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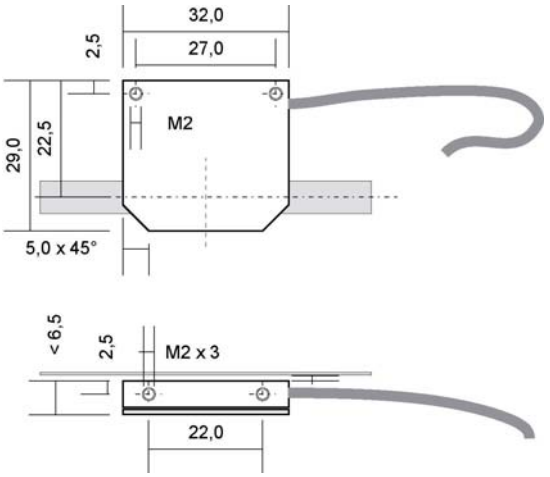
MR Measuring System for manual and motorized microscope stages / scanning stages

The linear magnetic measuring system MR consists of two components: Sensor and scale.

Features

- insensitive against contamination
- high resolution and accuracy
- favorable price in comparison to optical systems
- compact design
- easy to assemble



1. Sensor

The sensor uses the magnetoresistive principle. It changes its electric resistance depending on the magnetic field of the scale. The sensor compiles with protection class IP54. The MR sensor is available in two different versions: 5 Vpp analog and TTL.

1.1 Analog sin/cos

Power supply:	5 V DC ± 10%
Power consumption:	typically < 10 mA
Ambient temperature:	-20° C ... + 70° C (< 85 % RH)
Operating temperature:	0° C ... + 60° C (< 85 % RH)
Weight:	15 g
Case:	Aluminum, anodized
Protection class:	IP 54
Dimensions:	32 x 29 x 6 mm
Connection:	Cable
Signal form:	5 Vpp Sine, cosine analog signal
Signal range:	Differential signals, typically 2 V ± (0.4... 1.2) V amplitude, load > 100 ohm
Signal period:	500 µm
Distance to scale:	typically ≥ 100 µm

- High resolution, accuracy and speed in combination with Tango controller or SCD

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1.2 TTL

Resolution and frequency

Interpolation factor	TTL Period µm	Resolution[1] µm	V_{max} m/s	Input frequency kHz	Output frequency[2] MHz
200	10	2.5	10.5	21.00	1.08
500	4	1	4.20	8.40	1.08
1000	2	0.5	2.10	4.20	1.08
2000[3]	1	0.25	0.27	0.54	0.43
2000	1	0.25	1.08	2.16	1.08
4096	0.488281250	0.12207031250	0.50	1.00	1.08
8192	0.244140625	0.06103515625	0.25	0.50	1.08

[1] with 4 edge triggering, specification as e.g. with glass scales
[2] signal frequency at Vmax, edge frequency is 4x higher
[3] default setting, other settings on request

- Compatible with usual devices with A/B-TTL or RS422 standard signal.
- Alternatively resolution or speed can be optimized.
- The housing, in comparison to analog sensor, is approx. 1 mm thicker.

2. Scale

The MR scale consists of an aluminum carrier which has been magnetically coated. This magnetic coating is coded with a defined magnetic field achieving an accuracy of +/-1 µm and better as well as resolutions less than 100 nm. The scale can be produced in lengths reaching from a few centimeters up to about 650 mm.

The support's shape can be adapted to the application, which, in combination with the slim MR sensor, results in a compact complete system.

Both microscope stage and scale support have an identical thermal behavior, as both components consist of the same material.

The scale is insensitive to contamination like dust or fingerprints and contact with a dry cleaning cloth.
Nevertheless, do not contact the magnetic coating with any solvent, magnetic materials or tools e.g. screwdrivers.