



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.

ROBUST ENCODERS

FOR ACCURATE SPEED AND POSITION

PRECISION CONFIDENCE FLEXIBILITY

Precision, confidence and flexibility – reliable encoders for all industries

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.



1000 EXTREME

Extreme in every way. An encoder that handles most things.

The steel industry has many examples of environments with extreme requirements in terms of temperature, mechanical forces, vibrations and shocks. For such types of applications, we have designed the 1000 series.



800 HEAVY DUTY

Robust incremental encoder adapted for challenging industrial environments.

Are you looking for the most robust, maintenance-free and cost-effective encoder? Then the 800 series is for you, and it's also the first choice of most engineers!



700 COMPACT

Compact yet robust for applications with medium mechanical forces.

With its short build length, it is designed for filling the need for heavy-duty encoders even in installations where space is limited.



600 INDUSTRIAL

Absolute position encoders that can position single or multiturn movements.

These position encoders are equally suitable for use in industrial automation or in demanding environments. They can be connected via advanced fieldbus interfaces such as PROFIBUS, PROFINET or CAN.



500 ROBUST

Versatile and modular encoders.

These encoders conform to European industrial standards and are available in a hollow shaft or shaft design, which ensures simple installation. If you are looking for a standard encoder with unrivalled performance, the 500 series is the right choice.



300 MINIATURE

Robust and extremely reliable miniature encoders.

These incremental encoders are only 30 millimetres in diameter and intended for installation in applications where space is restricted.



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Precision

What does precision mean to you? To Leine & Linde, it means being accurate. Being exact in every operation and never simply guessing. Always being curious, studying data and listening to what you have to say. Always doing our very best.

Quality

Leine & Linde is a modern company with its roots in Swedish industrial traditions. We are strongly characterised by an inquisitive and quality-oriented culture of engineers who want to move forward and are never satisfied with second best. We are our own toughest customers – our products must be delivered on time, with no faults.

Exceptional requirements

Our specially-adapted position and speed encoders can now be found throughout the world. You will find

them in machines and applications operating under the toughest of conditions. Extreme environments where vibrations, moisture, interference, heat and cold set exceptional requirements in terms of material and design. Requirements that in many cases only encoders from Leine & Linde can meet. Leine & Linde is a global company. Through local presence we support our customers, wherever they are, with a high level of availability and service.

Rapid deliveries

It normally takes us two weeks to manufacture an encoder. If it's urgent, we offer 24-hour express manufacturing. 96 per cent of all orders are delivered on the promised delivery date.

So what does precision actually mean?
To us, it means everything.

Confidence

Leine & Linde not only builds robust encoders – we also build long-term relations. Our clients have one thing in common. They conduct their activities in tough environments that are extremely demanding in terms of the equipment they use. It is also very demanding for us as suppliers. Each application involves a unique environment – whether it be a mining locomotive thousands of metres under ground, a hot rolling mill or a turbine in a wind farm far out to sea – with specific requirements for encoders. Developmental work therefore takes place in close collaboration between designer and customer. The results are accurate encoders that you can rely on. For us, it's about constantly wanting to improve – to earn your confidence.

Wind

Many wind turbines are sited out at sea, far from land and with no possibility of rapid service. This demands a great deal in terms of operational reliability of the systems. Leine & Linde's incremental encoders are used in wind turbines to control the rotation speed of the generator. Absolute encoders take care of positioning the tower and rotor blades at the best angle for the wind.

Paper

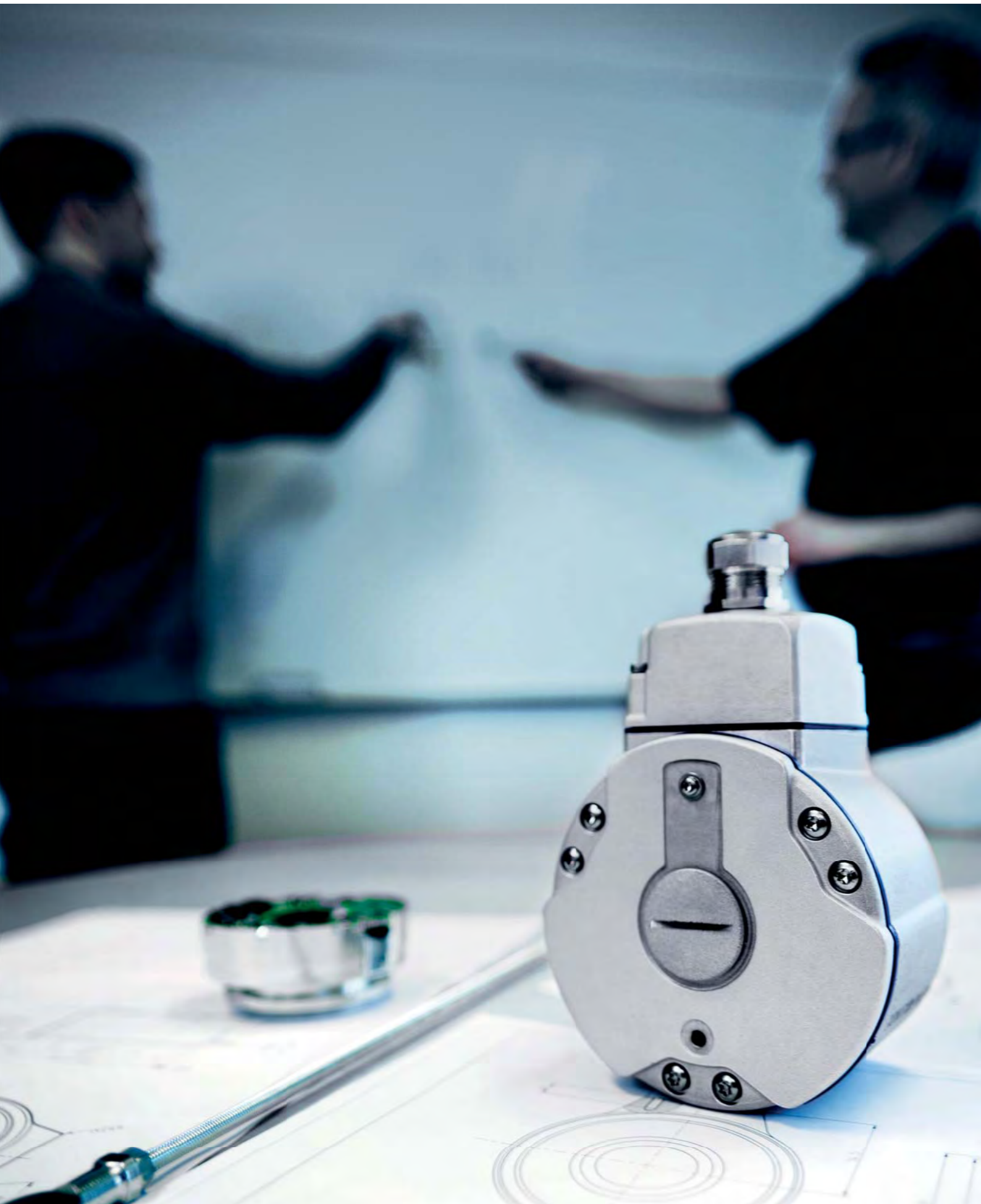
Reliability is a key factor within the paper industry. Production stoppages are very costly and must be avoided wherever possible. It is extremely important to be able to regulate the speed of the rollers driving the paper forward with a high level of accuracy. Robust and accurate encoders play a central role in such systems.

Steel

Few activities demand more from their equipment. In a rolling mill for steel production encoders are used, among other things, to control the speed of roll motors and for adjusting roll heights. This is an extreme environment, with dirt, vibrations, heat, big temperature fluctuations and mechanical forces at work.

Cranes

A crane in an outdoor environment is exposed to tough stresses. Cold, heat, sun, rain and snow all cause wear to the components. Leine & Linde's absolute position encoders are used in cranes to position winch and wheels so that the load can be safely lifted to the right place. The motors powering the system must be rapidly able to adjust their speed to the current weight of the load and incremental encoders are used for this.



Flexibility

Leine & Linde's encoders are generally manufactured in small batches adapted to the specific customer's unique requirements. There are around 10,000 variants of encoders, and new ones are being added every day. Development takes place in close collaboration between designer and customer; we are continuously developing new innovations together. Efficient process management enables rapid and quality-assured product development and production.

Global presence

Local sales offices throughout the world give us not only a strong global presence, but also a structure for identifying technical trends and new requirements that arise among our customers. Thanks to experience and constantly renewing our knowledge we have a good basis for delivering customised solutions to industries undergoing constant change.

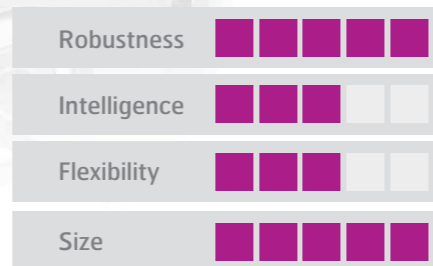
Encoder technology

The purpose of incremental and absolute encoders is to measure speed or position of rotating shafts. The key component in the encoders is a rotating disc that can have up to 10,000 thin lines. An LED illuminates the disc, which allows light through the lines as the disc rotates. On the other side of the disc the light is captured by a detector that converts the light pulses into an electrical wave motion. This in turn can be used to calculate the speed or position of the specific application. Line widths as small as 5 μm are common, which is very exacting in terms of optics. They must be manufactured with optimum precision and no contaminants – therefore production takes place in a cleanroom.





1000 EXTREME



Extreme in every way. Handles most things.

The steel industry has many examples of environments with extreme requirements in terms of temperature, mechanical forces, vibrations and shocks. For such types of applications, we have designed the 1000 series. An encoder series with exceptional durability, suited to an exposed environment.

Thanks to a high encapsulation level the encoder's internal parts are protected from dust and liquids. We can manufacture the product in stainless steel on request.

We offer different incremental and absolute interfaces, or combinations thereof in a single product. The absolute interfaces available include SSI and EnDat as well as fieldbus communication.

Technical data

Diameter	115 mm
Vibration	300 m/s ²
Shock	2000 m/s ²
Shaft load	680 N (radial) 260 N (axial)
Encapsulation level	IP67
Temperature	Variants up to -40 .. +100 °C






Designations

ESI	Extreme Shaft encoder, Incremental
ESA	Extreme Shaft encoder, Absolute
ESD	Extreme Shaft encoder, Dual

Models

ESI 1503	Standard
ESI 1504	High temperature
ESA 1608	Multiturn 25 bit resolution
ESD 1525	Dual signal output

Options

 Shafts	Solid: 11 mm with key, 15 mm with key
 Flanges	Solid: ø115 mm Euro flange
 Resolution	Incremental: 100, 500, 512, 1024, 2048, 2500, 3072, 4096, 5000, 8192, 10000 ppr Absolute: 25 bit (13 bit singleturn + 12 bit multiturn)
 Electronics	Incremental: HTL, HC-HTL, TTL, RS-422 Absolute: SSI, EnDat, PROFIBUS, parallel
 Connection	Terminals

This is a general summary for some of the most common options in Leine&Linde's 1000 series. Other variants are available on request.

PRODUCT FINDER

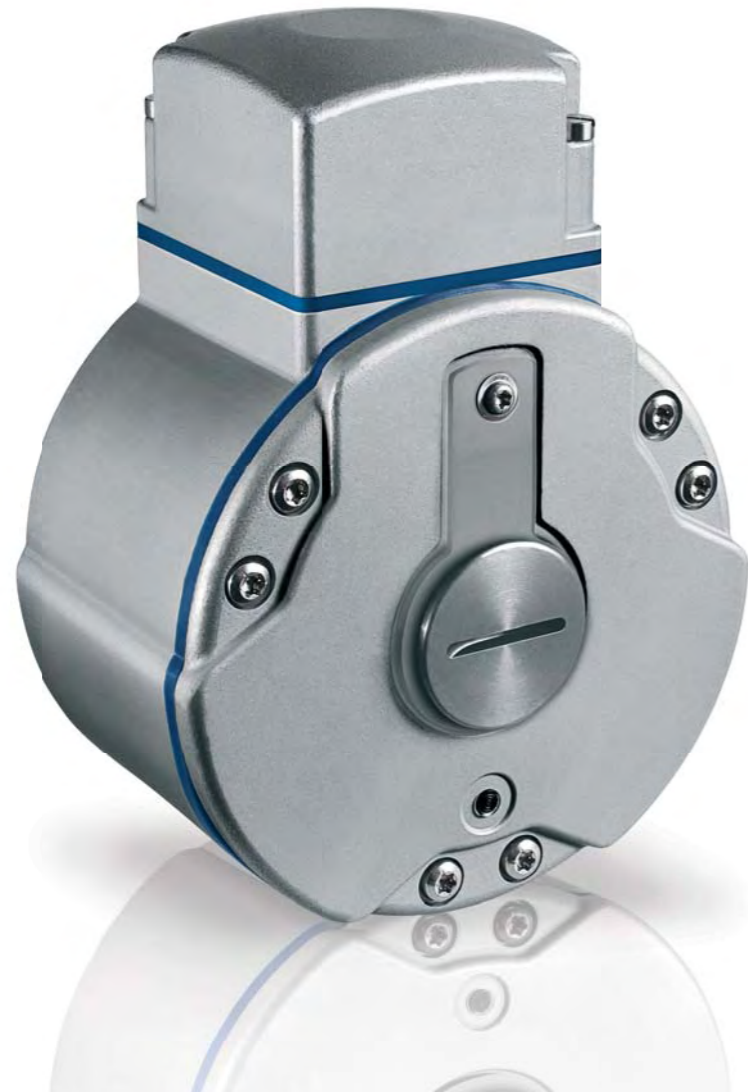
Visit www.leinelinde.com to find the product you are looking for. Using the Product Finder you can

- combine options and create your own encoder
- generate a detailed data sheet for your exact variant.



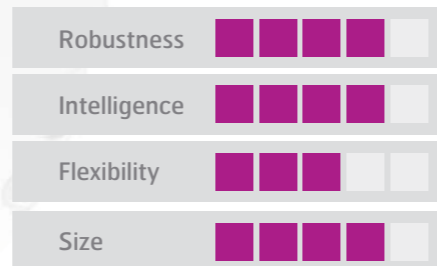
Extreme environments

In some industries, e.g. within metal processing and mining, encoders are exposed to extreme mechanical forces and a harsh environment. The 1000 series is designed with highly robust bearings to withstand forces, vibration and shocks, as well as being well encapsulated to protect the encoder's internal parts from the surrounding environment.



800

HEAVY DUTY



Robust incremental encoder adapted for challenging industrial environments.

Are you looking for the most robust, maintenance-free and cost-effective encoder? Then the 800 series is for you – it's the first choice of most engineers!

The product series has a long history of successful operation in applications within heavy industries, such as the steel, paper and wind power industries. These industries place stringent demands on robustness and reliability, and the encoder is designed thereafter. Mechanically it features a dual set of heavy duty bearings and a well-encapsulated enclosure.

The 800 series can also be equipped with Leine & Linde's advanced diagnostics system, ADS Online, for condition-based maintenance.

Technical data

Diameter	110 mm
Vibration	200 m/s ²
Shock	1500 m/s ²
Shaft load	300 N (radial) 100 N (axial)
Encapsulation level	IP66
Temperature	Variants up to -40 .. +100 °C






Designations

XHI	X-heavy duty H ollow shaft encoder, I ncremental
XSI	X-heavy duty S haft encoder, I ncremental
XHD	X-heavy duty H ollow shaft encoder, D ual

Models

XHI 801	Extra robust
XHI 803	Standard
XHI 841	Flameproof Ex-encapsulation
XSI 850	Solid shaft
XHD 865	Dual signal output

Options

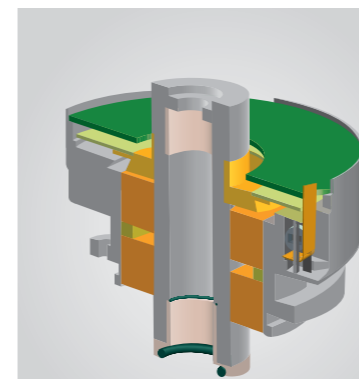
 Shafts	Solid: 11 mm with key Hollow shaft, through-going: 25 mm, 1 inch Hollow shaft, blind: 12 mm, 12 mm with keyway, 16 mm, 17 mm taper
 Flanges	Solid: ø115 mm Euro flange Hollow shaft: ø110 mm
 Resolution	Incremental: 100, 500, 512, 1024, 2048, 2500, 3072, 4096, 5000, 8192, 10000 ppr
 Electronics	Incremental: HTL, HC-HTL, TTL, RS-422, 1 Vpp, Optolink
 Connection	M23, screw terminal, cable

This is a general summary for some of the most common options in Leine&Linde's 800 series. Other variants are available on request.

PRODUCT FINDER

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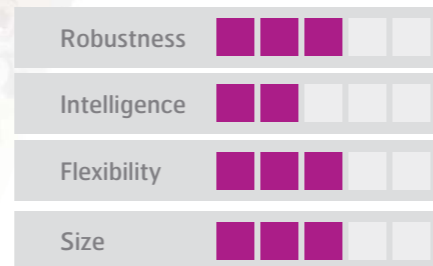
Robustness and reliability

The encoder's robust construction is the key to prolonged operation. The ADS Online option also enables condition-based maintenance so that reliability is increased even more. ADS Online is an advanced diagnostics system that constantly monitors the encoder's key functions – fully integrated into each encoder. The system immediately produces a warning if an impending fault is detected. This enables service that is only performed as necessary and that can be planned in ample time to avoid unforeseen breakdowns.





700 COMPACT



Robustness in a compact design.

Robustness in a compact design are the key words for the 700 series. With its short build length, it is designed for filling the need for heavy duty encoders even in installations where space is limited. Despite its compactness, the series is nevertheless designed for the tough environments where typical Leine & Linde products are used.

The encoders are available with large hollow shafts up to 25.4 mm. The series also includes many other shaft variants that cover the market's standards for both inch- and millimetre-based dimensions. On the electronics side, there are several incremental interfaces to choose among.

Technical data

Diameter	100 mm
Vibration	200 m/s ²
Shock	1500 m/s ²
Shaft load	100 N (radial) 50 N (axial)
Encapsulation level	IP66
Temperature	-40 .. +100 °C






Designations

CHI Compact Hollow shaft encoder, Incremental

Models

CHI 703 Standard

Options

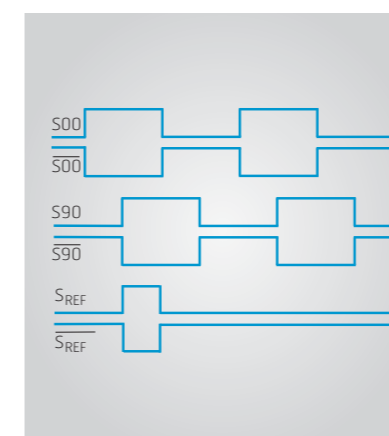
 Shafts	Hollow shaft: 5/8 inch, 3/4 inch, 1 inch, 16 mm, 20 mm, 25 mm (through-going)
 Flanges	ø100 mm with torque bracket or tether arm
 Resolution	Incremental: 100, 500, 512, 1024, 2048, 2500, 3072, 4096, 5000, 8192, 10000 ppr
 Electronics	HTL, HC-HTL, TTL, RS-422, 1 Vpp
 Connection	M23, MS, cable

This is a general summary for some of the most common options in Leine&Linde's 700 series. Other variants are available on request.

PRODUCT FINDER

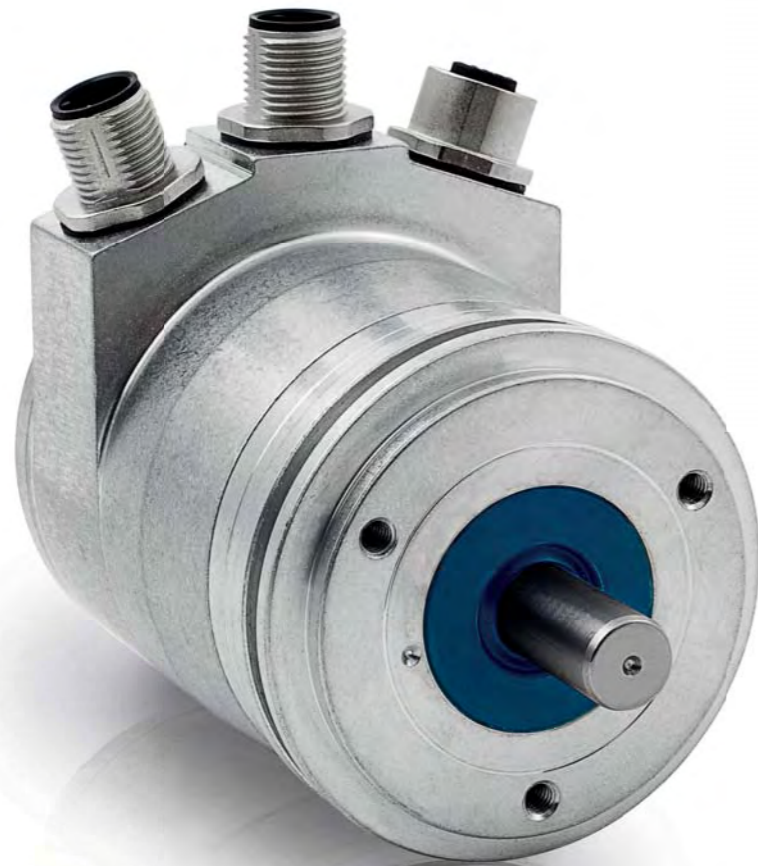
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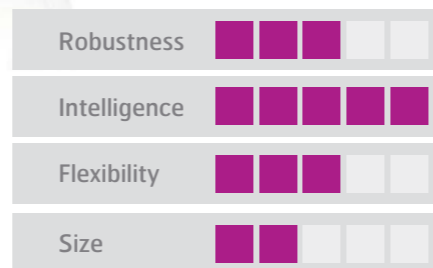
Incremental pulses

The encoder's resolution specifies the pulse rate, in other words the number of pulses that are produced during one revolution. For each detected pulse, the encoder produces the signal S00 along with the signal S90, which follows with a delay of 90 electric degrees (the length of a half pulse). Moreover, the two inverted signals S00\ and S90\ are produced, which enable differential transmission and consequently reducing the sensitivity of the signals to electrical interference. A reference pulse is also produced once per revolution – Sref with the inverse Sref\.



600

INDUSTRIAL



Absolute position encoders that can position single or multiturn movements.

The inductive 600 series is based on special technology developed to increase the encoder's durability in demanding environments. Thanks to our inductive scanning method and that robust ball bearings have been used in the series, the product is one of the most robust ø58 mm encoder on the market. The construction provides increased resistance to vibrations and consequently even extends service life.

The 600 series features absolute encoders that can position single or multiturn movements. The encoders communicate via the serial interfaces SSI and EnDat, or with advanced fieldbus interfaces such as PROFIBUS, PROFINET or CAN.

Technical data

Diameter	58 mm
Vibration	300 m/s ²
Shock	2000 m/s ²
Shaft load	125 N (radial) 100 N (axial)
Encapsulation level	IP67
Temperature	Variants up to -40 .. +100 °C

Designations

IHA	Inductive H ollow shaft encoder, A bsolute
ISA	Inductive S haft encoder, A bsolute

Models

ISA/IHA 608	Multiturn 25 bit resolution
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Options

● Shafts	Solid: 6 mm round, 10 mm round Hollow shaft: 12 mm through-going or blind (SSI, EnDat), 12 mm blind (fieldbus)
○ Flanges	Solid: ø58 mm synchro, ø58 mm clamping Hollow shaft: ø58 mm with stator coupling
▒ Resolution	Absolute: 25 bit (13 bit singleturn + 12 bit multiturn)
■ Electronics	Absolute: SSI, EnDat, PROFIBUS, PROFINET, CANopen, DeviceNet, SSI/HTL, SSI/RS-422
■ Connection	SSI/EnDat: M23, cable Fieldbus: M12, screw terminal

This is a general summary for some of the most common options in Leine&Linde's 600 series. Other variants are available on request.

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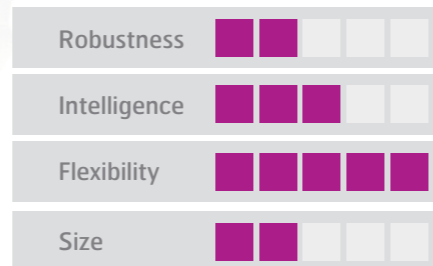


Exact positioning

Each position within the revolution of an absolute encoder is made up of a unique code, allowing the shaft's exact position to be read directly on start-up. The resolution is normally 25 bits which is equivalent to 8192 unique positions on each individual revolution, multiplied by 4096 distinguishable revolutions. Other resolutions are available on request. Leine & Linde's 600 series is available with serial interfaces for communication, such as SSI and EnDat, as well as a number of fieldbus interfaces.



500 ROBUST



Versatile and modular encoders.

Versatile and modular – these are the encoders in the 500 series. These encoders conform to European industrial standards and are available in a hollow shaft or shaft design, which ensures simple installation. If you are looking for a standard encoder with unrivalled performance, then the 500 series is the right choice for you.

The encoders in this series are used in various types of industrial applications, such as electric motors, cranes, elevators and general automation.

If the series' standard selection does not fit the requirements for your application, then Leine & Linde will be happy to develop a customised solution. Always cost-effective and with short lead times.

Technical data

Diameter	58 mm
Vibration	300 m/s ²
Shock	2000 m/s ²
Shaft load	60 N (radial) 50 N (axial)
Encapsulation level	IP66
Temperature	Variants up to -40 .. +100 °C






Designations

RHI	Ruggedized H ollow shaft encoder, I ncremental
RSI	Ruggedized S haft encoder, I ncremental
RHA	Ruggedized H ollow shaft encoder, A bsolute
RSA	Ruggedized S haft encoder, A bsolute
RSD	Ruggedized S haft encoder, D ual

Models

RSI 501	Extra robust (2 channels)
RSI/RHI 503	Standard
RSI/RHI 504	High temperature
RSI 505	Imperial measurement
RSA/RHA 506	Singleturn 10 bit resolution
RSA/RHA 507	Singleturn 13 bit resolution
RSD 525	Dual signal output

Options

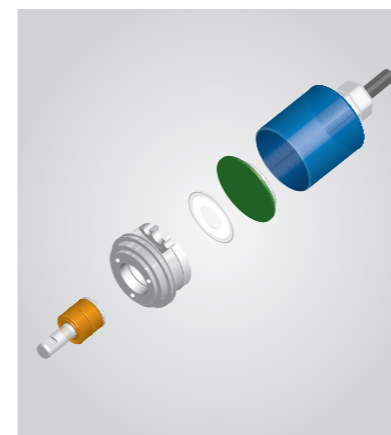
 Shafts	Solid: 6 mm round, 6 mm with face, 10 mm round, 10 mm with face Hollow shaft: 8 mm, 10 mm, 12 mm, 14 mm, 15 mm (through-going or blind)
 Flanges	Solid: ø58 mm synchro, ø58 mm clamping, 2.5" square, ø58 mm LL51, ø68 mm LL52 Hollow shaft: ø58 mm with or without stator coupling
 Resolution	Incremental: 100, 500, 512, 1024, 2048, 2500, 3072, 4096, 5000, 8192, 10000 ppr Absolute: 10 bit (singleturn), 13 bit (singleturn)
 Electronics	Incremental: HTL, HC-HTL, TTL, RS-422 Absolute: Analog, parallel, SSI, CANopen
 Connection	M23, M12, cable

This is a general summary for some of the most common options in Leine&Linde's 500 series. Other variants are available on request.

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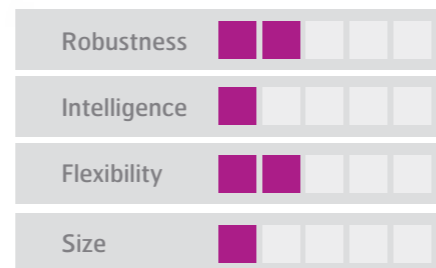


Versatility and modularity

The 500 series is extremely flexible for customisation. Each encoder consists of five modules, and each module is available in a large number of variants. Leine&Linde can easily put together new combinations of the five modules, which means that there are thousands of possible encoder variants in the series. One to suit any requirement!



300 MINIATURE



Robust and extremely reliable miniature encoders.

Robust and extremely reliable miniature encoders – that's the 300 series. These incremental encoders are only 30 millimetres in diameter and intended for installation in applications where space is restricted.

The encoders in this series support various types of incremental electrical interface, such as TTL and HTL. Mobile machinery and industrial high-pressure machines are typical applications for miniature encoders.

The encoders in this series have a very high encapsulation level (IP67) as well as a shock and vibration-resistant design – something that guarantees a long service life.

Technical data

Diameter	30 mm
Vibration	300 m/s ²
Shock	5000 m/s ²
Shaft load	10 N (radial) 10 N (axial)
Encapsulation level	IP67
Temperature	-40 .. +70 °C

Designations

MSI Miniature Shaft encoder, Incremental

Models

MSI 301 Extra robust (3 channels)

MSI 303 Standard (6 channels)

Options

 Shafts	Solid: 6 mm with face
 Flanges	Solid: ø30 mm synchro
 Resolution	Incremental: 20, 25, 50, 100, 125, 160, 200, 250, 500, 512, 1000, 1024, 1250 ppr
 Electronics	Incremental: HTL, TTL
 Connection	M12, M8, cable

This is a general summary for some of the most common options in Leine&Linde's 300 series. Other variants are available on request.

PRODUCT FINDER

Visit www.leinelinde.com to find the product you are looking for. Using the Product Finder you can

- combine options and create your own encoder
- generate a detailed data sheet for your exact variant.



Small but tough

Space for encoders in a harvester is limited. Therefore our miniature model is used. However, dust, water and cold are standard factors in such environments, so despite its small size the encoder must offer optimum robustness.



Accessories

FOR INSTALLATION

The right accessories for installation and extended functionality.

Leine & Linde offers a wide range of accessories for its encoders. Shaft couplings, connectors, measuring wheels and various types of mounting brackets are some of the accessories that are available.

Leine & Linde also offers several types of gateway for adapting encoder signals. A gateway is used together with an encoder and can convert its signals for a different desired interface, e.g. optical signals or PROFIBUS.

It is very important that all accessories used in an application are of the same high quality as the encoder. Therefore you should only use accessories that have been verified by us in terms of function and performance, as that is the best way to ensure that the accessories are the right quality.

Accessories

Shaft couplings	Several types of couplings for installation of shaft encoders. The following types are available: bellow, membrane, oldham or double loop.
Connectors	Connectors for encoders, with or without assembled cable.
Mounting kits	Various mechanical installation kits for shaft and hollow shaft encoders.
CRG PROFIBUS	Robust DIN-rail-mounted gateway between EnDat and PROFIBUS.
CRG CANopen	Robust DIN-rail-mounted gateway between EnDat and CANopen.
CRG Optolink	A robust DIN-rail-mounted system for fibre-optic transmission of incremental encoder signals.
Interface converter	DIN-rail-mounted interface converter for incremental encoder signals, e.g. from HTL to TTL. Also variants for splitting a signal in two.
Speed monitor	DIN-rail-mounted system for monitoring of speed, stoppages or direction.
Draw wire	Robust draw wire for linear measurement. Wire lengths between 2.5 and 30 metres.
Test unit PWM 9	Test unit that enables function testing of incremental encoders. Checks, among other things, line count, accuracy and power consumption.



Compact Robust Gateway

Leine & Linde offers several types of gateway for adapting electrical signals. A gateway with PROFIBUS interface is connected to an EnDat position encoder and can be sited outside the exposed environment in which the actual encoder is located. If the encoder needs replacing, the gateway can remain connected to the fieldbus system, with all its settings for the unit saved.



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