
















## TECHNICAL DATA

Scale model electronic version	Output signals	System resolution [ $\mu\text{m}$ ]	Accuracy grades [ $\mu\text{m}/\text{m}$ ]	Grating pitch [ $\mu\text{m}$ ]	Integrated interpolation	Maximum velocity [m/s]	Max. output- frequency [kHz]
<b>MSA xxx.03</b>	 1 Vpp	dep. on external interpolation	$\pm 3, \pm 5$	20	--	2.0	100
<b>MSA xxx.01</b>	 1 Vpp	dep. on external interpolation	$\pm 3, \pm 5$	10	--	2.0	200
<b>MSA xxx.00</b>	 1 Vpp	dep. on external interpolation	$\pm 2, \pm 3, \pm 5$	8	--	2.0	250
							Edge separation $a_{\text{min}}$
<b>MSA xxx.23</b>		5.0	$\pm 3, \pm 5$	20	times 1	2.0	1.25 $\mu\text{s}$
<b>MSA xxx.33</b>		2.5	$\pm 3, \pm 5$	20	times 2	2.0	625 ns
<b>MSA xxx.63</b>		1.0	$\pm 3, \pm 5$	20	times 5	2.0	250 ns
<b>MSA xxx.73</b>		0.5	$\pm 3, \pm 5$	20	times 10	1.92	250 ns
<b>MSA xxx.61</b>		0.5	$\pm 3, \pm 5$	10	times 5	1.92	250 ns
<b>MSA xxx.71</b>		0.25	$\pm 3, \pm 5$	10	times 10	0.96	250 ns
<b>MSA xxx.51</b>		0.1	$\pm 3, \pm 5$	10	times 25	0.77	125 ns
<b>MSA xxx.81</b>		0.05	$\pm 3, \pm 5$	10	times 50	0.38	125 ns
<b>MSA xxx.30</b>		1.0	$\pm 2, \pm 3, \pm 5$	8	times 2	2.0	250 ns
<b>MSA xxx.70</b>		0.2	$\pm 2, \pm 3, \pm 5$	8	times 10	0.77	250 ns
<b>MSA xxx.80</b>		0.04	$\pm 2, \pm 3, \pm 5$	8	times 50	0.3	125 ns
<b>MSA xxx.90</b>		0.02	$\pm 2, \pm 3, \pm 5$	8	times 100	0.15	125 ns

**Standard measuring lengths (ML):** [mm]

70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 570, 620, 670, 720,  
 770, 820, 870, 920, 970, 1040, 1140, 1240, 1340, 1440, 1540, 1640,  
 1740, 1840, 1940, 2040, 2240, 2440, 2640, 2840, 3040 (20 µm grating pitch possible)  
 (8 or 10 µm grating pitch only possible up to measuring length 1140 mm)  
 (other measuring lengths on request)

**Scale unit:**

- Glass scale ( $\alpha \approx 8,5 \times 10^{-6}/K$ )
- Glass ceramic scale ( $\alpha \approx 0 \times 10^{-6}/K$ )  
 up to ML 1440 mm  
 (longer measuring lengths on request)

**Location of reference mark (RI):**

- Distance-coded reference mark (**K**)  
 after travelling max. 20 mm the absolute position is available
- Optional: one reference mark at any location  
 additional reference marks can be selected by distances of  $n \times 50$  mm

**Required moving force:**

- With standard sealing lips < 2.0 N
- With low drag respectively without any sealing lips < 0.1 N

**Environmental sealing acc. EN 60529 resp. IEC 60529:**

- With standard sealing lips IP 53
- With DA 300: IP 64 (see page 33)

**Permissible vibration:** 100 m/s<sup>2</sup> (40 to 2000 Hz)

**Permissible shock:** 200 m/s<sup>2</sup> (8 ms)

**Permissible temperature:**

-20 °C to +70 °C (storage)  
 0 °C to +50 °C (operation)

**Weight (approx.):**


MSA 470, MSA 570: 460 g + 2,5 g/mm (ML)  
 MSA 4x1, MSA 5x1: 295 g + 2,5 g/mm (ML)  
 + 175 g (reading head without cable)

MSA 7xx, MSA 8xx: 75 g + 0,57 g/mm (ML)  
 + 50 g (reading head MSA 7xx without cable)  
 + 65 g (reading head MSA 8xx without cable)

**Weight of cable:**

30 g/m

**Power supply:**

- Sinusoidal voltage signals  $\sim$  1 V<sub>pp</sub>  
 +5 V ±5%, max. 150 mA (unloaded)
- Square-wave signals via Line Driver   
 +5 V ±5%, max. 180 mA (unloaded)

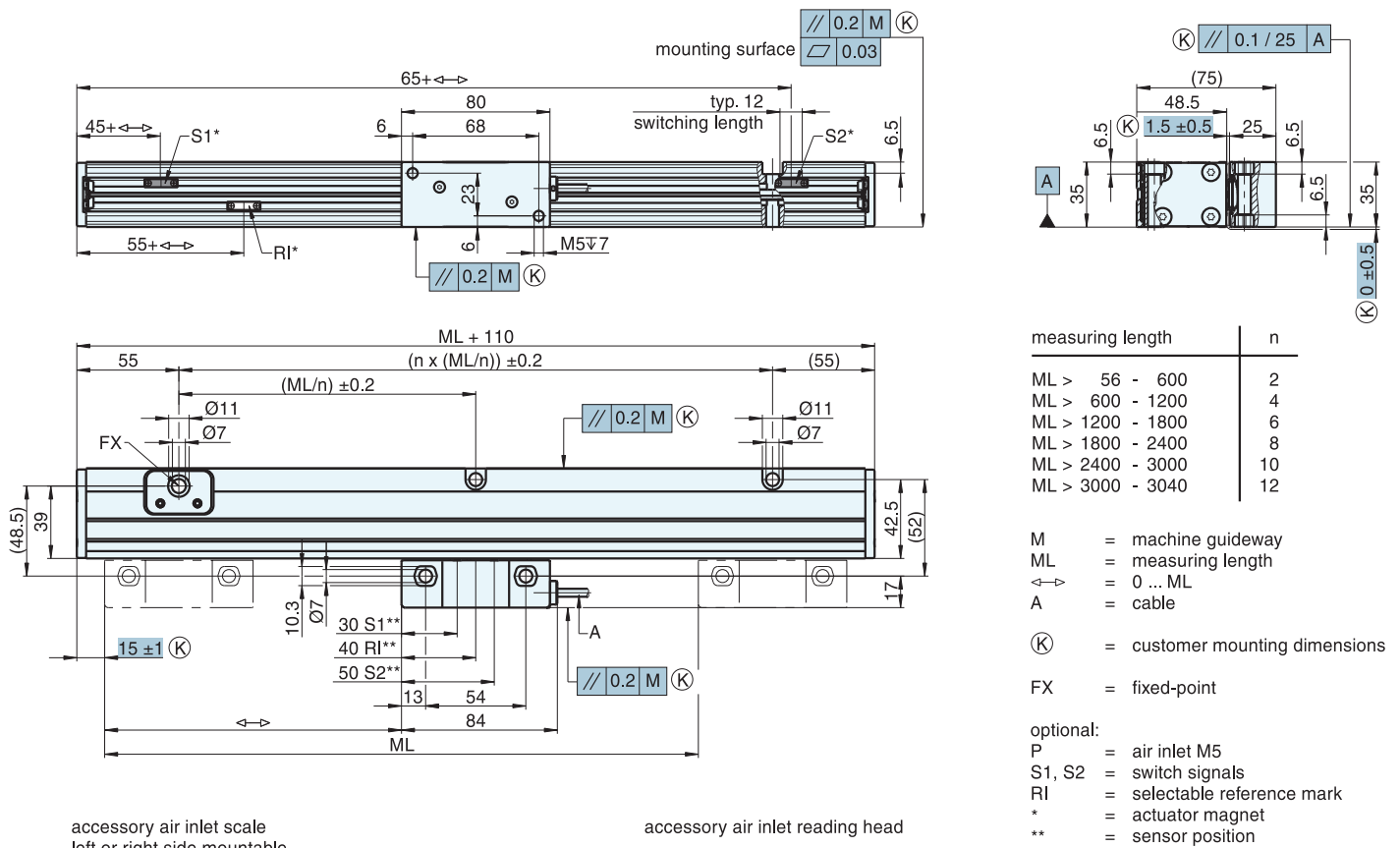
**RoHS-conformity:**

The Linear Encoders of the MSA 4, MSA 5, MSA 7 and MSA 8 series comply with the guideline of the RoHS- directive (2002/95/EG) on the restriction of the use of certain hazardous substances in electrical and electronic equipment

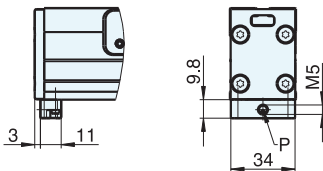
## MSA 411, MSA 511



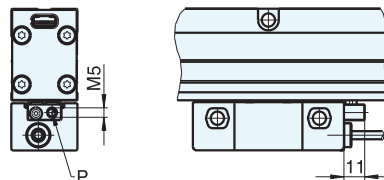
### Dimensions, mounting tolerances MSA 411:



accessory air inlet scale  
left or right side mountable



accessory air inlet reading head



### Dimensions MSA 511:

