

LMSA

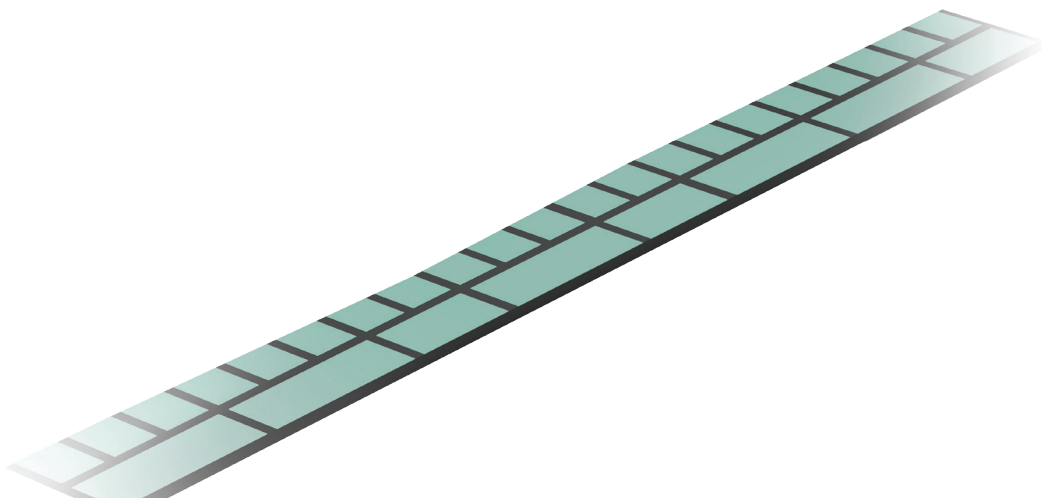
Linear Magnetic Scale Absolute (PRC - Pseudo Random Code)

Linear Magnetic Scales (LMS) are the basis for highly accurate incremental and absolute magnetic measurement systems. The magnetization process, developed and patented by BOGEN, writes the magnetic poles with an exceeding accuracy referring to width and position. LMS is resistant against environmental influences like production residues, utilities, vibrations and other. The operating temperature ranges from - 40°C up to + 100 °C. Accuracy classes up to $\pm 3 \mu\text{m}$ ensure magnetic scale solutions for a great number of customer applications, such as automation technology, robotics, mechanical and electrical engineering.

Absolute
Incremental
Measuring

Linear
Applications

Counting
Controlling



Features and Benefits

- highly accurate encoded pole pairs
- different accuracy classes available
- resistant to contamination, vibrations, temperature fluctuations, humidity
- no wear from usage
- customized variants on demand

Characteristics

Linear Magnetic Scales

accuracy class	± 3 µm, ± 10 µm, ± 20 µm, ± 40 µm		
material	magnetic tape: elastomer filled with ferrite carrier tape: stainless steel		
width [mm]	10		
thickness [mm]	0.5 to 1.66 (depending on scale setup)		
pole pitch [mm]	absolute track: min. 2 mm; incremental track: 2 mm		
magnetic flux density	pole pitch	magnetic flux	distance
	2 mm	30mT +10/-10 mT	0.7 mm
operating temperature	- 40 °C to + 100 °C max.		
expansion coefficient	~ 16 x 10 ⁻⁶ /K		
minimum bending radius [mm]	65		
length in pieces	see „Scale Dimensions“ section		
mounting holes for pieces	multiple hole combinations and angle cuts possible (on request)		

Adhesive Tape

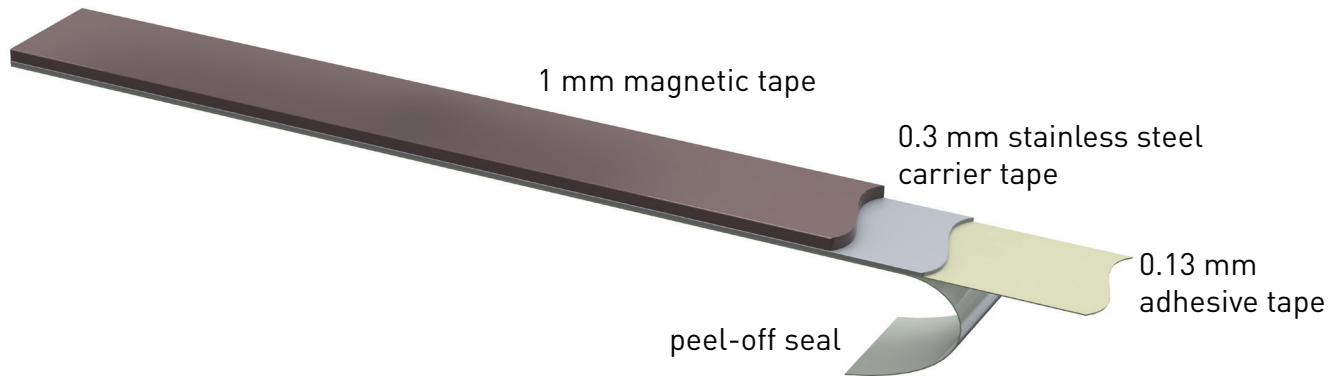
material	double-sided acrylic adhesive tape
width [mm]	1 mm narrower than width of elastomer tape
thickness [mm]	0.13

Cover Tape (optional accessory)

material	cover tape: non-magnetic stainless steel; acrylic adhesive tape
thickness [mm]	0.23 total thickness (0.1 mm stainless steel tape + 0.13 mm adhesive tape)

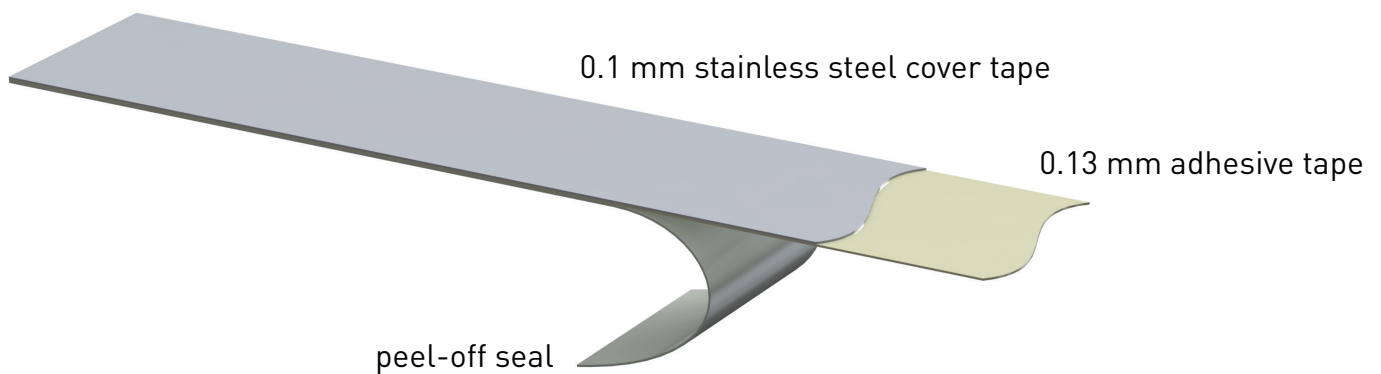
Dimensions

Magnetic Scale*



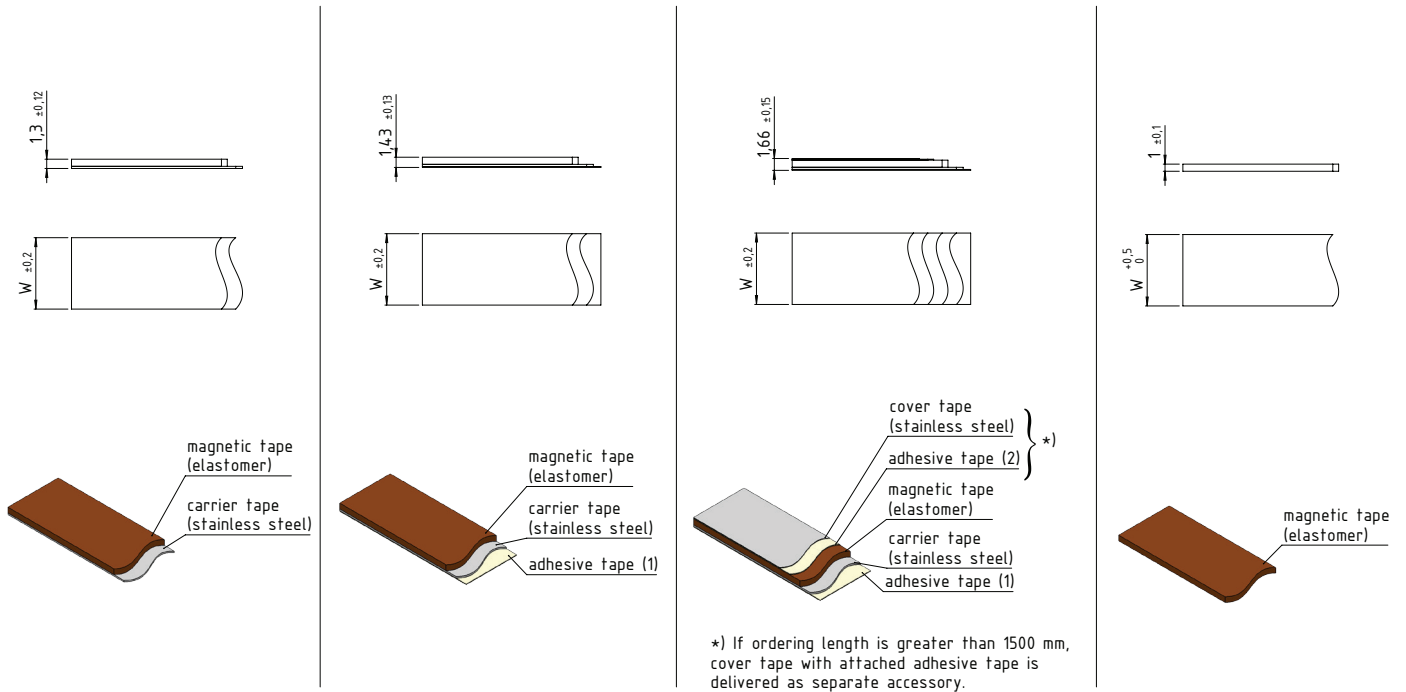
*) standard parameters, other dimensions please refer to following page

Cover Tape (optional accessory)



Due to mechanical characteristics of individual parts and applied manufacturing processes, the top surface of the magnetic component may show minimal surface changes. This has no negative impact on functionality.

Scale Dimensions with Standard Layer Stackup



Scale Dimensions with Optional Layer Stackup ⁽¹⁾

For individual scale setups following layer dimensions can be used

magnetic tape	0.5 mm or 1.0 mm
carrier tape	0.1 mm or 0.3 mm
adhesive tape	0.13 mm , 0.212 mm or 0.050 mm
cover tape	0.076 mm, 0.1 mm , 0.15 mm

⁽¹⁾ standard parameters in bold

Length

Linear magnetic scales cut in pieces or supplied on reel.

A153 → max. length 8.2 m

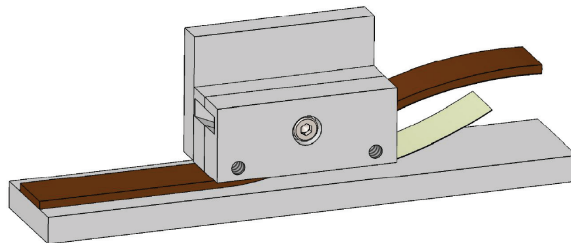
A154 → max. length 32.7 m

Optional Accessories

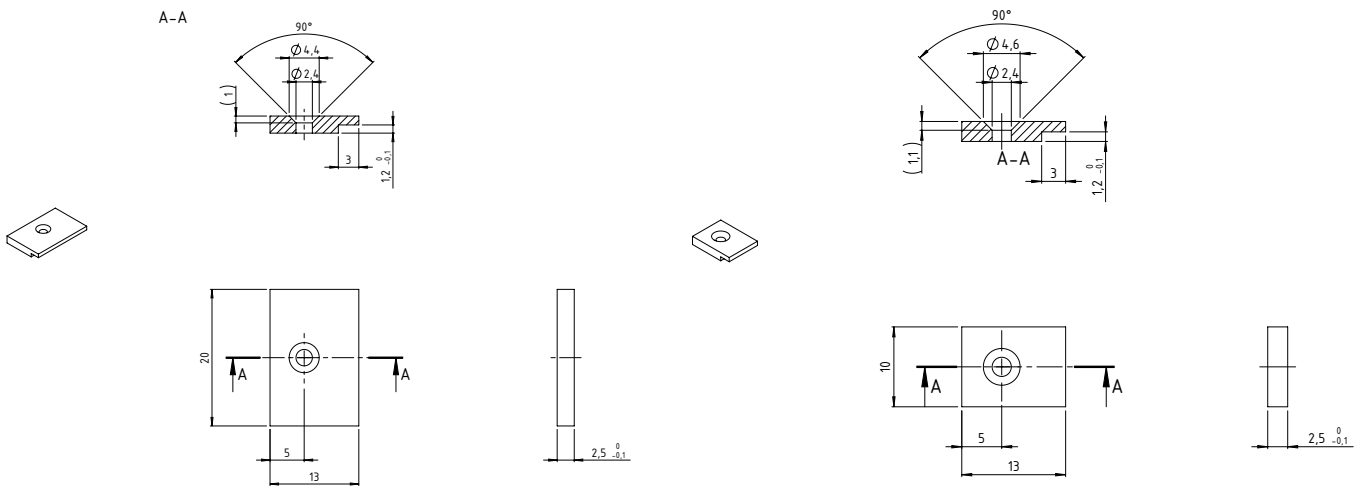
- Extruded Aluminum Profile (please contact our application engineers for the right profile for your LMS)



- Scale Applicator (for easy and precise installation of the scale)

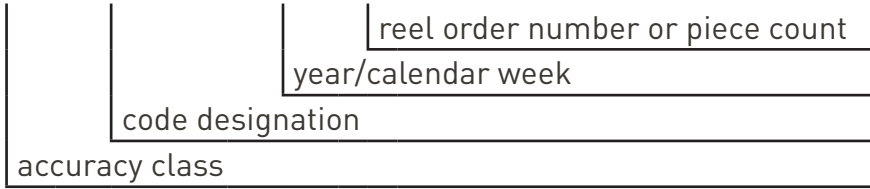


- Clamps for Scale Ends



Marking

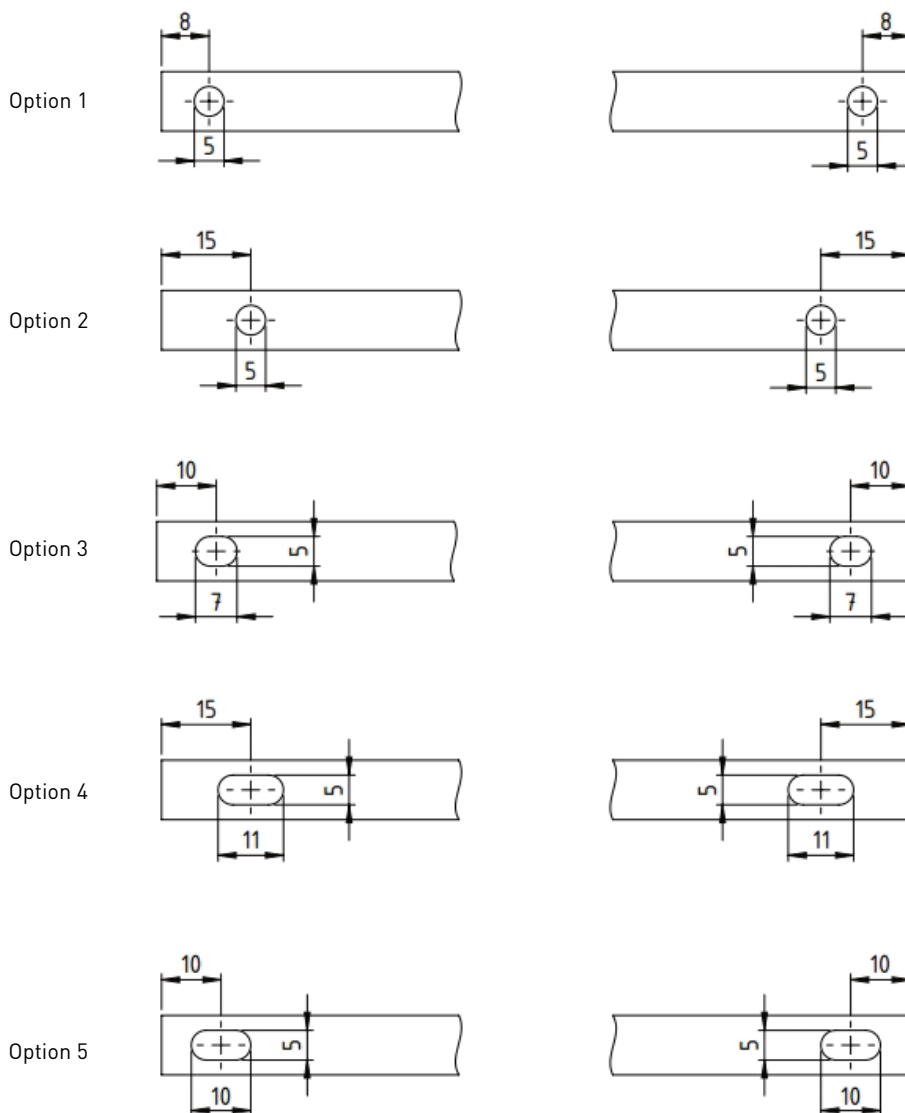
A20 - A153/154- 1944 - 01



The marking distance is 250 mm and is composed as follows:

accuracy class	absolute code	year/week	reel no.	arrow indicates direction of magnetization
A20	A153	1944	01	→
A20	A154	1944	01	→

Standard Mounting Holes



Order Code

LMS - N - P - L - W - H - A - C - K - T - EB

		code	explanation ⁽¹⁾	
	N	number of tracks	2 two tracks	
	P	track parameters	A153-I2 track 1: absolute track according to „manch_12bit.txt“ track 2: incremental track, 2 mm pole pitch	
			A154-I2 track 1: absolute track according to „manch_MTA21_14bit.txt“ track 2: incremental track, 2 mm pole pitch	
	L	length ⁽²⁾	L ... A153 - max. length 8.2 m A154 - max length 32.7 m	
	W	width (mm)	W10 10 mm	
	H	scale height (mm)	1 mm magnetic tape, 0.3 mm carrier tape	
			H1-0.1 1 mm magnetic tape, 0.1 mm carrier tape	
			H0.5-0.3 0.5 mm magnetic tape, 0.3 mm carrier tape	
			H0.5-0.1 0.5 mm magnetic tape, 0.1 mm carrier tape	
	A	accuracy class	A03 $\pm 3 \mu\text{m/m}$ (only delivered up to piece length 2300 mm)	
			A10 $\pm 10 \mu\text{m/m}$ (only delivered up to piece length 2300 mm)	
			A20 $\pm 20 \mu\text{m/m}$	
			A40 $\pm 40 \mu\text{m/m}$	
	C	cover tape	without cover tape	
			C equipped with cover tape (only delivered up to piece length 1500 mm)	
K	adhesive tape	without adhesive tape		
		K equipped with adhesive tape		
T	text imprint	with BOGEN text imprint		
		T0 without text imprint		
		T2 with customer specific text imprint (on request)		
EB	mounting holes ⁽³⁾	without mounting holes		
		1		
		2		
		3 please see drawings on previous page		
		4		
		5		

⁽¹⁾ standard parameters are bold

⁽²⁾ length of scale: measuring length (specified accuracy class guaranteed) + 5 mm at each end (specified accuracy class cannot be guaranteed)

⁽³⁾ for other options than listed please contact our application engineers

Ordering Example

<p>LMS2-A153-I2-L4000-W10-A20-K</p>	<p>linear magnetic scale, number of tracks: 2 track1: absolute, absolute track according to manch_12bit.txt, min. 2 mm pole pitch, 5 mm track width, starting with North pole; track2: incremental, 2 mm pole pitch, 4 mm track width, starting with south pole, 1 mm unmagnetized area between the tracks accuracy class: $\pm 20 \mu\text{m/m}$ total width: 10 mm total height: 1.43 mm total length: 4000 mm without cover tape with adhesive tape with BOGEN standard imprint drawing: LKM 002266-01 pattern according to: manch_12bit.txt</p>
<p>LMS2-A154-I2-L30000-W10-A40</p>	<p>linear magnetic scale, number of tracks: 2 track 1: absolute, absolute track according to manch_MTA21_14bit.txt, 6 mm track width, starting with north pole; track 2: incremental, 2 mm pole pitch, 4 mm track width, starting with North pole accuracy class: $\pm 40 \mu\text{m/m}$ total width: 10 mm total height: 1.43 mm total length: 30000 mm without cover tape without adhesive tape with BOGEN standard imprint drawing: LKM_003578-A pattern according to: MTA21_14bit.txt</p>

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