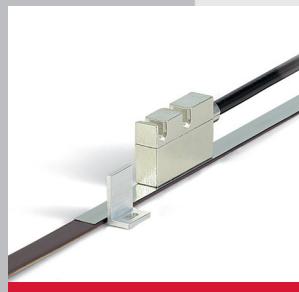


.....lika

Position measurement & control



Magnetic measurement system

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Position measurement & control

Lika Electronic has successfully developed solutions for the automation industry since **1982**, becoming a leading manufacturer of optical encoders, magnetic measurement systems and positioning units in Europe. The export trend allows Lika to sell its products all over the world. At present approximately 50% of the production volume is exported to foreign countries.



Lika's range includes the following product categories:

ROTAPULS: incremental encoders;

ROTACOD: absolute encoders;

ROTAMAG: magnetic encoders;

LINEPULS: linear and rotary magnetic measurement system;

LINECOD: absolute magnetic measurement system;

DRIVECOD: integrated positioning units;

POSICONTROL: displays & position controllers;

ACCESSORIES: couplings, fixing supports, draw-wire encoders...

Thanks to **flexible production**, Lika can realize customer specific requirements, focusing attention on performance and functionality.

This is achieved by performing all the research, design and production inside the company.

During these years Lika has developed strong know-how in:

- Digital and analog electronic design;
- mechanical design;
- optical design;
- software development

Continuous research and innovation are part of daily activities.

Lika often works in conjunction with the most prestigious Italian Universities and accredited Institutes, establishing permanent and productive relationships.

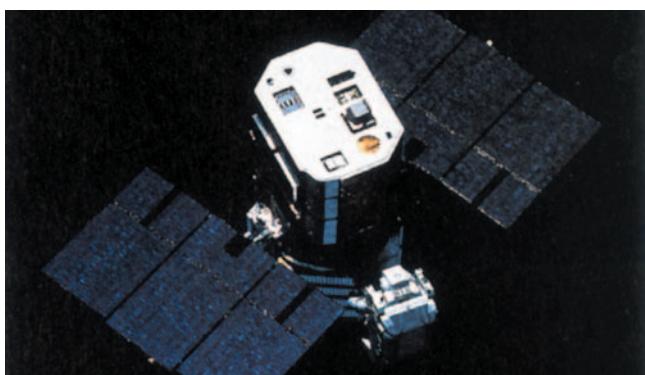
In cooperation with the CISAS (Interdepartmental Centre of Space Studies and Activities) of Padua, Lika is involved in the **worldwide space project**, the ROSETTA-ESA mission.

A particular model of incremental encoder has been developed by Lika and employed in the mechanism of the WAC and NAC telescopes forming the OSIRIS payload in the ROSETTA-ESA mission.

The ROSETTA-ESA mission, started on March 2nd 2004 with the launch of Ariane 5 and will last twelve years.

During this period, the rocket will travel **450 million kilometers**.

ROSETTA has the scope to reveal some secrets of the solar system and to study the origins of earth and the universe.



Typical application fields of Lika products are:

- Woodworking machinery;
- lift and hoists;
- packaging machines;
- machines tools

Lika has been **ISO 9001 certified** since 1997.



ROTAPULS
Optical incremental encoders

LINEPULS
Linear and rotary magnetic measurement system

DRIVECOD
Integrated positioning units

ROTACOD
Optical absolute encoders

LINECOD
Absolute magnetic measurement system

POSICONTROL
Displays & position controllers

ROTAMAG
Magnetic encoders

...about Lika

- | | |
|---|---|
| <p>2005 Project in cooperation with Padua University for the development of a measurement system based on laser technology.</p> <p>2004 Rosetta project: the satellite with Lika's encoders has been launched.
Compliant with ISO 9001:2000 certification.</p> <p>2003 Lika obtains the Q PLUS (Q+) certification.</p> <p>2002 Production in antistatic environment (ESD).
Reorganization of NC department and introduction of DRIVECOD & POSICONTROL product range.</p> <p>2001 Foundation of <i>Lika Germany</i> branch.
LINEPULS range.</p> <p>2000 Start of ROSETTA project in cooperation with CISAS.</p> <p>1999 Lika Electronic moves to Carrè (VI), in the new and expanded headquarters.</p> <p>1998 Introduction of the numerical control department.</p> | <p>1997 Lika obtains the ISO 9001:1994 certification.
First single-turn absolute encoder with 16 bit resolution developed for aerostatic probes of Florence University.</p> <p>1996 ROTACAM ASR58: absolute encoder with integrated cam programmer.</p> <p>1993 The range of encoders with 58 mm diameter is completed.</p> <p>1991 Foundation of Lika Trading.</p> <p>1987 Introduction of EP cam programmer.
Lika manufactures the smallest absolute encoder in Europe, with a diameter of 50 mm.</p> <p>1986 Production of absolute encoders with integrated display and incremental encoders for Italian market.</p> <p>1985 Lika starts the production of absolute encoders for the German market.</p> <p>1982 Lika Electronic founded in Schio (VI), Italy.</p> |
|---|---|



LINEPULS Magnetic measurement system

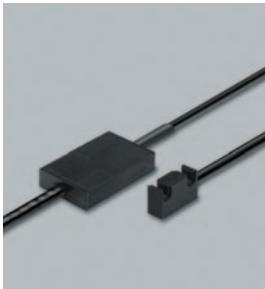
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Series	MT • MTS	MRI	SMx-C • SMx-R	EBOX
Features	magnetic tape	magnetic rings	passive sensors	electronic converter
Dimensions (mm)	10 mm/5 mm x 100 m max.	-	25 x 15 x 8,5 / M10 x 30	90 x 20 x 55
Connections	 	- -	- • •	
Resolution	-	-	depending on EBOX or display	10 µm max. (programmable)
Output circuits	-	-		Push-Pull, Line Driver
Operating temperature	-40°C +120°C (-40°F +248°F)	-40°C +120°C max. (-40°F +248°F max.)	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)
Protection	IP67	IP67	IP67	IP40

LINEPULS Magnetic measurement system

lika



Series	SMBx	SME5	SME2	SME1
Features	separate converter	standard sensor	standard sensor	high resolution
Dimensions (mm)	25 x 15 x 8,5 49 x 30 x 10	40 x 25 x 10	40 x 25 x 10	40 x 25 x 10
Connections	 	• 	• 	•
Resolution	5 µm max.	5 µm max.	2 µm max.	0,5 µm max.
Travel speed	16 m/s max.	16 m/s max.	16 m/s max.	16 m/s max.
Output circuits	Push-Pull, Line Driver	Push-Pull, Line Driver	Push-Pull, Line Driver	Push-Pull, Line Driver
Operating temperature	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)
Protection	IP67	IP67	IP67	IP67

LINEPULS Magnetic measurement system

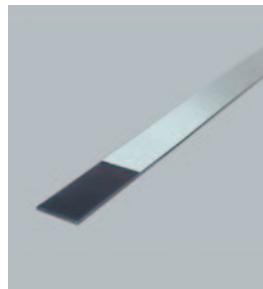
lika



Series	SHD1 • SHD2 • SHD5	SMK	SML • SMH	SMS
Features	for linear motors	standard sensor	standard sensor	sin/cos
Dimensions (mm)	40 x 25 x 10			
Connections	• 	• 	• 	•
Resolution	1 µm max.	10 µm max.	100 µm max.	1 mm pole pitch
Travel speed	16 m/s max.	2,5 m/s max.	10 m/s max.	16 m/s max.
Output circuits	Push-Pull, Line Driver	Push-Pull, Line Driver	Push-Pull, Line Driver	1 Vpp
Operating temperature	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)
Protection	IP67	IP67	IP67	IP67

LINEPULS • LINECOD Absolute magnetic system

lika



Series	SMxx	MTA5 • MTA1	SMA5	SMA1
Features	bidirectional sensor	absolute coded tape	integrated absolute sensor	integrated absolute sensor
Dimensions (mm)	M10 x 30	20 mm x 5.1 m max.	65 x 20 x 20	85 x 21 x 20
Connections	• 	- 	• 	•
Resolution	5 mm (1.25), 2 mm (0.5)	-	5 µm max.	5 µm max.
Travel speed	7,5 kHz max.	-	5 m/s max.	5 m/s max.
Output circuits	Universal circuit	-	SSI	BiSS + sin/cos
Operating temperature	-10°C +70°C (14°F +158°F)	-40°C +120°C (-40°F +248°F)	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)
Protection	IP67	IP67	IP67	IP67

LINEPULS Magnetic measurement system

lika



Series	LD120	LD130	LD112
Features	LED display	3 axis LED display	small battery display
Display	LED 5 digit	3 x LED 5 digit	LCD 6 digit
Display mode	linear, angular, mm/inch	linear, mm/inch	linear, angular, mm/inch
Dimensions (mm)	72 x 36 x 62	97 x 73 x 83	72 x 48 x 31
Input	magnetic sensor	magnetic sensor	magnetic sensor
Travel speed	< 5 m/s	< 5 m/s	< 5 m/s
Power supply	+10 +30Vdc	+10 +30Vdc	battery
Interface	RS485	RS485, RS232	-
Output	-	-	-

LINEPULS Magnetic measurement system

lika



Series	LD140 • LD142	LD111	LD141
Features	battery display	small OEM battery display	OEM battery display
Display	LCD 6 digit	LCD 6 digit	LCD 6 digit
Display mode	linear, angular, mm/inch	linear, angular, mm/inch	linear, angular, mm/inch
Dimensions (mm)	96 x 72 x 47	61 x 39 x 23	87 x 60,5 x 47
Input	magnetic sensor	magnetic sensor	magnetic sensor
Travel speed	< 5 m/s	< 5 m/s	< 5 m/s
Power supply	battery	battery	battery
Interface	RS232	-	RS232
Output	-	-	-

ROTAPULS incremental encoders

lika



Series	I28	I40 • I41	I58S • I58 • I58A • I58V	IT65 • I65
Features			standard size, sin/cos	standard size
Housing ø (mm)	28	40	58	65
Shaft ø (mm)	4, 5	4, 6, 6.35, 8	6, 8, 9.52, 10, 12	6, 8, 9.52, 10, 12
Connections	 	• •	• •	• •
Resolution (PPR)	1024 max.	3600 max.	10000 max.	10000 max.
Output frequency (kHz)	100 max.	100 max.	300 max.	300 max.
Output circuits	Push-Pull, Line Driver, Universal circuit	NPN, Push-Pull, Line Driver, Universal circuit	NPN, Push-Pull, Line Driver, Universal circuit, 1Vpp, 11µApp	NPN, Push-Pull, Line Driver, Universal circuit
Operating temperature	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)	-40°C +100°C max. (-40°F +212°F max.)	-40°C +100°C max. (-40°F +212°F max.)
Protection	IP54	IP54	IP65 max.	IP66 max.

ROTAPULS incremental encoders

lika



Series	XC77	I105	ICS	CK46
Features	ATEX	high resolution	spring loaded shaft	
Housing ø (mm)	77	105	172 x 80 x 53	46
Shaft ø (mm)	14	10	12	6, 6.35
Connections	 	• •	• •	•
Resolution (PPR)	10000 max.	18000 max.	1068 max.	3600 max.
Output frequency (kHz)	300 max.	300 max.	60	60
Output circuits	NPN, Push-Pull, Line Driver, Universal circuit	Push-Pull, Line Driver, Universal circuit	NPN, Push-Pull, Line Driver, Universal circuit	NPN, Push-Pull, Line Driver, Universal circuit
Operating temperature	-20°C +40°C (-4°F +104°F)	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)	-40°C +100°C max. (-40°F +212°F max.)
Protection	IP66	IP65 max.	IP65 max.	IP65 max.

ROTAPULS incremental encoders

lika



Series	C50	CB50	CB59	C59 • C60 • C58
Features	for motor applications	feedback encoder for brushless motors	for servo motors	
Housing ø (mm)	50	50	58	58
Shaft ø (mm)	6, 6.35, 8, 9.52, 10	6, 6.35, 8, 9.52, 10	12.7, 15	14, 15
Connections	• 	• 	• 	•
Resolution (PPR)	2500 max.	2500/8 poles max.	2048/ 1 sin/cos	5000 max.
Output frequency (kHz)	100	200	200	60
Output circuits	NPN, Push-Pull, Line Driver, Universal circuit	Push-Pull, Line Driver, U, V, W signals	1 Vpp + Z track	Push-Pull, Line Driver, Universal circuit
Operating temperature	-40°C +100°C max. (-40°F +212°F max.)	-20°C +100°C (-4°F +212°F)	-20°C +100°C (-4°F +212°F)	-40°C +100°C (-40°F +212°F)
Protection	IP65 max.	IP20	IP40	IP65 max.

ROTAPULS incremental encoders

lika



Series	C58R • C58A	CK59 • CK60 • CK58	CK61	C80 • C81
Features		standard size heavy duty	motor feedback	for lift motors
Housing ø (mm)	58	58	58	80
Shaft ø (mm)	14, 15	14, 15	10, 12	6 ÷ 43,97
Connections	• 	• 	• 	•
Resolution (PPR)	5000 max.	10000 max.	5000 max.	5000 max.
Output frequency (kHz)	300 max.	300 max.	300 max.	200 max.
Output circuits	Push-Pull, Line Driver, Universal circuit	NPN, Push-Pull, Line Driver, Universal circuit, 1Vpp	Push-Pull, Line Driver, Universal circuit	Push-Pull, Line Driver, Universal circuit, 1Vpp
Operating temperature	-40°C +100°C max. (-40°F +212°F max.)	-40°C +100°C max. (-40°F +212°F max.)	-40°C +100°C max. (-40°F +212°F max.)	-40°C +100°C max. (-40°F +212°F max.)
Protection	IP65 max.	IP65 max.	IP65 max.	IP65 max.

ROTACOD absolute encoders

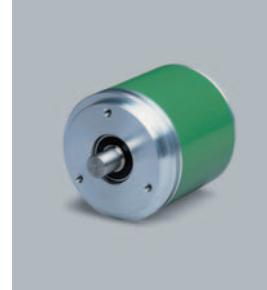
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Series	ASC58 • AS58 • AS58S	ASx58x sin/cos	AST6	XAC77
Features	standard size	motor feedback	US size	ATEX
Housing ø (mm)	58	58	65	77
Shaft ø (mm)	6, 8, 9.52, 10, 12, 14, 15	6, 8, 9.52, 10, 12, 14, 15	6, 8, 9.52, 10, 12	14
Connections		•	•	•
		•	•	•
Resolution	16 bit max.	16 bit + 2048 sin/cos	16 bit max.	16 x 14 bit max.
Output circuits	NPN, Push-Pull, SSI	SSI + 1 Vpp	NPN, Push-Pull, SSI	NPN, Push-Pull, SSI
Operating temperature	-40°C +100°C max. (-40°F +212°F max.)	-20°C +70°C (-4°F +158°F)	-40°C +100°C max. (-40°F +212°F max.)	-20°C +40°C (-4°F +104°F)
Protection	IP65	IP65	IP66 max.	IP66

ROTACOD absolute encoders

lika



Series	ASR58	AS58A • AM58A	AS58 ISI • AM58 ISI	AS5 • AM5
Features	integrated cam programmer	analogue output	incremental serial interface	
Housing ø (mm)	58	58	58	51
Shaft ø (mm)	6, 8, 9.52, 10, 12	6, 8, 10, 12	6, 8, 9.52, 10, 12	6, 8, 10, 12
Connections				•
		•	•	•
Resolution	3600/0,1°	16 bit max.	2048 PPR, 2048 PPR x 4096 rev	12 bit, 12 x 8 bit max.
Output circuits	16 x on/off, 100mA	0-5V, 0-10V, 4-20mA	(Incremental serial interface)	NPN, Push-Pull
Operating temperature	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)
Protection	IP65	IP65	IP65	IP65

ROTACOD absolute encoders

lika



Series	AMC58 • AM58 • AM58S	AMx58x sin/cos	AMx58x P	AMC9 • AM9
Features	standard size	for motor feedback	programmable	low profile
Housing ø (mm)	58	58	58	88
Shaft ø (mm)	6, 8, 9.52, 10, 12, 14, 15	6, 8, 9.52, 10, 12, 14, 15	6, 8, 9.52, 10, 12	10, 15
Connections	• •	• •	• •	• •
Resolution	16 x 14 bit max.	16 x 14 bit + 2048 sin/cos	13 x 12 bit max.	13 x 12 bit max.
Output circuits	NPN, Push-Pull, SSI	SSI + 1Vpp	NPN, Push-Pull, SSI	SSI
Operating temperature	-40°C +100°C max. (-40°F +212°F max.)	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)	-40°C +100°C max. (-40°F +212°F max.)
Protection	IP65	IP65	IP65	IP65

ROTACOD absolute encoders

lika



Series	Ax58x PB	Ax58x IB	Ax58x FD	Ax58x CB
Features	Profibus DP	Interbus-S	DeviceNet	CANopen • CANlift
Housing ø (mm)	58	58	58	58
Shaft ø (mm)	6, 8, 9.52, 10, 12, 14, 15	6, 8, 9.52, 10, 12, 14, 15	6, 8, 9.52, 10, 12, 14, 15	6, 8, 9.52, 10, 12, 14, 15
Connections	Connection cap with PG or connectors •		Connection cap with PG or connectors •	Connection cap with PG or connectors •
Resolution	16 bit, 16 x 14 bit max.	16 bit, 16 x 14 bit max.	16 bit, 16 x 14 bit max.	16 bit, 16 x 14 bit max.
Output circuits	ProfiBus DP	Interbus-S	DeviceNet	CANopen • CANlift
Operating temperature	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)	-20°C +70°C (-4°F +158°F)
Protection	IP65	IP65	IP65	IP65

ROTAMAG magnetic encoders

lika.....



Series	MI58S • MI58	MC59 • MC60 • MC58	MMC58 • MM58 • MM58S
Features	incremental magnetic	incremental magnetic	absolute magnetic
Housing ø (mm)	58	58	58
Shaft ø (mm)	6, 8, 9.52, 10, 12	14, 15	6, 8, 9.52, 10, 12, 14, 15
Connections	 •  •	 •  •	 •  •
Resolution (PPR)	10000 max.	10000 max.	12 bit x 16 bit max.
Output circuits	Push-Pull, Line Driver, Universal circuit	Push-Pull, Line Driver, Universal circuit	SSI, BiSS
Operating temperature	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)	-25°C +85°C (-13°F +185°F)
Protection	IP67 max.	IP67 max.	IP67 max.

Accessories

lika.....



Series	SF • SFMx	PAN/PGF	LKM-xxx	RM-xxxx
Features	Draw wire support	Couplings	Brackets, flanges	Metric wheels
	<ul style="list-style-type: none"> With encoder or potentiometer Measuring length 5000 mm or 6800 mm (series SF) Measuring length 1000 mm or 1500 mm (series SFMx) 	<ul style="list-style-type: none"> Flexible or rigid Zero backlash Electrical insulation High torque Steel versions Keyway 	<ul style="list-style-type: none"> Mounting brackets Mounting bells Adapting flanges Fixing accessories Connectors Connection cables 	<ul style="list-style-type: none"> 200 or 500 mm circumference Rubber or metal surface Integrated encoders (IR65) available Racks & pinions available

DRIVECOD Positioning units

lika.....



Series	RD1	RD11	RD12
Features	positioning unit	positioning unit	with integrated brake
Dimensions (mm)	58 x 124 x 122	58 x 124 x 122	58 x 124 x 150
Shaft ø (mm)	14	15	14
Shaft rotational speed	240 rpm max.	240 rpm max.	240 rpm max.
Nominal torque	5 Nm max.	5 Nm max.	5 Nm max.
Max. torque	10 Nm max.	10 Nm max.	10 Nm max.
Power supply	24 Vdc	24 Vdc	24 Vdc
Interface	RS485, CANopen, Profibus	RS485, CANopen, Profibus	RS485, CANopen, Profibus
Encoder	absolute	absolute	absolute

DRIVECOD Positioning units

lika.....



Series	RD2	RD22	RD3
Features	positioning unit	with integrated brake	positioning unit
Dimensions (mm)	56 x 56 x 104	56 x 56 x 140	56 x 75 x 158
Shaft ø (mm)	14	14	14
Shaft rotational speed	110 rpm max.	110 rpm max.	240 rpm max.
Nominal torque	1,6 Nm max.	1,6 Nm max.	5 Nm max.
Max. torque	3 Nm max.	3 Nm max.	10 Nm max.
Power supply	24 Vdc	24 Vdc	24 Vdc
Interface	RS485, CANopen, Profibus	RS485, CANopen, Profibus	RS485, CANopen, Profibus
Encoder	absolute	absolute	absolute

POSICONTROL Displays & Position controllers

lika



Series	PS600	TE600	PV1	LD200
Features	position controller	RDxx CANbus terminal	4 axis DRO	universal display
Display	LCD	LCD	LCD	LED 8 digit
Display mode	position, parameters	RDxx status, parameters	linear, mm/inch	linear, angular, mm/inch
Dimensions (mm)	120 x 154 x 34	120 x 154 x 34	280 x 110 x 35	96 x 48 x 49
Input	2 x AB	CAN	4 x ABO	ABO, 1Vpp,SSI, magnetic sensor
Counting frequency	20 kHz max.	-	2 MHz max.	500 kHz max.
Power supply	24 Vdc	24 Vdc	24 Vdc	24 Vdc
Interface	RS232, CAN	RS232, CAN	RS232	RS232, CAN
Output	8 x 24 V @ 500 mA	-	4 x ±10 V 12 x 24 V @ 500 mA	3 x 24 V @ 50 mA

POSICONTROL Displays & Position controllers

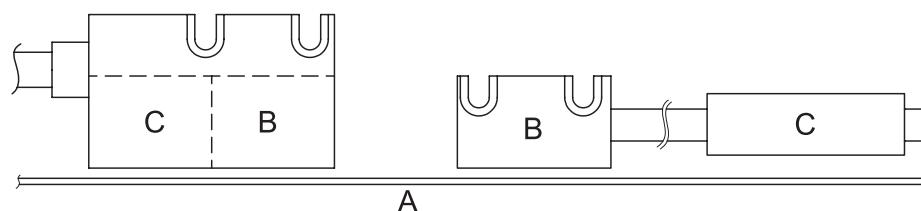
lika



Series	MC150	MC111	MC221
Features	position display	position display	2 axis display
Display	LED 6 digit	LED 6 digit	2 x LED 6 digit
Display mode	linear, angular	linear, angular	linear, angular
Dimensions (mm)	96 x 72 x 71	96 x 72 x 60	96 x 96 x 72
Input	ABO	AB, Analogue	2 x AB
Counting frequency	330 kHz max.	25 kHz max.	90 kHz max.
Power supply	24 Vdc/Vac 115 Vac, 230 Vac	24 Vdc	24 Vdc/Vac 115 Vac, 230 Vac
Interface	RS232	-	RS232
Output	2 x 24 V @ 600 mA	2 x 24 V @ 600 mA	2 x 24 V @ 600 mA

OPERATING PRINCIPLE AND TECHNICAL INFORMATION

The magnetic measuring system includes magnetic tape (A), sensor head (B) and translation circuitry (C). The sensor head detects the position as it travels over the magnetic tape. The measuring system is non-contacting and therefore wear-free. The sensor records the information in the form of fields and sends it on to the translation circuitry in the form of sine and cosine signals. The translation circuitry converts these signals into protocols suitable for interface.



MAGNETIC TAPE

The magnetic tape is made of a polymer-bonded material with a non-ferrous backing and steel cover strip. An alternating magnetic field H is produced by a systematic magnetization with north and south poles (for incremental version) or by a coded sequence of poles (for absolute version).

The pole pitch is the measurement of the distance between two poles. This measurement is provided in mm. A significant value for the sensor is the field strength Hy, which is perpendicular to the magnetic tape and is present over the entire length of travel as a continuous sine wave (for incremental version) or a coded position (for absolute version).

The accuracy of the magnetic tape is indicated by $\mu\text{m}/\text{m}$.

The accuracy value represents the maximum deviation of inaccuracy inside any section of 1 m of the measurement range. The accuracy class is listed as $\pm xx \mu\text{m}$, where xx = number of $\mu\text{m}/\text{m}$ (example: class 10 = $\pm 10 \mu\text{m}/\text{m}$ of accuracy).

MAGNETIC SENSOR

The incremental version converts the magnetic sine waves of the magnetic tape into two separate sine/cosine signals with 90° phase offset, while the absolute version converts the coded sequence of poles into an absolute serial signal. The detected signals are sent to an electronic converter to be processed.

The precisely calculated spatial arrangement of the sensor elements suppresses the environmental static magnetic fields.

ELECTRONIC CONVERTER

The translation circuitry collects the signals received from the sensor head read on the magnetic tape and converts them into standard output signals. Optimising filters considerably reduce the effects of the environmental static and dynamic magnetic fields on the system accuracy.

Different measuring rates and measuring resolutions are available via interpolation, depending on the type of converter selected.

The converter generates output signals:

- square wave A B signals with 90° phase shift
- sine/cosine signals with 90° phase shift
- serial SSI

INDEX SIGNALS

Incremental magnetic sensors are available with a periodic index signal (option "I") or a single reference signal (option "R") output.

Index signals are sent once per pole for the duration of a measuring resolution increment. In connection with these signals and external sensor (e.g. inductive proximity switch), one reference point can thus be produced per external sensor. The accuracy of the external sensor therefore does not directly affect the accuracy of the detection of reference points. It must be ensured, however, that the switching hysteresis of the external sensor is smaller than the length of one pole of magnetic tape so that its signal can be clearly assigned to an index signal.

Reference signals are generated by an additional sensor element in connection with an external "Reference pole" (accessory LKM-1309/x) for the duration of a measuring resolution increment. The presence and proper operation of the reference pole is signalled by a functioning LED located on the sensor head.

DATUM OF ABSOLUTE SENSOR

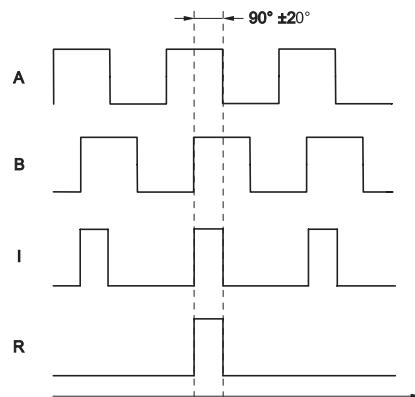
Absolute magnetic sensors need to be datumed at installation by means of an electric signal. Datum position corresponds to absolute position value zero (0).

OUTPUT SIGNALS

Incremental magnetic sensors generate two square waves signals A and B phase shifted by 90° electrical and an index signal (I or R) gated with A and B.

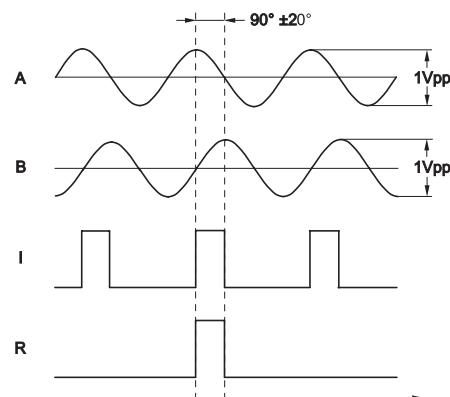
The integrated electronic can produce additional complementary (or inverted) signals for each output channel which are indicated as /A, /B and /I or /R.

A measuring step (resolution) corresponds to the distance between two successive edges of A and B.



Sine/cosine magnetic sensors generate two sine wave signals phase shifted by 90° electrical (sine and cosine). The integrated electronics produce complementary (or inverted) signals for each output channel.

The signal amplitude is typically 1Vpp (peak-to-peak). Index or Reference are TTL signals with a duration of a 1/4 of the magnetic pole.



Absolute sensors are available with SSI (Synchronous Serial Interface) and "LSB right aligned" 25 bit transmission protocol, or BiSS interface.



EDGE DISTANCE

Order code	Edge distance (usec)	Max. counting freq. (kHz)	Resolution (μm) vs. max. possible speed (m/s)*							
			0,5	1	2	5	10	25	50	100
H	0,3	3.333	1,7	3,3	6,7	16,7	25,0	25,0	25,0	25,0
J	0,5	2.000	1,0	2,0	4,0	10,0	20,0	25,0	25,0	25,0
A	1	1.000	0,5	1,0	2,0	5,0	10,0	25,0	25,0	25,0
B	2	500	0,3	0,5	1,0	2,5	5,0	12,5	25,0	25,0
C	4	250	0,1	0,3	0,5	1,3	2,5	6,3	12,5	25,0
D	8	125	0,1	0,1	0,3	0,6	1,3	3,1	6,3	12,5
E	16	62,5	0,0	0,1	0,1	0,3	0,6	1,6	3,1	6,3
F	32	31,3	0,0	0,0	0,1	0,2	0,3	0,8	1,6	3,1

* theoretic speed between sensor and tape/ring. Please check travelling speed limitation on product specs.

OUTPUT CIRCUITS

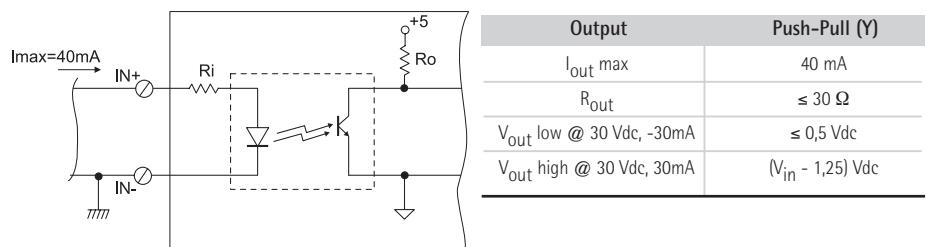
Magnetic sensors can be ordered with Push-Pull, Line Driver, 1Vpp sin/cos or serial SSI.

PUSH-PULL (HTL)

Sensors with Push-Pull output circuit have generally 10 to 30 Vdc power supply (typically 12 or 24 Vdc). Push-Pull with complementary signals (A_{B0}, /A_{B0}) is recommended for long distance and noise proof transmissions.

RECOMMENDED INPUT CIRCUIT

Input circuits with optocouplers are recommended (see figure/table).



LINE DRIVER (TTL)

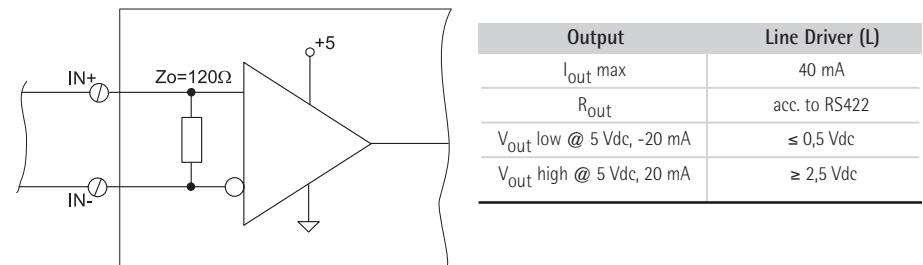
Sensors with Line Driver output circuit generally have 5 Vdc power supply and are recommended for noise proof transmission.

For the signal transmission over long distances it is advisable to use sensors with 24 Vdc (10 - 30 Vdc) power supply.

The RS422 Line Driver output circuit produces complementary (or inverted) signals.

RECOMMENDED INPUT CIRCUIT

Line Receiver input circuits (eg. 26LS32AM, MC3486, SN75ALS193) with 120 Ω receiver input impedance (Z) are recommended (see figure).



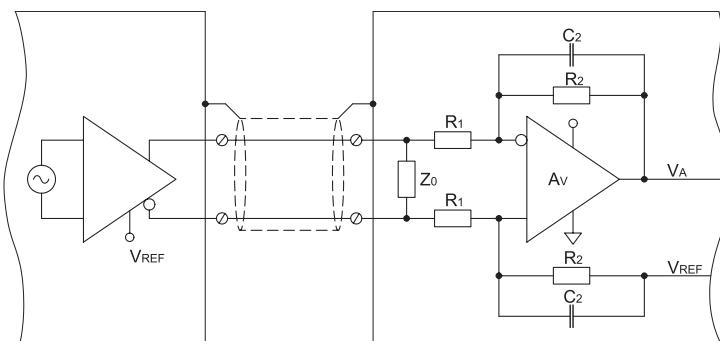
1VPP (SIN/COS)

The sinusoidal output signals are phase shifted by 90° electrical (sine and cosine) and have an amplitude of typically 0.5 Vpp (peak-to-peak) with an offset of 2.5 V. The 1 Vpp output level is the result of differential signal detection.

Index and Reference are digital signals with TTL level and a duration of 1/4 of a magnetic pole pitch. The internal electronic produces complementary (or inverted) signals for each output channel.

RECOMMENDED INPUT CIRCUIT

Input circuitry should be designed with an operational analogue amplifier in differential configuration (see fig.).



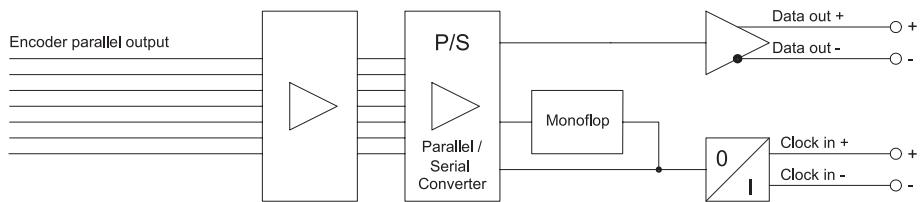
Output	1Vpp
I _{out} max	100 mA
V _{offset}	(V _{in} -0,2) / 2 ±5%
V _{out} (peak to peak)	0,8 ÷ 1,2 ±5%*

* differential measurement

SSI OUTPUT

The position output value of absolute sensors is always positive. Moving the absolute sensor below zero position in decreasing counting direction, output will be equal to the maximum quote -1 (... , 3, 2, 1, 0, qmax., qmax.-1, qmax.-2,...).

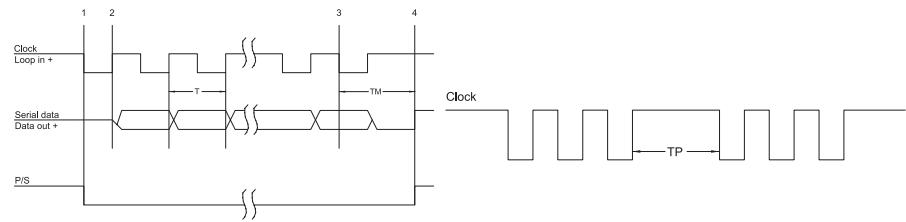
BLOCK DIAGRAM



OPERATION SYSTEM

The first falling edge of the clock signal (1) the position value is stored. After the first rising edge (2) the position is sent starting with the MSB. At every change of the clock signal a bit is sent out until the LSB.

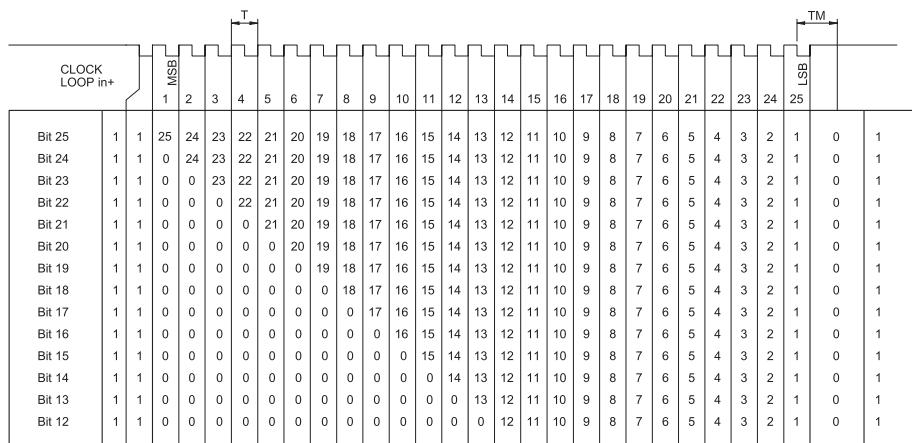
TIMING



The data transmission cycle is terminated by the last falling edge of clock signal (3). After the period Tm the sensor is ready for the next transmission. The time interval between two clock sequence transmissions must be at least 30 μ sec.

TRANSMISSION PROTOCOLS

Absolute sensors with SSI (Synchronous Serial Interface) produce a "LSB right aligned" transmission protocol. The data word length is 25 bit and unused bits are forced to logic level low (zero).



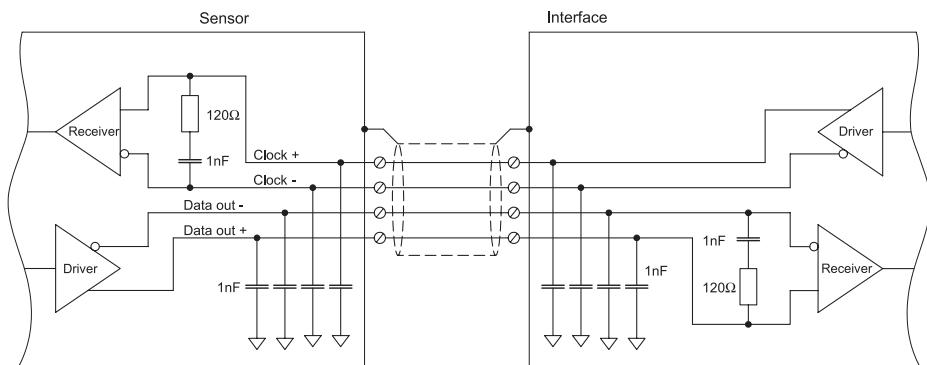
RECOMMENDED TRANSMISSION RATES

The SSI interface has a frequency of data transmission from 100 kHz to 1.5 MHz with a clock signal which has a typical logic level of 5 V. The output signal is given with level 5 V (for standard version). The transmission rate (baud rate) depends on the length of transmission cables.

Cable length	Baudrate
< 50 m	< 400 kHz
< 100 m	< 300 kHz
< 200 m	< 200 kHz
< 400 m	< 100 kHz

RECOMMENDED INPUT CIRCUIT

A differential Line Receiver with 120Ω terminal impedance for the data lines and a RS422 Line Driver (eg. DS8921, SP3490 driver or 26LS31 driver) for clock signals is recommended.



BiSS INTERFACE

Bidirectional digital sensor interface BiSS safeguards communication between position encoders or measuring devices and industrial controls, such as a drive control, for example, and if necessary can transmit measurement values from up to 8 sensors simultaneously.

For **1 to 8 subscribers** the interface master provides a clock signal for the simultaneous capture of all position data and for the synchronous-serial data transmission which follows on from this. Just four unidirectional RS422 data lines are required; the slave electronics, kept to an absolute minimum, are incorporated on the sensor ICs. When the master sends a clock pulse on line MA, the slave answers directly on return line SL with the recorded position data. Commands and parameters can be swapped on a PWM pulse form; this is, however, not necessary to start the BiSS protocol.

With each data cycle the master learns and compensates for line delays, thus permitting **clock rates of up to 10 Mbit/s** even for cable lengths of up to 100 m. Changes in line conditions which occur during cable drag, for example, are corrected. The precision of synchronization among several position encoders along various axes is less than **1 microsecond**; the master also makes the signal delay it has recorded accessible to the control unit, allowing further optimization.

The BiSS protocol classifies each subscriber in one of the following data sections: sensor data, multicycle data or register data. These data sections have various setups with regard to access and transmission performance so that a number of different sensor applications are catered for.

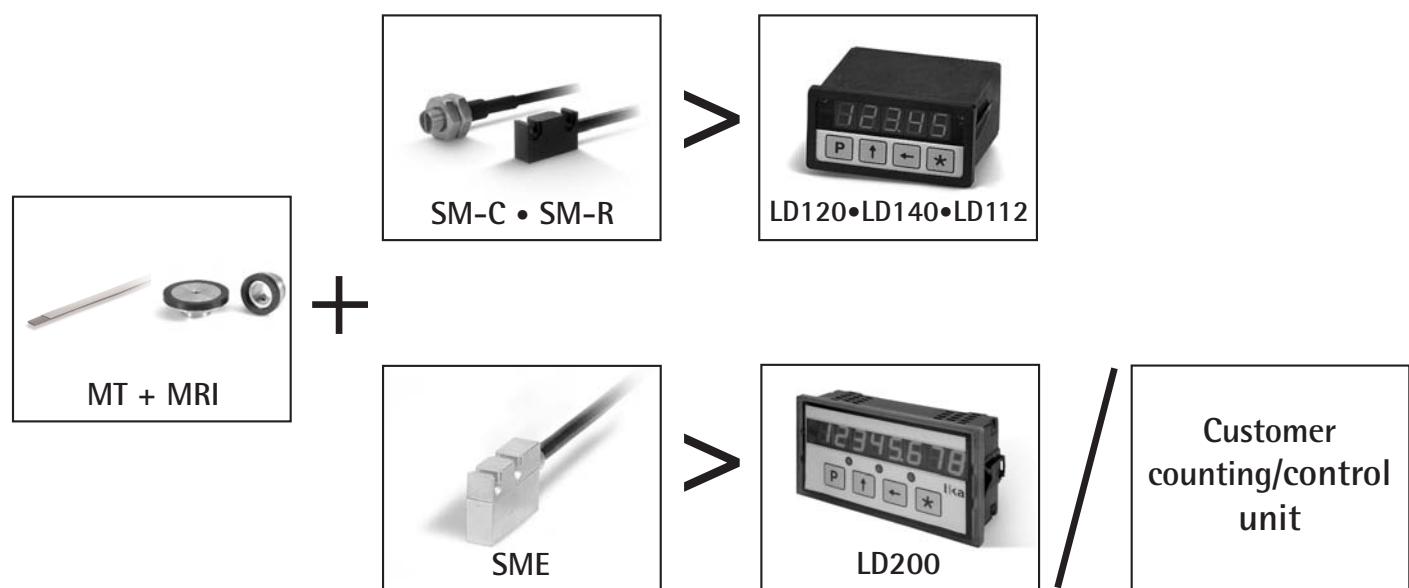
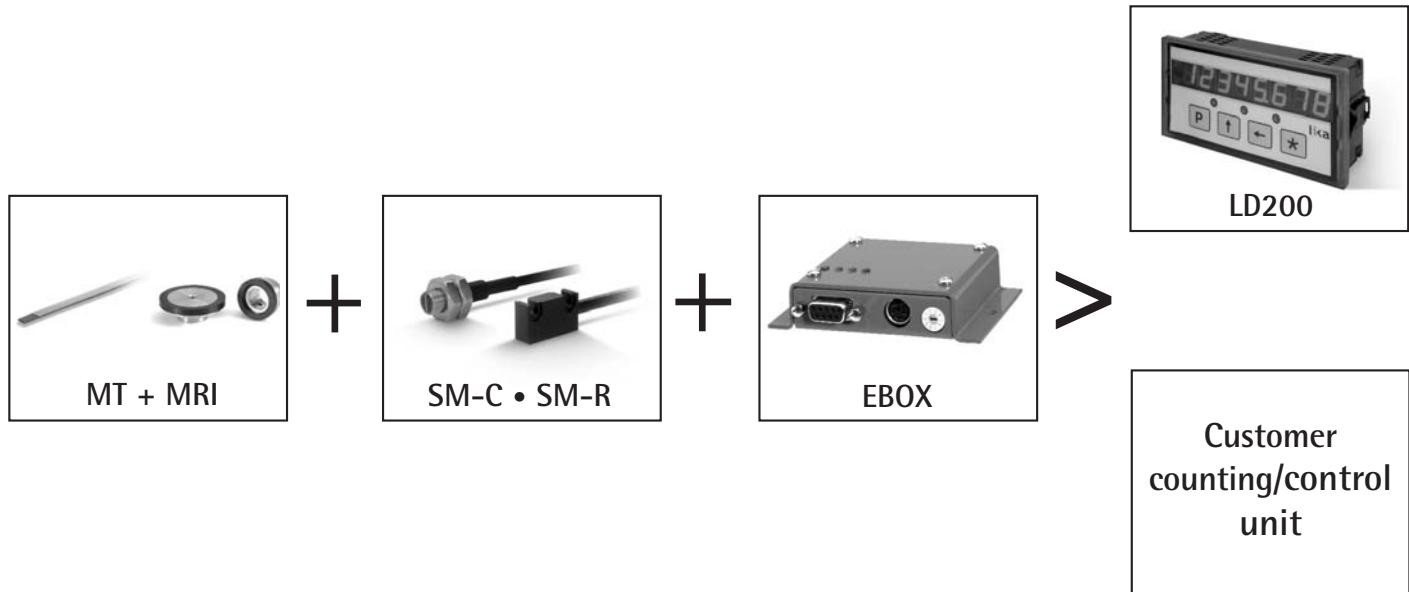
Bidirectional **parameter communication for device configuration** - also applicable to what are known as OEM parameters - is usually consigned to the register data section. Data which alters gradually, such as revolution counts or drive temperatures, is allocated to the multicycle data section, with rapidly changing angle data being assigned to the sensor data section.

Control cycle times of **less than 10 µs** are thus not a problem, even for data words of up to 64 bits in length. There is enough room in the protocol for **redundancy**; this space is normally used to implement a CRC (cyclic redundancy check). Framed by just one start and one stop bit, the sensor data is transmitted at the best-possible core data rate; a single multicycle data bit is optional.

The individual user's freedom of design for specific devices is not curbed by the need to keep solutions compatible with other BiSS products, thus also cutting down on unnecessary additional costs. A BiSS subscriber is defined in its entirety by just a few parameters; an **XML device description file** supplied with the sensor simplifies initial operation with a control system. If this does not yet have a BiSS input, BiSS devices **can be switched over to SSI mode**.

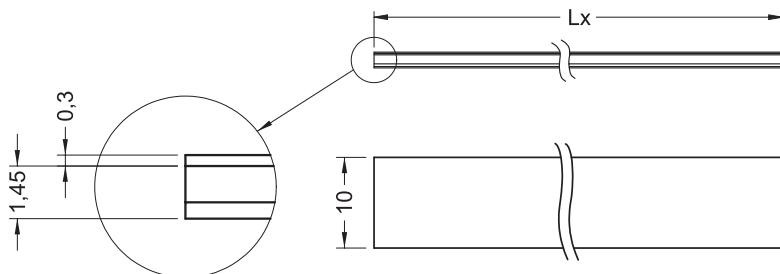


LINEPULS System combinations

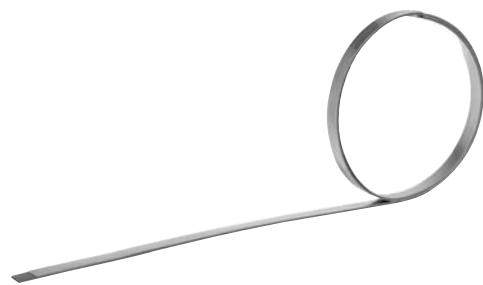


series

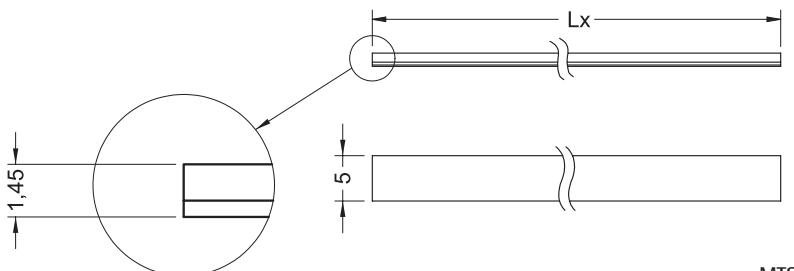
MT • MTS



MT



MT•MTS



MTS

- Flexible magnetic scale with adhesive tape and cover strip
- Resistant to debris, liquids and oils

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-40°C ÷ +120°C (-40°F, +248°F)
Storage temperature range:	-40°C ÷ +120°C (-40°F, +248°F)
Protection:	IP67

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Material:	plastic and steel
Accuracy class:	±85 / ±35 / ±8 µm/m (11 ± 1) µm/K
Temperature coefficient:	
Length:	MT max. 100 m, MTS max. 30 m
Polar pitch:	MT/MTS50 : 5,0 mm, MT/MTS40 : 4,0 mm, MT32 : 3,2 mm MT/MTS20 : 2,0 mm, MT/MTS25 : 2,5 mm, MT10 : 1,0 mm

ACCESSORIES

PS1-1,0:	Protection profile
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ORDERING CODE

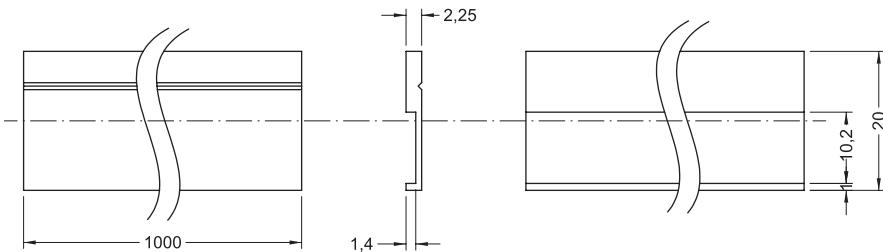
XXXX	-	X	-	X	-	X
SERIES						
MT40		1				
MT32		2				
MT10		4				
MT/MTS50		10				
MT/MTS25		20				
MT/MTS20		30				
(only MT) 50,0 m		50				
(only MT) 100,0 m		100				
LENGTH						
ACCURACY CLASS						
COVER STRIP						



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• Data-sheet
• User manual

series

PS1 • PSG



PS1

MECHANICAL SPECIFICATIONS

Dimensions:

see drawing

Material:

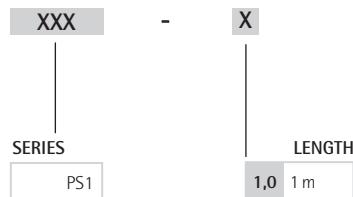
aluminium

Length:

1 m

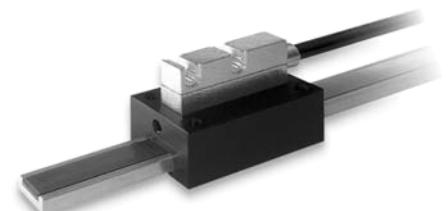
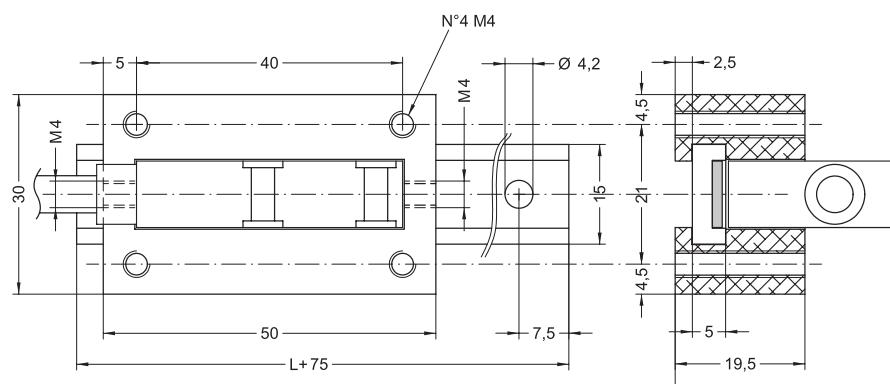
- Protection profile for MT50, MT40 or MT32

ORDERING CODE



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- Data-sheet
- User manual



PSG

MECHANICAL SPECIFICATIONS

Dimensions:

see drawing

Material:

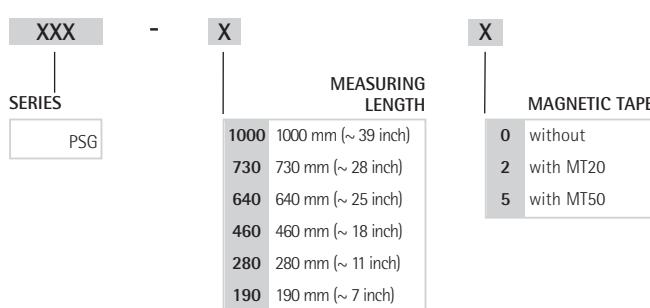
aluminium, plastic

Measuring length:

Stroke + 75 mm

- Rail and cursor for magnetic sensors series SME2, SME5, SMK

ORDERING CODE



www.lika.biz

- Data-sheet
- User manual

LINEPULS

Magnetic rings

series

MRI/xxx



- Modular, flexible and robust encoder ring systems in combination with magnetic sensors
- Custom specific designs available up to 600 mm outside diameter



MRI/xxx



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• Data-sheet
• User manual

ENVIRONMENTAL SPECIFICATIONS

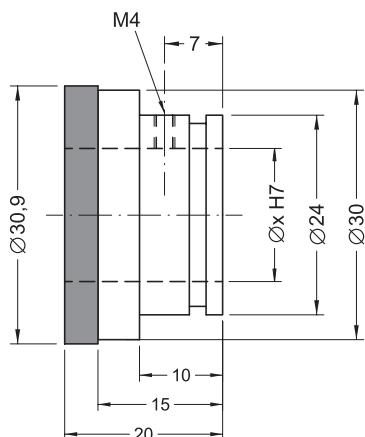
Operating temperature range:	-40°C ÷ +120°C (-40°F +248°F)
Storage temperature range:	-40°C ÷ +120°C (-40°F +248°F)
Protection:	IP67

MECHANICAL SPECIFICATIONS

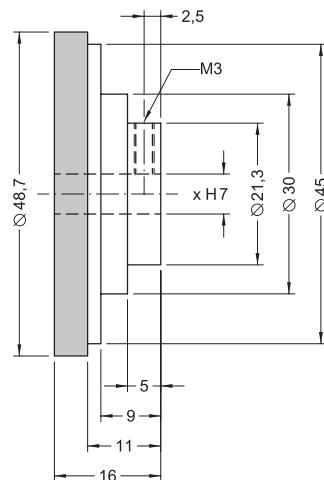
Dimensions:	see drawing
Ring support:	Aluminium or steel
Rotational speed:	MRI/31, MRI/48 = 20000 rpm max. MRI/114, MRI/284 = 1500 rpm max.
Magnetic poles:	see ordering code
System accuracy:	± 0,1°
Repeatability:	±1 increment

ACCESSORIES

SME2:	Magnetic sensor
SME1:	Magnetic sensor
SME5:	Magnetic sensor
SMS:	Magnetic sensor
SMX:	Magnetic sensor



MRI/31



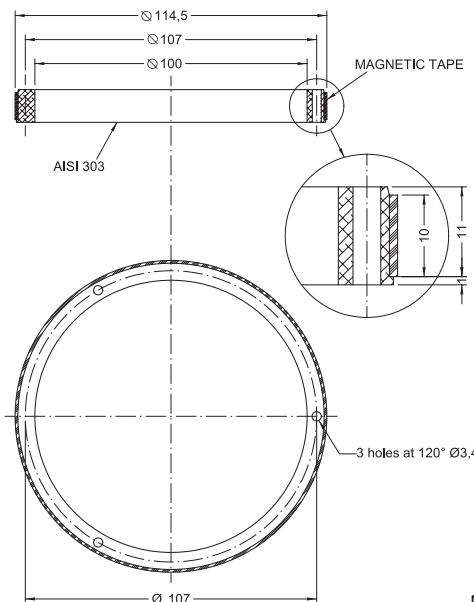
MRI/48

OREDERING CODE

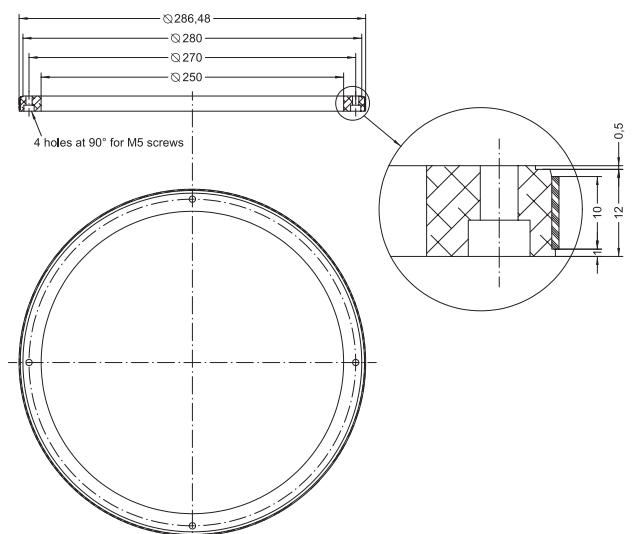
XXX	-	XX	-	XX	
SERIES					
MRI/31					
MAGNETIC POLES/PITCH				SHAFT-Ø	
48 Pole/poli @ 2 mm	48-2			16	16 mm
20 Pole/poli @ 5 mm	20-5			19	19 mm

ORDERING CODE

XXX	-	XX	-	X	
SERIES					
MRI/48					
MAGNETIC POLES/PITCH				SHAFT-Ø	
32 Pole/poli @ 5 mm	32-5			6	6 mm



MRI/114



MRI/284

ORDERING CODE

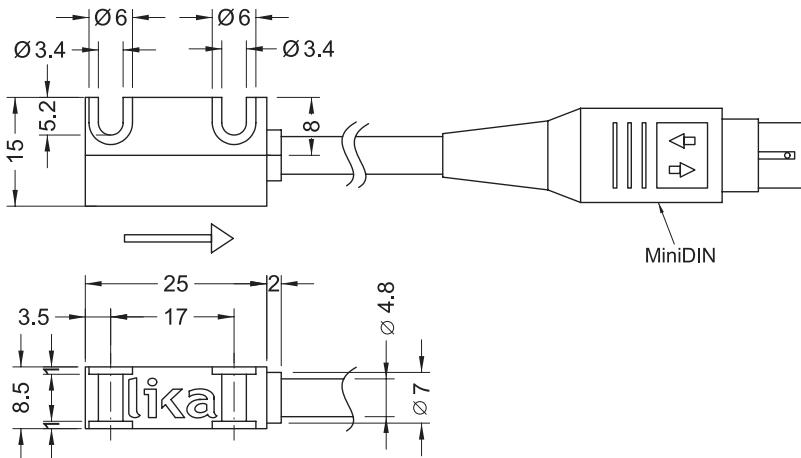
XXX	-	XX	-	XXX	
SERIES					
MRI/114					
MAGNETIC POLES/PITCH				SHAFT-Ø	
72 Pole/poli @ 5 mm	72-5			100	100 mm
182 Pole/poli @ 2 mm	182-2				

ORDERING CODE

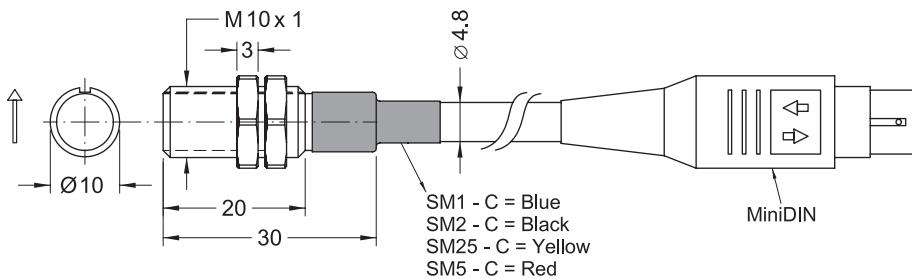
XXX	-	XX	-	XXX	
SERIES					
MRI/284					
MAGNETIC POLES/PITCH				SHAFT-Ø	
900 Pole/poli @ 1 mm	900-1			250	250 mm
450 Pole/poli @ 2 mm	450-2				
180 Pole/poli @ 5 mm	180-5				

series

SMx



SM-R



SM-C

- Compact sensors with connectors for position displays and interpolation boxes

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range: $-25^{\circ}\text{C} \div +85^{\circ}\text{C}$ ($-13^{\circ}\text{F} \div +185^{\circ}\text{F}$)

Storage temperature range: $-25^{\circ}\text{C} \div +85^{\circ}\text{C}$ ($-13^{\circ}\text{F} \div +185^{\circ}\text{F}$)

Protection: IP67

MECHANICAL SPECIFICATIONS

Dimensions: see drawing

Housing: aluminium

Connections: MiniDIN

Cable length: max. 20 m (SM25 max. 2,0 m)

Gap sensor-magnetic tape: SM2 0,1 \div 1,0 mm (@ MT20)

SM25 0,1 \div 1,0 mm (@ MT25)

SM5 0,1 \div 2,0 mm (@ MT50)

Travel speed: max 16 m/s

ACCESSORIES

EBOX (SM5): Converter

LD120 (SM5): LED Display

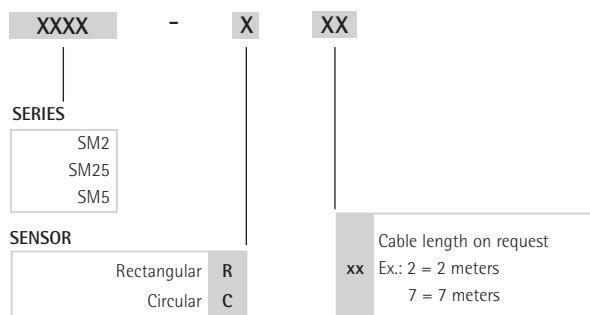
LD200 (SM2, SM5): LED Display

LD140 (SM25): Battery Display

MT20/MT25/MT50: Magnetic tape

PS1: Protection profile

ORDERING CODE



- Data-sheet
- User manual

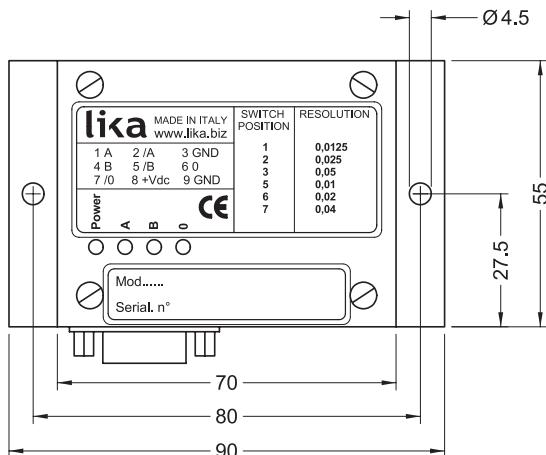
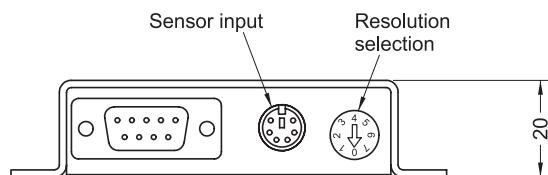
LINEPULS

Electronic converter for SM5 sensors

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series

EBOX



EBOX

- Interpolation box for magnetic sensors
- Variable resolution and output types

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP40

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connections:	DSUB 9 pin
Resolution:	0,05 / 0,025 / 0,02 / 0,0125 / 0,01 mm
System accuracy (after automatic gain + offset regulation):	± 1 increment
Repeatability:	± 1 increment

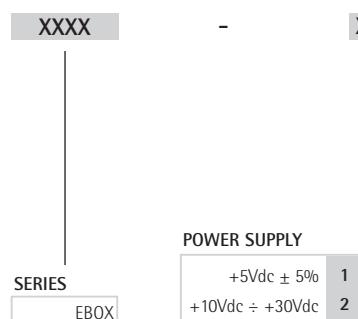
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ± 5%, +10Vdc ÷ +30Vdc
Output circuits:	Line Driver, Push-Pull
Output signals:	A, /A, B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5Vdc Version)

ACCESSORIES

EDE9P:	Mating connector
SM5:	Magnetic sensor
MT50:	Magnetic tape
PS1:	Protection profile
LKM-1089:	Fixing plate

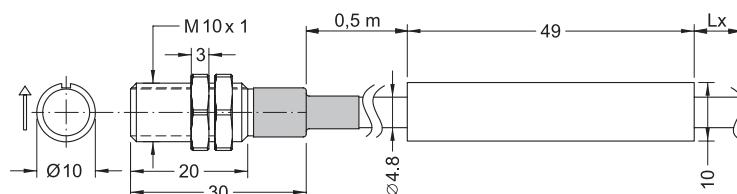
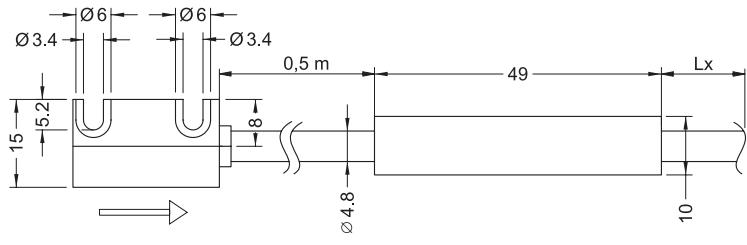
ORDERING CODE



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• Data-sheet
• User manual

series

SMBx



SMBx-R

- Compact sensors with in-line external interpolator
- IP67 protection
- Resolution up to 5 µm

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connections:	cable 2,0 m
Gap sensor-magnetic tape:	SMB2 0,1 ÷ 1,0 mm SMB5 0,1 ÷ 2,0 mm
Travel speed:	max 16 m/s
Resolution:	0,1 / 0,01 / 0,005 mm
System accuracy:	±15 µm max.
Repeatability :	±1 increment

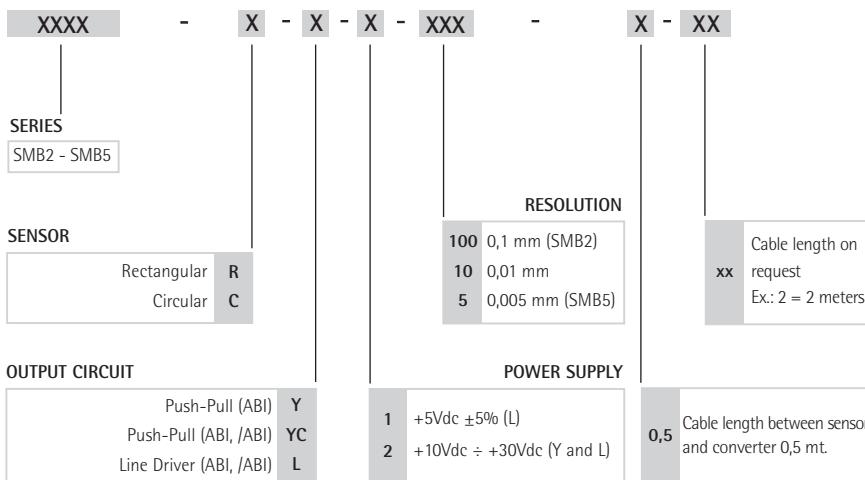
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ±5%, +10Vdc ÷ +30Vdc
Output circuits:	Line Driver, Push-Pull
Output signals:	A, /A, B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5Vdc version)

ACCESSORIES

MT50:	Magnetic tape
MT20:	Magnetic tape
PS1:	Protection profile

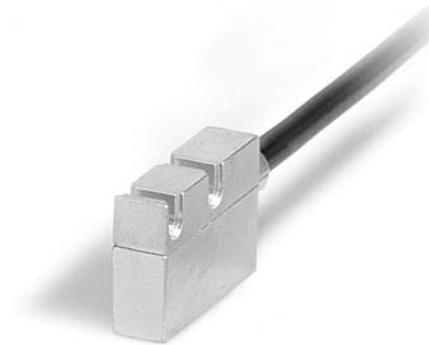
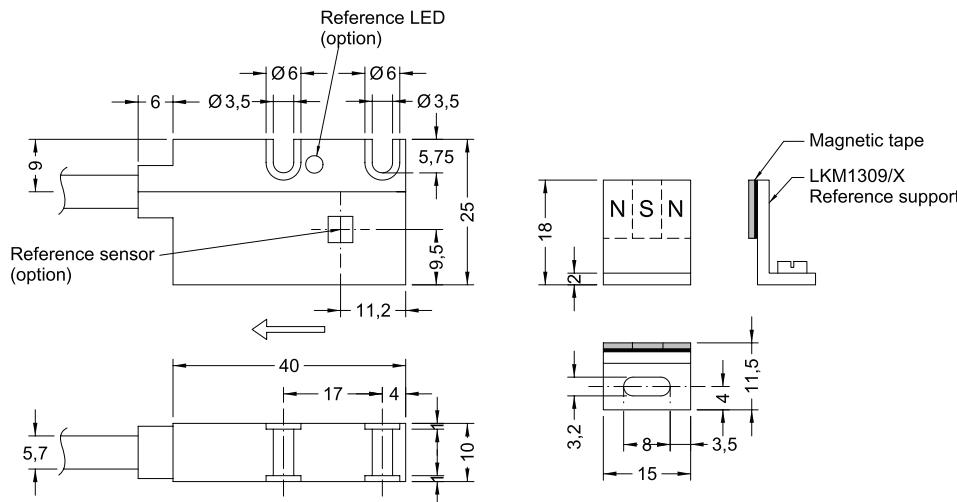
ORDERING CODE



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• Data-sheet
• User manual

series

SME5



SME5

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

- Robust sensor for linear and angular measurements
- Gap clearance up to 2.0 mm
- IP67 protection
- Speed proportional output signals
- Resolution up to 5 µm

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connections:	Cable 2,0 m
Gap sensor-magnetic tape:	0,1 ÷ 2,0 mm
Travel speed:	max 16 m/s
Resolution:	0,05 / 0,04 / 0,025 / 0,02 / 0,01 / 0,005 mm
System accuracy:	±15 µm max.
Repeatability:	±1 increment

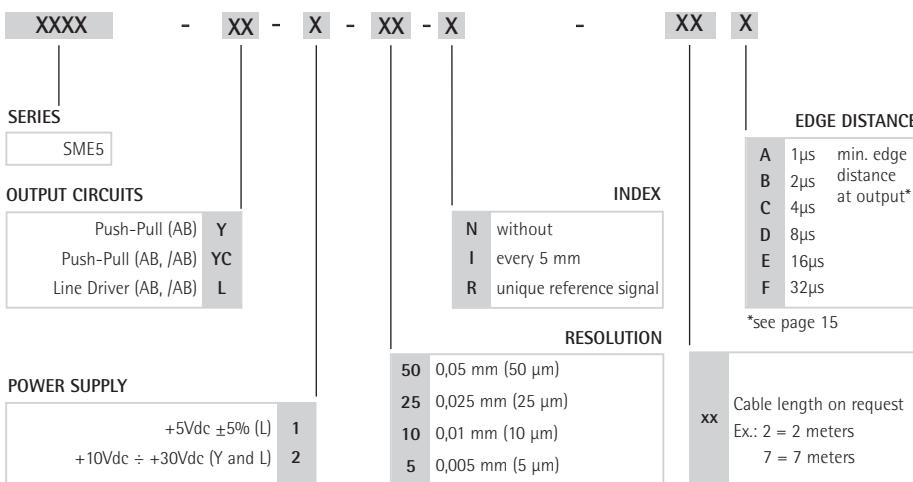
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ±5%, +10Vdc ÷ +30Vdc
Output circuits:	Line Driver, Push-Pull
Output signals:	A, A/B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5Vdc version) and short-circuit

ACCESSORIES

MT50:	Magnetic tape
LKM1309/5:	Reference pole support
PS1:	Protection profile
MRI:	Magnetic ring

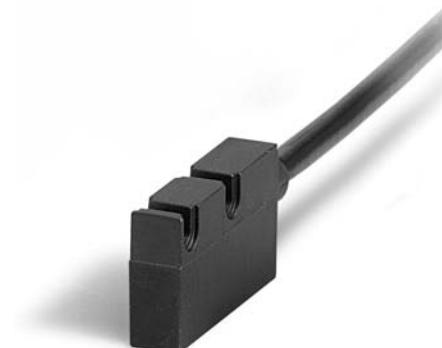
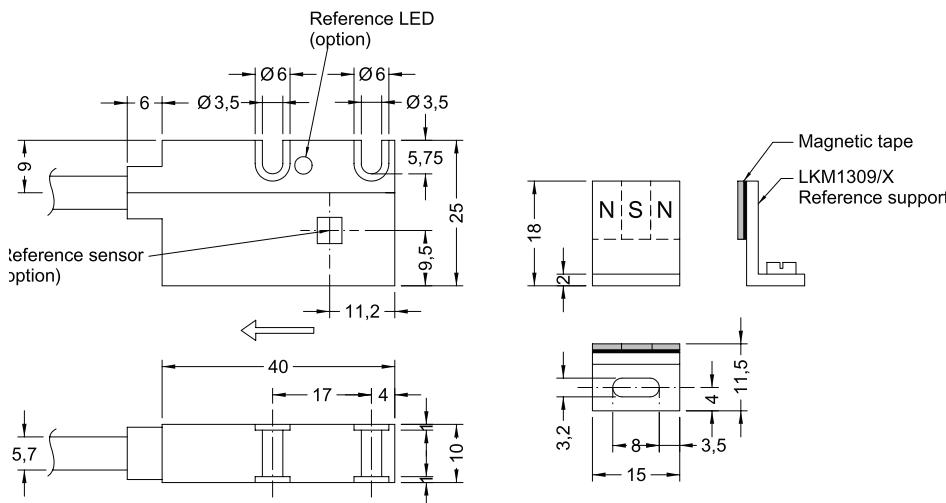
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SME2



SME2

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connection:	cable 2,0 m
Gap sensor-magnetic tape:	0,1 ÷ 1,0 mm
Travel speed:	max. 16 m/s
Resolution:	0,1 / 0,05 / 0,025 / 0,01 / 0,002 mm
System accuracy:	±15 µm max.
Repeatability:	±1 increment

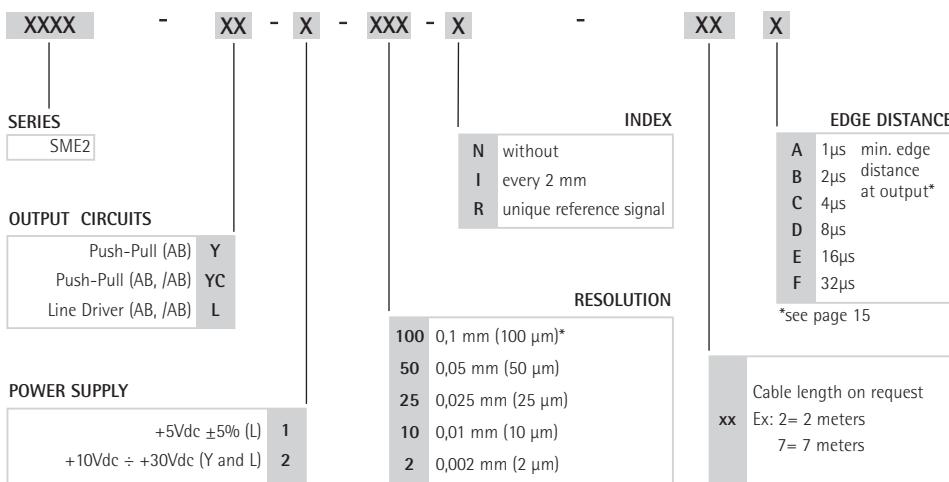
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ±5%, +10Vdc ÷ +30Vdc
Output circuits:	Line Driver, Push-Pull
Output signals:	A, /A, B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5Vdc version) and short-circuit

ACCESSORIES

MT20:	Magnetic tape
LKM-1309/2:	Reference pole support
MRI:	Magnetic ring
PS1:	Protection profile

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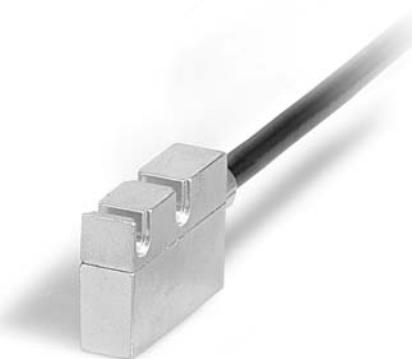
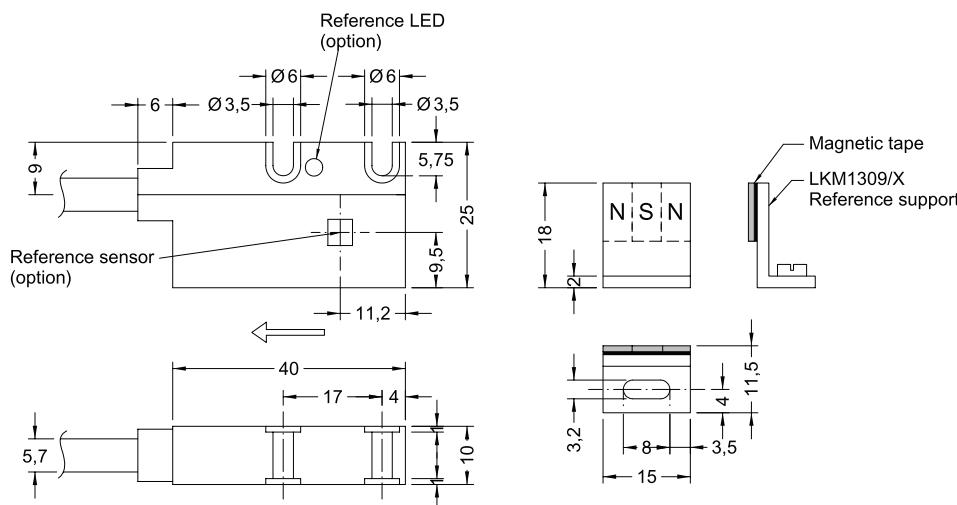
* Not in combination with "R"



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SME1



SME1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

- Magnetic sensor for linear and torque motors
- IP67 protection
- Speed proportional output signals
- Resolution up to 0.5 µm

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connection:	cable 2,0 m
Gap sensor-magnetic tape (without cover strip):	0,1 ÷ 0,5 mm
Travel speed:	max 16 m/s
Resolution:	0,01 / 0,005 / 0,002 / 0,001 / 0,0005 mm
System accuracy:	±15 µm max.
Repeatability:	±1 increment

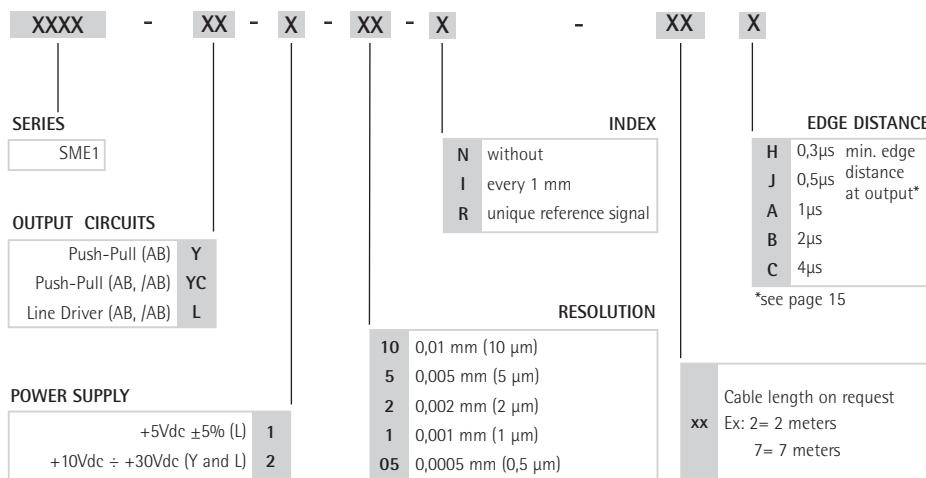
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ±5%, +10Vdc ÷ +30Vdc
Output circuits:	Line Driver, Push-Pull
Output signals:	A, /A, B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5Vdc version) and short-circuit

ACCESSORIES

MT10:	Magnetic tape
LKM-1309/1:	Reference pole support
MRI:	Magnetic ring

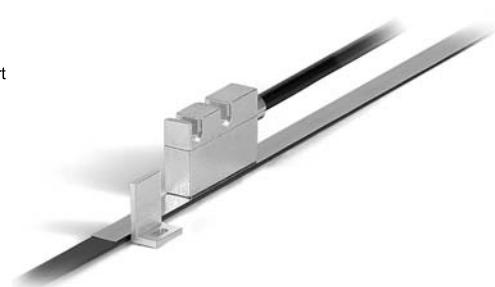
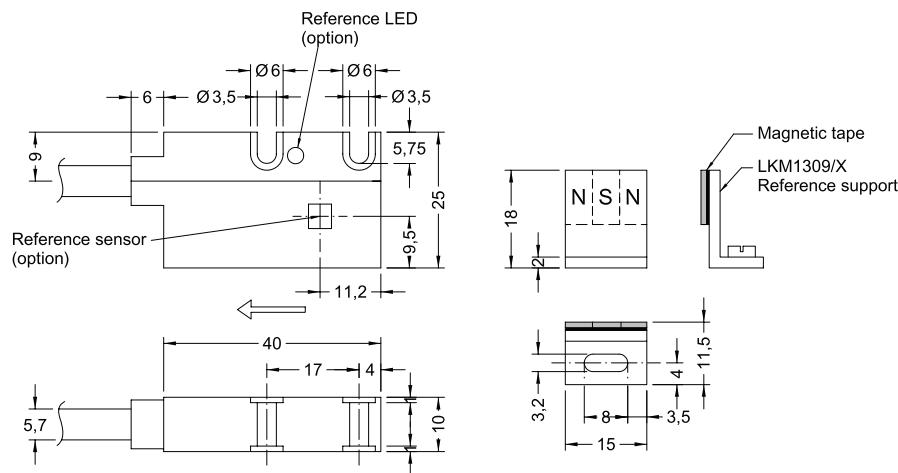
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SMS



SMS

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F, +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F, +212°F)
Protection:	IP67

- Magnetic sensor for linear and torque motors
- Sine-Cosine 1Vpp real-time output
- Unaffected by dust, debris or liquids
- IP67 protection
- Easy installation
- Signal period of 1000 µm

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connection:	cable 2,0 m
Gap sensor-magnetic tape (without cover strip):	0,1 ÷ 0,5 mm
Travel speed:	max 16 m/s
Period length:	1 mm
Repeatability :	±1 increment

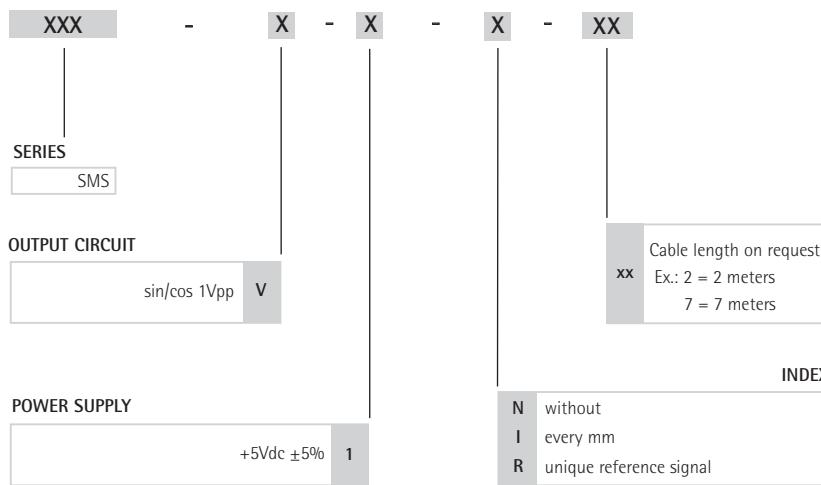
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ±5%
Output circuits:	1Vpp
Output signals:	sine/cosine, ref
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against short-circuit

ACCESSORIES

MT10:	Magnetic tape
LKM-1309/1:	Reference pole support

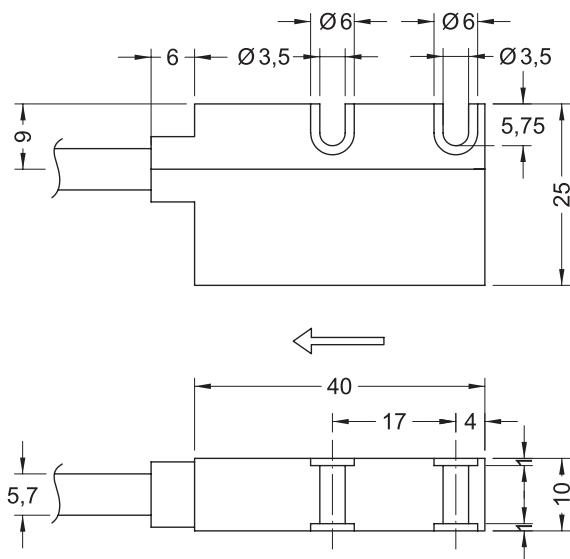
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SHD5 • SHD2 • SHD1



SHD5•SHD2•SHD1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

- Magnetic sensor for linear and torque motors
- Speed proportional output signals
- Automatic gain and offset regulation
- Resolution up to 1 µm

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connection:	cable 2,0 m
Gap sensor-magnetic tape:	0,1 ÷ 2,0 mm @ SHD5 0,1 ÷ 1,0 mm @ SHD2 0,1 ÷ 0,4 mm @ SHD1
Travel speed:	max. 16 m/s
Resolution:	0,001 mm max.
System accuracy (after automatic gain + offset regulation):	±1 increment
Repeatability:	±1 increment

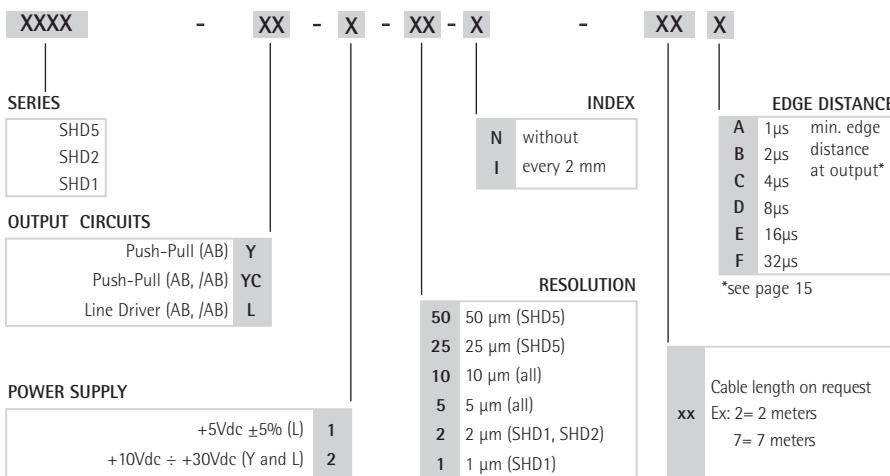
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ±5%, +10Vdc ÷ +30Vdc
Output circuits:	Line Driver, Push-Pull
Output signals:	A, /A, B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5Vdc version) and short-circuit

ACCESSORIES

MT50:	Magnetic tape
MT20:	Magnetic tape
MT10:	Magnetic tape
MRI:	Magnetic ring

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*see page 15

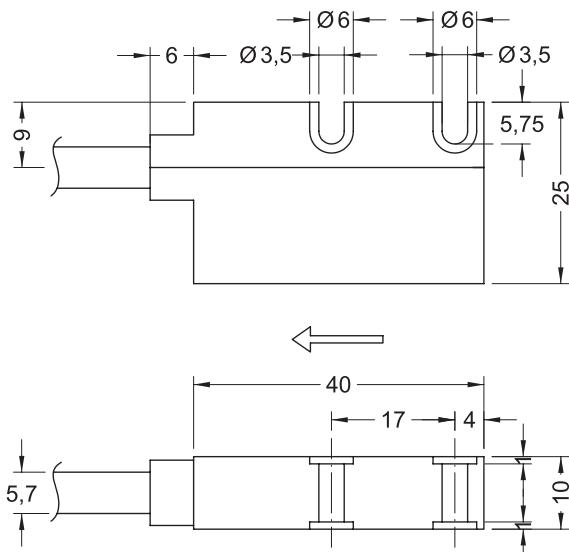
x x
Cable length on request
Ex: 2= 2 meters
7= 7 meters



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SMK



SMK

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

- Robust magnetic sensor for linear applications
- Gap clearance up to 4.0 mm
- IP67 protection
- Resolution up to 0.01 mm
- Special resolutions possible

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connection:	cable 2,0 m
Gap sensor-magnetic tape:	0,1 ÷ 4,0 mm
Travel speed:	2,5 m/s max.
Resolution:	1 / 0,5 / 0,1 / 0,05 / 0,025 / 0,01 mm
System accuracy:	±25 µm max.
Repeatability:	±1 increment

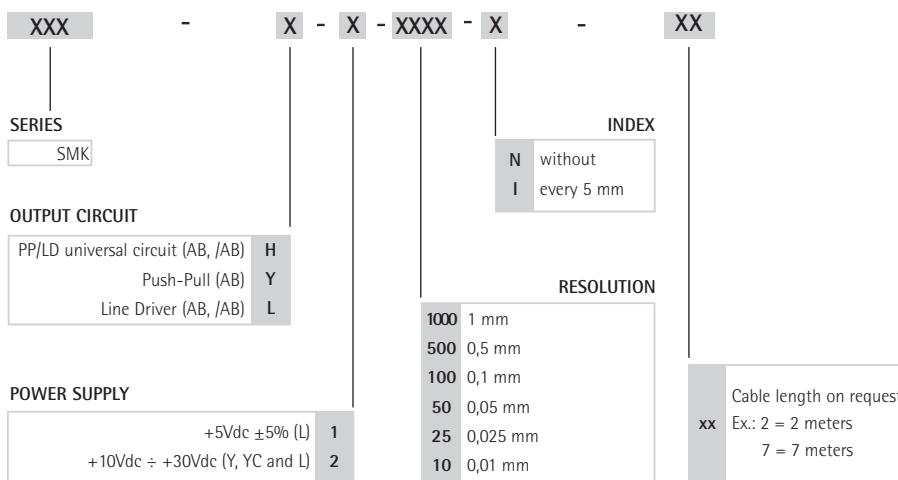
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ±5%, +10Vdc ÷ +30Vdc
Output circuits :	Line Driver, Push-Pull
Output signals :	A, /A, B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5Vdc version) and short-circuit

ACCESSORIES

MT50:	Magnetic tape
PS1:	Protection profile

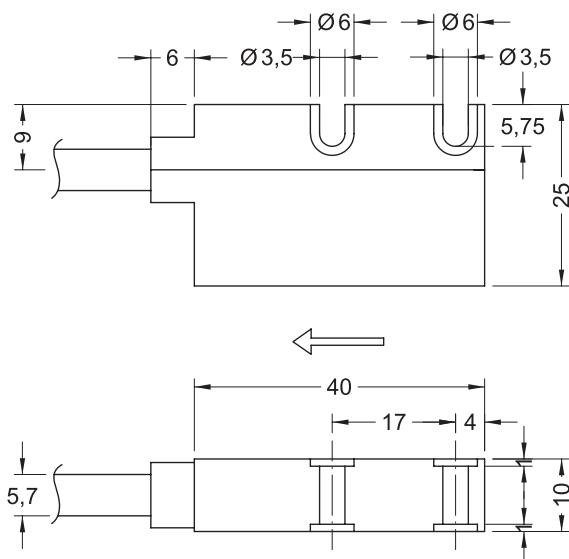
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SML • SMH



SML • SMH

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F, +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F, +212°F)
Protection:	IP67

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connection:	cable 2,0 m
Gap sensor-magnetic tape:	0,1 ÷ 2,0 mm
Travel speed:	max 5 m/s
Resolution:	0,1 mm
System accuracy:	±25 µm max.
Repeatability:	1 increment

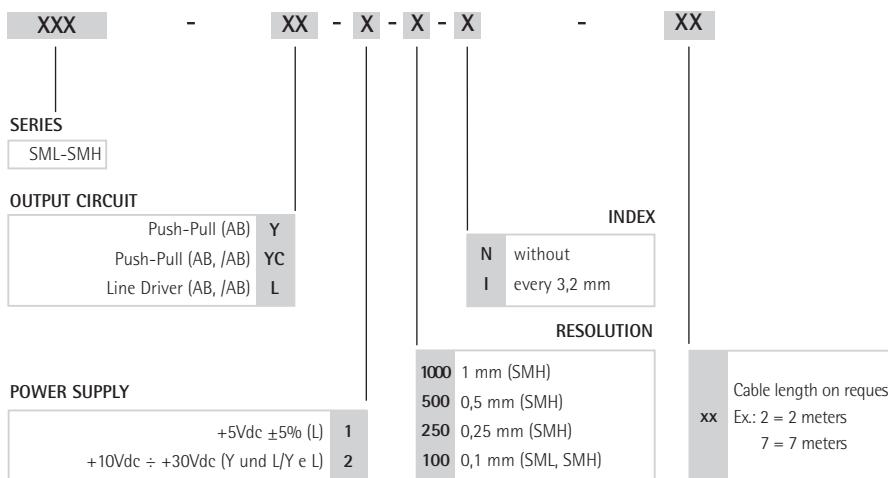
ELECTRICAL SPECIFICATIONS

Power supply:	+5V ±5%, +10V ÷ +30V
Output circuits:	Line Driver, Push-Pull
Output signals:	A, /A, B, /B, I, /I
Output current (per channel):	40 mA max
Input current:	70 mA max
Protection:	against inversion of polarity (except 5V version)

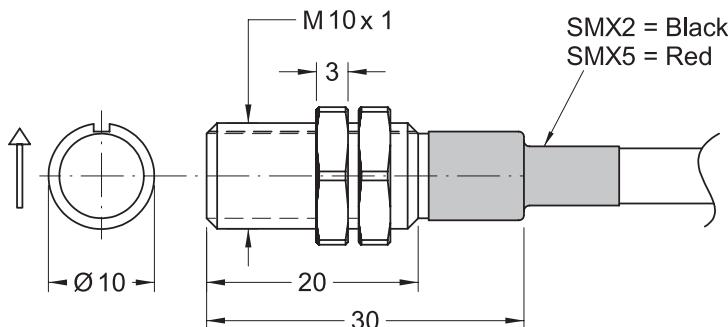
ACCESSORIES

MT32 @ SML:	Magnetic tape
MT40 @ SMH:	Magnetic tape
PS1:	Protection profile

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SMX

- Heavy-duty magnetic sensor
- Quadrature output
- AB signals
- Universal output circuit (Push-Pull & Line Driver)
- M10 steel case
- Gap clearance up to 3.0 mm

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-10°C ÷ +70°C (+14°F ÷ +158°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F ÷ +176°F)
Protection:	IP67

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	steel
Cable length:	1 m
Gap sensor-magnetic tape:	SMX2 = 0,1 ÷ 2,0 mm SMX5 = 0,1 ÷ 3,0 mm
Resolution:	1 pulse each pair of poles (N-S)

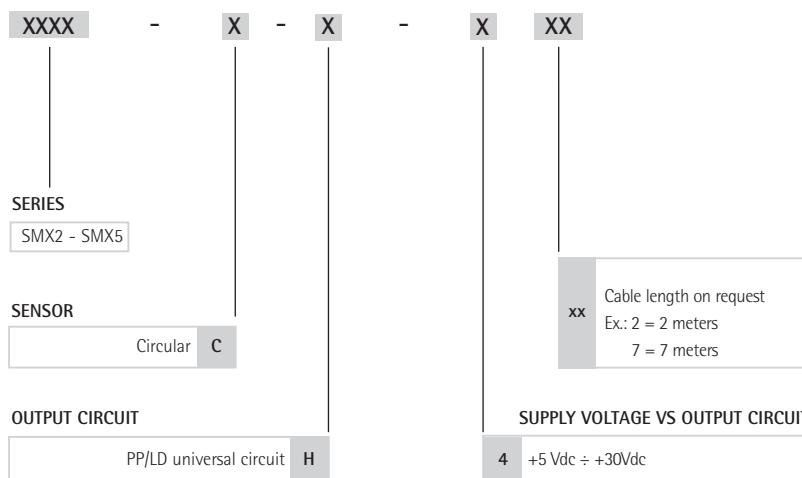
ELECTRICAL SPECIFICATIONS

Power supply:	+5Vdc ÷ +30Vdc
Output circuit:	PP/LD universal circuit
Output signals:	A, /A, B, /B
Output frequency:	7.5 kHz max.
Output current (per channel):	40 mA max
Input current:	50 mA max

ACCESSORIES

MT20 (SMX2):	Magnetic tape
MT50 (SMX5):	Magnetic tape
MRI:	Magnetic rings
MC111:	LED Display

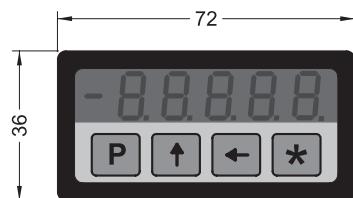
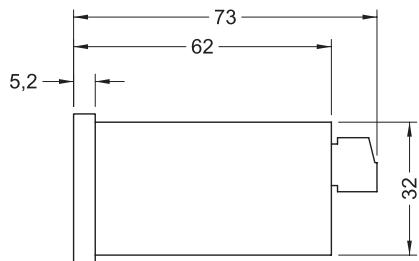
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LD120



LD120 + SM5

- Compact LED display for magnetic sensors
- RS485 interface
- Panel mount
- Resolution up to 0.01 mm

PARAMETERS

3 Offset values, preset, resolution, decimal point, mm/inch, counting direction

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	0°C ÷ +50°C (+32°F, +122°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F, +176°F)
Protection:	IP60 front, IP40 back

MECHANICAL SPECIFICATIONS

Dimensions:	72 x 36 x 62 mm
Cut out:	68 x 33 mm ²
Display:	LED, 10 mm (-99999 ÷ 99999)

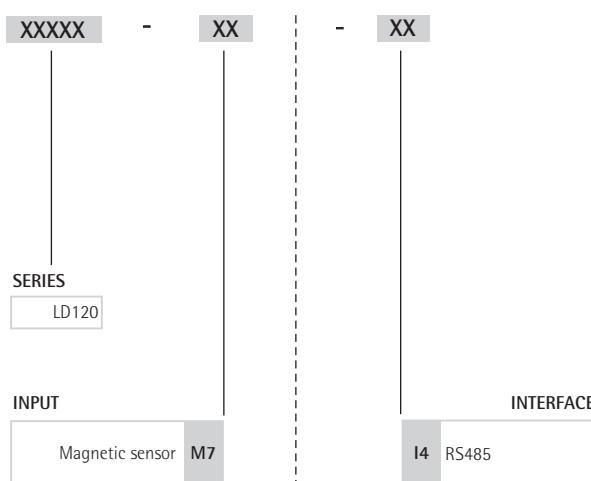
ELECTRICAL SPECIFICATIONS

Power supply:	+10Vdc ÷ +30Vdc
Consumption:	800 mW
Measurement speed:	<5 m/s max.
Input circuit:	SM5 Magnetic sensor
Interface:	RS485 (optional)

ACCESSORIES

SM5:	Magnetic sensor
MT50:	Magnetic tape
PS1:	Protection profile

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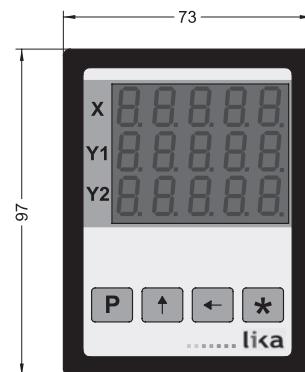
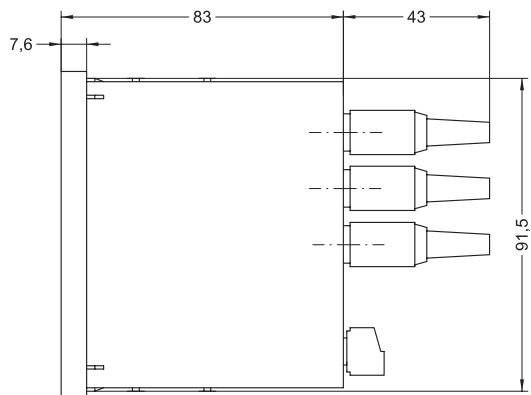
LINEPULS

3 axis LED Display for SM5 magnetic sensors

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LD130



LD130

- Compact 3 axis LED display
- RS485 interface
- Panel mount
- Resolution up to 0.01 mm
- Actual/target position difference display
- Low power mode for position backup

PARAMETERS

Offset, preset, target position, resolution, counting direction, device address

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	0°C ÷ +50°C (+32°F, +122°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F, +176°F)
Protection:	IP60 front, IP40 back

MECHANICAL SPECIFICATIONS

Dimensions:	97 x 73 x 83 mm
Cut out:	91,5 x 67,5 mm ²
Display:	3 x LED, 10 mm (-99999 ÷ 99999)

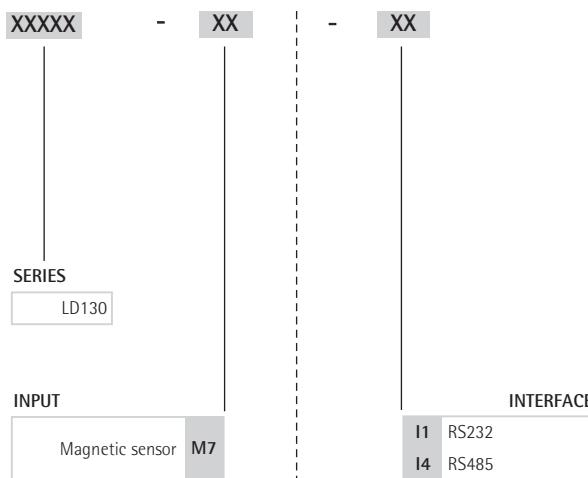
ELECTRICAL SPECIFICATIONS

Power supply:	+10Vdc ÷ +30Vdc
Consumption:	4.800 mW (480 mW sleep mode)
Measurement speed:	5 m/s max.
Input circuit:	3 x SM5 magnetic sensor
Interface:	RS485, RS232

ACCESSORIES

SM5:	Magnetic sensor
MT50:	Magnetic tape
PS1:	Protection profile

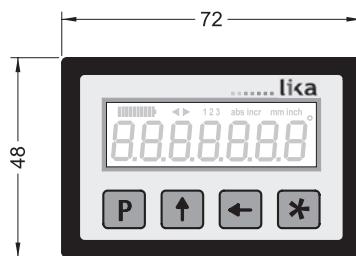
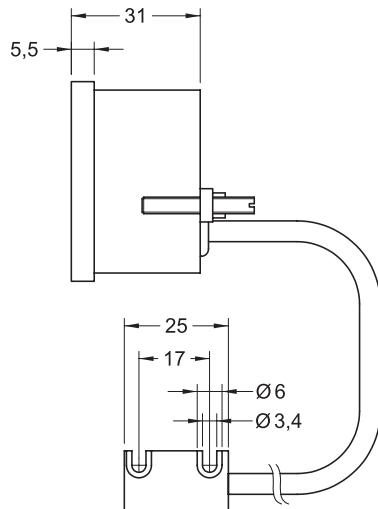
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LD112



LD112

- Quasi-absolute battery powered display
- Compact housing
- Connected sensor
- Linear and angular display mode
- Resolution up to 0.01 mm

PARAMETERS

3 Offset values, preset, resolution, mm/inch, angular display mode

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	0°C ÷ +50°C (+32°F, +122°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F, +176°F)
Protection:	IP60 front, IP40 back

MECHANICAL SPECIFICATIONS

Dimensions:	72 x 48 x 31 mm
Cut out:	68 x 33 mm ²
Cable length:	5 m max.
Display:	LCD (-999999 ÷ 999999)

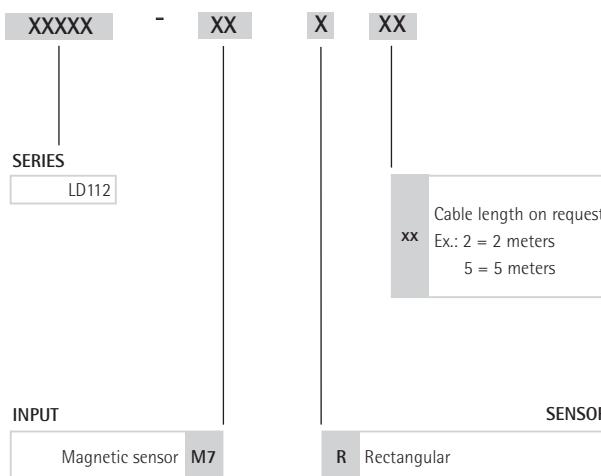
ELECTRICAL SPECIFICATIONS

Power supply:	2 batteries 1,5 V
Consumption:	~ 220 µA
Measurement speed:	< 5 m/s max.

ACCESSORIES

MT25:	Magnetic tape
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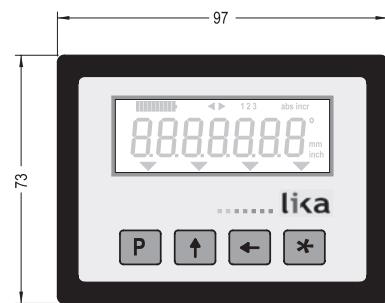
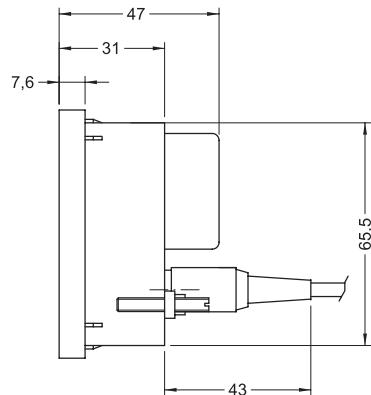
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LD140



LD140 + SM25

PARAMETERS

3 Offset values, preset, resolution, mm/inch, angular display mode

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	0°C ÷ +50°C (+32°F, +122°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F, +176°F)
Protection:	IP60 front, IP40 back

MECHANICAL SPECIFICATIONS

Dimensions:	96 x 73 x 47 mm
Cut out:	91,5 x 67,5 mm ²
Display:	LCD, 14 mm (-999999 ÷ 999999)

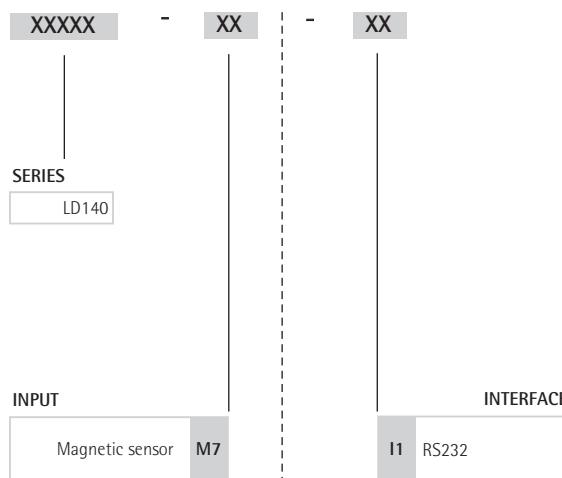
ELECTRICAL SPECIFICATIONS

Power supply:	1,5 V battery
Consumption:	~ 700 µA
Measurement speed:	< 5 m/s max.
Input circuit:	SM25 magnetic sensor
Interface:	RS232 (optional)

ACCESSORIES

SM25:	Magnetic sensor
MT25:	Magnetic tape
PF4012:	Fixing support

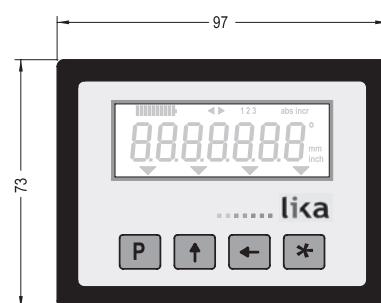
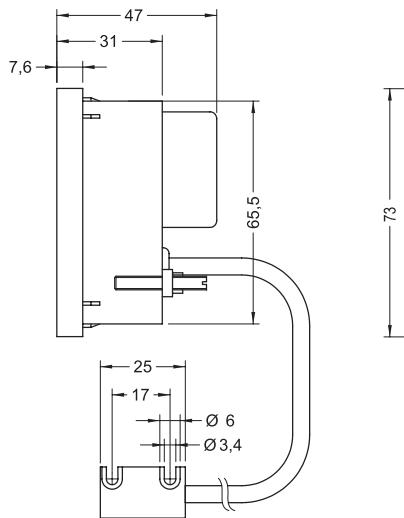
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LD142



LD142 + SM25

PARAMETERS

3 Offset values, preset, resolution, mm/inch, angular display mode

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	0°C ÷ +50°C (+32°F, +122°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F, +176°F)
Protection:	IP60 front, IP40 back

MECHANICAL SPECIFICATIONS

Dimensions:	96 x 73 x 47 mm
Cut out:	91,5 x 67,5 mm ²
Cable length:	5 m max.
Display:	LCD, 14 mm (-999999 ÷ 999999)

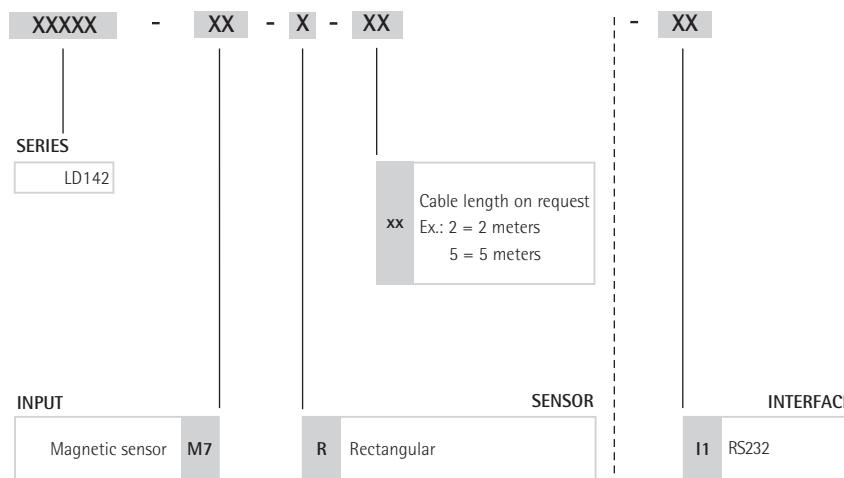
ELECTRICAL SPECIFICATIONS

Power supply:	1,5 V battery
Consumption:	700 µA
Measurement speed:	< 5 m/s max.
Input circuit:	SM25 magnetic sensor
Interface:	RS232 (optional)

ACCESSORIES

PF4012:	Fixing support
MT25:	Magnetic tape

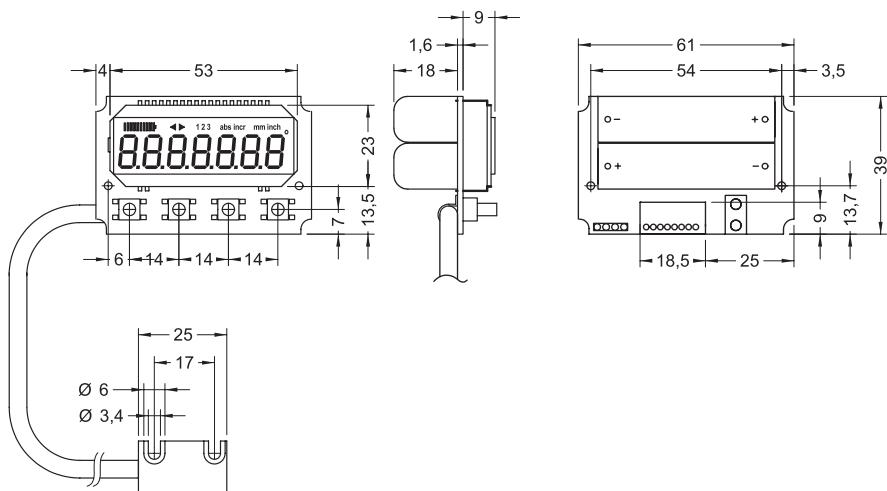
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LD111



LD111

- Quasi-absolute battery powered display
- Ultracompact OEM version
- Connected sensor
- Mm-inch-degree mode
- Resolution up to 0.01 mm

PARAMETERS

3 Offset values, preset, resolution, mm/inch, angular display mode

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	0°C ÷ +50°C (+32°F, +122°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F, +176°F)
Protection:	IP00

MECHANICAL SPECIFICATIONS

Dimensions:	61 x 39 x 25 mm
Cable length:	5 m max.
Display:	LCD (-999999 ÷ 999999)

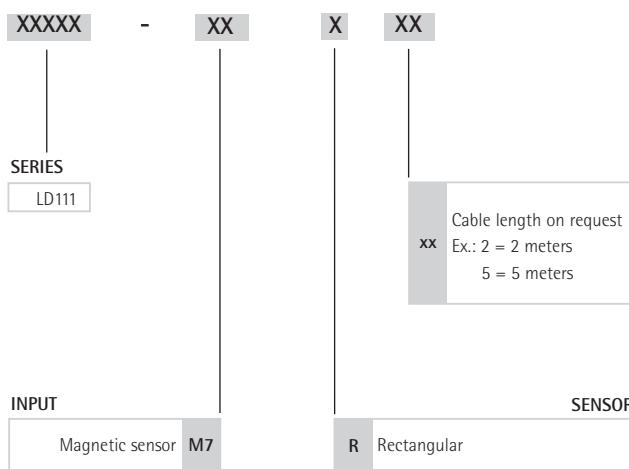
ELECTRICAL SPECIFICATIONS

Power supply:	2 battery 1,5 V
Consumption:	~ 220 µA
Measurement speed:	< 5 m/s max.

ACCESSORIES

MT25:	Magnetic tape
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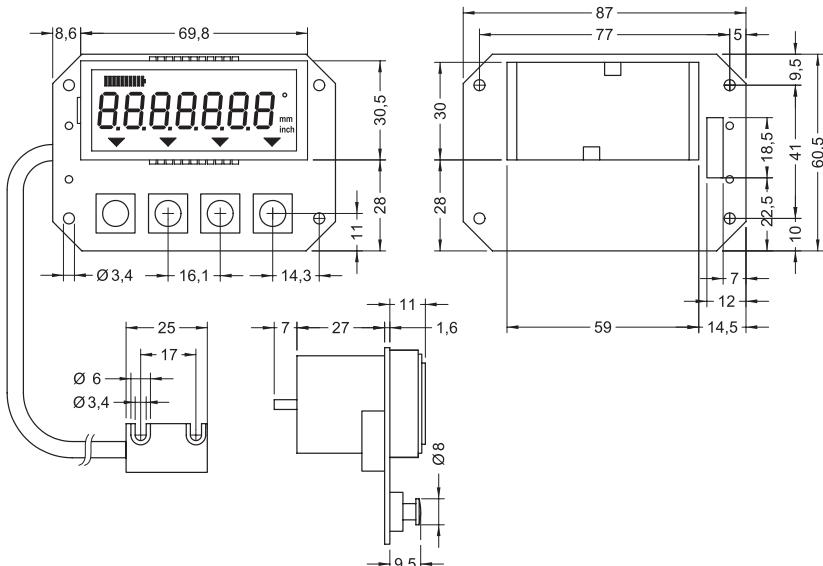
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LD141



LD141

PARAMETERS

3 Offset values, preset, resolution, mm/inch, angular display mode

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	0°C ÷ +50°C (+32°F ÷ +122°F)
Storage temperature range:	-20°C ÷ +80°C (-4°F ÷ +176°F)
Protection:	IP00

MECHANICAL SPECIFICATIONS

Dimensions:	87 x 61 x 43 mm
Cable length:	5 m max.
Display:	LCD, 14 mm (-999999 ÷ 999999)

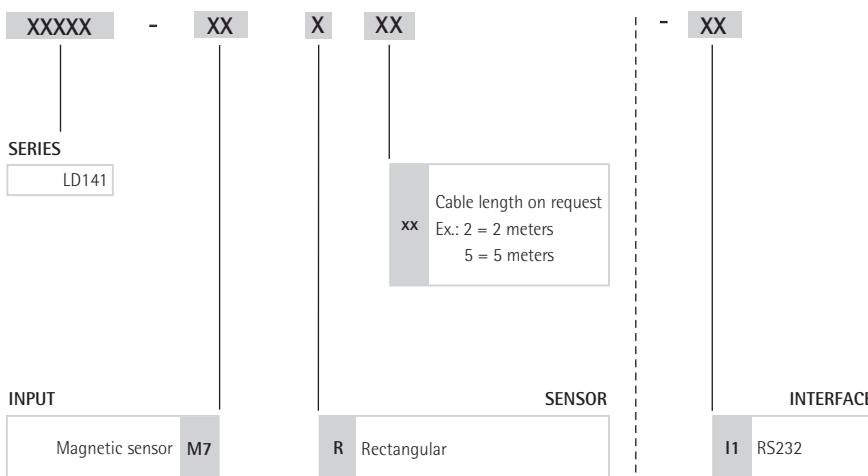
ELECTRICAL SPECIFICATIONS

Power supply:	1,5 V battery
Consumption:	~ 700 µA
Measurement speed:	< 5 m/s max.
Interface:	RS232 (optional)

ACCESSORIES

MT25:	Magnetic tape
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 • Manual

LINECOD System combinations



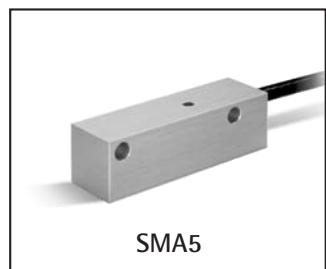
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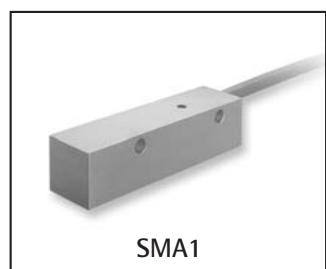
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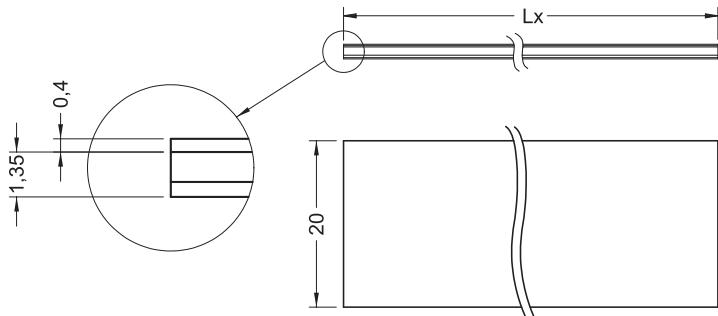


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series

MTA5 • MTA1



MTA5•MTA1

- Absolute coded magnetic scale with adhesive tape
- Resistant to debris, liquids and oils

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-40°C ÷ +120°C (-40°F +248°F)
Storage temperature range:	-40°C ÷ +120°C (-40°F +248°F)
Protection:	IP67

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Material:	plastic and steel
Accuracy class:	±35 µm/m max.
Temperature coefficient:	(11 ±1) µm/K
Length:	5,1 m max

ORDERING CODE

XXXX	-	XX	-	XX	-	X
SERIES						
MTA5 - MTA1						
LENGTH	-		-		-	
0,1 m	-	0,1	-			
0,2 m	-	0,2	-			
...	-	...	-			
0,5 m	-	0,5	-			
1,0 m	-	1,0	-			
1,5 m	-	1,5	-			
...	-	...	-			
4,5 m	-	4,5	-			
5,1 m	-	5,1	-			
ACCURACY CLASS						
50		±35 µm/m				
COVER STRIP						
0		not supplied				
1		supplied (only MTA5)				



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• Manual

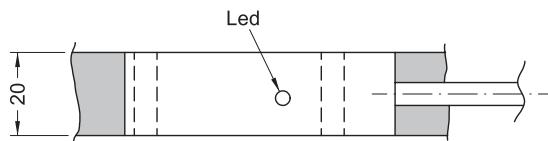
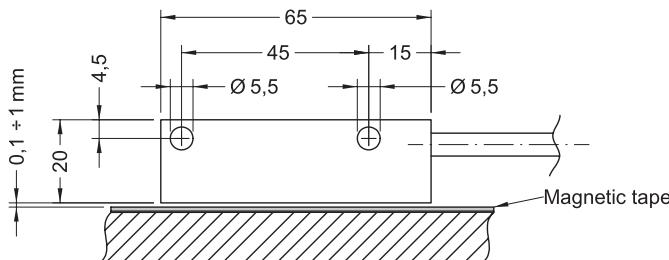
LINECOD

Absolute magnetic sensor with integrated converter

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series

SMA5



SMA5

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

- Compact absolute magnetic sensor
- SSI interface
- Resolution up to 5 µm
- Unaffected by dust, debris or liquids

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connections:	cable 2,0 m
Gap sensor-magnetic tape:	0,1 ÷ 1,0 mm
Travel speed:	max 5 m/s
Resolution:	0,1 / 0,05 / 0,01 / 0,005 mm
System accuracy:	±20 µm/m max.
Repeatability:	±1 increment
Measurement length:	5,05 m max. Measurement length = tape length - 70 mm

ELECTRICAL SPECIFICATIONS

Power supply:	+10Vdc ÷ +30Vdc
Output circuit:	Gray, SSI
Output current (per channel):	40 mA max
Input current:	1 W max
Protection:	against inversion of polarity

ACCESSORIES

MTA5:	Magnetic tape
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ORDERING CODE

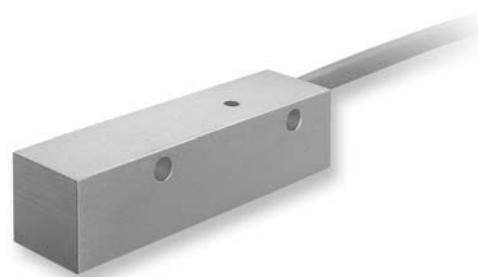
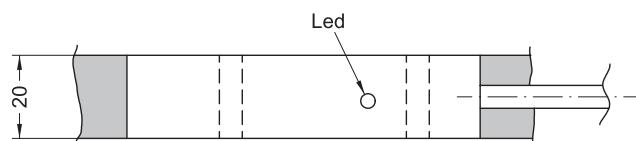
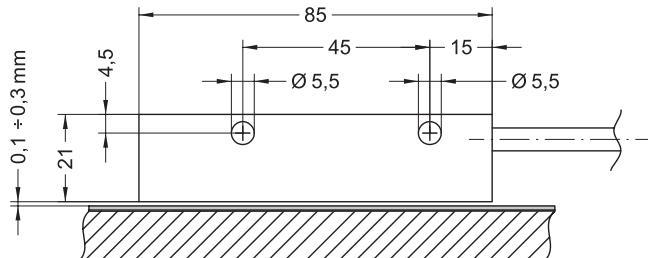
XXXX	-	X	-	XXX	-	XX		
SERIES								
SMA5								
OUTPUT CIRCUIT								
SSI Interface		GA						
							Cable length on request xx Ex: 2 = 2 meters 7 = 7 meters	
							RESOLUTION	
							100 0,1 mm 50 0,05 mm 10 0,01 mm 5 0,005 mm	



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• manual

series

SMA1



SMA1

ENVIRONMENTAL SPECIFICATIONS

Operating temperature range:	-25°C ÷ +85°C (-13°F +185°F)
Storage temperature range:	-40°C ÷ +100°C (-40°F +212°F)
Protection:	IP67

- Compact absolute magnetic sensor
- BiSS and sine/cosine interface
- Resolution programmable up to 5 µm
- Unaffected by dust, debris or liquids

MECHANICAL SPECIFICATIONS

Dimensions:	see drawing
Housing:	aluminium
Connections:	cable 2,0 m
Gap sensor-magnetic tape (without cover strip):	0,1 ÷ 0,3 mm
Travel speed:	max 5 m/s
Resolution:	absolute BiSS: 0,005 mm max. signal period 1 Vpp: 1 mm
System accuracy:	±20 µm/m max.
Repeatability:	±1 increment
Measurement length:	5,05 m max. Measurement length = Tape length - 70 mm

ELECTRICAL SPECIFICATIONS

Power supply:	+10Vdc ÷ +30Vdc
Output circuit:	BiSS, 1Vpp
Output current (per channel):	40 mA max
Input current:	1,5 W max
Protection:	against inversion of polarity

ACCESSORIES

MTA1:	Magnetic tape
-------	---------------

ORDERING CODE

XXXX	-	X	-	XXX	-	XX	
SERIES							
SMA1							
Cable length on request							
Ex.: 2 = 2 meters							
7 = 7 meters							
OUTPUT CIRCUIT	RESOLUTION						
BiSS Interface	I7	5	0,005 mm				



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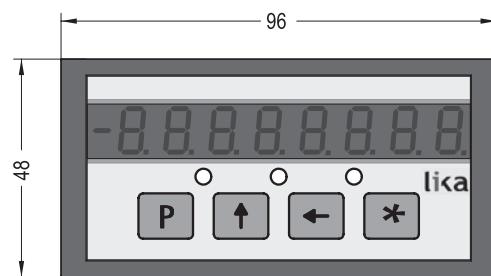
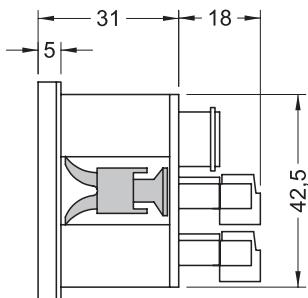
POSICONTROL

Universal display

series

LD200

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LD200

- Universal position display
- Inputs for incremental, 1Vpp, magnetic sensors or SSI signals
- Easy setup
- Counting frequency up to 500 kHz
- RS232 interface

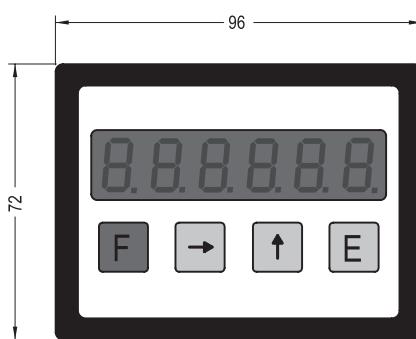
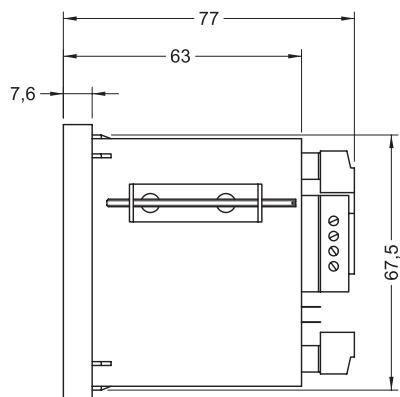
POSICONTROL

Single axis display

series

MC150

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MC150

- Position display for encoders
- Counting frequency up to a 330 kHz
- Various power supplies

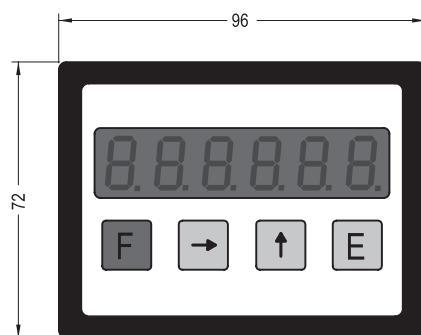
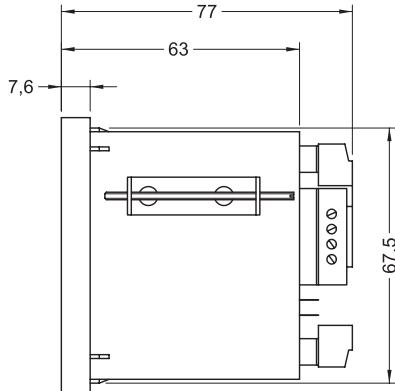
POSICONTROL

Single-axis display

series

MC111

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MC111

- Position display for encoders
- Inputs AB quadrature and analog signals

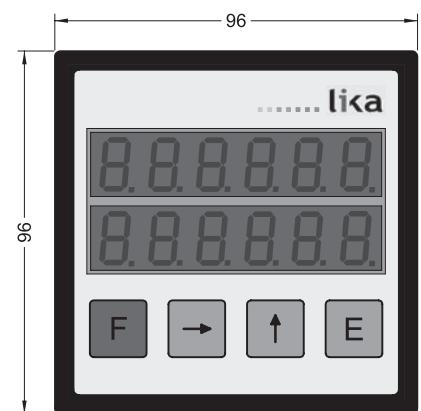
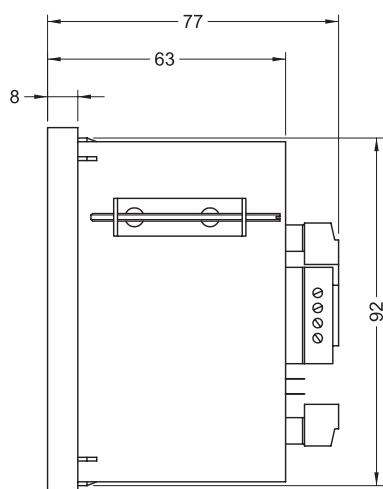
POSICONTROL

Position display

series

MC221

www.lika.biz



MC221

- 2-axis encoder display
- Compact housing
- Various power supplies

SMB, SME, SMS, SHD, SMK, SML, SMH

COLOUR	FUNCTION
Yellow	A
Bleu	/A
Green	B
Orange	/B
White	I
Grey	/I
Red	+Vdc
Black	0Vdc GND

8 leads cable

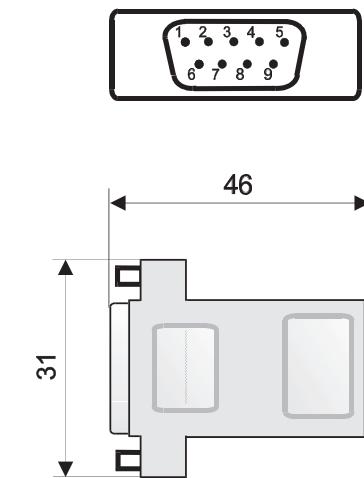
CABLE SPECIFICATIONS

Sheath material:	PUR
Outer diameter:	$\varnothing 5,4 \pm 0,2$ mm
Conductors:	6 x 0,14 + 2 x 0,22 mm ²
Screen:	Copper braiding
Conductor resistance:	0,14 mm ² : < 148 Ω /km 0,22 mm ² : < 91 Ω /km
Bending radius:	min. 50 mm
Temperature range (flexible use):	-40°C + 90°C
Acceleration:	max. 6 m/s ²
Travel speed:	max. 10 m/s
Bending cycles:	max. 1.000.000

EBOX

PIN	FUNCTION
1	A
2	/A
3	0Vdc GND
4	B
5	/B
6	I
7	/I
8	+Vdc
9	0Vdc GND

EDE9P 9 pin connector



SMX2 • SMX5

COLOUR

COLOUR	FUNCTION
Yellow	A
Orange	/A
Green	B
Brown	/B
Red	+Vdc
Black	0Vdc GND

6 wires cable (1 m, 3,3 ft)

CABLE SPECIFICATIONS

Sheath material:	PUR
Outer diameter:	$\varnothing 4,5 \pm 0,2$ mm
Conductors:	6 x 0,14 mm ²
Screen:	Copper braiding
Conductor resistance:	< 145 Ω /km
Bending radius:	min. 50 mm
Temperature range (flexible use):	-25°C + 80°C
Acceleration:	max. 4 m/s ²
Travel speed:	max. 2,5 m/s

SMA5

COLOUR	FUNCTION
yellow	Clock in +
blue	Clock in -
green	Data out +
orange	Data out -
grey	Complementary
white	Zero setting
red	+10Vdc +30Vdc
black	0Vdc GND

8 wires cable

CABLE SPECIFICATIONS

Sheath material:	PUR
Outer diameter:	$\varnothing 5,4 \pm 0,2 \text{ mm}$
Conductors:	$6 \times 0,14 + 2 \times 0,22 \text{ mm}^2$
Screen:	Copper braiding
Conductor resistance:	$0,14 \text{ mm}^2: < 148 \Omega/\text{km}$ $0,22 \text{ mm}^2: < 91 \Omega/\text{km}$
Bending radius:	min. 50 mm
Temperature range (flexible use):	-40°C + 90°C
Acceleration:	max. 6 m/s²
Travel speed:	max. 10 m/s
Bending cycles:	max. 1.000.000

SMA1

COLOUR	FUNCTION
grey	Clock in +
pink	Clock in -
yellow	Data out +
green	Data out -
brown	A
white	/A
black	B
violet	/B
grey	Complementary
red	+10Vdc +30Vdc
black	0Vdc GND

10 wires cable

CABLE SPECIFICATIONS

Sheath material:	PVC
Outer diameter:	$\varnothing 6,5 \text{ mm}$
Conductors:	$5 \times 2 \times 0,14 \text{ mm}^2$
Screen:	Copper braiding
Conductor resistance:	< 138 Ω/km
Bending radius:	min. 65 mm
Temperature range (flexible use):	-5°C + 80°C

NOTES

NOTES

NOTES

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Estonia	South Africa
Finland	South Korea
France	Spain
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Hong-Kong	Taiwan
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Iran	Turkey
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Latvia	Uruguay

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likा



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