lateral +/-5mm movement L=90mm +/-5mm, ID=38mm	M-PA-40CF-HEX	POA	POA
HEXAPOD port aligner DN63CF angular +/-5° lateral +/-5mm movement L=110mm +/-5mm, ID=65mm	M-PA-63CF-HEX	POA	POA
HEXAPOD port aligner DN100CF angular +/-5° lateral +/-5mm movement L=120mm +/-5mm, ID=102mm	M-PA-100CF-HEX	POA	POA
HEXAPOD port aligner DN160CF angular +/-5° lateral +/-3mm movement L=105mm +/-5mm, ID=150mm	M-PA-160CF-HEX	POA	POA

All dimensions are nominal in millimetres unless otherwise specified

Multi-Port Adapters & Support Tubes



Specifications:

Materials

St.St.

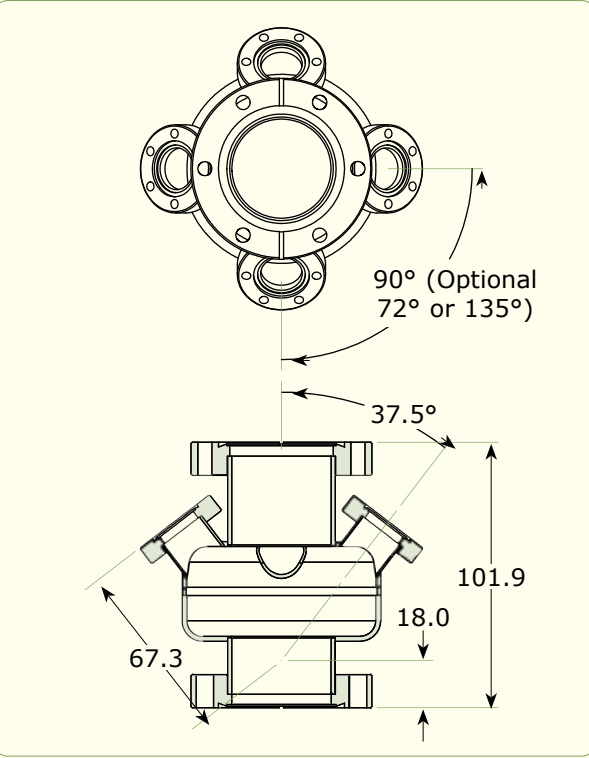
Vacuum Range

CF flanged atm to 1x10<sup>-11</sup>Torr

Temperature Range\*

CF flanged -20 to 210°C

\* - Assembly rating must be reduced to that of lowest rated component.



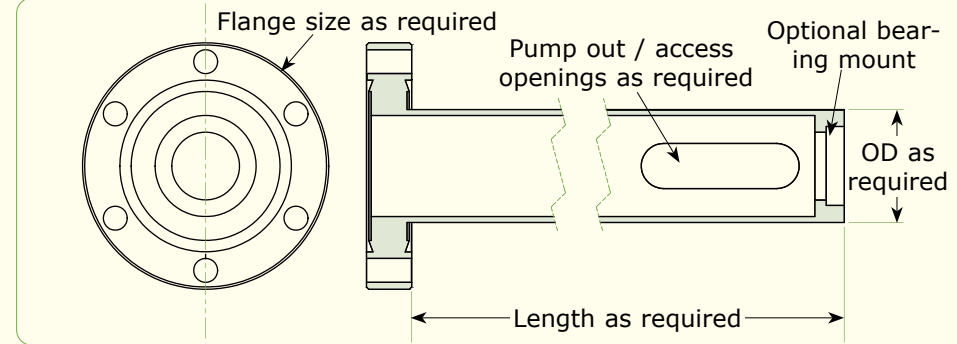
Multi-port adaptors are useful for adding power, thermocouple, liquid nitrogen and other feedthroughs to existing (usually larger) flanges. These adaptors can also be devised to provide outboard support for things like rotary and / or linear motion feedthroughs so the motion can be delivered where it is actually needed. The "standard" support tube is 31.8mm (1.25") OD with pumpout holes, slots for wires and LN2 lines and a removable adaptor with ball bearing (usually 9.5mm (0.375") ID). Many different configurations are available, including different size flanges, different numbers of flanges and radial spacing of the smaller flanges. The most common size uses DN40CF flanges on the top and bottom with four off DN16CF flanges around the body. Zero-length adaptor flanges can be used to mate the multi-port adapters to other flanges.

Multiport Adapters & Support Tubes



Description	Part Code	Price £	Price €
Multiport adapter DN40CF top & bottom, 4 x DN16CF @ 90° spacing	M-MPA-40CF	POA	POA

Alternative flange configurations and lengths are available, please contact sales office for further details. Support tubes are also available in many different configurations of flange size, tube diameter and length etc. A schematic diagram below shows the general appearance of the support tube. Please contact our sales office to discuss your specific requirements for support tube.



All dimensions are nominal in millimetres unless otherwise specified

UHV In-vacuum Stepper Motors



Features:

- 1.8° step angle
- UHV compatible materials, suitable for use below  $1 \times 10^{-10}$  mbar.
- Bakeable to 200°C.
- Embedded K type thermocouple
- Operating temperature -65°C to 190°C.\*
- Continuous in-vacuum operation with M-SMD2 controller.
- Long life bearings with very low particulate generation.
- Custom / Radiation hard versions available.
- Shaft modifications available.

\* - Assembly rating must be reduced to that of lowest rated component.

Fourth Generation Hybrid UHV Stepper Motors

AML stepper motors are specifically designed for use in UHV environments making them ideally suited for low speed precision in-vacuum manipulation without the use of particle generating motion feedthroughs. The considerable reduction in mechanical complexity, absence of metal to metal sliding surfaces and low outgassing characteristics make these motors especially suitable for sensitive handling applications. The model D motors are two phase hybrid stepper motors, available in a range of standard sizes and torque ratings. Standard motors provide 200 full steps per revolution and are suitable for use between -65°C to +190°C. Extended low temperature range (-196°C) versions, radiation hard versions ( $1 \times 10^7$  Gy), shaft modifications and hybrid bearings are all available options. All motors are designed, cleaned and hand assembled to UHV standards in an ISO Class 7 cleanroom.

Technical Data

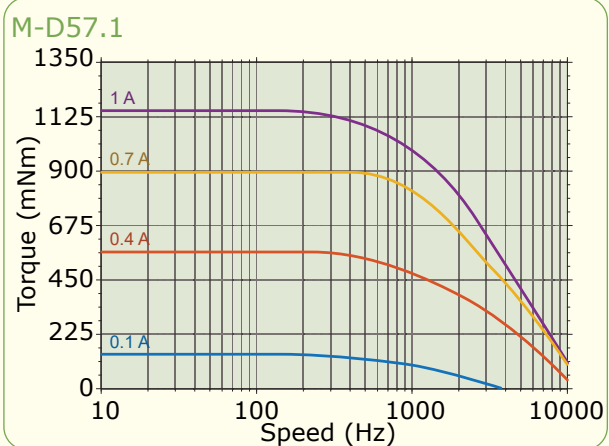
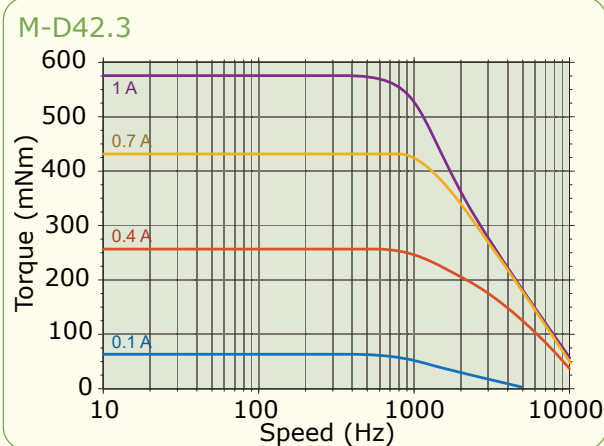
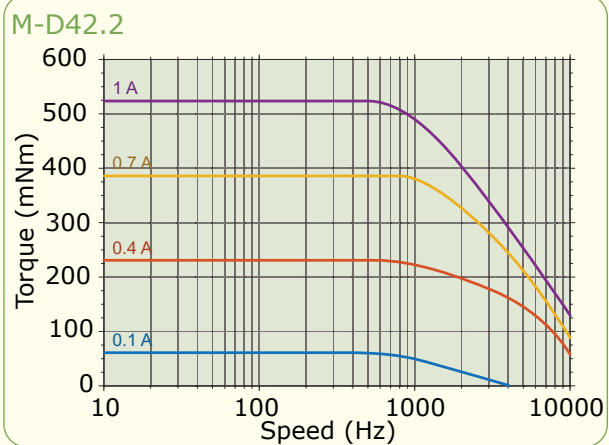
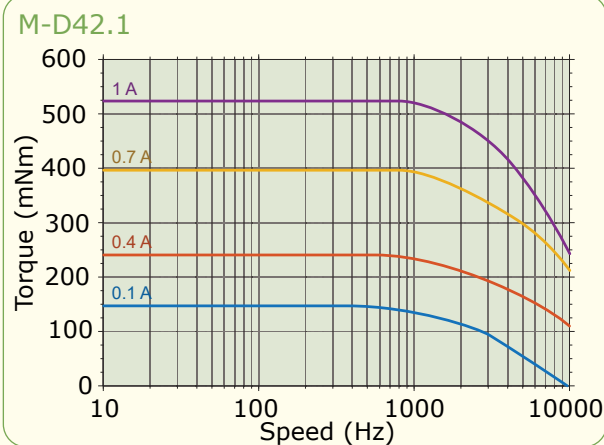
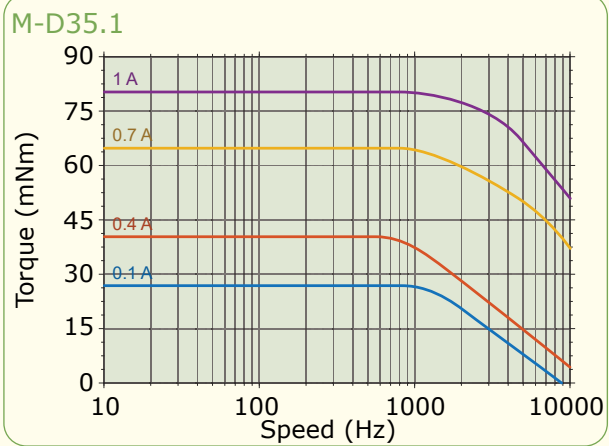
Model	Holding torque mNm	Detent torque mNm	Rotor inertia gcm <sup>2</sup>	Max. Axial force N	Max. Radial Force <sup>(1)</sup> N	Mass g	Current per phase A	Phase resistance @ 20°C Ω	Phase inductance mH
M-D35.1	75	8	10	9	15	190	1.0	4.7	3.8
M-D42.1	250	8	35	9	15	350	1.0	5.3	6.6
M-D42.2	500	14	68	9	15	470	1.0	6.8	10.5
M-D42.3	550	20	102	9	15	610	1.0	8.5	19.5
M-D57.1	1000	30	300	13	40	885	1.0	10.5	27.0

Vacuum nvironment <1×10<sup>-10</sup>mbar  
Operating temperature -65 to +190°C  
Temperature Sensor Type K thermocouple as standard or PT100 optional  
Bakeout temperature 200°C  
Step angle 1.8°  
Step angle tolerance 5%  
Lead length 1.5m

<sup>(1)</sup> - Refer to sales office for details

Speed vs Torque Characteristics

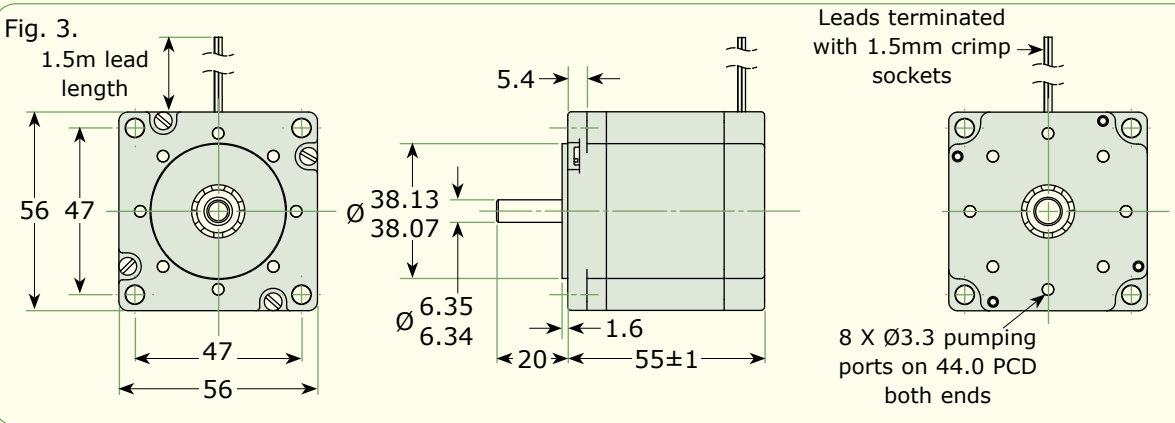
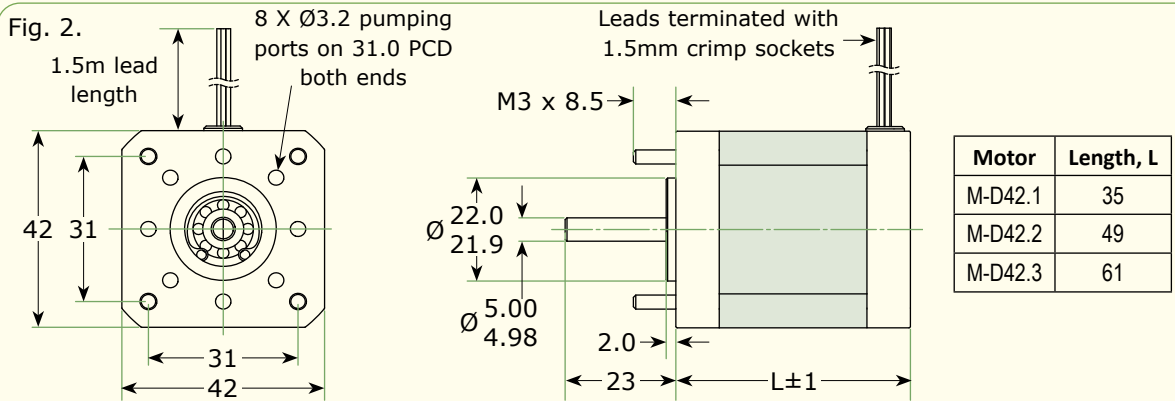
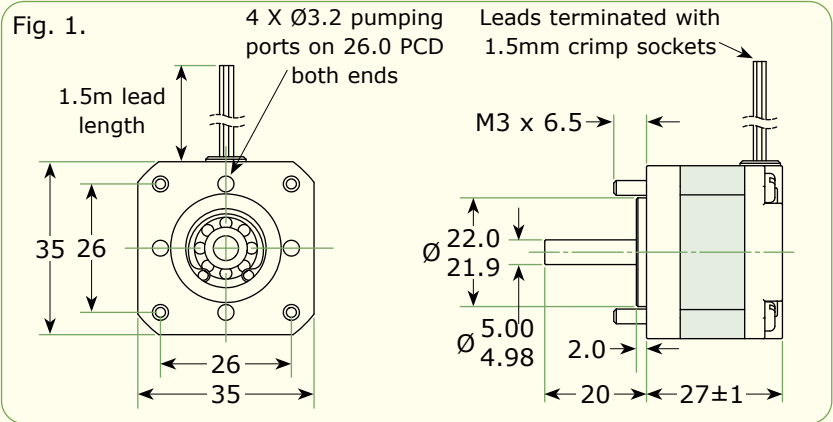
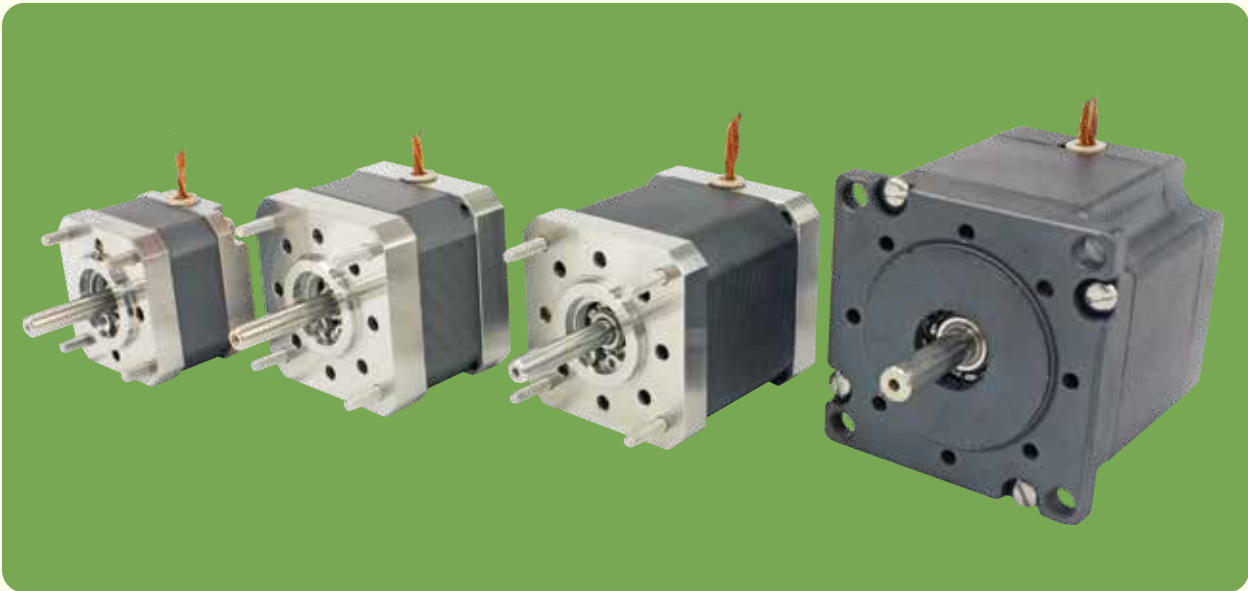
The performance shown on these graphs was obtained using an M-SMD3 drive configured for 256 step division up to a step frequency of 1000 Hz, and full step mode thereafter. source voltage is 67V.  
M-SMD3 stepper moptor drive is a single-axis bipolar stepper motor drive, intended for use with our range of vacuum compatible stepper motors (VCSM's), with maximum performance and minimal heat.  
Different drives will produce different speed / torque curves. Drives capable of producing a total phase current of more than 1A RMS may damage the insulation. Reducing the drive voltage may impair high speed performance. Use of the embedded thermocouple is essential for motor protection.



All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified

UHV In-vacuum Stepper Motors



All dimensions are nominal in millimetres unless otherwise specified

Miniature Stepper Motors

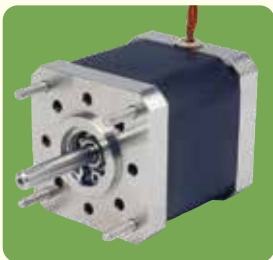


Fig.	Description	Part Code	Price £	Price €
1	UHV stepper motor, 75mNm	M-D35.1	£680	€782
2	UHV stepper motor, 250mNm	M-D42.1	£676	€778
2	UHV stepper motor, 500mNm	M-D42.2	£760	€874
2	UHV stepper motor, 550mNm	M-D42.3	£860	€989
3	UHV stepper motor, 1000mNm	M-D57.1	£1034	€1190

Bearings

Standard motors are fitted with open stainless steel bearings lubricated with NyeTorr® 6300 UHV grease.  
Option 'H' motors have hybrid bearings with silicon nitride ceramic balls, dry lubricated with molybdenum disulfide.

Options

- H - Hybrid ceramic bearings
- R - Radiation hardened to 1 x 10<sup>7</sup> Gy
- P - PT100
- X - Shaft modification. Please provide a sketch of your requirement
- C - Cryogenic. Extended operating temperature range. -196°C to +1905°C

Please call our sales office to discuss your requirement for motor options.

All dimensions are nominal in millimetres unless otherwise specified



UHV Inline Spur Gearhead For Use With M-D35 Stepper Motors



Features:

- Suitable for use below  $1 \times 10^{-10}$  mBar
- 5:1 ratio
- Efficiency >75%
- Low inertia
- High precision, low backlash
- Bakeable to 200°C\*
- Temperature range -65°C to +190°C
- Inline shafts
- Anti-backlase spur gears
- RoHS compliant

\* - Assembly rating must be reduced to that of lowest rated component.

UHV Inline Spur Gearhead For Use With M-D35 Stepper Motors

The M-SG35 series gearheads couple directly to M-D35.1 stepper motors and are suitable for use in UHV environments. Primarily used for increasing resolution, torque multiplication and inertia matching. They are designed for maximum torque capacity, high efficiency and zero backlash.

PLEASE NOTE :- Motor and gearhead will be supplied fully assembled as these must be factory assembled. Not suitable for dry lubrication motor options

Reduction Ratio	Nominal Output Torque <sup>(1)</sup>	Maximum Acceleration Torque	Gear Inertia	Efficiency at Nominal Torque	Radial Load <sup>(2)</sup>	Axial Load <sup>(2)</sup>	Mass	Lubrication
:1	mNm	mNm	Kg-cm <sup>2</sup>	%	N	N	kg	
5	350	450	0.258	75	160	100	0.58	Nyetorr® 6300

Direction of rotation : Same as input

Vacuum environment : <  $1 \times 10^{-10}$  mbar

Max. temperature : +200°C

Min. temperature : -65°C

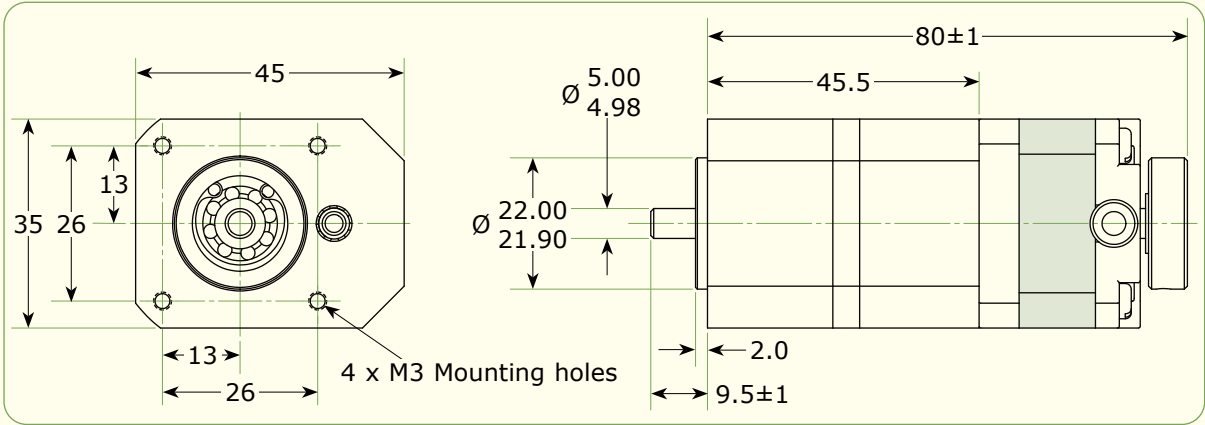
(1) Measured at 500Hz

(2) @75rpm, radial load applied at centre of shaft

UHV Planetary Gearhead For Use With M-D42 Stepper Motors



Fig.	Description	Part Code	Price £	Price €
1	UHV inline spur gearhead complete with M-D35.1 stepper motor	M-SG35-005	£1701	€1957



All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified



UHV Planetary Gearhead For Use With M-D42 Stepper Motors



Features:

- Suitable for use below  $1 \times 10^{-10}$  mBar
- Multiple ratio options, 4:1 through 100:1
- Low inertia
- High precision, low backlash
- Service life >10,000hrs
- Bakeable to 200°C\*

\* - Assembly rating must be reduced to that of lowest rated component.

UHV Planetary Gearhead For Use With M-D42 Stepper Motors

The M-PG42 series gearheads couple directly to M-D42 stepper motors and are suitable for use in UHV environments. Primarily used for increasing resolution, torque multiplication and inertia matching. They are designed for maximum torque capacity, high efficiency and low backlash. PLEASE NOTE :- Pricing does not include the motor.

Reduction Ratio	Nominal Output Torque	Maximum Acceleration Torque	Gear Inertia	Backlash <sup>(1)</sup>	Efficiency at Nominal Torque	Radial Load <sup>(2)</sup>	Axial Load <sup>(2)</sup>	Maximum Mass	Lubrication			
:1	Nm	Nm	Kg-cm²	arc-min	%	N	N	kg				
4	5.9	11.8	0.020	<15	96	200	196	0.60	Nyetorr® 6300			
5	6.2	11.8	0.018									
7	5.5	11.0	0.016									
10	3.5	7.0	0.016									
16	6.5	13.0	0.019	<18	94						0.90	
20	6.5	13.0	0.017									
25	6.7	13.0	0.017									
35	6.7	13.0	0.016									
40	6.5	13.0	0.016									
50	6.7	13.0	0.016									
70	5.5	11.0	0.016									
100	3.5	7.0	0.016									

Nominal input speed : 4500rpm  
Maximum input speed : 8000rpm  
Direction of rotation : Same as input  
Vacuum environment : <  $1 \times 10^{-10}$  mbar  
Max. temperature : +200°C  
Min. temperature : -65°C

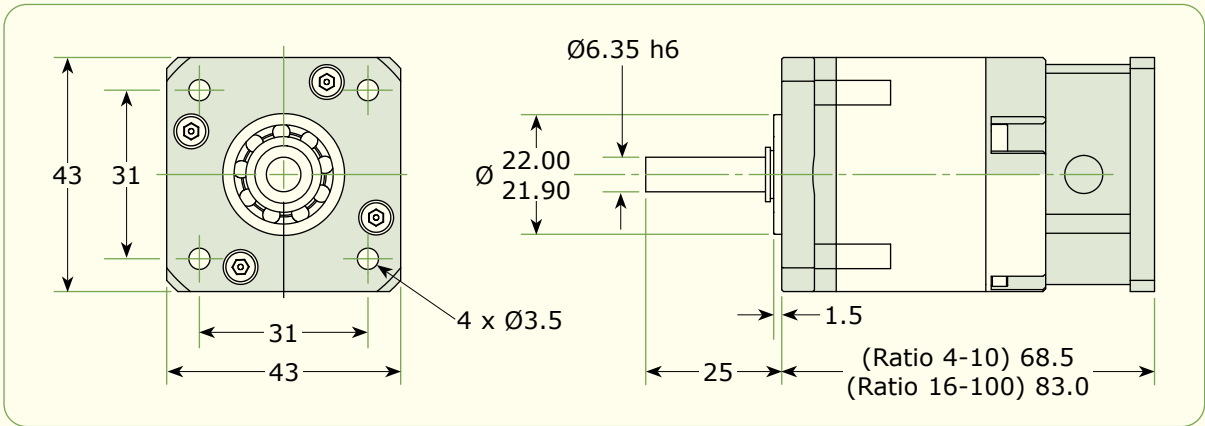
(1) Measured at 2% of rated torque  
(2) @ 100rpm, radial load applied at centre of shaft

All dimensions are nominal in millimetres unless otherwise specified

UHV Planetary Gearhead For Use With M-D42 Stepper Motors



Fig.	Description	Part Code	Price £	Price €
1	Planetary gearhead for M-D42 motors (ratio 4:1)	M-PG42-004	£2019	€2322
1	Planetary gearhead for M-D42 motors (ratio 5:1)	M-PG42-005	£2019	€2322
1	Planetary gearhead for M-D42 motors (ratio 7:1)	M-PG42-007	£2019	€2322
1	Planetary gearhead for M-D42 motors (ratio 10:1)	M-PG42-010	£2019	€2322
1	Planetary gearhead for M-D42 motors (ratio 16:1)	M-PG42-016	£2435	€2801
1	Planetary gearhead for M-D42 motors (ratio 20:1)	M-PG42-020	£2435	€2801
1	Planetary gearhead for M-D42 motors (ratio 25:1)	M-PG42-025	£2435	€2801
1	Planetary gearhead for M-D42 motors (ratio 35:1)	M-PG42-035	£2435	€2801
1	Planetary gearhead for M-D42 motors (ratio 40:1)	M-PG42-040	£2435	€2801
1	Planetary gearhead for M-D42 motors (ratio 50:1)	M-PG42-050	£2435	€2801
1	Planetary gearhead for M-D42 motors (ratio 70:1)	M-PG42-070	£2435	€2801
1	Planetary gearhead for M-D42 motors (ratio 100:1)	M-PG42-100	£2435	€2801



All dimensions are nominal in millimetres unless otherwise specified

UHV Planetary Gearhead For Use With M-D57 Stepper Motors



Features:

- Suitable for use below  $1 \times 10^{-10}$  mBar
- Multiple ratio options, 3:1 through 100:1
- Low inertia
- High precision, low backlash
- Service life > 10,000 hours
- Bakeable to 200°C

\* - Assembly rating must be reduced to that of lowest rated component.

UHV Planetary Gearhead For Use With M-D57 Stepper Motors

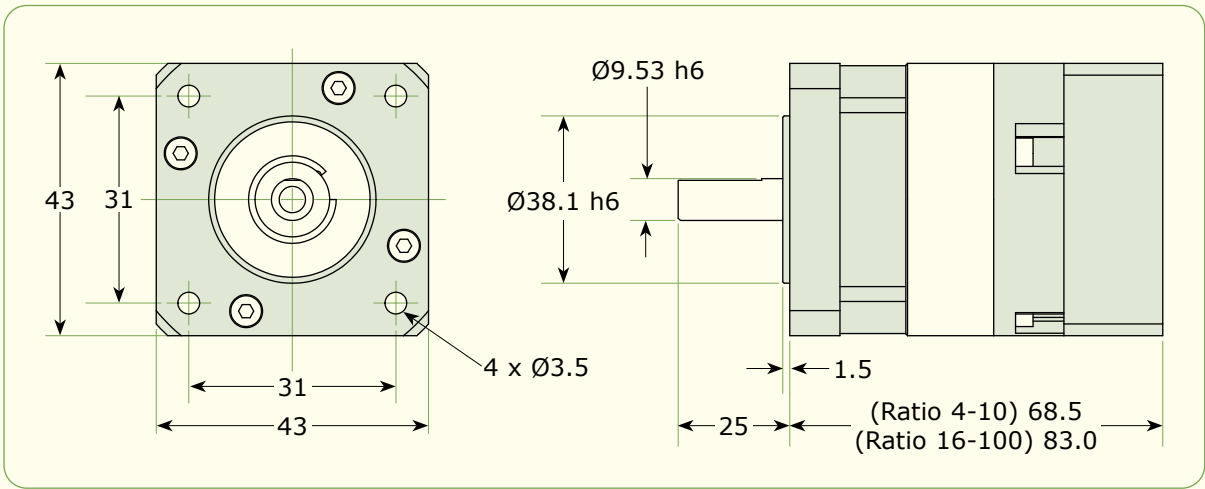
The M-PG57 series gearheads couple directly to M-D57 stepper motors and are suitable for use in UHV environments. Primarily used for increasing resolution, torque multiplication and inertia matching. They are designed for maximum torque capacity, high efficiency and low backlash. PLEASE NOTE :- Pricing does not include the motor.

Reduction Ratio	Nominal Output Torque	Maximum Acceleration Torque	Gear Inertia	Backlash <sup>(1)</sup>	Efficiency at Nominal Torque	Radial Load <sup>(2)</sup>	Axial Load <sup>(2)</sup>	Maximum Mass	Lubrication
:1	Nm	Nm	Kg-cm <sup>2</sup>	arc-min	%	N	N	kg	
3	12.0	24.0	0.140	<12	96	665	765	1.2	Nyetorr® 6300
4	18.9	36.4	0.100						
5	19.6	36.4	0.084						
7	16.7	33.4	0.075						
10	10.6	21.2	0.007						
12	18.2	36.4	0.097	<16	94			1.6	
15	19.4	36.4	0.083						
20	21.5	40.0	0.083						
25	20.0	40.0	0.083						
30	22.5	40.0	0.070						
40	21.5	40.0	0.070						
50	20.0	40.0	0.070						
70	16.7	33.4	0.070						
100	10.6	21.2	0.070						
Nominal input speed : 4500rpm Maximum input speed : 8000rpm Direction of rotation : Same as input Vacuum environment : < 1x10 <sup>-10</sup> mbar Max. temperature : +200°C Min. temperature : -65°C (1) Measured at 2% of rated torque (2) @100rpm, radial load applied at centre of shaft									

UHV Planetary Gearhead For Use With M-D57 Stepper Motors



Fig.	Description	Part Code	Price £	Price €
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-003	£2294	€2639
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-004	£2294	€2639
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-005	£2294	€2639
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-007	£2294	€2639
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-010	£2294	€2639
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-012	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-015	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-020	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-035	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-030	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-040	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-050	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-070	£2669	€3070
2	Planetary gearhead for M-D57 motors (ratio 3:1)	M-PG57-100	£2669	€3070



Stepper Motor Controller, Feedthroughs and Cables

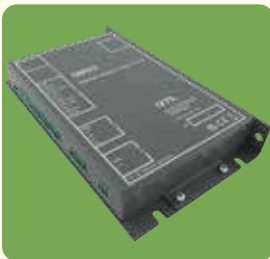


The M-SMD3 Stepper Motor Drive is a single-axis bipolar stepper motor driver that is engineered to drive vacuum-compatible stepper motors with maximum performance and minimal heat. It is optimised for use with AML UHV-compatible motors. Powerful software is supplied with the M-SMD3 that enables you to control and configure multiple M-SMD3 devices simultaneously, in a single user-friendly graphical interface.

Features:

- Single-channel UHV stepper motor drive optimised for vacuum use, ideally suited for use with our range of UHV stepper motorsAdvanced low-power drive techniques for minimum motor temperature rise and outgassing and maximum operating time.
- Advanced low-power drive techniques for minimum motor temperature rise, minimum outgassing and maximum operating time
- Holding torque can be controlled independently of dynamic torque under program control, to reduce power.
- Full-step and up to 256x micro-step resolution, with user-configurable transition from micro step to full-step mode (stops on full-step positions only; micro-stepping used for control of resonance and smoother step transition).
- Continuous monitoring of motor temperature with automatic shutdown if motor temperature exceeds tolerable levels.
- Current adjustable from 0 A to 1 A RMS in approx. 30 mA steps.
- 2 x configurable limit inputs.
- Opto-coupled step, direction and enable interface.
- Control via USB.
- Comprehensive configuration and control software supplied, or interface to your own application. C# API is available.

Stepper Motor Controller & Cables etc.



Description	Part Code	Price £	Price €
Single axis bipolar stepper motor driver	M-SMD3	£587	€676
Two button joystick for M-SMD3/4	M-SMD3JOY	£74	€86
48VDC, 60Watt power supply	M-SPSU48V	£84	€97
Non bakeable lead, 3m M-MLF18F to M-SMD3	M-MLF18SMD3	£247	€285
Bakeable lead, 3m M-MLF18F to M-SMD3	M-MLF18SMD3-B	£324	€373

Stepper Motor Controller, Feedthroughs and Cables



Features:

- Single-channel UHV stepper motor driver, ideally suited for use with our range of UHV stepper motors.
- Minimise temperature rise and outgassing with advanced drive current profiles.
- Monitor motor temperature using the thermocouple or RTD inputs. Drive current is removed if temperature exceeds safe levels.
- Power using a standard 48 Vdc power supply,and the drive voltage is boosted to 67 Vdc to maximise speed and torque. Power supply included.
- Up to 256x micro-step resolution minimises resonances, providing smooth motion
- Current adjustable from 0 A to 1 A RMS in 30 mA steps, with dynamic set-points for acceleration, running and hold currents

Stepper Motor Controller & Cables etc.



Description	Part Code	Price £	Price €
Single axis bipolar stepper motor driver	M-SMD4	£1110	€1277
Two button joystick for M-SMD3/4	M-SMD3JOY	£74	€86
SMD4 cable, 3m long D-sub 15 male to D-sub 9 female	M-CAB-D15D9	POA	POA
SMD4 cable, 3m long D-Sub 15 male to MLF18	M-CAB-D15MLF	POA	POA
SMD4 cable, 3m long 3X D-SUB 15 male toMLF18	M-CAB-3D15MLF	POA	POA

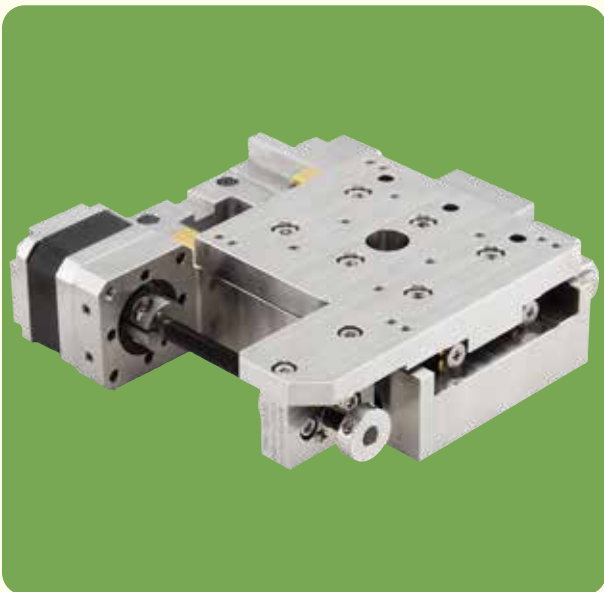
Stepper Motor Feedthroughs and Cables



Description	Part Code	Price £	Price €
Electrical 18 way feedthrough on DN40CF	M-MLF18F	£234	€270
Air side bakeable connector 18 way	M-MLF18AC	£157	€181
In vacuum bakeable connector 18 way female	M-MLF18VCF	£76	€88
In vacuum bakeable connector 18 way male	M-MLF18VCM	£74	€86
M-MLF18AC/VCF spare sockets - 20/PK	M-MLF18SKT	£20	€23
M-MLF18AC/VCM spare pins - 20/PK	M-MLF18PIN	£17	€20
Crimp tool for M-MLF18 connectors	M-MLF-XCR24	£65	€75
Pin extraction tool for M-MLF18 connenvtors	M-MLF-XPX24	£30	€35



Modular UHV Compatible Linear Translation Stage



Features:

- Standard travels from 50 mm to 200 mm.
- 5 µm Resolution (1 µm for option HR).
- Better than 0.5 µm repeatability.
- Traverses up to 5 or 15 mm/sec.
- Suitable for use to  $1 \times 10^{-10}$  mBar.
- UHV-prepared aluminium construction as standard.
- Stainless steel construction available (option SS).
- Bakeable to 150°C (200°C for option SS).
- Features M-D35.1 stepper motor.
- Can optionally be fitted with limit switches or an optical encoder.
- High resolution, radiation resistant and dry lubricated versions available.
- Directly stackable for XYZ orientations.
- Compatible with all VSM17 modular stages and accessories.
- May be customised for specific requirements.

Our ultra high vacuum compatible modular linear translation stages provide translation for loads of up to several tens of kilograms. They can be used standalone or as part of a complex motion system, as they are compatible with the range of M-VSM17 modular stages. They have very high rigidity, which is necessary where several transporters are stacked for compound motion or where offset loads are present. They are manufactured with UHV compatible material and construction methods and utilise UHV stepper motors.

Modular UHV Compatible Linear Translation Stage



Description	Part Code	Price £	Price €
High performance modular UHV compatible linear translation stage 50mm travel, 5µm resolution	M-VSM17-X-050	£2609	€3001
High performance modular UHV compatible linear translation stage 100mm travel, 5µm resolution	M-VSM17-X-100	£38844	€44671
High performance modular UHV compatible linear translation stage 150mm travel, 5µm resolution	M-VSM17-X-150	£5016	€5769
High performance modular UHV compatible linear translation stage 200mm travel, 5µm resolution	M-VSM17-X-200	£7017	€8070

Modular UHV Compatible Long Travel Linear Translation Stage



Features:

- Standard travels from 100 mm to 450 mm.
- 5 µm Resolution (1 µm for option HR).
- Better than 0.5 µm repeatability.
- Maximum speed 25 mm/sec. (5mm/s for HR).
- Suitable for use to  $1 \times 10^{-10}$  mBar.
- Load capacity 20kg
- UHV-prepared aluminium construction as standard.
- Stainless steel construction available (option SS).
- Bakeable to 150°C (200°C for option SS).
- Features M-D35.1 stepper motor.
- Limit switch and encoder options available.
- High resolution, radiation resistant and dry lubricated versions available.
- Compatible with all VSM modular stages and accessories.
- May be customised for specific requirements.

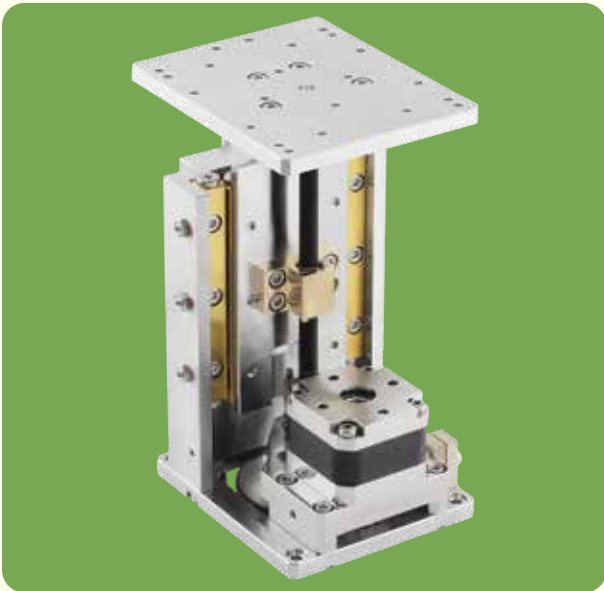
Our ultra high vacuum compatible modular linear translation stages provide long travel with minimum height for loads of up to 20 kilograms. They have widely spaced 'V' roller guides and are useful in simpler compound mechanisms where torsional loads are small. Smooth motion is provided by a diamond corrected lead-screw and a matched nut to ensure good positional stability, and incorporate a preloaded leadscrew nut to eliminate backlash. They can be used standalone or in combination with other VSM modular stages to create multi-axis mechanisms.

Modular UHV Compatible Long Travel Linear Translation Stage



Description	Part Code	Price £	Price €
Long travel modular UHV compatible linear stage 100mm Ttravel, 5 µm resolution	M-VSM23-X-100	£2644	€3041
Long travel modular UHV compatible linear stage 150mm Ttravel, 5 µm resolution	M-VSM23-X-150	£2965	€3410
Long travel modular UHV compatible linear stage 200mm Ttravel, 5 µm resolution	M-VSM23-X-200	£3470	€3991
Long travel modular UHV compatible linear stage 250mm Ttravel, 5 µm resolution	M-VSM23-X-250	£3670	€4221
Long travel modular UHV compatible linear stage 300mm Ttravel, 5 µm resolution	M-VSM23-X-300	£3887	€4471
Long travel modular UHV compatible linear stage 350mm Ttravel, 5 µm resolution	M-VSM23-X-350	£4087	€4701
Long travel modular UHV compatible linear stage 400mm Ttravel, 5 µm resolution	M-VSM23-X-400	£4337	€4988
Long travel modular UHV compatible linear stage 450mm Ttravel, 5 µm resolution	M-VSM23-X-450	£4584	€5272

Modular UHV Compatible Z Translation Stage

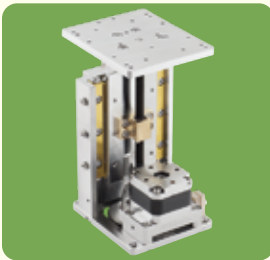


Features:

- Standard travels from 50 mm.
- 1 µm Resolution.
- 0.26 µm repeatability.
- Maximum speed of 5 mm/sec.
- Suitable for use to 1 x 10<sup>-10</sup> mBar.
- Bakeable to 200°C.
- 30kg centred load capacity.
- Features M-D35.1 stepper motor.
- Can optionally be fitted with limit switches or an optical encoder.
- High resolution, radiation resistant and dry lubricated versions available.
- Designed for Z-axis translation.
- Compatible with all VSM17 modular stages and accessories.
- May be customised for specific requirements.

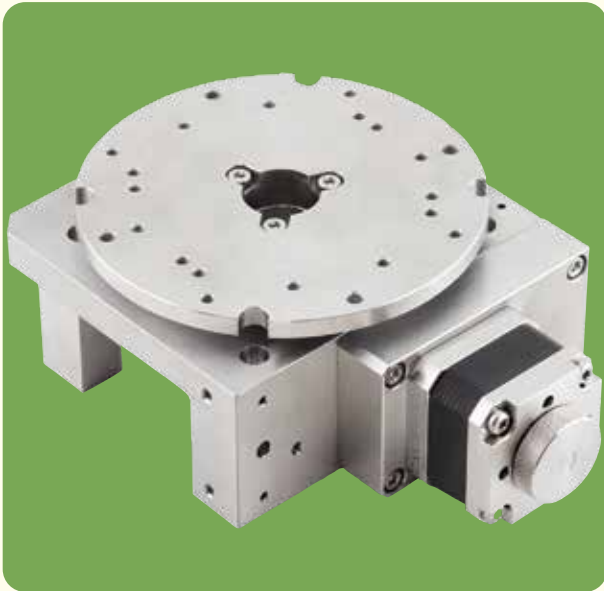
Our ultra high vacuum compatible vertical linear translation stages for z-axis translation of loads up to 30 kg. They can be used standalone or as part of a complex motion system, as they are compatible with the range of M-VSM17 modular stages. The M-VSM17-Z is designed specifically for Z-axis translation with its high load capacity. They are manufactured with UHV compatible material and construction methods and utilise UHV stepper motors.

Modular UHV Compatible Z Translation Stage



Description	Part Code	Price £	Price €
High performance modular UHV compatible Z translation stage 50mm travel, 1µm resolution	M-VSM17-Z-050	£3566	€4101

Modular UHV Compatible Rotation Stage



Features:

- 360° rotation stage.
- 0.1° - 0.005° Resolution.
- Better than resolution unidirectional repeatability.
- Maximum loaded speed of up to 100rpm.
- Maximum torque of up to 8 Nm.
- Suitable for use to 1 x 10<sup>-10</sup> mBar.
- Bakeable to 200°C.
- UHV-prepared aluminium construction as standard.
- 100kg centre load capacity.
- Features M-D35.1 stepper motor.
- Can optionally be fitted with limit switches or an optical encoder.
- High resolution, radiation resistant versions available.
- Directly stackable for XYZ orientations.
- Compatible with VSM17 modular stages and accessories.
- May be customised for specific requirements.
- Lubricated with NyeTorr®6300 grease.

Our ultra high vacuum compatible rotation stages are manufactured with UHV compatible material and construction methods in an ISO-7 cleanroom and utilise M-D35.1 UHV stepper motors. The M-VSM17-R stages feature a precision cross-roller ring bearing system, providing high rotational accuracy capable of bearing loads in every direction. It has a 18 mm clear aperture, anti-backlash spur gearing and can optionally be fitted with an optical UHV compatible rotary encoder.

Modular UHV Compatible Rotation Stage



Description	Part Code	Price £	Price €
High performance modular UHV rotation stage 0.1° resolution continuous rotation	M-VSM17-R-3K6	£4934	€5675
High performance modular UHV rotation stage 0.005° resolu- tion continuous rotation	M-VSM17-R-72K	£4143	€4765

Modular UHV Compatible Goniometer Stage



Features:

- $\pm 15^\circ$  /  $\pm 180^\circ$  Travel.
- 0.005° Resolution.
- Rotation centre to table 70mm / 114mm.
- Suitable for use below  $1 \times 10^{-10}$  mBar.
- Bakeable to 200°C.
- 40kg / 20kg centre load capacity.
- Features M-D35.1 stepper motor.
- Can optionally be fitted with limit switches.
- High torque and radiation resistant versions available.
- Directly stackable for XYZ orientations.
- Compatible with most VSM17 modular stages and accessories.
- May be customised for specific requirements.
- Lubricated with NyeTorr®6300 grease.

Our ultra high vacuum compatible goniometer stages with  $\pm 15^\circ$  /  $\pm 180^\circ$  travel, provide rotation on a transverse axis above the table. Can be used standalone or as part of a complex motion system when combined with other M-VSM17 modular stages. It is possible to build a Euler goniometer with a common centre of rotation when combined with an M-VSM17-G-114./ M-VSM17-G-070

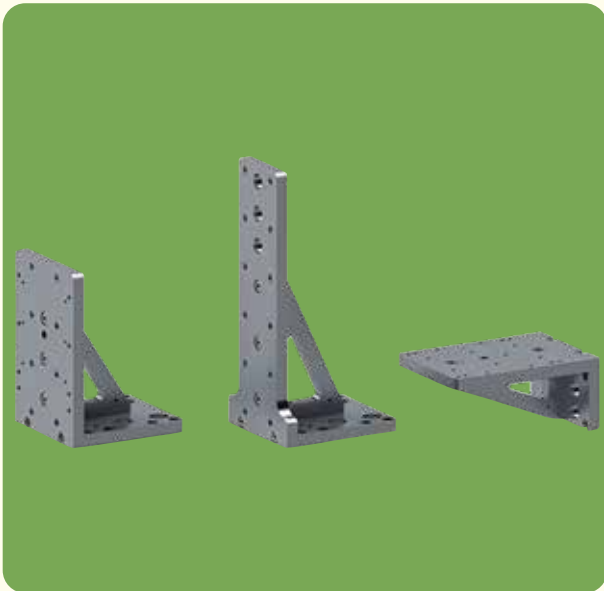
The VSM17-G features rigid construction to allow for high load capacity whilst maintaining smooth motion through the full range of travel. They are manufactured with UHV compatible material and construction methods and utilise UHV stepper motors.

Modular UHV Compatible Goniometer Stage



Description	Part Code	Price £	Price €
High performance modular UHV goniometer stage 0.005° resolution +/-15° travel, rotational centre 70mm	M-VSM17-G-070	£5921	€6810
High performance modular UHV goniometer stage 0.005° resolution +/-180° travel, rotational centre 114mm	M-VSM17-G-114	£6634	€7630

Modular UHV Compatible Mounting Brackets & Table

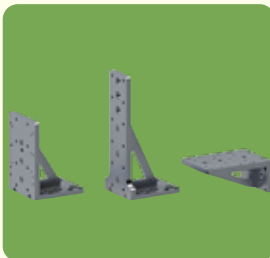


Features:

- Designed for M-VSM17 stages.
- Suitable for use to  $1 \times 10^{-10}$  mBar.
- Bakeable to 150°C (200°C for option SS).
- Create multi-axis systems with standard products.
- Lightweight UHV-prepared construction.
- Stainless-steel construction available (option SS).
- Adapt linear stages for vertical translation.
- Custom mounting brackets available.

Our UHV compatible mounting brackets for use with M-VSM17 stages. Used to reorient stages or design multiaxis mechanism with standard products. Our mounting brackets are constructed with lightweight uhv prepared aluminium to reduce mass whilst maintaining stability.

Modular UHV Compatible Mounting Brackets & Table



Description	Part Code	Price £	Price €
90° mounting bracket (small) for UHV compatible stages	M-VSAB01	£176	€203
90° mounting bracket (large) for UHV compatible stages	M-VSAB02	£192	€221
90° table for UHV compatible stages	M-VSAT01	£169	€195



UHV Rotation Stage



Features:

- Resolutions from 0.036° to 0.004° per step.
- Unloaded backlash is less than resolution.
- Intended for intermittent rotation of balanced loads of up to 1 kg.
- M-RSB10K/20K/30K can stack on LewVac / AML translation stages.
- Suitable for use below  $1 \times 10^{-10}$  mBar.
- Bakeable to 200°C. Recommended Max. operating temp. 190°C

Ultra high vacuum compatible rotation stages are intended for intermittent rotation of balanced loads or as a precision gearbox. They are manufactured with UHV compatible material and construction methods and utilize M-D35.1 UHV stepper motors. The M-RSB10K/20K/30K can be mounted directly on M-LTV translation stages or stacked on another M-RSB without additional hardware.

UHV RSB Rotation Stage



Description	Part Code	Price £	Price €
UHV rotation stage 10,000 steps per revolution	M-RSB10K	£2288	€2632
UHV rotation stage 20,000 steps per revolution	M-RSB20K	£2288	€2632
UHV rotation stage 30,000 steps per revolution	M-RSB30K	£2587	€2976
UHV rotation stage 90,000 steps per revolution	M-RSB90K	£3378	€3885
UHV rotation stage 120,000 steps per revolution	M-RSB120K	£3439	€3955

All dimensions are nominal in millimetres unless otherwise specified

All dimensions are nominal in millimetres unless otherwise specified

