



Solutions for Measuring. Control. Positioning.

Magnetic linear and rotation measuring systems,
position indicators and positioning controls





In focus

SOLUTIONS FOR MEASURING

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- Magnetic linear and rotation measuring systems



SOLUTIONS FOR MEASUREMENT & DISPLAY

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- Measuring and display systems
- Position indicators

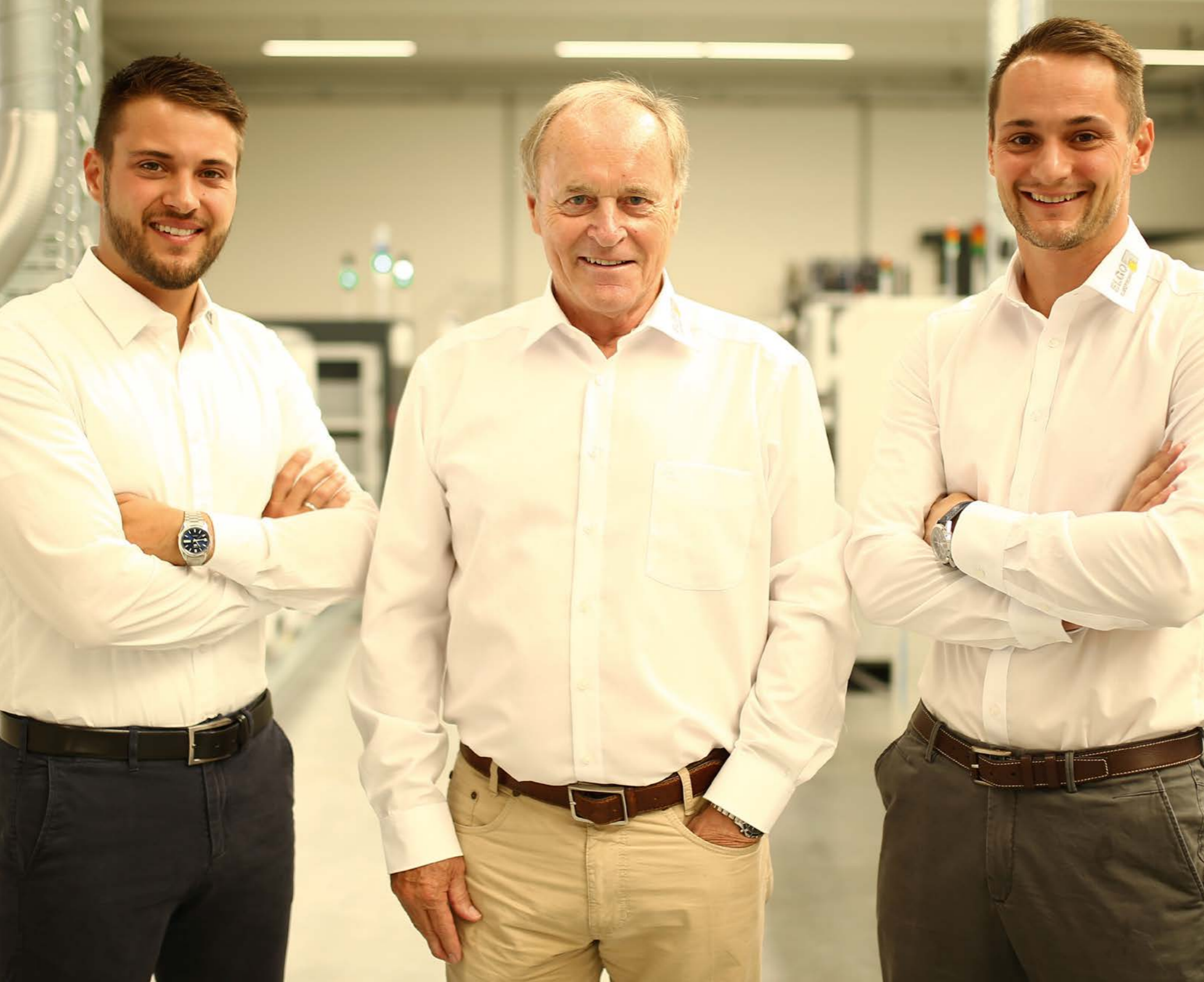


SOLUTIONS FOR CONTROL

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- Positioning controls





Our passion: Measuring. Control. Positioning. Since 1978

With more than 4,000,000 meters of magnetic tape produced annually and 160,000 assembled electronic modules, the ELGO Group is one of the leading companies worldwide in the field of magnetically based measuring and positioning technology. For four decades we have been developing and manufacturing sensors, measuring and positioning systems for many different industries and applications.

Our portfolio comprises three product lines: Magnetic measuring systems for length, angle and speed measurement, display units for visualisation of the measured values and compact positioning controllers.

ELGO Electronic is certified according to DIN ISO 9001:2015.



Picture above from left to right Moritz, Helmut and Felix Grimm, management

Magnetic measuring systems



Absolute measuring systems linear | rotation

Resolution up to 1 µm EMAX-HI GSA2 FMAX FMAX2/FMAX3	8
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Incremental measuring systems linear | rotation

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**For position detection
on round rod profiles**
MTM-A | MTM-Q | MTM-I

Magnetic standards

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Magnetic measurement technology

Contactless, robust and reliable

Magnetic measurement technology uses a pattern of magnetic north and south poles which defines a scale. The scale, in the form of a magnetic tape or magnetic ring, is read by contactless Magneto-resistive (MR) or Hall Effect sensors. Depending on requirements, the sensor converts the magnetic sine/cosine input signals into electrical signals that can be used for a control system or an electronic position indicator.

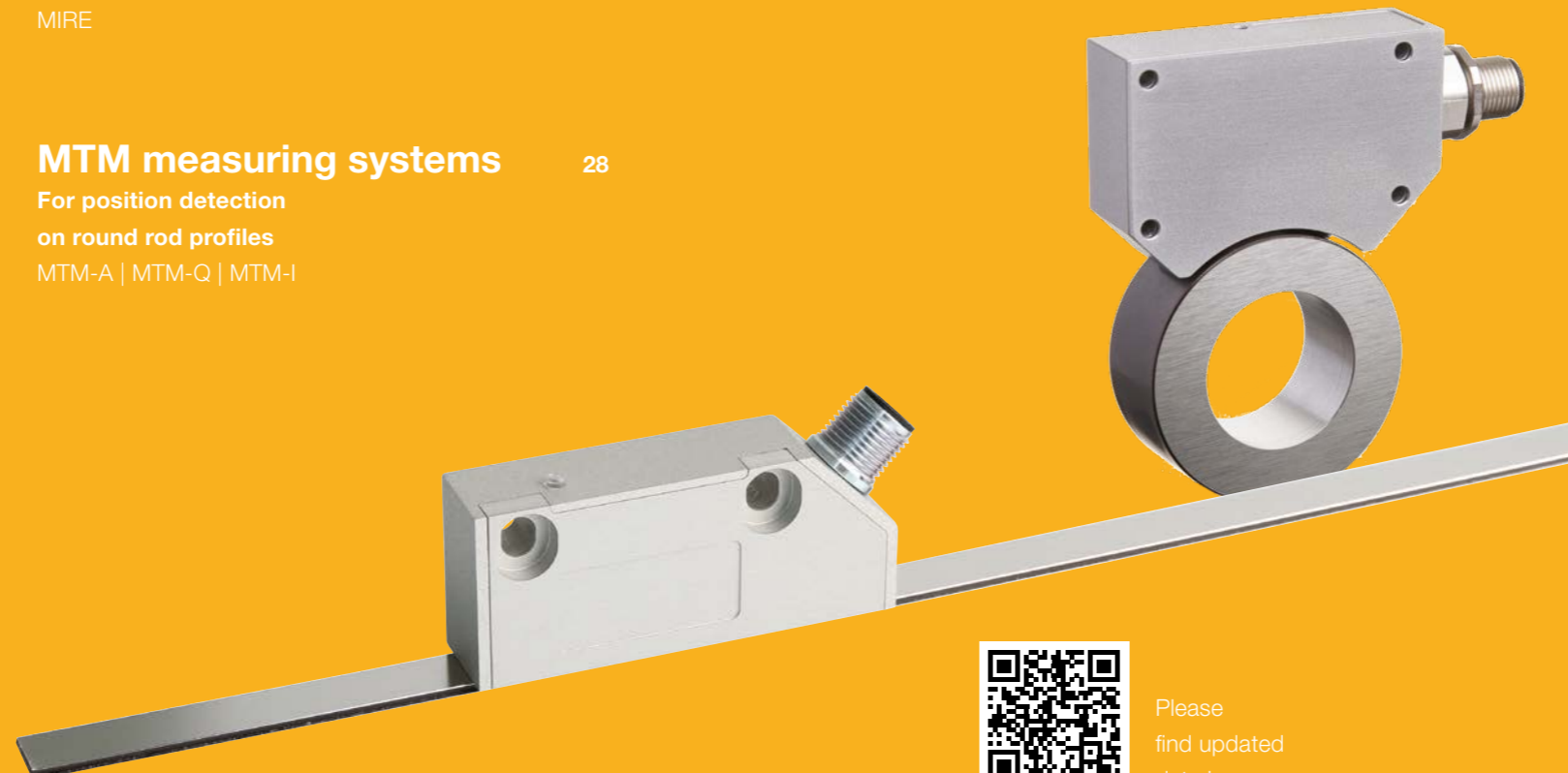
Depending on the version, our sensors are suitable for linear measurement of displacement and position as well as for the detection of angle and speed. For rotary measurements we offer magnetic rings in various designs and geometries. Incremental or absolute measuring methods are also available.

The right system for every application

In order to meet the different application requirements of our customers, we offer sensors and magnetic scales in a variety of sizes and designs. Our products are highly configurable with countless ordering options. We also offer product modifications and application specific special solutions upon request.

In summary

- Fast and precise detection of positions with high repeat accuracy
- Completely wear-free system – contactless measuring principle enables reading at a distance
- Extremely robust system – dust, dirt, oil, liquids etc. do not influence the magnetic measurement
- Insensitive to shock and vibration
- Space-saving – compact design
- Different designs up to PCB board solutions
- Easy handling and assembly



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ABSOLUTE MEASUREMENT WITH HIGH PRECISION

High-resolution absolute measuring system for dynamic control

A trend towards fast linear movements is becoming apparent in numerous applications. The high-resolution 1 μm measuring system EMAX-HI is designed for dynamic and precise positioning with high repeat accuracy. With high robustness and small housing dimensions, EMAX-HI meets requirements such as those found in the monitoring of slide positions in electric/pneumatic linear drives.

Guided absolute measuring systems

The high-resolution GSA2 system provides absolute position feedback and thus represents a robust alternative to glass scales. GSA2 is ideal for use in sheet metal processing machines.

The guided measuring unit FMAX with 10 μm resolution is designed for measuring distances up to 0.65 m and in the unguided version is also suitable for angle measurements.

Ideal for motor feedback systems

The FMAX2 absolute measuring system is ideal for linear and rotary motor feedback systems in highly dynamic applications.

	EMAX-HI	GSA2	FMAX	FMAX2 FMAX3
	 	 	 	 
	High-resolution 1 μm measuring system for dynamic and precise positioning with high repeat accuracy.	Guided linear measuring unit for highest precision and repeat accuracy.	Guided absolute measuring system for measuring lengths up to 650 mm. In unguided version also suitable for angle measurements.	Absolute measuring system for linear and rotary applications. Ideal for motor feedback systems. Two versions with different max. measuring lengths.
Mechanical Data		Mechanical Data		
Measuring principle	absolute	absolute	absolute	absolute
Repeat accuracy	± 1 increment	± 1 increment	± 1 increment	± 1 increment
System accuracy in μm at 20 °C L=measuring length in metres	± (10 + 20 x L)	± (10 + 20 x L)	± (50 + 20 x L)	± (50 + 20 x L)
Reading distance max.	0.5 mm	fixed by guide carriage	fixed by guide carriage, 0.5 mm with unguided version	0.6 mm
Housing dimensions (L x W x H)	70 x 16 x 30 mm	110 x 54 x 24 mm	90 x 48 x 23 mm	50 x 24 x 26 mm
Measuring length max.	8 m	1 m	650 mm	FMAX2: 192 mm FMAX3: 240 mm
Electrical Data		Electrical Data		
Power supply voltage	10 ... 30 VDC	10 ... 30 VDC	10 ... 30 VDC	10 ... 30 VDC
Interfaces available	SSI (Gray or binary), CANopen (DS406), RS422, on request: CAN BASIC ELGO, BISS-C	SSI (Gray or binary), CANopen (DS406), CAN BASIC ELGO, RS422	SSI (Gray or binary), RS232, RS422	SSI (Gray or binary)
Resolution	0.001 mm	0.001 mm	0.01 mm	19 Bit
Traverse speed max.	1 m/s with permanent absolute position output, 2 m/s with TTL output, 10 m/s with sin/cos output	1 m/s with permanent absolute position output, 2 m/s with additional 5 V TTL output, 10 m/s with SC10 output, higher on request	0.5 m/s	16 m/s
Further options	additional incremental output with A/B square wave signals or 1 Vpp Sin/Cos signals			
Environmental Conditions		Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	IP40, IP 65 optional	sensor head: IP40, others on request mechanical parts: IP54	IP40, IP 65 optional	IP54, IP67 optional



COMPACT
ALL-ROUNDERS

With a resolution of 10 µm, the EMAX and EMAX2 absolute measuring systems offer a wide range of interfaces. EMAX is also available with IO-Link interface. An incremental output is optionally available for dynamic motion control in both systems. EMAX is available in two designs, with round connector or with cable outlet. In the version with guide carriage FW2080, EMAX can also be used as a guided system.

Both systems have a read distance control.



	EMAX EMAL	EMAX2
	 <p>10 µm resolution. Compact and bus-compatible absolute measuring system for measuring lengths up to 20 m. Two designs. IO-Link interface possible.</p>	 <p>10 µm resolution. Extremely compact design for confined installation situations. For measuring lengths up to 20 m.</p>
Mechanical Data		
Measuring principle	absolute	absolute
Repeat accuracy	± 1 increment	± 1 increment
System accuracy in µm at 20 °C L=measuring length in metres	± (150 + 20 x L), ± (50 + 20 x L) optional	± (150 + 20 x L), ± (75 + 20 x L) optional
Reading distance max.	1.5 mm, 2 mm with reduced measuring accuracy	1.2 mm, 1.7 mm with reduced measuring accuracy
Housing dimensions (L x W x H)	75 x 24 x 26 mm (type with cable outlet), 75 x 22 x 39 mm (type with M9 connector)	70 x 16 x 30 mm
Measuring length max.	10 m (EMAX), 20 m (EMAL)	10 m, 20 m optional
Electrical Data		
Power supply voltage	10 ... 30 VDC	10 ... 30 VDC
Interfaces available	SSI (Gray or binary), CANopen (DS406), CAN BASIC ELGO, RS232, RS422, RS422 addressable IO-Link acc. IEC 61131-9, BISS-C in preparation	SSI (Gray or binary), CANopen (DS406), CAN BASIC ELGO, RS422, RS422 addressable
Resolution	0.01 mm	0.01 mm
Traverse speed max.	4 m/s	4 m/s
Further options	additional incremental output with A/B square wave signals or 1 Vpp sin/cos signals (type with cable outlet)	additional incremental output with A/B square wave signals or 1 Vpp sin/cos signals
Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	IP40, IP 65 optional	IP40, IP 65 optional, higher on request



ABSOLUTE MEASUREMENT FOR LONG TRAVEL DISTANCES

Absolute measurement for up to 5 metres travel

Due to its high protection class, the MAX3 absolute measuring system in a compact sensor housing is ideal for use in harsh environments such as those found in mobile automation or other outdoor applications. Measuring lengths up to 2.45 metres can be measured. The battery-supported, quasi-absolute BMIX system is suitable for up to 5 metres travel and enables a large reading distance of 10 mm.

Position detection over long distances

The absolute measuring systems LIMAX2, MAX1 and IMAX enable absolute path measurement and position detection over very long distances and are therefore ideal for applications in transport and logistics. They can be mounted quickly and easily and are resistant to temperature changes.



	MAX3	BMIX	LIMAX2	MAX1	IMAX
	 	 	 	 	 
	1 mm resolution. Extremely compact sensor design with high protection class up to IP69K.	1 mm resolution. Battery-supported quasi absolute measurement system. Optionally with analogue output (voltage or current) or CANopen.	1 mm standard resolution. For measuring distances up to 260 m, speeds up to 10 m/s. With integrated tape guide or unguided.	1 mm standard resolution. For measuring distances up to 524 m with a housing length of only 98 mm. With SSI interface.	1 mm resolution. Compact, auto-referencing, quasi-absolute system. For measuring lengths up to 1048 m (CANopen) or 262 m (SSI).
Mechanical Data			Mechanical Data		
Measuring principle	absolute	quasi-absolute	absolute	absolute	quasi-absolute (autoreferencing)
Repeat accuracy	± 1 increment	± 1 increment	± 1 increment	± 1 increment	± 1 increment
System accuracy in µm at 20 °C L=measuring length in metres	± 1 mm at max. 2450 mm measuring length	± (1000 + 20 x L)	± (1000 + 100 x L)	± (1000 + 20 x L)	± (1250 + 20 x L)
Reading distance max.	1.5 mm	10.0 mm	4.0 mm (unguided version)	1.5 mm	1.8 mm
Housing dimensions (L x W x H)	52 x 16 x 30 mm	100 x 12 x 25 mm	246 x 55 x 55 mm	98 x 15 x 32 mm	50 x 12 x 25 mm
Measuring length max.	2.45 m	5 m	260 m	524 m	262 m (SSI), 1.048 m (CANopen)
Electrical Data			Electrical Data		
Power supply voltage	10 ... 30 VDC	10 ... 30 VDC	10 ... 30 VDC	10 ... 30 VDC	10 ... 30 VDC
Interfaces available	analog output in different versions, CANopen (DS406), SSI (Gray or binary) on request	analog output in different versions, CANopen (DS406)	CAN, CANopen (DS406 or DS417), RS422, RS232, SSI (Gray or binary), PROFIBUS, others on request	SSI (Gray), others on request	SSI (Gray or binary), CANopen (DS406)
Resolution	1 mm, others on request	1 mm	1 mm, optional: 0.5/ 0.25/0.125/0.0625 mm	1 mm, others on request	1 mm
Traverse speed max.	2 m/s	2 m/s	10 m/s	6 m/s	4 m/s
Environmental Conditions			Environmental Conditions		
Operating temperature	-25 ... +85 °C	0 ... +60 °C	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	IP65, IP69K – Heavy Duty optional	IP67	IP50, higher on request	IP65	IP67



MAGNETIC ANGLE AND SPEED MEASUREMENT

Durable, extremely robust and space-saving

The angle and speed measuring systems are extremely compact and therefore ideal for small installation spaces. Extreme environmental conditions or weather influences in outdoor areas are no problem. Since the systems are bearingless, mechanical influences do not directly affect the entire sensor.

For highly dynamic applications

Especially in robotics, movements must be precisely controlled and monitored. When handling sensitive components, fast feedback for comparing actual and target values is essential for error-free operation. The EMAX-RO and FMAX2 systems are particularly suitable for dynamic motor feedback due to additional incremental signals.

Measurement at the front of a shaft

The measuring systems RMAX1 (absolute) and MIRE (incremental) are suitable for measurements at the front of a shaft. A small round magnet with two poles is applied directly to the motor shaft or axis. RMAX1 is suitable as a single-turn absolute encoder for angle measurements, the incremental system MIRE can also be used for speed measurement.

	FMAX2	EMAX-RO	RMAX1	MIRE
				
	Max. 19 bit resolution. Additional incremental output signals for dynamic speed measurement, up to 20,000 rpm.	16,000 measuring steps/revolution. Singleturn absolute encoder, additional incremental signals for highly dynamic drives.	Max. 12 bit resolution. Single-turn absolute encoder.	8 to 12 bit resolution. Incremental encoder. Other resolutions on request.
Mechanical Data		Mechanical Data		
Measuring principle	absolute	absolute	absolute	incremental
Repeat accuracy	± 1 increment	± 1 increment	± 0.5°	± 1 increment
System accuracy in µm at 20 °C L=measuring length in metres	± (50 + 20 x L)	± (150 + 20 x L) ± 0.35°, ± (50 + 20 x L) ± 0.16° optional	± 0.5°	< ±1.40625°
Reading distance max.	0.6 mm, 0.3 mm with additional aluminium protective ring for > 3000 rpm	1.0 mm, 0.45 mm with additional aluminium protective ring	1.0 mm, stronger magnets for larger distances available on request	1.0 mm
Housing dimensions (L x W x H)	50 x 24 x 26 mm	64,5 x 40.5 x 20 mm	30 x 12.5 x 25 mm	30 x 10 x 25 mm
Measuring range max.	360° at certain ring diameters	360°	analog version: 0 ... 360°, PWM version: 0 ... 270°, f = 200 Hz, other ranges on request	360°
Electrical Data		Electrical Data		
Power supply voltage	10 ... 30 VDC	10 ... 30 VDC	5 VDC (±100 mV)	10 ... 30 VDC or 5 VDC
Interfaces available (absolute)	SSI (Gray or binary)	SSI, CANopen (DS406) on request: CAN BASIC ELGO, RS232, RS422 or addressable RS422, BISS-C in preparation	analog 0.5 ... 4.5V, PWM f = 200 Hz	–
Output signals, output level, index pulse	–	–	–	A, A', B, B', Z, Z' / HTL or TTL / 1 index pulse per revolution (zero point)
Resolution	19 bit	16,000 measuring steps / revolution	12 bit ≙ 4,096 measuring steps / revolution	8 to 12 bit, others on request
Rotational speed max.	20,000 rpm	20,000 rpm (depending on interface) 0 ... 1000 rpm without protective ring, 1000 ... 20,000 rpm with protective ring	2,000 rpm	10,000 rpm, higher on request
Further options	additional incremental output with HTL, TTL or 1 Vss sin/cos signals on request	additional incremental output with A/B square wave signals or 1 Vss sin/cos signals	–	–
Environmental Conditions		Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-25 ... +85 °C	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	IP54, IP67 optional	IP50, IP65 optional	IP67	IP64



HIGH RESOLUTION SENSOR TECHNOLOGY

The incremental measuring systems are suitable for both linear and angle measurements. They have the following features:

- High resolution of 1 μm
- High repetition accuracy
- Compact design with integrated evaluation electronics
- Speed proportional output of square wave signals HTL/TTL
- Periodic index pulse or freely definable reference mark (HMIX2, EMIX22/23)
- Active sensor surface on long or short housing surface (EMIX2X)
- Optional reading distance control – a LED warning light provides warning signals when the magnetic field is too weak. Facilitates commissioning and function monitoring.
- High resistance to external influences such as dirt or even vibration and shock

Magnetic sensors for precision motor feedback

The extremely compact incremental measuring systems HMIX1X and EMIX1X with a resolution up to 1 μm are designed for dynamic processes and are preferably used in drive and control engineering.

Although the measuring accuracy is lower compared to optical systems, the resolution and repeatability meet the requirements for highly dynamic operation of the systems, such as those found in robot arms or in pick & place applications.

	HMIX2	HMIX1X	EMIX1X	EMIX23	EMIX22
					
	For very precise positioning with high repeat accuracy. Compact housing.	High resolution and repeat accuracy. Ideal for motor feedback.	Compared to HMIX a larger reading distance is possible. Ideal for motor feedback.	High resolution 1 μm technology.	High resolution 1 μm technology. With selectable resolution.
Mechanical Data			Mechanical Data		
Measuring principle	incremental	incremental	incremental	incremental	incremental
Repeat accuracy	± 1 μm	± 1 μm	± 2 μm	± 1 increment for resolutions >10 μm ± 2 μm for resolutions ≤ 10 μm	± 1 increment for resolutions >10 μm ± 2 μm for resolutions ≤ 10 μm
System accuracy in μm at 20 °C L=measuring length in metres	± (15 + 20 x L)	± (15 + 20 x L)	± (20 + 20 x L)	± (20 + 20 x L)	± (20 + 20 x L)
Reading distance max.	0.2 mm, 0.5 mm when used without cover tape	0.2 mm, 0.5 mm when used without cover tape	0.8 mm	0.8 mm	0.8 mm
Housing dimensions (L x W x H)	30 x 12.5 x 24.5 mm	37 x 10 x 15 mm	37 x 10 x 15 mm	30 x 12.5 x 25 mm	30 x 12.5 x 25 mm
Measuring length max.	theoretically unlimited	theoretically unlimited	theoretically unlimited	theoretically unlimited	theoretically unlimited
Electrical Data			Electrical Data		
Power supply voltage	10 ... 30 VDC or 5 VDC	5 VDC	5 VDC	10 ... 30 VDC or 5 VDC	10 ... 30 VDC or 5 VDC
Output signals	A, A', B, B', Z, Z' or R, R'	A, A', B, B', Z, Z'	A, A', B, B', Z, Z'	A, A', B, B', Z, Z' or R, R'	A, A', B, B', Z, Z' or R, R'
Output level	HTL or TTL	TTL	TTL	HTL or TTL	HTL or TTL
Resolution (at 4 edge triggering)	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm and others
Index pulse	every 1 mm (periodically), optionally as reference pulse	every 1 mm (periodically)	every 2 mm (periodically)	every 2 mm (periodically), optionally as reference pulse	every 2 mm (periodically), optionally as reference pulse
Traverse speed max.	2 m/s	2 m/s	2 m/s	2 m/s	2 m/s
Environmental Conditions			Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	IP67	IP67	IP67	IP67	IP 67




ECONOMICAL
ALL-ROUND SOLUTIONS

Proven classics

The sensors of the EMIX and LMIX series are the most frequently applied ELGO systems. The measuring systems have been proven for 20 years in numerous applications. The incremental sensors are very compact and require only little installation space. Depending on whether the evaluation electronics are integrated in the sensor or placed in the D-SUB connector (EMIX1/GMIX1A), additional space can be saved. The sensors can also be used for angle and speed measurement. Magnetic rings in various dimensions are available for rotary applications.

Extremely robust

In contrast to optical systems, magnetic measuring systems can be used in environments that are contaminated by oil, grease, dust or water. The sensor heads of most incremental measuring systems are supplied with IP67 protection as standard or are optionally available with this protection degree.

	EMIX1	EMIX2	LMIX22	GMIX1A
	 	 	 	 
	10 µm resolution. High accuracy class. Extremely compact design. Sensor and evaluation electronics in separate housings.	10 µm resolution. Sensor and evaluation electronics are integrated in one housing.	Up to 2.5 µm resolution. Lower resolutions possible. Optional reference signal via mounting bracket or via second magnetic track.	Up to 10 µm resolution. Other resolutions and output levels can be set in external evaluation box. Speed monitoring (LED and signal output).
Mechanical Data		Mechanical Data		
Measuring principle	incremental	incremental	incremental	incremental
Repeat accuracy	± 1 increment	± 1 increment	± 1 increment at 10 µm resolution	± 1 increment
System accuracy in µm at 20 °C L=measuring length in metres	± (20 + 20 x L)	± (20 + 20 x L)	± (25 + 20 x L)	± (25 + 20 x L)
Reading distance max.	0.8 mm	0.8 mm	2.0 mm	1.5 mm
Housing dimensions (L x W x H)	30 x 10 x 15 mm	30 x 12.5 x 25 mm	30 x 12.5 x 25 mm	sensor head: 30 x 10 x 15 mm evaluation box: 116 x 74 x 28 mm
Measuring length max.	theoretically unlimited	theoretically unlimited	theoretically unlimited	theoretically unlimited
Electrical Data		Electrical Data		
Power supply voltage	10 ... 30 VDC or 5 VDC	10 ... 30 VDC or 5 VDC	10 ... 30 VDC or 5 VDC	10 ... 30 VDC
Output signals	A, A', B, B', Z, Z'	A, A', B, B', Z, Z'	A, A', B, B', Z, Z' or R, R'	A, A', B, B', Z
Output level	HTL or TTL	HTL or TTL	HTL or TTL	HTL / TTL (switchable)
Resolution (at 4 edge triggering)	0.01 mm	0.01 mm	up to 2.5 µm	0.1 / 0.05 / 0.025 / 0.02 or 0.01 mm (selectable)
Index pulse	every 2 mm (periodically), optionally as reference pulse	every 2 mm (periodically), optionally as reference pulse	every 5 mm (periodically), optionally as reference pulse	every 5 mm (periodically)
Traverse speed max.	4 m/s	4 m/s	4 m/s at 25 µm resolution	depending on selected resolution
Environmental Conditions		Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	sensor head: -10 ... +70 °C, -25 ... +85 °C on request evaluation box: -10 ... +50 °C
Protection degree	IP67	IP67	IP67	sensor head: IP67 evaluation box: IP40



MORE COMFORT AND ADDITIONAL SAFETY

Path, position, angle, speed







The incremental measuring systems can be used for linear measurements of path and position as well as for rotary applications. Magnetic rings in various diameters and pole numbers are available for angle and speed measurement.

Simple, time-saving assembly

The installation of the sensor and magnetic tape is very easy. By adhesive mounting (adhesive tape is included in the delivery) the tape is fixed along the distance to be measured. The incremental tapes can be used for almost any measuring length and can be individually assembled.

Round sensor

KMIX2 is an extremely space saving sensor, where the evaluation electronics are housed in a small round sensor head. The sensor is suitable for both linear and rotary measurement applications. It is mounted via a M10 fine thread. PCB board solutions are available on request.

	LMIX1	LMIX2	KMIX2	RMIX2
	 	 	 	 
	25 µm resolution. Extremely compact design. Sensors and evaluation electronics are located in separate housings.	25 µm resolution. Sensor technology and evaluation electronics are integrated in one housing. Vertical mounting to magnetic tape possible.	25 µm resolution. Easy mounting via bore hole possible.	25 µm resolution. For highly dynamic applications. Ideal also for rotary applications with high rotation speed.
Mechanical Data		Mechanical Data		
Measuring principle	incremental	incremental	incremental	incremental
Repeat accuracy	± 1 increment	± 1 increment	± 1 increment	± 1 increment
System accuracy in µm at 20 °C L=measuring length in metres	± (25 + 20 x L)	± (25 + 20 x L)	± (25 + 20 x L)	± (25 + 20 x L)
Reading distance max.	2.0 mm	2.0 mm	2.0 mm	0.6 mm
Housing dimensions (L x W x H)	30 x 10 x 15 mm	30 x 12.5 x 25 mm	L = 60 mm, Ø = 12 mm	50 x 12 x 25 mm
Measuring length max.	theoretically unlimited	theoretically unlimited	theoretically unlimited	theoretically unlimited
Electrical Data		Electrical Data		
Power supply voltage	10 ... 30 VDC or 5 VDC	10 ... 30 VDC or 5 VDC	10 ... 30 VDC	10 ... 30 VDC or 5 VDC
Output signals	A, A', B, B', Z, Z'	A, A', B, B', Z, Z'	A, B, Z	A, A', B, B', Z, Z'
Output level	HTL or TTL	HTL or TTL	HTL	HTL or TTL
Resolution (at 4 edge triggering)	0.025 mm	0.025 mm	0.025 mm	0.025 mm
Index pulse	every 5 mm (periodically)	every 5 mm (periodically)	every 5 mm (periodically)	every 4 mm (periodically)
Traverse speed max.	5 m/s	5 m/s	4 m/s	20 m/s , 300,000 rpm, per number of pole pairs
Environmental Conditions		Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	IP67	IP67	IP67	IP67



LARGE READING DISTANCE TOLERANCES

Ideal for applications in storage and conveyor technology

The measuring systems DMIX3 and GMIX2 are designed for the detection of large measuring distances. Due to their large reading distance tolerance they are especially suitable for requirements in the areas of storage and logistics, for example for the automation of high-bay warehouses. They are easy to install and resistant to temperature changes and environmental pollution.



	DMIX3	GMIX2
		
	<p>1 mm resolution. Large reading distance allowed. Freely selectable reference pulse.</p>	<p>2.5 mm resolution. Compact sensor head. Large permissible reading distance. Ideal for applications in storage and conveyor technology. High protection class IP67.</p>
Mechanical Data		
Measuring principle	incremental	incremental
Repeat accuracy	± 1 increment	± 1 increment
System accuracy in µm at 20 °C L=measuring length in metres	± (1000 + 20 x L)	± (25 + 20 x L)
Reading distance max.	10.0 mm	4.0 mm
Housing dimensions (L x W x H)	50 x 24 x 26 mm	38.5 x 25 x 10 mm
Measuring length max.	theoretically unlimited	theoretically unlimited
Electrical Data		
Power supply voltage	10 ... 30 VDC or 5 VDC	10 ... 30 VDC
Output signals	A, A', B, B', Z, Z' or R, R'	A, B
Output level	HTL or TTL	HTL
Resolution (at 4 edge triggering)	1 mm	2.5 mm
Index pulse	every 16 mm (periodically), optionally as reference pulse	not available
Traverse speed max.	20 m/s	10 m/s
Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	IP40, IP65 optional	IP67



MAGNETIC MEASURING SYSTEMS WITH 1 VPP SIN/COS SIGNAL OUTPUTS

The HMSC, EMSC and LMSC sensors are specially designed for controllers and successor electronics with a sine/cosine measuring system input.

Depending on application-specific requirements, systems with 1mm (HMSC), 2 mm (EMSC) or 5 mm (LMSC) signal period are offered. The sensors are each available in two different designs with integrated (EMSC2, MSC2) or external evaluation electronics (HMSC1, EMSC1, LMSC1).

The incremental measuring systems are particularly suitable for dynamic applications in automation and in wood and metal processing.

	HMSC1	EMSC1	EMSC2	LMSC1	LMSC2
	 	 	 	 	 
	1 mm signal period, external evaluation electronics.	2 mm signal period. Small sensor with external evaluation electronics.	2 mm signal period. Small design despite integrated evaluation electronics. Vertical mounting position to magnetic tape possible.	5 mm signal period. Small sensor with external evaluation electronics.	5 mm signal period. Small design despite integrated evaluation electronics. Vertical mounting position to magnetic tape possible.
Mechanical Data			Mechanical Data		
Measuring principle	incremental	incremental	incremental	incremental	incremental
Repeat accuracy	depending on evaluation unit	depending on evaluation unit	depending on evaluation unit	depending on evaluation unit	depending on evaluation unit
System accuracy in μm at 20 °C L=measuring length in metres	$\pm (15 + 20 \times L)$, depending on evaluation unit	$\pm (20 + 20 \times L)$, depending on evaluation unit	$\pm (20 + 20 \times L)$, depending on evaluation unit	$\pm (25 + 20 \times L)$, depending on evaluation unit	$\pm (25 + 20 \times L)$, depending on evaluation unit
Reading distance max.	0.8 mm	0.8 mm	0.8 mm	2.0 mm	2.0 mm
Housing dimensions (L x W x H)	sensor: 30 x 10 x 15 mm, evaluation box: 72 x 24 x 48 mm	sensor: 30 x 10 x 15 mm, evaluation box: 72 x 24 x 48 mm	30 x 12.5 x 25 mm	sensor: 30 x 10 x 15 mm, evaluation box: 72 x 24 x 48 mm	30 x 12.5 x 25 mm
Measuring length max.	theoretically unlimited	theoretically unlimited	theoretically unlimited	theoretically unlimited	theoretically unlimited
Electrical Data			Electrical Data		
Power supply voltage	5 VDC, 10 ... 30 VDC on request	10 ... 30 VDC or 5 VDC	5 VDC, 10 ... 30 VDC on request	10 ... 30 VDC or 5 VDC	5 VDC, 10 ... 30 VDC on request
Output signals	Sin+, Cos+, Sin-, Cos-	Sin+, Cos+, Sin-, Cos-	Sin+, Cos+, Sin-, Cos-	Sin+, Cos+, Sin-, Cos-	Sin+, Cos+, Sin-, Cos-
Output level	1 Vss	1 Vss	1 Vss	1 Vss	1 Vss
Sin-signal period	1 mm signal period	2 mm signal period	2 mm signal period	5 mm signal period	5 mm signal period
Traverse speed max.	10 m/s	10 m/s	10 m/s	10 m/s	10 m/s
Environmental Conditions			Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	sensor: IP67, evaluation box: IP40	sensor: IP67, evaluation box: IP40	IP67	sensor: IP67, evaluation box: IP40	IP67



GUIDED MEASURING SYSTEMS

Alternative to glass scales

The guided systems GSI2 and GSI4 are designed as a robust alternative to glass scales mainly for sheet metal working machines and allow resolutions down to 0.5 µm (GSI4). Lengths of up to 1 m are possible.

Digital potentiometer replacement

The mechanically guided incremental linear measuring system PMIX represents a digital alternative to potentiometers. The sensor head and magnetic tape are firmly integrated in a cylinder, so that the longitudinal movement can be optimally executed. Depending on the selected measuring system (EMIX, LMIX, for IZ-series see displays) different resolutions can be achieved.

Linear units with roller guide

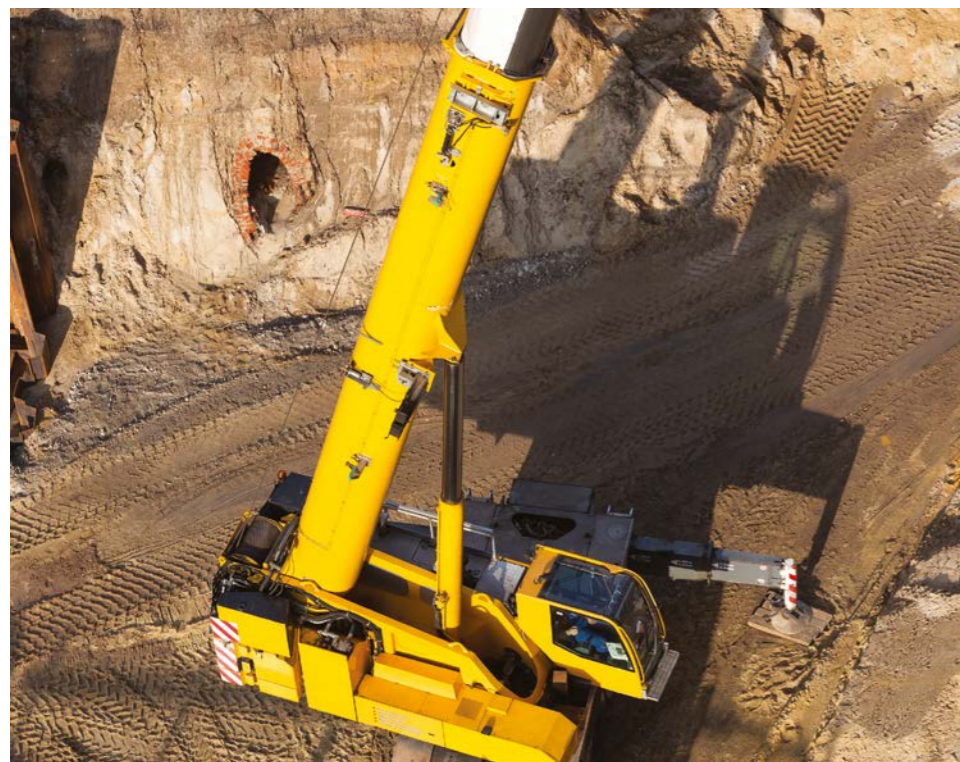
The guided linear unit is available with a closed and open carriage and can be equipped with the measuring systems EMIX1, LMIX1 and the battery-powered measuring and display systems IZ16E or IZ15E.

	GSI4	GSI2	PMIX	FOW / FLW
				
	High-precision position feedback with max. 1 µm resolution. High-quality guide unit with roller guide. With adjustable reference pulse.	Max. 1 µm resolution. An interesting alternative to glass scales in terms of price. Ideal for use in press brakes. With adjustable reference pulse.	1 µm, 10 µm or 25 µm resolution, depending on the selected measuring system. Wear-free alternative to potentiometers.	1 µm, 10 µm or 25 µm resolution, depending on the selected measuring system. Linear measuring unit with roller guide. Carriage in open (FOW) or closed (FLW) design.
Mechanical Data		Mechanical Data		
Measuring principle	incremental	incremental	incremental	incremental
Repeat accuracy	± 1 increment	± 1 increment	± 1 increment	± 1 increment
System accuracy in µm at 20 °C L=measuring length in meters	± (20 + 20 x L)	pole pitch 2 mm: ± (20 + 20 x L), pole pitch 5 mm: ± (25 + 20 x L)	EMIX: ± (20 + 20 x L), LMIX: ± (25 + 20 x L)	EMIX: ± (20 + 20 x L), LMIX: ± (25 + 20 x L)
Reading distance max.	determined by carriage	determined by carriage	determined by guidance	determined by carriage
Housing dimensions (L x W x H)	guide carriage: 80 x 50 x 12 mm (without cable and coupling adapter), guide rail: (150 + measuring length) x 48 x 22.5 mm	guide carriage: 80 x 55 x 33 mm, guide rail: (150 + measuring length) x 55 x 20 mm	(60 + measuring length) x 43 x 46 mm	FOW: 85 x 65 x 8.4 mm, FLW: 95 x 65 x 21 mm
Measuring length max.	1 m	1 m	600 mm	2 m, longer lengths are possible by arranging the guide rails side by side
Electrical Data		Electrical Data		
Power supply voltage	10 ... 30 VDC or 5 VDC	10 ... 30 VDC or 5 VDC	10 ... 30 VDC or 5 VDC	10 ... 30 VDC or 5 VDC
Output signals	A, A', B, B', R, R'	A, A', B, B', R, R'	A, A', B, B', Z, Z'	A, A', B, B', Z, Z'
Output level	HTL or TTL	HTL or TTL	HTL or TTL	HTL or TTL
Resolution (at 4 edge triggering)	up to 0.001 mm	up to 0.001 mm	EMIX23: 0.001 mm, EMIX1: 0.01 mm, LMIX1: 0.025 mm, Series IZ: 0.01 mm	EMIX23: 0.001 mm, EMIX1: 0.01 mm, LMIX1: 0.025 mm, Series IZ: 0.01 mm
Index pulse	reference pulse, position adjustable	reference pulse, position adjustable	EMIX: every 2 mm (periodically), LMIX: every 5 mm (periodically)	EMIX: every 2 mm (periodically), LMIX: every 5 mm (periodically)
Traverse speed max.	depending on selected resolution	depending on selected resolution	EMIX23: 2 m/s, EMIX / Series IZ : 4 m/s, LMIX: 5 m/s	depending on selected measuring system
Environmental Conditions		Environmental Conditions		
Operating temperature	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request	-10 ... +70 °C, -25 ... +85 °C on request
Protection degree	sensor: IP67, mechanics: IP54	sensor: IP67, mechanics: IP54	sensor: IP65, cylinder: IP40	sensor: IP67

PATH AND POSITION DETECTION FOR ROUND ROD PROFILES

The magnetic-translatory measuring systems MTM are suitable for path and position detection of moving round rod profiles, for example for stroke monitoring of hydraulic cylinders. The systems consist of a magnetically coded piston rod and an application-specific sensor.

A major advantage of these systems is that the standard cylinder mechanics do not have to be changed in order for the system to be installed (as is often necessary with for example magneto-strictive systems). The magnetic technology utilised by MTM systems turns the piston rod itself into a scale. The compact, space-saving reading head is then applied to the front of the cylinder. Since the design of the cylinders does not have to be changed, the systems are also ideally suited for retrofitting.



	MTM-A	MTM-Q	MTM-I
			
	Absolute position monitoring. For measuring lengths up to max. 2,450 mm. CANopen (DS406) or analog output (voltage or current).	Battery-supported quasi-absolute position monitoring. For measuring lengths up to max. 2,500 mm. CANopen (DS406) or analog output (voltage or current).	Incremental measuring system with 1 mm, optional 0.025 mm resolution.
Mechanical Data		Mechanical Data	
Measuring principle	absolute	quasi-absolute (base incremental)	incremental
Repeat accuracy	± 1 increment	± 1 increment	± 1 increment
System accuracy in µm at 20 °C L=measuring length in metres	± 1 mm with max. 2450 mm measuring length (standard)	± (1000 + 20 x L)	± (160 + 20 x L) for resolution 0.025 mm, ± (1000 + 20 x L) resolution 1.0 mm
Sensor distance to coded piston rod max.	1.0 mm with 10 mm wide coding, 1.5 mm with 20 mm wide coding or all-round coding	2.0 mm with 10 mm wide coding, 3.0 mm with 20 mm wide coding, others on request	1.0 mm for resolution 0.025 mm, 3.0 mm for resolution 1.0 mm, others on request
Dimensions sensor head (L x W x H)	52 x 16 x 30 mm	MTM-Q/short: 64 x 44 x 43 mm, MTM-Q/large: 64 x 44 x 55 mm	12 x 10 x 10 mm
Possible diameter round rod	acc. ISO 3320, min. 20 ... max. 360 mm	acc. ISO 3320, min. 20 ... max. 360 mm	min. 25 mm
Possible diameter cylinder	acc. ISO 3320, min. 30 ... max. 400 mm	acc. ISO 3320, min. 30 ... max. 400 mm	acc. ISO 3320, min. 30 ... max. 400 mm
Measuring length max.	2.45 m	2.50 m, others on request	5.0 m
Electrical Data		Electrical Data	
Power supply voltage	10 ... 30 VDC	10 ... 30 VDC	10 ... 30 VDC or 5 VDC
Output signals (MTM-I)	–	–	A, A', B, B', Z, Z'
Output level (MTM-I)	–	–	HTL or TTL
Interfaces available (MTM-A)	analog output in different versions, CANopen (DS406), J1939 on request	analog output in different versions, CANopen (DS406), J1939 on request	–
Resolution	analog output: 12 bit, CANopen: 1 mm	analog output: 12 bit, CANopen: 1 mm	1.0 mm, 0.025 mm optional
Traverse speed	2 m/s	2 m/s	4 m/s for resolution 0.025 mm, 20 m/s for resolution 1.0 mm
Environmental Conditions		Environmental Conditions	
Operating temperature	-25 ... +85 °C	-25 ... +85 °C	-25 ... +85 °C
Protection degree	IP67, IP69K optional	IP65, IP69K optional	IP67, IP69K optional

Magnetic tapes – the heart of magnetic measurement technology

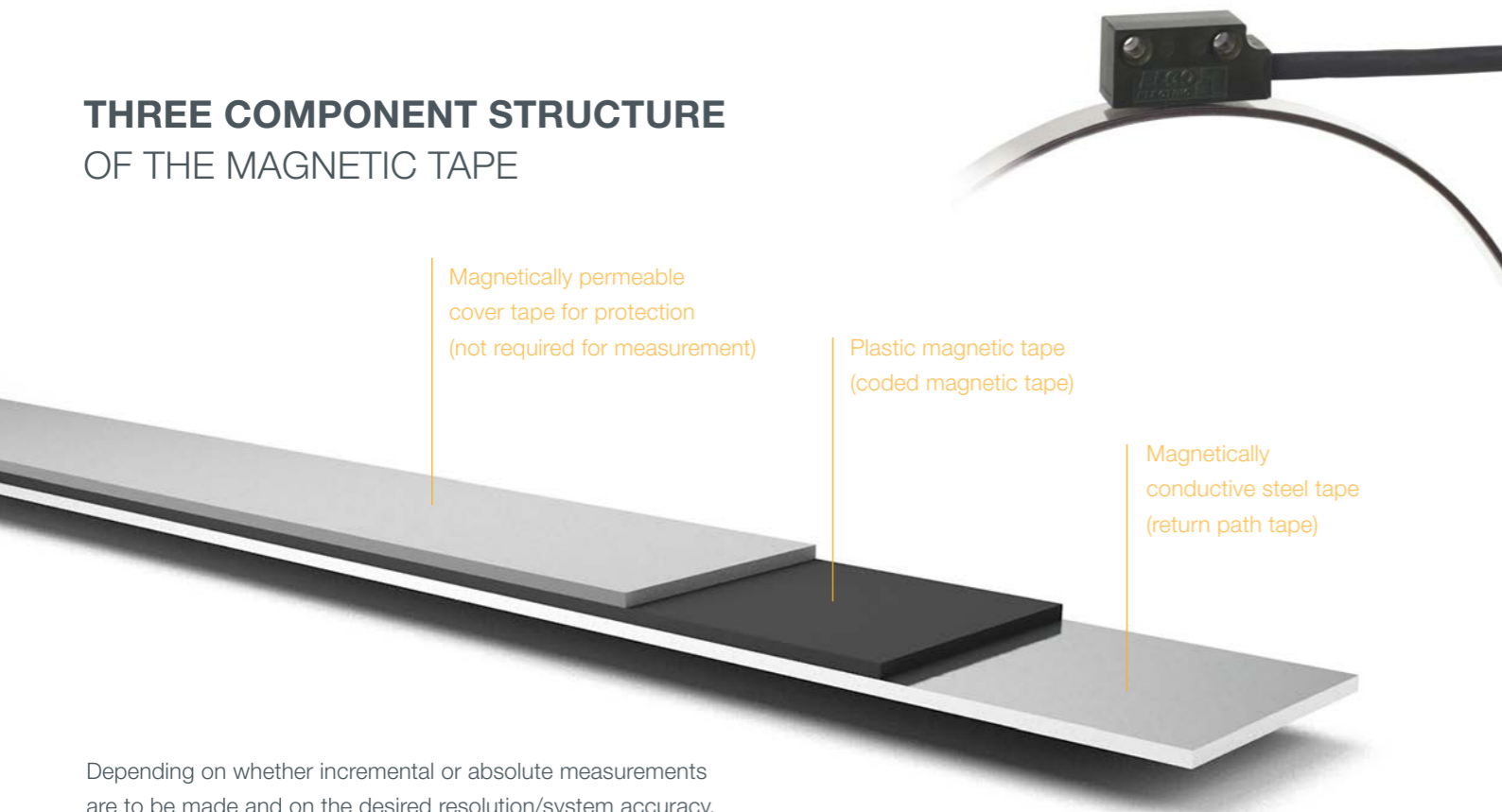
The heart of magnetic metrology are the magnetic tapes, which represent the standard of the magnetic measurement technology. The magnetic tapes are manufactured at ELGO Batscale AG in Liechtenstein precisely and with the greatest care. With more than 4.000.000 m produced magnetic tape per year ELGO Batscale AG is one of the leading companies in this field.

The flexible, bendable tapes consist of a magnetically encoded plastic tape, which is connected to a steel tape as a carrier. Using specially developed processes, one or more

magnetic code tracks are applied to the magnetic tapes. The code tracks differ in the pole length, which together with the magnetic sensor determines the accuracy and resolution of the measuring system. The know-how consists in creating a very precise magnetic pattern, i.e. to set the boundary between the north and south poles as accurately as possible.

The magnetic tape is laid along the distance to be measured by simple adhesive mounting (with the help of a pre-attached adhesive strip).

THREE COMPONENT STRUCTURE OF THE MAGNETIC TAPE



Depending on whether incremental or absolute measurements are to be made and on the desired resolution/system accuracy, different codings are required.

INCREMENTAL MEASUREMENTS – ECONOMICAL ALL-ROUND SOLUTION

For incremental measurements the magnetic tape is encoded with regular north and south poles. North and south poles are scanned by a magnetoresistive sensor without contact. One sine/cosine signal per pole is generated, these signals are interpolated and output as square-wave signals. The actual position or the distance covered is determined by counting

pulses. Among other things, the pole length determines the maximum resolution and accuracy of the measurement.

The incremental tapes can be used for almost any measuring length and can be individually assembled.

Single-track system



Single-track system with reference signal



ABSOLUTE MEASUREMENTS – MORE COMFORT AND ADDITIONAL SAFETY

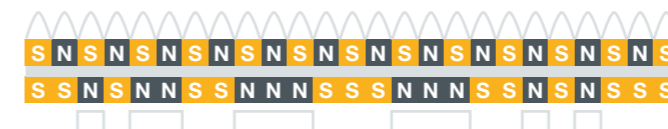
The absolute measuring systems use a magnetic tape with an absolute track. Referencing is no longer necessary here, since a sensor immediately provides an absolute position as

soon as it is supplied with voltage. Position changes in the currentless state are detected when the system is switched on again.

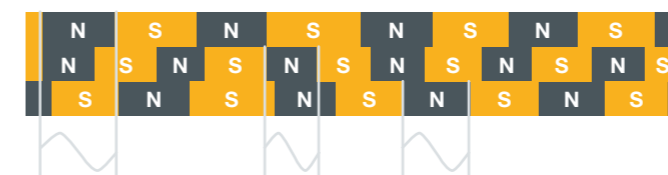
Single-track system (pseudo-random code)



Two-track system with fine interpolation track



Three-track system – phase difference measurement according to the nonius principle



Rotation measurement technology – Durable and space-saving

WEAR-FREE AND EXTREMELY ROBUST

Wherever rotary movements have to be monitored and controlled or where angular positions and rotational speed on axes and drives have to be measured precisely and highly dynamically, magnetic pole rings in conjunction with the appropriate sensor technology are a robust and space-saving option. In principle all ELGO incremental sensors in connection with a magnetic ring are suitable for rotary applications.

As bearingless encoders they are an ideal alternative to conventional encoder systems, especially when speed or angle measurement under difficult environmental conditions is required. Since the systems are bearingless, mechanical influences do not directly affect the entire sensor. Due to the small installation depth and the compact design, our rotary measuring systems are also ideally suited for narrow installation spaces.

THE MAGNETIC RING – THE KEY FOR A PERFECT MEASURING SYSTEM

In addition to a large number of standard sizes, we offer customer-specific geometries with outside diameters from 10 to 450 mm and inside diameters from 5 to 400 mm.

The sequence of north and south poles is applied as a true angular division. The pole length at the measuring position results from the angular length and the ring size. Since the common measurement technique requires discrete pole lengths, a suitable number of poles can be found for almost

any geometry, which harmonises with the measuring heads. The accuracy of a system improves with larger rings.

There are only a few limitations in the design of the magnetic pattern. Single or multi-track patterns, incremental or reference patterns, different design or number of reference marks, vernier patterns, coded switching points or PRC patterns, are all possible and can be customised.



MRR
For radial measurements



MRA
For axial measurements



TYPICAL APPLICATIONS

Robotics and Automation

- Position feedback and optimum control quality in torque motors
- Industrial robots: highly dynamic turning and pivoting

Mechanical Engineering

- Speed measurement on drive shafts of machine tools, woodworking or textile machines
- Speed measurement on high-speed spindles of milling or drilling machines

Wind turbines

- Monitoring of rotor position and speed
- Monitoring of the generator speed
- Detection of the nacelle position

Solar power plants

- Heliostat tracking
- Tracking of parabolic trough mirrors

Transport and logistics

- Steering axle adjustment on driverless transport systems
- Speed monitoring of the main axis on escalators

Mobile working machines

- Position control of rotating bodies and attachments
- Detection of the direction of rotation and position of the driver's cab

Motors and Generators

- Recording the speed of the drive directly at the motor

Medical Technology

- Position feedback in the field of computer and magnetic resonance imaging
- Positioning of patient tables

OVERVIEW OF BENEFITS

- Contactless, wear-free magnetic scanning principle
- Magnetic rings made of sintered hard ferrite or elastomer-based
- Space-saving due to bearingless, compact design
- Robust against dirt
- High tolerance to shock, vibration and oscillation
- High mounting tolerance between sensor and magnetic ring
- Easy integration into existing mechanics
- Suitable for outdoor applications and highly dynamic applications (motor feedback)

Position indicators



24V

Measuring and display systems Battery operated

Absolute measuring

AZ14 E
AZ16E | AZ16E-300
AZ17E

36

1 axis

40

Z25
Z50
Z51

Incremental measuring

IZ14E
IZ15E
IZ16E | IZ16E-600
IZ17E
HWD15

38

Multiple axes

42

Z52
Z60
Z60-014



Please
find updated
data here.

For fast and reliable format adjustments

Wherever measured values are to be displayed and read directly at the machine, position indicators from ELGO Electronic are the first choice. Whether battery-operated or with 24 Volt supply, in combination with linear and rotation

measuring systems, many customer-specific applications in the field of manual and semi-automatic format adjustment can be easily supported.

Battery-powered measuring and display systems

The self-contained, battery-powered measuring and display systems consist of a sensor connected to the display unit via a cable suitable for drag chains. The displays are characterised by their compact design and low installation effort. They can be mounted quickly and completely wire-free as snap-in installation housings or as surface-mounted housings with mounting brackets.

Position indicators with 24 V supply

The ELGO position indicators allow the visualisation of the recorded measuring values of up to three axes. The displays can be integrated in absolute as well as incremental measuring systems. Extensive standard menus allow individual adjustments to the requirements. We also offer systems that communicate with a higher-level system via interface (Z60-014).

The batteries are housed in an integrated or, if required, an external battery compartment (connection via pluggable screw terminals). To conserve the battery, all systems have a standby mode. The battery-operated displays are particularly suitable for mounting on movable slides, guides and stop systems.

All mains-operated displays are equipped with:

- Impulse multiplication factor
- 4-fold edge triggering
- Switchable counting direction
- Millimetre/inch switching
- Offset function
- Actual value memory
- Adjustable decimal point
- Sign (direction of rotation)
- Degree Display

All battery-powered displays have the following features:

- LCD display parameterisable with sign, battery status, units and symbols
- Parameterizable display modes: mm/m/inch with fractional display/ ° degrees
- Adjustable decimal point position and multiplication factor
- Three adjustable offset dimensions (individually parameterisable)
- Switchover between relative and absolute dimension
- No wiring required
- Front foil with short-stroke keys
- Adjustable reference value
- Adjustable counting direction
- Key lock





ABSOLUTE MEASUREMENT AND DISPLAY

Miniature position indicator

The space-saving position indicator AZ14E with 7-digit LCD (digit height 9 mm) and absolute measuring system offers the user extensive possibilities for parameterisation. The snap-in installation housing ensures fast and easy mounting. Like all battery-powered absolute measuring and display systems, AZ14E features an automatic power-saving mode.

All-rounder

The AZ16E system with large 7-digit LCD display (digit height 14 mm) offers variants for different requirements. On request, AZ16E is also available with an integrated sensor line and an 868 MHz radio module. With the AZ16E-300 up to three axes can be measured and displayed. In addition to the snap-in installation housing, AZ16E is also available in a robust surface-mounted housing.

Measuring and display system with two-line LCD




The AZ17E display has a two-line LCD and is optionally available with an 868 MHz radio module for transmitting the current actual value. The AZ17E has extensive mounting options, e.g. snap-in installation housing.

Absolute measurement – no referencing required

As the absolute measured value is available in the AZ series, the systems are ideally suited for swivel stops where the sensor is removed from the magnetic tape during the measuring process. The current position is reliably displayed here even after repositioning.

Measurement value detection

An absolute sensor is available for absolute value measurement, which is permanently connected to the display unit (AZ14E) or connected via an RJ45 plug (AZ16E, AZ17E).

	AZ14E	AZ16E AZ16E-300	AZ17E
			
	Compact miniature position indicator.	Large LCD display with serial interface for integration into machine control, radio module possible. Also as 3-axis version (AZ16E-300).	Two-line LCD, optionally also with RF868 MHz radio module for transmitting actual values.
Mechanical Data		Mechanical Data	
Housing	norm panel housing	norm panel housing	norm panel housing
Housing dimensions (W x H)	72 x 36 mm	96 x 72 mm	96 x 48 mm
Installation depth (complete)	38 mm	66 mm	60 mm
Electrical Data		Electrical Data	
Display	7 digits LCD (digit height 9 mm) with sign, battery state and measurement units	7 digits LCD (digit height 14 mm) with sign, battery state and measurement units	7 or 8 digits LCD (digit height 8.5 resp. 12.6 mm) with sign, battery state and measurement units
Perspective	12 o' clock	12 o' clock	12 o' clock
Accuracy	± 1 digit	± 1 digit	± 1 digit
Power supply voltage	battery (1.5 V resp. 3 V) integrated or external	battery (1.5 V resp. 3 V) integrated or external	battery (1.5 V resp. 3 V) integrated or external, 24 VDC on request
Battery service life	up to 4 years (depending on power-on time)	up to 4 years (depending on power-on time)	1 ... 5 years (depending on power-on time, battery type and version)
Interfaces available	RS485	RS485, RS232 optional, RF 868 MHz on request	RS485, RS232 optional, RF 868 MHz on request
Environmental Conditions		Environmental Conditions	
Operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Protection degree	IP54 (front), IP40 (rear)	IP54 (front), IP40 (rear)	IP54 (front), IP40 (rear)
Magnetic Sensor AZS-100		Magnetic Sensor AZS-100	
Dimensions (L x W x H)		100 x 12 x 25 mm	
Reading distance max.		1.5 mm	
Resolution		0.1 mm	
Repeat accuracy		± 2 increments	
Measuring length max.		8.0 m	
Traverse speed max.		2 m/s	
Protection degree		IP67	



INCREMENTAL
MEASUREMENT AND DISPLAY

The battery-powered incremental position indicators consist of an indicator and a magnetic sensor, which is usually fixed to the indicator via a cable suitable for drag chains (up to 2 m long). No wiring or connections are therefore required during installation. All systems have extensive possibilities for parameterisation.

Miniature position indicators











The extremely compact IZ14E and IZ15E with 7-digit LCD and incremental measuring system are suitable for both linear and rotary applications. The resolution 0.1 / 0.01 mm is switchable. The IZ15E can also be supplied via an external battery compartment (200 mm long cable outlet). In addition, IZ15E has an optional RS232 interface for communication with a higher-level control system.

Popular all-rounder

The popular IZ16E display system is individually programmable and has a conveniently readable LCD display (digit height 14 mm). It can also be supplied via 24 VDC. Via the optionally available interfaces RS232, RS485 or wireless 868 MHz radio module (IZ16E-600), IZ16E can also communicate with a higher-level control system. Optionally, IZ16E is also available as a robust surface-mounted housing.

Measurement value detection

An incremental sensor is available for measured value acquisition, which is usually permanently connected to the display unit. Optionally, the IZ16E and IZ17E can also be connected via a round plug.

	IZ14E	IZ15E	IZ16E / IZ16E-600	IZ17E	HWD15
	 	 	 	 	 
	Miniature position indicator with permanently connected sensor.	Compact position indicator with fixed sensor and optional RS232 interface.	Universal measuring and display system, as IZ16E-600 also available with integrated radio module.	Compact, battery-powered measuring and display system with 2-line LCD. Also available with radio module.	Digital handwheel with adjustable spindle pitch. For hollow shaft diameter 20 mm.
Mechanical Data			Mechanical Data		
Housing	norm panel housing	norm panel housing	norm panel housing	norm panel housing	for shaft mounting, hollow shaft diameter 20 mm
Housing dimensions (W x H)	72 x 36 mm	72 x 48 mm	96 x 72 mm	96 x 48 mm	72 x 114 x 61.5 mm
Installation depth (complete)	38 mm	min. 30 mm (depending on version)	min. 30 mm (depending on version)	30 mm (fixed cable outlet), 60 mm (round connector)	
Electrical Data			Electrical Data		
Display	7 digits LCD (digit height 9 mm) with sign, battery state and measurement units	7 digits LCD (digit height 9 mm) with sign, battery state and measurement units	7 digits LCD (digit height 14 mm) with sign, battery state and measurement units	7 or 8 digits LCD (digit height 8.5 resp. 12.6 mm) with sign, battery state and measurement units	7 digits LCD (digit height 9 mm) with sign, battery state and measurement units
Perspective	12 o' clock	12 o' clock	12 o' clock	12 o' clock	12 o' clock
Accuracy	± 1 digit	± 1 digit	± 1 digit	± 1 digit	± 1 digit
Power supply voltage	battery (1.5 V resp. 3 V) integrated or external	battery (1.5 V resp. 3 V) integrated or external	battery (1.5 V resp. 3 V) integrated or external, 24 VDC on request	battery (1.5 V resp. 3 V) integrated or external, 24 VDC on request	battery 1.5 V
Battery service life	0.5 ... 3 years (depending on battery type)	1 ... 3 years (depending on battery type)	1 ... 3 years (depending on battery type)	1 ... 5 years (depending on version and battery type)	app. 12 months (depending on battery type)
Interfaces available	–	RS232 (type IZ15E-100)	RS232, RS485, RF 868 MHz	RS232, RS485, RF 868 MHz	
Environmental Conditions			Environmental Conditions		
Operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Protection degree	IP54 (front), IP40 (rear)	IP54 (front), IP40 (rear)	IP54 (front), IP40 (rear)	IP54 (front), IP40 (rear)	IP43
Magnetic Sensor MS-250			Magnetic Sensor MS-250		
Dimensions (L x W x H)	30 x 10 x 15 mm		30 x 10 x 15 mm		
Reading distance max.	0.8 mm		0.8 mm		
Resolution	0.1 ... 0.01 mm		0.1 ... 0.01 mm		
Traverse speed max.	4 m/s		4 m/s		
Protection degree	IP67		IP67		



DISPLAY
OF ONE AXIS

Extremely compact single-axis position indicator
Z25 is the smallest display from ELGO. Despite the very small dimensions, the high-contrast illuminated display guarantees a comfortable and precise reading of the determined actual position. The display can be set to zero either via the dustproof front keypad or via external signals. Both incremental linear measuring systems or rotary encoders and absolute measuring systems can be evaluated.

Universal position indicator
The Z50 is a single-axis universal position indicator allowing any ELGO measuring systems to be connected and processed using either incremental or absolute signal outputs. The display is equipped with a RS232 interface as standard. The function and parameter menu is clearly arranged, structured and easy to operate.

Position indicator with LED display
Z51 is an extremely cost-effective counter type with a distinctive 7-segment display in a solid aluminium housing, for display of the output tracks A and B of incremental HTL rotary pulse encoders or magnetic ELGO measuring systems.

	Z25	Z50	Z51
	  <p>Parameterisable miniature position indicator with extensive functions</p>	  <p>Universal position indicator for all ELGO measuring systems.</p>	  <p>Uncomplicated position indicator for one axis in a solid aluminium housing.</p>
Mechanical Data		Mechanical Data	
Housing	norm panel housing	norm panel housing	built-on housing
Dimensions (W x H)	72 x 48 mm (without seal), 74 x 50 mm (with seal)	96 x 72 mm (without seal), 98 x 74 mm (with seal)	116 x 76 x 65 (60) mm
Installation depth (complete)	27 mm (without connectors)	27.7 mm (with connectors)	
Electrical Data		Electrical Data	
Display	7 digits LCD (digit height 14 mm) with sign and measurement units	7 digits LCD (digit height 14 mm) with sign and measurement units	LED, red (digit height 10 mm), direction positive: 7 digits, direction negative: 6 digits + sign
Perspective	12 o' clock	12 o' clock	all
Accuracy	± 1 digit	± 1 digit	± 1 digit
Power supply voltage	24 VDC ±20%	24 VDC ±20%	24 VDC ±20%
Encoder supply	24 VDC	24 VDC or 5 VDC	24 VDC
Load by encoder/measuring system	max. 300 mA	max. 300 mA	max. 130 mA
Signal inputs	HTL, TTL or RS422	HTL, TTL or RS422	HTL
Signal channels	A, B resp. A, A', B, B', Z, Z' or RxD+, RxD-	A, B resp. A, A', B, B', Z, Z' or RxD+, RxD-	A, B
Maximum input frequency	80 kHz	100 kHz	20 kHz/channel
Interfaces (on request)	–	USB with virtual COM port	–
Environmental Conditions		Environmental Conditions	
Operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Protection degree	IP54 (front, with seal), IP43 (front, without seal), IP40 (rear)	IP54 (front, with seal), IP43 (front, without seal), IP40 (rear)	IP40



MONITORING

UP TO THREE AXES

Two axes position indicator

Z52 is an extremely cost-effective counter type indicator with a distinctive 7-segment display in a solid aluminium housing. On request, Z52 is also available as an installation housing.

1-3 axes universal position indicator

The universal position display was developed for the simultaneous evaluation of one to three axes. The graphic display allows customer-specific masks and menus. The display can be integrated into both incremental and absolute measuring systems. Optionally, an analog input can also be specified, which allows the acquisition of analog measuring systems e.g. linear potentiometers or tachometers. A flow rate display can also be achieved in this way. Z60 is equipped with a RS232 interface as standard. An analogue output is available as an option. A bus solution can also be implemented to connect several displays and to communicate with a higher-level PC.

Bus capable position indicator

The Z60-014 offers an innovative solution for flexible and safe format adjustment. The system supports the machine operator during manual format change and ensures complete control and process reliability with the bidirectional transmission of measured values between the machine control and the adjustment unit. Nominal and actual positions of up to three axes can be processed and displayed simultaneously. The integrated rechargeable battery cell turns the incremental measuring system into a quasi absolute measuring system, since the actual position is permanently detected and internally processed, even in a currentless state.

	Z52	Z60	Z60-014
	Position indicator for two axes in a solid aluminium housing with a 7-segment display.	Graphic universal position display for up to three axes.	Graphic display with quasi-absolute measuring system for monitoring manual Format adjustments (1 – 3 axes).
Mechanical Data		Mechanical Data	
Housing	built-on housing	norm panel housing	norm panel housing
Dimensions (W x H)	116 x 76 x 65 (60) mm	96 x 72 mm	72 x 96 mm
Installation depth (complete)	–	33 mm (without connectors)	100 mm (with connectors), 37 mm (without connectors)
Electrical Data		Electrical Data	
Display	LED, red (digit height 10 mm), direction positive: 7 digits, direction negative: 6 digits + sign	graphic LCD display with 120 x 80 pixels	graphic LCD display with 80 x 120 pixels
Perspective	all	frontal	frontal
Accuracy	± 1 digit	± 1 digit	± 1 digit
Power supply voltage	24 VDC ±20%	24 VDC ±20%	14 ... max. 30 VDC
Encoder supply	24 VDC	24 VDC or 5 VDC	–
Load by encoder/measuring system	max. 130 mA	max. 300 mA	–
Signal inputs	HTL	HTL, TTL or RS422	–
Signal channels	A, B	A, B, Z resp. A, A', B, B', Z, Z' or RxD+, RxD-	–
Maximum input frequency	20 KHz / channel	100 kHz (500 KHz on request)	–
Interfaces (on request)	–	RS232, RS422 or RS485	RS232, RS422 or RS485
Environmental Conditions		Environmental Conditions	
Operating temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Protection degree	IP40	IP40 front, mounted state; higher protection classes can be realised on request	IP40 front, mounted state; higher protection classes can be realised on request

Positioning controls

P40 range

P4011
P40
P40T

46



P52T

48



Please
find updated
data here.

The perfect solution for every requirement

The control portfolio of ELGO ranges from simple compact controls to customised multi-axis controls. Numerous machine applications, as they are found for example in wood or sheet metal processing, can be achieved with our controls. The development of positioning controls has a long tradition with us, with the first automatic positioning machines being produced in the early 1980s.

Simple handling, intuitive operation and practical functions.

Whether a modern touch screen or a keyboard with large keys – the user-friendly designed user interfaces and the intuitive operation of our controllers guarantees simple and quick product programming and quick access to programs stored in the memory. Functions are arranged where they are needed. Depending on the control model, comprehensively equipped databases for materials and tools are already included in the scope of services, so that even more complex programs can be processed at the push of a button. The control systems can be integrated in control cabinets as well as in swivelling operating panels



FOR SIMPLE AND RELIABLE POSITIONING

Compact positioning control for one axis

The P4011 controller is ideal for simple positioning applications in mechanical engineering and is designed for maximum economy. The focus is on simple and fast input of the setpoint and, if necessary, the quantity. Actual value, setpoint, quantity and other values are shown on the LCD display. Parameterisation is carried out in plain text via a graphic menu. As standard, the P4011 covers functions such as correction of cumulative errors, compensation of spindle errors and tool corrections.

Programmable compact positioning control for one or two axes

P40 has extensive standard software and an internal program memory for up to 1000 blocks. Three different output signal variants are available for positioning: Switch-off positioning (for one to three speeds), PID analog output and ramp-controlled analog output. An optional interface can be used to communicate with a higher-level system.

Touch control

The touch control P40T has a large touch display. The user interface and menu navigation are intuitive. The controller is easy to program. Automatic functions for cutting gap, cutting angle, cutting length, correction/folding of the backgauge are available. The internal program memory is designed for 1000 blocks. There are 16 freely configurable digital inputs and outputs available.

The menu navigation for all controllers is available in different languages.

P4011




P40



P40T



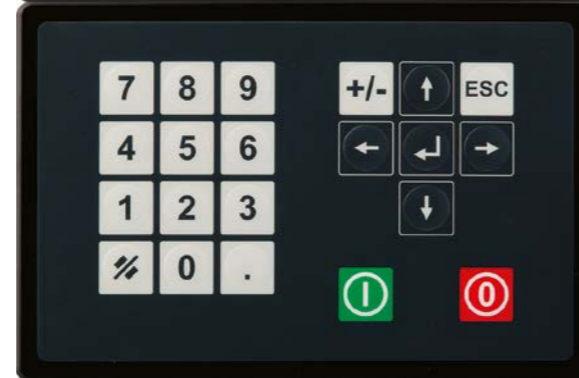
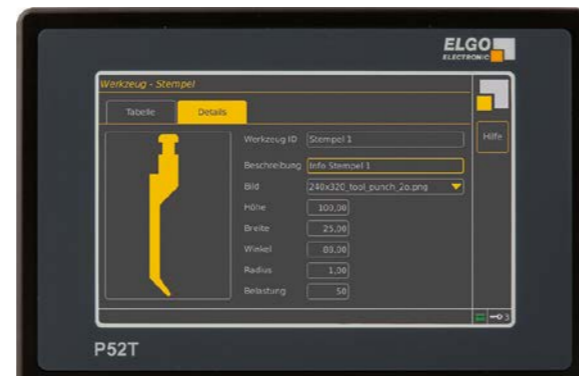
	P4011	P40	P40T
			
Mechanical Data		Mechanical Data	
Housing	panel housing	panel housing	panel housing
Front plate dimensions (W x H)	144 x 144 mm	144 x 144 mm	180 x 144 mm
Housing Dimensions (W x H)	136 x 136 mm	136 x 136 mm	136 x 136 mm
Keyboard	foil, short stroke keys	foil, short stroke keys	touch screen panel
Installation depth	40 mm (without connectors), 75 mm (with connectors)	40 mm (without connectors), 75 mm (with connectors)	48 mm (without connectors), 83 mm (with connectors)
Electrical Data		Electrical Data	
Display	LCD dot matrix 120 x 80 pixels with white background lighting	LCD dot matrix 120 x 80 pixels with white background lighting	TFT touch screen monitor
Hardware	32 bit microcontroller with 1 MByte Flash and 56 KByte RAM	32 bit microcontroller with 1 MByte Flash and 56 KByte RAM	32 bit microcontroller with 1 MByte Flash and 128 KByte RAM
Program memory	up to 100 steps, more on request	up to 1.000 steps, more on request	up to 1.000 steps, more on request
System accuracy	± 1 increment	± 1 increment	± 1 increment
Power supply voltage	24 VDC +10/-20%	24 VDC +10/-20%	24 VDC +10/-20%
Input signals (measuring system)	HTL, TTL, analog	HTL, TTL, analog	HTL, TTL, analog
Signal channels	A, B, Z resp. A, A', B, B', Z, Z' or analog 0 ... 3.3 V	A, B, Z resp. A, A', B, B', Z, Z' or analog 0 ... 3.3 V	A, B, Z resp. A, A', B, B', Z, Z' or analog 0 ... 3.3 V
External inputs	max. 5 x digital PNP inputs, assignment and logic are freely programmable	16 x digital PNP inputs, assignment and logic are freely programmable	16 x digital PNP inputs, assignment and logic are freely programmable
Analog inputs	1 analog input (10 bit) at 10 VDC measuring system supply	optionally 1 ... 2 analog inputs (12 bit) at 3.3 VDC measuring system supply	optionally 1 ... 3 analog inputs (12 bit) at 3.3 VDC measuring system supply
Outputs signals	max. 5 relays or 8 digital PNP outputs or stepper motor signals, assignment and logic (active HIGH/LOW) are freely programmable	16 digital PNP outputs, assignment and logic (active HIGH/LOW) are freely programmable	16 digital PNP outputs, assignment and logic (active HIGH/LOW) are freely programmable
Analog outputs	max. 2 analog outputs or ± 10 V unregulated, optional ± 10 V PID	optional ± 10 V PID or ± 10 V unregulated (each 12 bit)	optional ± 10 V PID (12 bit) or ± 10 V unregulated (each 11 bit)
Interfaces	–	–	optional: RS232
Environmental Conditions		Environmental Conditions	
Operating temperature	0 ... +45 °C	0 ... +45 °C	0 ... +45 °C
Protection degree (front)	IP43 (installed state)	IP43 (installed state)	IP43 (installed state)

BEST POSITIONING RESULTS

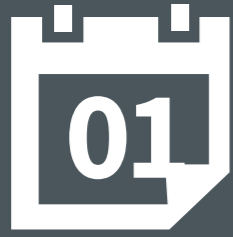
FOR UP TO 4 AXES

P52T brings the IPC world and compact control together. The 4-axis CNC-control with TFT-colour LCD is available in sizes from 7" to 15". Larger sizes are also available on request. The navigation is done via a high-quality resistive touch screen. A decentralised solution with external operating panel with membrane keyboard is also available as an option. Design and operating concept can be adapted to customer-specific requirements.

Only in connection with application-specific software.



P52T	
Mechanical Data	
Housing	panel housing
Front plate dimensions (W x H)	7" touch screen panel: 216 x 144 mm 10.1" touch screen panel: 286 x 194 mm
Housing Dimensions (W x H)	7" version: 194 x 132 mm 10.1" version: 264 x 180 mm
Dimensions decentralised control (L x W x H)	192 x 132 x 54 mm
Keyboard	touch screen panel: resistive touch, optional control panel: foil keypad
Installation depth	7" version (decentralised): 32 mm 7" version (all-in-one): 70 mm 10.1" version (decentralised): 40 mm 10.1" version (all-in-one): 72 mm, each without connectors
Electrical Data	
Display	7" widescreen touch TFT or 10.1" widescreen touch TFT
Hardware	controller unit: 32 bit microcontroller with 1 MByte Flash and 128 KByte RAM touch screen panel: ARM Cortex A8, 1 GHz clock frequency, 512 MB RAM, 4 GB Flash
Program memory	up to 1,000 steps, more on request
System accuracy	± 1 increment
Power supply voltage	24 VDC +10/-20%
Input signals (measuring system)	HTL, TTL, analog on request: CANopen, RS422
Signal channels	A, B, Z resp. A, A', B, B', Z, Z' or analog 0 ... 10 V
External inputs	16 galvanically isolated digital PNP inputs, freely programmable
Analog inputs	4 x 0 ... 10 V (12 bit) at 10 VDC measuring system supply
Outputs signals	16 galvanically isolated digital outputs, freely programmable
Analog outputs	2 x ±10 V with hydraulic axes regulator 2 x (4 x) ± 10 V with PID regulator 4 x 10 V reference voltage for measuring systems (max. 20 mA, short circuit proof)
Interfaces	RS232 on request: CANopen, RS422
Environmental conditions	
Operating temperature	0 ... +45 °C
Protection degree (front)	IP43 (installed state)



1978 founded



250 employees worldwide



3 production sites



7.400
sqm production area



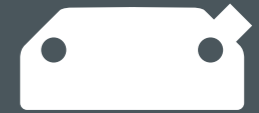
43 sales offices and
agencies worldwide



175
trainees since 1987



4.000.000
metres magnetic tape/year



160.000 assemblies/year

ELGO worldwide

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Legend



Absolute measurement



Incremental measurement



Linear measurement



Rotation measurement



High resolution



Large measuring length



Large reading distance



Sin/Cos signal outputs



Guided systems



MTM



Battery operated



24 V supply

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