

AXIAL SEALS



In combination with radial shaft seal rings, VRM axial seals from DICHTOMATIK are an outstanding sealing system for diverse applications in powertrain technologies and machine-building.

Axial seals, which are upstream elements, protect housing interiors from dirt, dust and splash water. Each axial seal consists of a coated metal ring and an elastomer sealing element. If desired, the metal ring is also available in stainless steel.

Depending on the requirements, DICHTOMATIK offers a standard version (VRM 01) and a special variation with an extended metal ring (VRM 02). The seal is spread onto the metal ring but is not firmly bound to it. An axial rim collar helps to hold the ring in place.

Thanks to its centrifugal effect, the metal ring supports the sealing function and protects the elastomer sealing element from external mechanical effects. As the circumferential speed increases, the elastomer sealing element, animated by the centrifugal force, tends to move outward, reducing the contact pressure. If circumferential speed exceeds a limit, the sealing lip detaches from the metallic undersurface. The axial seal then merely functions as a gap seal and a thrower ring.

In addition to the standard version VRM 01, the VRM 02 offers an additional labyrinth effect. To ensure that the extended metal ring moves in the groove, a circumferential groove is provided. The resulting labyrinth in the housing groove works as a shield, protecting against impurities. For this reason, the VRM 02 is used in demanding applications with increased contamination from the exterior.

APPLICATIONS

Axial seals are primarily used in powertrain technologies and machine-building. Typical areas of application:

- Electric motors
- Gearboxes

- Pumps
- Power saws
- Cardan shafts
- Wheel hubs and axles
- Agricultural machinery
- Construction machinery
- Machine tools
- Roller bearing housings
- Washing machines

DIMENSIONS

The currently available dimensions can be found on our online ordering platform **EASY** and in our webshop at www.dichtomatik.com.

CHARACTERISTICS

Sealing materials and media resistance

Axial seals made of NBR (acrylonitrile butadiene rubber) and FKM (fluoro rubber) exhibit good chemical resistance to petroleum oils and greases. FKM is also highly resistant to synthetic oils and greases.

Requirements for the counter-surface

The VRM axial seal runs against a counter-surface arranged at a right angle to the shaft. For example, it can be the flange cover or the end wall of a bearing housing. The metallic bottom of a radial shaft seal ring is often used as a counter-surface as well. The requirements for the counter-surface are less stringent than those for radial shaft seal rings. They should have a finely processed surface, with a maximum Ra of 2 µm.



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Components made with injection-molded or cast light metal alloys as well as formed steel sheet metal can function as counter-surfaces without additional processing. But the material must not have surface deformations or flaws, such as sharp edges, burrs, shrinkage cavities, undulations, bumps or other imperfections.

Requirements for the shaft

To guarantee the required press-fit and a secure seat on the shaft, the shaft must be produced with a tolerance of ISO H9. An additional axial fixation is not required. In the event of roller bearings, the current ISO G6 or N6 tolerance can be defined as the manufacturing dimension. To achieve the proper pretensioning of the elastomer seal during mounting, the use of an axial block in the form of a shaft shoulder or a retaining ring is recommended. The surface roughness of the shaft must not exceed the value of $R_a = 4 \mu\text{m}$. To ease assembly, the shaft should be carried out with a chamfer at an angle of 10° to 20° . The transition should be polished to avoid sharp edges and burrs.



In comparison with other rotational seals, VRM axial seals are relatively insensitive to eccentricity, shaft runout and tilted shaft positions.

Mounting

VRM axial seals are easy to mount. If the elastomer sealing element is greased before mounting, the dynamic coefficient of friction and thus the operating life are improved. Adhesion after a relatively long stoppage can be avoided in this way. The axial seal should be pressed into the proper installation position with the help of an appropriate mounting tool under uniform pressure. If no axial block is provided in the installation space, the mounting tool must be designed in such a way that the axial pretensioning is maintained according to the specifications.

YOUR ADVANTAGES AT A GLANCE

- Multipurpose options for use
- Reliable protection against external contamination
- Due to its centrifugal effect, the metal ring provides added sealing function and protects the elastomer from damage
- Low requirements for surface quality on the counter-surface
- Good dynamic sealing effect
- No additional axial block required
- Easy mounting
- Simple sealing element with small mounting width

Profile	Type	Color	Material	Temperature (°C)	Circumferential speed (m/s)	Pressure
	VRM 01	Black	NBR	-40 to +100	≤ 12	Only designed for pressureless operation
		Brown	FKM	-30 to +180	≤ 12	
	VRM 02	Black	NBR	-40 to +100	≤ 12	Only designed for pressureless operation
		Brown	FKM	-30 to +180	≤ 12	

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