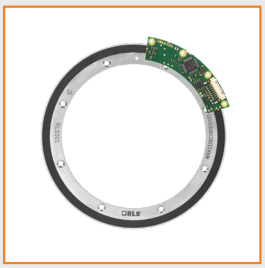
APPLICATION NOTE
MRAD01_01
Issue 01, 2nd December 2024

Axial magnetic rings
Installation types and properties

Correct installation of the magnetic ring is essential for optimal performance of the AksIM encoder. The magnetic ring must be securely fastened to a supporting structure. The method of attachment depends on the specific magnetic ring model, application requirements, desired strength and need for disassembly.

Related products



AksIM-4 off-axis absolute magnetic encoder

AksIM-2 off-axis absolute magnetic encoder

AksIM-2 redundant off-axis absolute magnetic encoder

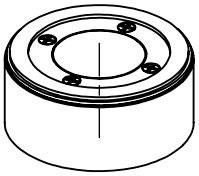
Installation instructions

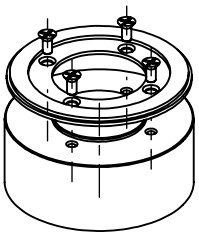
Magnetic ring must be secured and attached to a supporting structure. The choice of mounting type depends on the encoder ring type, specific application, required strength, the need for disassembly or permanence and safety requirements of the application. Installation surfaces must be clean and free of debris.

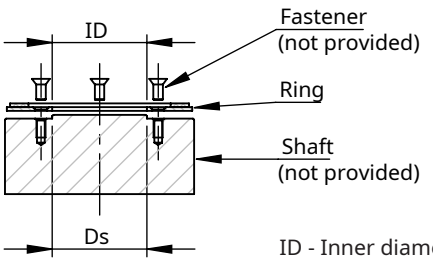
Installation with fasteners

Fastener mounting involves using screws, bolts, or fasteners to secure magnetic ring to the rotating shaft. The type of fasteners and the mounting torque depend on the magnetic ring type. The use of thread lockers is recommended. For correct tightening torque follow the guidelines in the document TTD01, which can be downloaded from **RLS Media center**.

Recommended fit: H7/g6







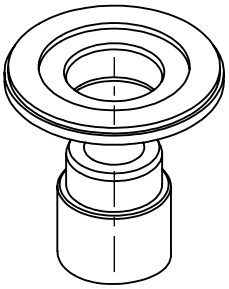
ID - Inner diameter
Ds - Diameter of the shaft

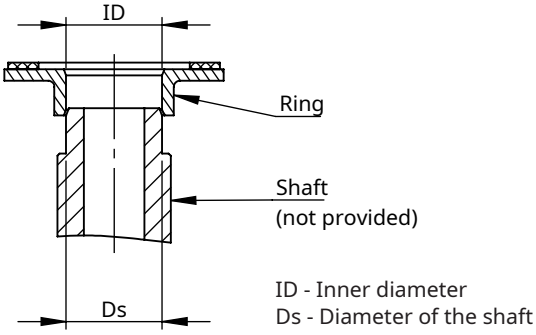
Installation by press-fitting

Press-fit mounting involves inserting one component into another with a tight fit without the use of additional fasteners. Assembly can be performed with cold pressing.

Press-fit of turned rings

Recommended interference fit between turned ring and shaft is H5/r5 or H5/s5.





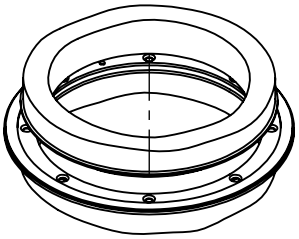
ID - Inner diameter
Ds - Diameter of the shaft

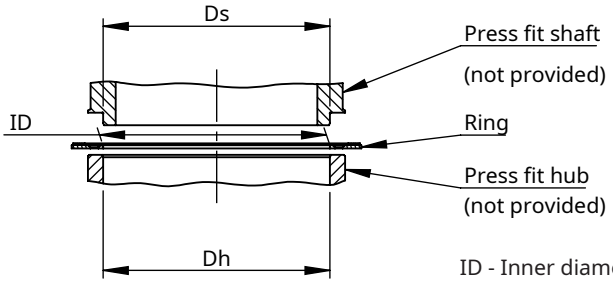
A shoulder on press-fit shaft is highly recommended for parallel alignment.

Installation with shrink-fit is not recommended, as extreme heat or cold may reduce the performance of the encoder (accuracy and strength of the magnetic field).

Press-fit of sheet metal rings, using an additional insert

Recommended interference fit between shaft and hub is S5/g5 or T5/g5.

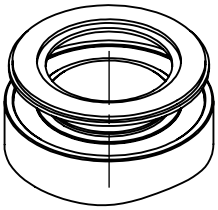


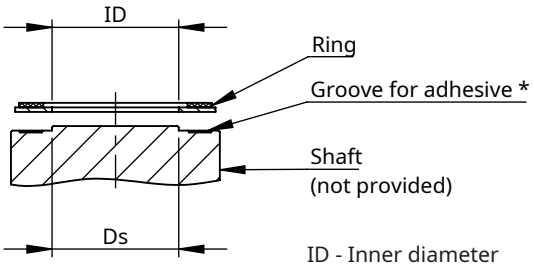


ID - Inner diameter
Ds - Diameter of the shaft
Dh - Diameter of the hub

Installation by gluing

Adhesive mounting relies on the use of adhesive materials such as glue or epoxy to bond objects together. Cleaning and degreasing of bonded surfaces are essential. Adhesive materials should be applied according to manufacturer's specification.





ID - Inner diameter
Ds - Diameter of the shaft

*Dimensions according to adhesive specifications.

Rings that can only be mounted with glue:
- MRA049BG034DSN00,
- MRA053BG040DSN00 and
- MRA080BG064DSN00.

It is possible to install any kind of AksIM-2 ring with glue. RLS does not recommend or supply any type of adhesive. Contact a local adhesive supplier for further assistance in selecting the correct adhesive.

What to consider when choosing the right adhesive:
- Good adhesion to the shaft material.
- Good adhesion to the metal part of the ring (the material is specified in the data sheet).
- Required temperature range and material expansion.
- Acceleration of the shaft in the end application.
- Minimum adhesive thickness (from the data sheet).
- The adhesive thickness must be very uniform so that the air gap between the ring and sensor does not vary.
- Mechanical shock and vibration tests as well as temperature cycles must be carried out to validate the assembly and prevent future failures.

Typical situations:
- Hard adhesive is susceptible to braking if the shaft and ring materials have very different coefficients of thermal expansion and temperature variations are large.
- Soft adhesives based on foam or double-sided tape may have a limited temperature range or could add metrology errors into the system.

Follow the recommended procedure supplied with the selected adhesive. Consult the user manual or ask the local distributor of the adhesive for assistance.

Typical procedure:
1. Clean the surfaces with alcohol, remove all particles, dust and grease.
2. Apply the adhesive to one or both surfaces.
3. Press the parts together evenly.
4. Ensure that the rubber part of the ring is not contaminated with adhesive.
5. Cure the adhesive (heat, force, duration, humidity ...).
6. Measure the air gap between the ring and the read head.

Mounting type	Advantages	Disadvantages
Fastener mounting	Best for SIL certification Secure attachment - high acceleration applications Adjustability Ease of installation Cost effective High temperature resistance Reusability and serviceability	Time consuming Damage to material Risk of over-tightening Vibration and loosening
Press-fit	SIL certification possible Secure attachment - high acceleration applications Time effective mounting Simplicity No additional components Improved mechanical integrity Narrow shaft diameter	Tolerance sensitivity Tooling requirements Risk of damage Permanent assembly
Adhesive mounting	Wide inner diameter of the ring Versatility Clean appearance	Not recommended for SIL certification Surface preparation Long curing times Limited temperature resistance Inconsistent results Aging and deterioration

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Document issues

Issue	Date	Page	Description
1	2. 12. 2024	-	New document