

LEINE  LINDE



PREMIUM 900 SERIES

ABSOLUTE ENCODERS FOR HEAVY DUTY INDUSTRIES



Premium performance

Leine & Linde has long been known for encoders made for heavy duty applications. With the Premium 900 series we take the starting point in our experience for such applications, and rise to a new level when it comes to functionality.

Functionality

Machines are becoming more and more advanced in classic industrial applications. More complex motions need to be monitored in order to achieve full process control. To meet this increasing demand the 900 series is based on absolute scanning which enables position feedback with high resolution. It is available with advanced communication protocols for transfer of detailed data into the required system.

Reliability

With rising demands on machine efficiency the reliability of each component is critical. The 900 series therefore offers increased performance when it comes to enduring conditions like high temperatures and moisture or vibration and shock. All to achieve a reliable motion feedback at all times.

Flexibility

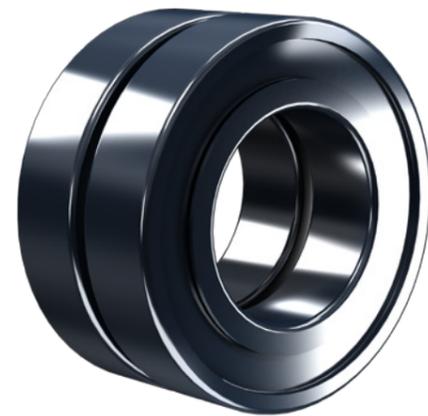
Flexibility when it comes to interfaces is important in order to provide an encoder for easy integration in the machine, and therefore the 900 series offers a variety of different shafts, connectors and communication interfaces. Backed up with fast delivery times and local technical support we are there to help you to solve your needs.

Absolute confidence

How does one design a Premium encoder line? The development of the 900 series focused on the following five areas in order to provide a user-friendly encoder made to endure.

1. Lifetime – reliability year after year

The most important factor when it comes to encoder lifetime is the size of the bearings. They will rotate millions of revolutions during many years in operation. By using bearings twice the size compared to similar encoders on the market, the 900 series is made to serve a long life in operation. Reliability is to know that the encoder will do its job, always.



Bearings scale 1:1

2. Temperature and moisture

– full performance in all environments

The 900 series is designed to perform in the most demanding environments. Some encoders end up in outdoor applications where they must withstand intense cold during the winter, while others are installed in metal processing applications where they are exposed to extreme heat. Moisture is another climate factor, whether it be rain and snow or hot water and steam. In some applications the encoder is exposed to dramatic fluctuations where the temperature may change in seconds.

Withstanding this is a matter of details and caring for each component of the encoder. The mechanics are produced with strict demands on tolerances to offer

a perfect fit. The cover is treated with an anodization to keep a smooth surface also when exposed to salt water. We specify the shaft sealings to at least IP66 even after years in operation. The bearings are selected with a grease that withstands temperatures well above the limits of the encoder. Care is given when selecting each specific electronic component to be sure it fulfills the stringent requirements. When the full design is put together it is tested to its limits, in order to be sure that everything performs together. Once again it's about reliability – to know that it will work even at exceptional conditions.

3. Vibration and shock – designed to endure

Thanks to a unique scanning principle you get

a solution with top-notch robustness without compromising on resolution and accuracy. Market standard encoders have their most sensitive point in the optical scanning components for detection of shaft position. This may be a problem in heavy duty applications like metal processing where an encoder is subject to high continuous vibrations and instant

shocks. To strengthen this point the 900 series has been developed with a unique scanning principle called inductive scanning. It is based on components which are extra resistant to harsh treatment and provides a solution where robustness is in its essence. On the same time it offers a high resolution output of 19 bit singleturn and 16 bit multiturn.





4. Flexibility in design - easy to integrate

To fit your machine we provide a big variety of interfaces, both mechanically and electrically.

What size is the shaft of your motor? We offer hollow shafts in several different dimensions and with special features like taper shaft or with keyway. If you prefer a flange-mounted encoder we offer the Euro-flange with solid shaft.

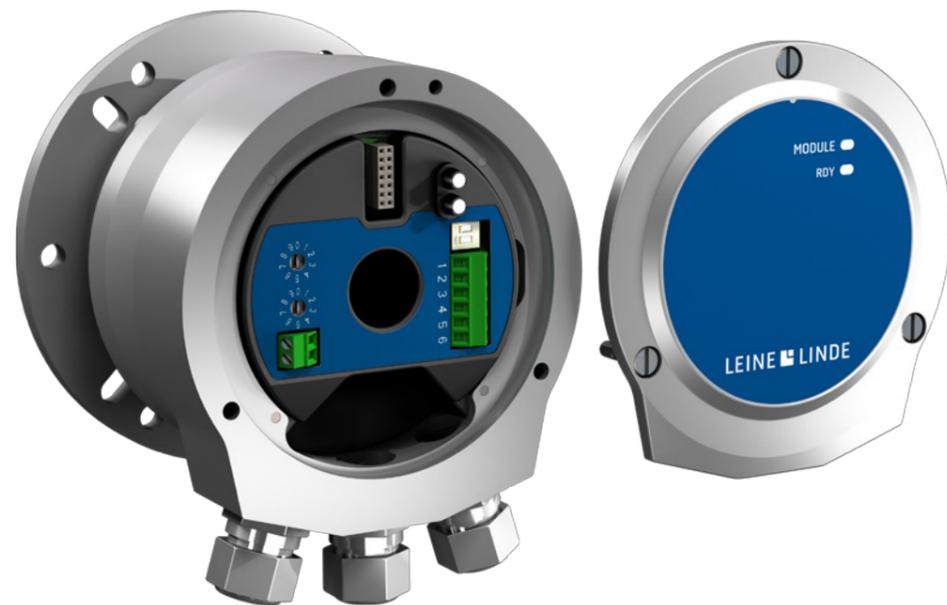
What language does your system speak? We offer different communication protocols for integration

with your electronics, whether you want the data serially, over a fieldbus or as incremental pulses. We can even make combination encoders if you need different kinds of outputs from the same unit. Tell us your requirements, and we will customize the encoder according to them!

5. Installation – handling the encoder

Compact, but filled to the limits with functionality. Thanks to the compactness of the inductive scanning we are able to increase the size of the bearings at the same time as we add more advanced functionality, all without increasing the total size of the encoder. This will make the 900 series fit, without having to redesign the installation where another heavy duty encoder has been used.

We offer different kinds of pre-installed connectors for direct fitting in your installation. Or, if you prefer, terminal connection for you to install your own cable on site - easily accessed on the back of the encoder and with the encoder's internal parts always enclosed by a protection cover.



Mechanics

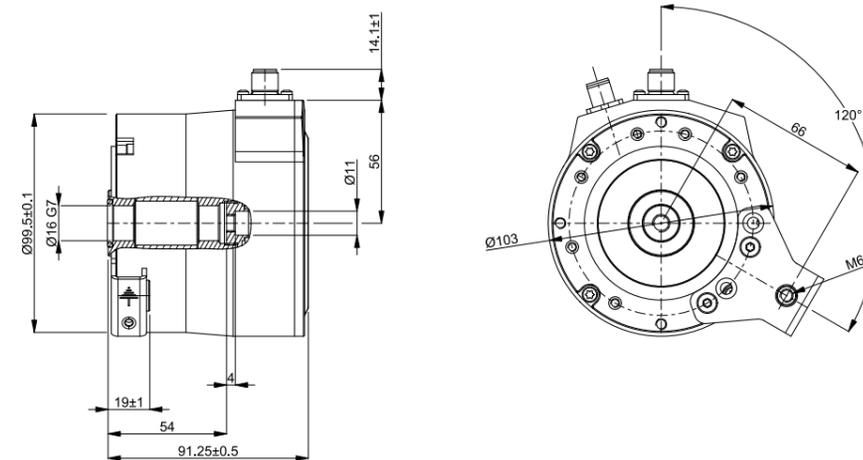
– solutions for easy installation

What size is the shaft of your machine? We offer hollow shafts in several different dimensions and with special features like taper shaft or with keyway. If you prefer a flange-mounted encoder we offer the Euro-flange with solid shaft.

Absolute encoders

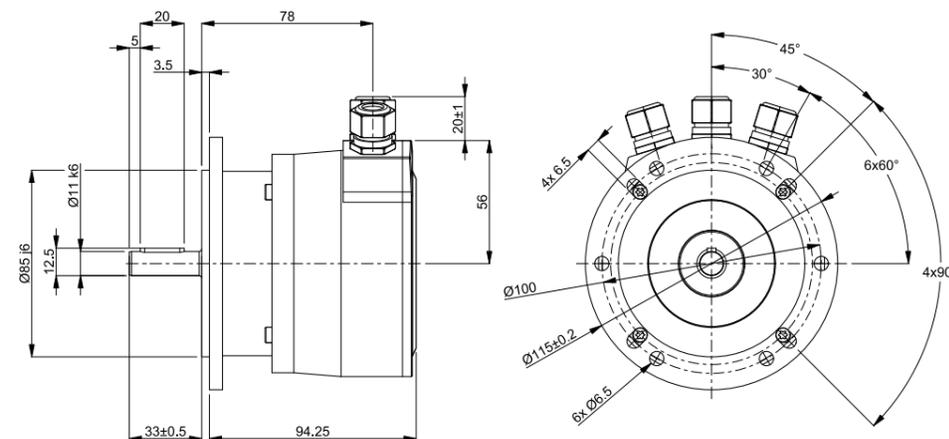
Hollow shaft and M12 connectors

Ø12 or Ø16 mm hollow shaft. Connection for DRIVE-CLiQ.



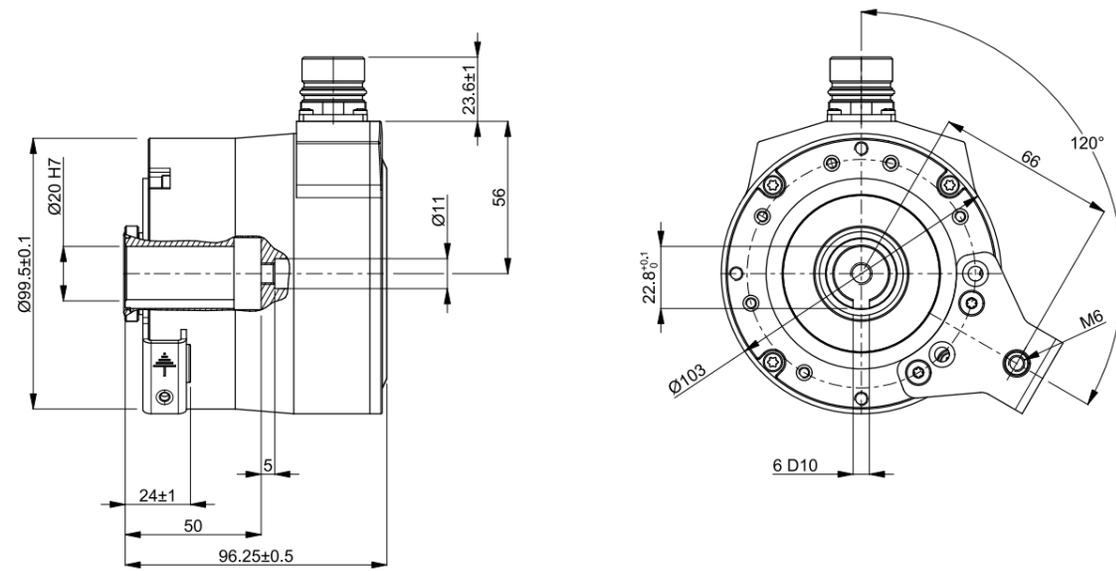
Euro-flange and M16 cable glands for terminal connection

Ø11 or Ø14 mm solid shaft with key nut. Connection for PROFIBUS.



Keywayed hollow shaft and M23 connector

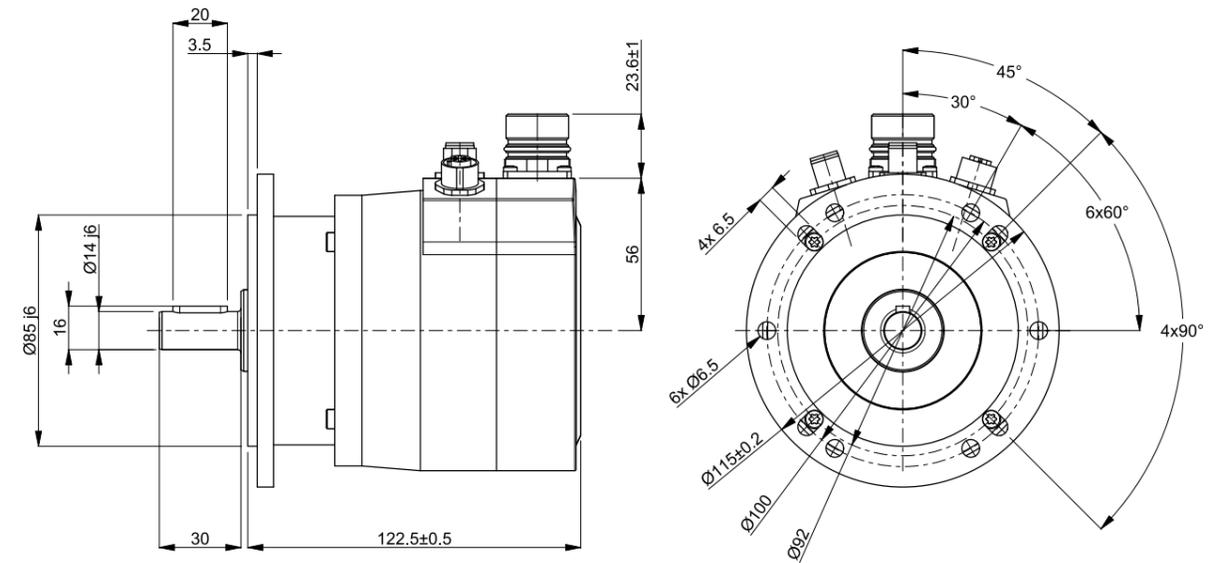
Ø20 mm hollow shaft with keyway. Connection for SSI or EnDat.



Combination encoders

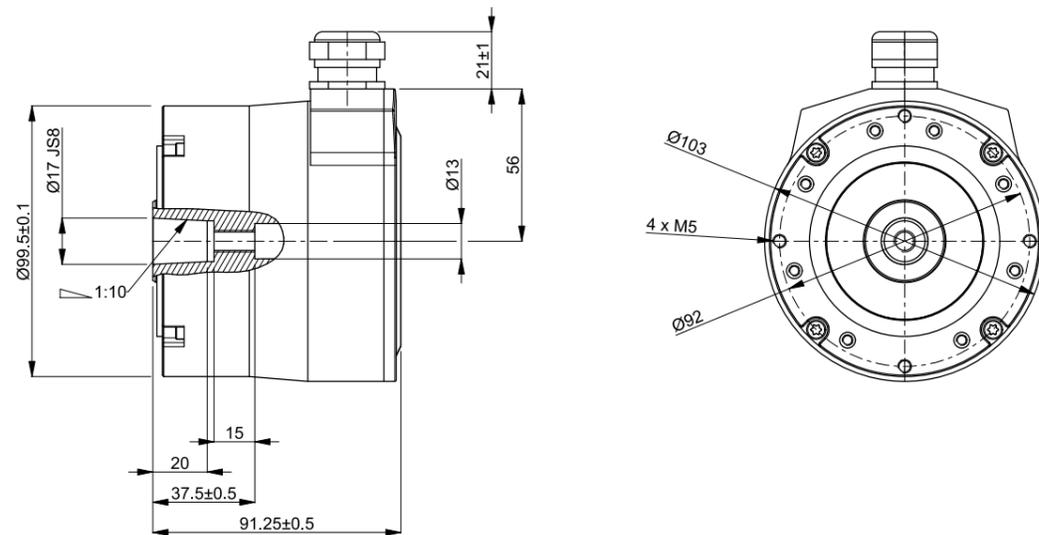
Euro-flange and connectors

Ø11 or Ø14 mm solid shaft with key nut. Connectors M12 for PROFIBUS and M23 for incremental output.



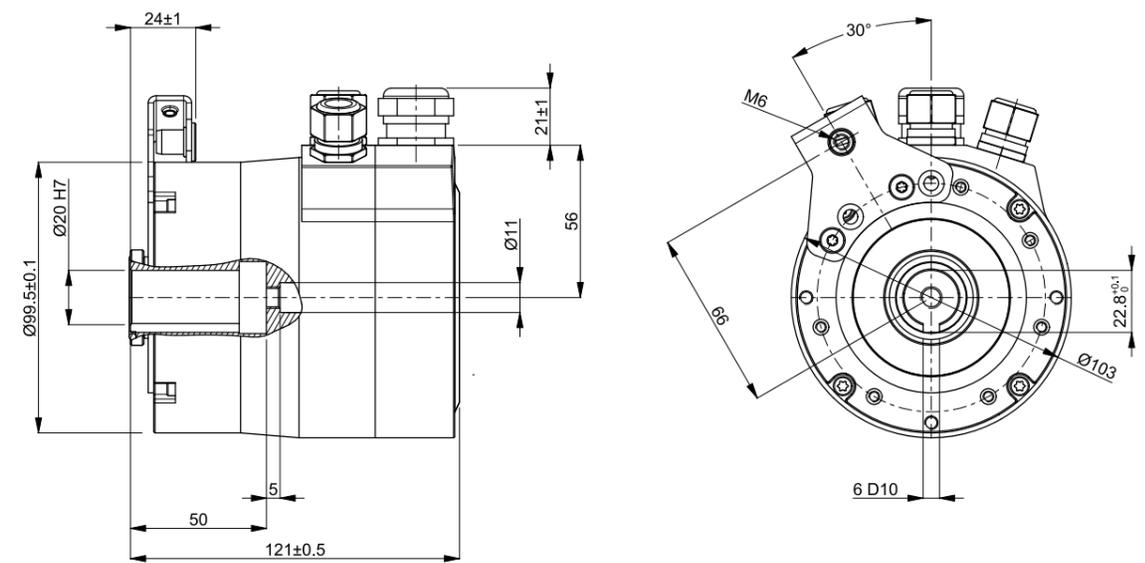
Taper hollow shaft and M20 cable gland for terminal connection

Ø17 mm taper shaft. Connection for SSI.



Keywayed hollow shaft and cable glands for terminal connection

Ø20 mm hollow shaft with keyway. Cable glands M16 for PROFIBUS and M20 for incremental output.



Electronics

– flexibility in interfaces

What language does your system speak? We offer different communication protocols for integration with your electronics, whether you want the data serially, over a fieldbus or as incremental pulses.

PROFIBUS

PROFIBUS is a powerful and versatile open fieldbus, defined by several international standards. Leine & Linde's encoders follow the device profiles for DPV0 and DPV2. A PROFIBUS system is set up with slave-to-slave communication, which means that slaves in a net can exchange information with each other without communication being initiated by the master. This type of communication is very efficient and fast and reduces the response time on the bus by up to 90%. PROFIBUS encoder functionality includes position read out, changed direction of counting, diagnostic data, scaling function, preset value function, as well as velocity read-out.



SSI

SSI or Synchronous Serial Interface is a digital point-to-point interface. It provides unidirectional communication at speeds up to 1 MHz by the use of only four wires.

EnDat

The EnDat interface is a digital bidirectional interface. It is capable of transmitting position values from absolute encoders, as well as reading and updating information stored in the encoder. Thanks to the serial transmission method only four signal lines are required.



DRIVE-CLiQ

DRIVE-CLiQ is an Ethernet-based protocol from Siemens. This interface is specially made for drive applications for an easy connection between components such as converters, motors and sensors. With a speed of 100 Mbit/s and a cycle time of 31.25 μ s, DRIVE-CLiQ has the performance required for the most demanding applications. Components with DRIVE-CLiQ are automatically configured with each other since every component has an electronic label. The encoders are supplied with specially adapted connectors, with power supply and data in the same connector, making it easy to connect the encoders.

DRIVE-CLiQ

Incremental

Interface	TTL	RS 422	HCHTL
Supply	5 Vdc	9-30 Vdc	9-30 Vdc
Output signal	5 Vdc	5 Vdc	9-30 Vdc
Suitable for	Low frequencies over short cables	High frequencies over long cables	Medium frequencies over long cables
Max frequency	200 kHz	200 kHz	200 kHz
Max cable length	50 m at 50 kHz	1000 m at 200 kHz	350 m at 100 kHz



Resolution

The 900 series is available with high resolutions for absolute position data up to 19 bit singleturn and 16 bit multiturn. Depending on the communication protocol the receiving electronics may have limitations on how much data it can handle. Therefore the resolution is scaled down for certain communication protocols as described in the code key on pages 12-13.

For incremental outputs any resolution may be selected between 1 and 32768 pulses per revolution.

Code keys

Absolute encoder models 901 and 903

9 0 - - - - - 0 0

Model

903 = Standard
901 = Extra robust (ceramic bearings)

Shaft

2 = Hollow shaft 12 mm
6 = Hollow shaft 16 mm
7 = Hollow shaft 17 mm taper (only model 901)
0 = Hollow shaft 20 mm with keyway (only model 901)
1 = Solid shaft 11 mm with key nut
4 = Solid shaft 14 mm with key nut

Flange

0 = No torque bracket (hollow shaft)
2 = Torque bracket 120° (hollow shaft)
3 = Torque bracket 330° (hollow shaft)
8 = Euro-flange B10 (solid shaft)

Output

Electronics	Resolution	
11 = SSI singleturn	13 bit	with HTL 2048 ppr
12 = SSI multiturn	13 + 12 bit	with HTL 2048 ppr
21 = EnDat singleturn	19 bit	with 1 Vpp 32 ppr
22 = EnDat multiturn	19 + 16 bit	with 1 Vpp 32 ppr
31 = PROFIBUS singleturn	19 bit	
32 = PROFIBUS multiturn	19 + 12 bit	
33 = PROFIBUS multiturn-HR	15 + 16 bit	
41 = DRIVE-CLiQ singleturn	19 bit	
42 = DRIVE-CLiQ multiturn	19 + 15 bit	

Connection

Connection type	Available outputs
1 = Cable gland	SSI (1 x M20), PROFIBUS (3 x M16)
2 = Pre-mounted cable xx m	SSI (14 wires), EnDat (12 wires), specify cable length separately
4 = M23 connector	SSI (17 pin CW), EnDat (17 pin CW)
5 = M12 connector	PROFIBUS (3 x M12), DRIVE-CLiQ (1 x M12)
6 = M12 connector + temp input	DRIVE-CLiQ (2 x M12) with connection for external temperature sensor

Combination encoder models 921 and 923

9 2 - - - - - - - - - -

Model

923 = Standard
921 = Extra robust (ceramic bearings)

Shaft

2 = Hollow shaft 12 mm
6 = Hollow shaft 16 mm
7 = Hollow shaft 17 mm taper (only model 921)
0 = Hollow shaft 20 mm with keyway (only model 921)
1 = Solid shaft 11 mm with key nut
4 = Solid shaft 14 mm with key nut

Flange

0 = No torque bracket (hollow shaft)
2 = Torque bracket 120° (hollow shaft)
3 = Torque bracket 330° (hollow shaft)
8 = Euro-flange B10 (solid shaft)

Absolute output

Electronics	Resolution	
11 = SSI singleturn	13 bit	with HTL 2048 ppr
12 = SSI multiturn	13 + 12 bit	with HTL 2048 ppr
31 = PROFIBUS singleturn	19 bit	
32 = PROFIBUS multiturn	19 + 12 bit	
33 = PROFIBUS multiturn-HR	15 + 16 bit	
41 = DRIVE-CLiQ singleturn	19 bit	
42 = DRIVE-CLiQ multiturn	19 + 15 bit	

Connection, absolute output

Connection type	Available outputs
1 = Cable gland	SSI (1 x M20), PROFIBUS (3 x M16)
2 = Pre-mounted cable xx m	SSI (14 wires), specify cable length separately
4 = M23 connector	SSI (17 pin CW)
5 = M12 connector	PROFIBUS (3 x M12), DRIVE-CLiQ (1 x M12)
6 = M12 connector + temp input	DRIVE-CLiQ (2 x M12) with connection for external temperature sensor

Incremental output

Electronics (supply/output)	Connection
91 = HCHTL (9-30 V / 9-30 V)	1 x M23 connector (12 pin CW)
92 = HCHTL (9-30 V / 9-30 V)	1 x M20 cable gland
93 = RS422 (9-30 V / 5 V)	1 x M23 connector (12 pin CW)
94 = RS422 (9-30 V / 5 V)	1 x M20 cable gland
95 = TTL (5 V / 5 V)	1 x M23 connector (12 pin CW)
96 = TTL (5 V / 5 V)	1 x M20 cable gland

Incremental resolution

1-32768 ppr

Performance

Technical data

Ingress protection class [IEC 60529]	IP67 (IP66 at shaft inlet)
Shock [IEC 60068-2-27]	1500 m/s ²
Vibration [IEC 60068-2-6]	200 m/s ²
Operating temperature	-20 °C .. +85 °C *
Shaft load axial / radial	125 N / 400 N
Weight	1600 g
Cover material	Aluminum (anodized)
Shaft material	Stainless steel with insulated peek insert
Rotational speed max	6000 rpm

* -40 °C with ceramic bearings, + 70 °C for PROFIBUS

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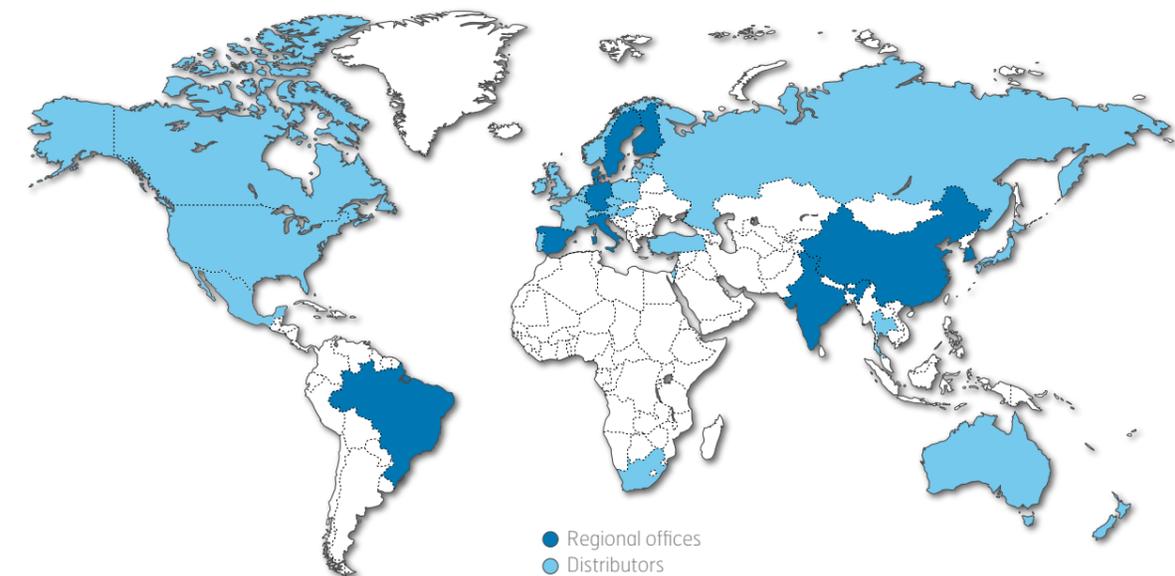
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Leine & Linde's worldwide presence. Read more at www.leinelinde.com



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

LEINE  LINDE

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