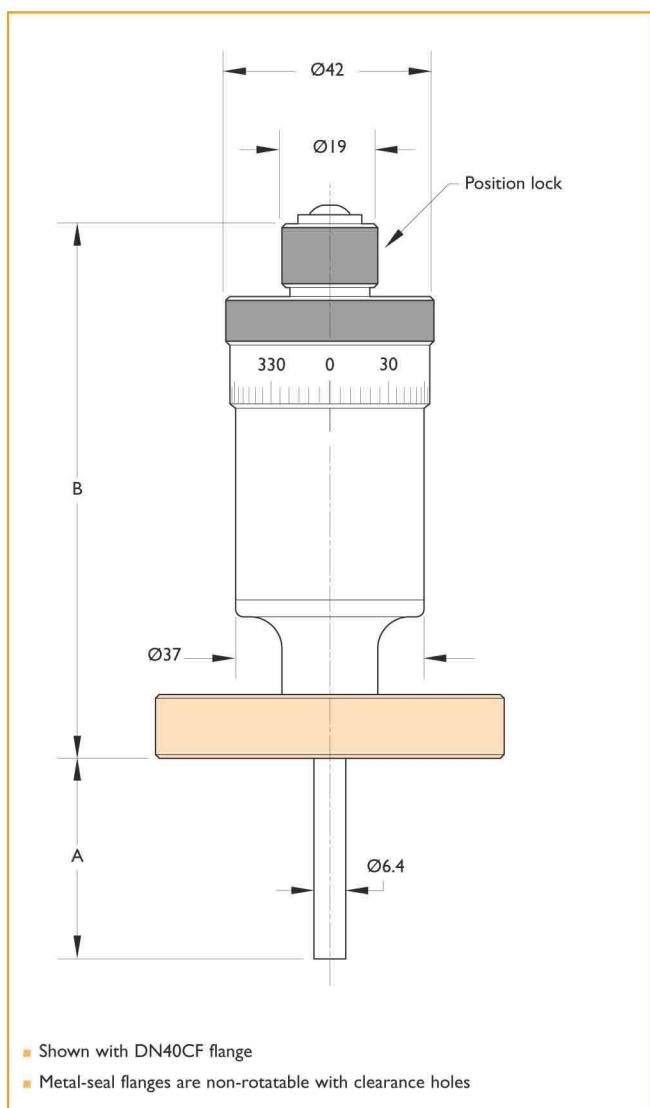




BRM-133



UHV and HV series

Features

- Continuous rotary motion
- Manual or motorized actuator
- Rotary position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C – CF version bakeable to 180°C
- CF and ISO KF port mounts

Description

Caburn-MDC standard rotary motion feedthroughs are a popular and economical solution for in-vacuum sample or device rotation. They are constructed of the highest grade vacuum compatible materials. Position is measured along a 360° laser-etched, black anodized barrel graduated in 5° increments. Welded stainless steel bellows, a unique off-axis wobble design and the use of rotary shaft bearing supports provide devices of unsurpassed reliability and performance. Automation can be achieved with one of four motorization options and controls.

Motor controls must be purchased separately.

Specifications

Material

Flange/actuator body 304ss/Anodized aluminium

Shaft seal AM 350 welded bellows

Vacuum range UHV/HV 1.3×10^{-11} mbar/ 1.3×10^{-8} mbar

Temperature range¹ UHV/HV -20°C to 180°C

Speed 20 rpm

Torque 0.4 Nm

Axial load 2.7 kg

Lateral load 4.5 kg

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed and 30°C maximum when motorized

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Rotary motion

Standard



UHV Series	
CF	100°C

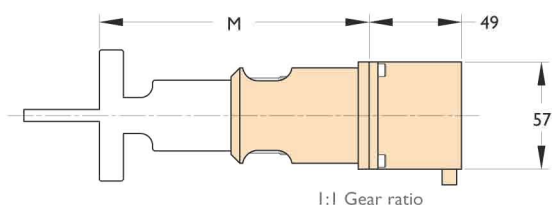
Flange size	Flange OD	A	B	M	N	Wt kg	Reference	Part number
DN16CF	34	40	109	143	118	0.5	BRM-133	670000
DN40CF	70	40	109	143	118	0.9	BRM-275	670002

HV Series	
ISO KF	100°C

Flange size	Flange OD	A	B	M	N	Wt kg	Reference	Part number
DN16KF	30	37	112	146	123	0.5	K075-BRM	670020
DN40KF	55	41	108	142	119	0.9	K150-BRM	670022

Motorization options

Option -03



Option -03

In-line stepper motor



Motorization ¹	Motor Specification	Add-on weight kg	Option Number
In-line stepper	D	0.9	-03

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above

For example: **670036-03**

For total unit weight, add option weight to component weight

All dimensions are nominal in millimetres unless specified - Weights given are approximate

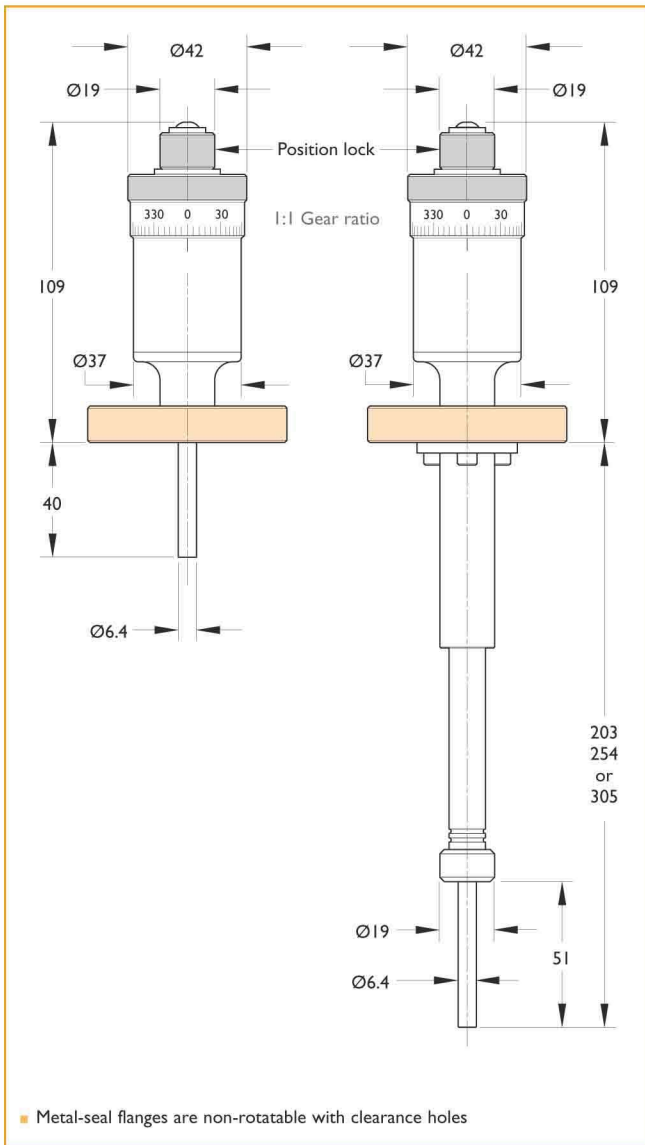
Rotary motion

High temperature standard



HTBRM-275-10

HTBRM-275



UHV and HV series

Features

- Continuous rotary motion
- Manual actuator
- Rotary position lock
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C
- CF port mounts
- Guide tube included on extended models

Description

Caburn-MDC high temperature rotary motion feedthroughs are the perfect solution for UHV sample rotation. They are constructed of 304ss to endure the rigors of high temperature vacuum service. Rotation can be measured along a 360° laser etched barrel graduated in 5° increments. Welded stainless steel bellows, a unique off-axis wobble design and the use of rotary shaft bearing supports provide a product of unsurpassed reliability and performance. Extended length models are constructed with bearing fitted shaft support guide tubes for maximum rigidity.

Specifications

Material

Flange/actuator body 304ss
 Shaft seal AM 350 welded bellows

Vacuum range UHV/HV 1.3×10^{-11} mbar

Temperature range¹ UHV/HV -20°C to 230°C

Torque 0.3 Nm

Axial load 2.7 kg

Lateral load 4.5 kg

Weight and dimensions See table

Shaft length	Flange	Wt kg	Reference	Part number
Standard UHV series				
40	DN16CF	0.5	HTBRM-133	670004
40	DN40CF	0.9	HTBRM-275	670005

Extended UHV series				
203	DN40CF	3.6	HTBRM-275-8	670006
254	DN40CF	3.6	HTBRM-275-10	670007
305	DN40CF	3.6	HTBRM-275-12	670008

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ABRM-133

Includes solenoid

UHV and HV series

Features

- Adjustable 90° rotary motion
- Pneumatic actuator with 24V DC solenoid
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts
- Complete with 24V DC air control solenoid valve
- 240V AC air control solenoid valve optional

Description

Caburn-MDC pneumatic rotary feedthroughs are designed for in-vacuum shutters and other light-duty two-position rotary motion applications. Feedthrough rotation has two adjustable stops. One adjusts the start position from 0° to 30°, and the other adjusts the finish position from 60° to 90°. One air control solenoid valve is also included. Feedthroughs are available on CF metal seal flanges or ISO KF elastomer seal port mounts.

Specifications

Material

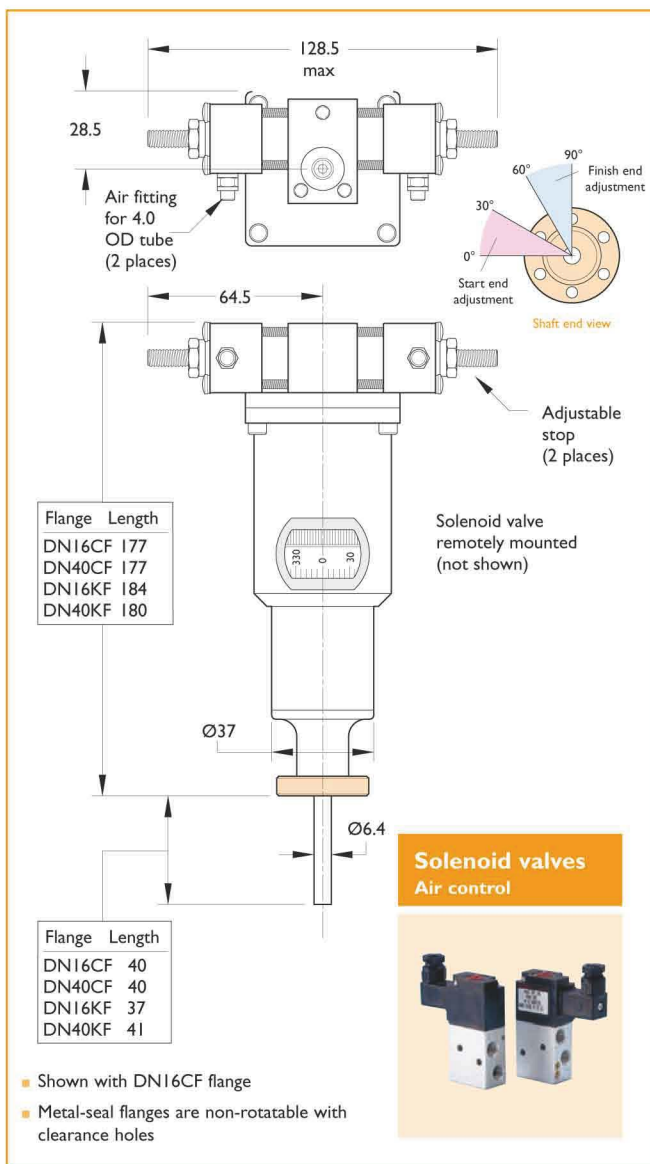
Flange/actuator body 304ss/Anodized aluminium
 Shaft seal/piston seal AM 350 welded bellows/Viton®

Vacuum range UHV/HV 1.3x10⁻¹¹ mbar/1.3x10⁻⁸ mbar

Temperature range¹ UHV/HV -20°C to 100°C

Torque 0.4 Nm maximum

Weight and dimensions See table



Solenoid valves Air control



Description	Wt kg	Reference	Part number
UHV series			
DN16CF	0.9	ABRM-133	670050-01
DN40CF	1.4	ABRM-275	670051-01

Description	Wt kg	Reference	Part number
HV series			
DN16KF	0.9	K075-ABRM	670052-01
DN40KF	1.4	K150-ABRM	670053-01

¹ UHV units are bakeable to 230°C with actuator removed
 Option -01 (24V DC air control solenoid valve) fitted as standard

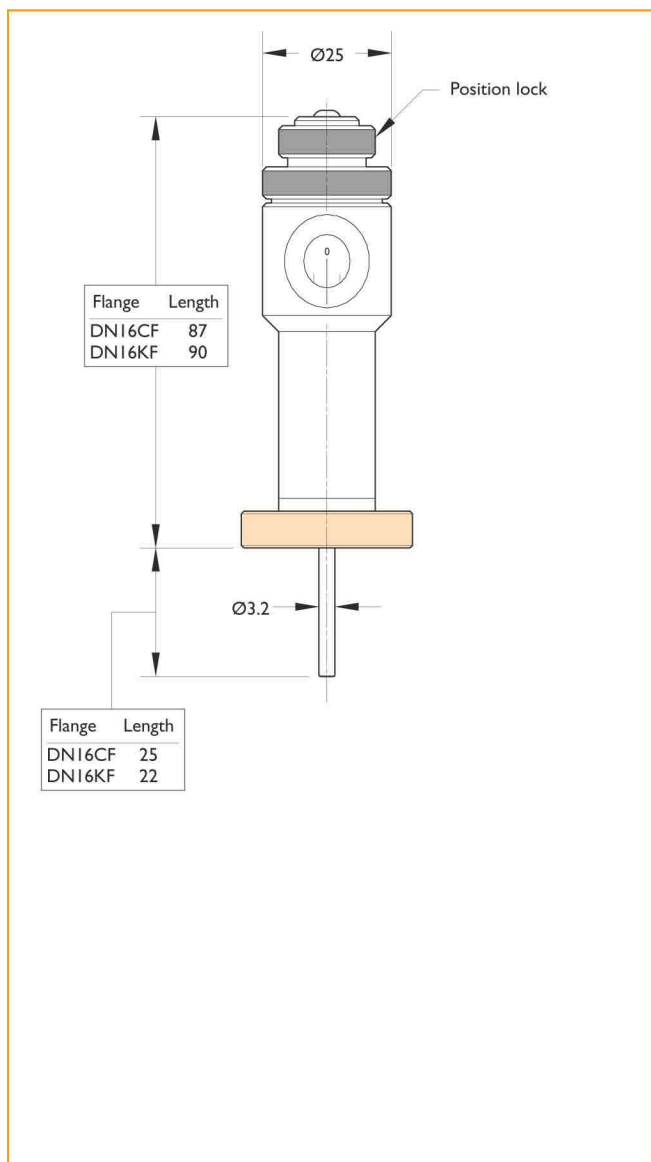
Description	Option number
240V DC Air control control solenoid valve	-02

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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E-MBR-133



UHV and HV series

Features

- Continuous rotary motion
- Manual or motorized actuator
- Rotary position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Caburn-MDC miniature rotary feedthroughs are specifically designed for in-vacuum light-duty applications where torques will not exceed 0.1 Nm. Feedthroughs are available in both manual or low voltage DC motor configurations. Motors can be fitted with optional magnetic encoder. Motor controls must be purchased separately.

Specifications

Material

Flange/actuator body	304ss/ Anodized aluminium
Shaft seal/piston seal	AM 350 welded bellows/

Vacuum range UHV/HV	1.3×10^{-11} mbar
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Temperature range ¹ Manual	-20°C to 100°C
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Torque	0.18 Nm maximum
---------------	-----------------

Axial load	0.9 kg
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Lateral load	2.7 kg
---------------------	--------

Weight and dimensions	See table
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Description	Wt kg	Reference	Part number
UHV Series			
DNI6CF	0.9	MBR-133	671500
HV Series			
DNI6KF	0.9	K075-MBR	671501

For total unit weight, add option weight to component weight

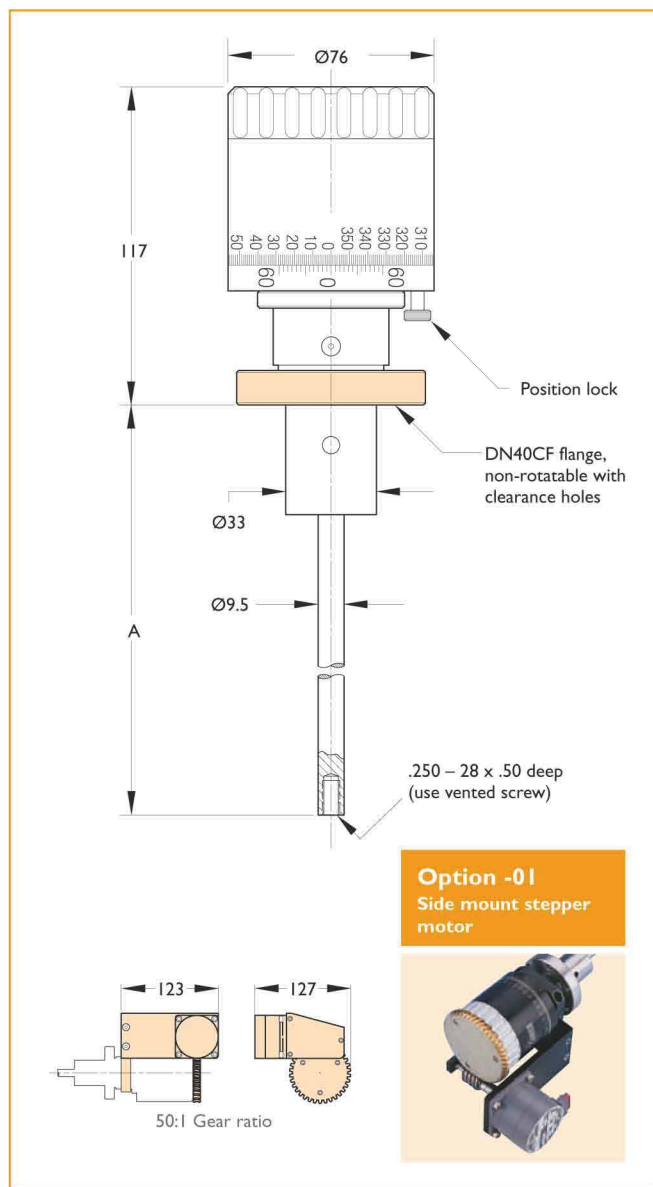
All dimensions are nominal in millimetres unless specified - Weights given are approximate

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E-PBRM1-10

Manual actuator



Option -01
Side mount stepper motor



UHV Series

Features

- Continuous rotary motion
- Manual or motorized actuator
- Rotary position lock
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C¹
- DN40CF port mount
- Low backlash design

Description

Precision rotary motion feedthroughs are low backlash instruments with a display resolution of 0.1°. Welded stainless steel bellows, a unique off-axis wobble design and the use of rotary shaft bearing supports provide long life and smooth operation. Feedthroughs are available on Conflat® compatible CF metal seal flanges. Motorization option is available. Motor controls must be purchased separately.

Specifications

Material	
Flange/actuator knob	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows
Vacuum range	1.3x10 ⁻¹¹ mbar
Temperature range	-20°C to 230°C
Torque	0.79 Nm maximum
Axial load	2.3 kg
Lateral load	4.5 kg
Weight and dimensions	See table

Description	Wt kg	Reference	Part number
UHV Series			
254	3.2	PBRM1-10	670024
400	3.2	PBRM1-15	670027
600	3.6	PBRM1-23	670030
800	3.6	PBRM1-31	670033

Motorization ²	Motor specification	Add-on weight kg	Option Number
Stepper motor	D	2.3	-01

¹ Bakeable to 30°C maximum with motor option fitted
² When ordering motorized options, add the option number and price to the desired UHV component part number listed above
 For example: **670026-01**
 For total unit weight, add option weight to component weight
³ Screws provided

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Section 7.1

Rotary motion

Magnetic and direct



MRM-275

Description

Caburn-MDC magnetically coupled rotary motion feedthroughs provide basic rotation and UHV compatibility without the use of bellows. This product is intended for manually operated light-duty service not exceeding 0.1Nm of torque. Conflat® compatible DN40CF diameter CF metal seal flanges are the standard mount.

UHV

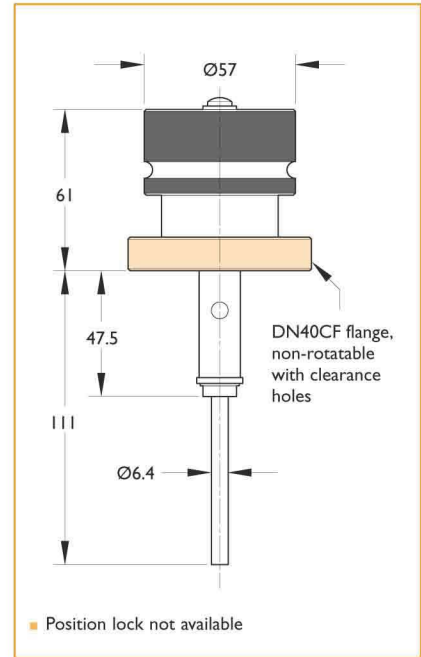
Features

- Continuous rotary motion
- Manual actuator
- Bakeable to 100°C
- DN40CF port mount
- Magnetically coupled

Specifications

Materials	UHV compatible
Vacuum range	1.3x10 ⁻¹¹ mbar
Temperature range	-20°C to 100°C
Speed	50 rpm maximum
Torque	0.14 Nm maximum
Axial load	1.1kg maximum
Lateral load	2.3 kg @ 101.6mm extension max

Magnetic drive



Description	Wt kg	Reference	Part number
UHV Series			
Manual actuation DN40CF	0.9	MRM-275	671000



FRM-125

Description

Caburn-MDC direct drive rotary motion feedthroughs provide basic rotation and HV compatibility. Vacuum integrity is maintained by a single preloaded Viton® elastomer shaft seal. Fitted with dual rotary bearing shaft supports, this product can be manually or mechanically operated at intermittent speeds up to 300rpm. It is mounted on the traditional 25.4mm baseplate mount.

HV

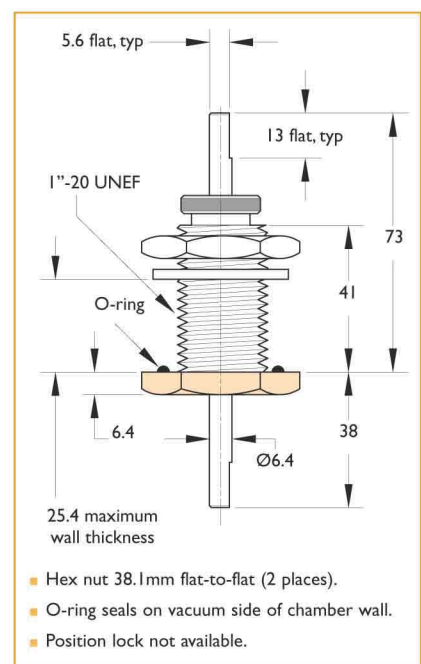
Features

- Continuous rotary motion
- Manual actuator
- Viton® elastomer shaft seal
- Bakeable to 100°C
- 25.4mm bolt hole installation

Specifications

Materials	HV compatible
Vacuum range	1.3x10 ⁻⁸ mbar
Temperature range	-20°C to 100°C
Speed	300 rpm maximum
Torque	0.71 Nm maximum
Axial load	1.1kg maximum
Lateral load	higher loads at reduced rpm 2.3 kg

Direct drive



Description	Wt kg	Reference	Part number
HV Series			
Manual actuation 25.4mm baseplate HV	0.9	FRM-125	652000

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Rotary motion

Direct, differentially pumped



UHV and HV series

Features

- Continuous rotary motion
- Manual actuator
- UHV or HV-compatible materials
- Differentially pumped, Dual Viton® elastomer shaft seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Differentially pumped direct-drive rotary motion feedthroughs provide 11Nm and 500rpm maximum rotation. The rotary shaft is supported by two radial bearings located inboard of dual Viton® elastomer shaft seals. The region between the seals can be differentially pumped through the 3.2mm female pipe thread port provided and thus attain UHV compatibility to 1.3x10⁻⁹ mbar.

Specifications

Material

Flange/actuator body	304ss
Shaft seal	Viton®

Vacuum range UHV/HV	1.3x10 ⁻⁹ mbar
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Temperature range ¹ UHV/HV	-20°C to 100°C
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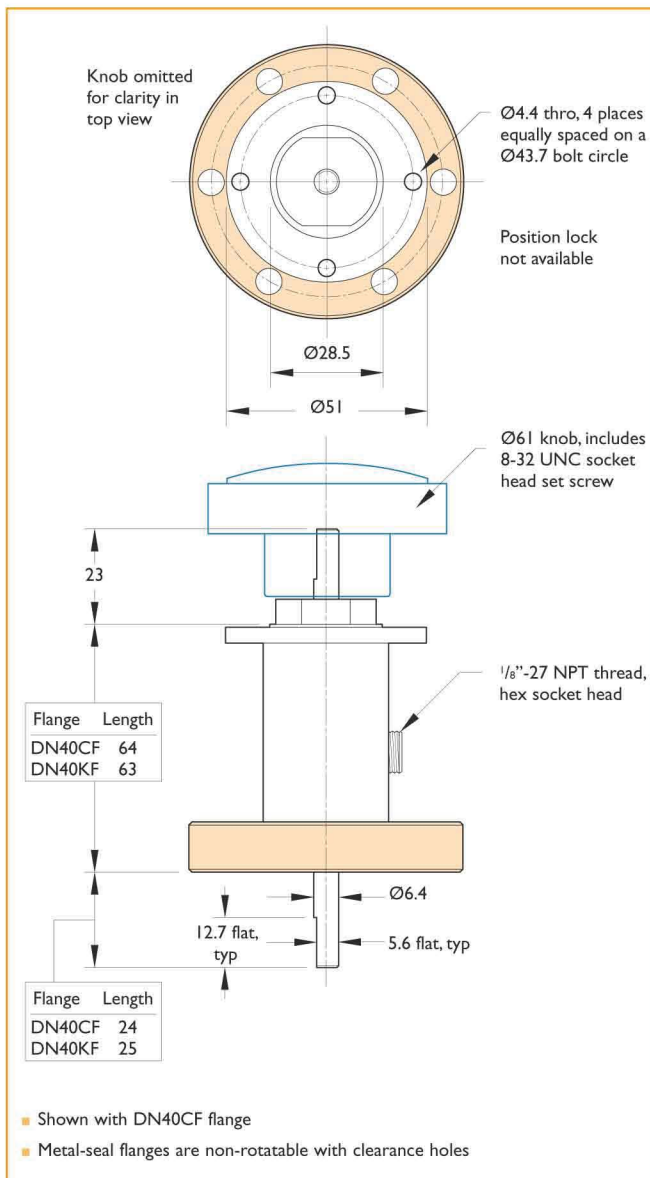
Speed	(500rpm) 11 Nm
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Torque	11.3 Nm
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Axial load	1.1 kg
-------------------	--------

Lateral load higher loads at reduced rpm	2.3 kg
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Weight and dimensions	See table
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Description	Wt kg	Reference	Part number
UHV series			
DN40CF	0.9	DDRM-275	652100
HV series			
DN40KF	0.9	K150-DDRM	652101

¹ UHV units are bakeable to 150°C with actuator removed.

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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BLM-133-I

UHV and HV series

Features

- 25 to 152mm linear travel
- Manual or motorized actuator
- Linear position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C + 180°C¹
- CF and ISO KF port mounts

Description

Caburn-MDC standard linear motion feedthroughs are the perfect solution for linear displacement of in-vacuum samples or devices. They are constructed of the highest grade vacuum compatible materials. Linear position is measured along a laser etched black-anodized barrel graduated in 0.001" (0.03mm) increments. A full revolution of the barrel translates into 0.025" (0.6mm) of linear travel. A linear scale on the body is also provided and is marked in both inch and metric units. The inch scale is graduated in increments of 0.025" (0.6mm) while the metric scale is graduated in 1mm increments. Welded stainless steel bellows, a 40 pitch lead screw design and the use of linear bearing shaft support provide devices with excellent durability and performance. They are available on industry standard Conflat® compatible CF metal seal flanges or ISO KF port mounts. Automation can be attained with one of four motorization options and controls. Motor controls must be purchased separately.

Specifications

Material

Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows

Vacuum range UHV/HV	1.3x10 ⁻¹¹ mbar/1.3x10 ⁻⁸ mbar
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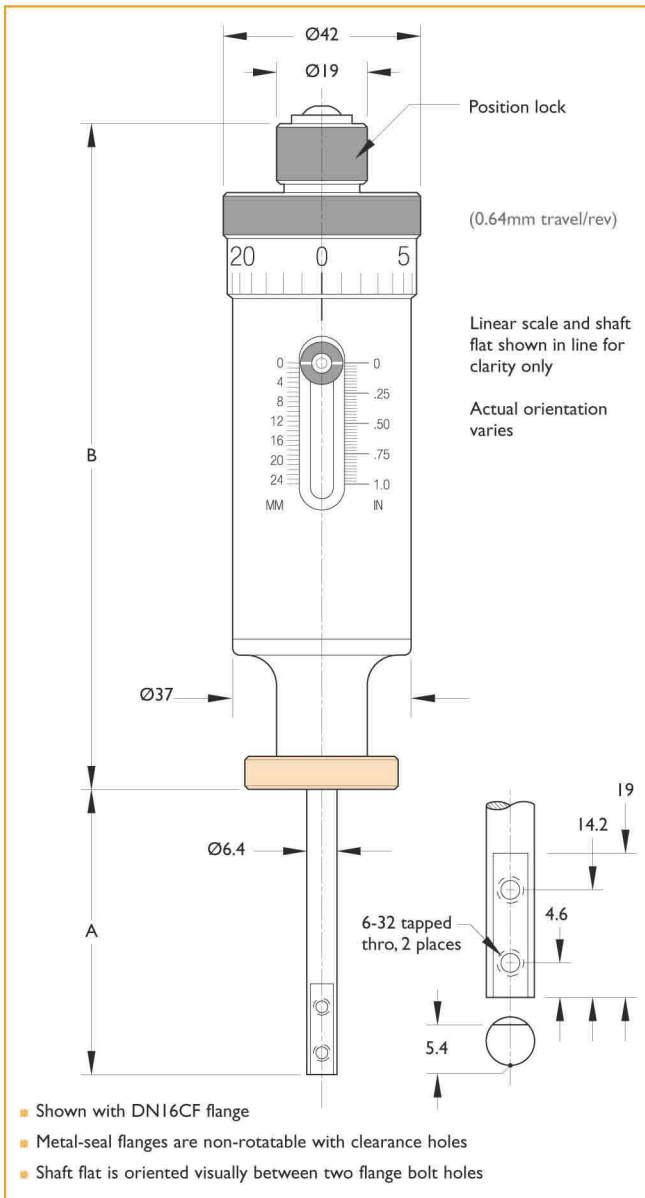
Temperature range ¹ UHV/HV	-20°C to 100°C + 180°C
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Axial load	2.3 kg
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Lateral load	2.3 kg @ 50.8 extension maximum
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Weight and dimensions	See table
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¹ UHV units are bakeable to 230°C with actuator removed and 30°C maximum when motorized



All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Linear motion

Standard



UHV Series

CF **100°C**

Flange size	Linear travel	A		B	M	N	Wt kg	Reference	Part number
		Min	Max						
DN16CF	25	90	115	140	172	152	0.5	BLM-133-1	660000
DN16CF	51	90	141	178	210	184	0.9	BLM-133-2	660004
DN16CF	102	90	192	256	299	273	1.4	BLM-133-4	660008
DN16CF	152	90	242	319	375	350	1.8	BLM-133-6	660012
DN40CF	25	90	115	140	172	152	0.5	BLM-275-1	660002
DN40CF	51	90	141	178	210	184	0.9	BLM-275-2	660006
DN40CF	102	90	192	256	299	273	1.4	BLM-275-4	660010
DN40CF	152	90	242	319	375	350	1.8	BLM-275-6	660014

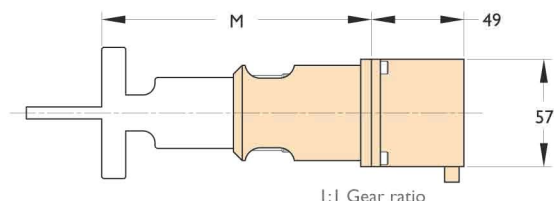
HV Series

ISO KF **100°C**

Flange size	Linear travel	A		B	M	N	Wt kg	Reference	Part number
		Min	Max						
DN16KF	25	87	112	143	177	152	0.5	K075-BLM-1	660020
DN16KF	51	87	138	181	216	190	0.9	K075-BLM-2	660024
DN16KF	102	87	189	270	304	279	1.4	K075-BLM-4	660028
DN16KF	152	87	239	350	381	355	1.8	K075-BLM-6	660032
DN40KF	25	91	116	138	173	148	0.5	K150-BLM-1	660022
DN40KF	51	91	142	177	211	186	0.9	K150-BLM-2	660026
DN40KF	102	91	193	265	300	275	1.4	K150-BLM-4	660030
DN40KF	152	91	243	342	376	351	1.8	K150-BLM-6	660034

Motorization options

Option -03



Option -03

In-line stepper motor



Motorization ¹	Motor specification	Add-on weight kg	Option Number
In-line stepper	D	0.9	-03

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above

For example: **670036-03**

For total unit weight, add option weight to component weight

All dimensions are nominal in millimetres unless specified - Weights given are approximate

Linear motion

High temperature standard



HBLM-133-1

UHV Series

Features

- 25 to 51mm linear travel
- Manual actuator
- Linear position lock
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C
- CF port mounts

Description

Caburn-MDC high-temperature linear motion feedthroughs are the perfect solution for linear displacement of in-vacuum samples or devices. They are constructed of 304ss to endure the rigors of high temperature vacuum service. Linear position is measured along a laser etched stainless steel barrel graduated in 0.001" (0.03mm) increments. A full revolution of the barrel translates into 0.025" (0.6mm) of linear travel. A linear scale on the body is also provided and is marked in both inch and metric units. The inch scale is graduated in increments of 0.025" while the metric scale is graduated in 1mm increments. Welded stainless steel bellows, a 40 pitch lead screw design and the use of linear bearing shaft support provide devices with excellent durability and performance.

Specifications

Material

Flange/actuator body	304ss
Shaft seal	AM 350 welded bellows

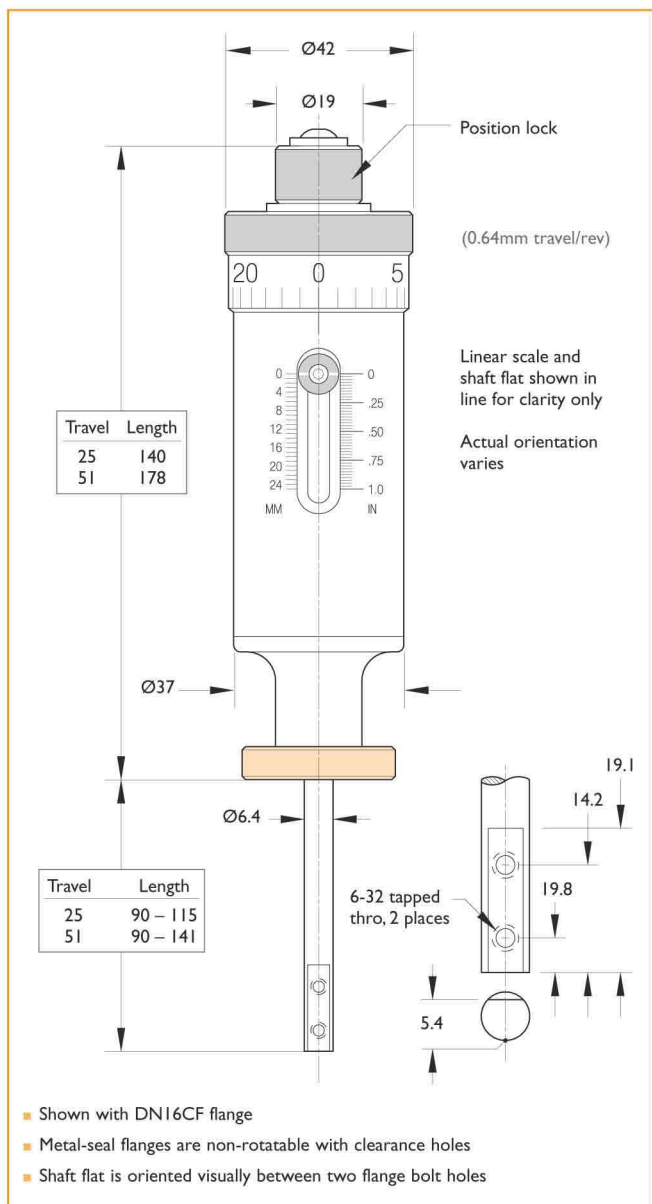
Vacuum range	1.3x10 ⁻¹¹ mbar
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Temperature range	-20°C to 230°C
--------------------------	----------------

Axial load	2.3 kg maximum
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Lateral load	2.3 kg @ 50.8 extension maximum
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Weight and dimensions	See table
------------------------------	-----------



Linear travel	Flange	Wt kg	Reference	Part number
UHV Series				
25	DN16CF	0.5	HTBLM-133-1	660036
25	DN40CF	0.9	HTBLM-275-1	660037
51	DN16CF	0.9	HTBLM-133-2	660038
51	DN40CF	1.4	HTBLM-275-2	660039

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Linear motion

High temperature compact



Linear motion



E-LMD-133-2

UHV Series

Features

- 51mm linear travel
- Manual actuator
- UHV-compatible materials
- Formed bellows seal
- Bakeable to 230°C
- CF port mounts

Description

Compact high-temperature linear motion feedthroughs have the smallest atmosphere side envelope and are constructed with high temperature vacuum grade materials. Linear position is measured along a laser etched stainless steel barrel graduated in 20 equally spaced increments. A full revolution of the barrel translates into 1.25mm of linear travel. Air side linear clearance must be considered to accommodate the rising lead screw mechanism. Formed stainless steel bellows, a 1.25mm pitch lead screw design and the use of radial bearings provide this product with excellent durability and performance. All drive mechanism components are located on the atmosphere side of the formed bellows.

Specifications

Material

Flange/actuator body 304ss
 Shaft seal Type 312 stainless steel formed bellows

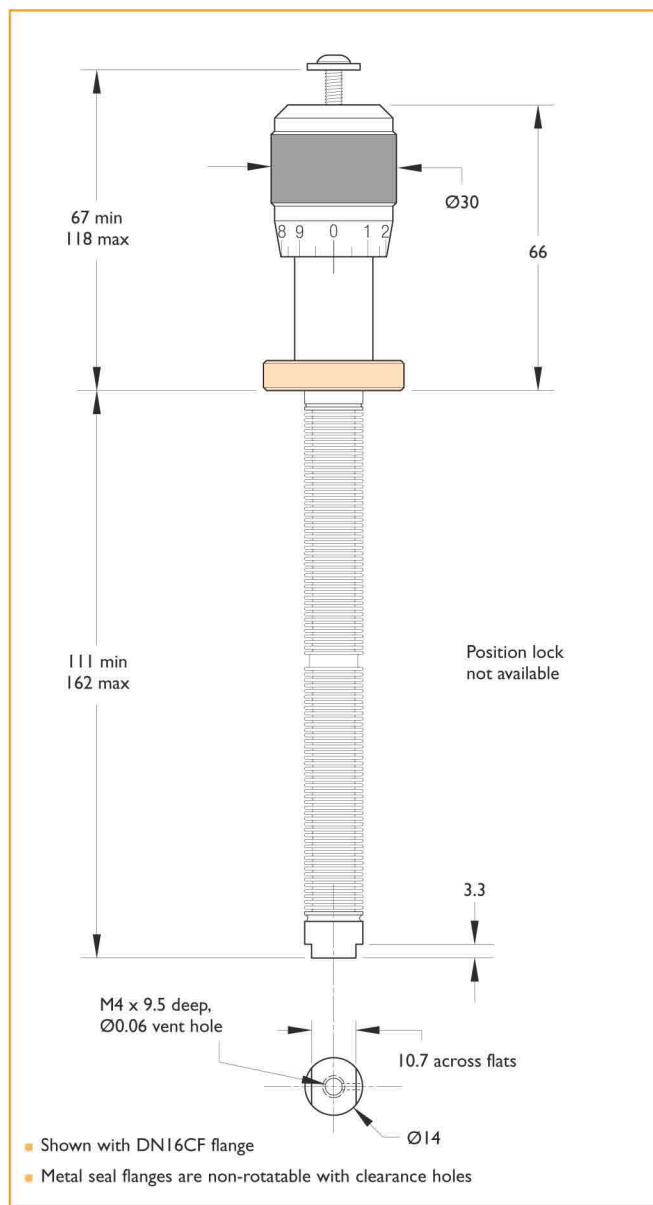
Vacuum range 1×10^{-11} mbar

Temperature range -20°C to 230°C

Axial load 4.5 kg maximum

Lateral load 2.3 kg @ 50.8 extension maximum

Weight and dimensions See table



Linear travel	Wt kg	Reference	Part number
UHV Series			
DN16CF	0.5	E-LMD-133-2	665512
DN40CF	1.4	E-LMD-275-2	665513

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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E-MBL-133-1

UHV and HV series

Features

- 13 to 25mm linear travel
- Manual or motorized actuator
- Linear position lock
- UHV and HV-compatible materials
- Welded bellows seal
- Bakeable to 180°C¹
- CF and ISO KF port mounts

Description

Caburn-MDC miniature linear feedthroughs are specifically designed for in-vacuum light-duty applications. Full revolution of the barrel translates into 0.6mm of linear travel. These instruments are available in both manual or low voltage 12V DC motor configurations. Motor options with an integral magnetic encoder are also available.

Motor controls are not included with the motor options and must be purchased separately.

Specifications

Material

Flange/actuator body 304ss/Anodized aluminium

Shaft seal AM 350 welded bellows

Vacuum range 1×10^{-11} mbar

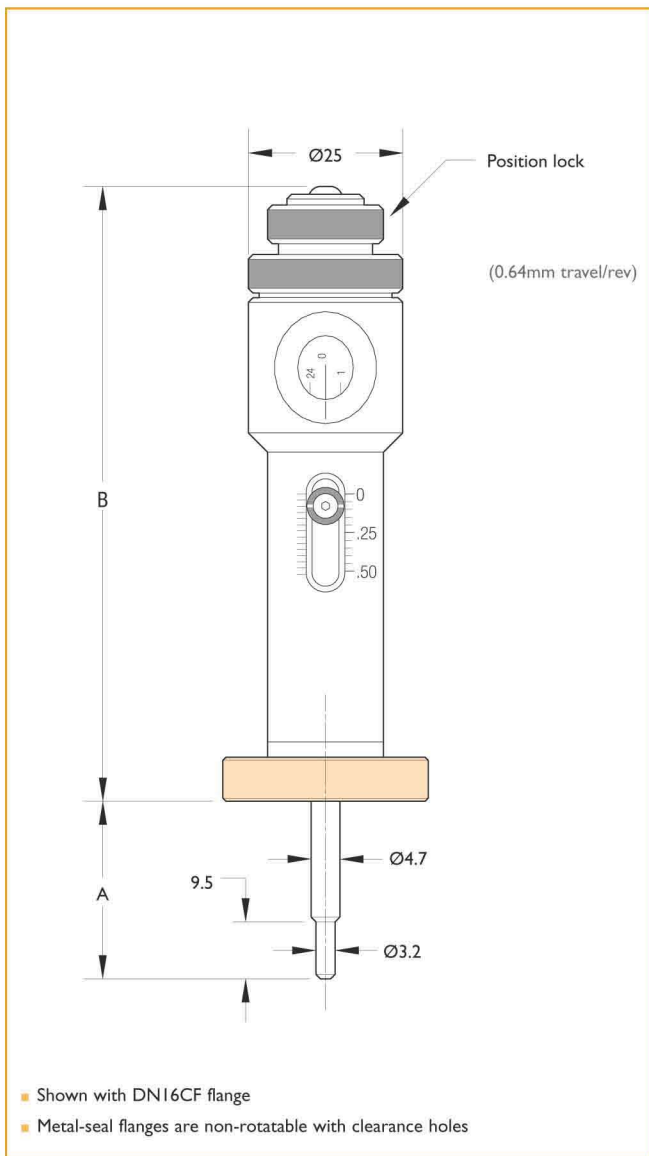
Temperature range¹ Manual -20°C to 100°C

Axial load 1.1 kg

Lateral load 2.3 kg maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed and 30°C maximum when motorized



All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Linear motion

Miniature



UHV Series

CF 100°C

Flange size	Linear travel	A		B	Wt kg	Reference	Part number
		Min	Max				
DNI6CF	13	25	38	114	0.9	MBL-133-0	660500
DNI6CF	25	25	50	127	0.9	MBL-133-1	660501

HV Series

ISO KF 100°C

Flange size	Linear travel	A		B	Wt kg	Reference	Part number
		Min	Max				
DNI6KF	13	25	38	114	0.9	K075-MBL-133-0	660502
DNI6KF	25	25	50	127	0.9	K075-MBL-133-1	660503

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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SBLM-133-1

UHV and HV series

Features

- 25 to 152mm linear travel
- Manual actuator
- Linear position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Caburn-MDC push-pull linear motion feedthroughs are the most basic of the manual motion devices offered in this catalogue. They provide quick action linear motion via a stainless steel hand-held actuator shaft. They are typically operated by observing the motion process through a vacuum viewport. For quick and easy positioning reference the feedthrough body has been laser etched with linear travel graduation marks in increments of 0.025" (0.6mm). An attractive black anodized finish provides high contrast visibility of the laser etched graduated scale. The actuator can be locked in position by simply tightening the position lock located at the top end of the actuator body.

Push-pull linear motion feedthroughs are constructed of the highest grade vacuum compatible materials. Welded stainless steel bellows and the use of linear bearing shaft supports provide reliability and smooth operation.

Specifications

Material

Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows

Vacuum range UHV/HV	1.3x10 ⁻¹¹ mbar/1.3x10 ⁻⁸ mbar
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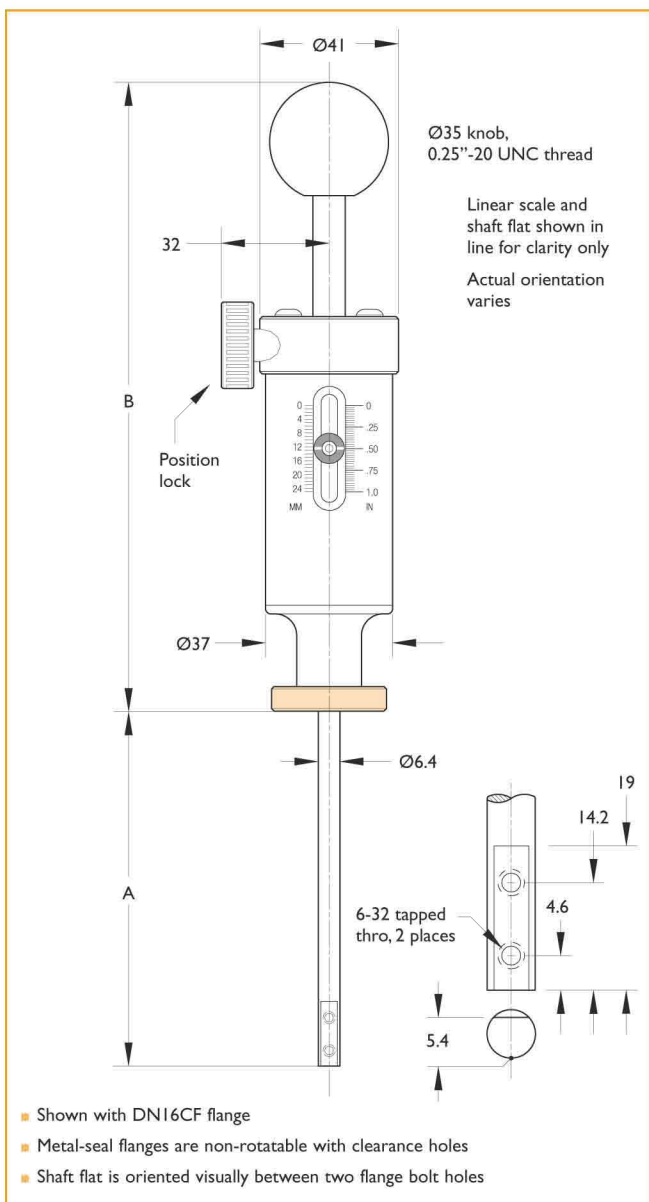
Temperature range ¹ UHV/HV	-20°C to 100°C
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Axial load	4.5 kg
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Lateral load	2.3 kg @ 50.8 extension maximum
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Weight and dimensions	See table
------------------------------	-----------

¹ UHV units are bakeable to 230°C with actuator removed and 30°C maximum when motorized



All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Linear motion

Push-pull



UHV Series

CF 100°C

Flange size	Linear travel	A			B			Wt kg	Reference	Part number
		Min	-	Max	Min	-	Max			
DN16CF	25	90		115	165		191	0.5	SBLM-133-1	663000
DN16CF	51	90		141	203		254	0.9	SBLM-133-2	663004
DN16CF	102	90		192	292		394	1.4	SBLM-133-4	663016
DN16CF	152	90		242	368		521	1.8	SBLM-133-6	663018
DN40CF	25	90		115	165		191	0.5	SBLM-275-1	663002
DN40CF	51	90		141	203		254	0.9	SBLM-275-2	663006
DN40CF	102	90		192	292		394	1.4	SBLM-275-4	663017
DN40CF	152	90		242	368		521	1.8	SBLM-275-6	663019

HV Series

ISO KF 100°C

Flange size	Linear travel	A			B			Wt kg	Reference	Part number
		Min	-	Max	Min	-	Max			
DN16KF	25	87		112	168		193	0.5	K075-SBLM-1	663080
DN16KF	51	87		138	206		257	0.9	K075-SBLM-2	663012
DN16KF	102	87		189	297		399	1.4	K075-SBLM-4	663020
DN16KF	152	87		239	371		523	1.8	K075-SBLM-6	663024
DN40KF	25	91		116	165		193	0.5	K150-SBLM-1	663010
DN40KF	51	91		142	203		254	0.9	K150-SBLM-2	663014
DN40KF	102	91		193	292		394	1.4	K150-SBLM-4	663022
DN40KF	152	91		243	368		521	1.8	K150-SBLM-6	663026

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RPLM-133-2

Linear scale

UHV and HV series

Features

- 50 to 152mm linear travel
- Manual actuator
- Linear position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Caburn-MDC rack and pinion linear motion feedthroughs are very similar to push-pull devices, but provide finer control of linear motion. The rack and pinion drive mechanism is still considered quick-action when compared to rotating actuator, linear motion devices. They too are operated by observing the motion process through a vacuum viewport. For quick and easy positioning reference the feedthrough body has been laser etched with linear travel graduation marks in increments of 0.6mm. A 1/4 turn on the handle generates 25mm of linear travel. An attractive black anodized finish provides high contrast and visibility of the laser etched graduated scale. The actuator can be locked in position by simply tightening the position lock located at the top end of the actuator body.

Rack and pinion linear motion feedthroughs are constructed of high grade vacuum compatible materials. Welded stainless steel bellows and the use of linear bearing shaft supports provide reliability and smooth operation.

Specifications

Material

Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows

Vacuum range UHV/HV	1.3x10 ⁻¹¹ mbar/1.3x10 ⁻⁸ mbar
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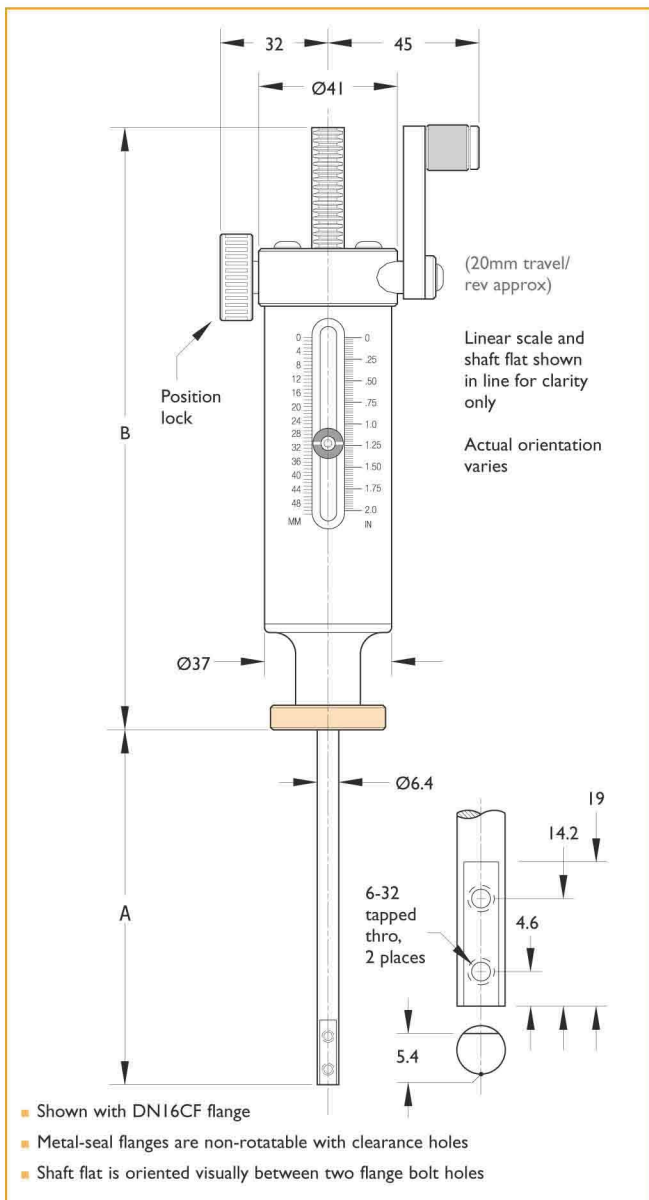
Temperature range ¹ UHV/HV	-20°C to 100°C
--	----------------

Axial load	4.5 kg
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Lateral load	2.3 kg @ 50.8mm extension maximum
---------------------	-----------------------------------

Weight and dimensions	See table
------------------------------	-----------

¹ UHV units are bakeable to 230°C with actuator removed



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Linear motion

Rack and pinion



UHV Series

CF

100°C

Flange size	Linear travel	A			B			Wt kg	Reference	Part number
		Min	-	Max	Min	-	Max			
DN16CF	51	90	-	141	165	-	216	0.9	RPLM-133-2	666000
DN16CF	102	90	-	192	254	-	356	1.4	RPLM-133-4	666002
DN16CF	152	90	-	242	330	-	483	1.8	RPLM-133-6	666004
DN40CF	51	90	-	141	165	-	216	1.4	RPLM-275-2	666001
DN40CF	102	90	-	192	254	-	356	1.8	RPLM-275-4	666003
DN40CF	152	90	-	242	330	-	483	2.3	RPLM-275-6	666005

HV Series

ISO KF

100°C

Flange size	Linear travel	A			B			Wt kg	Reference	Part number
		Min	-	Max	Min	-	Max			
DN16KF	51	87	-	140	168	-	219	0.9	K075-RPLM-2	666006
DN16KF	102	87	-	189	257	-	359	1.4	K075-RPLM-4	666010
DN16KF	152	87	-	239	333	-	486	1.8	K075-RPLM-6	666014
DN40KF	51	91	-	142	164	-	215	0.9	K150-RPLM-2	666008
DN40KF	102	91	-	193	253	-	354	1.4	K150-RPLM-4	666012
DN40KF	152	91	-	243	329	-	481	1.8	K150-RPLM-6	666016

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Section 7.1 Linear motion

Pneumatic



ABLM-275-2

Includes 24V DC solenoid.

UHV and HV series

Features

- 25 to 51mm linear travel
- Pneumatic actuator
- Adjustable linear travel stop
- UHV or HV compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts
- Complete with 24V DC air control solenoid valve
- 240V AC air control solenoid valve optional

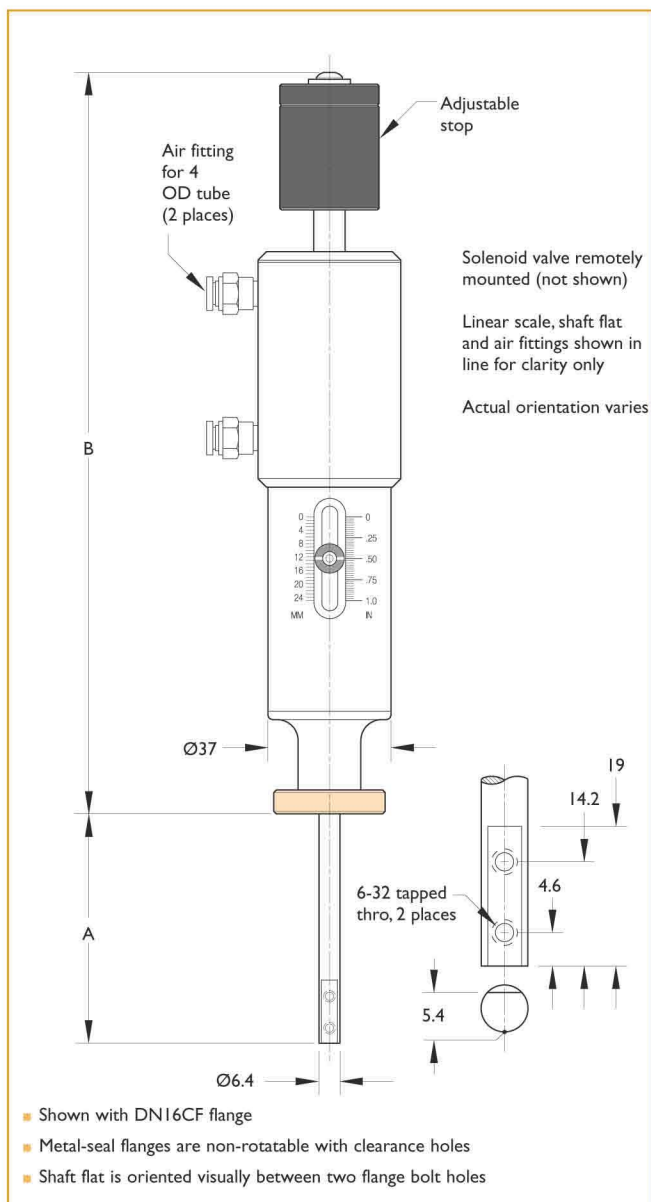
Description

Pneumatic linear motion feedthroughs provide two-position fast action linear motion. Typical motion applications would include on-off, open-close and in-out motions similar to those of in-vacuum shutters. Linear travel can be shortened or lengthened by turning the adjustment knob located at the top end of the pneumatic actuator. Once adjusted the jam nut locks the knob in place. For quick and easy positioning the feedthrough body has been laser etched with linear travel graduation marks in increments of 0.025" (0.6mm). A black anodized finish provides high contrast and visibility of the laser etched graduated scale. Pneumatic linear motion feedthroughs are constructed of high grade vacuum compatible materials. Welded stainless steel bellows and the use of linear bearing shaft supports provide reliability and smooth operation.

Specifications

Material	
Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows
Piston seal	Viton® O-ring
Vacuum range UHV/HV	1×10^{-11} mbar / 1×10^{-8} mbar
Temperature range ¹ UHV/HV	-20°C to 100°C
Axial load	9.1 kg maximum
Lateral load	2.3 kg @ 50.8mm extension maximum
Actuator pressure	4 – 5.5 bar
Piston surface area	5.7 cm ²
Solenoid valve	24V DC
Weight and dimensions	See table

¹ UHV units are bakeable to 230°C with actuator removed



- Shown with DN16CF flange
- Metal-seal flanges are non-rotatable with clearance holes
- Shaft flat is oriented visually between two flange bolt holes

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Linear motion

Pneumatic



Linear motion

UHV Series

CF **100°C**

Flange size	Linear travel	A			B			Wt kg	Reference	Part number
		Min	-	Max	Min	-	Max			
DN16CF	25	90	-	115	216	-	241	0.9	ABLM-133-1	662000-01
DN16CF	51	90	-	141	279	-	330	1.4	ABLM-133-2	662004-01
DN40CF	25	90	-	115	216	-	241	1.4	ABLM-275-1	662002-01
DN40CF	51	90	-	141	279	-	330	1.4	ABLM-275-2	662006-01

HV Series

ISO KF **100°C**

Flange size	Linear travel	A			B			Wt kg	Reference	Part number
		Min	-	Max	Min	-	Max			
DN16KF	25	87	-	112	218	-	244	0.9	K075-ABLM-1	662008-01
DN16KF	51	87	-	138	282	-	333	1.4	K075-ABLM-2	662012-01
DN40KF	25	91	-	116	216	-	241	0.9	K150-ABLM-1	662010-01
DN40KF	51	91	-	142	279	-	330	1.4	K150-ABLM-2	662014-01

Air control solenoid valves



Description	Option number
240V AC Air control solenoid valve	-02

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HLM-275-2

UHV Series

Features

- 50 to 152mm linear travel
- Manual actuator
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- DN40CF port mount

Description

Heavy duty linear motion feedthroughs allow linear displacement of larger in-vacuum samples and components. This feedthrough has basic, rotary manual actuation and does not provide position indication. Position must be determined by visual inspection of the in-vacuum sample or component. A heavy duty acme thread lead screw provides 25mm of linear travel for every six revolutions of the actuator knob. Unlike conventional motion feedthroughs, heavy duty models have a re-entrant welded bellows configuration.

Specifications

Material

Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows

Vacuum range 1×10^{-11} mbar

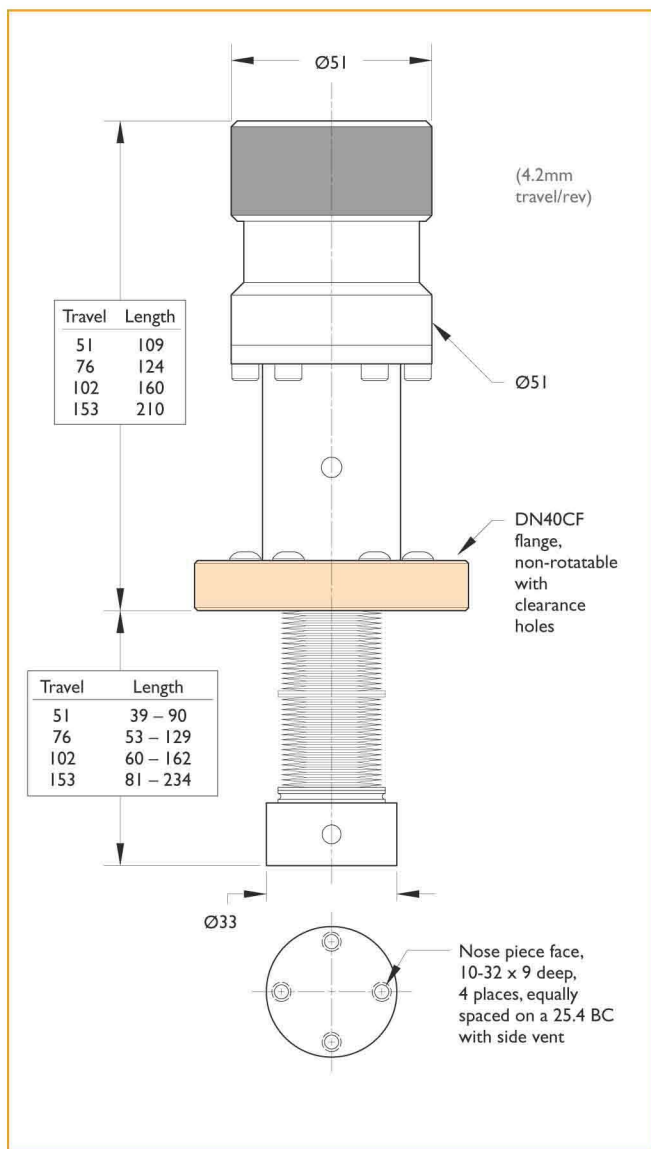
Temperature range¹ -20°C to 100°C

Axial load 9.1 kg

Lateral load 9.1 kg @ 101.6mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed



Linear travel	Wt kg	Reference	Part number
UHV Series			
51	0.9	HLM-275-2	661018
76	0.9	HLM-275-3	661000
102	0.9	HLM-275-4	661016
153	1.4	HLM-275-6	661017

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Linear motion

Heavy duty, pneumatic



ALM-275-2

Includes 24V DC solenoid

UHV Series

Features

- 25 to 76mm linear travel
- Pneumatic actuator
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- DN40CF port mount

Description

Heavy-duty pneumatic linear motion feedthroughs provide two-position fast-action linear motion for heavy sample loads. Typical motion applications would include open-close or in-out motions similar to those used for in-vacuum shutters.

Specifications

Material

Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows
Actuator gaskets	Viton®

Vacuum range 1x10⁻¹¹ mbar

Temperature range¹ -20°C to 100°C

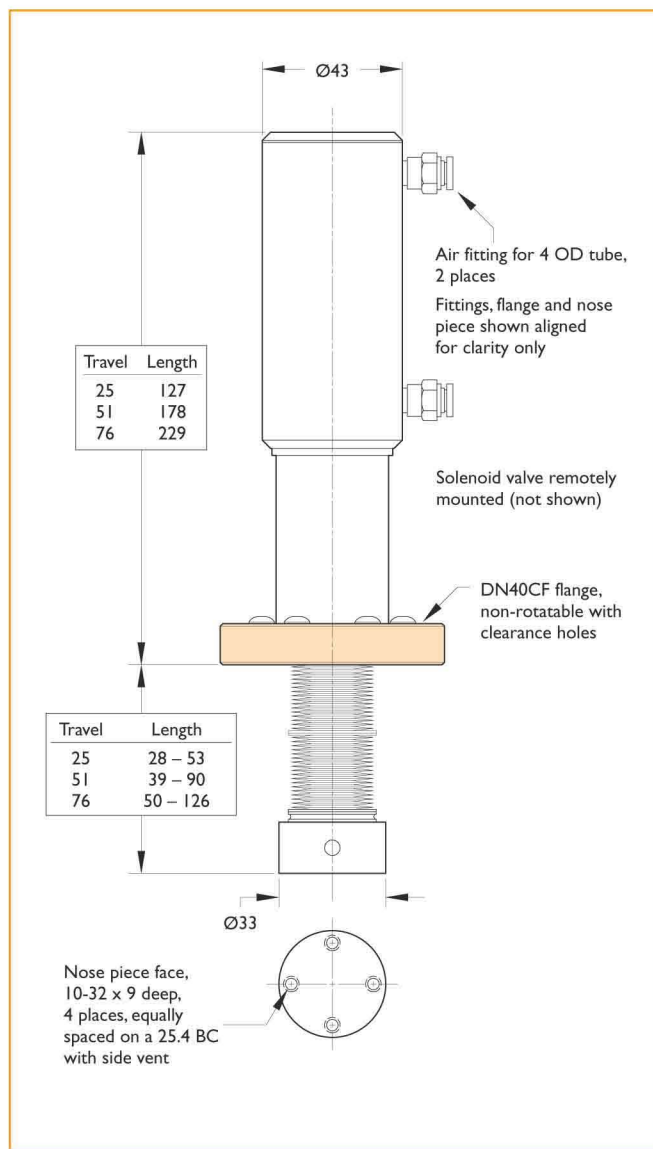
Axial load 9.1 kg

Lateral load 9.1 kg @ 76mm extension maximum

Solenoid valve 24V DC

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed



Linear travel	Wt kg	Reference	Part number
UHV series			
25	0.9	ALM-275-1	661050-01
51	1.4	ALM-275-2	661051-01
76	1.4	ALM-275-3	661052-01

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Linear motion

Heavy duty, push-pull



SLM-275-3 Special

UHV Series

Features

- 50 to 152mm linear travel
- Manual actuator
- Linear position lock
- UHV compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- DN40CF port mount

Description

Heavy duty push-pull linear motion feedthroughs allow linear displacement of heavier samples and components than conventional designs. These devices do not provide position indication. Sample or component position must be verified visually through a viewport. Sample linear position can be fixed with an integral position lock knob mounted on the actuator housing. Unlike conventional motion feedthroughs, heavy duty models employ re-entrant welded bellows construction allowing the use of sturdier and larger diameter shafts. Push-pull linear motion feedthroughs provide two-position fast action motion ideal for applications including open-close or in-out motions similar to those used for in-vacuum shutters. Special configurations, such as the 76.2mm version displayed in the photograph, may be quoted upon request.

Specifications

Material

Flange/actuator body 304ss/Anodized aluminium
 Shaft seal AM 350 welded bellows

Vacuum range 1×10^{-11} mbar

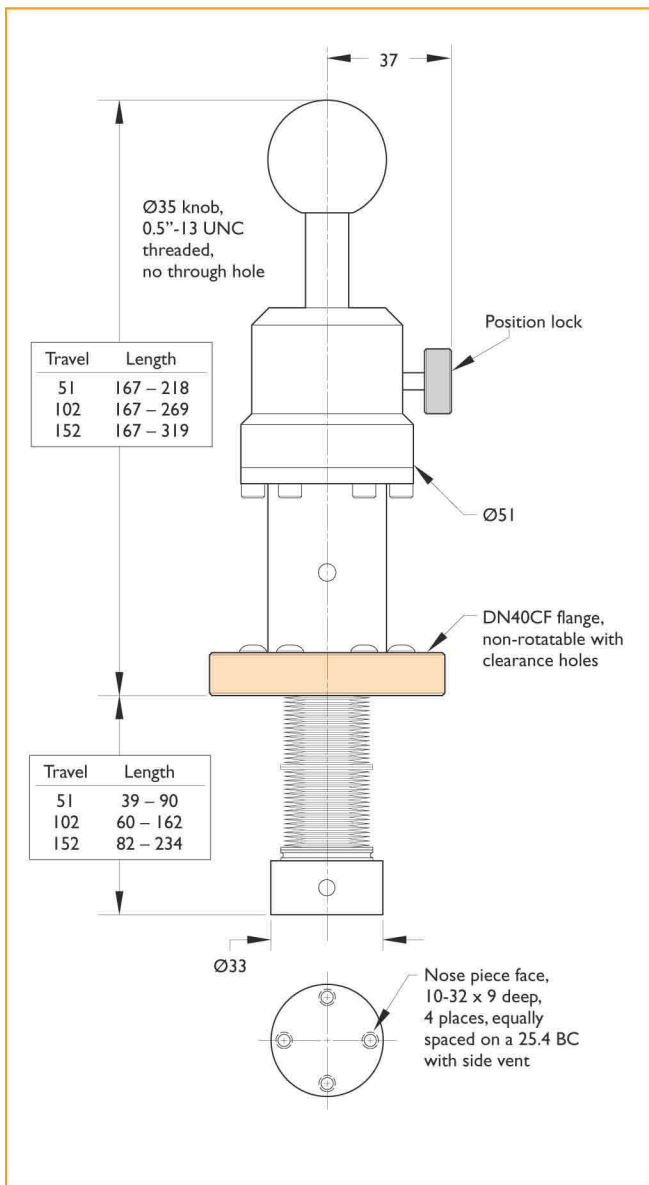
Temperature range¹ -20°C to 100°C

Axial load 9.1 kg

Lateral load 9.1 kg @ 76mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed



Linear travel	Wt kg	Reference	Part number
UHV series			
51	1.4	SLM-275-2	674001
102	1.8	SLM-275-4	674003
152	2.3	SLM-275-6	674005

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Linear motion

Heavy duty, tunnel access



Linear motion



TLM-275-2

UHV Series

Features

- 50 to 152mm linear travel
- Manual actuator
- Linear position lock
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- DN40CF port mount

Description

Heavy duty tunnel access, push-pull linear motion feedthroughs allow linear displacement of heavy samples and components. The push-pull shaft is hollow providing tunnel access for instrumentation leads such as those used for thermocouple temperature measurements and other low voltage electrical applications. The vacuum nose piece is shipped with a blank DN16CF flange which can be removed or modified to accept electrical feedthroughs as required. These devices do not provide position indication. Sample or component position must be verified visually through a viewport. Sample linear position can be fixed with an integral position lock knob mounted on the actuator housing. Unlike conventional motion feedthroughs, heavy duty models employ re-entrant welded bellows construction allowing the use of sturdier and larger diameter shafts.

Specifications

Material

Flange/actuator body 304ss/Anodized aluminium
 Shaft seal AM 350 welded bellows

Vacuum range 1x10⁻¹¹ mbar

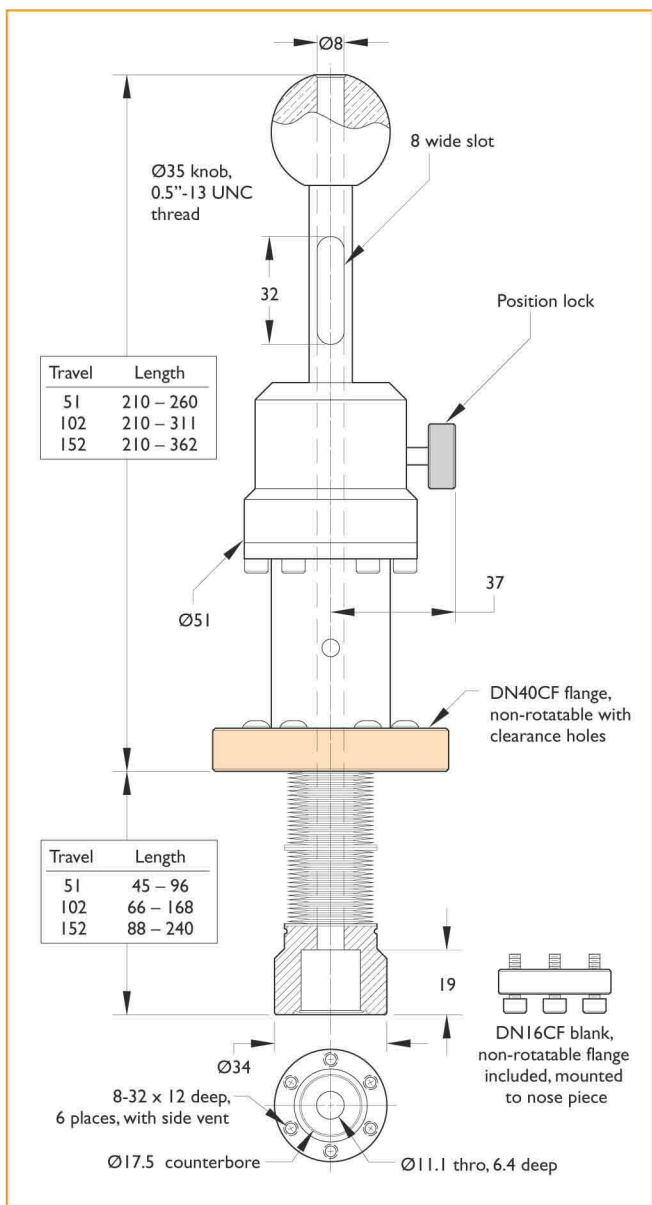
Temperature range¹ -20°C to 100°C

Axial load 9.1 kg




Lateral load 9.1 kg @ 76mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed



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Linear motion

Heavy duty, micrometer



UHV Series

Features

- 50mm linear travel
- Manual, precision micrometer actuator
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- DN40CF port mount

Description

Heavy duty, micrometer driven linear motion feedthroughs allow linear displacement of heavier samples and components with the accuracy and precision of fine pitch thread micrometers. These devices provide position indication on both rotary and linear scales with display resolutions of 0.0025" (0.06mm) on the rotary scale and 0.025" (0.6mm) on the linear scale. A full revolution of the rotary scale translates into 0.025" (0.6mm) of linear travel. Unlike conventional motion feedthroughs, heavy duty models employ re-entrant welded bellows construction allowing the use of sturdier and larger diameter shafts.

Specifications

Material

Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows

Vacuum range 1 x 10⁻¹¹ mbar

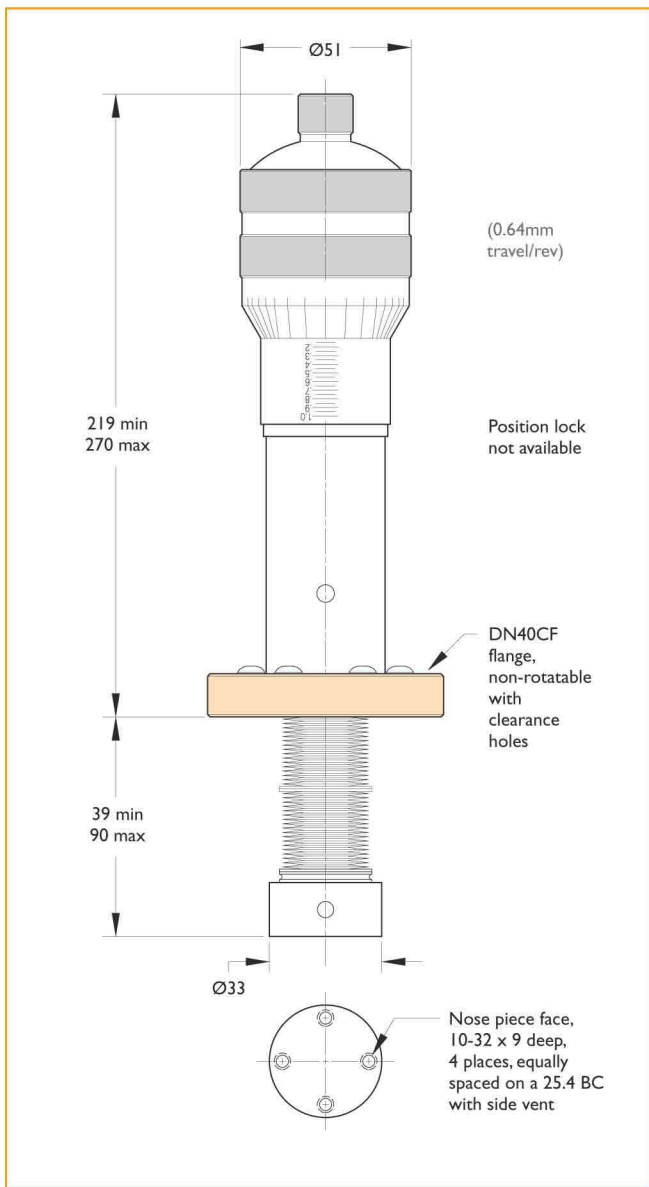
Temperature range¹ -20°C to 100°C

Axial load 4.5 kg maximum

Lateral load 9.1 kg @ 100mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed



Linear travel	Wt kg	Reference	Part number
UHV series			
51	1.4	LMM-275-2	668002

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Multi-motion

Rotary linear, standard



BRLM-133

UHV and HV series

Features

- 360° rotary motion and 25mm linear travel
- Manual actuator
- Rotary position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Rotary-linear standard devices offer 360° of rotation and 25mm of linear travel via two separate drive knob actuators. Both rotary and linear positions are measured along laser etched scales on actuator barrel and housing. The 360° rotary scale is graduated in 5° increments. The linear scale has both a linear and rotary scale components, the linear portion is graduated in 0.025" (0.6mm) increments while the rotary portion is graduated in 0.03mm increments. Full revolution of the linear scale produces 0.6mm of linear travel.

Specifications

Material

Flange/actuator knob 304ss/Anodized aluminium
 Shaft seal AM 350 welded bellows

Vacuum range 1x10⁻¹¹ mbar/1x10⁻⁸ mbar

Temperature range -20°C to 100°C

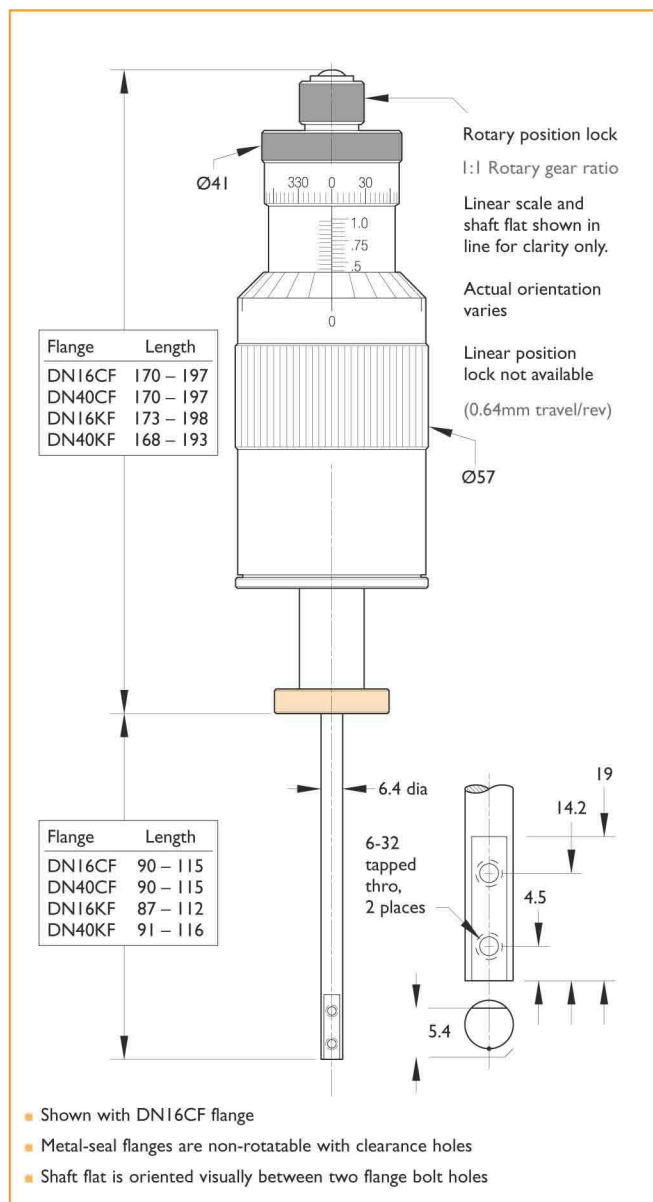
Torque 3.5 Nm maximum

Axial load 1.8 kg maximum

Lateral load 1.8 kg @ 50mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed



Description	Wt kg	Reference	Part number
UHV Series			
DN16CF	1.4	BRLM-133	672000
DN40CF	1.4	BRLM-275	672002
HV Series			
DN16CF	1.4	KM075-BRLM	672004
DN40CF	1.4	KM150-BRLM	672006

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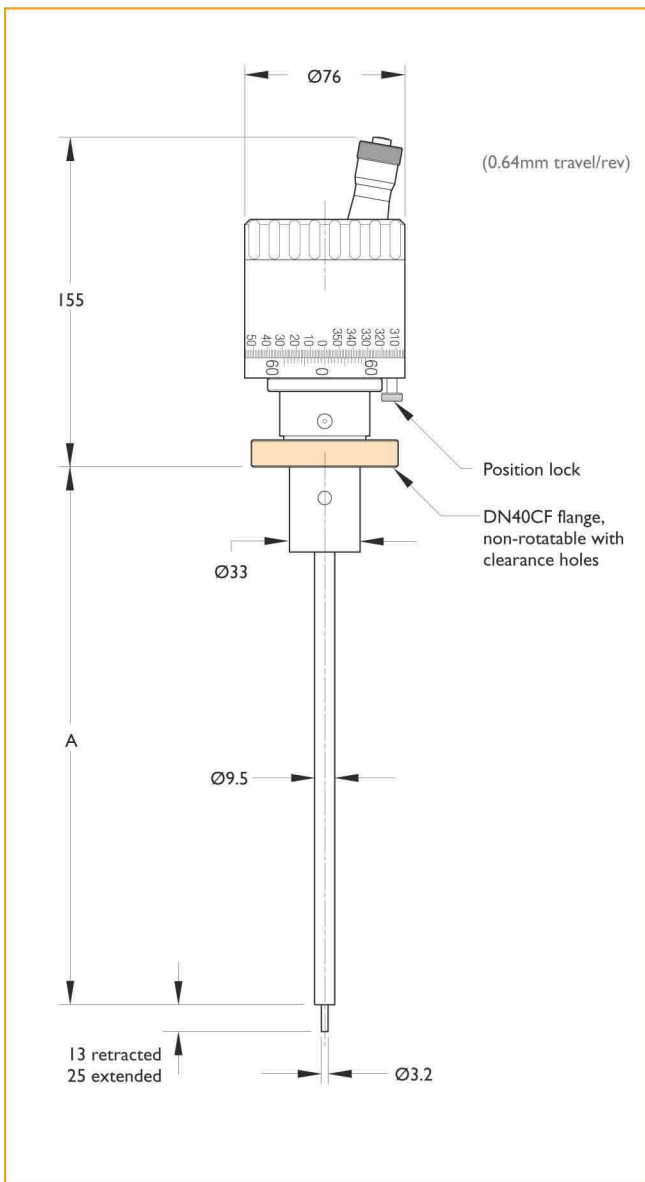
Multi-motion

Rotary-linear, precision



PBRM2-10

Linear drive



UHV Series

Features

- Continuous rotary motion and 13mm linear travel
- Manual or motorized actuator
- Rotary position lock
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C¹
- CF port mount

Description

Precision rotary-linear motion feedthroughs are low backlash instruments with a rotary display resolution of 0.1° and a linear display resolution of 0.03mm. Full revolution of the linear drive translates into 0.6mm of linear travel with a maximum overall linear travel of 13mm. Welded stainless steel bellows, a unique off-axis wobble design and the use of rotary shaft bearing supports provide long life and smooth operation. Motorization options are available for both linear and rotary drive components. If motorization is required on both drives, add each option number to the end of the base part number.

Note The entire linear drive mechanism (manual or motorized) will rotate when the rotary drive is actuated. This must be considered when allocating space for its installation.

Motor controls are not included with the motorization options and must be purchased separately.

Specifications

Material

Flange/actuator body	304ss/Anodized aluminium
Shaft seal	AM 350 welded bellows
Position knob and internal washer	Brass

Vacuum range 1×10^{-11} mbar

Temperature range¹ -20°C to 230°C

Torque 0.7 Nm maximum

Axial load

Rotary	2.3 kg maximum
Linear	0.4 kg maximum

Lateral load 4.5 kg @ 50mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 30°C with actuator removed

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Multi-motion

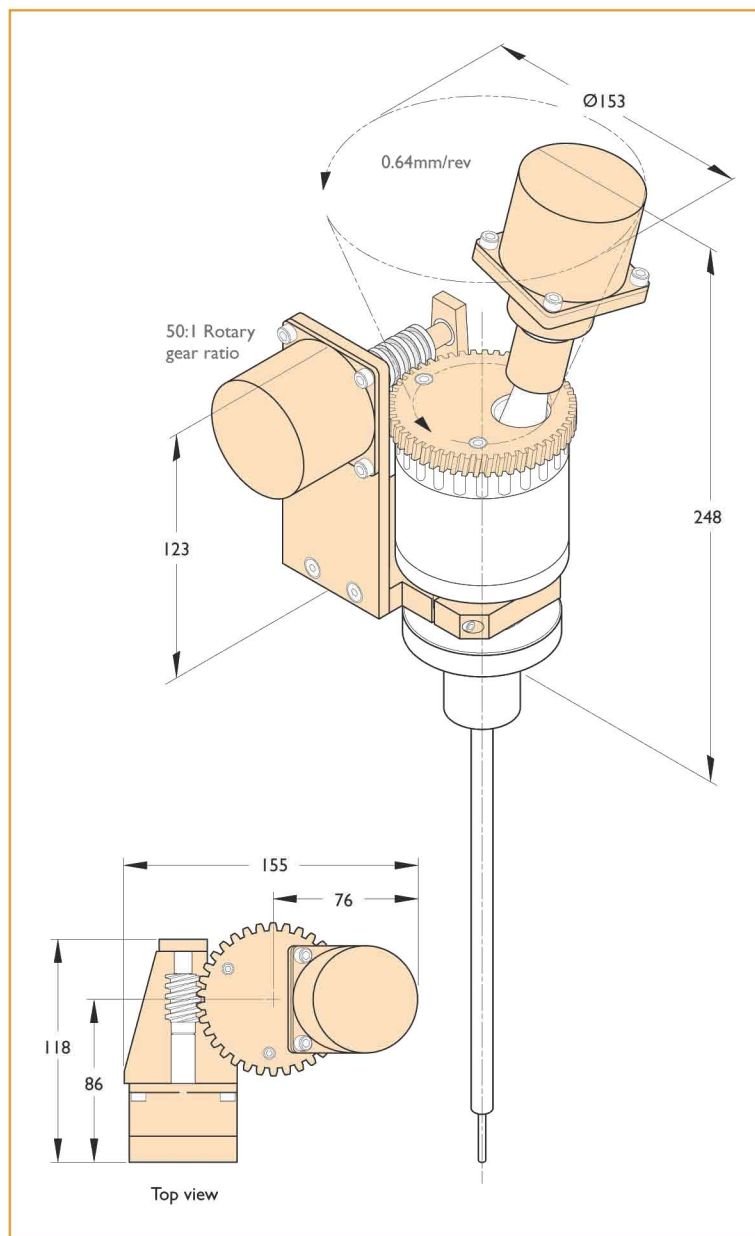
Rotary-linear, precision



UHV Series	
CF	230°C

Flange size	A	Wt kg	Reference	Part number
DN40CF	254	3.6	PBRM2-10	670025
DN40CF	400	3.6	PBRM2-15	670028
DN40CF	600	4.1	PBRM2-23	670031
DN40CF	800	4.1	PBRM2-31	670034

Motorization options



Option -01 Rotary motorization



Option -02 Linear motorization



Motorization ¹	Motor specification	Add-on weight kg	Option Number
Rotary axis	D	2.3	-01
Linear axis	D	0.9	-02

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above
 For example: **670025-01-02**
 For total unit weight, add option weight to component weight

All dimensions are nominal in millimetres unless specified - Weights given are approximate



CRPP-1

Ø61 knob, includes
8-32 socket head set
screw

203.2 travel
Position lock
not available

Flange	Min – Max
DN40CF	89 – 292
DN40KF	88 – 291

1/8"–27 NPT thread,
hex socket head

Ø51

Travel stop

Ø6.4

Flange	Min – Max
DN40CF	32 – 235
DN40KF	33 – 236

■ Shown with DN16CF flange

■ Metal seal flanges are non-rotatable with clearance holes

UHV and HV series

Features

- Continuous rotary motion and 203mm linear travel
- Manual actuator
- UHV or HV-compatible materials
- Differentially pumped, Dual Viton® elastomer shaft seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Differentially pumped direct drive rotary-linear motion feedthroughs are a basic and economical solution for vacuum applications requiring both rotary and linear motion. Their simple construction provides 11 Nm of manual rotational torque.

The rotary shaft is supported by two phosphor bronze bearings and uses dual Viton® elastomer shaft seals. The region between the seals can be differentially pumped through the 1/8" female pipe thread port provided and thus attain UHV compatibility to 1×10^{-9} mbar. Feedthroughs are available on industry standard Conflat® compatible DN40CF metal seal flanges or ISO KF DN40 port mounts.

Specifications

Material

Flange/actuator body 304 Stainless steel

Shaft seal Viton®

Vacuum range UHV/HV 1×10^{-8} mbar 1×10^{-8} mbar

Temperature range¹ UHV/HV -20°C to 100°C

Torque 11.3 Nm maximum

Axial load No lock to support weight 1.1 kg

Lateral load 2.3 kg @ 50mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 150°C with actuator removed

Linear travel	Wt kg	Reference	Part number
UHV		CRPP-1	672008
HV		K-CRPP-1	672009

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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UHV and HV series

Features

- 114mm linear travel and 22° wobble motion
- Manual actuator
- Angular position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Wobble stick linear-angular motion feedthroughs are basic and manual sample motion devices. They provide quick action linear travel and angular wobble motion via a stainless steel hand-held actuator shaft with a ball and socket joint design. They are typically operated by observing sample motion through a vacuum viewport. The actuators angular position can be locked in place by tightening the lock collar located on the port mount flange. Wobble stick linear-angular motion feedthroughs are offered with 114mm linear travel and a maximum 22° of angular wobble with unrestricted mating flange and port diameter. Re-entrant, welded stainless steel bellows are standard on these products.

Specifications

Material

Flange/actuator body 304ss

Shaft seal AM 350 welded bellows

Vacuum range UHV/HV 1×10^{-11} mbar / 1×10^{-8} mbar

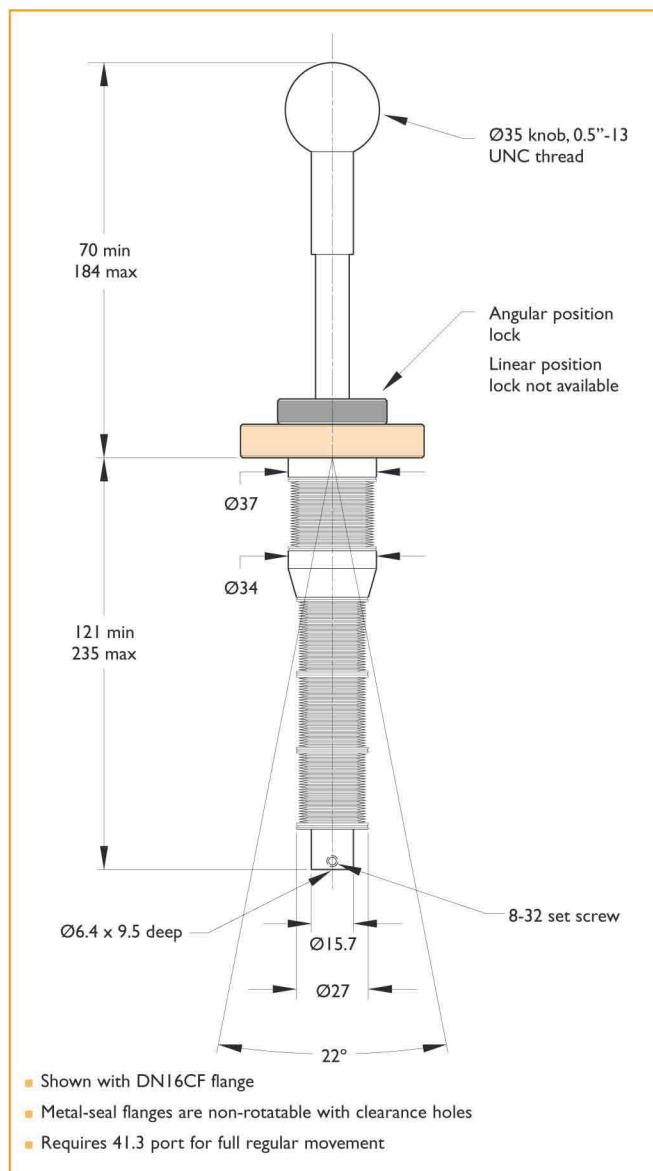
Temperature range¹ UHV/HV -20°C to 100°C

Axial load No lock to support weight 9.1 kg

Lateral load 91 kg @ 50mm extension maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed



Description	Wt kg	Reference	Part number
UHV Series			
DN40CF	1.4	SU-275	696000
HV Series			
DN40KF	0.9	K150-SU	696001

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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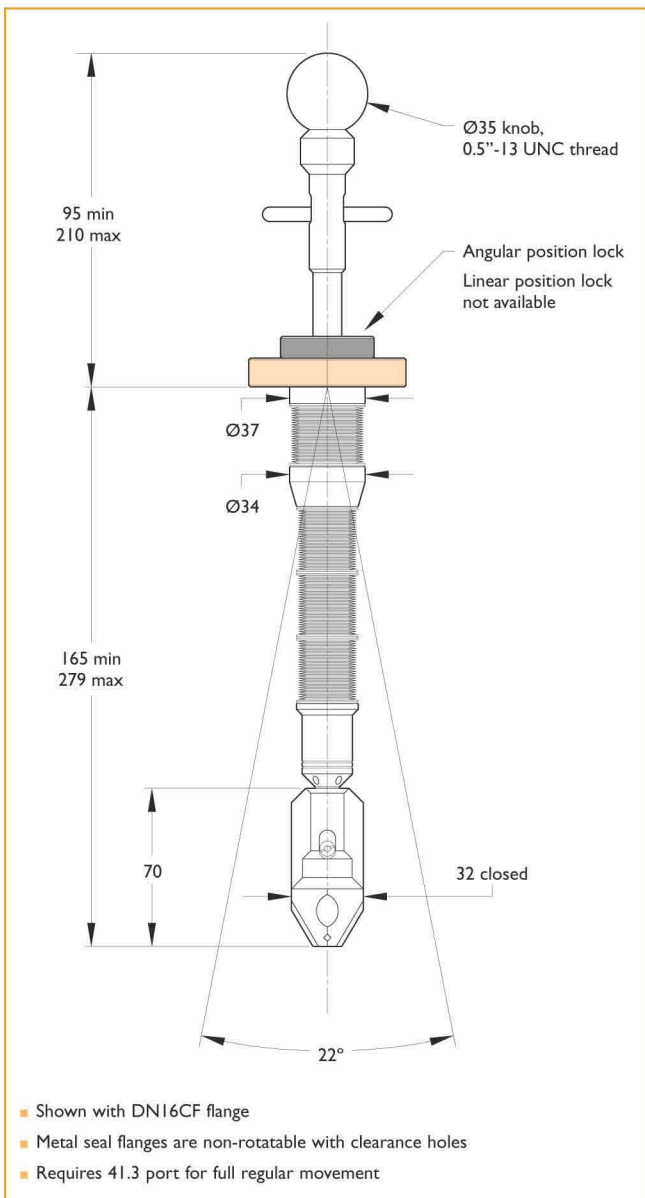
Multi-motion

Wobble stick, pincer



VGU-275

Blank jaws



- Shown with DN16CF flange
- Metal seal flanges are non-rotatable with clearance holes
- Requires 41.3 port for full regular movement

UHV and HV series

Features

- 114mm linear travel and 22° wobble, with pincer-grip
- Manual actuator
- Angular position lock
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

Wobble sticks with pincer action are identical to the wobble-linear products, except for the addition of an integral and articulated sample holding pincer mechanism. The pincer is activated via two shaft mounted finger grips allowing the pincer jaws to grip 22.4mm maximum sample diameters. These feedthroughs provide quick action linear-angular motion via a manually activated shaft with ball and socket joint design. They are typically operated by observing sample motion through a vacuum viewport. Angular position can be locked with an integral lock collar located on the port mount flange.

Specifications

Material

Flange/actuator body 304 Stainless steel
Shaft seal AM 350 welded bellows

Vacuum range UHV/HV 1×10^{-11} mbar / 1×10^{-8} mbar

Temperature range¹ UHV/HV -20°C to 100°C

Axial load 0.9 kg maximum

Lateral load 0.9 kg maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed

Description	Wt kg	Reference	Part number
UHV Series			
DN40CF	1.4	VGU-275	695000

HV Series			
DN40KF	0.9	K150-VGU	695001

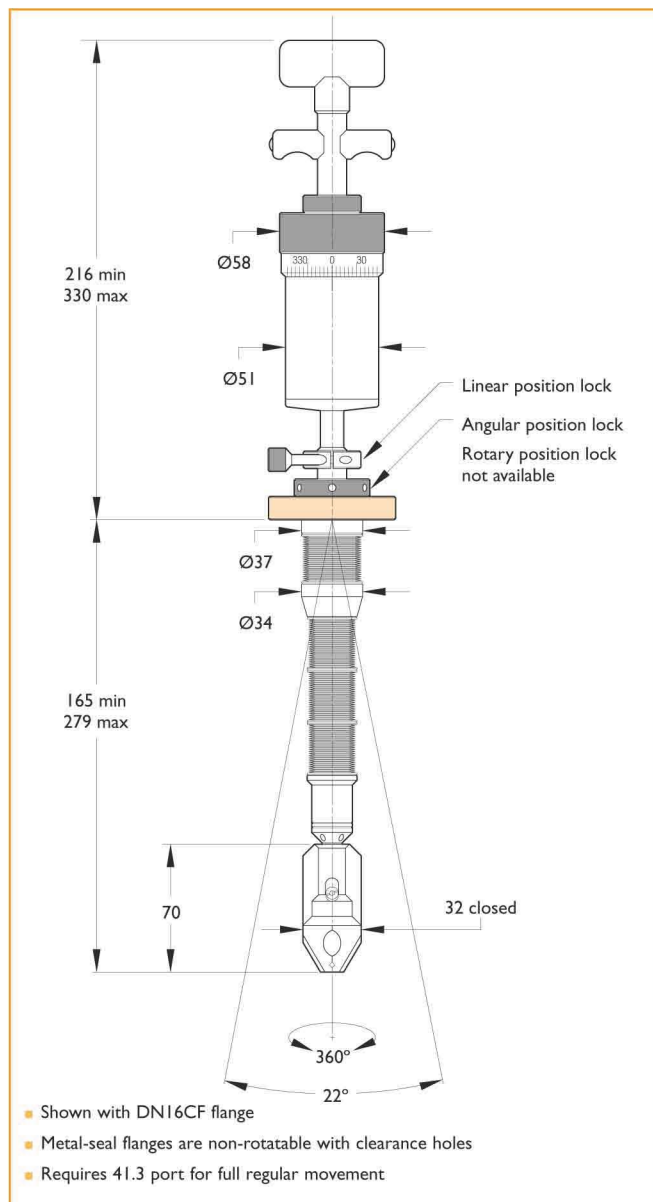
Description	Wt kg	Reference	Part number
Jaw kit, blank	0.5	DG-275-BJ	694001

All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Multi-motion

Wobble stick, rotary pincer



UHV and HV series

Features

- Continuous rotary motion, 114mm linear travel and 22° wobble, with pincer-grip
- Manual actuator
- Linear and angular position locks
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 100°C¹
- CF and ISO KF port mounts

Description

These products are rotary-linear-pincer action wobble sticks identical to the linear and linear-pincer wobble stick products with the addition of full 360° rotary motion. The pincer mechanism is activated via two shaft mounted finger grips allowing the pincer jaws to grip up to 22.4mm sample diameters. These feedthroughs provide quick action rotary, linear and angular motion with an actuator shaft ball and socket joint design. Angular and linear positions can be locked with integral lock collars located on the port mount flange and actuator shaft.

Specifications

Material

Flange/actuator body 304ss/Aluminium
 Shaft seal AM 350 welded bellows

Vacuum range UHV/HV 1×10⁻¹¹ mbar/ 1×10⁻⁸ mbar

Temperature range¹ UHV/HV -20°C to 100°C

Torque 0.3 Nm maximum

Axial load 0.9 kg maximum

Lateral load 0.9 kg maximum

Weight and dimensions See table

¹ UHV units are bakeable to 230°C with actuator removed

Description	Wt kg	Reference	Part number
UHV Series			
DN40CF	1.4	DG-275	694000

HV Series			
DN40KF	0.9	K150-DG	694002

Description	Wt kg	Reference	Part number
Jaw kit, blank	0.5	DG-275-BJ	694001

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Multi-motion

Wobble stick, wide angle



WS-133

UHV and HV series

Features

- 13 or 50mm linear travel and 44° or 60° wobble, respectively
- Manual actuator
- UHV or HV-compatible materials
- Welded bellows seal
- Bakeable to 230°C
- CF and ISO KF port mounts

Description

Wide angle wobble sticks, the most basic products of the wobble stick family, provide an economical solution for light duty sample motion and manipulation. They are stripped down wobble sticks ideally suited for user customization. Under vacuum load the bellows are compressed and the shaft completely extended into the vacuum chamber. Offered in two models they provide 44° and 60° of angular displacement respectively.

Specifications

Material

Flange/actuator body	304 Stainless steel
Shaft seal	AM 350 welded bellows

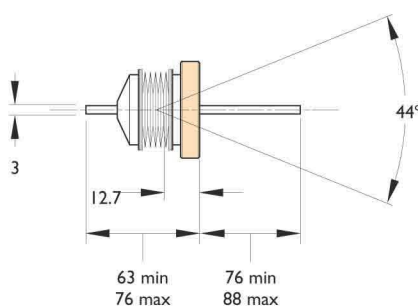
Vacuum range UHV/HV	1×10^{-11} mbar / 1×10^{-8} mbar
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Temperature range

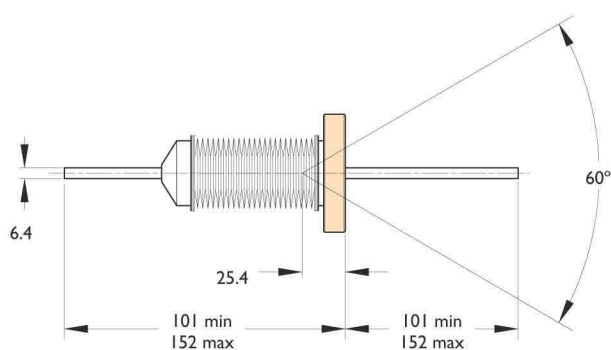
UHV	-20°C to 230°C
HV	-20°C to 150°C

Weight and dimensions	See table
------------------------------	-----------

12.7 Linear travel 44° wobble



50.8 Linear travel 60° wobble



- Requires 41.3 port for full regular movement
- Position lock not available

Description	Linear travel	Wt kg	Reference	Part number
UHV Series				
DN16CF	12.7	1.4	WS-133	693001
DN40CF	50.8	1.4	WS-275	693000

UHV Series	Linear travel	Wt kg	Reference	Part number
DN16CF	12.7	1.4	K075-WS	693002
DN40CF	50.8	1.4	K150-WS	693003

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Magnetic transporters

Guided and unguided



E-GMTM-12 Guided transporter

UHV Series

Features

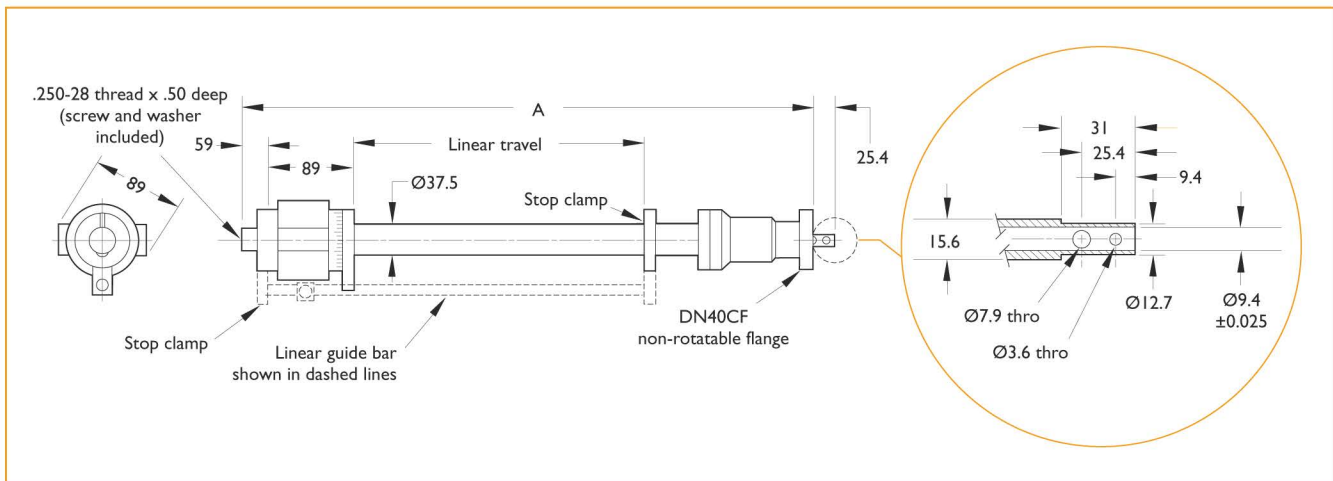
- UHV-compatible materials
- All-metal with ball bearing guides
- Magnetically coupled rotary/linear transporter rod
- Vertical or horizontal mounting
- Guided and unguided models
- 2.27kg maximum axial force
- 1Nm maximum torque
- Type 304 (1.4301) stainless steel construction
- Bakeable to 200°C
- Vacuum range 10^{-11} mbar

Description

MTM series UHV magnetically coupled sample transporters allow samples to be moved 305mm (12"), 610mm (24") or 915mm (36"), depending on the model, into the chamber.

They can also be rotated 360°. Linear positioning is controlled by sliding an external sleeve which is magnetically coupled with the transporter rod and sample holder inside the system.

GMTM models have linear guide bar to lock the rotation in any position during linear travel.



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Magnetic transporters

Guided and unguided



UHV Series

Ball bearings 200°C

Transporter type	Nominal travel	Transporter A	Wt kg	Reference	Part number
Unguided	305	699	4.5	MTM-12	665700
Unguided	610	1041	5.5	MTM-24	665701
Unguided	915	1346	6.3	MTM-36	665702
Guided	305	699	4.5	GMTM-12	665700-01
Guided	610	1041	5.5	GMTM-24	665701-01
Guided	915	1346	6.3	GMTM-36	665702-01

HV Series

Vespel® bearings 150°C

Transporter type	Nominal travel	Transporter A	Wt kg	Reference	Part number
Unguided	305	584	4.5	MT-12	665100
Unguided	610	927	5.5	MT-24	665101
Unguided	915	1232	6.3	MT-36	665102
Guided	305	584	4.5	GMT-12	665100-01
Guided	610	927	5.5	GMT-24	665101-01
Guided	915	1232	6.3	GMT-36	665102-01

Transporter options

Option -01
Guide rod

Option -02
In-line 90V DC motor

Motorization ¹	Motor Specification	Add-on weight kg	Option Number
Motor 90V DC	B	1.4	-02

Motorized UHV transporter
Motorized option includes a linear guide bar.

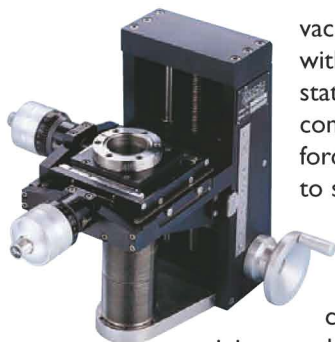
¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above
For example: **665700-02**
For total unit weight, add option weight to component weight

All dimensions are nominal in millimetres unless specified - Weights given are approximate



Features

- V-Plane® XY and Z stages
- V-Plane® guide tubes
- Compact XY and Z stages
- Standard XY and Z stages
- Rotatable axis stages



V-Plane® XY and Z stages

Caburn-MDC's V-Plane® modular stages are building block components designed to streamline the implementation of a sample manipulation system. They can be used as stand alone components or combined with other V-Plane® instruments to attain customized motion and manipulation solutions. V-Plane® dual axis XY stages are micrometer driven and guided by cross roller bearing slides. Caburn-MDC micrometers have unique laser etched plus-minus scales that indicate positive or negative port displacement. V-Plane® single axis stages employ handwheel and worm gear reduction drive mechanisms with linear displacement measured along the stage's frame mounted scale.

V-Plane® guide tubes

Caburn-MDC guide tubes provide bellows support for V-Plane® manipulator stages fitted with long-stroke bellows as well as secondary rotary and linear motion feedthroughs installed on the stage. They are supplied with both rotary and linear bearing supports. For applications requiring sample heating, cooling, high voltage biasing, thermocouple temperature measurements, etc., the guide tube tip has been fitted with two slots 180° apart through which wires or tubes can be fed. Four DN16CF and one DN40CF flange accessory ports allow the installation of up to five additional accessory components. When a manipulator stage is not under

vacuum or is let up to air with the bellows in some state of compression, the compressed bellows' spring force may force the bellows to shift off-axis at some point during its travel. The off-axis shift could be sudden and violent causing user injury or damage to the bellows. Caburn-MDC recommends that all long-stroke 38mm diameter bore Z axis V-Plane® stages, with linear travels exceeding 150mm, be fitted with guide tubes.



Compact XY and Z stages

Compact stages are small footprint single or triple axis stages and are ideally suited for applications with limited space. They are available in a Z only or XYZ configuration.

Standard XY and Z stages

Standard XYZ stages are large bore stages which incorporate triple axis motion in a single stage. The XY travels are micrometer driven and guided by cross roller bearing slides. Caburn-MDC micrometers have unique laser etched plus-minus scales that indicate positive or negative port displacement. The Z axis employs a handwheel and worm gear reduction drive mechanism with displacement measured along the stage's frame mounted scale.

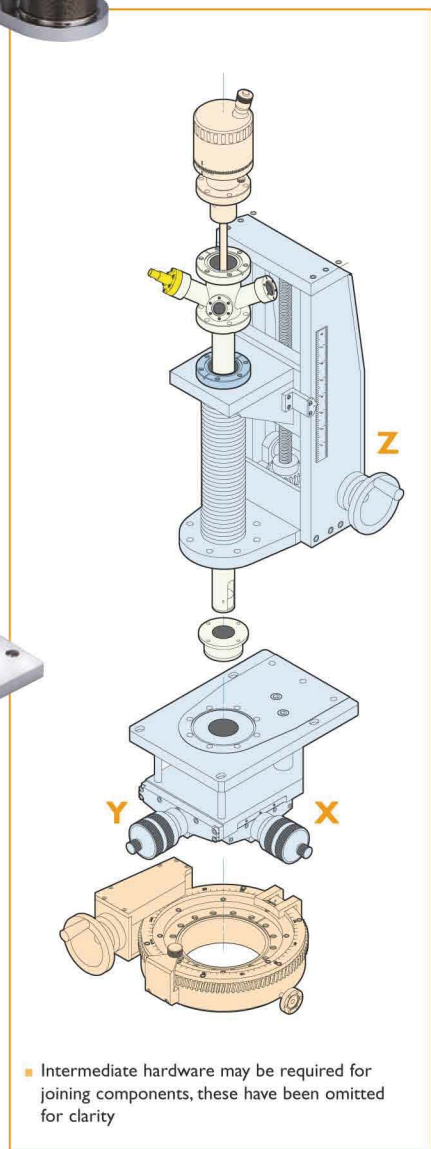


Rotatable axis stages

Rotatable axis stages replace conventional rotatable mounting tables previously offered by Caburn-MDC. They provide 360° positioning with greater precision, control and ease of use. Rotatable stages are constructed with worm gear drive



mechanisms which offer substantial mechanical advantage over non-gearred designs, High torque stepper motors are also available for these stages. Caburn-MDC rotatable stages can be used to rotate heavy samples or sample support apparatus and structures. Two spring energized PTFE face seals are at the heart of the rotatable stage's sealing mechanism. With provision for differential pumping between the seals, these rotatable stages can be used in UHV environments with bakeout temperatures as high as 200°C.



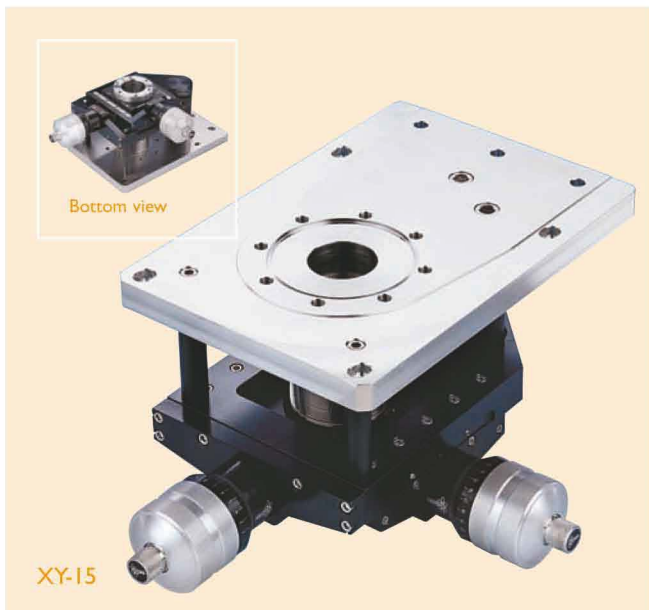
■ Intermediate hardware may be required for joining components, these have been omitted for clarity

Caution

Anodized aluminium finishes will begin to discolour when baked in excess of 150°C. This is only a cosmetic condition which does not impact performance or reliability.

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UHV Series

Features

- V-Plane® building block component
- Plus or minus 13 and 25mm off centre XY motion
- 38 to 102mm bore diameters
- Manual or motorized actuator
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C
- CF port mounts

Description

Caburn-MDC's V-Plane® modular stages are building block components designed to streamline the implementation of a sample manipulation system. They can be used as stand alone components or combined with other V-Plane® instruments to attain customized motion and manipulation solutions.

V-Plane® dual axis XY stages are micrometer driven and guided by cross roller bearing slides. Micrometers have unique laser etched plus-minus scales that indicate positive or negative port displacement. Caburn-MDC V-Plane® dual axis XY stages provide precise motion and manipulation of samples inside ultra-high vacuum environments. Dual axis XY stages can be stacked with V-Plane® single axis Z stages and also fitted with guide tubes to further expand their capabilities.

Specifications

Material

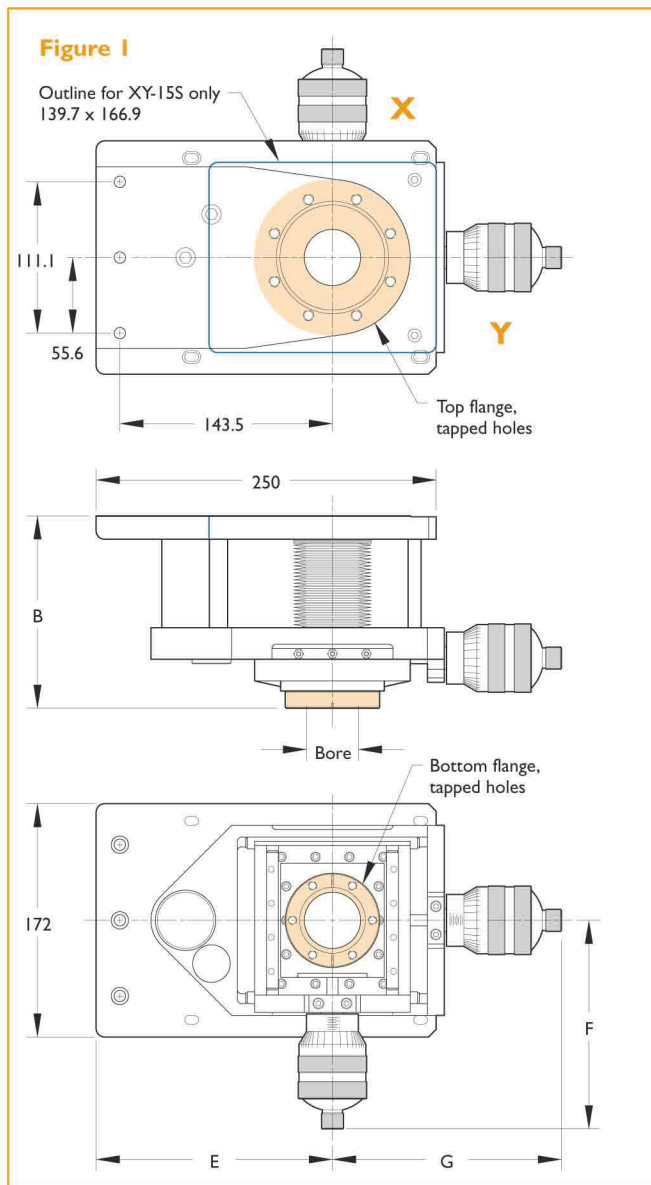
Flange	304 Stainless steel
Actuator body	Anodized aluminium
Shaft seal	AM 350 welded bellows

Vacuum range	1.3x10 ⁻¹¹ mbar
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Temperature range¹	-20°C to 230°C
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Weight and dimensions	See table
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¹ UHV units are bakeable to 30°C maximum when motorized



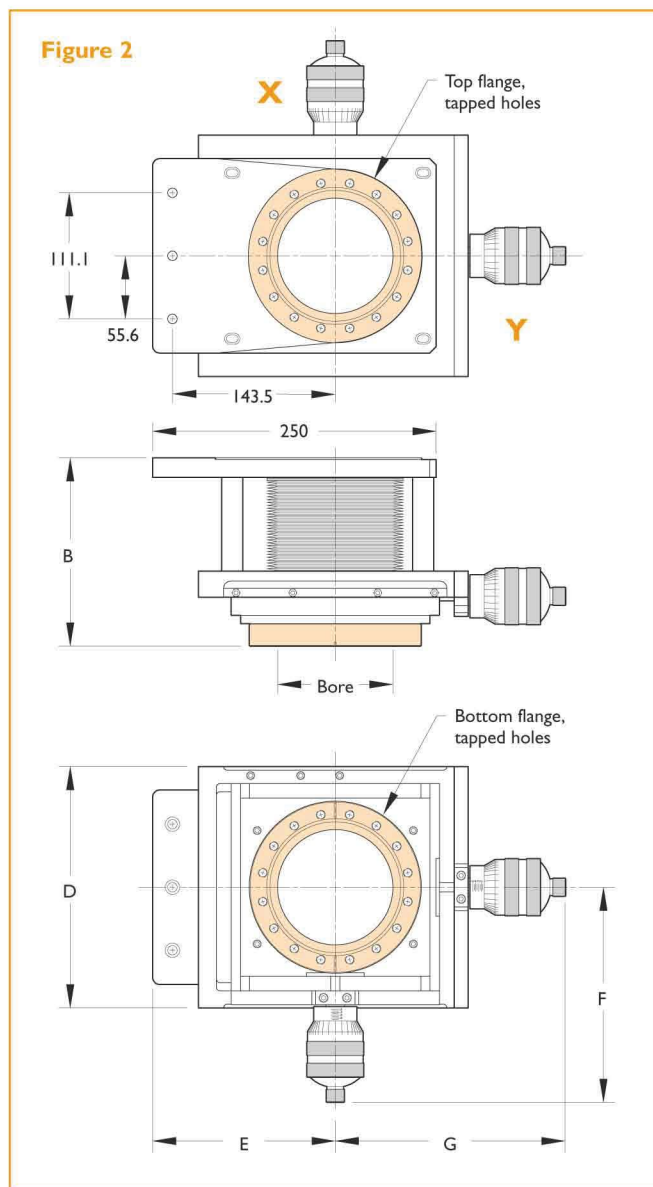
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Bore size	Travel ¹ ±	Figure	Top flange	Bottom flange	B	D	E	F	G	H	J	Wt kg	Reference	Part number
38.1	12.7	1	DN40CF	DN40CF	127	–	83	146	157	194	209	10.9	E-XY-155*	677021
38.1	12.7	1	DN63CF	DN40CF	143	–	161	146	157	194	209	11.4	E-XY-15	677009
63.5	12.7	1	DN63CF	DN63CF	146	–	161	165	175	210	224	12.7	E-XY-25	677010
63.5	12.7	1	DN63CF	DN100CF	149	–	161	165	175	230	244	13.2	E-XY-26	677018
63.5	25.4	1	DN63CF	DN63CF	168	–	161	232	248	235	251	12.7	E-LXY-25	677013
63.5	25.4	1	DN63CF	DN100CF	171	–	161	232	248	256	269	13.2	E-LXY-26	677019
101.6 ³	12.7	2	DN63CF	DN100CF	165	213	161	184	194	231	244	13.6	E-XY-40	677011
101.6	12.7	2	DN100CF	DN100CF	165	213	161	184	194	231	244	14.5	E-XY-44	677012
101.6 ³	25.4	2	DN63CF	DN100CF	184	213	161	254	267	256	269	14.5	E-LXY-40	677014
101.6	25.4	2	DN100CF	DN100CF	184	224	161	254	267	256	269	15.4	E-LXY-44	677015

³ 101.6 bore diameter is reduced to 63.5 at DN63CF top flange
⁴ Match sample support structure and stage bore for maximum XY travel
 * E-XY-155 is a stand alone model unsuitable for combination with Z only columns

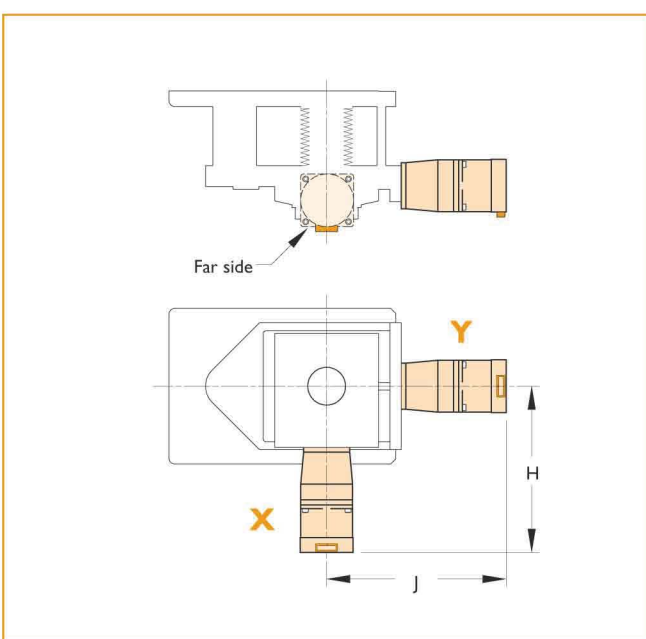


Motorization options

Option -01
In-line stepper motor

Motorization ¹	Motor specification	Add-on weight kg	Option number
XY in-line stepper	D	1.4	-01

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above
 For example: **670020-01**
 For total unit weight, add option weight to component weight



All dimensions are nominal in millimetres unless specified - Weights given are approximate



XY-15

UHV Series

Features

- V-Plane® building block component
- 152 to 914mm Z-axis travel
- 38 to 102mm bore diameters
- Manual or motorized actuator
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C
- CF port mounts

Description

Caburn-MDC's V-Plane® modular stages are building block components designed to streamline the implementation of a sample manipulation system. They can be used as stand alone components or combined with other V-Plane® instruments to attain customized motion and manipulation solutions. V-Plane® single axis stages employ handwheel and worm gear reduction drive mechanisms with linear displacement measured along the stage's frame mounted scale. Z axis linear travels of up to 914.4mm are available. Caburn-MDC V-Plane® stages provide precise sample motion and manipulation of samples inside ultra-high vacuum environments. Caburn-MDC recommends that all long-stroke 38.1mm diameter bore Z axis V-Plane® stages, with linear travels exceeding 150mm, be fitted with guide tubes.

Specifications

Material

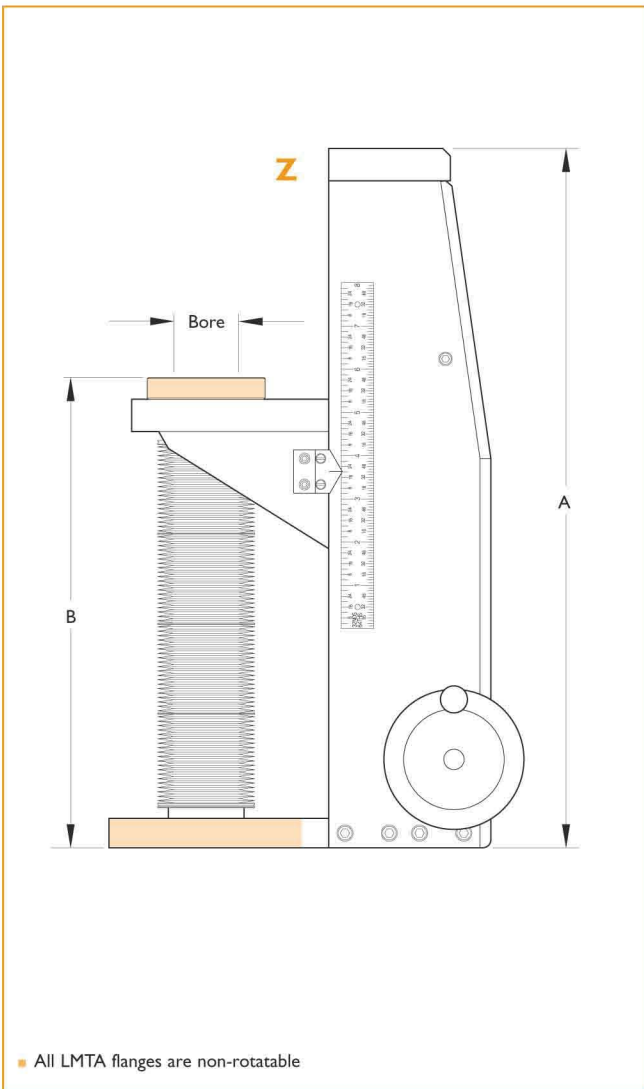
Flange	304 Stainless steel
Actuator body	Anodized aluminium
Shaft seal	AM 350 welded bellows

Vacuum range 1.3×10^{-11} mbar

Temperature range¹ -20°C to 230°C

Weight and dimensions See table

¹ UHV units are bakeable to 30°C maximum when motorized



■ All LMTA flanges are non-rotatable

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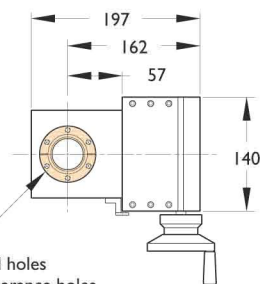


Single axis Z stage

UHV Series

CF 230°C

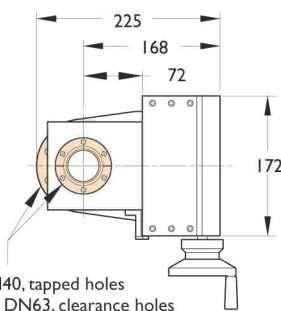
End view 1



DN40CF

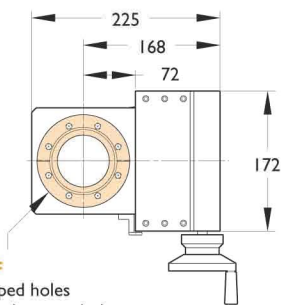
Top – tapped holes
Bottom – clearance holes

End view 2



Top – DN40, tapped holes
Bottom – DN63, clearance holes

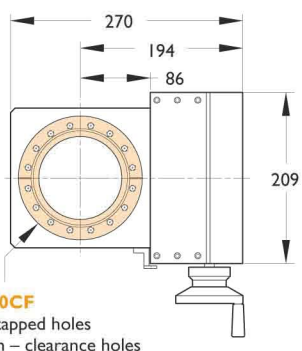
End view 3



DN63CF

Top – tapped holes
Bottom – clearance holes

End view 4



DN100CF

Top – tapped holes
Bottom – clearance holes

Bore size	Z Travel	End view	A	Min	B	Max	Wt kg	Reference	Part number
38.1	152.4	1	335	170.1	–	322.6	17	E-LMTA-1506S	665546
38.1	203.2	1	386	170.1	–	373.4	19	E-LMTA-1508S	665547
38.1	304.8	1	544	226.1	–	530.9	23	E-LMTA-1512S	665548
38.1	406.4	1	704	284.5	–	690.9	26	E-LMTA-1516S	665549
38.1	609.6	1	1016	401.3	–	1011.0	34	E-LMTA-1524S	665550
38.1	914.4	1	1501	574.0	–	1988.4	45	E-LMTA-1536S	665551
38.1	152.4	2	361	193.0	–	345.4	18	E-LMTA-1506	665534
38.1	203.2	2	412	193.0	–	396.2	20	E-LMTA-1508	665535
38.1	304.8	2	513	193.0	–	497.8	24	E-LMTA-1512	665536
38.1	406.4	2	666	243.8	–	650.2	27	E-LMTA-1516	665537
38.1	609.6	2	970	345.4	–	955.0	35	E-LMTA-1524	665538
38.1	914.4	2	1428	497.8	–	1412.2	45	E-LMTA-1536	665539
63.5	152.4	3	356	193.0	–	345.4	20	E-LMTA-2506	665558
63.5	203.2	3	406	193.0	–	396.2	22	E-LMTA-2508	665559
63.5	304.8	3	544	228.6	–	533.4	26	E-LMTA-2512	665560
63.5	406.4	3	678	261.6	–	668.0	30	E-LMTA-2516	665561
63.5	609.6	3	950	330.2	–	939.8	37	E-LMTA-2524	665562
63.5	914.4	3	1356	431.8	–	1346.2	48	E-LMTA-2536	665563
101.6	152.4	4	356	195.6	–	348.0	23	E-LMTA-4006	665570
101.6	203.2	4	406	195.6	–	398.8	25	E-LMTA-4008	665571
101.6	304.8	4	508	195.6	–	500.4	28	E-LMTA-4012	665572
101.6	406.4	4	635	223.5	–	629.9	32	E-LMTA-4016	665573
101.6	609.6	4	894	276.9	–	878.8	39	E-LMTA-4024	665574
101.6	914.4	4	1278	355.6	–	1270.0	50	E-LMTA-4036	665575

Motorization options

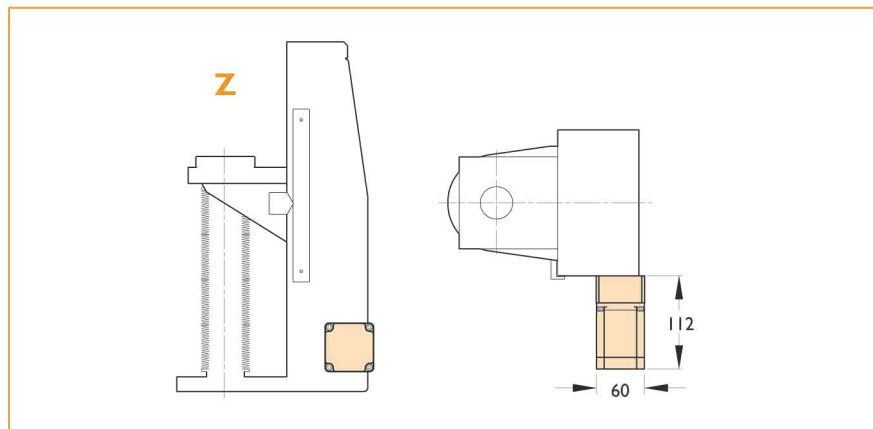
Option -01
In-line stepper motor



Motorization ¹	Motor Specification	Add-on weight kg	Option number
Z In-line stepper	F	1.4	-01

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above. For example: **665546-01**

For total unit weight, add option weight to component weight



All dimensions are nominal in millimetres unless specified - Weights given are approximate



Accessory ports

E-GT-1506

UHV Series

Features

- V-Plane® building block component
- Used with 38mm bore Z-axis V-Plane® stages with greater than 152mm travel
- Bakeable to 230°C
- DN16CF access ports
- Linear bearing guide tube support
- Includes 6.4 and 9.5mm diameter shaft rotary bearing supports

Description

Caburn-MDC guide tubes provide bellows support for V-Plane® manipulator stages fitted with long-stroke bellows as well as secondary rotary and linear motion feedthroughs installed on the stage. Guide tubes mount directly onto V-Plane® manipulator stages fitted with DN40CF port flanges with a bore clearance suitable for the 28.6mm guide tube diameter. They are supplied with both rotary and linear bearing supports. Rotary bearings for 6.4 and 9.5mm diameter shafts are included. For applications requiring sample heating, cooling, high voltage biasing, thermocouple temperature measurements, etc., the guide tube tip has been fitted with two slots 180° apart through which wires or tubes can be fed. Four DN16CF and one DN40CF flange accessory ports allow the installation of up to five additional accessory components. When a manipulator stage is not under vacuum or is let up to air with the bellows in some state of compression, the compressed bellows' spring force may force the bellows to shift off-axis at some point during its travel. The off-axis shift could be sudden and violent causing injury or damage to the bellows.

Caburn-MDC recommends that all long-stroke 38.1mm diameter bore Z axis V-Plane® stages, with linear travels exceeding 150mm, be fitted with guide tubes.

Note The linear bearing support requires a 63.5 bore in any mating component.

Specifications

Material

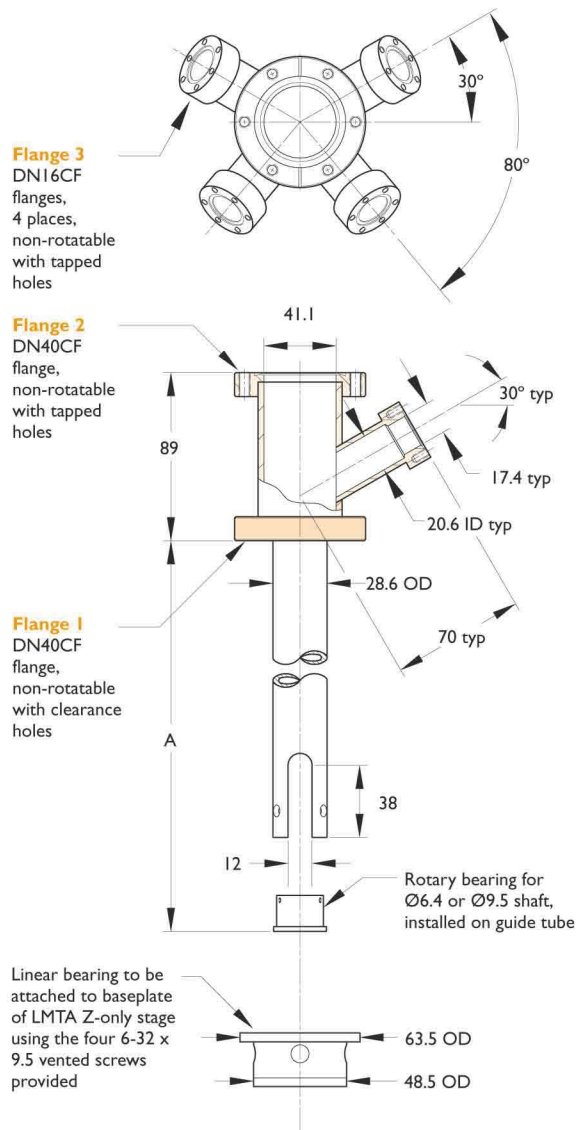
Flange 304 Stainless steel

Bearings 300 Series stainless steel with Dicronite® coating

Vacuum range 1×10^{-11} mbar

Temperature range -200°C to 230°C

Weight and dimensions See table



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UHV Series	
CF	230°C

A	Use ² with	Flange 1	Flange 2	Flange 3	Wt kg	Reference	Part number
495	665534	DN40	DN40	DN16	4	E-GT-1506	665582
546	665535	DN40	DN40	DN16	4	E-GT-1508	665583
648	665536	DN40	DN40	DN16	4	E-GT-1512	665584
800	665537	DN40	DN40	DN16	5.5	E-GT-1516	665585
1105	665538	DN40	DN40	DN16	5.5	E-GT-1524	665586
1562	665539	DN40	DN40	DN16	6.5	E-GT-1536	665587
Feedthrough multi-port assembly without guide tube						E-GTFA	1603051

² Use with 38.1 bore single axis Z stages

Typical guide tube application



The DN63CF base flange on V-Plane® stages with 38.1mm bore is fitted with a counterbore and four tapped holes. This counterbore and tapped holes provide the means of attaching the guide tube's linear bearing support.



The guide tube extends into vacuum beyond the linear bearing support. The rotary bearing radial screws, located at guide tube tip, may need removing to properly fit guide tube through linear bearing housing.



The linear bearing support is shown fastened to the DN63CF base flange of a V-Plane® single axis Z stage using four vented stainless steel socket head screws supplied with each guide tube assembly. The linear bearing support requires a 63.5mm bore in any mating component.



Other motion products may be attached to the guide tube's main flange. Shown here is a precision rotary-linear instrument found in Section 7.1.



Six threaded studs are fastened to the V-Plane® Z axis stage top flange prior to inserting the guide tube through the top flange and bellows.



The rotary-linear drive shaft extends into vacuum beyond the rotary bearing support on the guide tube tip.



The guide tube assembly is secured to the V-Plane® Z axis stage top flange using the nuts and washers supplied.



Four mini CF ports can be used for the input or output of sample voltage biasing as well as thermocouple and other instrumentation signals. Insulated wires exit into vacuum through slots on guide tube tip.

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Single axis

Compact Z stage



E-LMT-051

E-LMT-151

E-LMT-254

Description

Compact single axis Z stages have smaller footprints than V-Plane® and other stages. They are a practical and economical solution for applications with limited space. Models with 25.4 to 101.6mm of linear travel and bore diameters from 12.7 to 63.5mm are available. The instrument's precision drive employs a fine pitch lead screw mechanism. Approximate positions can be measured along a graduated machinist's scale with both inch and millimetre units included. Top and bottom port flanges are available in DN16CF, DN40CF and DN63CF compatible, tapped CF metal seal flanges. Edge welded stainless steel bellows are used to connect the port flanges on all compact stages.

Specifications

Material

Flange/body 304 Stainless steel

Bellows AM 350

Vacuum range 1×10^{-11} mbar

Temperature range¹ -20°C to 230°C

Weight and dimensions See table

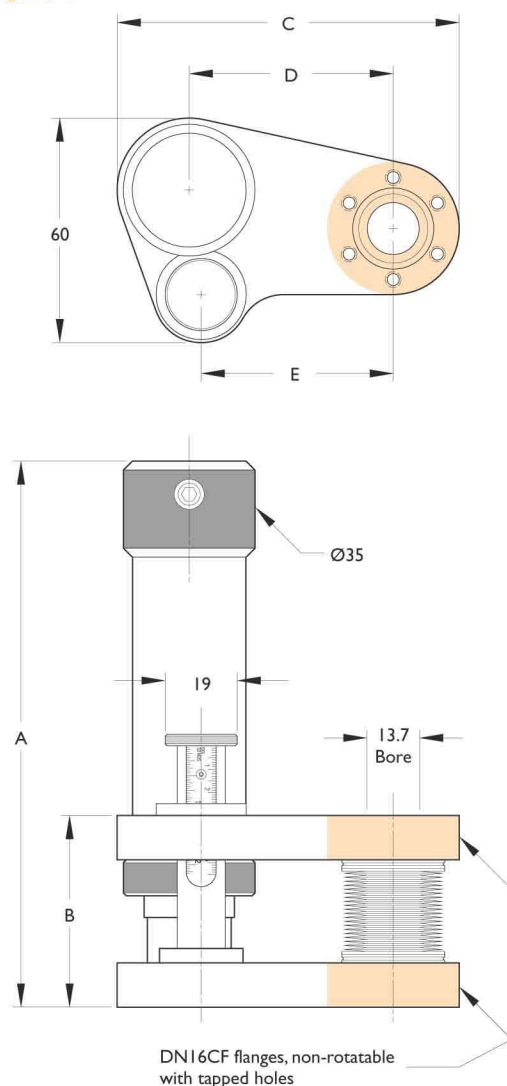
¹ UHV units are bakeable to 30°C when motorized

UHV Series

Features

- 25 to 102mm Z-axis travel
- 13, 38 and 63mm bore diameters
- Manual or motorized actuator
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C¹
- CF port mounts

Figure 1



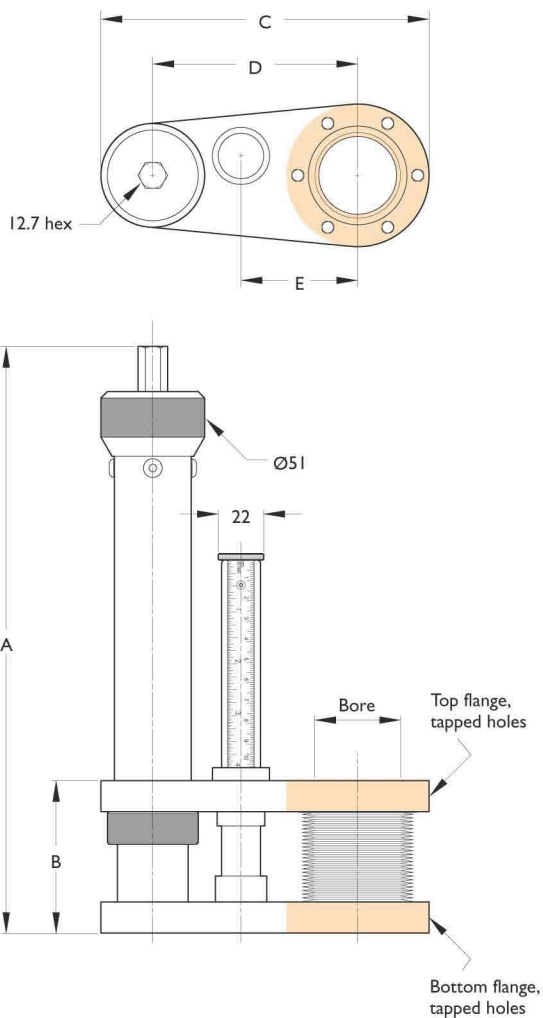
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Bore size	Linear travel	Flange size	Fig	A		B		C	D	E	F	Wt G	kg	Reference	Part number
				Min	Max	Min	Max								
38.1	25.4	DN40CF	2	180.8	206.2	55.9	81.3	161	100	57	219	212	4	E-LMT-151	665507
38.1	50.8	DN40CF	2	180.8	231.6	55.9	106.7	161	100	57	244	212	4	E-LMT-152	665509
38.1	101.6	DN40CF	2	278.1	374.7	74.9	176.5	161	100	57	387	133	5	E-LMT-154	665511
38.1	152.4	DN40CF	2	349.3	501.7	82.6	235.0	161	100	57	514	212	6	E-LMT-156	665521
63.5	25.4	DN63CF	2	180.8	206.2	55.9	81.3	207	117	73	219	250	4	E-LMT-251	665525
63.5	50.8	DN63CF	2	180.8	231.6	55.9	106.8	207	117	73	244	250	4	E-LMT-252	665526
63.5	101.6	DN63CF	2	273.1	374.7	74.9	176.5	207	117	73	387	250	5	E-LMT-254	665527

Figure 2



Motorization options

Option -01
Side mount stepper motor

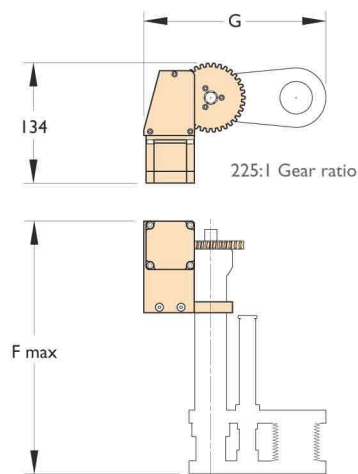


Motorization ¹	Motor specification	Add-on weight kg	Option number
Z Side mount	E	1.4	-01

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above

For example: **665518-01**

For total unit weight, add option weight to component weight



All dimensions are nominal in millimetres unless specified - Weights given are approximate



UHV Series

Features

- UHV-compatible
- Edge welded bellows
- 14mm clear bore
- Bakeable to 230°C
- Z Travel 25mm or 50mm
- Parallelism of flanges: $\pm 0.25\text{mm/cm}$
- Resolution: $1 \times 360^\circ \text{ turn} = 1\text{mm}$
- Both flanges DN16CF tapped M4

Description

This type of UHV-compatible Z-shifter for applications where space is limited. The MZ types are designed for long service life and high degrees of constructional stability.

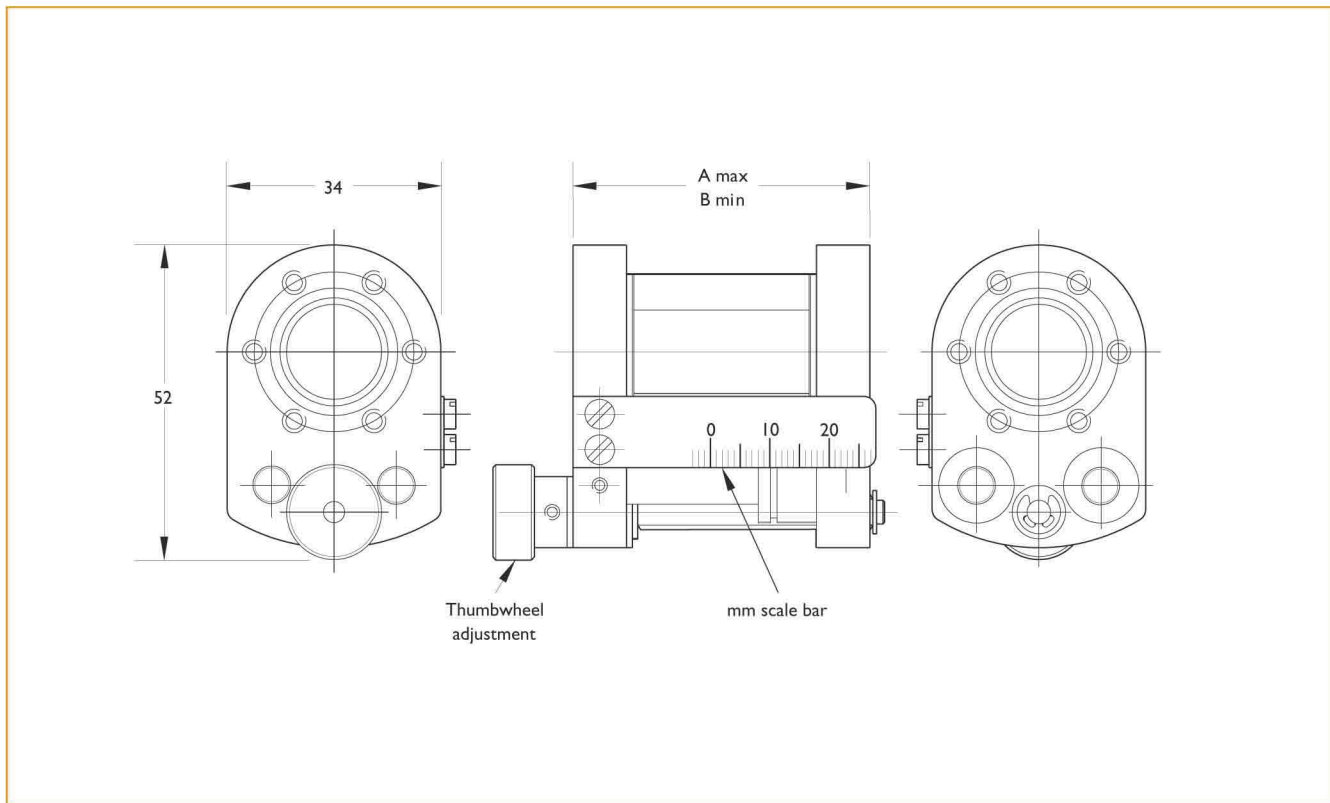
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UHV Series	
CF	230°C

Description	Flange	Travel	Min	Max	Wt kg	Reference	Part number
Mini-Z-Shift	DN16CF	25.4	55	30	0.3	MZI6-25	1601000
Mini-Z-Shift	DN16CF	50.8	86	36	0.4	MZI6-50	1601001



All dimensions are nominal in millimetres unless specified - Weights given are approximate

Triple axis

Compact XYZ stage



PSM-1504

Description

Compact triple axis XYZ stages have smaller footprints than V-Plane® stages. They are a practical and economical solution for applications with limited space. Models with 50 and 100mm of linear travel and bore diameter of 38.1 and 63.5mm are available. The instruments precision Z drive employs a fine pitch lead screw mechanism with approximate positions measured along a graduated machinist's scale with both inch and millimetre units included. The XY axes are micrometer driven and guided by cross roller bearing slides. Micrometers have unique laser-etched plus-minus scales that indicate positive or negative port displacement. Caburn triple axis XY stages provide precise motion and manipulation of samples inside ultra-high vacuum environments. Top and bottom port flanges are available in DN40 and DN63-compatible, tapped CF metal seal flanges. Edge welded stainless steel bellows are used to connect the port flanges on all XYZ compact stages.

Specifications

Material

Flange/Body 304 Stainless steel

Bellows AM 350

Vacuum range 1×10^{-11} mbar

Temperature range¹ -20°C to 230°C

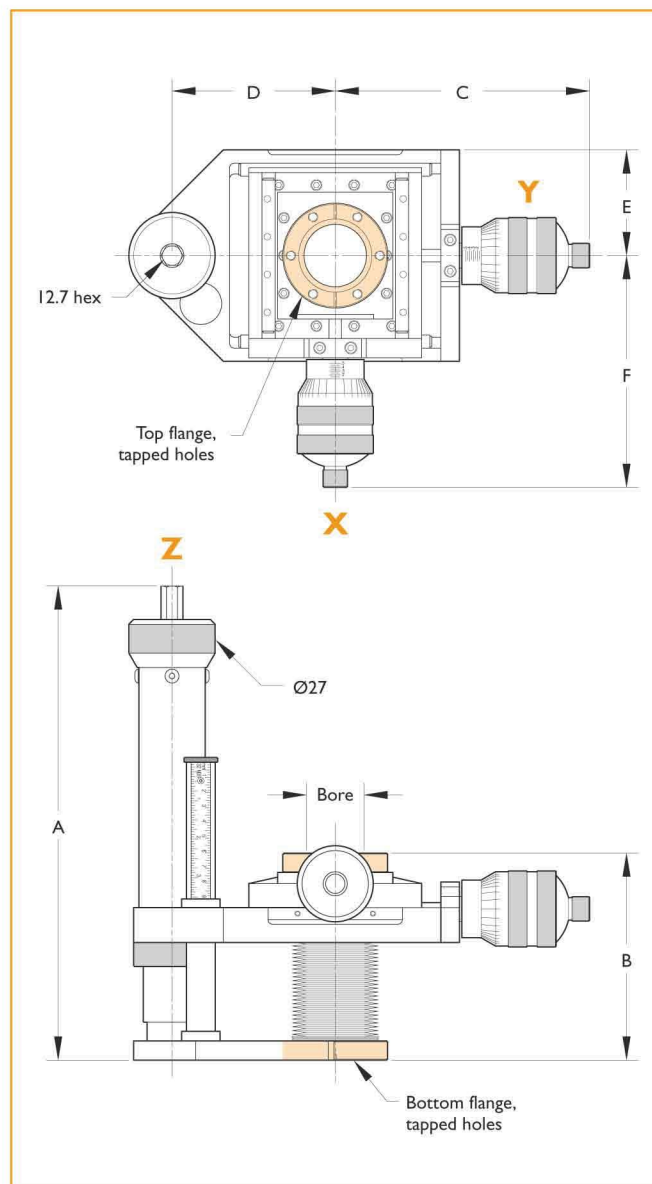
Weight and dimensions See table

¹ UHV units are bakeable to 30°C when motorized

UHV Series

Features

- 50 or 102mm Z-axis travel
- Plus or minus 13mm off-centre XY motion
- 38 and 63mm bore diameters
- Manual or motorized actuators
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C¹
- CF port mounts



All dimensions are nominal in millimetres unless specified - Weights given are approximate

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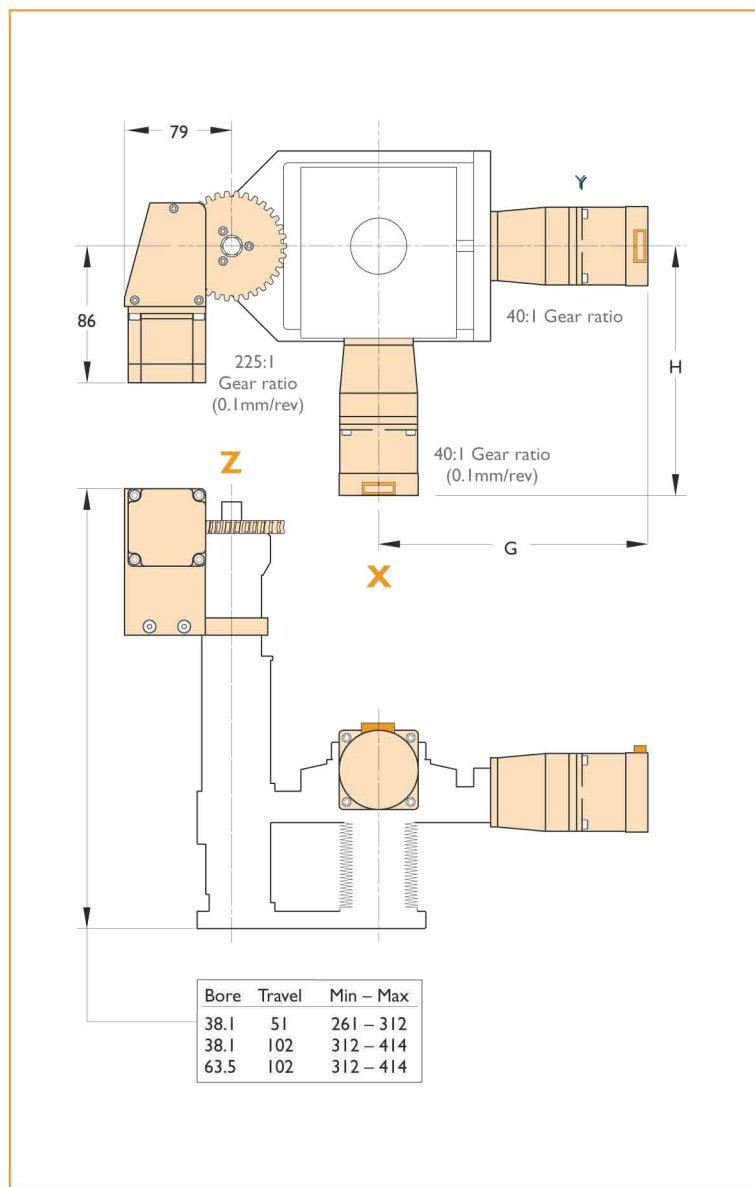
Triple axis

Compact XYZ stage



Bore size	± XY travel	Z Travel	Flange	A		B			C	D	E	F	G	H	Wt kg	Reference	Part number
				Min	Max	Min	Max	Min									Max
38.1	13	51	DN40CF	248	299	124	175	164	105	70	150	216	198	11	E-PSM-1502	678002	
38.1	13	102	DN40CF	299	401	124	226	164	105	70	150	216	198	11	E-PSM-1504	678003	
63.5	13	102	DN63CF	299	401	147	249	178	133	86	162	228	209	13	E-PSM-2504	678007	

Motorization options



Option -01 XY motorization



Option -02 Z motorization



Motorization ¹	Motor specification	Add-on weight kg	Option number
XY In-line stepper	D	1.4	-01
Z Side mount	C	1.4	-02

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above

For example: **678002-01-02**

For total unit weight, add option weight to component weight

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Triple axis

Standard XYZ stage



PSMA-1506

Description

Standard XYZ stages are large bore stages which incorporate triple axis motion in a single stage. The XY travels are micrometer driven and guided by cross roller bearing slides. Caburn-MDC micrometers have unique laser etched plus-minus scales that indicate positive or negative port displacement and are available with either 12.7 or 25.4mm of linear XY displacement. The Z axis employs a handwheel and worm gear reduction drive mechanism with displacement measured along the stage's frame mounted machinist's scale. Z axis linear travels of up to 304.8mm are available. Caburn-MDC standard stages provide precise sample motion and manipulation of samples inside ultra-high vacuum environments.

Specifications

Material

Flange	304 Stainless steel
Actuator body	Anodized aluminium
Bellows	AM 350

Vacuum range 1×10^{-11} mbar

Temperature range¹ -20°C to 230°C

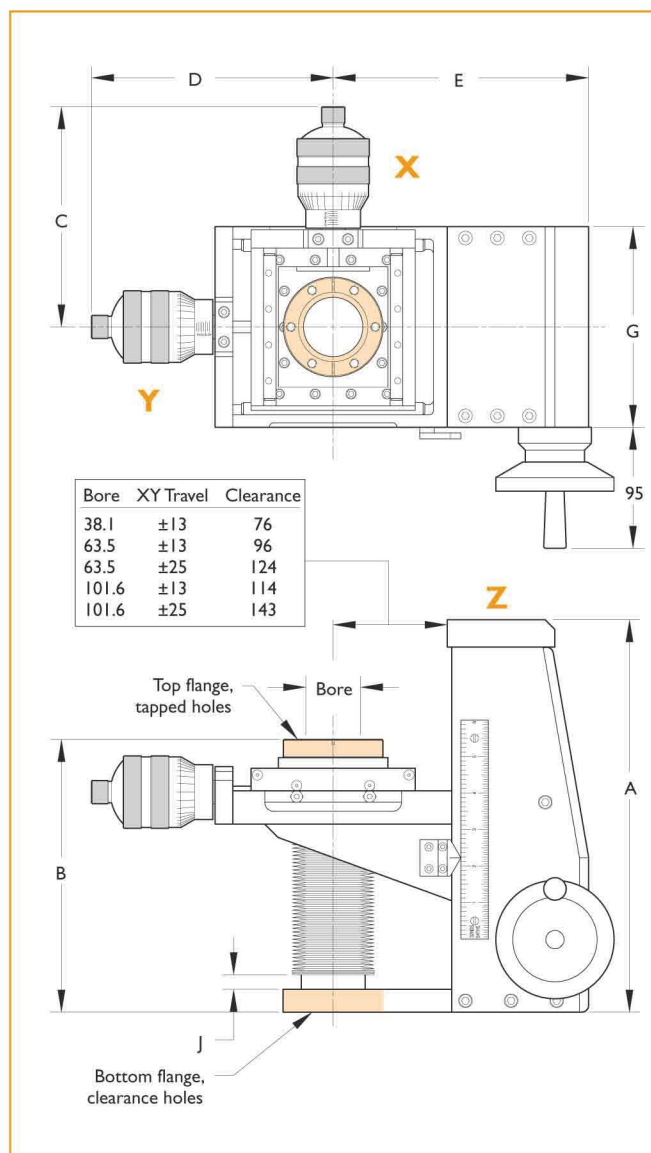
Weight and dimensions See table

¹ UHV units are bakeable to 30°C when motorized

UHV Series

Features

- 102 to 304mm Z-axis travel
- Plus or minus 13 and 25mm off-centre XY motion
- 38, 63 and 102mm bore diameters
- Manual or motorized actuators
- UHV-compatible materials
- Welded bellows seal
- Bakeable to 230°C¹
- CF port mounts



All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Triple axis

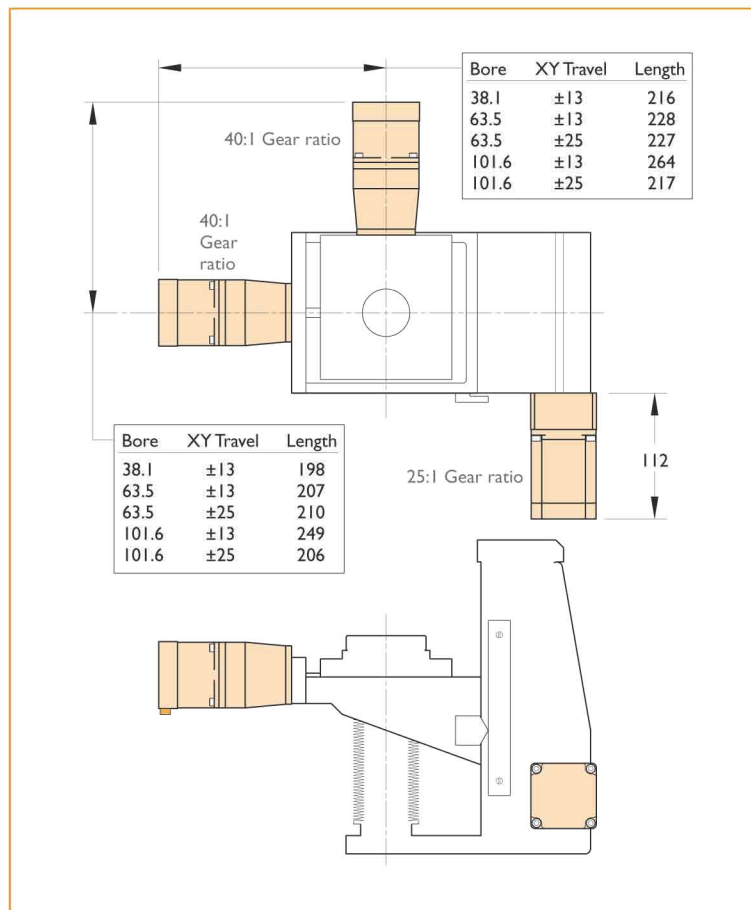
Standard XYZ stage



Triple axis

Bore size	± XY Travel	Z Travel	Flange	A	Min	B - Max	C	D	E	G	J	Wt kg	Reference	Part number
38.1	13	102	DN40CF	274	177	- 279	150	164	178	140	32	9	E-PSMA-1504	678030
38.1	13	152	DN40CF	325	177	- 329	150	164	178	140	32	12	E-PSMA-1506	678031
38.1	13	203	DN40CF	404	208	- 411	150	164	178	140	32	19	E-PSMA-1508	678032
38.1	13	305	DN40CF	564	266	- 571	150	164	178	140	32	21	E-PSMA-1512	678033
63.5	13	102	DN63CF	297	210	- 312	162	178	196	181	57	20	E-PSMA-2504	678038
63.5	13	152	DN63CF	348	210	- 363	162	178	196	181	57	21	E-PSMA-2506	678039
63.5	13	203	DN63CF	406	216	- 419	162	178	196	181	57	22	E-PSMA-2508	678040
63.5	13	305	DN63CF	513	223	- 528	162	178	196	181	57	23	E-PSMA-2512	678041
63.5	25	102	DN63CF	315	228	- 330	206	225	229	187	57	22	E-PSML-2504	678014
63.5	25	152	DN63CF	366	229	- 381	206	225	229	187	57	23	E-PSML-2506	678015
63.5	25	203	DN63CF	429	236	- 439	206	225	229	187	57	24	E-PSML-2508	678016
63.5	25	305	DN63CF	526	236	- 541	206	225	229	187	57	25	E-PSML-2512	678017
101.6	13	102	DNI00CF	315	228	- 330	184	195	252	213	64	22	E-PSMA-4004	678046
101.6	13	152	DNI00CF	371	236	- 388	184	195	252	213	64	23	E-PSMA-4006	678047
101.6	13	203	DNI00CF	429	241	- 444	184	195	252	213	64	24	E-PSMA-4008	678048
101.6	13	305	DNI00CF	533	246	- 551	184	195	252	213	64	25	E-PSMA-4012	678049
101.6	25	102	DNI00CF	335	246	- 348	254	267	264	224	64	24	E-PSML-4004	678022
101.6	25	152	DNI00CF	389	249	- 401	254	267	264	224	64	25	E-PSML-4006	678023
101.6	25	203	DNI00CF	450	259	- 462	254	267	264	224	64	26	E-PSML-4008	678024
101.6	25	305	DNI00CF	551	259	- 564	254	267	264	224	64	27	E-PSML-4012	678025

Motorization options



Option -01 XY motorization



Option -02 Z motorization



Motorization ¹	Motor specification	Add-on weight kg	Option number
XY In-line stepper	D	1.3	-01
Z In-line stepper	F	1.3	-02

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above

For example: **678026-01-02**

For total unit weight, add option weight to component weight

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Rotatable axis

360° Adjustable stage

Rotatable axis



E-RMTG-450

Description

Rotatable axis stages replace conventional rotatable mounting tables previously offered by Caburn-MDC. They provide 360° positioning with greater precision, control and ease of use. Rotatable stages are constructed with worm gear drive mechanisms which offer substantial mechanical advantage over non-g geared designs, a feature which allows effortless manual operation, even under a full vacuum load. High torque stepper motors are also available for these stages.

Caburn-MDC rotatable stages can be used to rotate heavy samples or sample support apparatus and structures. Two spring energized PTFE face seals are at the heart of the rotatable stage's sealing mechanism. With provision for differential pumping between the seals, these rotatable stages can be used in UHV environments with bakeout temperatures as high as 200°C.

Specifications

Material

Flange	304 Stainless steel
Actuator body	Anodized aluminium
Gasket seals	PTFE

Vacuum range

HV Applications	1×10^{-8} mbar
UHV Applications	Differentially pumped to 1×10^{-2} mbar

Temperature range¹ -20°C to 200°C

Weight and dimensions See table

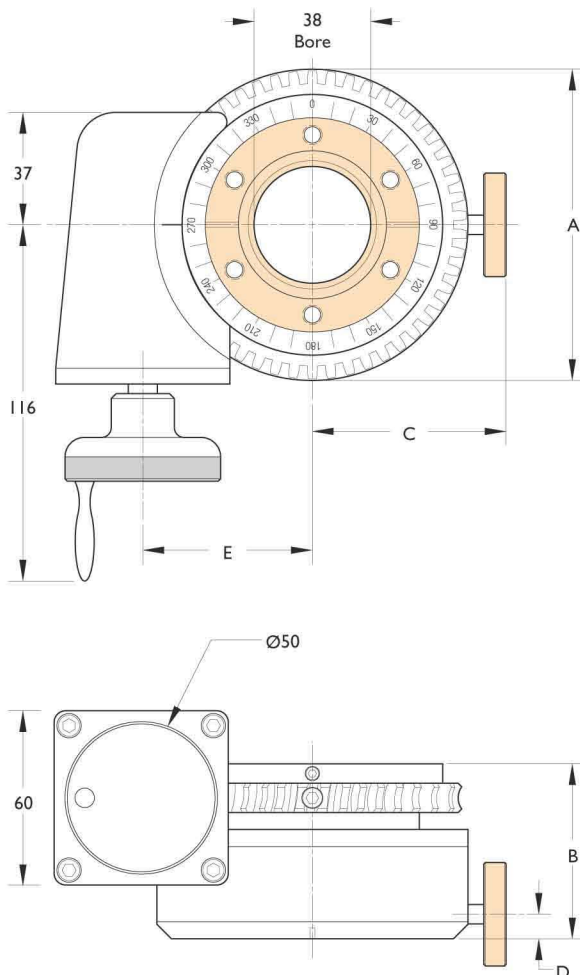
¹ UHV units are bakeable to 30°C when motorized

HV Series

Features

- 360° continuous rotary positioning
- Manual or motorized actuator
- Rotary position lock
- Differentially pumped, dual PTFE elastomer seals
- UHV-compatible materials
- Bakeable to 200°C¹
- CF port mounts

Figure 1



■ Both top and bottom flanges have tapped holes

All dimensions are nominal in millimetres unless specified - Weights given are approximate

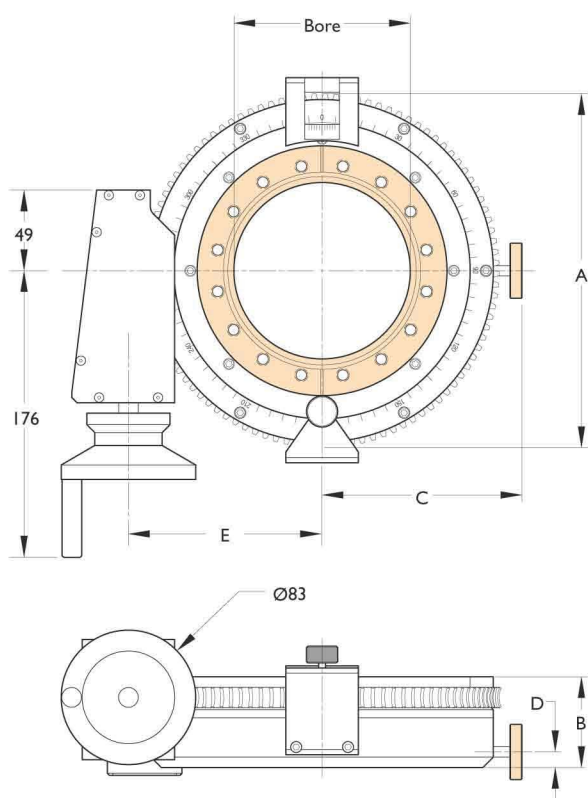
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HV Series	
CF	200°C

Bore size	Flange size	Fig	A	B	C	D	E	Wt kg	Reference	Part number
38.1	DN40	1	102	57	63	8	55	5	E-RMTG-275	665421
63.5	DN63	2	173	56	114	11	68	9	E-RMTG-450	665422
108.0	DN100	2	212	56	122	10	119	12	E-RMTG-600	665423
158.8	DN160	2	311	62	159	10	172	18	E-RMTG-800	665424
209.6	DN200	2	324	62	184	10	178	25	E-RMTG-1000	665425

Figure 2



Both top and bottom flanges have tapped holes

Motorization options

Option -01
 Side mount stepper motor

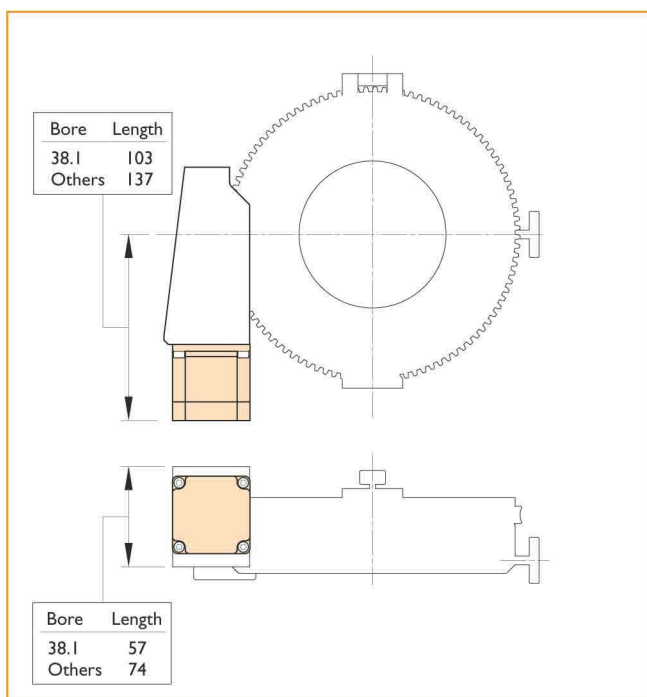


Motorization ¹	Motor specification	Add-on weight kg	Option number
Z Side mount	E	1.4	-01

¹ When ordering motorized options, add the option number and price to the desired UHV or HV component part number listed above

For example: **665518-01**

For total unit weight, add option weight to component weight



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AG-150

UHV Series

Features

- 10° horizontal tilt
- 3.2mm axial displacement
- Micrometer actuators with position lock
- Formed bellows seal
- Bakeable to 200°C
- CF port mounts
- Includes magnetic transporter extension kit

Description

Port aligners are adjustable port flange interfaces that provide motion instruments with angular tilt and axial shift. They can also be used to correct mate-up between components with minor alignment imperfections.

Load-lock gimbals are unique port alignment instruments specifically designed for the precision alignment of magnetically coupled transporters as used with circular and rectangular entry load-lock systems. Load-lock gimbal port aligners are fitted with precision micrometer adjustments for both horizontal tilt (above and below a horizontal plane of travel) and side to side parallel axis displacement. Load-lock gimbals are intended for horizontal installation with its tilt adjustment micrometer at a bottom 6 o'clock position. They include a stainless steel formed bellows adaptor which mates between the magnetic transporter and the sample staging chamber. A transporter shaft extension kit to compensate for the increase in the transporters overall length is also included.

Specifications

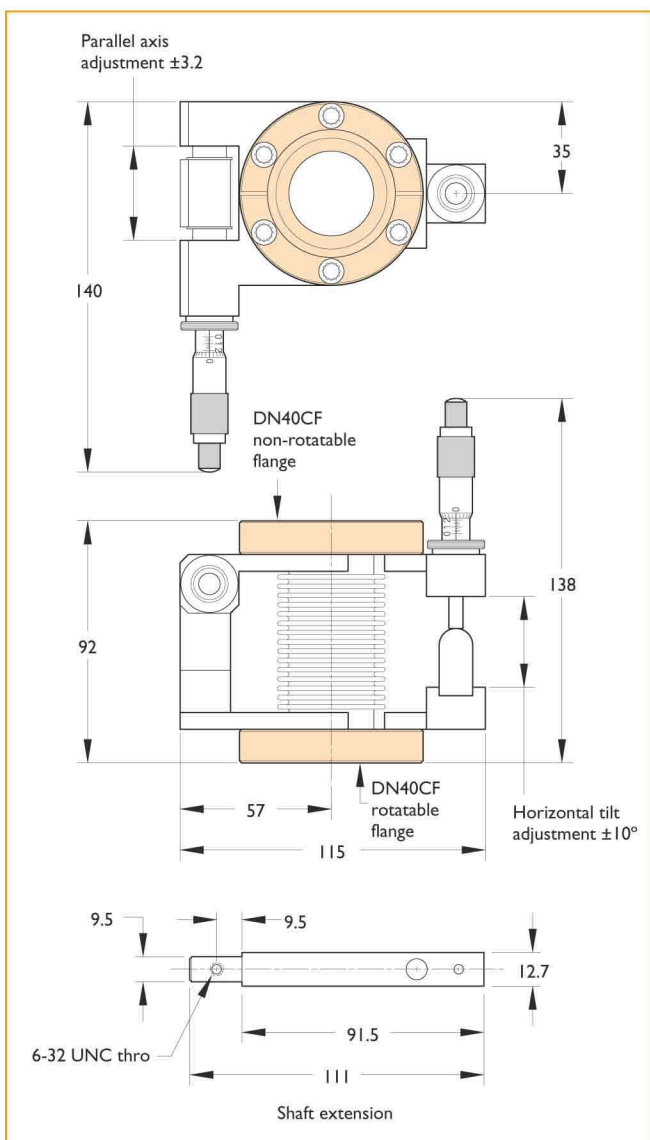
Material

Flange	304 Stainless steel
Body	Anodized aluminium
Bellows, formed	316 Stainless steel

Vacuum range 1×10^{-11} mbar

Temperature range -20°C to 200°C

Weight and dimensions See table



Description	Wt kg	Reference	Part number
Alignment gimble	1	AG-150	665300

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Port aligners

Standard gimbal



UHV Series

Features

- Independent planes provide 15° tilt about X and Y axes
- Tilt position lock for each plane
- Micrometer or screw adjustment actuators
- UHV-compatible materials
- Bakeable to 230°C with screw type actuators
- Designed for use with CF port mount formed bellows adaptors

Description

The standard gimbal geometry consists of three parallel and equidistant aluminium plates interconnected in a universal joint geometry. The top and bottom plates are equally spaced from the centre plate and held in a parallel and neutral position with eight coil springs. Top and bottom plates are fitted with precision micrometers used to produce a 15° tilt about the centre plates X and Y axis respectively. When all adjustment mechanisms are disengaged the springs force the plates back to a neutral and parallel position. Economical screw type adjustments are also available in place of micrometers.

Standard gimbals are designed for use with Caburn-MDC formed bellows flexible adaptors with 50.8 and 31.8mm bore diameters. Flexible bellows adaptors are not included with standard gimbal assemblies and must be purchased separately.

Specifications

Material

Flange 304 Stainless steel
Body Anodized aluminium

Vacuum range 1×10^{-8} mbar

Temperature range

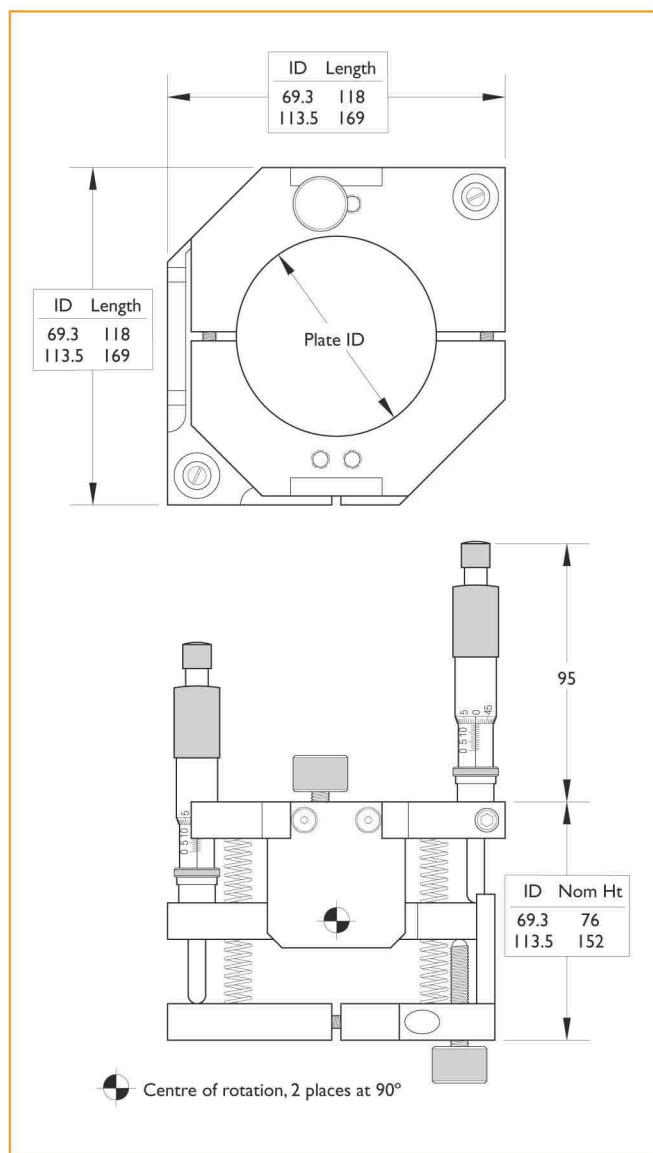
Screw type -20°C to 230°C

Micrometer type -20°C to 100°C

Weight and dimensions

See table

Plate ID	Type	Wt kg	Reference	Part number
69.3	Micrometer	2	FGC-275-M	676000
69.3	Screw	2	FGC-275-S	676001
113.5	Micrometer	3	FGC-450-M	676002
113.5	Screw	3	FGC-450-S	676003
69.3	Bellows	1	150-X	400003
113.5	Bellows	2	250-X	400005



All dimensions are nominal in millimetres unless specified - Weights given are approximate

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Quick-access doors

Blank and viewport



HV Series

Features

- Blank or viewport fitted doors
- Viton® elastomer door seal
- HV-compatible materials
- Bakeable to 150°C
- CF port mounts
- Clearance hole mounting port flange

Specifications

Material

Flange	304ss
Door Seal	Viton®
Viewport	7056 Glass

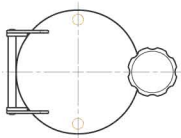
Vacuum range 1×10^{-8} mbar

Temperature range¹ -20°C to 150°C

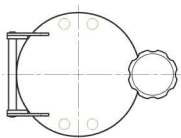
Weight and dimensions See table

Bolt hole orientation Reference

On centreline QD-275



Straddles centreline QD-450



QD-600
QD-800
QD-1000

Description

Quick-access doors provide convenient and fast manual loading of samples in and out of vacuum chambers. Doors are hinged and fitted with a swing-away hand knob locking mechanism. Viewport fitted doors are constructed with Corning type 7056 glass fused to a Kovar® nickel-iron transition sleeve. All access doors are supplied with Viton® elastomer seals suitable for high vacuum service. High temperature Kalrez® elastomers can be used to increase a door's maximum temperature rating.

Quick-access doors with clearance mounting holes are intended for installation on chamber ports with tapped holes.

Socket-cap head bolts must be used.

¹ Contact factory for high temperature rating

All dimensions are nominal in millimetres unless specified - Weights given are approximate

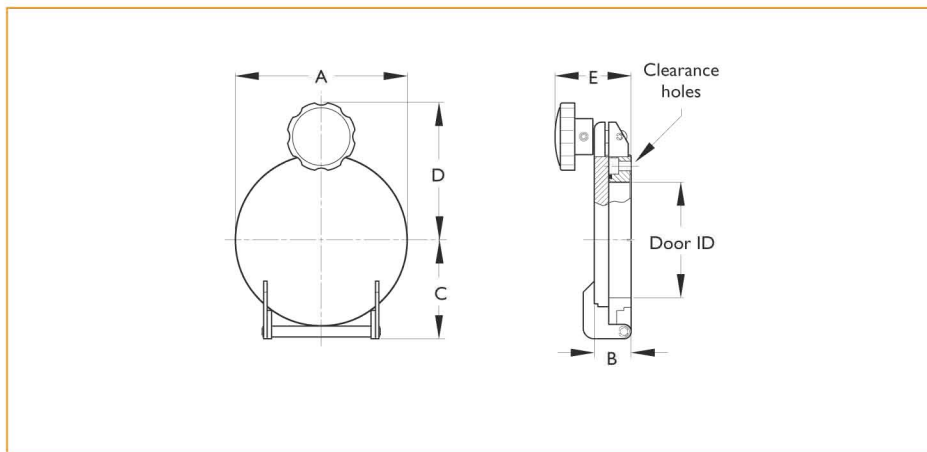
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Quick-access doors

Blank and viewport

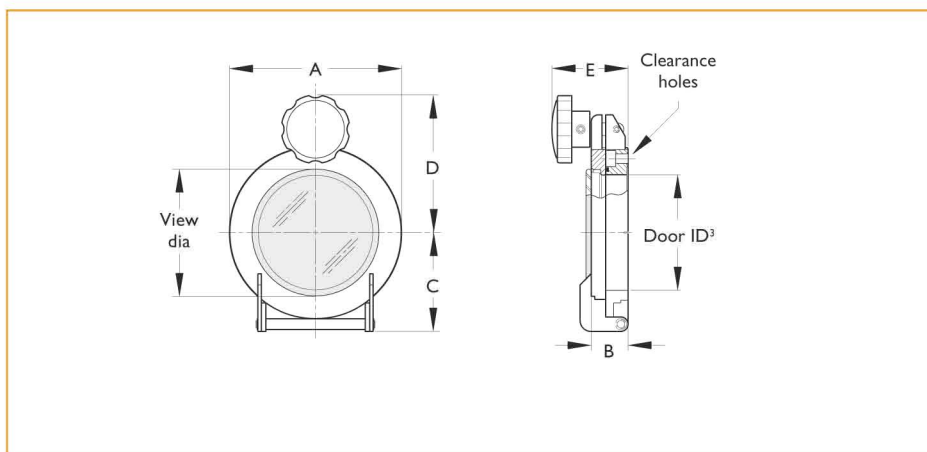


Blank door
Clearance holes



Flange size	Clear holes	Door diameter	A	B	C	D	E	Wt kg	Reference	Part number
DN40CF	6.7	34.9 ²	70	23	44	57	37	1	QD-275-CH	665210
DN63CF	8.4	64	114	27	70	96	47	3	QD-450-CH	665211
DN100CF	8.4	102	152	33	87	121	67	5	QD-600-CH	665212
DN160CF	8.4	152	203	35	118	147	71	9	QD-800-CH	665213
DN200CF	8.4	204	253	38	143	172	74	12	QD-1000-CH	665214

viewport door
Clearance holes



Flange size	Clear holes	Door diameter	A	B	C	D	E	Wt kg	Reference	Part number
DN40CF	6.7	34.9	70	23	44	57	37	1	QD-275-VP-CH	665215
DN63CF	8.4	68	114	27	70	96	47	3	QD-450-VP-CH	665216
DN100CF	8.4	98	152	33	87	121	67	5	QD-600-VP-CH	665217
DN160CF	8.4	136	203	35	118	147	71	9	QD-800-VP-CH	665218
DN200CF	8.4	136	253	38	143	172	74	12	QD-1000-VP-CH	665219

² Nominal ID of door gasket is 38.8

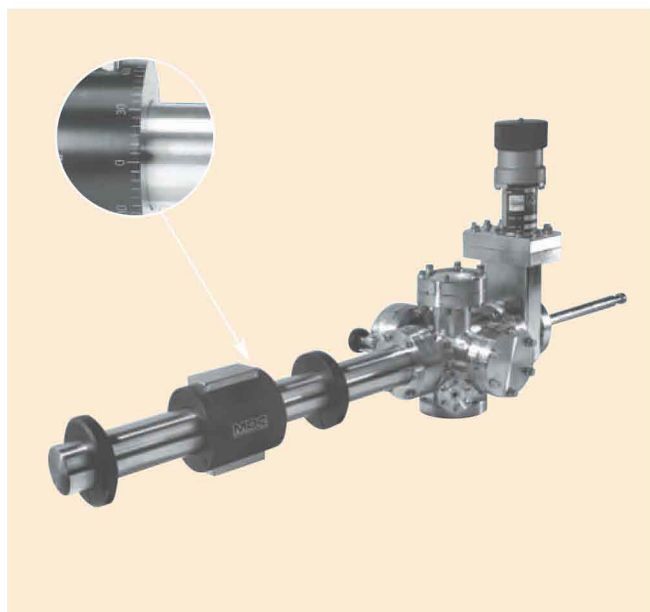
³ For viewport door ID, use blank door ID in table above

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Load-lock systems

Introduction



UHV and HV series

Features

- Transfer samples from atmosphere to UHV in minutes
- Choice of 35mm (1³/₈"), 65mm (2³/₈") and 95mm (3³/₄") nominal sample sizes
- Magnetically coupled rotary/linear transporter rod
- Sample chamber with viewport and quick open/close door
- Vertical or horizontal mounting
- Type 304 (1.4301) stainless steel construction
- UHV version bakeable to 200°C

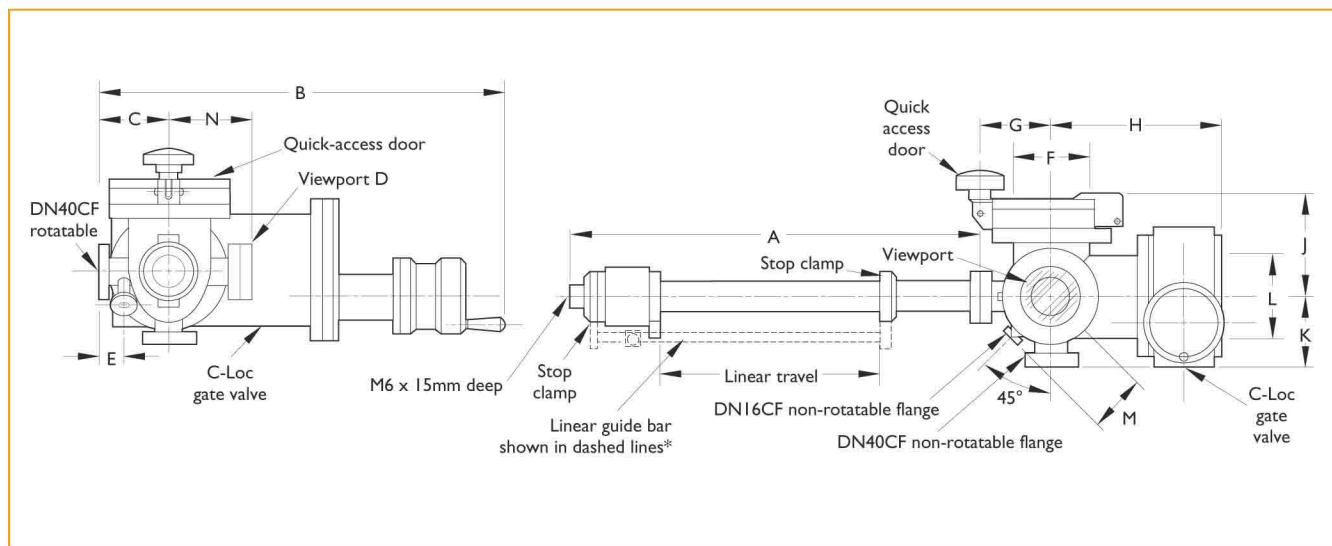
Description

E-FEL fast entry load-lock systems allow quick and easy loading and unloading of a sample in and out of the vacuum chamber, without breaking the system vacuum.

Samples are loaded on to the E-FEL internal transporter through the quick access door on the sample transfer chamber. Loading can be observed through a viewport.

After the transfer chamber is evacuated to the desired level through DNCF flange port, the C-Loc gate valve is opened for access into the main vacuum chamber.

The sample can be moved 305mm (12"), 610mm (24") or 915mm (36"), from the centre of the entry load lock. It can also be rotated 360°. Positioning is controlled by sliding an external sleeve that is magnetically coupled with the transporter rod, connected to the sample holder, inside the system.



E-FEL Series	Valve HT B	C	View dia D	E	G	H	J	K	M	N
E-FEL-100	279	75.2	E-FEL-100	33.5	62.5	113.3	58	63	60.2	61
E-FEL-200	314	86.2	E-FEL-200	34.8	74.4	174.5	99	71	58.7	70
E-FEL-400	522	88.9	E-FEL-400	32.0	93.5	210.1	138	89	72.9	112

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Load-lock systems

Introduction



UHV Series

Nominal sample	Linear travel	(A) Magnetic transporter	Door ID (F)	Valve ID (L)	Reference	Part number
35	304.8	584.2	41.4 ¹	38.1 ¹	E-FEL-112M	1600011
35	609.6	927.1	41.41	38.11	E-FEL-124M	1600012
35	914.4	1231.9	41.41	38.11	E-FEL-136M	1600013
60	304.8	584.2	60.5	63.5	E-FEL-212M	1600015
60	609.6	927.1	60.5	63.5	E-FEL-224M	1600016
60	914.4	1231.9	60.5	63.5	E-FEL-236M	1600017
95	304.8	584.2	97.3	101.6	E-FEL-412M	1600019
95	609.6	927.1	97.3	101.6	E-FEL-424M	1600020
95	914.4	1231.9	97.3	101.6	E-FEL-436M	1600021

¹ The nominal ID of 100 series door and gate valve gasket is 38.8 ID when using CCG40



HV Series

Nominal sample	Linear travel	(A) Magnetic transporter	Door ID (F)	Valve ID (L)	Reference	Part number
35	304.8	584.2	41.4 ¹	38.1 ¹	E-FEL-112	160000
35	609.6	927.1	41.41	38.11	E-FEL-124	160001
35	914.4	1231.9	41.41	38.11	E-FEL-136	160002
60	304.8	584.2	60.5	63.5	E-FEL-212	160004
60	609.6	927.1	60.5	63.5	E-FEL-224	160005
60	914.4	1231.9	60.5	63.5	E-FEL-236	160006
95	304.8	584.2	97.3	101.6	E-FEL-412	160008
95	609.6	927.1	97.3	101.6	E-FEL-424	160009
95	914.4	1231.9	97.3	101.6	E-FEL-436	160010

¹ The nominal ID of 100 series door and gate valve gasket is 38.8 ID when using CCG40

Customer note Load lock systems are shipped in component form, for customer assembly on-site.

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Features

- Cab-Fast® right angle sample handlers
- Auto-Dock™ in-line sample handlers
- Rotary-linear accessories

Cab-Fast® right-angle sample handlers

The Cab-Fast® sample handling system provides a simple yet versatile means of loading samples for transportation to manipulators, parking carousels, deposition stations and other locations inside ultra-high vacuum systems. They allow the transfer of



samples between linear drive instruments positioned at right angles. Samples are first secured to platens using sample mounting strips. The loaded platen is placed inside a load-lock sample staging chamber through the chambers quick-access door. Inside, the platen is secured and attached to the platen fork previously installed to the tip of a magnetic transporter. Once the staging chamber is evacuated to the desired vacuum level and the gate valve is opened the sample is ready for transfer.



Auto-Dock™ in-line sample handlers

The Caburn-MDC's Auto-Dock™ sample handling system is a patented group of modular sample handling components ideally suited for the transfer of samples between chambers and typically used in tandem with Caburn-MDC magnetic transporters. In contrast with the Cab-Fast® system, Auto-Dock™ allows the transfer of samples between linear drive instruments positioned in-line with each other. The Auto-Dock™ system is comprised of three basic components, a sample-holder plate, a vacuum-dock and a transport-dock. Samples are shuttled back and forth between a vacuum process chamber and a load-lock's sample staging chamber attached to it by fastening samples to the sample-holder plate. The sample-holder plate is manually secured to the tip of an Caburn-MDC magnetic transporter inside the load-lock's sample staging chamber. The sample is then transported to the process chamber where the vacuum-dock component is strategically positioned and ready to receive the sample-holder plate



Caution

Anodized aluminium finishes will begin to discolour when baked in excess of 150°C.

This is only a cosmetic condition which does not impact performance or reliability.

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Rotary-linear accessories

Rotary-linear accessories are an assortment of in-vacuum hardware components used to complement and expand the capabilities of Caburn-MDC rotary and linear motion and manipulation

instruments. Various drive shaft attachments are offered including universal joints, bellows couplings, extension couplings, rotary and linear

bearings and bearing mounts, ground shaft stock, set-screw collars and vented cap screws.



In-vacuum accessories

Sample handling systems



Cab-Fast® right-angle sample handlers

The Cab-Fast® sample handling system provides a simple yet versatile means of loading samples for transportation to manipulators, parking carousels, deposition stations and other locations inside ultra-high vacuum systems. They allow the transfer of samples between linear drive instruments positioned at right angles to each other. They are ideally suited for use with magnetically coupled transporters and other motion and manipulation instruments.

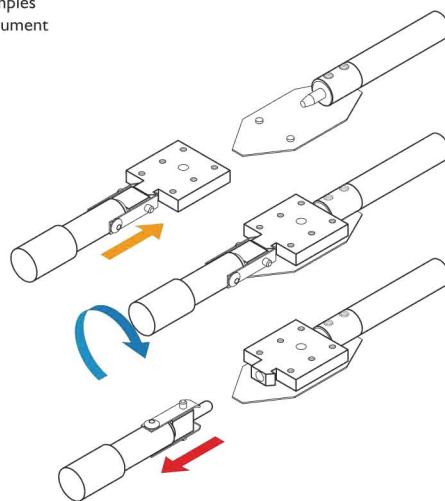
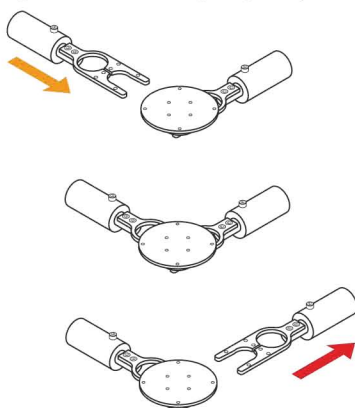
Auto-Dock™ in-line sample handlers

The Auto-Dock™ sample handling system is a group of modular sample handling components ideally suited for the transfer of samples between vacuum chambers when used with Caburn-MDC magnetic transporters. Auto-Dock™ allows the transfer of samples between linear drive instruments positioned in-line with each other. The Auto-Dock™ system is comprised of three basic components, a docking sample-holder, a vacuum-dock and a transport-dock.

Features

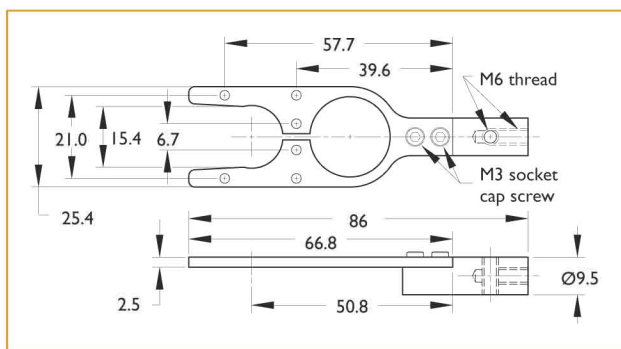
- UHV sample handling
- Fast sample transfer
- 304ss construction

Cab-Fast® sample handling tools are designed to transport samples in and out of vacuum systems. This diagram shows a dual instrument arrangement which allows right angle sample transfer.



Auto-Dock™ sample handling tools are ideally suited for use with Caburn-MDC magnetic transporters in sample transfer load-lock systems. They are designed for in-line sample transfer.

Platen fork



Reference

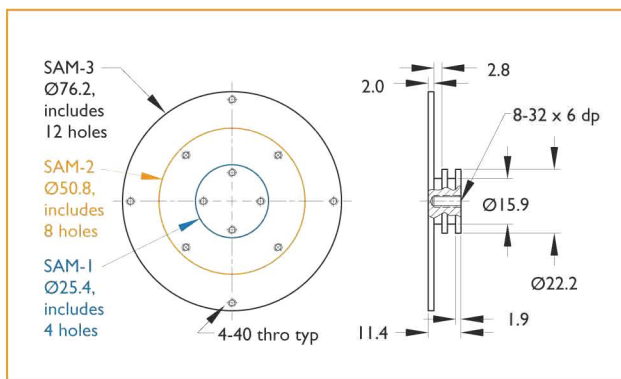
FOR-1

Part number

7665029

Cab-Fast® platen forks are designed to lock on to and hold Cab-Fast® platens during the transport and transfer of samples between chambers or other motion and manipulation instruments.

Platen sample holder



Reference

SAM-1

SAM-2

SAM-3

Part number

7665026

7665027

7665028

Cab-Fast® sample platens are designed to hold samples during in-vacuum sample processing. Samples can be secured in place using sample mounting strips and screws.

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In-vacuum accessories

Cab-fast® sample handlers

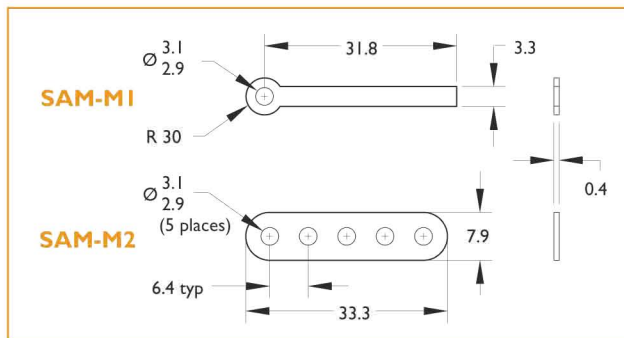


Sample mount strips

SAM-M2



SAM-M1

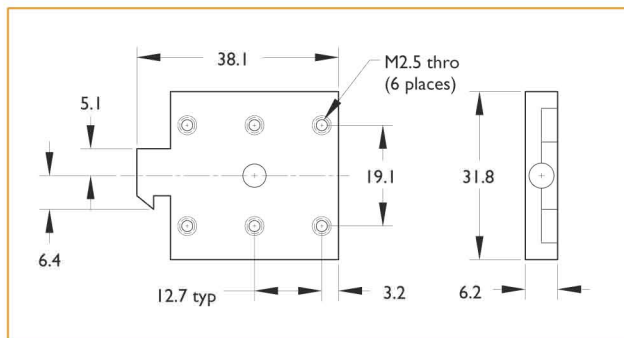


Reference	Part number
SAM-M1	665039
SAM-M2	665040

Caburn-MDC sample mounting strips offer a versatile means of fastening samples to Cab-Fast® sample platens and Auto-Dock™ docking sample-holders.

Sold in packages of 5.

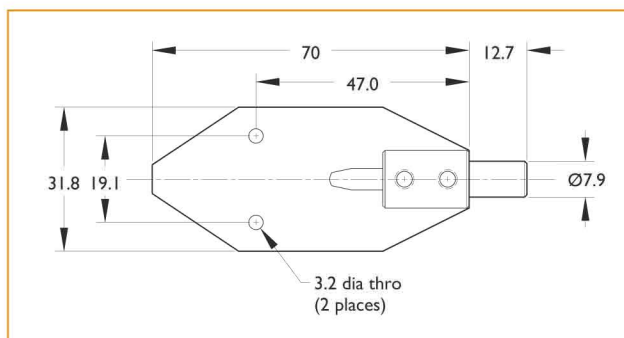
Dock sample-holder



Reference	Part number
STA-1	665016

Auto-Dock™ docking sample-holders are designed to hold samples during in-vacuum sample processing. Samples are secured in place using sample mounting strips and screws.

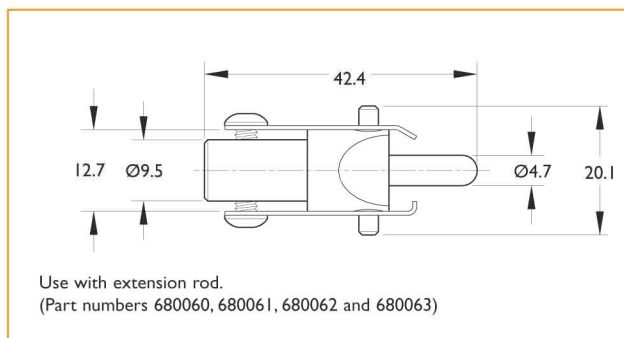
Vacuum-dock



Reference	Part number
STA-2	665017

Auto-Dock™ vacuum-docks are designed to receive and hold Auto-Dock™ sample-holders during in-vacuum sample processing. They are typically fixed inside a vacuum chamber as part of a sample processing structure.

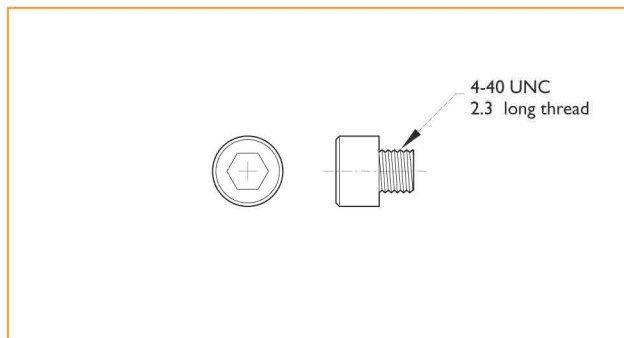
Transport-dock



Reference	Part number
STA-3	665015

Auto-Dock™ transporter-docks are designed to receive, hold and transport Auto-Dock™ sample-holders in and out of vacuum sample processing chambers. They are attached to the end of Caburn-MDC magnetic transporter shafts.

Screws, non-vented



Reference	Part number
SAM-S1	665041

Socket head screws made of 300ss ideal for Cab-Fast® and Auto-Dock™ sample handling systems and come in packages of 25 pieces. These screws are not vented and should only be installed into tapped through holes.

All dimensions are nominal in millimetres unless specified - Weights given are approximate

In-vacuum accessories

Rotary and linear motion



Rotary-linear accessories

Rotary-linear accessories are an assortment of in-vacuum hardware components used to complement and expand the capabilities of Caburn-MDC rotary and linear motion and manipulation instruments. Various drive shaft attachments are offered including universal joints, bellows couplings, extension couplings, rotary and linear bearings and bearing mounts, ground shaft stock, set-screw collars and vented cap screws.

The components presented in this section can also be used in combination with products presented in the Cab-Fast® and Auto-Dock™ accessories sections of this catalogue. Custom designed hardware is also available if required.

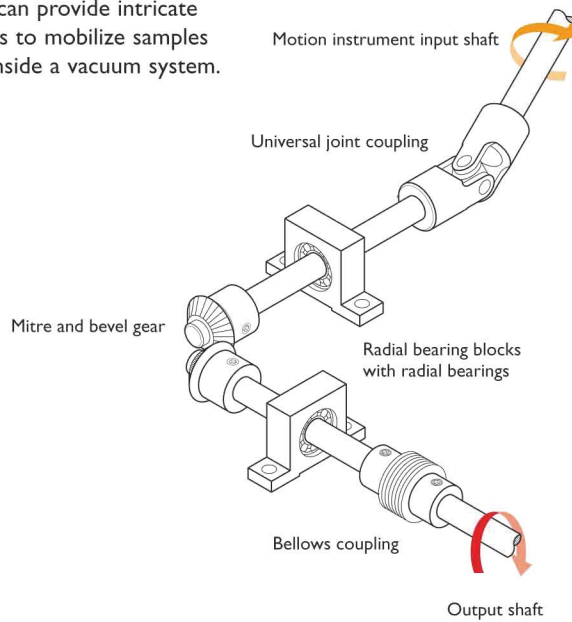
Please contact Caburn-MDC's technical sales engineers with your inquiries.



Features

- UHV sample handling
- Fast sample transfer
- 304ss construction

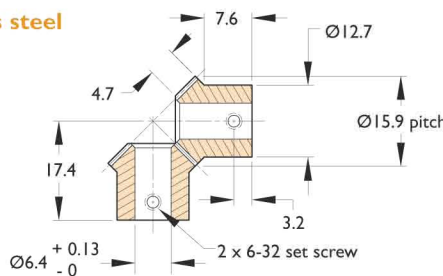
Caburn-MDC rotary and linear accessories can provide intricate motion paths to mobilize samples or devices inside a vacuum system.



Mitre and bevel gear



Stainless steel



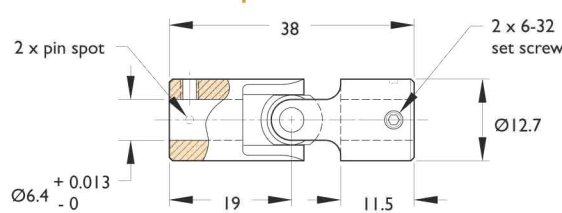
Reference	Part number
AM48-1-S	685000

Mitre and bevel gears provide the means of rotary input with 90° output rotation. They accept 6.4mm diameter shafts and come in a set of two gears fitted with 6-32 UNC set screws for fastening to shafts.

Universal joint



Stainless steel / Phosphor bronze



Reference	Part number
AUJ-3	680000

Universal joints provide rotary motion input with variable angle rotary output for 6.4mm shaft diameters. The maximum operating angle is 30° at low speeds and 10° at high speeds.

All dimensions are nominal in millimetres unless specified - Weights given are approximate

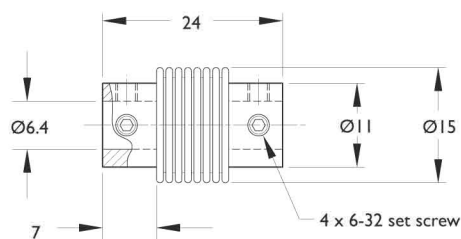
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In-vacuum accessories

Rotary and linear motion



Bellows coupling



Reference

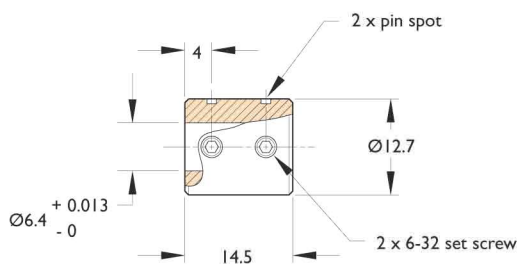
ACO4-4

Part number

682000

Bellows couplings for 6.4mm shaft diameters provide 0.4 Nm maximum torque at a maximum tilt angle of 5° or maximum axial misalignment of 0.3mm. They provide zero backlash and uniform angular velocity with low vibration.

Sleeve coupling



Reference

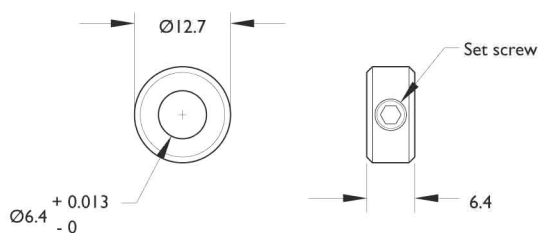
ACT-3

Part number

683000

Sleeve couplings are used to customize and extend 6.4mm diameter shafts inside a vacuum system. They are fitted with two 6-32 UNC set screws to lock shafts in position.

Set screw collar



Reference

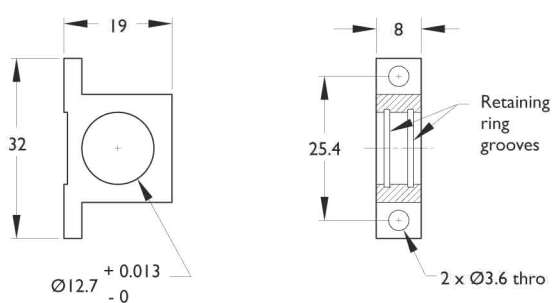
ACS-22

Part number

690000

Set screw collars are used to create mechanical stops along a shaft's length. Supplied with 6-32 UNC set screws for position lock.

Bearing mount, radial



Reference

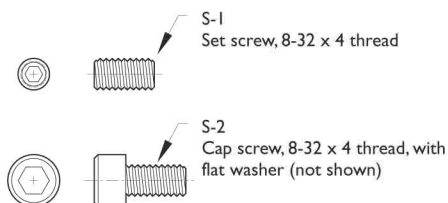
ABME-I

Part number

688000

Radial bearing mounts are made of vacuum grade aluminium. They are designed to accept a radial bearing for a 6.4mm shaft diameter. They include two retainer rings to hold the bearing assembly in place.

Screws, non-vented



Reference

S-1

S-2

Part number

680100

680101

These are 300 series stainless steel socket head screws. They come in packages of 25 pieces.

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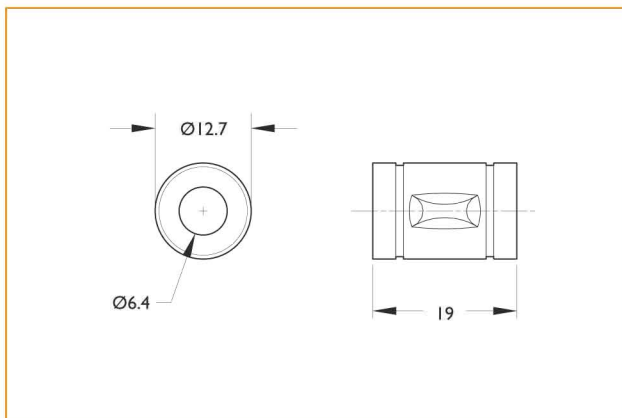
Section 7.2

In-vacuum accessories

Rotary and linear motion

Motion and manipulation

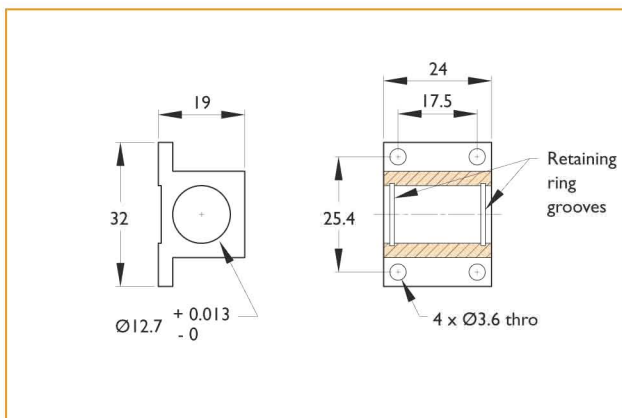
Linear ball bearing



Reference	Part number
ALMB-I	687000

Linear bearings support 6.4mm diameter linear motion drive shafts. They are constructed of 300 series stainless steel and coated with Diconite® dry lubricant suitable for UHV service.

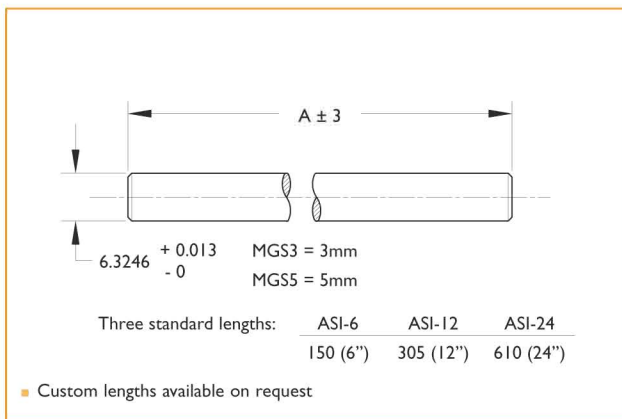
Bearing mount, linear



Reference	Part number
ALME-I	689000

Linear bearing mounts are made of vacuum grade aluminium. They are designed to accept a linear bearing for a 6.4mm shaft diameter. They include two retainer rings to hold the bearing assembly in place.

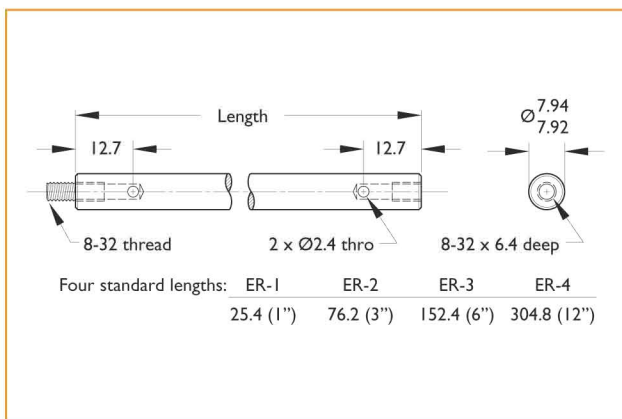
Ground stock



Reference	Part number
ASI-6	684000
ASI-12	684001
ASI-24	684002
MGS3-600	1511300
MGS5-600	1511301

Precision ground 304 stainless steel shafts offered in 150, 305 and 610mm lengths. With coupling accessories these shafts can be used to extend motion instrument drive shafts.

Extension rods



Reference	Part number
ER-1	680060
ER-2	680061
ER-3	680062
ER-4	680063

Extension rods have 8-32 UNC male and female threads on opposite ends. They can be connected end to end for custom length structures.

All dimensions are nominal in millimetres unless specified - Weights given are approximate

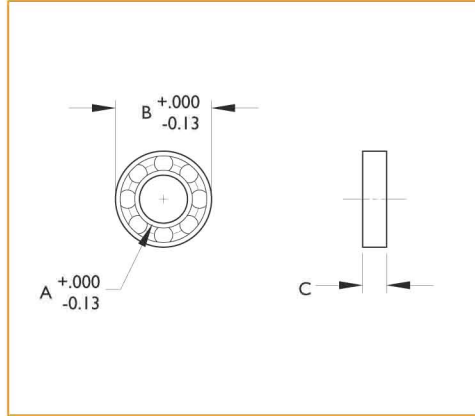
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In-vacuum accessories

Rotary and linear motion



Precision bearings

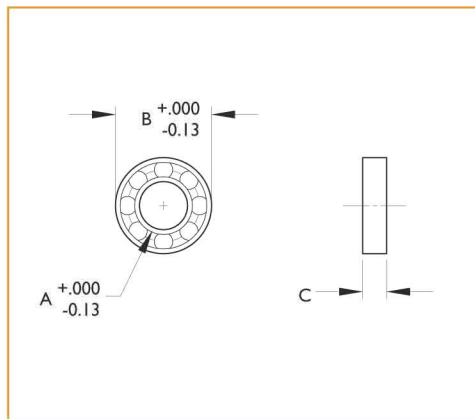


Features

- UHV clean
- No lubricants

ID A	OD B	C	Reference	Part number
Stainless steel				
6.35 (1/4")	12.7 (1/2")	3.17 (1/8")	PBS63	1551100
9.52 (3/8")	22.22 (7/8")	5.55 (1/2")	PBS95	1551101
5	11	3	PBS5-11	1551102
5	16	5	PBS5-16	1551103
3	7	2	PBS3-7	1551104
3	10	4	PBS3-10	1551105

Precision bearings Ceramic



Features

- UHV clean
- No lubricants
- Very long life in UHV

- Ceramic ball races are used for the most demanding long life UHV applications

ID A	OD B	C	Reference	Part number
Stainless steel				
6.35 (1/4")	12.7 (1/2")	3.17 (1/8")	PBC63	1551200
9.52 (3/8")	22.22 (7/8")	5.55 (1/2")	PBC95	1551201
5	11	3	PBC5-11	1551202
5	16	5	PBC5-16	1551203
3	7	2	PBC3-7	1551204
3	10	4	PBC3-10	1551205

All dimensions are nominal in millimetres unless specified - Weights given are approximate



In-vacuum accessories

Vented screws

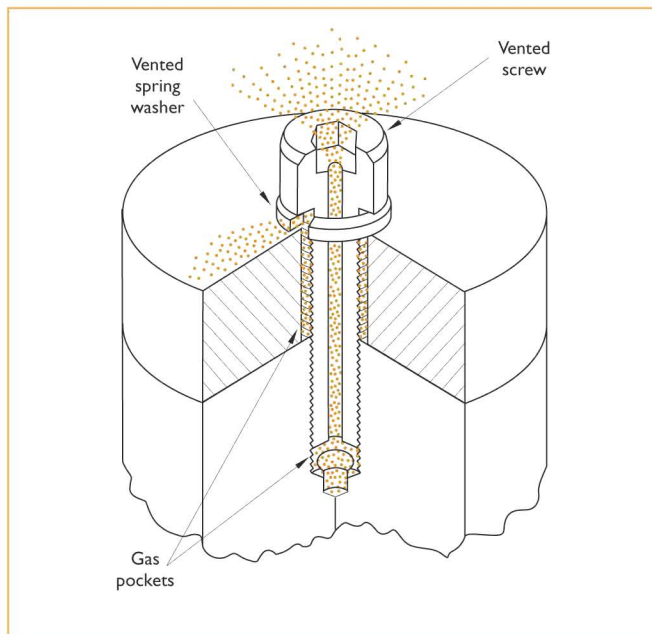
Description

When making screw attachments in vacuum it is important to avoid trapping even the smallest volumes of gas which can give rise to a 'virtual leak' within the system.

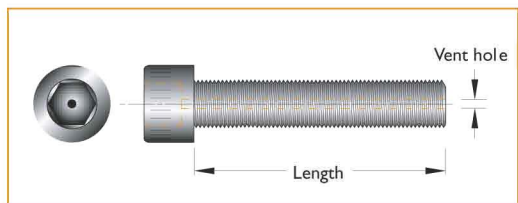
Caburn-MDC offers a full range of vented screws which allow gas to escape down a machined hole through the middle of the screw and through a gap in a vented washer (see drawing). For situations where pump-down is accompanied by high bakeout temperatures we offer molybdenum disulphide coated screws which avoid the problem of seizure due to heat expansion. All screws are cleaned and packed ready for UHV use.

Features

- Stainless steel – UHV cleaned
- Optional MoS₂ coated for high bakeout applications
- Additional vented washers are offered in stainless steel



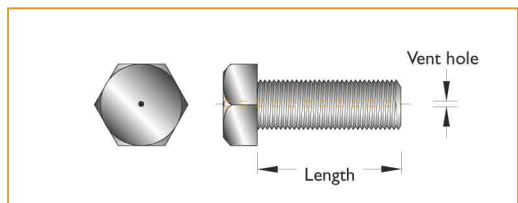
Vented metric socket head screws



Thread	Length	Quantity per pack	Reference	Part number
M1.6 ¹	4	10	VMS-16-4	1610000
M1.6 ¹	8	10	VMS-16-8	1610001
M2	4	10	VMS-20-4	1610002
M2	6	10	VMS-20-6	1610003
M2	10	10	VMS-20-10	1610004
M2.5	4	10	VMS-25-4	1610005
M2.5	8	10	VMS-25-8	1610006
M2.5	16	10	VMS-25-16	1610007
M3	4	10	VMS-30-4	1610008
M3	8	10	VMS-30-8	1610009
M3	16	10	VMS-30-16	1610010
M4	5	10	VMS-40-5	1610011
M4	10	10	VMS-40-10	1610012
M4	20	10	VMS-40-20	1610013
M5	6	10	VMS-50-6	1610014
M5	12	10	VMS-50-12	1610015
M5	25	10	VMS-50-25	1610016

¹ This size has gas relief flat in place of vent hole

Vented hexagonal head screws MoS₂ coated



Thread	Length	Quantity per pack	Reference	Part number
M4	6	10	VMHMO-40-6	1610078
M4	12	10	VMHMO-40-12	1610079
M4	25	10	VMHMO-40-25	1610080
M5	6	10	VMHMO-50-6	1610081
M5	12	10	VMHMO-50-12	1610082
M5	25	10	VMHMO-50-25	1610083

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In-vacuum accessories

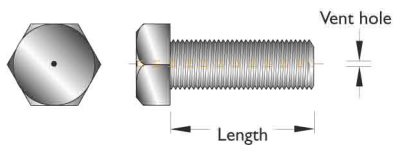
Vented screws



Vented metric hexagon head screws



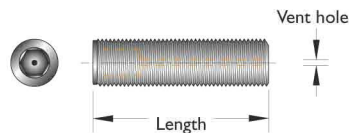
Thread	Length	Quantity per pack	Reference	Part number
M4	6	10	VMH-40-6	1610030
M4	12	10	VMH-40-12	1610031
M4	25	10	VMH-40-25	1610032
M5	6	10	VMH-50-6	1610033
M5	12	10	VMH-50-12	1610034
M5	25	10	VMH-50-25	1610035



Vented metric set screws



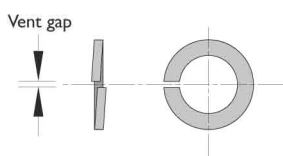
Thread	Length	Quantity per pack	Reference	Part number
M2.5	4	10	VMSS-25-4	1610037
M3	4	10	VMSS-30-4	1610038
M4	5	10	VMSS-40-5	1610039
M5	6	10	VMSS-50-6	1610040



Vented spring washers



Thread	Quantity per pack	Reference	Part number
M2	10	VMSW-20	1610042
M2.5	10	VMSW-25	1610043
M3	10	VMSW-30	1610044
M4	10	VMSW-40	1610045
M5	10	VMSW-50	1610046



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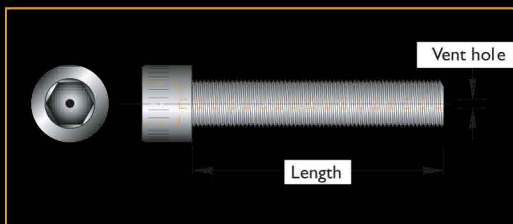
In-vacuum accessories

Vented screws

Vented socket heads UNC Thread



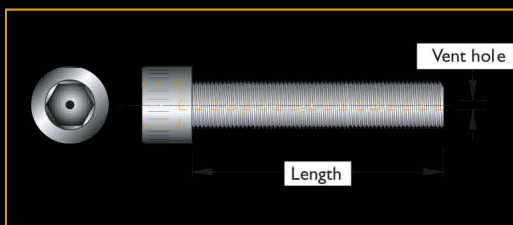
Thread	Length	Quantity per pack	Reference	Part number
6-32	6.4	10	VUNCS-6-32-25	1610095
6-32	12.7	10	VUNCS-6-32-50	1610096
8-32	6.4	10	VUNCS-8-32-25	1610097
8-32	12.7	10	VUNCS-8-32-50	1610098
10-32	6.4	10	VUNCS-10-32-25	1610099
10-32	12.7	10	VUNCS-10-32-50	1610100
1/4"-28	19.1	10	VUNCS-1/4-28-75	1610101



Vented socket head screws MoS₂ coated



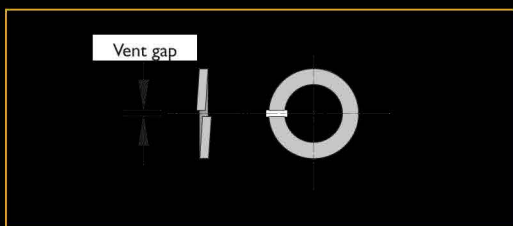
Thread	Length	Quantity per pack	Reference	Part number
M2	4	10	VMSM0-20-4	1610048
M2	8	10	VMSM0-20-8	1610049
M2.5	4	10	VMSM0-25-4	1610050
M2.5	8	10	VMSM0-25-8	1610051
M2.5	16	10	VMSM0-25-16	1610052
M3	4	10	VMSM0-30-4	1610053
M3	8	10	VMSM0-30-8	1610054
M3	16	10	VMSM0-30-16	1610055
M4	5	10	VMSM0-40-5	1610056
M4	10	10	VMSM0-40-10	1610057
M4	20	10	VMSM0-40-20	1610058
M5	6	10	VMSM0-50-6	1610059
M5	12	10	VMSM0-50-12	1610060
M5	25	10	VMSM0-50-25	1610061



Vented spring washers UNC Thread



Thread	Quantity per pack	Reference	Part number
6-32	10	VUNCSW-6-32	1610103
8-32	10	VUNCSW-8-32	1610104
10-32	10	VUNCSW-10-32	1610105
1/4"-28	10	VUNCSW-1/4-28	1610106



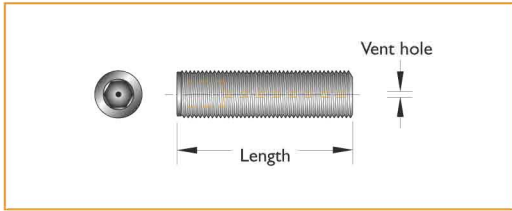
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In-vacuum accessories

Screws

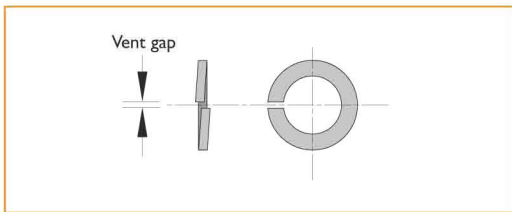


Vented metric set screws MoS₂ coated



Thread	Length	Quantity per pack	Reference	Part number
M2.5	4	10	VMSSMO-25-4	1610085
M3	4	10	VMSSMO-30-4	1610086
M4	5	10	VMSSMO-40-5	1610087
M5	6	10	VMSSMO-50-6	1610088

Vented spring washers MoS₂ coated



Thread	Quantity per pack	Reference	Part number
M2	10	VMSWMO-20	1610090
M2.5	10	VMSWMO-25	1610091
M3	10	VMSWMO-30	1610092
M4	10	VMSWMO-40	1610093
M5	10	VMSWMO-50	1610094

Molybdenum screws

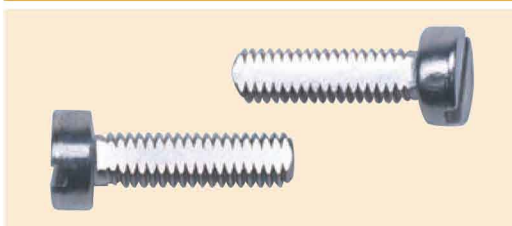


Thread	Size	Quantity per pack	Reference	Part number
Molybdenum screws	M2 x 8	10	MOM2-8	1611400
Molybdenum screws	M3 x 10	10	MOM3-10	1611401
Molybdenum nuts	M2	10	MOM-2N	1611412
Molybdenum nuts	M3	10	MOM-3N	1611413

Features

- Cleaned for UHV with gas relief flats

Tantalum screws



Thread	Size	Quantity per pack	Reference	Part number
Tantalum screws	M2 x 5	1	TAM2-5	1611402
Tantalum screws	M3 x 10	1	TAM3-10	1611403

Features

- Cleaned for UHV with gas relief flats

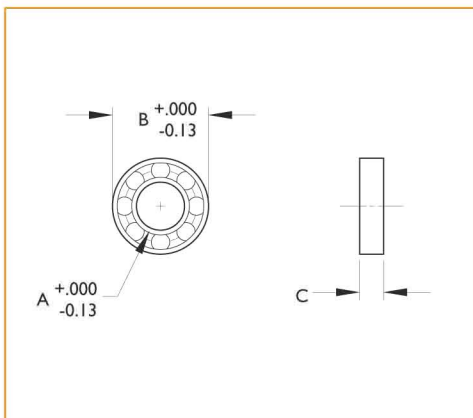
All dimensions are nominal in millimetres unless specified - Weights given are approximate

In-vacuum accessories

Rotary and linear motion



Precision bearings

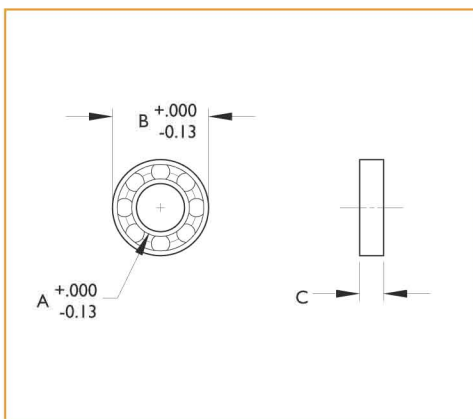


Features

- UHV clean
- No lubricants

ID A	OD B	C	Reference	Part number
Stainless steel				
6.35 (1/4")	12.7 (1/2")	3.17 (1/8")	PBS63	1551100
9.52 (3/8")	22.22 (7/8")	5.55 (1/2")	PBS95	1551101
5	11	3	PBS5-11	1551102
5	16	5	PBS5-16	1551103
3	7	2	PBS3-7	1551104
3	10	4	PBS3-10	1551105

Precision bearings Ceramic



Features

- UHV clean
- No lubricants
- Very long life in UHV

- Ceramic ball races are used for the most demanding long life UHV applications

ID A	OD B	C	Reference	Part number
Stainless steel				
6.35 (1/4")	12.7 (1/2")	3.17 (1/8")	PBC63	1551200
9.52 (3/8")	22.22 (7/8")	5.55 (1/2")	PBC95	1551201
5	11	3	PBC5-11	1551202
5	16	5	PBC5-16	1551203
3	7	2	PBC3-7	1551204
3	10	4	PBC3-10	1551205

All dimensions are nominal in millimetres unless specified - Weights given are approximate

In-vacuum accessories

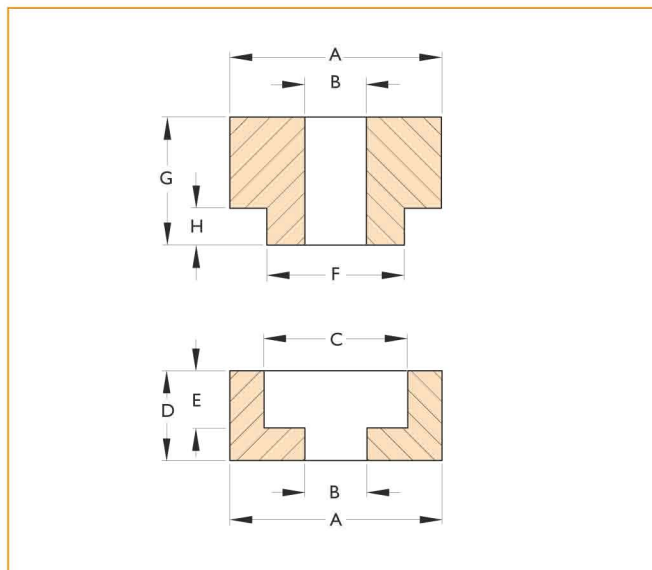
Heater and sample transfer accessories

Ceramic split bushes



Description

Ceramic split bushes can be used with UHV manipulators to enable sample plate or heater filaments to be mechanically clamped in position while maintaining electrical isolation. These items are cleaned to UHV standards and supplied in packs of 10.



Type	A	B	C	D	E	F	G	H	Reference	Part number
Stentite KERZZO – DIN40685										
Male	6.85	2.4	–	–	–	4.4	4.1	2.55	CSB-2M	1611405
Female	6.85	2.4	4.85	5.55	2.8	–	–	–	CSB-2F	1611406
Male	7.95	3.05	–	–	–	5.3	4.75	2.55	CSB-3M	1611407
Female	7.95	3.05	5.7	5.55	2.8	–	–	–	CSB-3S	1611408
Male	9.52	3.05	–	–	–	6.1	6.35	4.1	CSB-3L	1611409
Female	9.52	3.05	6.5	7.15	4.9	–	–	–	CSB-3LF	1611410

Machinable ceramics



Features

- Sample kits in various sizes
- Choice of materials
- Macor® – machinable glass ceramic
- Shapal M
- Boron Nitride HP grade
- Customer machining available on request

Specifications

Macor® sample kit 4 pieces in following mm sizes

- Cylinder 13 diameter x 77 long
- Block 64 x 8 x 8
- Block 39 x 19 x 6
- Block 54 x 20 x 20

Boron nitride HP grade sample kit

- 3 pieces in following mm size
- Cylinder 10 diameter x 75 long
 - Block 20 x 20 x 75
 - Plate 10 x 20 x 5

Shape M sample kit 2 pieces in following mm sizes

- Cylinder 10 diameter x 50 long
- Plate 22 x 9.5 x 3

Mixed ceramic technology All machinable

- Shapal M 10 diameter x 50 long
- Macor 10 diameter x 50 long
- XSBH (composite) 10 diameter x 50 long
- Boron nitride HP grade 10 diameter x 50 long

Description

Macor® machinable glass ceramic can be worked with ordinary tools and does not require firing after machining. It has the same electrical and thermal properties as ordinary ceramic. Caburn-MDC will be happy to quote against your drawings for custom machined parts.

Description	Number of pieces	Reference	Part number
Macor®	4	MGC-I	1611300
Shapal M	2	SHM-I	1611301
Boron nitride HP grade	3	BNHP-I	1611302
Mixed ceramic technology	4	MCT-I	1611303

All dimensions are nominal in millimetres unless specified - Weights given are approximate

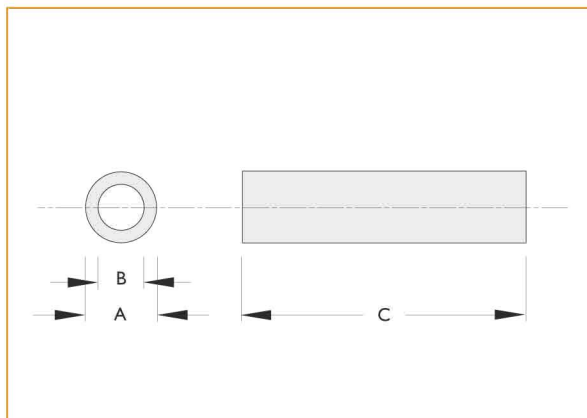
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In-vacuum accessories

Heater and sample transfer accessories



Ceramic tubes



Features

- UHV clean
- One, two and four hole types
- Material 99.7% Al2O3
- Maximum temperature 1700°C

In-vacuum accessories

Product	A	B	Length C	Number of holes	Quantity per pack	Reference	Part number
Ceramic tube	1.0	0.4	50	1	10	CERT0-50	1611100
Ceramic tube	2.0	1.0	50	1	10	CERT1-50	1611101
Ceramic tube	3.0	2.0	50	1	10	CERT2-50	1611102
Ceramic tube	6.0	4.0	50	1	10	CERT4-50	1611103
Ceramic tube	2.0	1.0	300	1	10	CERT1-300	1611105
Ceramic tube	3.0	2.0	300	1	10	CERT2-300	1611106
Ceramic tube	5.0	3.0	300	1	3	CERT3-300	1611107
Ceramic tube	10.0	7.0	300	1	3	CERT7-300	1611108
Ceramic tube	3.0	0.8	50	2	10	CERT08-50-2	1611110
Ceramic tube	3.0	0.8	300	2	1	CERT08-300-2	1611111
Ceramic tube	2.7	0.8	50	4	10	CERT06-50-4	1611112
Ceramic tube	2.6	0.6	300	4	1	CERT06-300-4	1611113
Ceramic tube	4.6	1.0	50	4	10	CERT1-50-4	1611114
Ceramic tube	4.5	1.0	300	4	1	CERT1-300-4	1611115

All dimensions are nominal in millimetres unless specified - Weights given are approximate