

Vacuum Feedthroughs Magnetic fluid sealed Product Overview

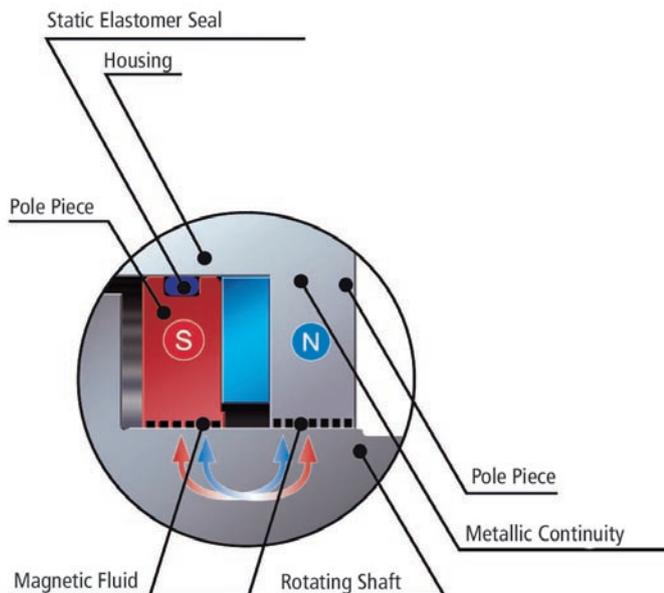
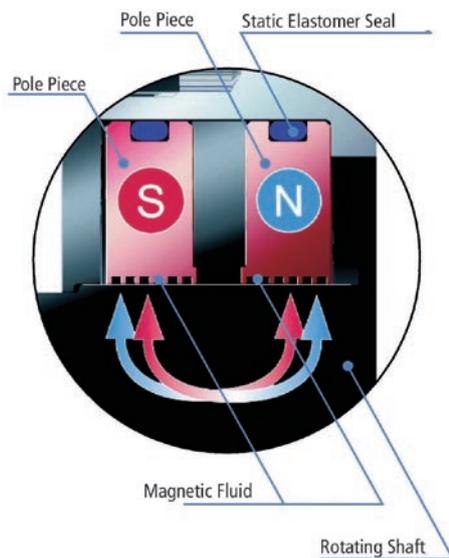


■ New ! ISO-K Feedthrough for high radial loads and high torque capacity (p.15)

Complete Cleanliness in Vacuum Applications

ALMA feedthroughs are for the introduction of rotary motion into a vacuum chamber. Magnetic fluids act as a sealing substance ensuring complete cleanliness in the vacuum application.

The static components inside the feedthrough are hermetically sealed against the rotary components. The typical problems with elastomer O-rings no longer occur.



Benefits

- low drag torque
- maintenance free
- long life
- non contaminating
- no stick-slip

Function of Magnetic fluid seal

Magnetic fluid seals take advantage of their reaction to a localised magnetic field. The magnetic fluid is held in place by the magnetic force at the sealing gap between the pole pieces and the rotating shaft. It creates a „liquid sealing lip“ and seals hermetically.

Metallic Continuity for Ultra High Vacuum Applications

The pole piece is connected to the housing by a continuous metallic bond. With this kind of seal there is no more permeability towards the vacuum unlike with o-rings. Advantage: the pole piece can be directly cooled providing an easier bake-out process.

How to find the right feedthrough ?

To find the right feedthrough for your individual mounting read the table below as follows:

- What type of vacuum are you working with?
- How do you want to mount the feedthrough to your apparatus? If it is not yet determined we recommend the ALMA flange as it offers much higher mounting and positioning accuracy inside the chamber.

- Do you need a feedthrough with a hollow shaft or a solid shaft?
- What are the requirements concerning the overall length and diameter of the feedthrough ?
- What is the shaft diameter ?

If the feedthroughs listed below do not meet your requirements we can easily and quickly design an individual feedthrough. To do this we only need the completed questionnaire which you will find on page 14. Please fax it to us.

We react quickly and readily to your requirements especially if service is needed. Research & Development, product design and production, sales and service are all located in Germany on a single site so that we can react and act immediately to your needs.

Vacuum	Adaptation	Shaft	Cooling	Flange Type	Length in mm	Shaft diameter in mm	Type	Material-No.	Page	
Low -/High Vacuum	ALMA-Flange	Solid shaft	Cooled				customer specific			
		Solid shaft	Non-Cooled	ALMA-Flange	95	8	ALMA-M-AF-008-V-U	1020632	4/5	
				ALMA-Flange	115	10	ALMA-M-AF-010-V-U	1020631	4/5	
				ALMA-Flange	150	12	ALMA-M-AF-012-V-U	1020630	4/5	
				ALMA-Flange	160	15	ALMA-M-AF-015-V-U	1020629	4/5	
				ALMA-Flange	100	14	ALMA-M-AF-044-A-U	1020634	6/7	
				ALMA-Flange	126	18	ALMA-M-AF-060-A-U	1019198	6/7	
			Hollow Shaft	Cooled				customer specific		
			Hollow Shaft	Non-Cooled	ALMA-Flange	100	8	ALMA-H-AF-008-A-U	1020635	8/9
					ALMA-Flange	126	10	ALMA-H-AF-010-A-U	1019200	8/9
Low -/High Vacuum	CF-Flange	Solid shaft	Cooled				customer specific			
		Solid shaft	Non-Cooled	CF-DN 40	115	10	ALMA-M-CF-010-V-U	1020627	10/11	
				CF-DN 63	160	15	ALMA-M-CF-015-V-U	1020180	10/11	
			Hollow Shaft	Cooled				customer specific		
			Hollow Shaft	Non-Cooled				customer specific		
Low -/High Vacuum	KF-Flange	Solid shaft	Cooled				customer specific			
		Solid shaft	Non-Cooled	KF-DN 25	95	8	ALMA-M-KF-008-V-U	1020293	12/13	
				KF-DN 32	115	10	ALMA-M-KF-010-V-U	1020294	12/13	
				KF-DN 40	150	12	ALMA-M-KF-012-V-U	1020292	12/13	
				KF-DN 50	160	15	ALMA-M-KF-015-V-U	1020295	12/13	
			Hollow Shaft	Cooled				customer specific		
			Hollow Shaft	Non-Cooled				customer specific		
Low -/High Vacuum	ISO-K-Flange	Solid shaft	Cooled				customer specific			
		Solid shaft	Non-Cooled	ISO-K-DN 63	160	15	ALMA-M-ISO-K-015-V-U	1020628	14/15	
			Hollow Shaft	Cooled				customer specific		
			Hollow Shaft	Non-Cooled				customer specific		
Ultra High Vacuum						customer specific				

Standard types can be supplied ex stock

■ ALMA-Flange Feedthroughs, magnetic fluid sealed

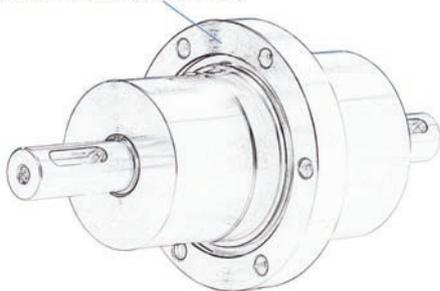
The ALMA flange feedthrough offers all the design freedom you wish for your vacuum chamber. You can build the mounting according to individual requirements of your system.

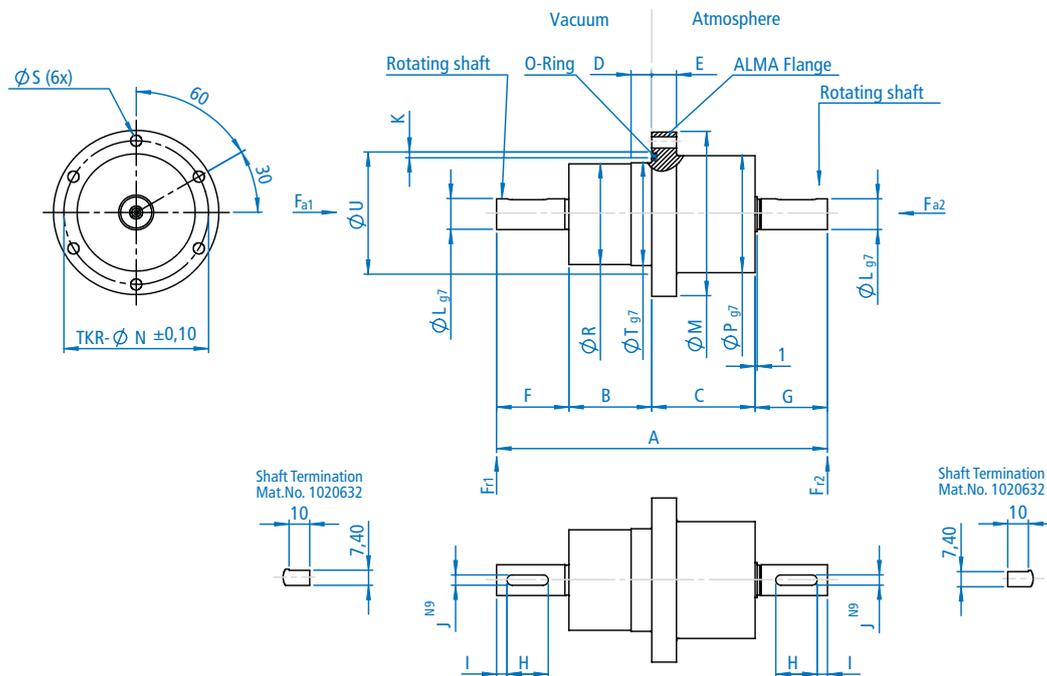
Furthermore the ALMA flange offers a much higher mounting and positioning accuracy for the feedthrough inside the chamber.



Leakage rate	$< 1 \times 10^{-8}$ mbar x l/s
Vacuum pressure	to 10^{-8} mbar
Bearing	Lifetime lubrication
Housing	Stainless Steel
Shaft	Stainless Steel, magnetic

The ALMA flange offers you highest flexibility and all the freedom you need to design your vacuum chamber. No additional centerings are necessary.





Model no.		ALMA-M-AF-008-V-U	ALMA-M-AF-010-V-U	ALMA-M-AF-012-V-U	ALMA-M-AF-015-V-U
Order no.		1020632	1020631	1020630	1020629
Flange type		ALMA Flange	ALMA Flange	ALMA Flange	ALMA Flange
Max. speed		10,000 min ⁻¹	10,000 min ⁻¹	7,500 min ⁻¹	9,000 min ⁻¹
Max.torque capacity*		5.00 Nm	9.00 Nm	16.00 Nm	32.00 Nm
Moment of friction		0.10 Nm	0.15 Nm	0.20 Nm	0.35 Nm
Temperature range		20-90°C	20-90°C	20-90°C	20-90°C
Weight in kg		0.300	0.550	0.950	1.600
Max. axial load on shaft **	F _{a1}	30.00 N	50.00 N	50.00 N	150.00 N
	F _{a2}	30.00 N	50.00 N	50.00 N	150.00 N
Max. radial load on shaft**	F _{r1}	30.00 N	75.00 N	75.00 N	200.00 N
	F _{r2}	30.00 N	75.00 N	75.00 N	200.00 N
Lengths and diameters in mm:	A	95.0	115.0	150.0	160.0
	B	8.0	12.0	30.0	40.0
	C	34.0	46.0	55.0	50.0
	D	--	--	5.0	10.0
	E	10.0	12.0	12.0	12.0
	F	30.0	30.0	35.0	35.0
	G	23.0	27.0	30.0	35.0
	H (2x)	--	17.0	20.0	20.0
	I (2x)	--	4.0	5.0	5.0
	J (2x)	--	3.0	4.0	5.0
	K	2.0	3.0	3.0	3.0
	L	8.0	10.0	12.0	15.0
	M	48.0	55.0	66.0	80.0
	N	TKR 40 +/- 0.10	TKR 48 +/- 0.10	TKR 56 +/- 0.10	TKR 70 +/- 0.10
	P	28.0	38.0	45.0	57.0
	R	28.0	30.0	36.0	49.0
	S (6x)	3.4	4.5	5.5	5.5
	T	--	--	37.0	50.0

* Basis for torque capacity calculation are average values. ** Calculation values for max. load cover 95 % of all applications. ALMA offers individual calculations for all extreme application values.

Delivery -/spare parts	O-Ring 29x1.5 80 FPM	O-Ring 34x3 80 FPM	O-Ring 40x3 80 FPM	O-Ring 52x3 80 FPM
Order no.	1020649	1019923	1004737	1005160

■ ALMA-Flange Feedthroughs for Easy Connection

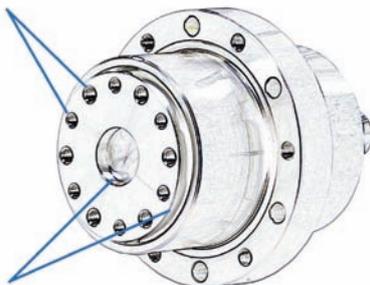
These feedthroughs offer highest flexibility for the connection of the mounted parts within your vacuum chamber. The shortened shaft end has a flange connection with two centering devices. For the connection of all further mountings you can choose between two different thread sizes. At the atmospheric side you find a pitch circle at the housing with fastening screw threads for mounting devices, such as torque supports, motor flanges etc.



Leakage rate	$< 1 \times 10^{-8}$ mbar x l/s
Vacuum pressure	to 10^{-8} mbar
Bearing	Lifetime lubrication
Housing	Stainless Steel
Shaft	Stainless Steel, magnetic

Vacuum side

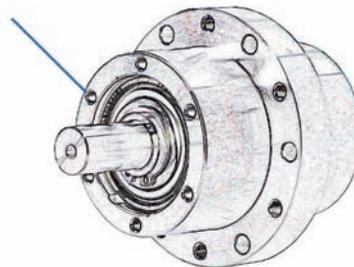
Two different thread sizes on a pitch circle give you high flexibility for connection.



Two centering devices are available for connection of components on the vacuum side

Atmosphere side

You can easily connect devices at the threads of the pitch circle



Combine these feedthroughs with drive solutions (p.19): www.alma-driving.de

■ ALMA-Flange Feedthroughs, Short Type with Integrated Hollow Shaft

These feedthroughs also offer high flexibility for the connection of mounted components within your vacuum chamber. Different media can be led through the integrated hollow shaft, e.g. cables or tubes. The shortened shaft end has a flange connection with two centering devices. For the connection of all further devices you can choose between two different thread sizes. At the atmospheric side you find a pitch circle at the housing with fastening screw threads for mounting devices, such as torque supports, motor flanges etc.

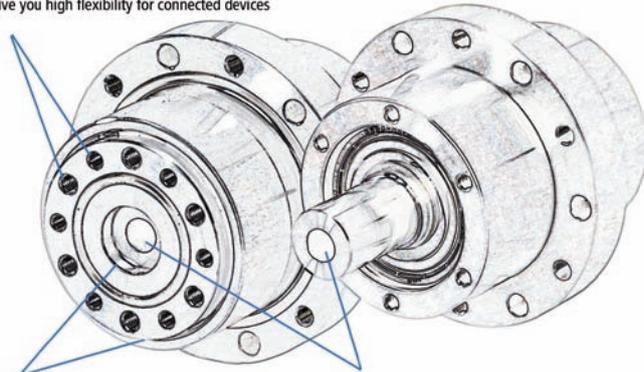


Leakage rate	$< 1 \times 10^{-8}$ mbar x l/s
Vacuum pressure	to 10^{-8} mbar
Bearing	Lifetime lubrication
Housing	Stainless Steel
Shaft	Stainless Steel, magnetic

Vacuum side

Atmosphere side

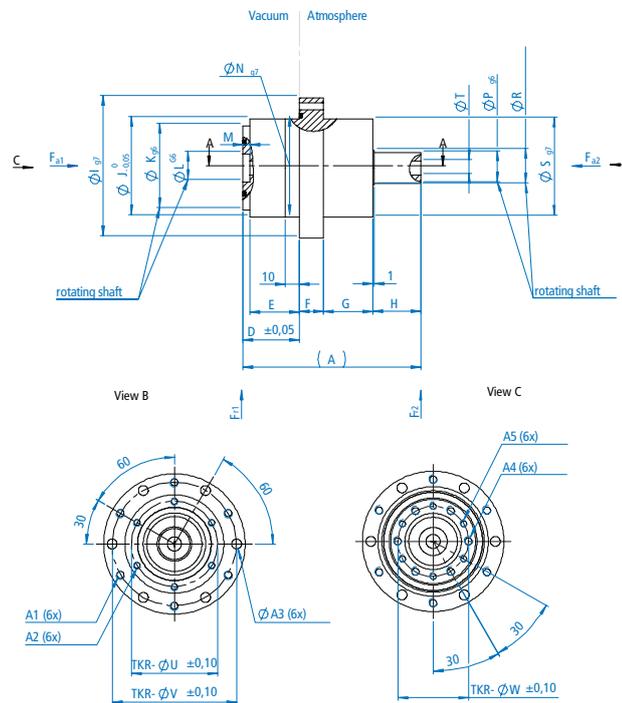
Two different thread sizes on a pitch circle give you high flexibility for connected devices



Easy centering of devices on the vacuum side

You can easily lead different media, e.g. cable or tubes through the integrated hollow shaft

You need the right vacuum screws ?
You find our wide selection on the internet:
www.alma-driving.de



Model no.		ALMA-H-AF-008-A-U	ALMA-H-AF-010-A-U		ALMA-H-AF-008-A-U	ALMA-H-AF-010-A-U
Order no.		1020635	1019200		1020635	1019200
Flange type		ALMA Flange	ALMA Flange			
Max. speed		4,000 min ⁻¹	2,000 min ⁻¹			
Max.torque capacity*		30.00 Nm	70.00 Nm			
Moment of friction		0.45 Nm	0.5 Nm			
Temperature range		20-90°C	20-90°C			
Weight in kg		1.500	3.000			
Max. axial load on shaft **	F_{a1}	300.00 N	300.00 N			
	F_{a2}	300.00 N	300.00 N			
Max. radial load on shaft**	F_{r1}	300.00 N	300.00 N			
	F_{r2}	300.00 N	300.00 N			
Lengths and diameters in mm:						
	A	100.0	126.0	T	TKR- 50 ±0.10	TKR- 61 ±0.10
	$D \pm 0,05$	34.0	40.0	U	TKR- 72 ±0.10	TKR- 88 ±0.10
	E	30.0	35.0	V	TKR- 36 ±0.10	TKR- 50 ±0.10
	F	15.0	17.0	A1	M5-through (6x)	M6-through (6x)
	G	30.0	35.0	A2	M4-8 deep(6x)	M5-10 deep (6x)
	H	21.0	34.0	A3	5.5-through (6x)	7-through (6x)
	I_{g7}	80.0	100.0	A4	M5-6 deep(6x)	M6-8 deep (6x)
	$J^0_{-0,05}$	53.95	69.95	A5	M4-6 deep (6x)	M5-8 deep(6x)
	K_{g6}	44.0	60.0			
	L_{G6}	16.0	20.0			
	M	3.0	5.0			
	N_{g7}	54.0	70.0			
	P_{g6}	14.0	22.0			
	R	15.0	24.4 ⁰ _{-0,05}			
	S_{g7}	58.0	70.0			
	T	8.0	10.0			

* Basis for torque capacity calculation are average values. ** Calculation values for max. load cover 95 % of all applications. ALMA offers individual calculations for all unusual applications.

Delivery-/ spare parts		O-Ring 40x2.5 80 FPM	O-Ring 34x3 80 FPM			
Order no.		1014822	1019923			

■ CF-Flange Feedthroughs, Magnetic Fluid Sealed

This feedthrough type can be comfortably adapted to the origin by the CF flange. The CF copper seal is part of the feedthrough.

The basis for all technical data are average values which cover 95 % of all applications. We intentionally do not print unusual values in this brochure which defines standard products. We offer to calculate parameters individually if you are working with unusual applications.



Leakage rate	$< 1 \times 10^{-8}$ mbar x l/s
Vacuum pressure	to 10^{-8} mbar
Bearing	Lifetime lubrication
Housing	Stainless Steel
Shaft	Stainless Steel, magnetic



■ KF-Flange Feedthroughs, Magnetic Fluid Sealed

This feedthrough type is very attractive in price. An O-ring is part of the delivery and is also deliverable as a spare part. This feedthrough can be supplied in flange types KF-DN 25, 32, 40 and 50.

On our homepage you can download CAD-data in .igs- and .dxf-format directly and also the corresponding data sheets for each single feedthrough.

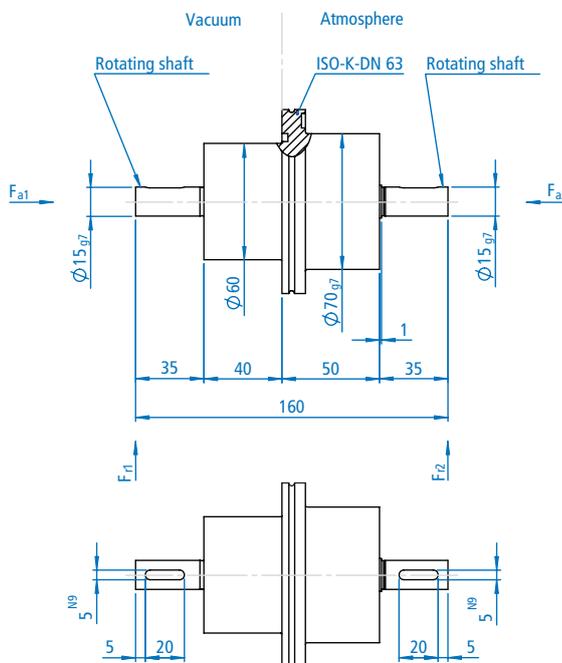


Leakage rate	$< 1 \times 10^{-8}$ mbar x l/s
Vacuum pressure	to 10^{-8} mbar
Bearing	Lifetime lubrication
Housing	Stainless Steel
Shaft	Stainless Steel, magnetic

ISO-K-Flange Feedthroughs, magnetic fluid sealed

This feedthrough was developed for ISO-K flange situations. More designs will be standardized in the near future and included in the catalogue.

Standard feedthrough types can be supplied ex stock. For customised requirements we react quickly and readily to your specific needs.



Model no.	ALMA-M-ISO-K-015-V-U	
Order no.	1020628	
Flange type	ISO-K-DN 63	
Max. speed	9,000 min ⁻¹	
Vacuum pressure	to 10 ⁻⁸ mbar	
Leakage rate	< 1 x 10 ⁻⁸ mbar x l/s	
Max. torque capacity*	32.00 Nm	
Moment of friction	0.4 Nm	
Temperature range	20-90°C	
Weight in kg	2.400	
Max. axial load on shaft **	F _{a1}	150.00 N
	F _{a2}	150.00 N
Max. radial load on shaft**	F _{r1}	200.00 N
	F _{r2}	200.00 N
Bearing	Lifetime lubrication	
Housing material	Stainless steel	
Shaft material	Stainless steel, magnetic	

* Basis for torque capacity calculation are average values

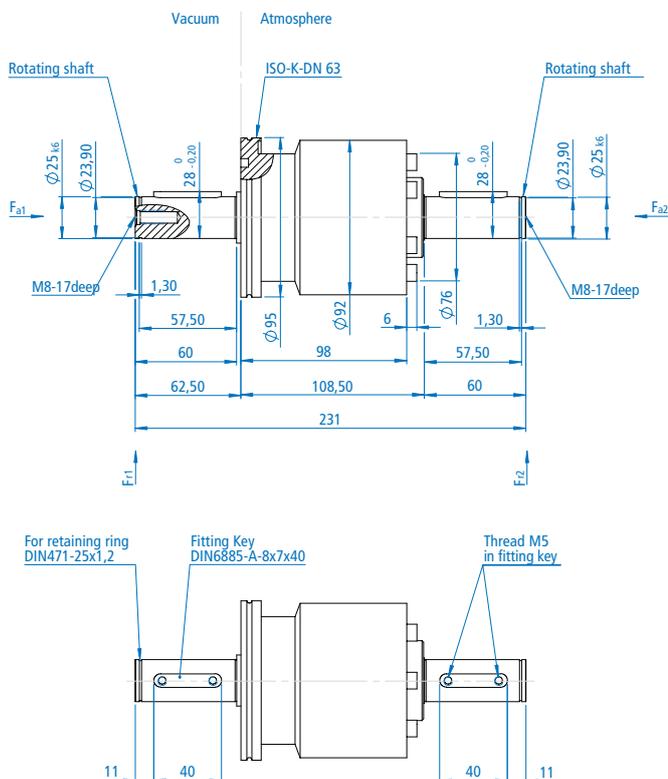
** Calculation values for max. load cover 95 % of all applications

ALMA offers individual calculations for all unusual applications

■ ISO-K-Flange Feedthroughs, magnetic fluid sealed

This type of ISO-K-Flange feedthrough was developed for high torque capacity of the shaft. It can also tolerate high radial loads. The shaft can easily be connected with the integrated fitting keys.

This feedthrough can also be delivered ex-stock at an attractive price.



Model no.	ALMA-M-ISO-K-025-A-U	
Order no.	1017627	
Flange type	ISO-K-DN 63	
Max. speed	1,500 min ⁻¹	
Vacuum pressure	bis 10 ⁻⁸ mbar	
Leakage rate	< 1 x 10 ⁻⁸ mbar x l/s	
Max. torque capacity*	110.00 Nm	
Moment of friction	0.8 Nm	
Temperature range	20-90°C	
Weight in kg	4.800	
Max. axial load on shaft**	F_{a1}	300.00 N
	F_{a2}	300.00 N
Max. radial load on shaft**	F_{r1}	500.00 N
	F_{r2}	500.00 N
Bearing	Lifetime lubrication	
Housing material	Stainless steel	
Shaft material	Stainless steel, magnetic	

* Basis for torque capacity calculation are average values

** Calculation values for max. load cover 95 % of all applications
ALMA offers individual calculations for all unusual applications

Customer Specific Feedthroughs

We work continuously on the development of our feedthroughs in order to offer you a large range of feedthroughs for standard applications. Feedthrough parameters can often be adjusted from the standard values.

Specific mounting configurations, the magnetic fluid, position of bearings,

cooling etc. We offer you the development and construction of feedthroughs which are completely customized to your specific needs and conditions.

These pages include examples of customised feedthroughs.



HV High Vacuum, ALMA-flange, Solid Shaft, Water Cooled

Application in coating system for LCD-displays. The feedthrough had to be constructed at low height und additionally an angular gear had to be integrated. The construction of the feedthrough body ensures that high radial loads can be accomodated.



HV High Vacuum, ALMA-flange, Hollow Shaft, Water Cooled

Application in substrate carrier sytem drive. Substrates had to be coated inside a vacuum chamber. The hollow shaft is driven by a synchron-tooth belt which was directly integrated into the feedthrough.



HV High Vacuum, ALMA-flange, Hollow Shaft, No Water Cooling

Application in chemical process analysis (gas chromatography). Here the customer's assembly conditions were extremely cramped. The exit slots for the synchron belt were directly integrated into the feedthrough body.



HV High Vacuum, ALMA-flange, Solid Shaft, No water cooling

Application in shutter drive of a coating system. The unusual design of the feedthrough body had to be adapted to the limited space within the assembly area.



HV High Vacuum, ALMA-flange, Hollow Shaft, No water cooling

This hollow shaft feedthrough with a large internal diameter was built with an extremely low height. Through the use of an integrated highly rigid bearing, extremely high radial loads were possible with this feedthrough.



HV High Vacuum, ALMA-flange, Solid Shaft, No water cooling

This was an application in a transport system for a hard-disc coating system. It was built as a small, compact product to meet the customers small assembly space. The specific shaft end was constructed for direct assembly onto the customers device.



Ultra High Vacuum, ALMA-flange, metallic seal, Hollow Shaft

This application in a wafer handling system under ultra high vacuum conditions required leak free operation and an ultra clean environment. To achieve this we used a metal seal as the static seal. ALMA developed a revolutionary sealing technology. The static pole piece was assembled via metallic continuity to avoid any kind of leakage.

Questionnaire

Magnetic fluid Sealed Feedthroughs

(Please complete and fax to +49/(0)9394/9700-50)

Company name	
Name, first name	
Department	
Street address/post box	
Zipcode and city	
Country	
Phone no.	
Fax no.	
email	

1	What vacuum range do you need inside the chamber ?	max. _____ mbar
2	Which medium is to be sealed ?	<input type="checkbox"/> Vacuum <input type="checkbox"/> Other gases: _____
3	Shaft type	<input type="checkbox"/> Solid shaft _____ NW _____ DIA mm <input type="checkbox"/> Hollow shaft _____ NW _____ DIA _{outer} mm _____ DIA _{inner} mm
4	How is the feedthrough to be fitted to the chamber ?	<input type="checkbox"/> ALMA-flange with O-Ring <input type="checkbox"/> ISO-KF-flange <input type="checkbox"/> CF-flange <input type="checkbox"/> ALMA-flange with metal sealing <input type="checkbox"/> ISO-K-flange
5	What max. speed is to be transferred ?	_____ U x min ⁻¹
6	What is the max. torque capacity ?	_____ Nm
7	What are the max. loads? - axial vacuum side - axial atmospheric side - radial vacuum side - radial atmospheric side	F _{a1} = _____ N F _{a2} = _____ N F _{r1} = _____ N F _{r2} = _____ N
8	What working temperature is the feedthrough exposed to?	_____ °C
9	Is cooling required?	<input type="checkbox"/> Yes <input type="checkbox"/> No
10	What is the position of the feedthrough?	<input type="checkbox"/> vertical ceiling <input type="checkbox"/> vertical ground <input type="checkbox"/> horizontal <input type="checkbox"/> Others _____
11	How large is the max. drilling diameter at the chamber wall ?	_____ NW _____ DIA mm
12	Is the total length of the feedthrough limited ?	<input type="checkbox"/> No <input type="checkbox"/> Yes _____ mm
13	Is a drawing of mounting area and chamber available ?	<input type="checkbox"/> Yes, attached <input type="checkbox"/> No
14	Please send quotation	<input type="checkbox"/> Yes, until latest: _____ no. of pcs.: _____

ALMA Products at a Glance

Products for Drive and Vacuum Applications



Precision Bearing Units

These products feature high true running accuracy of the rotating shaft. A high precision anti-friction bearing causes an extremely low starting and drag torque. The bearing units can be used in various applications. For instance, in vacuum applications and combining with a magnetic fluid sealed rotary feedthrough.



Vacuum Screws

Junctions of vacuum chambers can be vented quickly and economically with ALMA vacuum screws. The screws are manufactured in A2, the threads are completely rerolled, silver-plated and ultrasonically-cleaned. The threads are absolutely true to form and dimension which avoids cold sets and there is no need for thread inserts.



Shaft Nuts and Metal Bellow Couplings

With ALMA shaft nuts distortions of the nut during the installation can be avoided easily. They provide high axial force and feature an improved inherent stability. Drag torques can be transmitted by ALMA Metal Bellow Couplings absolutely torsion stiff. Shaft nuts and couplings are produced in stainless steel and are temperature proof to 300 °C.



Modular Drive Solutions for Vacuum Applications

These modular drive solutions are for the introduction of any rotary motion into a vacuum chamber. The integrated feedthrough ensures vacuum cleanliness while motor flanges provide an uncomplicated connection to the drive module. The user can therefore choose between various stages of expansion.



Customer Specific System Solutions

ALMA offers the realization of customer specific system solutions in addition to standard products. ALMA provides consulting and design services. We also offer development, construction, production, installation and initial operation at the customers site and subsequent service.

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Products:

- Vacuum Feedthroughs,
Magnetic fluid sealed
- Precision Bearing Units
- Vacuum Screws
- Metal Bellow Couplings
- Shaft Nuts



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