

## FlexAB™

### Absolute Magnetic Scale System for Large Diameters

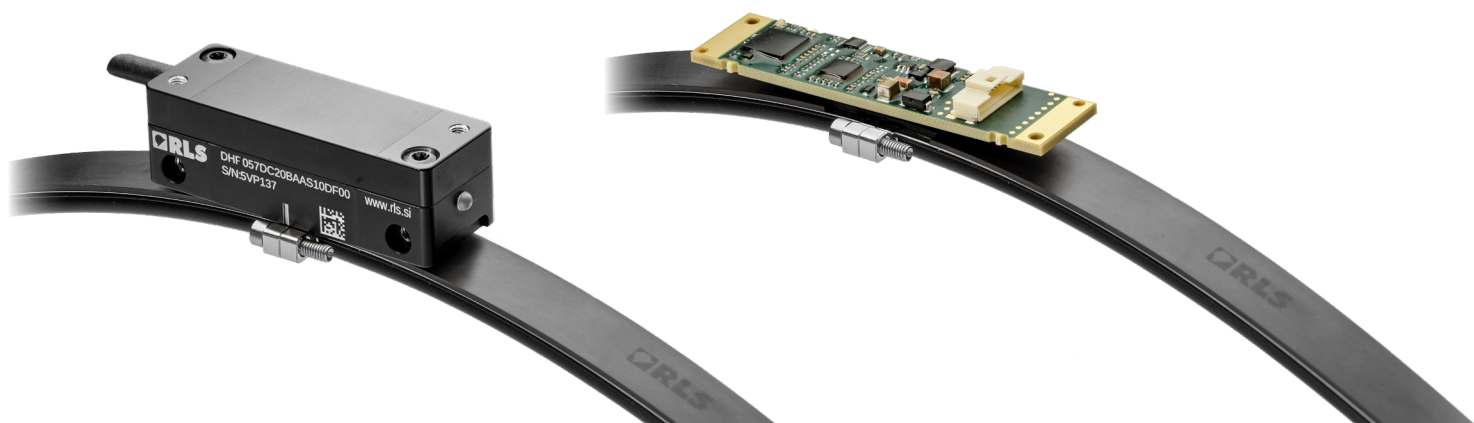
**FlexAB is a rubber-supported magnetic scale system with built-in tensioning mechanism compatible with Artos absolute rotary readheads.**

It is designed for installation on large shafts as an element of the position and speed control loop. The compact readhead has wide installation tolerances and offers industry-standard output types (SSI or BiSS) and parallel ABZ incremental signals for highly dynamic applications. The non-contact measuring principle ensures high reliability in demanding applications.

WIDE  
INSTALLATION  
TOLERANCES

WIDE  
TEMPERATURE  
RANGE

FLEXIBLE SHAFT  
DIAMETERS



### Features and benefits

- ▶ Rubber spring profile supported scale with built-in tensioning mechanism
- ▶ Wide operating temperatures
- ▶ For external diameter installation
- ▶ For diameters from 500 mm to 2,500 mm
- ▶ Full circle measurements
- ▶ Substrate thermal expansion compensation
- ▶ Large allowable shaft diameter tolerance  $\pm 0.2$  mm



## General information

The FlexAB magnetic scale system is compatible with RLS absolute Artos readhead, which ensures reliable operation due to the non-contact design.

Artos readhead provides a true-absolute position information immediately after power-on via the selected communication protocol. The encoder system is extremely reliable due to the large installation tolerances (axial/radial/tangential offset) and the robust design, which can withstand high temperatures.

The readhead is available in two versions: enclosed IP67 rated and PCB-A module. For more information about Artos readheads refer to [DRD01](#) and [DBD01](#).

## Choose your FlexAB system

### FlexAB scale

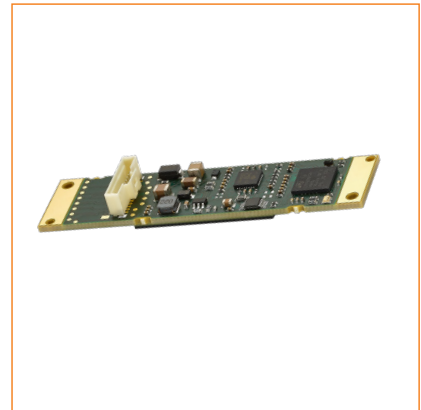


### Artos readhead



Choose the DHF readhead for harsh environments and EMC demanding applications. The enclosed readhead is easier to install. More about the enclosed readhead can be found in the DRD01 at [RLS Media center](#).

### Artos PCB-A readhead



Choose the DBF readhead for clean and EMC-sensitive environments. The PCB-A module can be additionally protected with a conformal coating. However, the installation requires more careful handling and additional bracket. More about the PCB-A module can be found in the DBD01 at [RLS Media center](#).

## Storage and handling

### Storage temperature



-40 °C to +60 °C

### Operating temperature

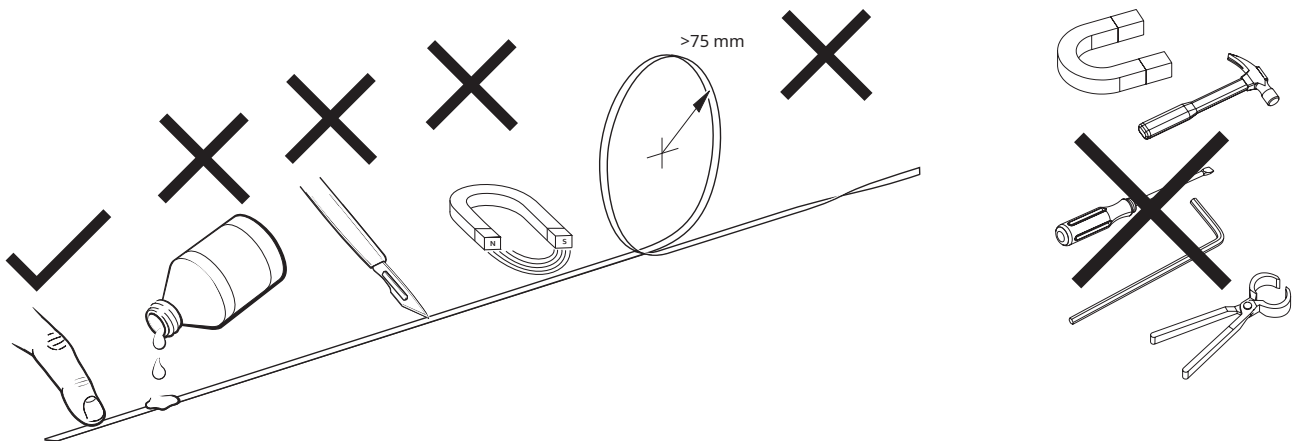


-40 °C to +85 °C

### Humidity



85% non-condensing



HANDLE WITH CARE. FlexAB system is a high performance metrology product and should be handled with the same care as any other precision instrument. The use of industrial tools during installation or exposure to strong magnets such as a magnetic base is not recommended as it carries the risk of damaging parts of the system which as a result might not perform in accordance with specifications.

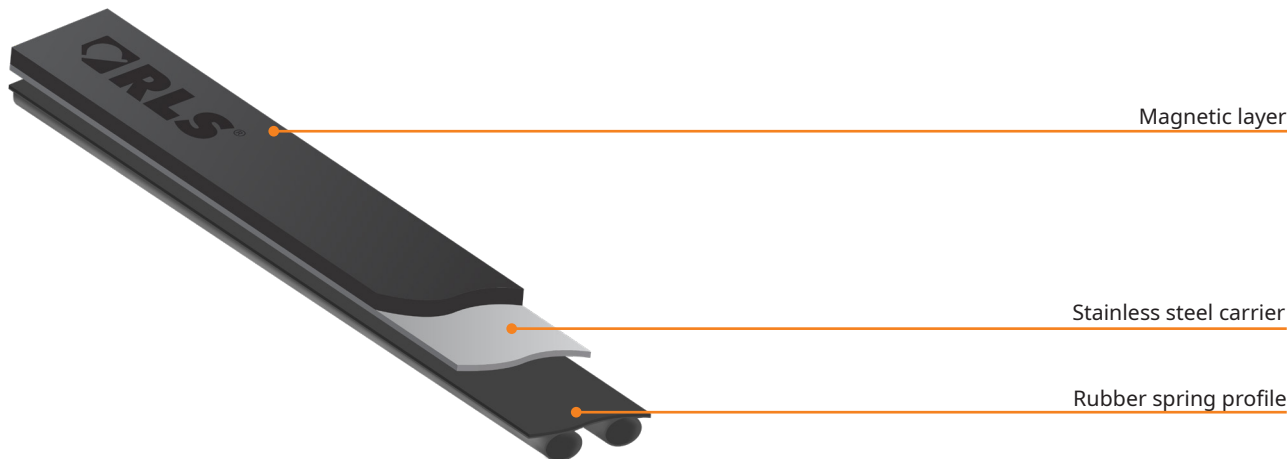
## Packaging

Each magnetic scale is packed and rolled in a cardboard box.

**All FlexAB magnetic scales have 12 months shelf life and should be installed within this period.**

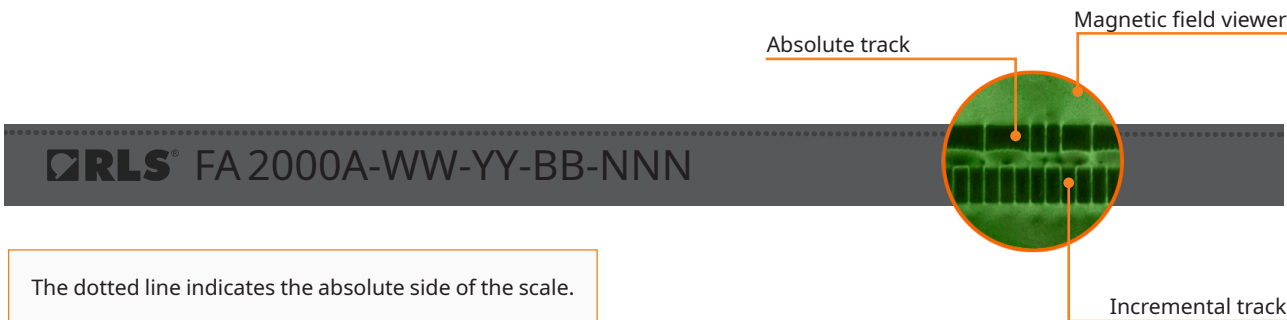
# FlexAB magnetic scale design

## Structure



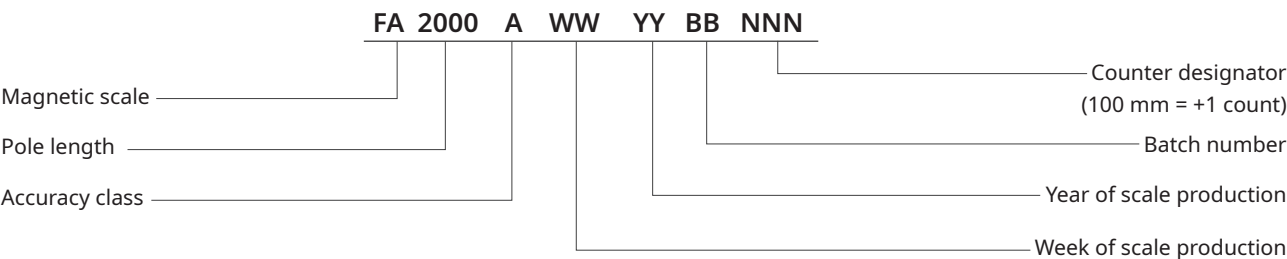
## Appearance and print

The orientation of the magnetised incremental track and absolute track is always the same, relative to the scale print as shown in the figure below. The dotted line indicates the absolute side of the scale.



## Scale surface print description

Scale surface print appears every 100 mm and contains the RLS logo and a unique code.



## Accuracy of FlexAB system

The accuracy of the FlexAB system is influenced by the accuracy errors of the encoder (magnetic scale and readhead) as well as by installation-related errors. To assess the overall accuracy of the system, all these errors must be considered. This chapter explains all relevant errors and provides an example of how to calculate them based on the shaft diameter and the eccentricity introduced in your system.

The accuracy and hysteresis can also be calculated using the [FlexAB calculator](#).

### Contributing factors to system inaccuracy

The system error consists of a:

- Magnetization error (Mag. error)
- Joint error
- Eccentricity error (Ecc. error)
- Crosstalk error due to the double track magnetization (absolute + incremental track)
- Sub-divisional error (SDE)

Figure 1 shows a typical accuracy error plot with marked contributions to the inaccuracy of the system.



Fig. 1. Typical accuracy error plot.

### Magnetisation error

The magnetisation error is caused by imperfections in the elasto-ferrite material and possible deviations due to the magnetisation process.

The following factors influence the result:

- The magnetic inhomogeneity of the elasto-ferrite layer
- The quality of the magnetisation system

The magnetisation error is a constant value defined by the magnetic scale's accuracy. Its contribution is as follows:

$$\text{Mag. error [°]} = \pm \frac{7200}{\text{CIRC [\mu m]}}$$

CIRC = Circumference in [μm]. It can be calculated based on the part number parameters of the FlexAB system (FA2000AXXXA0000A300). The FlexAB part number specifies the number of magnetic poles in the hexadecimal format (0XXX). In order to calculate the CIRC (circumference) the hexadecimal format must be converted to decimal format (XXXX).

$$\text{CIRC [\mu m]} = 2000 \times \text{XXXX}$$

XXXX = Number of magnetic poles per circumference in decimal format

**Example:** FlexAB scale with a diameter of 1 m

The part number of the FlexAB scale is FA2000A0630A0000A100

0630 (hex) = 1584 (dec)

CIRC =  $2000 \times 1584 = 3168000 \mu\text{m}$

Mag. error =  $\pm \frac{7200}{3168000 \mu\text{m}} = \pm 0.0023^\circ$

The contribution to the inaccuracy due to the magnetisation error is  $\pm 0.0023^\circ$  or  $\pm 2.3 \text{ mdeg}$  or  $\pm 8.3 \text{ arcsec}$ .

## Error on the joint

The joint error must be taken into account when calculating the system error. The joint error is caused by the phase mismatch and the damage of the magnetic pattern during the cutting process of the scale. The phase mismatch is the physical gap between both ends of the scale.

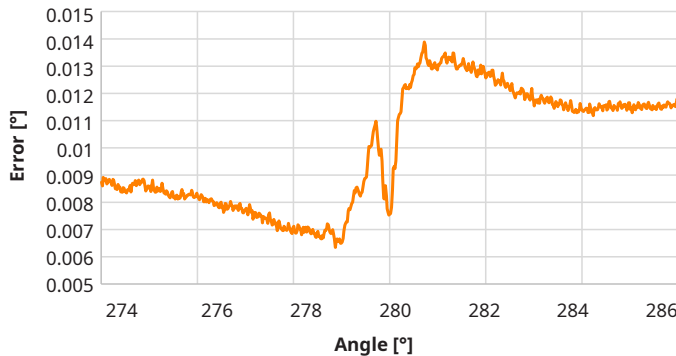


Fig. 2. Junction error plot.

Joint (micro gap)



The joint error is determined with a constant:

$$\text{Joint error } [^\circ] = \pm \frac{18000}{\text{CIRC } [\mu\text{m}]}$$

**Example:** FlexAB scale with a diameter of 1 m and a magnetic pole pitch 2 mm

The part number of the FlexAB scale is FA2000A0630A0000A300

0630 (hex) = 1584 (dec)

The FlexAB part number specifies the number of magnetic poles in the hexadecimal format (0XXX). In order to calculate the CIRC (circumference) the hexadecimal format must be converted to decimal format (XXXX).

CIRC =  $2000 \times 1584 = 3168000 \mu\text{m}$

$$\text{Joint error } [^\circ] = \pm \frac{18000}{3168000 \mu\text{m}} = \pm 0.0057^\circ$$

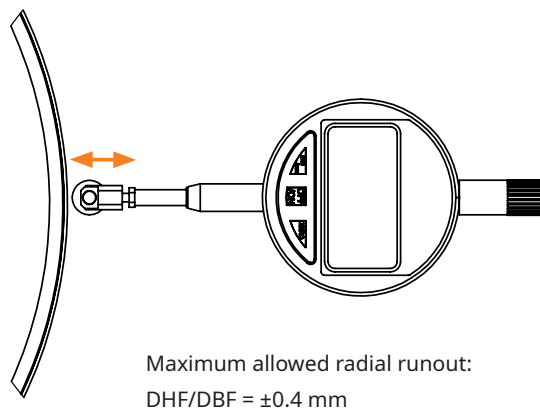
The contribution to the inaccuracy due to the error at the joint is  $\pm 0.0057^\circ$  or  $\pm 5.7 \text{ mdeg}$  or  $\pm 20.5 \text{ arcsec}$ .

## Eccentricity error

The installation and adjustment of the FlexAB scale have a significant influence on the overall accuracy of the system. The eccentricity error is caused by the uneven distribution of the rubber spring during the installation process of the FlexAB. The eccentricity can be reduced by correct and optimised installation. Please follow [the installation instructions](#) shown in the video.

The eccentricity error is determined with a constant as a worst case installation in the radial direction.

The drawing below shows the dial gauge indicator measuring the radial runout on the circumference of the installed FlexAB scale.



$$\text{Ecc. error } [^\circ] = \pm \frac{144000}{\text{CIRC } [\mu\text{m}]}$$

To simplify the calculation of the contribution of the radial runout to the inaccuracy of the system, a constant has been determined based on the maximum rideheight of the Artos readhead.

### Example 1: FlexAB scale with a diameter of 1 m

The part number of the FlexAB scale is FI2000A0630A0000A300

0630 (hex) = 1584 (dec)

The FlexAB part number specifies the number of magnetic poles in the hexadecimal format (0XXX). In order to calculate the CIRC (circumference) the hexadecimal format must be transformed to decimal format (XXXX).

$$\text{CIRC} = 2000 \times 1584 = 3168000 \mu\text{m}$$

$$\text{Ecc. error} = \pm \frac{144000}{3168000 \mu\text{m}} = \pm 0.0455^\circ$$

The contribution to the inaccuracy due to the eccentricity error is ±0.0455° or ±45.5 mdeg or ±163.8 arcsec.

For a more accurate calculation of the eccentricity error, it is recommended to measure the actual radial runout with a dial gauge indicator once the FlexAB is installed (as shown in the drawing above).

### Example 2: FlexAB scale with a diameter of 1 m, magnetic pole pitch of 2 mm and with a measured radial runout of ±100 μm

$$\text{Ecc. error} = \pm \frac{360000 \times E [\text{mm}]}{\text{CIRC } [\mu\text{m}]} = \pm \frac{360000 \times 0.1}{3168000 \mu\text{m}} = \pm 0.0114^\circ$$

E is measured radial runout in mm.

The contribution to the inaccuracy due to the eccentricity error is ±0.0114° or ±11.4 mdeg or ±41 arcsec.

## Crosstalk error

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Crosstalk is an undesirable effect of the magnetisation of the absolute track mark on the magnetisation of the incremental track, which leads to inaccuracy spikes. It depends on both the ride height and the lateral offset. To simplify the calculation of the system accuracy, the crosstalk error is already included in the magnetisation error and can be ignored. For more information about the accuracy please refer to the technical article at [RLS Media center](#).

## Sub-divisional error (SDE) or interpolation error

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The sub-divisional or interpolation error is a periodical accuracy error. It is influenced by the following factors:

- the homogeneity and cycle definition of the magnetic poles,
- the sensing distance (ride height) of the installed readhead,
- the quality of the signal processing,
- the characteristics of the internal AMR sensor.

The SDE leads to speed ripples in applications where the encoder is used as speed feedback, e.g. in speed control loops.

The SDE contribution was determined as a constant over the entire installation range.

$$\text{SDE error } [^\circ] = \pm \frac{1800}{\text{CIRC } [\mu\text{m}]}$$

**Example:** FlexAB scale with a diameter of 1 m

The part number of the FlexAB scale is FI2000A0630A0000A100

0630 (hex) = 1584 (dec)

The FlexAB part number specifies the number of magnetic poles in the hexadecimal format (0XXX). In order to calculate the CIRC (circumference) the hexadecimal format must be transformed to decimal format (XXXX).

$$\text{CIRC} = 2000 \times 1584 = 3168000 \mu\text{m}$$

$$\text{SDE error (2 mm pole pitch)} = \pm \frac{1800}{3168000 \mu\text{m}} = \pm 0.0006^\circ$$

The contribution to the inaccuracy due to the SDE error is  $\pm 0.0006^\circ$  or  $\pm 0.6 \text{ mdeg}$  or  $\pm 2.2 \text{ arcsec}$ .

## System error (SUM value)

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The system error results from the sum of all contributions described on the previous pages. The result is an expected accuracy value of the FlexAB system based on the shaft diameter and the eccentricity error. Most of the inaccuracy is an eccentricity error. It is therefore recommended to install the FlexAB scale as optimally as possible in order to achieve better results. Installation instructions can be found [here](#).

### Sys. error = ± (Mag. error + Joint error + Ecc. error + SDE error)

$$\text{System error} = \pm \frac{7200 + 18000 + 144000 + 1800}{\text{CIRC}} = \pm \frac{171000}{\text{CIRC}}$$

The system error on the FlexAB magnetic scale from the previous examples for each contribution is as follows:

$$\text{Sys. error} = \pm (0.0023^\circ + 0.0057^\circ + 0.0455^\circ + 0.0006^\circ) = \pm 0.0541^\circ$$

For a more precise calculation of the system error, it is recommended to use [the FlexAB calculator](#) on the RLS website.

## Hysteresis

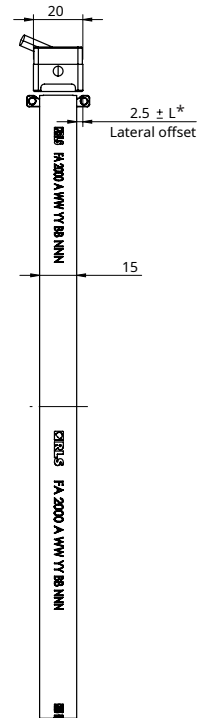
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Hysteresis is the difference in the result of measuring the same point when approaching it from different directions. It is known that ferromagnetic materials maintain their magnetised state in response to external fields and attempt to change direction.

The hysteresis in encoder systems depends on the strength of the magnetic field. A stronger magnetic field leads to a smaller hysteresis and vice versa. Therefore the hysteresis is strongly influenced by the ride height at which the readhead is installed. For more information please refer to the technical article at [RLS Media center](#).

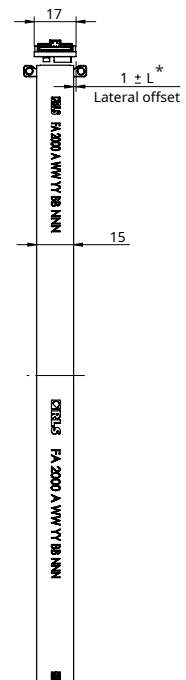
For a more precise calculation of the hysteresis, it is recommended to use [the FlexAB calculator](#) on the RLS website.

Technical drawing of the front view of a circular device with a mounting bracket. The drawing shows a circular body with a central hub and an outer ring. A mounting bracket is attached to the top. Dimensions include:  $23 \pm T^*$  for the bracket width,  $RH^*$  for the mounting height,  $D \pm 0.4$  for the outer diameter,  $D_h \pm 0.2$  for the hub diameter, and  $H$  for the adjustable mounting hole height  $\pm 0.7$ . A "Positive direction" arrow points to the right. A feature "A" is indicated on the right side. A note at the bottom states: "e side (180° from the scale joint) - peak in eccentricity."



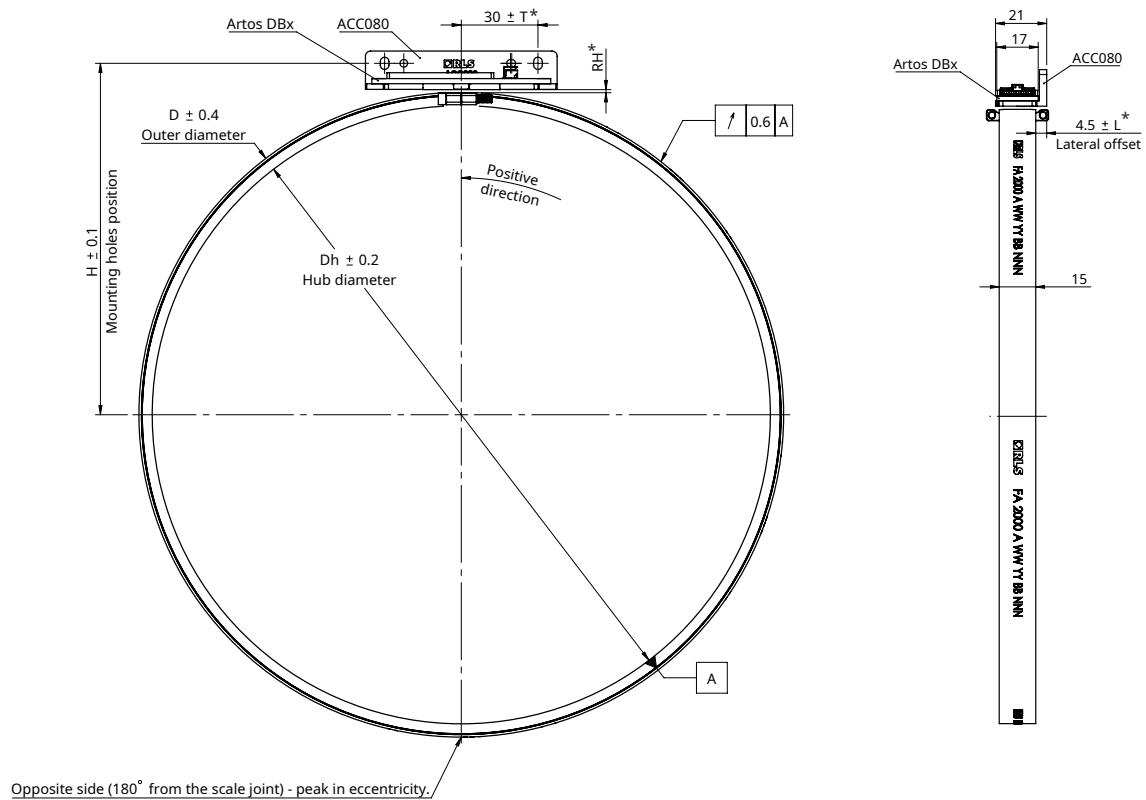
Technical drawing of a circular component, likely a wheel or disc, showing dimensions and labels:

- Outer diameter:**  $D \pm 0.4$
- Hub diameter:**  $D_h \pm 0.2$
- Adjustable mounting surface height:**  $\pm 0.7$
- Hub diameter:**  $35 \pm T^*$
- Hub height:**  $RH^*$
- Positive direction:** Indicated by an arrow pointing clockwise.
- Feature A:** A feature on the outer rim, labeled with a box containing 'A'.
- Feature A:** A feature on the hub, labeled with a box containing 'A'.



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## DBF readhead with ACC080



\* Check tolerances on **page 14**.

DBF readhead is compatible with ACC080 bracket in combination with FlexAB system. For more information about the installation please refer to the DBD01 data sheet at **RLS Media center**.

The absolute zero position is not fixed with respect to the location of the tensioning mechanism (scale joint).

Ride height needs to be adjusted on the opposite side of the magnetic scale joint.

Scale length      Hub diameter      Outer diameter      Mounting holes position

$$L_s = n \times p$$

$$D_h = \frac{L_s}{\pi} - 8.36$$

$$D = \frac{L_s}{\pi} + 2.3$$

$$\text{DHF: } H = \frac{L_s}{2\pi} + 5.7$$

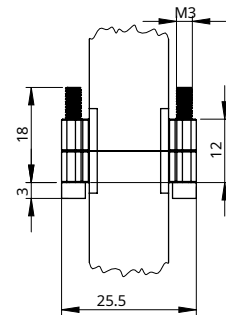
$$\text{DBF with bracket: } H = \frac{L_s}{2\pi} + 12$$

n - Number of magnetic poles (decimal value)

p - Magnetic pole length (2 mm)

$$\text{DBF: } H = \frac{L_s}{2\pi} + 4$$

#### Scale joint detail



The fasteners are M3x18, based on DIN912, with reduced shank and head (custom screws).

#### General tolerances for linear dimensions according to ISO 2768-m

| Tolerance class   | up to 6 | 6-30 | 30-120 |
|-------------------|---------|------|--------|
| <b>m (medium)</b> | ±0.1    | ±0.2 | ±0.3   |

The orientation of the readhead and FlexAB magnetic scale is essential. Please make sure that orientation is as specified.

## Technical specifications

| System data                                                                                       |            | With DHF and DBF readheads           |
|---------------------------------------------------------------------------------------------------|------------|--------------------------------------|
| Hub diameter                                                                                      |            | 500 mm to 2,500 mm                   |
| Number of magnetic poles                                                                          |            | 798 - 3,940                          |
| Accuracy (at 1 m diameter)                                                                        |            | See chapter <a href="#">Accuracy</a> |
| Resolution                                                                                        |            | 0.1 µm                               |
| Hysteresis                                                                                        |            | < 3.5 µm                             |
| Maximum permissible speed (mechanical limit)**<br>(for higher speed <a href="#">contact RLS</a> ) | D < 900 mm | rpm = 210/D* [m]                     |
|                                                                                                   | D > 900 mm | rpm = 325/D* [m]                     |

\* D stands for the outside diameter of the mounted scale.

\*\* The electrical limit values are determined by the selected readhead configuration. Please check [the FlexAB calculator](#) for the maximum speed on the RLS website.

### Mechanical data

|                                     |                                          |                                         |
|-------------------------------------|------------------------------------------|-----------------------------------------|
| Material                            | Carrier                                  | 1.4310 stainless steel                  |
|                                     | Magnetic scale                           | NBR elasto-ferrite                      |
|                                     | Rubber spring profile                    | EPDM rubber, black                      |
|                                     | Joint                                    | 1.4301 stainless steel                  |
| Thickness                           | Magnetic scale (relaxed rubber state)    | 6.25 ±0.6 mm                            |
| Mass                                | Magnetic scale and carrier               | 93 g/m                                  |
|                                     | Rubber spring profile                    | 33 g/m                                  |
|                                     | Connecting element (two used in a joint) | 4 g                                     |
|                                     | Fastener M3 (two used in a joint)        | 1 g                                     |
| Width                               |                                          | 15 <sup>+0.15</sup> <sub>-0.05</sub> mm |
| Thermal expansion coefficient (CTE) |                                          | 11.2 × 10 <sup>-6</sup> K <sup>-1</sup> |

### Environmental data

|                                                 |                                       |
|-------------------------------------------------|---------------------------------------|
| Operating temperature                           | -40 °C to +85 °C (without readhead)   |
| Storage temperature                             | -40 °C to +60 °C (without readhead)   |
| Maximum non-operational external magnetic field | 25 mT                                 |
| Maximum operational external magnetic field     | 1.5 mT                                |
| Vibrations (55Hz to 2000 Hz)                    | 300 m/s <sup>2</sup> (IEC 60068-2-6)  |
| Shocks (6 ms)                                   | 300 m/s <sup>2</sup> (IEC 60068-2-27) |
| Environmental sealing                           | Up to 85 % humidity non-condensing    |

# Installation tolerances

## Ride height / radial offset

|               | DHF/DBF                                  |
|---------------|------------------------------------------|
| Values in mm. | RH = 0.3 <sup>+0.5</sup> <sub>-0.2</sub> |



## Axial offset

|               | DHF/DBF |
|---------------|---------|
| Values in mm. | L = ±1  |



## Tangential offset

|               | DHF/DBF |
|---------------|---------|
| Values in mm. | T = ±1  |

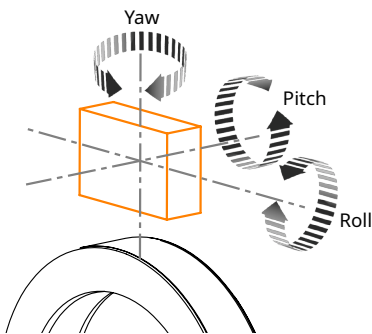


 Readhead     Magnetic scale

## Readhead to scale

|              |     |
|--------------|-----|
| <b>Roll</b>  | ±1° |
| <b>Yaw</b>   | ±1° |
| <b>Pitch</b> | ±1° |

At lower ride height the readhead can come into contact with the magnetic scale within the roll-pitch-yaw tolerances.



# Installation instructions

## Installation of the scale

Before starting the installation process, please make sure that you use appropriate rolling tool ([ACC096](#) / [ACC097](#) / [ACC098](#)) and the **mounting fluid** ([ACC077](#)). These two accessories are essential to achieve the best alignment and system performance and to ensure a secure and accurate fit. Plan the scale orientation in advance.

The following installation instructions for the FlexAB scale describe step by step the installation of the scale, the preparation of the surface, the alignment and the final adjustment. You can also follow the installation instructions shown in the video.



**FlexIN installation video**

### Method for axial alignment of the scale

Depending on the mounting surface, there are two options for the axial alignment of the scale to ensure optimum system performance. Both methods are designed to enable accurate and efficient installation of the scale and integrate seamlessly into your system.

#### Option 1

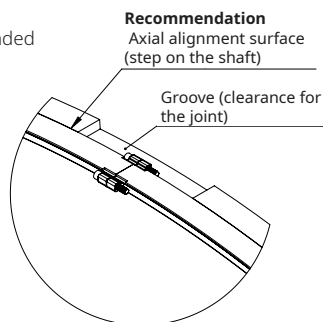
The step on the shaft serves as a shoulder for accurate lateral positioning of the scale. A groove must be milled into the mounting surface to provide sufficient space for the scale joint. The groove must also allow enough space for fastener mounting. This method provides a physical guide that ensures the scale is perfectly aligned with the machine axis.

#### Option 2

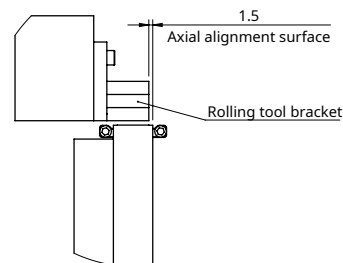
The surface of the rolling tool bracket is used as a reference point. By aligning the scale to the surface of the rolling tool bracket, you can achieve precise positioning without additional machining.

#### Option 1

Recommended



#### Option 2

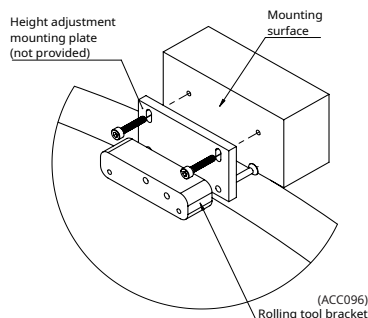


## Installation process

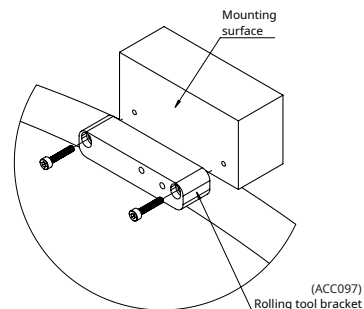
### 1. Preparation for the installation of the rolling tool

Prepare the readhead mounting surface. Install the rolling tool bracket by using the mounting holes where the readhead will be installed.

#### DHF option

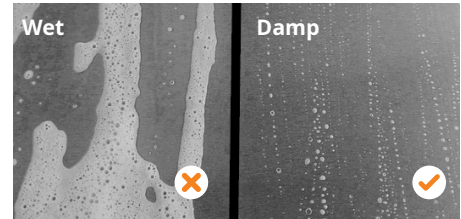
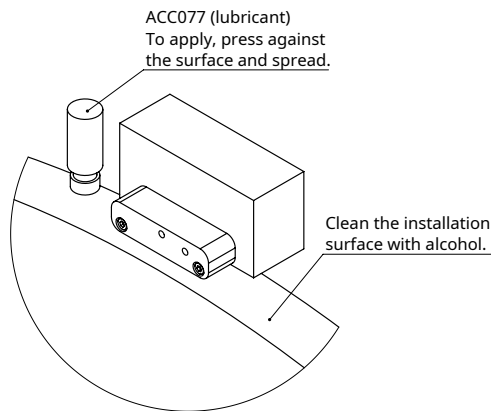


#### DBF option



## 2. Preparation of the installation surface

Start by thoroughly cleaning the installation surface to remove dirt, debris and contaminants. This will ensure a clean bonding environment for the scale. After cleaning, evenly apply a layer of the recommended mounting fluid to the surface. Make sure that the entire surface is damp. This will make it easier to position and adjust the scale during installation.



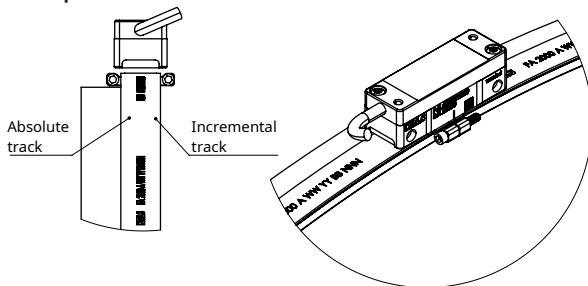
The use of a lubricant is required for all diameters. A moderate amount of mounting fluid ACC077 must be applied, as shown in the picture. The surface must be damp, not wet.

Recommended surface roughness  $R_a = 1.6$

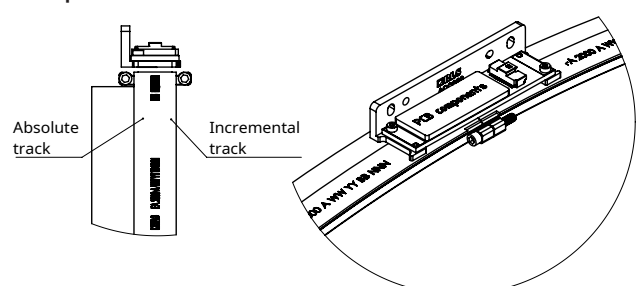
## 3. Setting up the scale

Carefully place the scale with the rubber side on the prepared installation surface without twisting or bending it.

### DHF option



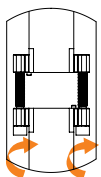
### DBF option



Make sure that the alignment of the scale and the readhead is correct.

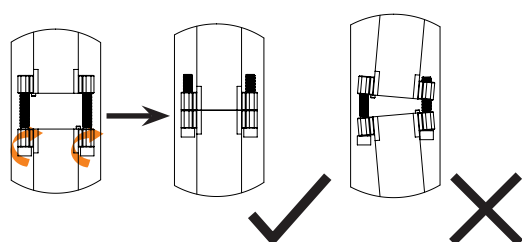
## 4. Securing the scale ends and axial alignment

Loosely connect the ends of the scale with the specified fasteners by leading them through the threads located in the adjacent connecting element. Align the scale in the axial direction on a reference surface around the entire circumference.



## 5. Connect the scale ends

Tighten the two fasteners alternately and gradually, no more than one full turn at a time. The maximum torque is 0.6 Nm. Make sure that the connecting elements remain parallel during the process.



Maximum torque is 0.6 Nm. No more than a full turn at a time.

Always make sure that the scale is axially aligned and has not moved from the required position.

## 6. Installing the rolling tool (ACC096 / ACC097 / ACC098)

Mount the rolling tool on the bracket. (Fig. 1.) Press the rolling tool down so that the connecting elements touch the installation surface. (Fig. 2.) Secure the roller in position by tightening the fasteners on the rolling tool.

### DHF option

Fig. 1

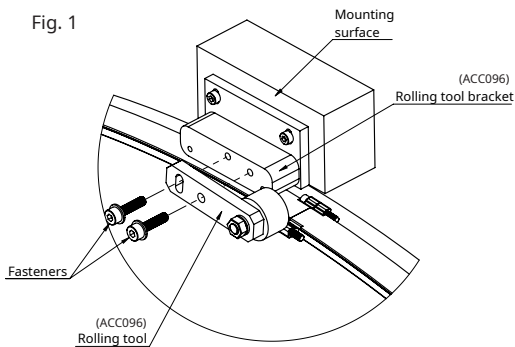
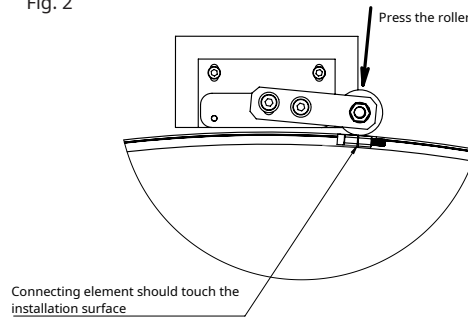
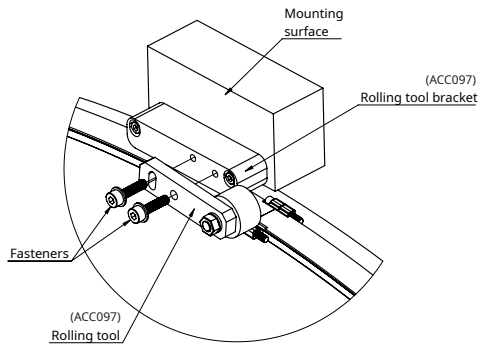


Fig. 2



### DBF option

Fig. 1



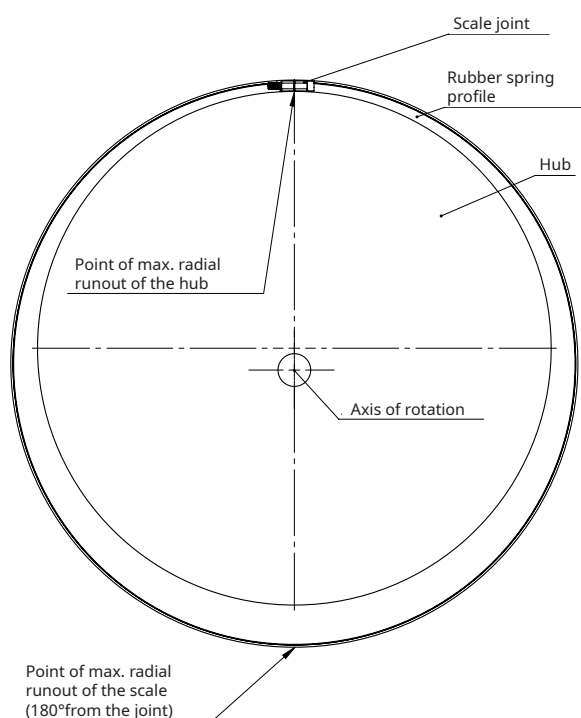
If rotation of the hub is not possible, any of the listed RLS accessories can be used to roll manually around the circumference.

The magnetic scale can easily be damaged by sharp edges, so use a smooth and soft roller.

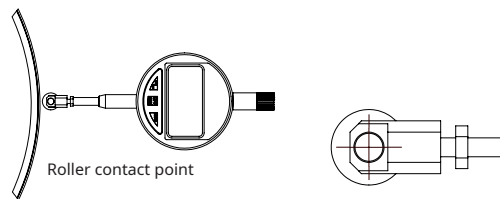
The roller should be pressed onto the magnetic scale with enough force to bend the scale and compress the rubber spring profile under the scale.

## 7. Improving radial runout circumference

Use a rolling tool to roll along the length of the scale while rotating the axis for at least 10 full rotations. Unfasten the wheel of the rolling tool and lift it from the scale. It is necessary to measure the radial runout with a dial indicator. If the radial runout of the magnetic scale does not meet the requirements, you can improve it by rolling another 10 full rotations or more.



This step is important to reduce eccentricity.



**Maximum allowed radial runout of the magnetic scale**

|         |         |
|---------|---------|
| DHF/DBF | ±0.4 mm |
|---------|---------|

Use a dial indicator with low exertion force to avoid scratching the scale surface. A digital indicator with a roller is recommended.

If the required radial runout cannot be achieved, check the radial runout of the hub with a dial indicator.  
The radial runout of the hub and the magnetic scale can be subtracted if the scale joint is placed at the point of max. radial runout the scale.

**8. Uninstalling / Removing the rolling tool**

Once you have successfully improved the radial runout of the scale, you can uninstall and remove the rolling tool.

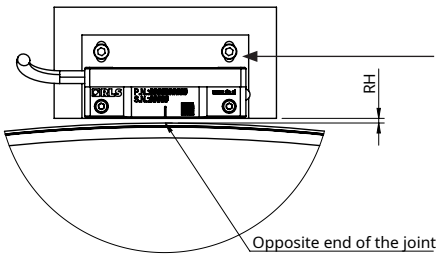
**9. Axial alignment**

After radial alignment, the belt must be checked for lateral alignment using the method selected at the beginning of the installation. The permissible axial deviation is ±1 mm.

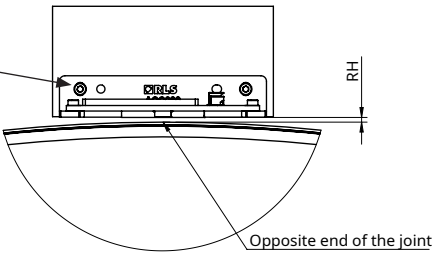
**10. Installing the readhead**

Set the ride height according to the specifications in the data sheet of the readhead. The rideheight must be set on the opposite side of the joint element where the eccentricity is highest. The LED on the readhead immediately indicates whether the installation was successful or adjustments are required. The properly installed FlexAB scale is ready for use after 1 hour. After 24 hours it is suitable for use under maximum load.

**DHF option**



**DBF option**



The readhead must be installed on the base that allows to set up the ride height (RH).

|             |                                |
|-------------|--------------------------------|
| Ride height | 0.1 - 0.9 (recommended 0.3 mm) |
|-------------|--------------------------------|

The ride height should be set on the opposite side of the scale joint.

**11. Steps to control the system when required radial runout is not achievable**

If we do not achieve the required radial runout, the system can be checked using the E201 interface. Connect the readhead to the E201 interface and observe the LED display on the readhead. If the LED indicator lights up green during the entire rotation, the system is working correctly.

## Part numbering

FA 2000 A 0310 A 0000 A3 00

### Scale length \*

**0xxx** - Where 0xxx equals scale length in poles in hexadecimal notation

\* To calculate the scale length and the number of poles, please use the [online calculator](#).

### Readhead compatibility

**A3** - DHF (enclosed readhead)

**A4** - DBF (PCB-A module readhead)

### Special requirements

**00** - No special requirements (standard)

### Table of available combinations

| Series | N/A  | N/A | Scale length | N/A | N/A  | Readhead compatibility | Special requirements |
|--------|------|-----|--------------|-----|------|------------------------|----------------------|
| FA     | 2000 | A   | xxxx         | A   | 0000 | A3                     | 00                   |
|        |      |     |              |     |      | A4                     |                      |

## Accessories

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Rolling tool for FlexAB DHF

**ACC096**



Rolling tool for FlexAB DBF with ACC080

**ACC097**



Rolling tool for FlexAB DBF

**ACC098**



Square bracket for DBL and DBR readheads

**ACC080**



Mounting fluid

**ACC077**



Magnet viewer

**MM0001**

## Head office

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## Global support

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Visit our [website](#) to contact your nearest sales representative.

## Document issues

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| Issue | Date         | Page | Description  |
|-------|--------------|------|--------------|
| 1     | 18. 11. 2025 | –    | New document |

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