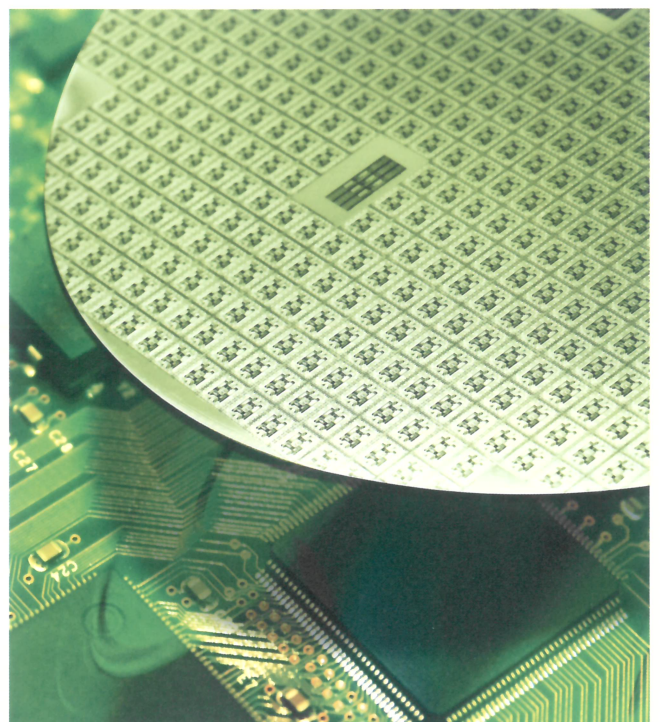
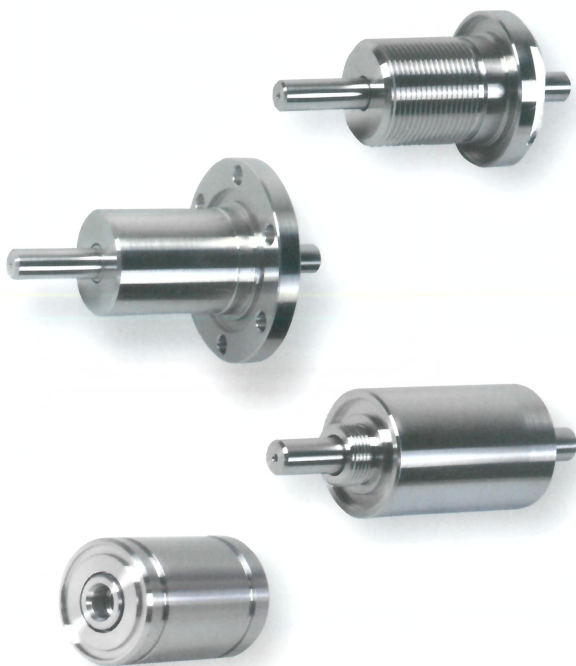
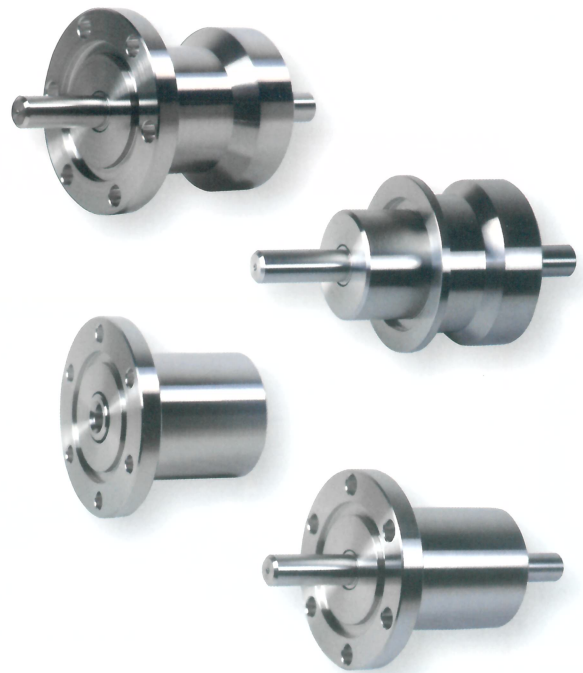


Rotary motion feedthroughs for vacuum and other environments

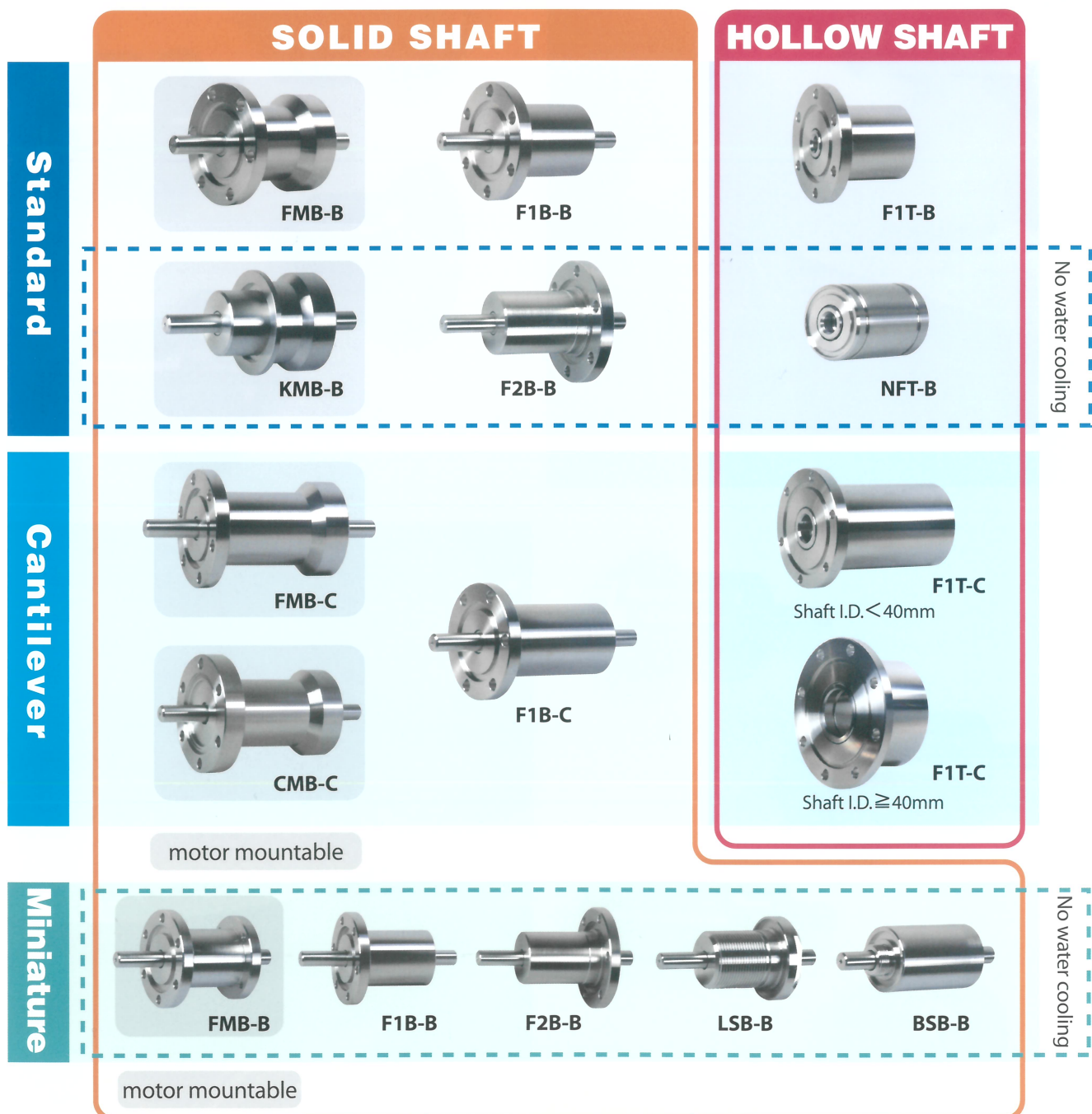
Rigaku Magnetic Seal Units



New standard products of Rigaku Magnetic Seal Units

You can find what you are looking for in our new product lineup.
There are three product lines classified from the structure as below.

- 1 **"Standard"** : Bearings are arranged in the vacuum side and the atmosphere side.
- 2 **"Cantilever"**: Bearings are not exposed to a vacuum.
- 3 **"Miniature"**: Shaft diameter is from 4mm to 8mm.



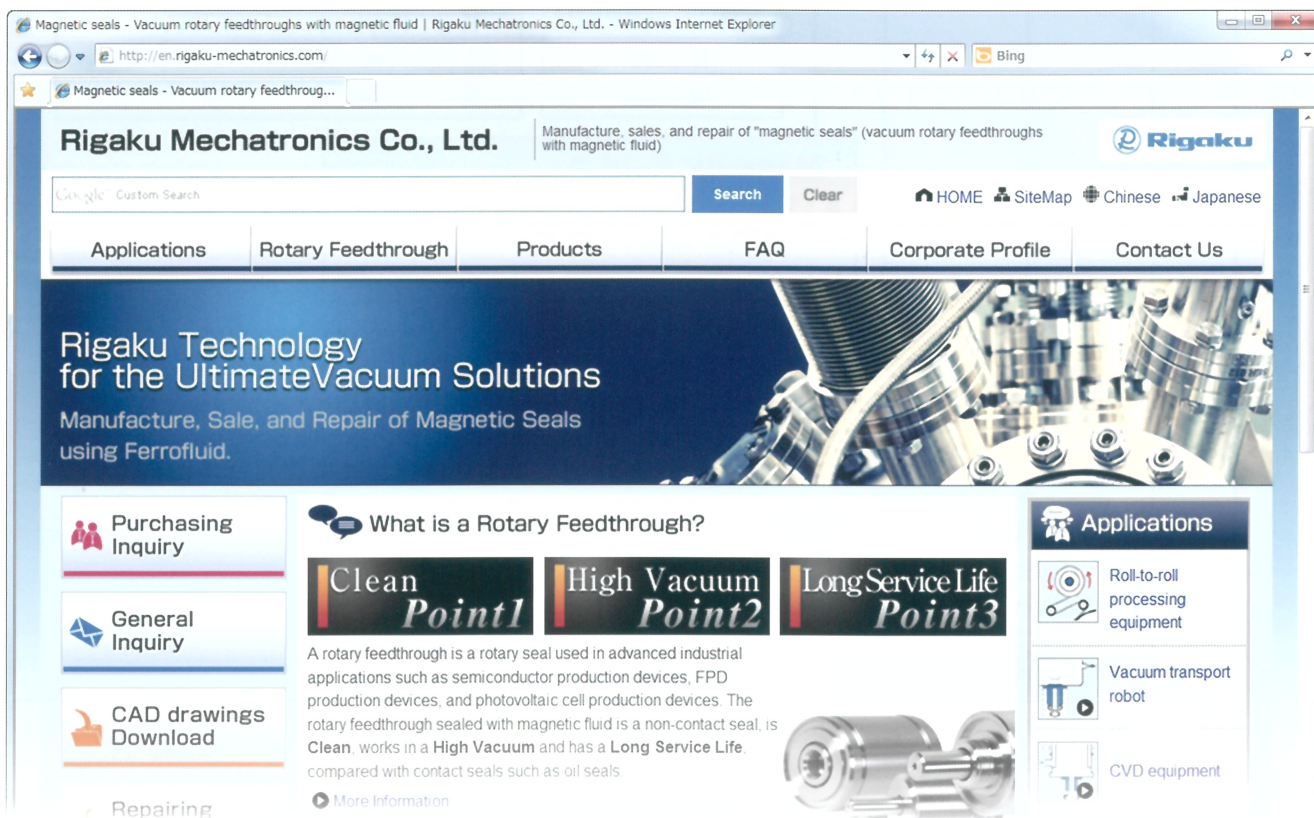
Get information from our website

<http://en.rigaku-mechatronics.com>

magnetic seal

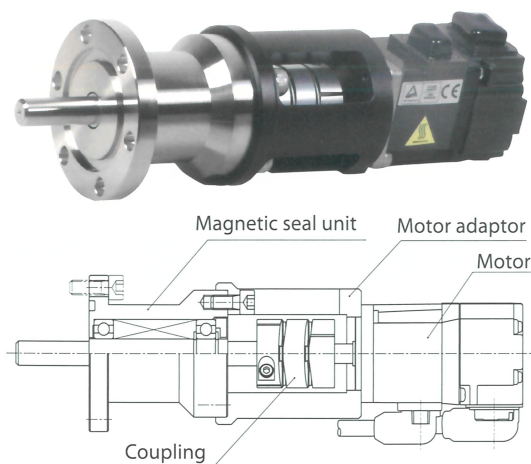
Search

- CAD drawings for all standard products are available for download.
- There is full of basic information about the Magnetic seals and the magnetic fluid. You can also watch the movie file of the magnetic fluid.
- In FAQ, you can clear up your questions about the Magnetic seals such as "adoption" "trouble" or "maintenance and overhaul".
- You can order the standard or the custom-made Magnetic seals on our website. You can also submit a request for repair.



Features of the new standard products

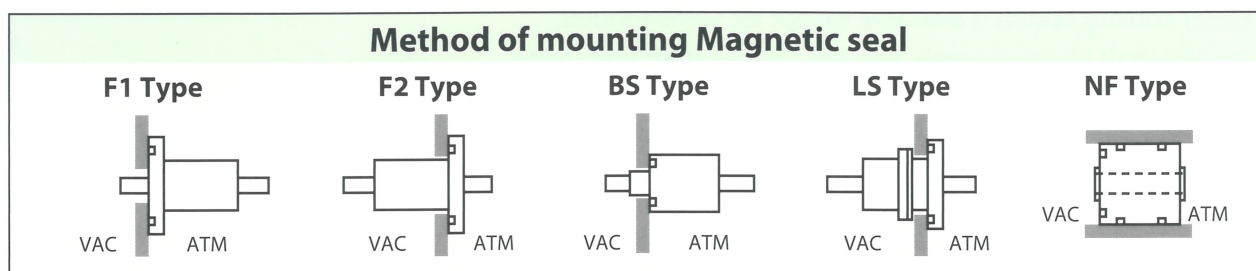
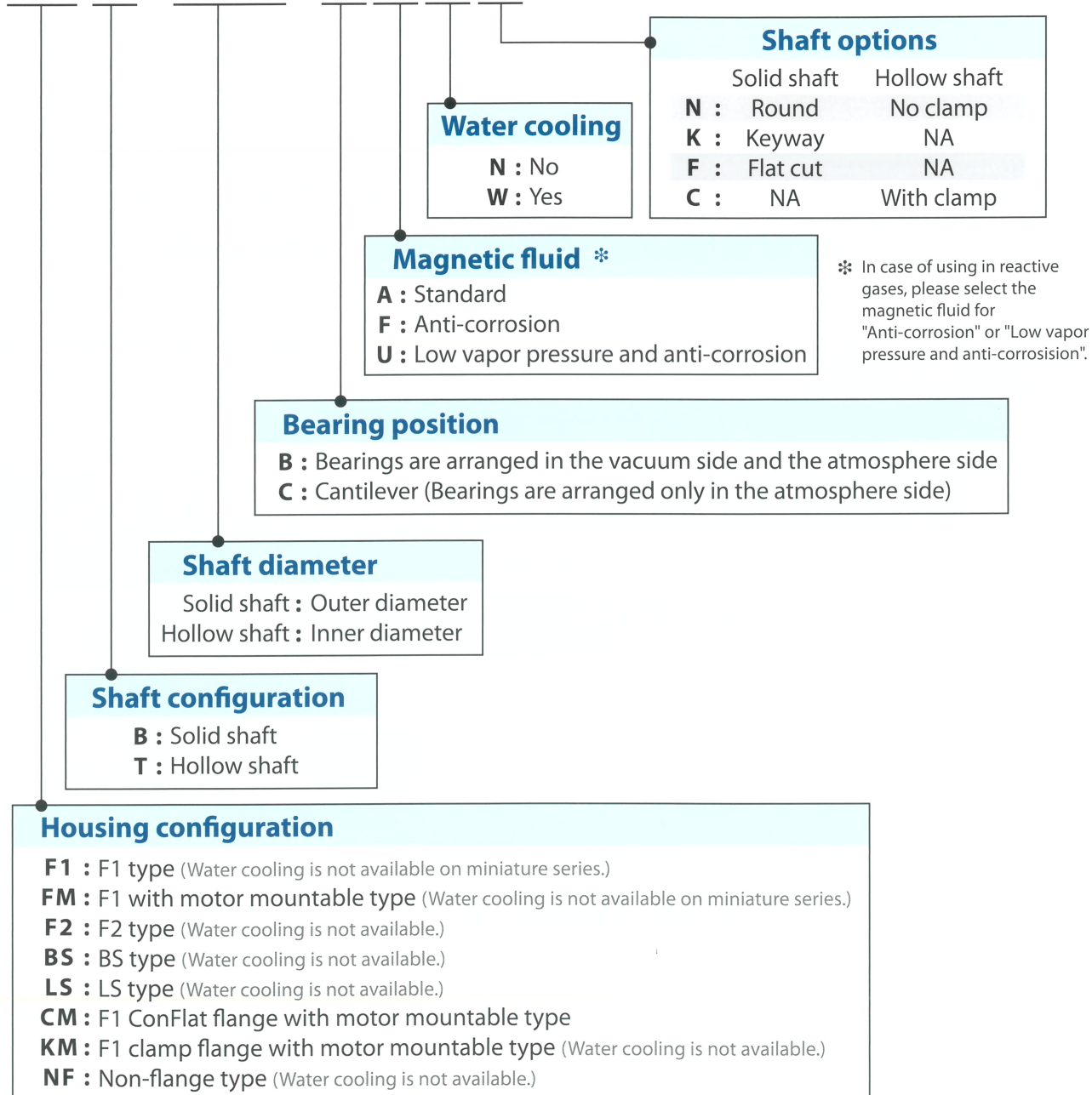
- Quick delivery
- "Cantilever series", bearings are not exposed to a vacuum, are added in standard products.
- Motor mountable Magnetic seals(Photo). Motor adaptor and coupling packages are also available.
- Water cooling option is available except for some models.
- In solid shaft Magnetic seals, you can choose shaft end shape out of "round", "flat cut" and "keyway".
- In hollow shaft Magnetic seals, you can choose shaft option either "with clamp" or "no clamp".



Basic information for new standard products

Model Designation

F1B-020-BANN



Common Specification

Operating pressure	From atmospheric pressure to 10^{-6} Pa	
Leak rate(He)	Less than 9.9×10^{-11} Pa·m ³ /sec	
Atmosphere	For vacuum, inert gas or reactive gas	
Material	Housing Shaft Pole piece Bearing O-ring	SUS304 SUS630 SUS630 SUJ2 FKM
	Bearing lubricant	Vac. side: Fluorinated vacuum grease Atm. side: Anti-corrosive grease
Standard accessories	O-ring Washer and nut (LSB series)	

Operating temperature range (NO WATER COOLING)

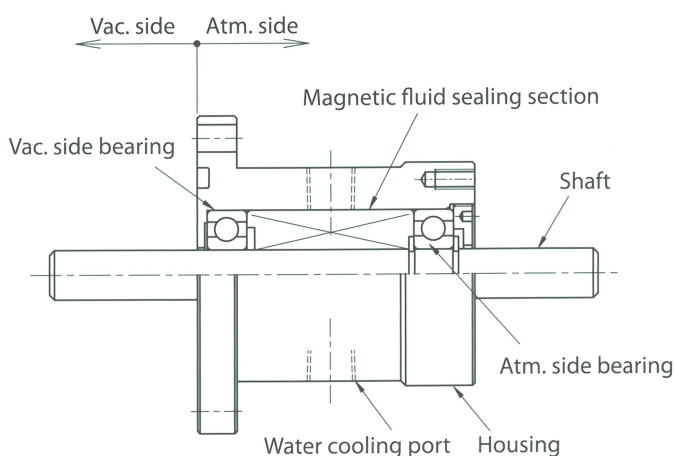
Temperatures listed below are indications for using Magnetic seals safely without water cooling. In the case of using Magnetic seals at out of range of those temperatures, water cooling may be required.

Magnetic fluid	Temperature
Standard	10 to 80 °C
Anti-corrosion	10 to 100 °C
Low vapor pressure and anti-corrosion	10 to 120 °C

Basic structure and Bearing arrangement

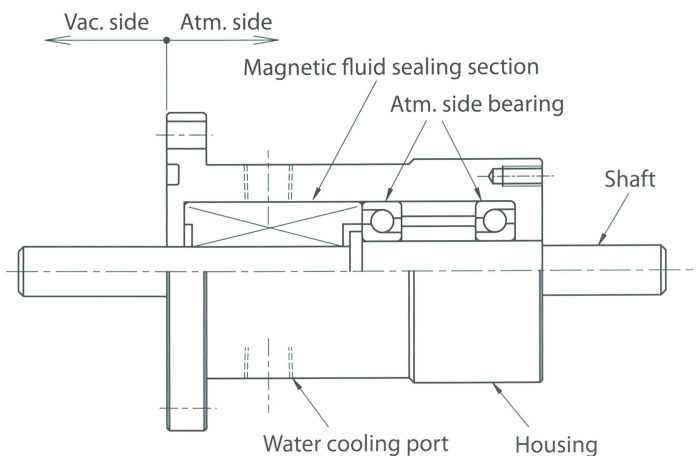
STANDARD

Bearings are arranged in the vac. and the atm. side



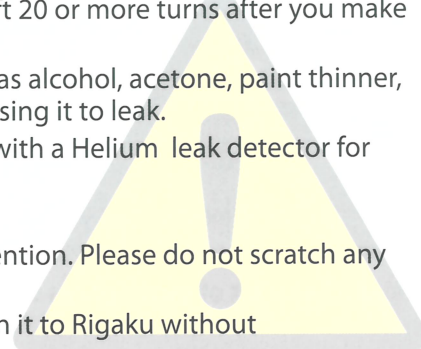
CANTILEVER

Bearings are arranged only in the atm. side



Handling Precautions

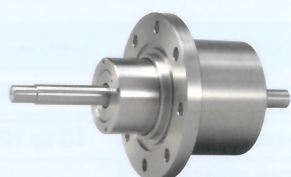
- When you operate the Magnetic seal unit for the first time, or when it has not been turned for two weeks or more, we suggest that it should be conditioned by rotating the shaft 20 or more turns after you make it vacuum.
- Do not use any solvents around the Magnetic seal unit! Solvents such as alcohol, acetone, paint thinner, etc., can attack the fluid sealing element in the Magnetic seal unit, causing it to leak.
- Do not use solvents or soap solution for leak testing! Always leak test with a Helium leak detector for best results.
- Install the Magnetic seal unit in the correct direction!
- The vacuum sealing surfaces of your Magnetic seal require careful attention. Please do not scratch any surface where an O-ring must seal.
- When the Magnetic seal unit requires overhaul or repairs, please return it to Rigaku without disassembling.



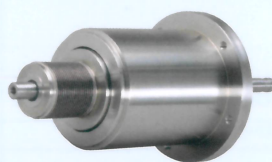
Custom-made models

Rigaku offers custom-made Magnetic seals matched with your requirements.

FOR VACUUM TRANSPORT ROBOTS



Multi-axial seals



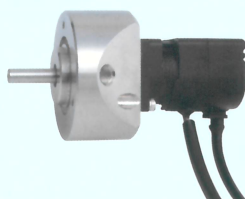
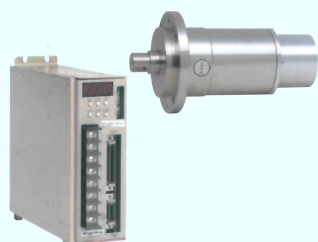
Bellows combination seals



Large diameter
dustproof seals

Rigaku's multi-axial seals are rigid and compact design, so the best choice for the large substrate handling robots. In addition, we can offer the bellows combination seals used where both rotary and linear motion is required.

MOTOR EQUIPPED MODELS



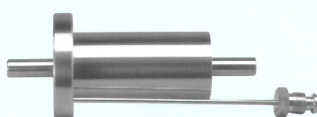
large diameter hollow shaft type

Low vibration, compac design and long service life.

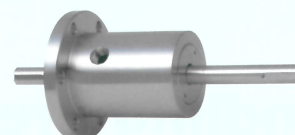
FUNCTION ENHANCED PRODUCTS



High-pressure type



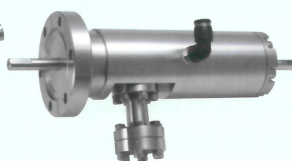
With a purge mechanism



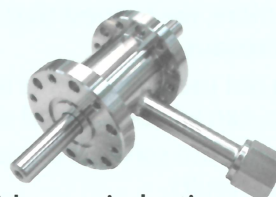
Vacuum chuck mechanism



Shaft extension type



Differential pumping type

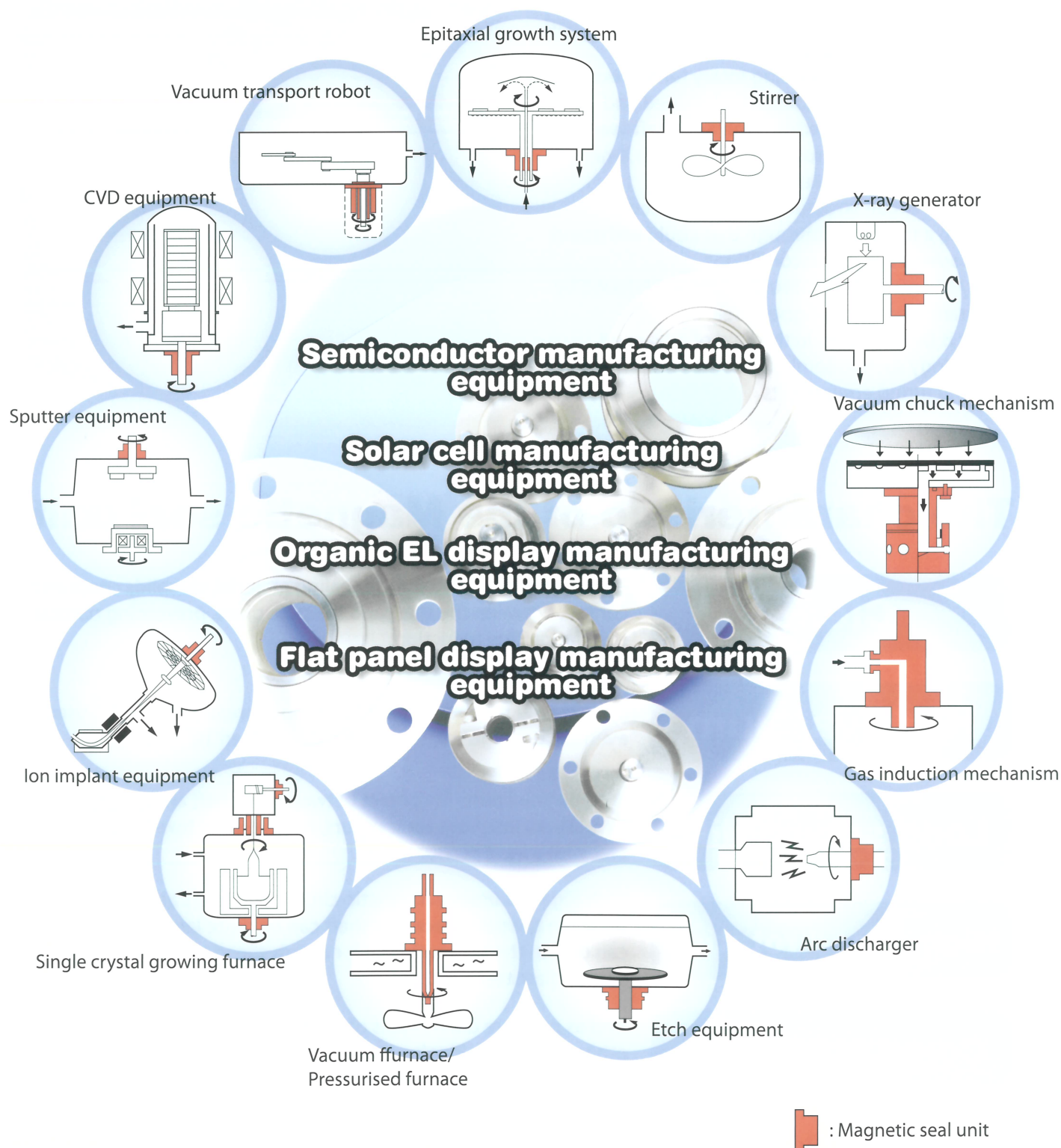


With a gas induction
mechanism

Rigaku has a lot of experiences of designing the Magnetic seals of various shape and the functions.

Application examples

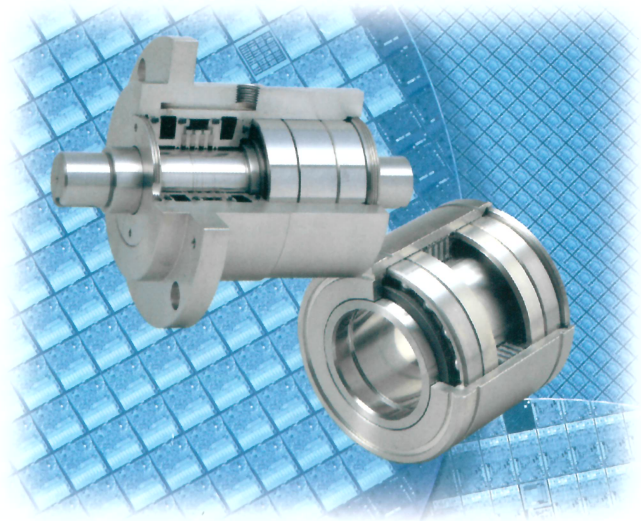
Magnetic seal unit is applied to wide range of manufacturing equipments for leading-edge industries.



Rigaku's Magnetic Seal Units

Magnetic seal unit, developed with Rigaku's own technologies, is the optimum tool for the introduction of rotary motion into vacuum or differential pressure environments.

The rotary feedthrough is a seal unit for rotating part that uses the remarkable property of magnetic fluid which is held by magnetic field of magnets. Rigaku has begun producing rotary feedthroughs since 1978, when our company designed and developed a rotary feedthrough as a shaft seal for the X-ray generator with rotating anode of an X-ray diffractometer. By developing a unique magnetic-circuit structure, Rigaku succeeded in creating a rotary feedthrough that could withstand these severe operating conditions. Today the rotary feedthrough of Rigaku is loved by the brand name of "Magnetic seal". And it is broadly used in the field of advanced technology such as semiconductor, FPD or solar cell manufacturing equipments.



The characteristic of the Magnetic seal unit

Clean

Because liquid is used for the sealing material, no solids come into contact between the shaft and the pole piece, preventing particle generation due to friction.

High vacuum

By using the magnetic fluid of low vapor pressure, it can be used even in ultra high vacuum region of less than 10^{-6} Pa.

Long service life

With no solid parts in contact between the shaft and pole piece, virtually no loss from wear occurs, resulting in a low-maintenance seal with a long service life.

High-speed rotation

With Rigaku's unique magnetic-circuit structure's ability, the gap between the pole piece and shaft can be quite large. So, Rigaku can design the Magnetic seal for a high speed rotation and having a large diameter shaft.

Compact design

And as pressure differentials of each stage of a seal are larger than other company's, Rigaku can design a Magnetic seal at a compact size.

help to provide a clean vacuum

Magnetic circuit configuration unique to Rigaku

Rigaku Magnetic seals form powerful magnetic fields repelled each other by arranging the same pole of the magnets on both sides of a pole piece (NS-SN-NS).

The tip of the pole piece inserted in this strong magnetic field is split in two, creating a independent magnetic circuit.

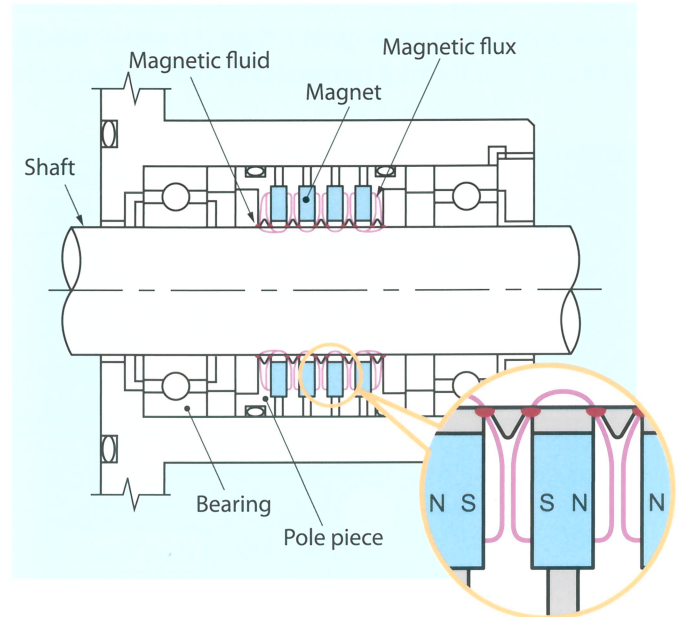
The repulsion effect between the two adjacent magnetic fields focuses the magnetic flux on the tips of the pole piece to hold the magnetic fluid firmly in place.

This arrangement enables each stage of the seal to withstand even large pressure differentials.

As a result, the Magnetic seals can be made compactly.

With this magnetic-circuit structure's ability to withstand even large pressure gradients, the gap between the pole piece and shaft can be quite large.

For the same reason, the Magnetic seals can design the product of a high speed rotation or a large diameter shaft.

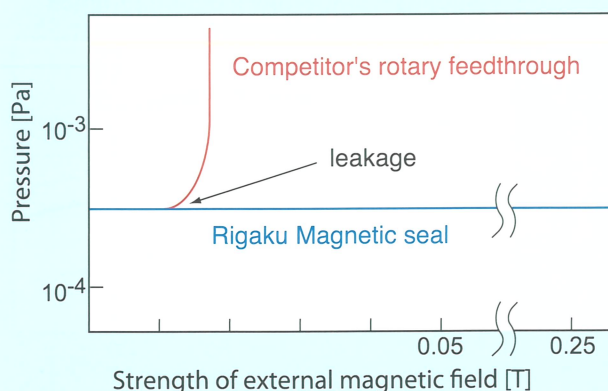


External magnetic field and magnetic-field leakage

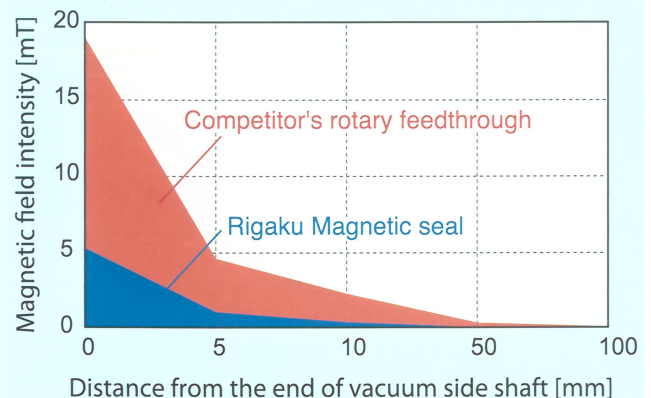
The magnetic circuit of Rigaku Magnetic seals are housed entirely within the pole piece. This structure offers the advantages of minimizing magnetic flux leakage from the Magnetic seal and protecting the magnetic field from influence from external magnetic fields.

As a result, Rigaku Magnetic seals are relied on applications both in equipment that must be shielded from external magnetic fields (such as those from electron-beam lithography system) and in equipment on which strong magnetic fields are applied (such as large diameter silicon growth system).

Comparison of resistance to external magnetic field



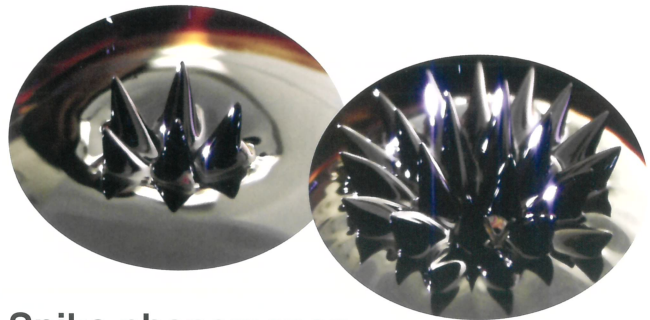
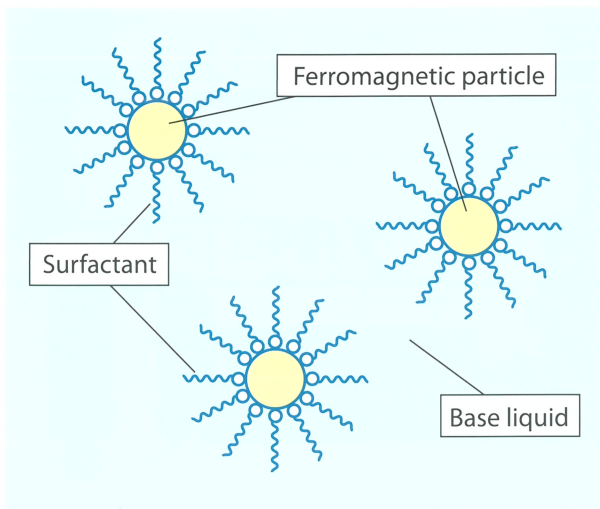
Comparison of magnetic field leakage



Magnetic fluid

Magnetic fluid is a fluid that is attracted to a magnet, just like iron. That has three main constituents: ferromagnetic particles such as magnetite, a surfactant, and a base liquid such as water or oil. The surfactant coats the ferromagnetic particles, each of which has a diameter of about 10 nm. This prevents coagulation and keeps the particles evenly dispersed throughout the base liquid. Its dispersibility remains stable in strong magnetic fields.

Main application of magnetic fluid is a rotary feedthrough. Magnetic fluid is held in place by the magnetic field and that forms a hermetically sealing liquid O-ring seal around a shaft of a rotary feedthrough.



Spike phenomenon

When you move magnet closer to magnetic fluid, you will find many spikes on its surface.

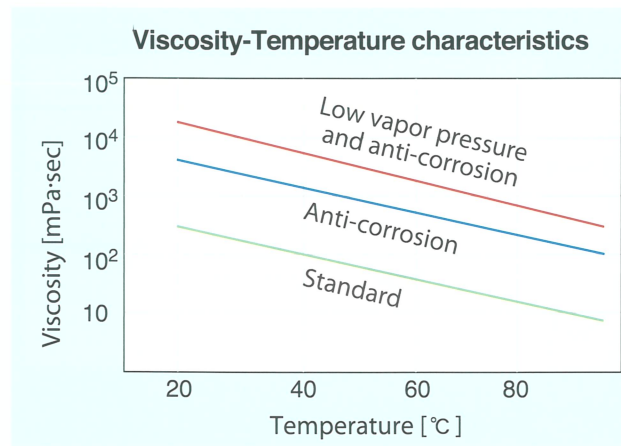
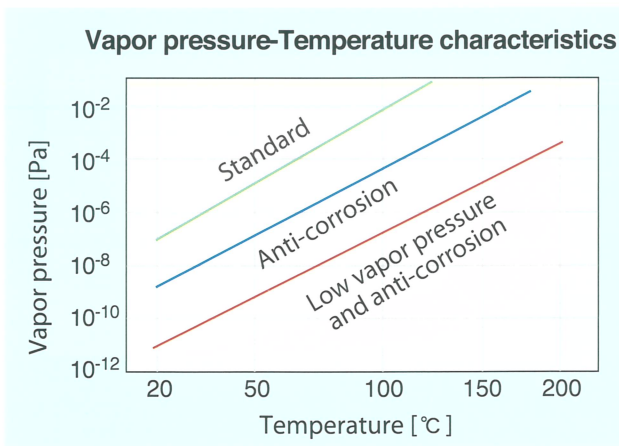
This performance of magnetic fluid is called "Spike phenomenon". The shape of spikes are determined by the balance of surface tension and magnetic force of magnet.

Characteristics of Rigaku's magnetic fluid

Rigaku has three types of magnetic fluid, "Standard", "Anti-corrosion" and "Low vapor pressure and anti-corrosion". We propose the magnetic fluid which is optimum to your specification.

The "vapor pressure - temperature characteristics" shows the relation between the temperature and the vapor pressure of the magnetic fluid. This is also called a "vapor pressure curve".

The "low vapor pressure" indicates that there is little evaporation even at a high temperature and a high vacuum. That is, the generation of the out gas that causes the contamination is also little.



Magnetic Seals Inquiry Form

Rigaku Corporation

Fax: 81-42-544-9605

Phone: 81-42-545-8188

Email: rm-info@rigaku.co.jp

Company name	Address
Department and Section	
Contact name	Phone
Email	Fax

Please fill in the blanks as much as you can in detail.

● Applications	
● Sealing conditions	<input type="checkbox"/> Vacuum : Base pressure () Pa • Process pressure () Pa
	<input type="checkbox"/> Pressurized : () kPa [G · abs]
	<input type="checkbox"/> Dust proof
● Environment	<input type="checkbox"/> Inert gas or air
	<input type="checkbox"/> Reactive gas (Gas species:)
● Shaft/Rotation	Shaft diameter () mm
	<input type="checkbox"/> Rotation : Speed () rpm
	<input type="checkbox"/> Rotary reciprocation : Speed () angle/sec • Frequency () Hz
● Transmission torque	() N·m
● Mounting	<input type="checkbox"/> Vertical /Top-mounted <input type="checkbox"/> Vertical /Bottom-mounted <input type="checkbox"/> Horizontal
● Temperature	<div>Environmental temperature Max. () °C • Usual () °C</div> <div>Temperature at the mounting surface Max. () °C • Usual () °C</div>
● Load (direction & location)	
● Water cooling available <input type="checkbox"/> Yes <input type="checkbox"/> No	

Special instructions

Global Locations



Rigaku Corporation
(Head office, Tokyo factory)



Rigaku Americas Corporation

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sale

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Rigaku Mechatronics Co., Ltd. has been certified according to ISO 9001.

URL <http://en.rigaku-mechatronics.com>

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