

BEARINGLESS 2000 SERIES

ENCODERS FOR LARGE SHAFTS



Low-maintenance for large shafts

Certain motors benefit from having the speed feedback sensor mounted directly on the main shaft. A bearingless sensor, mounted between the other parts in the machinery, takes up less space and requires less maintenance. The Leine Linde 2000 series is designed to meet this demand, also for shaft dimensions around a meter, or larger.

Wider tolerance for runout

The 2000 series is suitable for heavy duty applications, where motors are exposed to powerful shocks and vibrations, subjected to heavy mechanical forces. The 2000 series accepts an air gap of up to 6 mm between the rotating ring and the fixed scanning unit, which allows for a certain runout of the motor. This is why the Leine Linde ring offers significantly better performance than most ring products found on the market.

Commissioning made simple

Easy access for mounting and service saves commissioning time. The Leine Linde ring can be mounted from two sides of the shaft, as it is segmented into pieces. Fix the ring to the shaft by flange mounting or by the Leine Linde ClampFit solution. With the ClampFit solution, the ring automatically tightens around the mating shaft as the ring segments are screwed together. This enables fixing to a standard cylindrical shaft without any flange expansion prepared and makes retrofitting easy.

Various interfaces

The scanning head unit uses several market standard interfaces for incremental signals. The interface High Current HTL has been specially designed for long distance transmission. This is extra useful in the process industry, where very long cables may be needed to reach out to each encoder in the factory.

Engineered for end

Electronics

6 channel square wave signal for differential transmission and a reference pulse for relative position.

Available with different standard incremental interfaces.

| Interface | Supply voltage |
|-----------|----------------|
| HCHTL | 9-30 Vdc |
| HTL | 9-30 Vdc |
| RS422 | 9-30 Vdc |
| TTL | 5 Vdc |

Resolution

Resolution can be specified according to the requirements of the application. Resolution is available from 1 to 16383 ppr.

Wide air gap

Between ring and scanning head a gap is allowed in order to permit thermal expansion or runout of the application's mating shaft. Radial tolerance is 0.1-3 mm and axially a ± 4 mm offset is allowed.

Extended scanning

Greater runout tolerance, up to 6 mm, is available for shaft sizes over 400 mm.

Extra scanning heads

Available for achieving redundancy and increased connectivity with multiple sources, drives, or controllers.

Mechanics

Bearingless

Designed for wear-free operation.



Segmented into pieces

The ring is segmented for easy access and commissioning.



ClampFit design

Simplifies the manner of fixing the ring to any standard cylindrical shaft. When the ring segments are screwed together, the tethers will automatically tighten the ring to the mating shaft with only radial force.

urance



Flange mount design

Axial screw holes in the ring enable fixing to a flange expansion on the application's mating shaft.

Light-weight aluminium

Facilitates handling and transport. Anodized surface for use in salt water environments.

Inner and outer diameter

Flexible to customisations, as the scanning technology is made to compensate for almost any circumference.

Tethers

Eccentricity or thermal expansion of the mating shaft is compensated for by tethers. They ensure that the outer surface of the ring stays within optimal scanning range from the scanning head unit to give the best signal quality.

Magnetical tape

With alternating north and south poles for pulse generation.

Protective stainless steel surface

Ensures the magnetic tape is not damaged by exposure to mechanical hits.

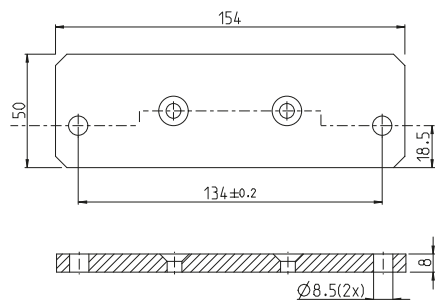
If you are interested to hear about more possibilities with our 2000 series, please contact Leine Linde.
Leine Linde is an active partner to our customers, willing to develop or customise solutions based on your specific needs.

Mechanics

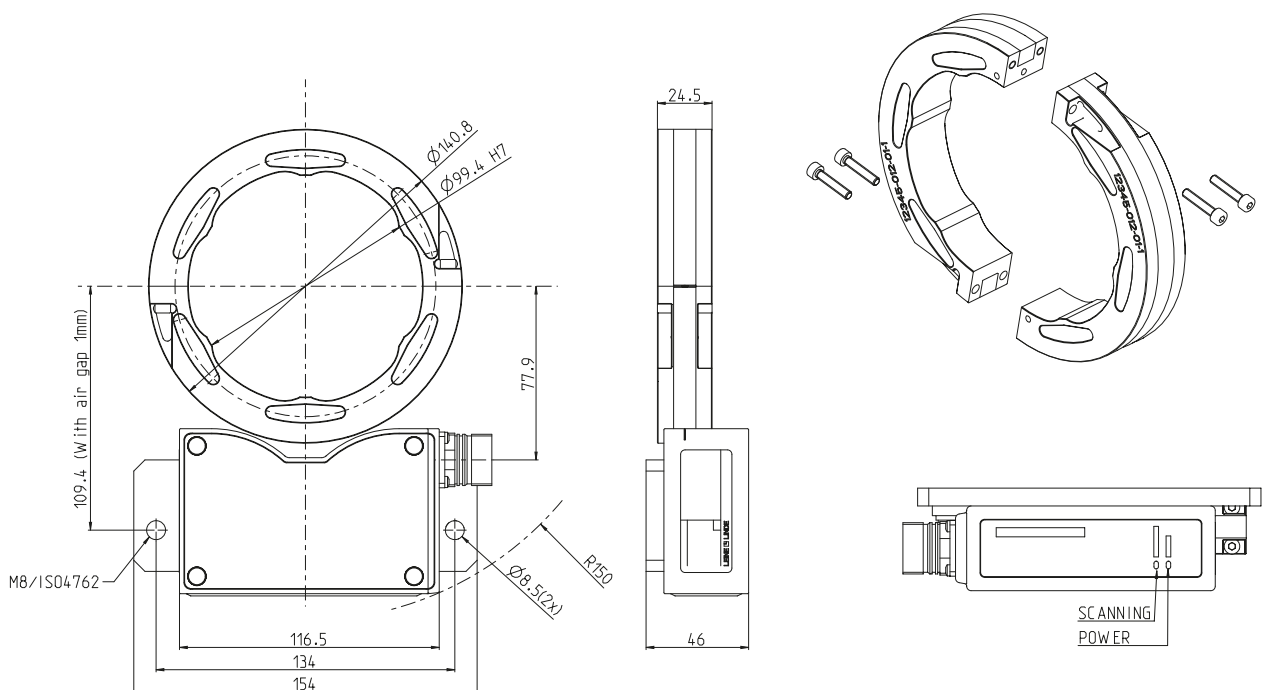
This spread offers an overview of the different mechanical variants available in the 2000 series. Other variants can be created according to the code key on page 9.

Mounting bracket

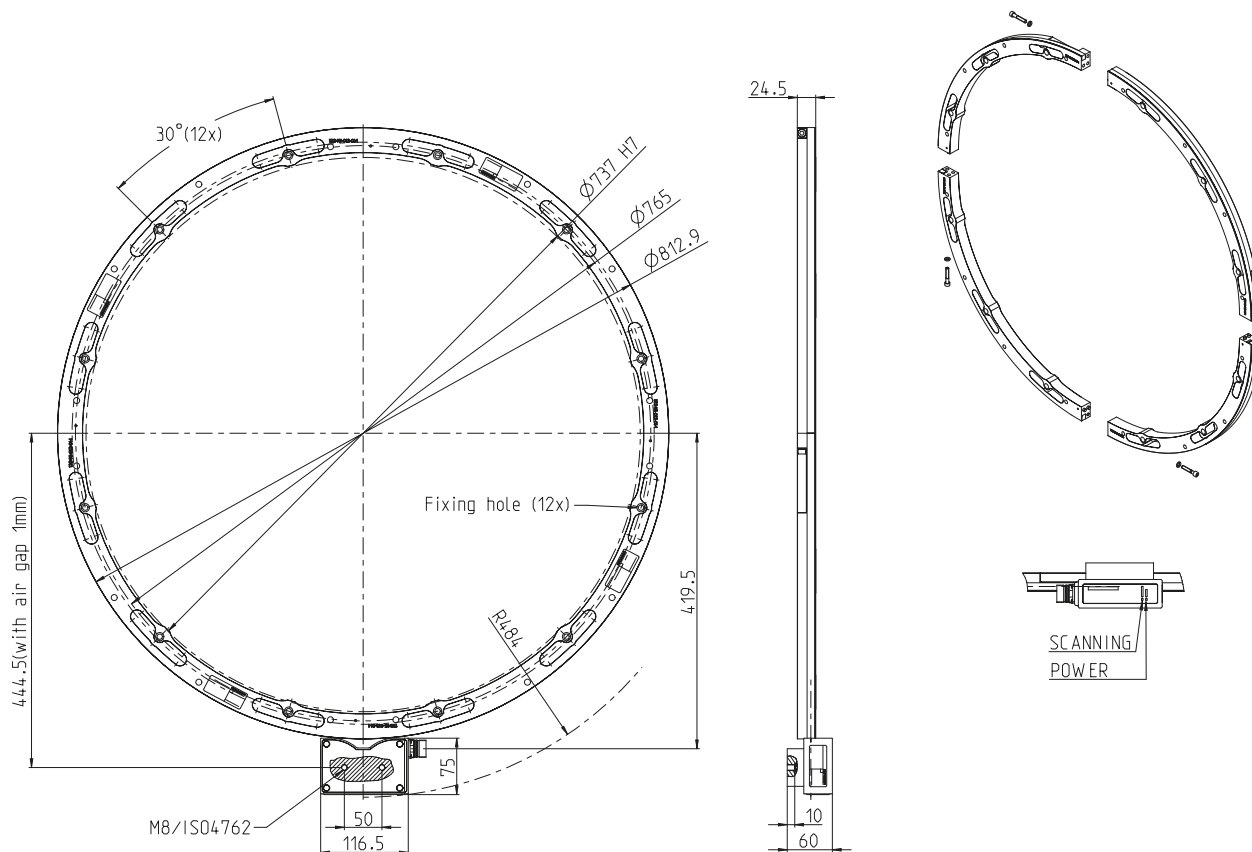
Screw mounting



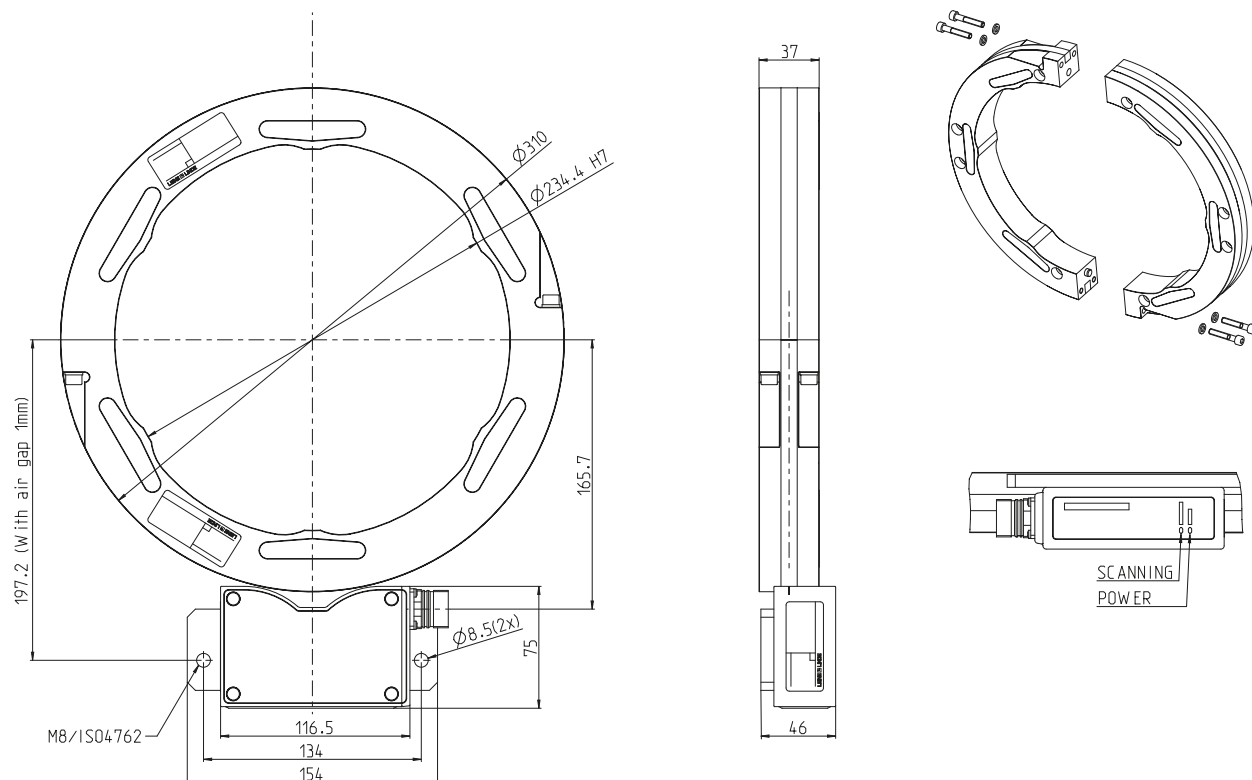
Model MRI 2302 ClampFit 100/140.8 mm with CCW 12 pin M23



Model MRI 2206 Flange mount 737/812.9 mm with CCW 12 pin M23

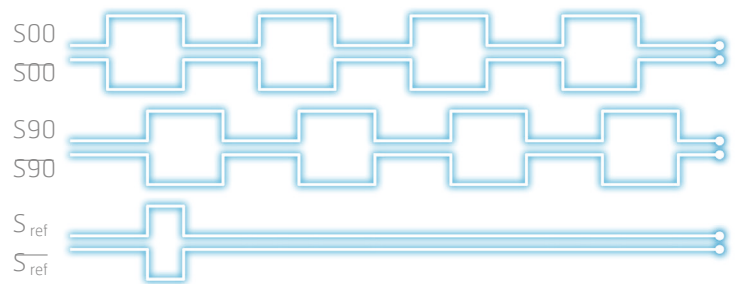


Model MRI 2302 ClampFit 235/310 mm with CCW 12 pin M23



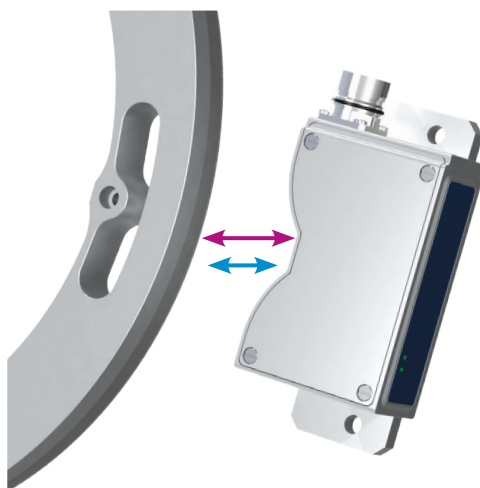
Electronics

Square wave signals



| Interface | TTL | RS422 | HTL | HCHTL |
|------------------|------------------------------------|-----------------------------------|--|-------------------------------------|
| Supply | 5 Vdc | 9-30 Vdc | 9-30 Vdc | 9-30 Vdc |
| Output signal | 5 Vdc | 5 Vdc | 9-30 Vdc | 9-30 Vdc |
| Suitable for | Low frequencies over short cables | High frequencies over long cables | High frequencies over medium-length cables | Medium frequencies over long cables |
| Max frequency | 100 kHz | 100 kHz | 100 kHz | 100 kHz |
| Max cable length | 50 m at 100 kHz (with power sense) | 1000 m at 100 kHz | 100 m at 100 kHz | 350 m at 100 kHz |

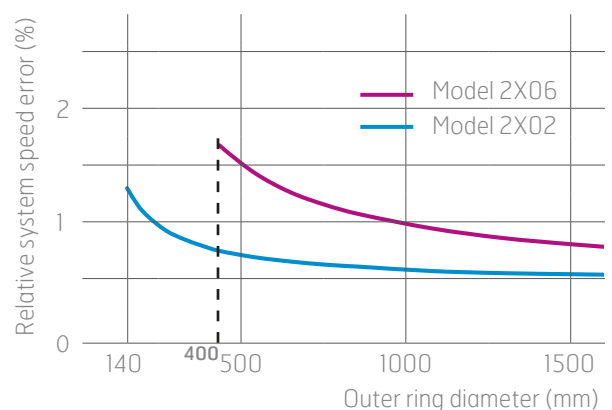
Scanning distance



- Model 2X06: Air gap 0,1-6 mm (nominal 3 mm)
- Model 2X02: Air gap 0,1-3 mm (nominal 1 mm)

System accuracy

Example system accuracy for a frequency converter with 3 ms time base. Difference between model 2X02 and 2X06 calculated at fix values for rotational speed (1500 rpm) and resolution (2048 ppr).



Code key

MRI 2X0X

M R I 2 0 -

Assemblage

- 2 = Flange mount
- 3 = ClampFit

Material

- 0 = Anodized aluminium

Scanning

- 2 = Increased accuracy
(Scanning distance 0,1-3 mm)
- 6 = Extended scanning distance*
(Scanning distance 0,1-6 mm)
- * Min outer dimension 400 mm

Connection

- 1 = Radial 12 pin M23 connector CCW reading head A
- 2 = Cable (Pre-mounted, specify length) reading head A
- 4 = Radial 12 pin M23 connector CCW reading head B
- 5 = Cable (Pre-mounted, specify length) reading head B

Electronics

- 1 = TTL with sense (5 Vdc supply, 5 Vdc output)*
- 5 = HC-HTL (9-30 Vdc supply, 9-30 Vdc output)
- 6 = HTL (9-30 Vdc supply, 9-30 Vdc output)
- 7 = RS422 (9-30 Vdc supply, 5 Vdc output)
- *Max 50 m cable with power sense wires connected (max 10 m without)

Mounting bracket

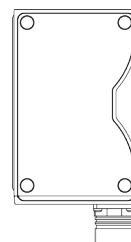
- 0 = No bracket
- 1 = Screw mounting (Type 01)
- 2 = Screw mounting (Type 02)

Dimension

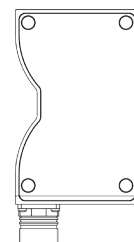
Customised (minimum out dimension of 140 mm)

Resolution

- 1024-16383 ppr*
- *Max 100 kHz pulse frequency



Orientation A
Standard



Orientation B

Performance

Technical data (based on MRI 2302 with HCHTL signals)

Encoder configuration

| | |
|-----------------|---------------------------|
| Type | MRI |
| Model | 2302 |
| Power supply | 9-30 Vdc |
| Output signal | HCHTL |
| Connection type | M23 connector 12-pin |
| Pin layout | Counter-clockwise pinning |

Mechanical data

| | |
|--------------------------------------|---------------------------|
| Operating temperature | -40 °C...+80 °C |
| Ingress protection class [IEC 60529] | IP67 |
| Vibration [IEC 60068-2-6] | $\leq 200 \text{ m/s}^2$ |
| Shock [IEC 60068227] | $\leq 1500 \text{ m/s}^2$ |
| Scanning axial tolerance | $\pm 4 \text{ mm}$ |
| Scanning radial tolerance | 0.1-3 mm (Nominal 1 mm) |
| Material | Aluminium anodized |
| Fastening type | ClampFit |
| Number of segments | 2-16 |

Electrical data

| | |
|-------------------------------|------------------------------|
| Polarity protected | Yes |
| Short circuit protected | Yes |
| Current consumption | 60 mA at 24 Vdc (max. 80 mA) |
| Incremental output load (max) | $\pm 40 \text{ mA}$ |
| Output frequency max | 100 kHz |
| Cable length max | 350 m at 100 kHz |

For other configurations please contact Leine Linde.

Contact us

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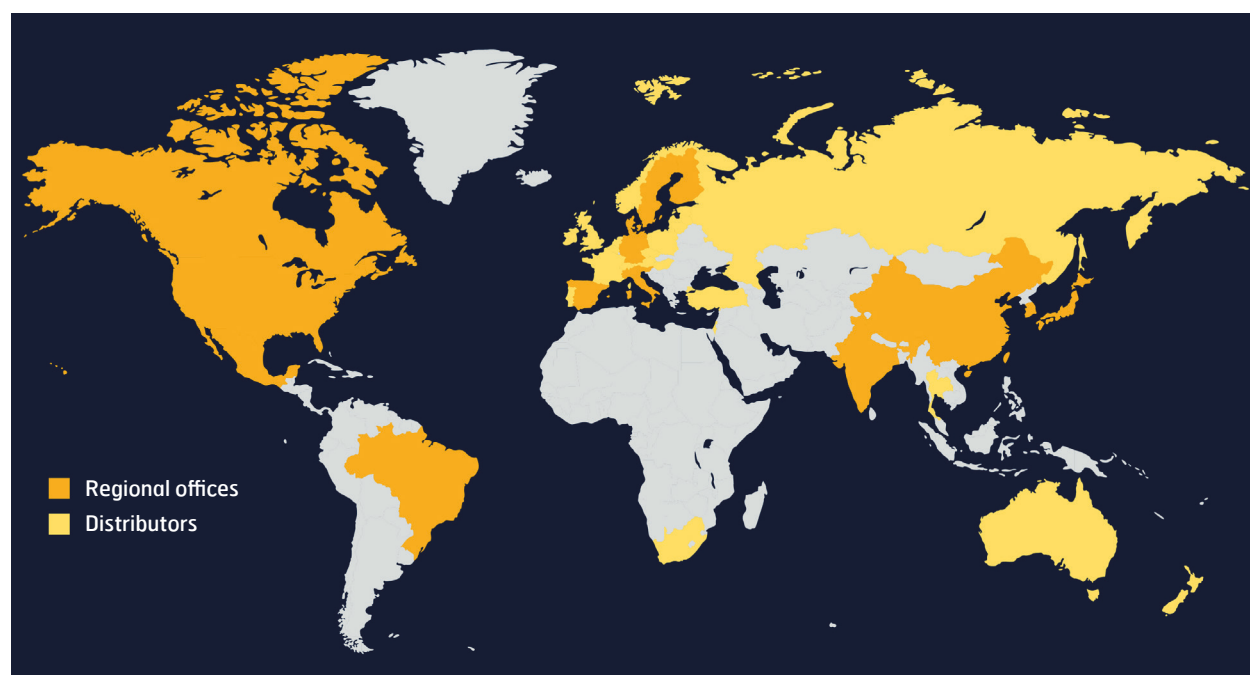
INDIA

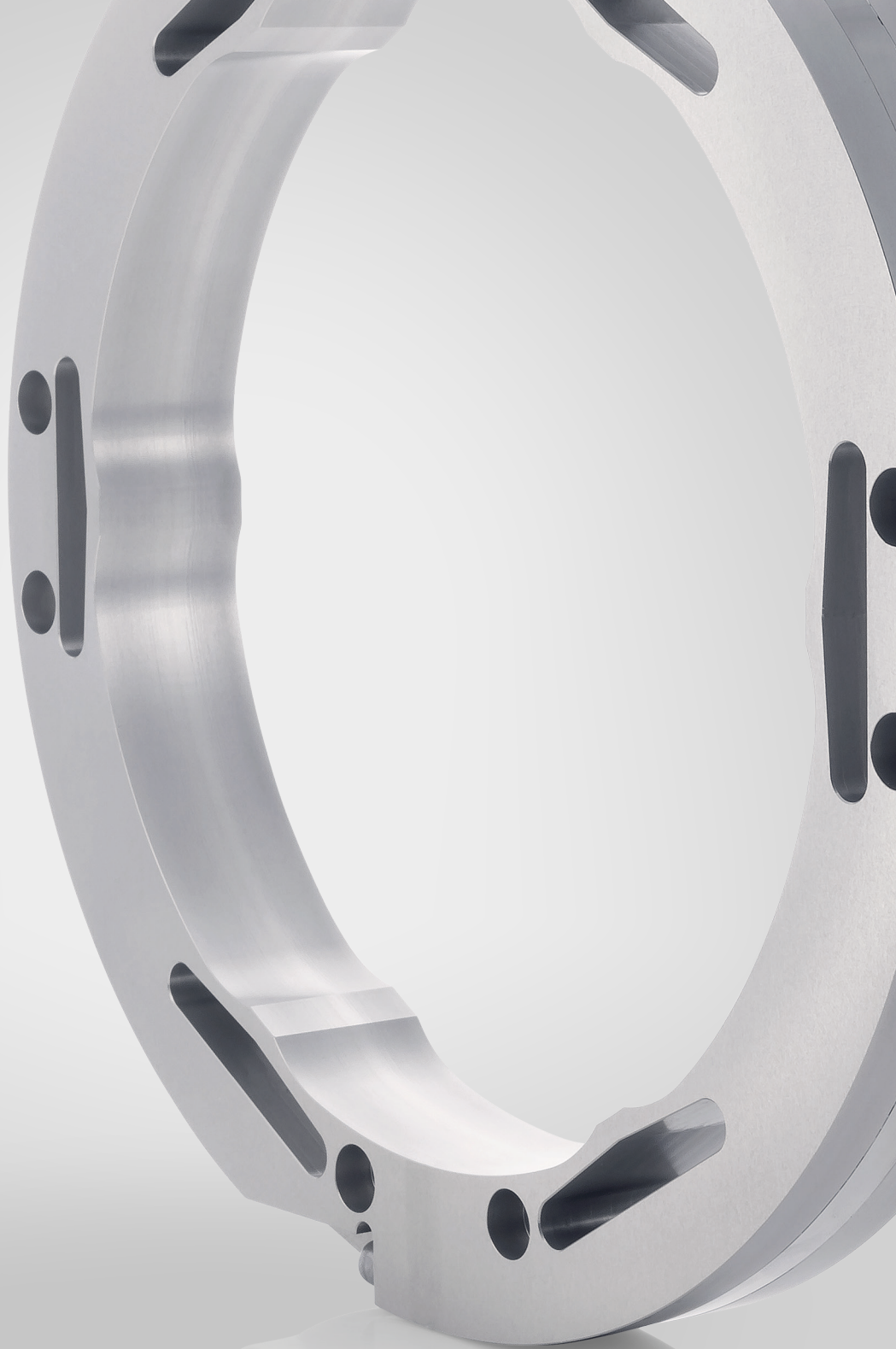
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Leine Linde's worldwide presence. Read more at www.leinelinde.com





The best encoders and sensors are those you never have to think about. Those that simply do their job – year after year. Leine Linde develops and manufactures customized encoder and sensor solutions for demanding environments, advanced measuring systems for accurate feedback of speed, position or strain.

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