ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *RSF Elektronik MSA 6905* at our website: *Click HERE*

RSF Elektronik

Technik, die zählt
Technology that counts

Incremental Linear Encoders

Enclosed Models



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table of contents

		Page
General description	Design and operation	4/5
	Output signals	6
	Subdividing Electronics, connecting cables	7
	Shield connections	8
	Environmental sealing	8
Overview	Nomenclature	9
	Selection guide	10 - 13
Technical data, Dimensions, Mounting tolerances Mounting possibilities	**MSA 170**	14/15
	MSA 002, MSA 003	16/17
	MSA 670	18/19
	MSA 671	20/21
	MSA 672	22/23
	MSA 680	24/25
	MSA 370	26/27
	MSA 371	28/29
	MSA 372	30/31
	MSA 673	32/33
	MSA 373	34/35
	MSA 690	36/37
	MSA 691	38/39
	MSA 390	40/41
	MSA 391	42/43
	MSA 690, MSA 691 switching magnets	44
	MSA 373, MSA 390, MSA 391 switching magnets	44
	MSA 690, MSA 691 pin outs, switching signals	45
	MSA 373, MSA 390, MSA 391 pin outs, switching signals	45
	MSA 650	46/47
	MSA 651	48/49
	MSA 350	50/51
	MSA 352	52/53
Accessories	Subdividing Electronics **ZE**	54
	InterFaceCard **IFC 430R**	55
	Male and female connectors, pin-outs	56
	Air Pressure Unit **DA300**	57
Other RSF-Products	Open Linear Encoder (extract from the catalog "Incremental Linear Encoder" open models)	58
	Digital Readouts	59
Branch Offices	Addresses	60

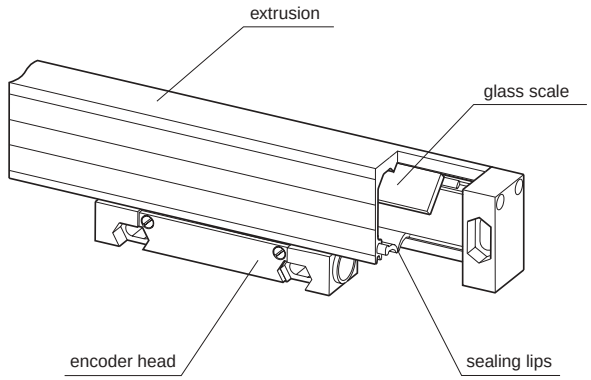
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Design and operation

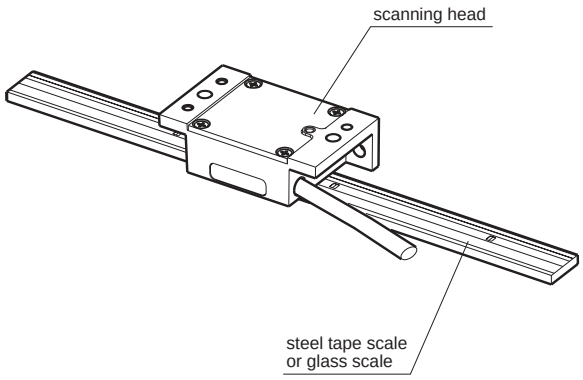
RSF manufactures linear encoders in enclosed and open versions.
The enclosed models are easy to install with large mounting tolerances.
They are also best suited for harsh environments. The sealing lips on the extrusion keep out coolants and contamination.

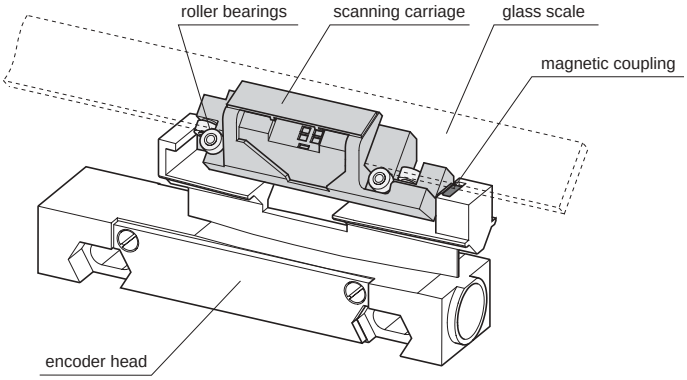
The non-contact open measuring systems are for high displacement velocities and high accuracies, commonly used in clean environments.

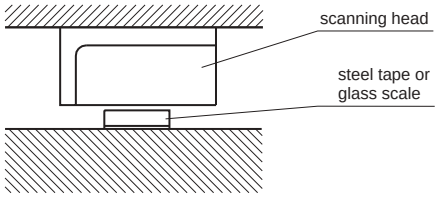
Enclosed systems
with guided scanning carriage



Open systems
with non-contact scanning carriage







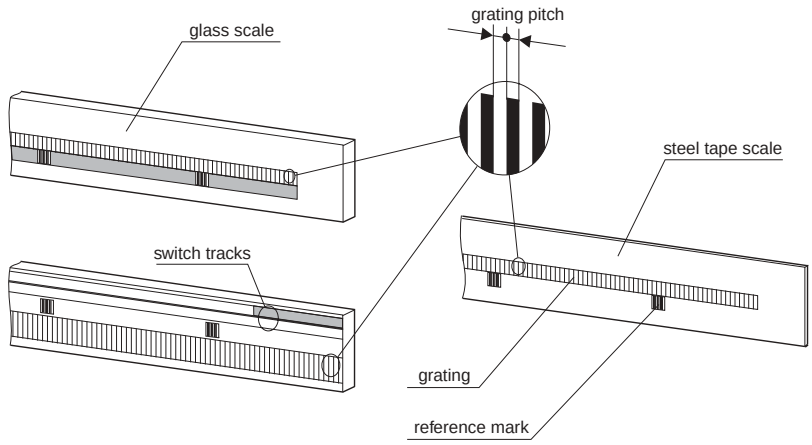
Enclosed Linear Encoders have a roller bearing self-guided scanning carriage. The scanning carriage is spring loaded to track properly within the encoder head mounting tolerance range. A set of rare earth magnets couple the scanning carriage to the mounting base of the encoder head.

This magnetic coupling compensates allowable mounting tolerances and machine guide non-parallelism.
Non-contact open encoders rely on the air gap between the encoder head and scale to be uniform over the measuring range. The flatness of the mounting surface and the parallelism of the machine guideway is important.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The scale graduation pattern has a high accuracy grating.
Scales can be produced on metal tape or spars, or glass substrates.
One cycle (period) of grating pitch, is defined as one chrome line and one corresponding line space, each with the same width.
The total width of one chrome line and one line space is called grating pitch.
A second track adjacent to the graduation pattern, contains the Reference mark(s). There are standard Reference mark locations, or they can be specified upon request.
Multiple Reference marks must be separated by n x 50 mm distances.

Scale graduation pattern

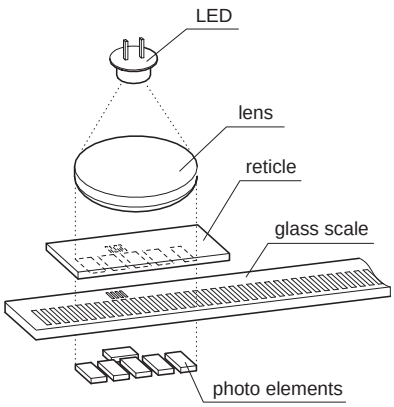


Linear Encoders with the suffix "**K**" in the model type have distance coded Reference marks. The absolute tool position is available after a measuring move of 20 mm maximum.

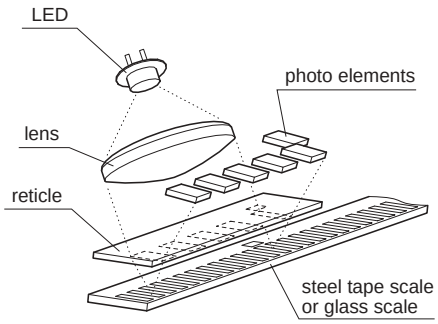
Cause of the optical scanning version a accurate reference mark is warranted.

When there is relative movement between the encoder head and the linear scale, LED light is modulated by the scale grating pitch and converted into electrical signals by the photo-elements. Solid state LEDs and silicon photo-elements are used for high reliability and durability.

Transmissive scanning principle



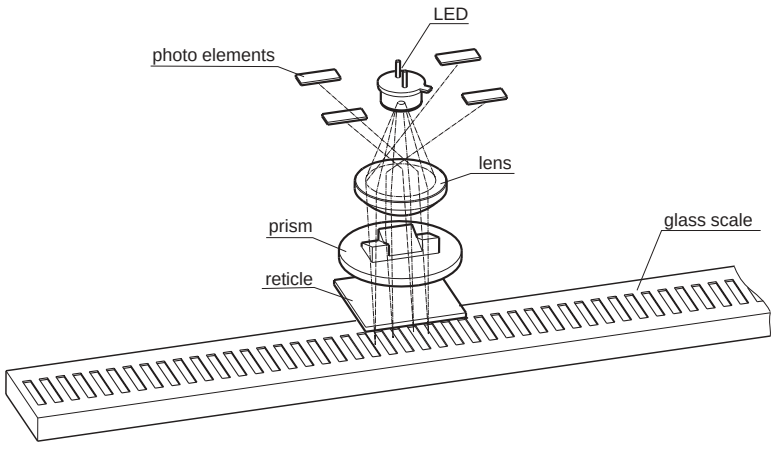
Reflective scanning principle



The scale consists of a glass carrier and reflection-type phase grating.
The scanning reticle acts as transmission phase grating.

The light beam, produced by a LED and collimated by a lens, is deflected by prisms and the phase grating of the reticle in different directions.
After reflection and diffraction at the scale grating the different, depending on the change of position phase shifted, beams interfere after passing the reticle again, thus producing 2 by 90° shifted, sinusoidal measuring signals.
Using this interferential measuring principle, one signal period equals half of the scale.

Reflection-type phase grating



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Output signals

Sinusoidal voltage signals
Two sinusoidal voltage signals A1 and A2 and one Reference index (with inverted signals).

Reference voltage of the output signals: V+/2 (approx. 2,5 V)
output signals A1 and A2:
Phaseshift 90° ±10° el.
Signal amplitude 0,6 Vpp to 1,2 Vpp typ. 1 Vpp with terminating impedance Zo = 120 Ω

Output signal Reference mark (RI):
El. position typical 135° (referenced to A1)
El. width typical 270° 0,2 to 0,85 V typical 0,4 V (effective quota) with terminating impedance Zo = 120 Ω

Advantage: High output frequency even with long cable length.
Connection possibilities any suitable CNC resp. Feed-back-Systems.

Sinusoidal micro-current signals
Two sinusoidal micro-current signals 0° and 90° and one Reference index (with inverted signals).

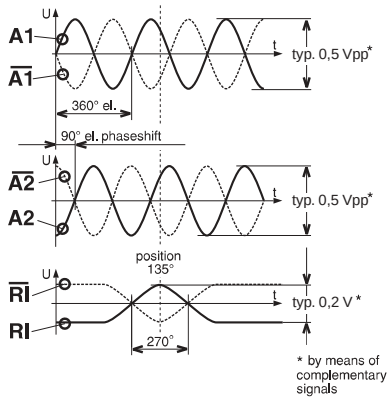
Output signals 0° and 90°:
Phaseshift 90° ±10° el.
electrical offset ±10% of the signal amplitude
Signal amplitude with a load of 1 kΩ:
7 to 16 µApp (11,5 µApp typical)

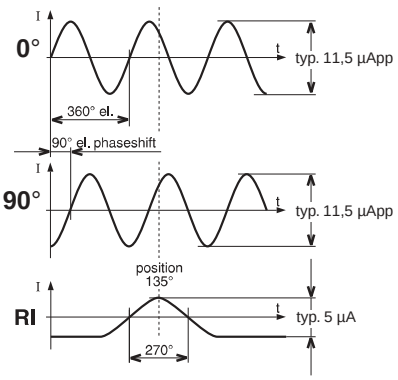
Output signal Reference mark (RI):
El. Position typical 135° (referenced to 0°)
El. width typical 270°
2 to 8 µA, (typical 5 µA)

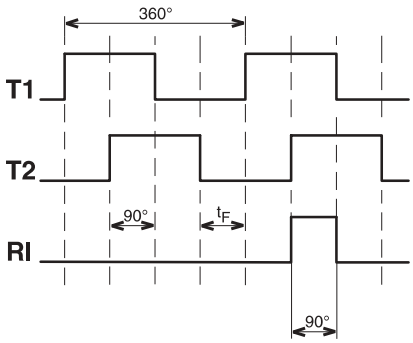
These signals can be input to External Subdividing Electronics or NC Controls with built-in Subdividing Electronics.

Square wave signals
The sinusoidal micro-current signals are converted into two square wave signals that have a phase shift of 90° either with a Schmitt-Trigger (times 1) or interpolation electronics (times 2, -5, -10, -25 or -100) output can be differential RS 422 Line Driver.
One counting step is the distance between the rising or falling edge of channels T1 and T2.
Machine controls/DROs have a minimum allowable distance between channels A and B changes of state, measured in time (inverse of maximum counting frequency).
The minimum edge distance t_F is shown in the technical data.

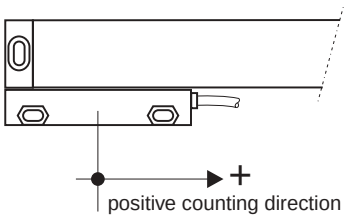
Drawing in "positive counting direction"

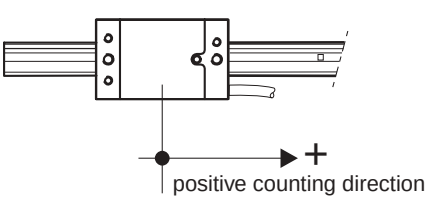






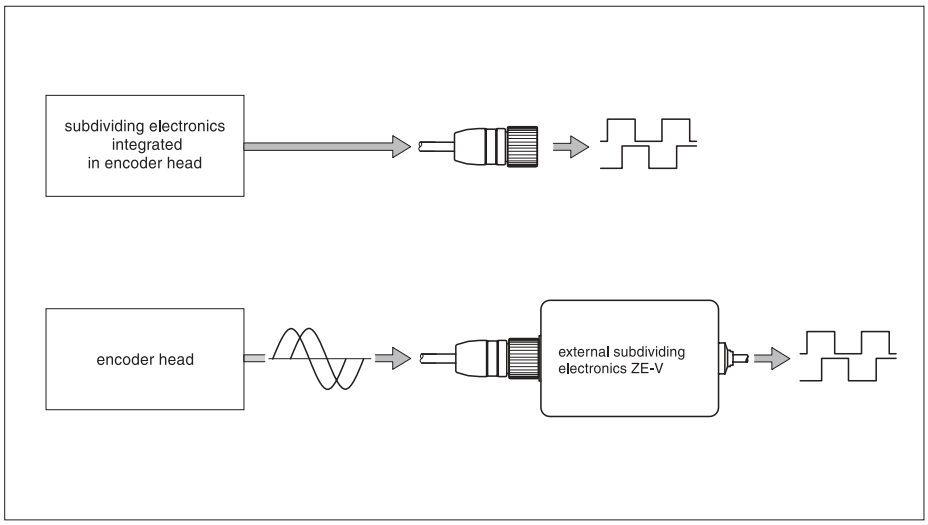
Positive counting direction orientation





Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Subdividing Electronics
Connecting cables



Signal interpolation is available in two versions.

- Subdividing Electronics integrated in the encoder head offer the advantage of reduced parts and labor, lower hardware cost, and it eliminates the need for space to mount an external subdividing electronic unit.
- external Subdividing Electronics require sinusoidal micro-current input signals (ZE-Vx) or sinusoidal voltage signal (ZE-Sx)

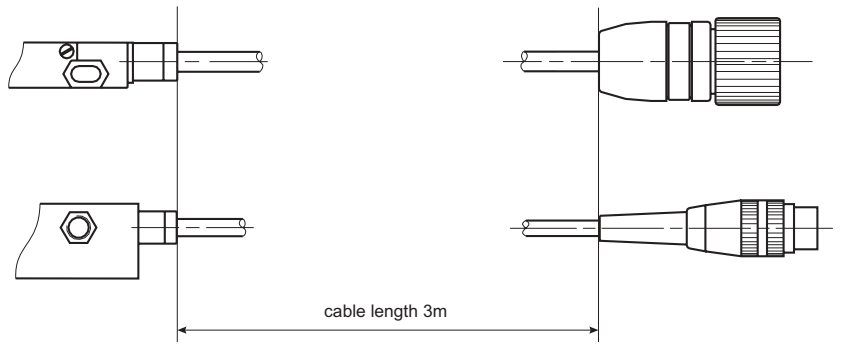
Both versions can output differential Line Driver RS 422 square wave signals.

Output signals resp. constructional features	Cable Ø mm	Shield	Minimum Bend radius Fixed mount	Minimum Bend radius Continuous bending *
Sinusoidal micro-current signals and sinusoidal voltage signals	5,7 4,4 3,9	double double, high flex double, ultra high flex	45 mm 35 mm 30 mm	85 mm 70 mm 60 mm
Square wave signals	5,7	single	45 mm	85 mm
MSA 65x and MSA 35x	4,8 4,3	single, with metal braiding single	25 mm 25 mm	50 mm 45 mm

*** cycle of bending typical 50 million**

Encoder heads have cables designed for the specific signal outputs.
Standard cable length is 3 m.
The cable jacket is a special thermo-plastic, resistant to commercial coolants and lubricants.
Cables should be protected with a metallic armor if exposed to a harsh environment like "hot metal chips".
The cables can be used in the following temperature ranges:
Fixed cable mounting: -20°C to +70°C
Continuous flexing: -5°C to +70°C

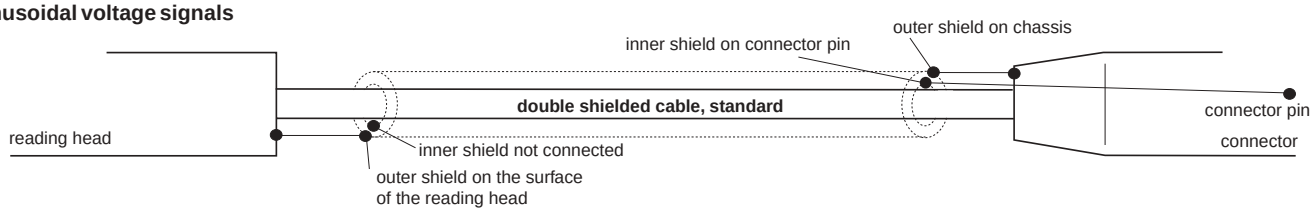
Definition of the cable length



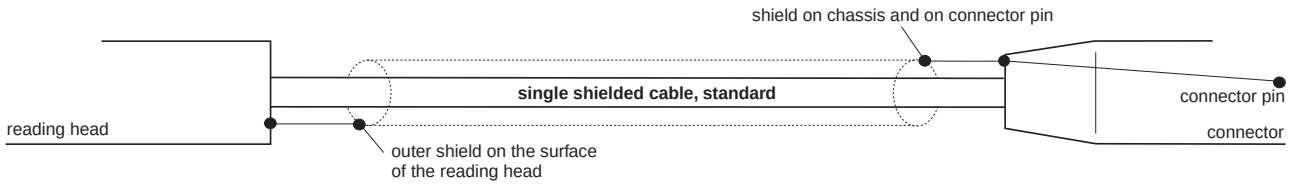
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Shield connections

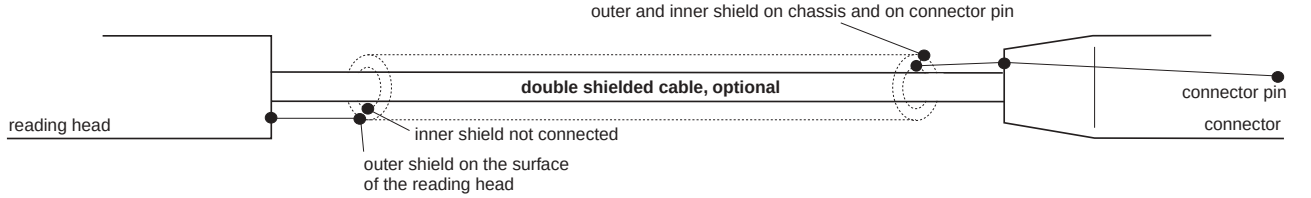
sinusoidal micro-current signals
sinusoidal voltage signals



square wave signals

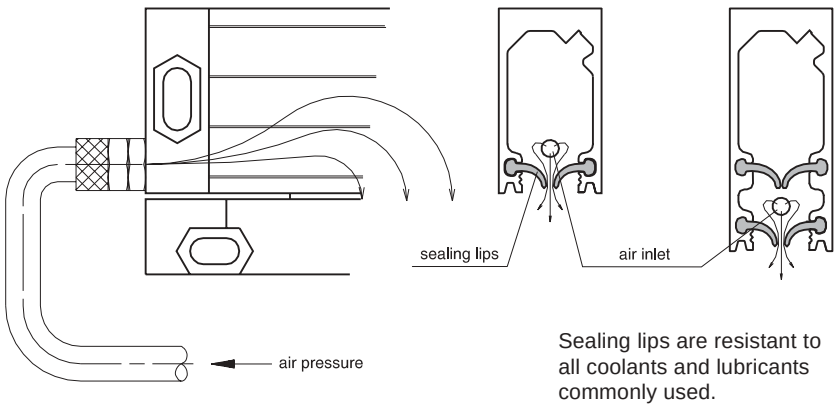


square wave signals



Environmental sealing

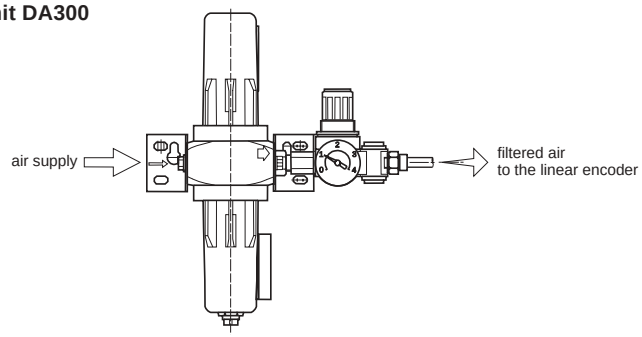
Environmental sealing



Sealing lips are resistant to all coolants and lubricants commonly used.

For applications where the Linear Encoders are used in harsh environments (e.g. oil and coolants), there are two methods of extra protection beyond the enclosed unit´s standard set of sealing lips.
1. An air inlet can be provided for filtered air to be input into the scale spar.
A limiting flow restrictor helps set the optimum overpressure airflow inside the scale spar to improve the sealing against oil and coolants.
2. Scale spars with two sets of sealing lips are available. The area between the two sets of sealing lips can also be pressurized to achieve the best possible environmental sealing.

Air pressure unit DA300



When filtered air is not available, the **RSF Air Pressure Unit DA300**, or an equivalent, should be used.
Pressure is adjustable. To avoid measuring errors due to thermal differences, it is absolutely necessary to provide pressurized air that has the same temperature as the machine tool. The DA300 requires standard compressed air at the input.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Nomenclature

Encoder Name

XXX XXX.XX-X XX

Encoder Type
(design features)

XXX XXX.XX-X XX

Output signals and integrated Subdividing

XXX XXX.XX-X XX

0 = sinusoidal voltage signals 1 Vpp
1 = sinusoidal micro-current signals 7 to 16 µApp
2 = square wave signals, times 1
3 = square wave signals, times 2
4 = square wave signals, times 20
5 = square wave signals, times 25
6 = square wave signals, times 5
7 = square wave signals, times 10
8 = square wave signals, times 50
9 = square wave signals, times 100

Grating pitch

XXX XXX.XX-X XX

0 = 8 µm
1 = 10 µm
2 = 16 µm
3 = 20 µm
4 = 40 µm
5 = 100 µm
6 = 200 µm
7 = 400 µm
8 = 50 µm
A = 6,35 µm
B = 10,16 µm
C = 12,70 µm
D = 20,32 µm
E = 50,80 µm
F = 101,60 µm
G = 25,40 µm
H = 35 µm
K = 2160 L/Inch
L = 21,167 µm

Version of the switch signal
(only for Linear Encoder with switch magnets)

XXX XXX.XX-X XX

-0 = without switch signal
-1 = TTL output (active high)
-2 = open collector output (active high impedance)
-3 = TTL output (active low)
-4 = open collector output (active low impedance)

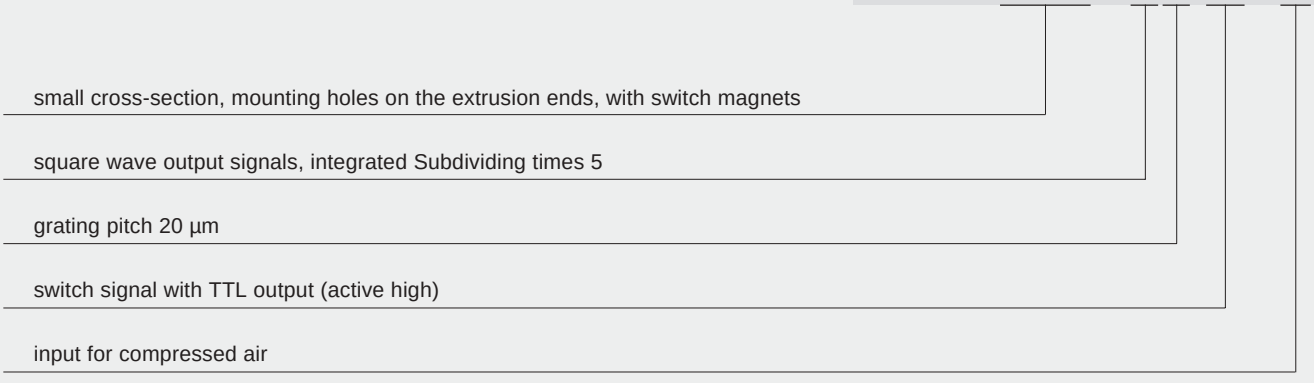
Possible options

K = distance coded Reference marks
P = input for compressed air

XXX XXX.XX-X XX

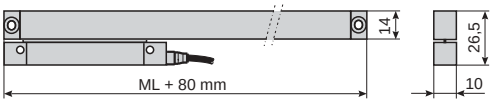
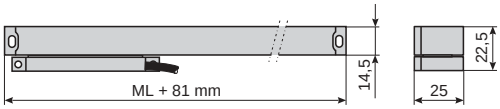
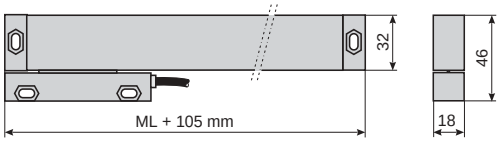
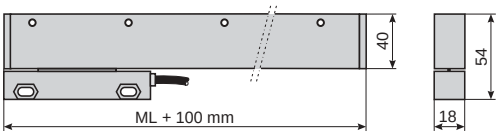
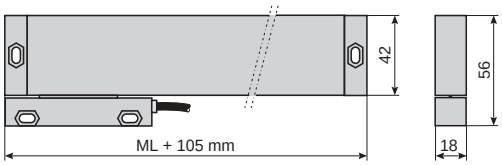
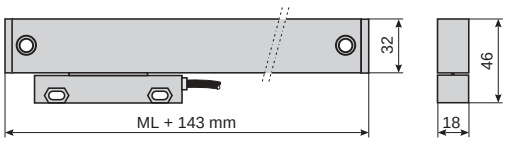
For example:

MSA 690 . 63-1 P

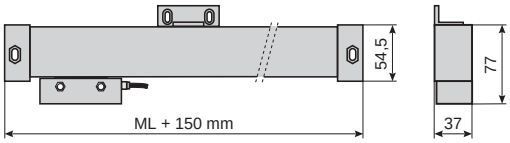
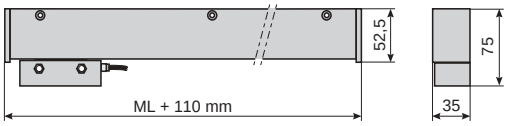
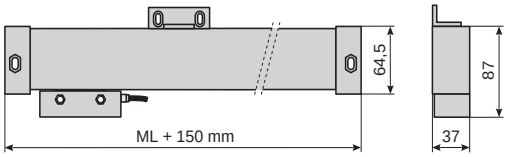
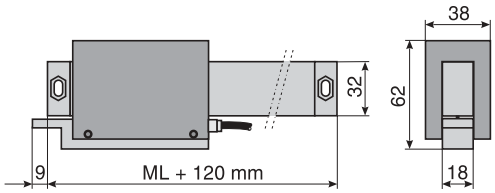
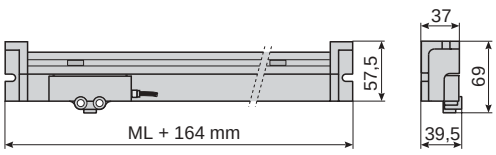


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Overview, Selection guide

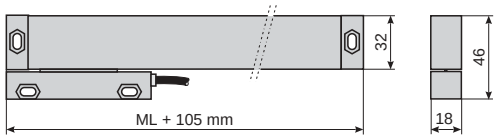
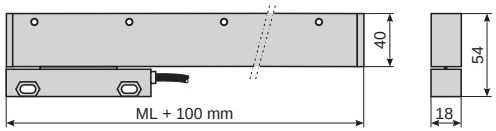
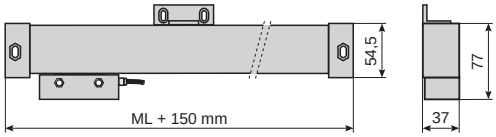
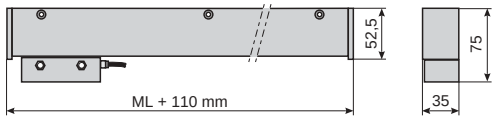
Design features	Overall measunring ML = measuring length	Scale type	Page
• **extremely small cross section** • **guided by ball bearings** • distance coded Reference marks (K) • max. measuring length 520 mm • enclosed version • mounting holes on the extrusion ends		**MSA 170**	14-15
• **extremely small cross section** • **MSA 002 with stainless steel construction for optimal thermal characteristics** • **MSA 003 with aluminium construction** • max. measuring length 520 mm • enclosed version without sealing lips • mounting holes on the extrusion ends		**MSA 002** **MSA 003**	16-17
• distance coded Reference marks (K) • max. measuring length 2240 mm • small cross-section • enclosed version • mounting holes on the extrusion ends		**MSA 670**	18-19
• distance coded Reference marks (K) • max. measuring length 2440 mm • small cross-section • enclosed version • mounting holes on top of the extrusion improves vibration rating		**MSA 671**	20-21
• **two sets of sealing lips for additional contamination protection** • distance coded Reference marks (K) • max. measuring length 2240 mm • small cross-section • enclosed version • mounting holes on the extrusion ends		**MSA 672**	22-23
• **with optimized thermal performance** • distance coded Reference marks (K) • max. measuring length 1240 mm • small cross-section • enclosed version • mounting holes on the extrusion ends		**MSA 680**	24-25

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

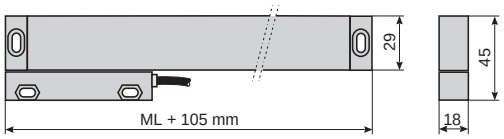
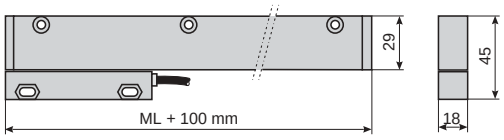
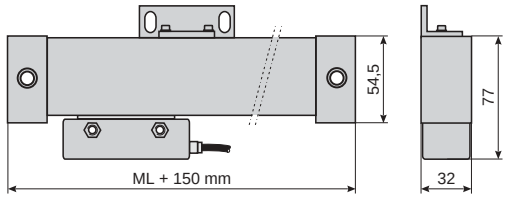
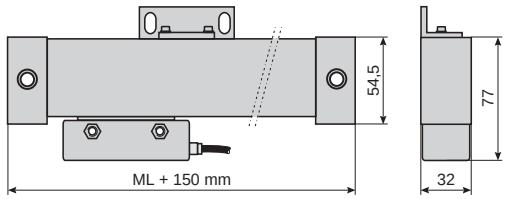
Design features	Overall measunring ML = measuring length	Scale type	Page
• distance coded Reference marks (K) • max. measuring length 3040 mm • rigid mounting • large cross-section • enclosed version • mounting holes on the extrusion ends and with mounting supports		**MSA 370**	26-27
• distance coded Reference marks (K) • max. measuring length 3040 mm • rigid mounting • mounting holes on top of the extrusion improves vibration rating • large cross-section • enclosed version		**MSA 371**	28-29
• **two sets of sealing lips for additional contamination protection** • distance coded Reference marks (K) • max. measuring length 3040 mm • rigid mounting • large cross-section • enclosed version • mounting holes on the extrusion ends and with mounting supports		**MSA 372**	30-31
• **for application on presses, bending machines and hydraulic cylinders** • **with self-guided bearing pack** • distance coded Reference marks (K) • max. measuring length 620 mm • enclosed version • mounting holes on the extrusion ends • encoder head attached to machine with rod in end of head bracket		**MSA 673**	32-33
• **for application on presses, bending machines and hydraulic cylinders** • **free positionable switching magnets for special functions** • **integrated, protected guideway** • max. measuring length 620 mm • rigid mounting • enclosed version • mounting holes on the extrusion ends • encoder head attached to machine with rod in end of head bracket		**MSA 373**	34-35

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Overview, Selection guide

Design features	Overall measunring ML = measuring length	Scale type	Page
• **free positionable switching magnets for special functions** • distance coded Reference marks (K) • max. measuring length 2240 mm • small cross-section • enclosed version • mounting holes on the extrusion ends		**MSA 690**	36-37
• **free positionable switching magnets for special functions** • distance coded Reference marks (K) • max. measuring length 2240 mm • small cross-section • enclosed version • mounting holes on the top of the extrusion improves vibration rating		**MSA 691**	38-39
• **individual choosing of the reference mark** • **free positionable switching magnets for special functions** • distance coded Reference marks (K) • max. measuring length 3040 mm • rigid mounting • large cross-section • enclosed version • mounting holes on the extrusion ends and with mounting supports		**MSA 390**	40-41
• **individual choosing of the reference mark** • **free positionable switching magnets for special functions** • distance coded Reference marks (K) • max. measuring length 3040 mm • rigid mounting • large cross-section • enclosed version • mounting holes on the top of the extrusion improves vibration rating		**MSA 391**	42-43

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Design features	Overall measunring ML = measuring length	Scale type	Page
• **for retrofit of machine tools** • **high mounting tolerances** • distance coded Reference marks (K) • max. measuring length 1740 mm • small cross-section • enclosed version • mounting holes on the extrusion ends		**MSA 650**	46-47
• **for retrofit of machine tools** • **high mounting tolerances** • distance coded Reference marks (K) • max. measuring length 2240 mm • small cross-section • enclosed version • mounting holes on top of the extrusion improves vibration rating		**MSA 651**	48-49
• **for retrofit of machine tools** • **high mounting tolerances** • distance coded Reference marks (K) • max. measuring length 3040 mm • rigid mounting • large cross-section • enclosed version • mounting holes on the extrusion ends and with mounting supports		**MSA 350**	50-51
• **for retrofit of machine tools** • **high mounting tolerances** • **with two sets of sealing lips** • distance coded Reference marks (K) • max. measuring length 3040 mm • rigid mounting • large cross-section • enclosed version • mounting holes on the extrusion ends and with mounting supports		**MSA 352**	52-53

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 170 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance)
• **Sinusoidal voltage signals 1 V_{pp}**				
MSA 170.03	depending on external Subdividing	±3, ±5, µm/m	20 µm	1 m/s
• **Sinusoidal micro-current signals**				
MSA 170.13	depending on external Subdividing	±3, ±5, µm/m	20 µm	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**				
MSA 170.23	5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 3,3 µs)
MSA 170.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 250 ns)
MSA 170.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 250 ns)
MSA 170.53	0,2 µm	±3, ±5 µm/m	10 µm	0,4 m/s (> 250 ns)
MSA 170.83	0,1 µm	±2, ±3 µm/m	10 µm	0,2 m/s (> 250 ns)

* **Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
50, 70, 120, 170, 220, 270, 320, 370, 420, 470, 520,

Measuring type: glass scale

Reference mark (RI): selectable
MSA 170.xx **K**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 170.xx
One Reference mark in the middle of the measuring length or 10 mm from both ends of measuring length. (excluding ML 50 mm)

Option:
One Reference mark at any location, or two or more RI`s separated by distances of n x 25 mm.

Required moving force: < 1 N

Environmental sealing DIN 40050: IP 53
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 100 m/s² (40 to 2000 Hz)
Permissible shock: 150 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
22 g/100 mm (scale spar) + 35 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 170.03

Power supply:
+5V ±5%, max. 90 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 170.13

Power supply:
+5 V ±5%, max. 90 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
50 kHz (with 3 m cable)

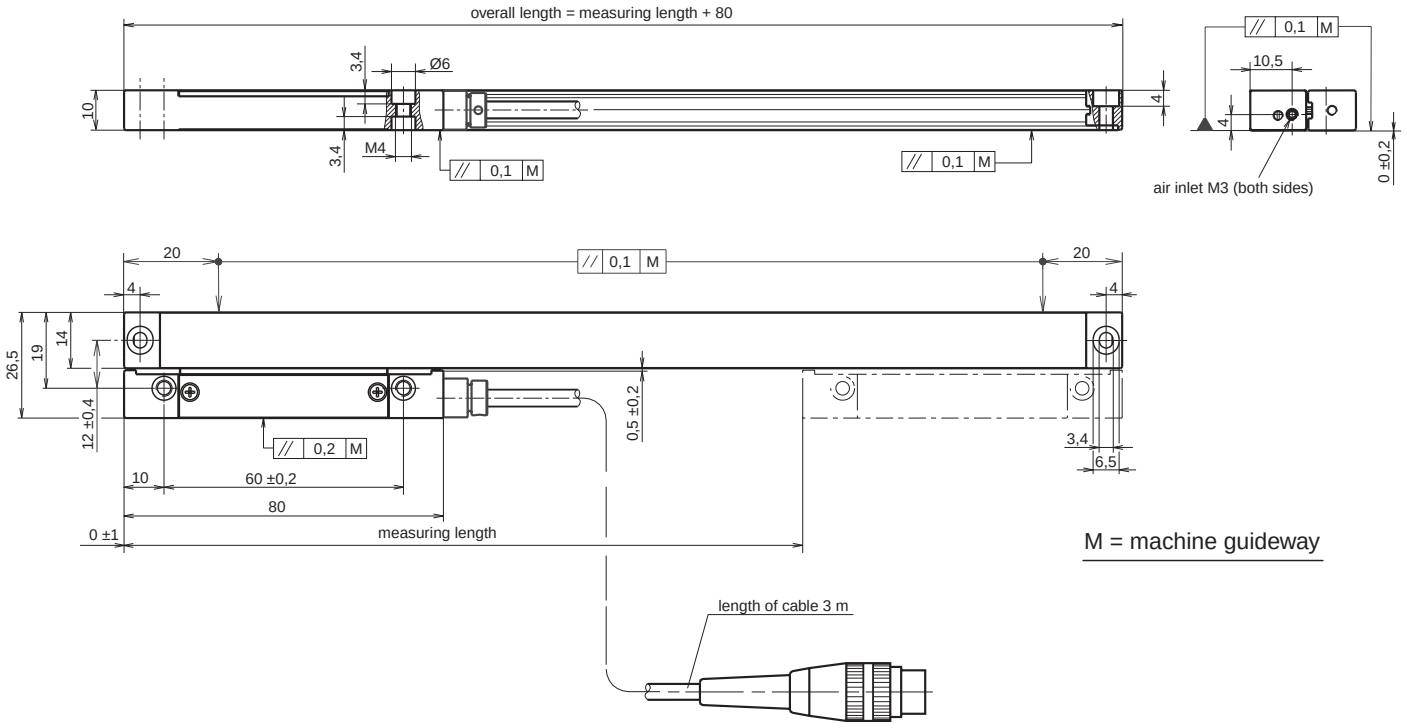
• **square wave signals** (single ended)
with integrated Subdividing Electronics

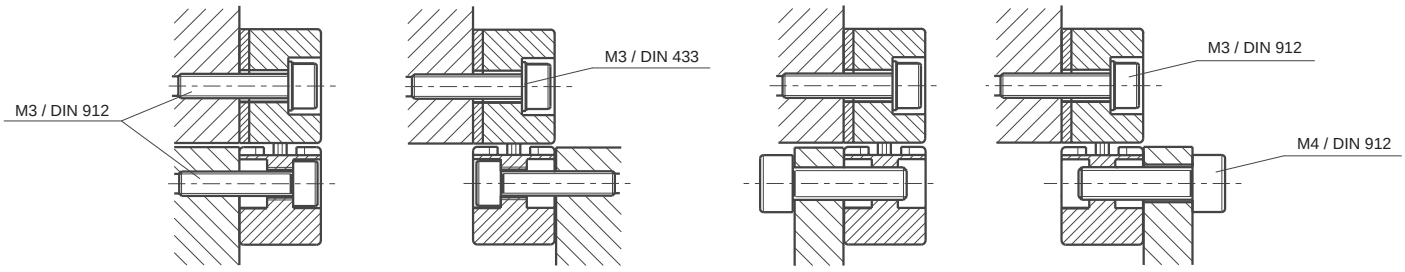
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 170.23 = times 1
MSA 170.63 = times 5
MSA 170.73 = times 10
MSA 170.53 = times 25
MSA 170.83 = times 50

Power supply:
+5 V ±5%, max. 200 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 170 Dimensions - Mounting tolerances - Mounting possibilities:





Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 002, MSA 003 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance)
• Sinusoidal micro-current signals				
MSA 002.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	2 m/s
MSA 002.11	depending on external Subdividing	±3, ±2 µm/m	10 µm	1 m/s
• Square wave Line Driver signals with integrated Subdividing				
MSA 002.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)
MSA 002.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)
MSA 002.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	1 m/s (> 300 ns)
MSA 002.51	0,1 µm	±2, ±3 µm/m	10 µm	0,45 m/s (> 200 ns)
• Sinusoidal micro-current signals				
MSA 003.13		±3, ±5, ±10 µm/m	20 µm	2 m/s
MSA 003.11		±3, ±2 µm/m	10 µm	1 m/s
• Square wave Line Driver signals with integrated Subdividing				
MSA 003.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)
MSA 003.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)
MSA 003.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	1 m/s (> 300 ns)
MSA 003.51	0,1 µm	±2, ±3 µm/m	10 µm	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

MSA 002 with stainless steel construction for optimal thermal characteristics
MSA 003 with aluminium construction

MSA 002 and MSA 003 are without sealing lips

Standard measuring lengths: (mm)
50, 70, 120, 170, 220, 270, 320, 370, 420, 470, 520

Measuring type: glass scale

Reference mark (RI):
Standard:
One Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI`s separated by distances of n x 50 mm.

Required moving force: < 0,1 N

Permissible vibration: 30 m/s² (40 to 2000 Hz)
Permissible shock: 150 m/s² (8 ms)

Permissible temperature: -20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
70 g/100 mm (scale spar) + 25 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal micro-current signals**
MSA 002.13
MSA 002.11

MSA 003.13
MSA 003.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

• **square wave signals** (single ended)
with integrated Subdividing Electronics

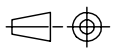
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 002.63 = times 5
MSA 002.73 = times 10
MSA 002.71 = times 10
MSA 002.51 = times 25

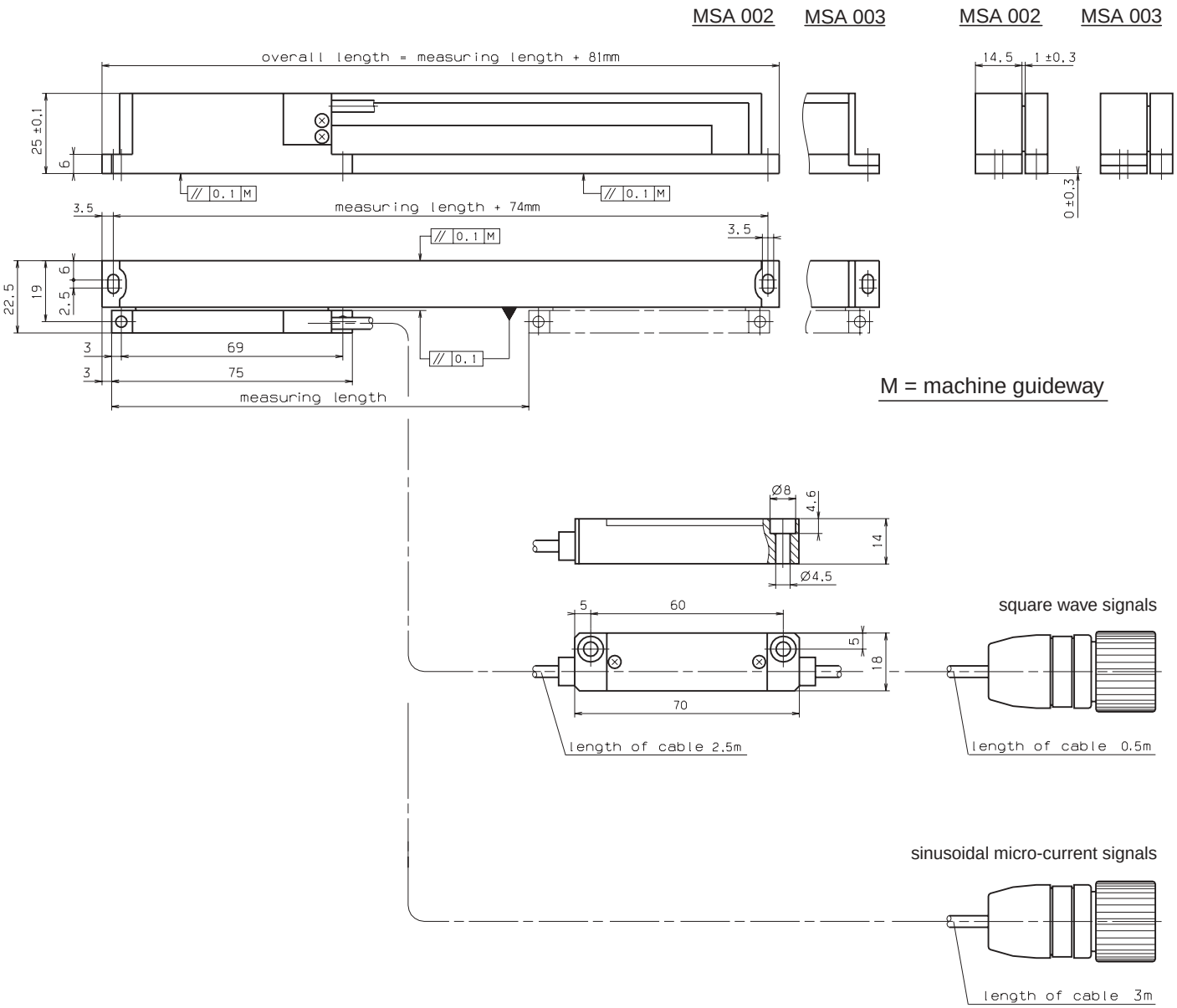
MSA 003.63 = times 5
MSA 003.73 = times 10
MSA 003.71 = times 10
MSA 003.51 = times 25

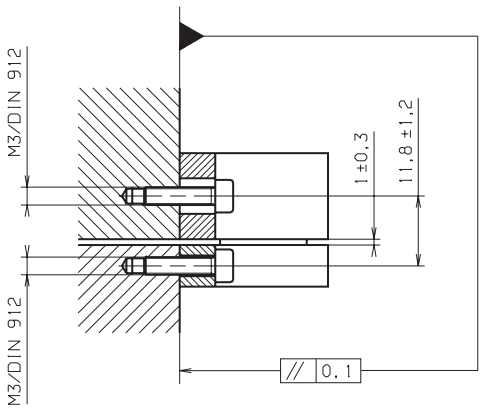
Power supply:
+5 V ±5%, max. 150 mA (unloaded)
5 - 5,25 V, max. 150 mA (only for times 25, unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 002, MSA 003 Dimensions - Mounting tolerances - Mounting possibilities:







Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 670 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• Sinusoidal voltage signals 1 V_{pp}					
MSA 670.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 670.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• Sinusoidal micro-current signals					
MSA 670.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 670.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• Square wave Line Driver signals with integrated Subdividing					
MSA 670.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 670.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 670.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 670.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 670.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 670.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 670.51	0,1 µm	±2, ±3,±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240

Measuring type: glass scale

Reference mark (RI): selectable
MSA 670.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 670.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 100 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
0,8 kg/m (scale spar) + 75 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 670.03
MSA 670.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 670.13
MSA 670.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

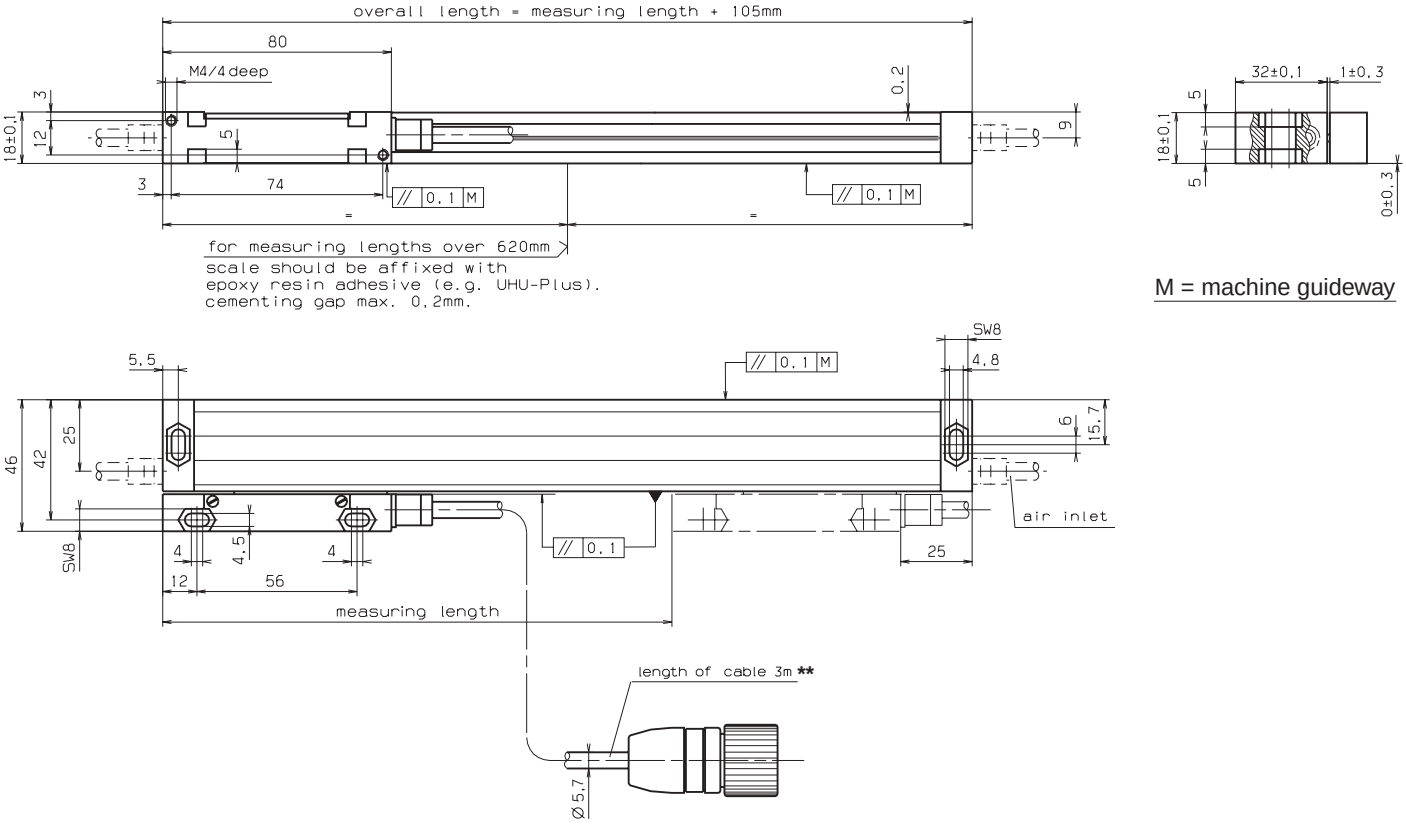
• **square wave signals** (single ended)
with integrated Subdividing Electronics

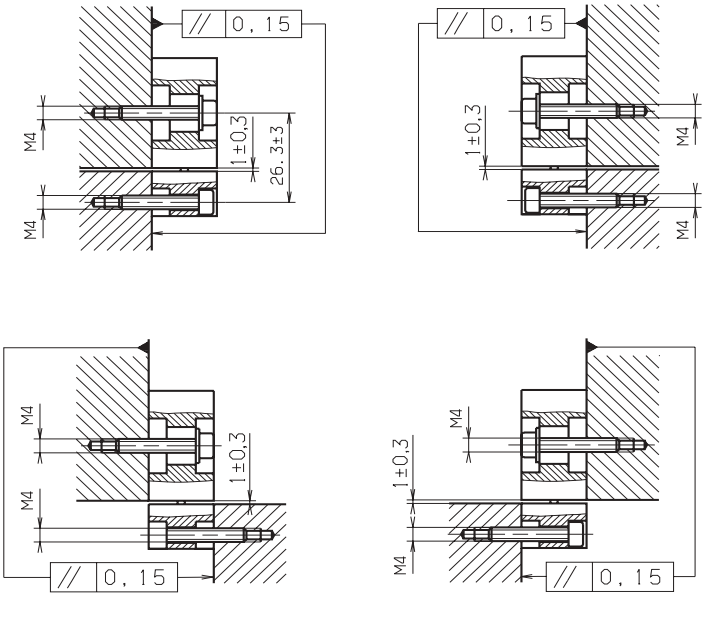
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 670.23 = times 1
MSA 670.24 = times 1
MSA 670.63 = times 5
MSA 670.64 = times 5
MSA 670.73 = times 10
MSA 670.74 = times 10
MSA 670.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 670 Dimensions - Mounting tolerances - Mounting possibilities:





** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 671 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 671.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 671.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 671.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 671.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 671.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 671.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 671.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 671.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 671.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 671.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 671.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240

Measuring type: glass scale

Reference mark (RI): selectable
MSA 671.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 671.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s² (40 to 2000 Hz)
Permissible shock: 300 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
0,8 kg/m (scale spar) + 75 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 671.03
MSA 671.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 671.13
MSA 671.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

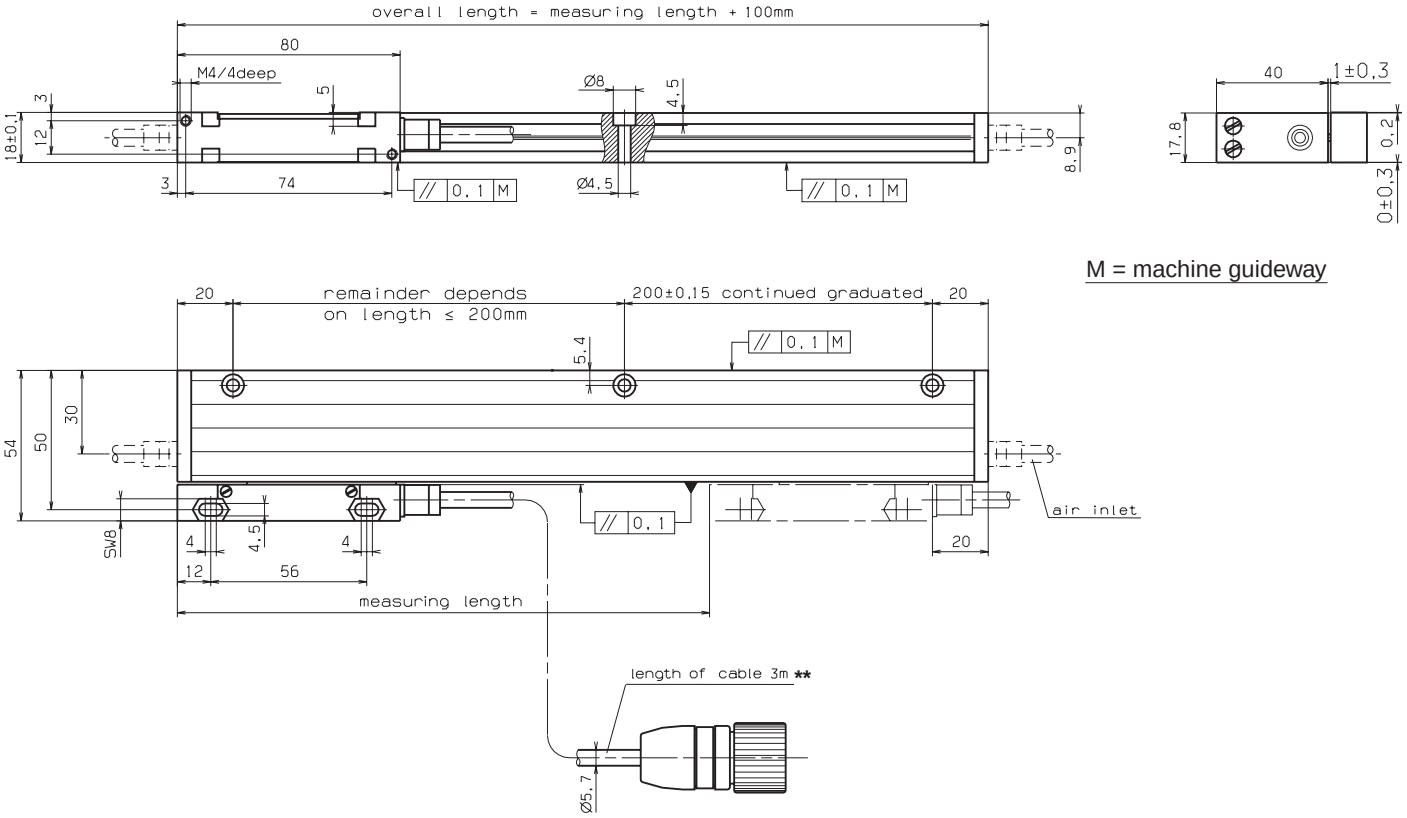
• **square wave signals** (single ended)
with integrated Subdividing Electronics

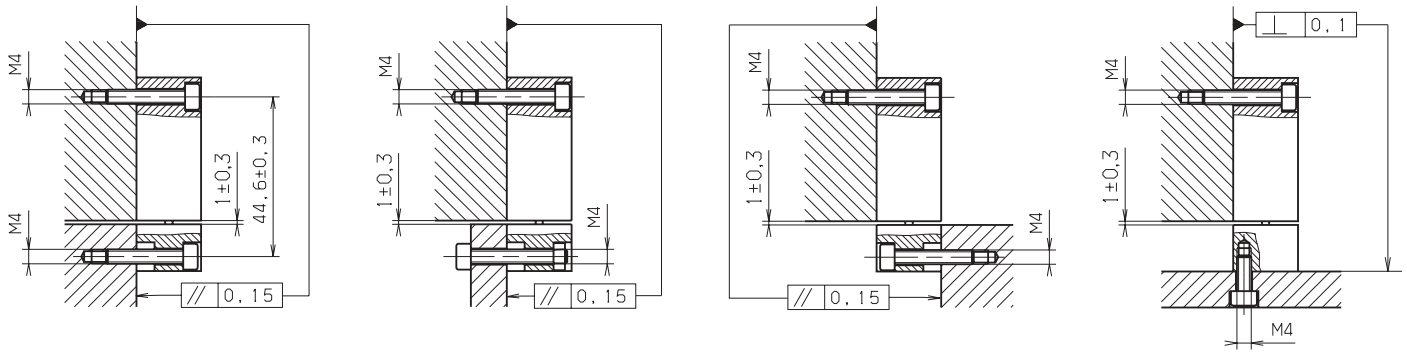
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 671.23 = times 1
MSA 671.24 = times 1
MSA 671.63 = times 5
MSA 671.64 = times 5
MSA 671.73 = times 10
MSA 671.74 = times 10
MSA 671.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 671 Dimensions - Mounting tolerances - Mounting possibilities:





** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 672 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• Sinusoidal voltage signals 1 V_{pp}					
MSA 672.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 672.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• Sinusoidal micro-current signals					
MSA 672.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 672.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• Square wave Line Driver signals with integrated Subdividing					
MSA 672.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 672.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 672.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 672.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 672.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 672.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 672.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240

Measuring type: glass scale

Reference mark (RI): selectable
MSA 672.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 672.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
< 6 N (two set of sealing lips)

Environmental sealing DIN 40050:
IP 54 (two set of sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s^2 (40 to 2000 Hz)
Permissible shock: 300 m/s^2 (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
0,8 kg/m (scale spar) + 80 g (scanning head without cable)

Signal-outputs (optional):

• sinusoidal voltage signals
MSA 672.03
MSA 672.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• sinusoidal micro-current signals
MSA 672.13
MSA 672.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

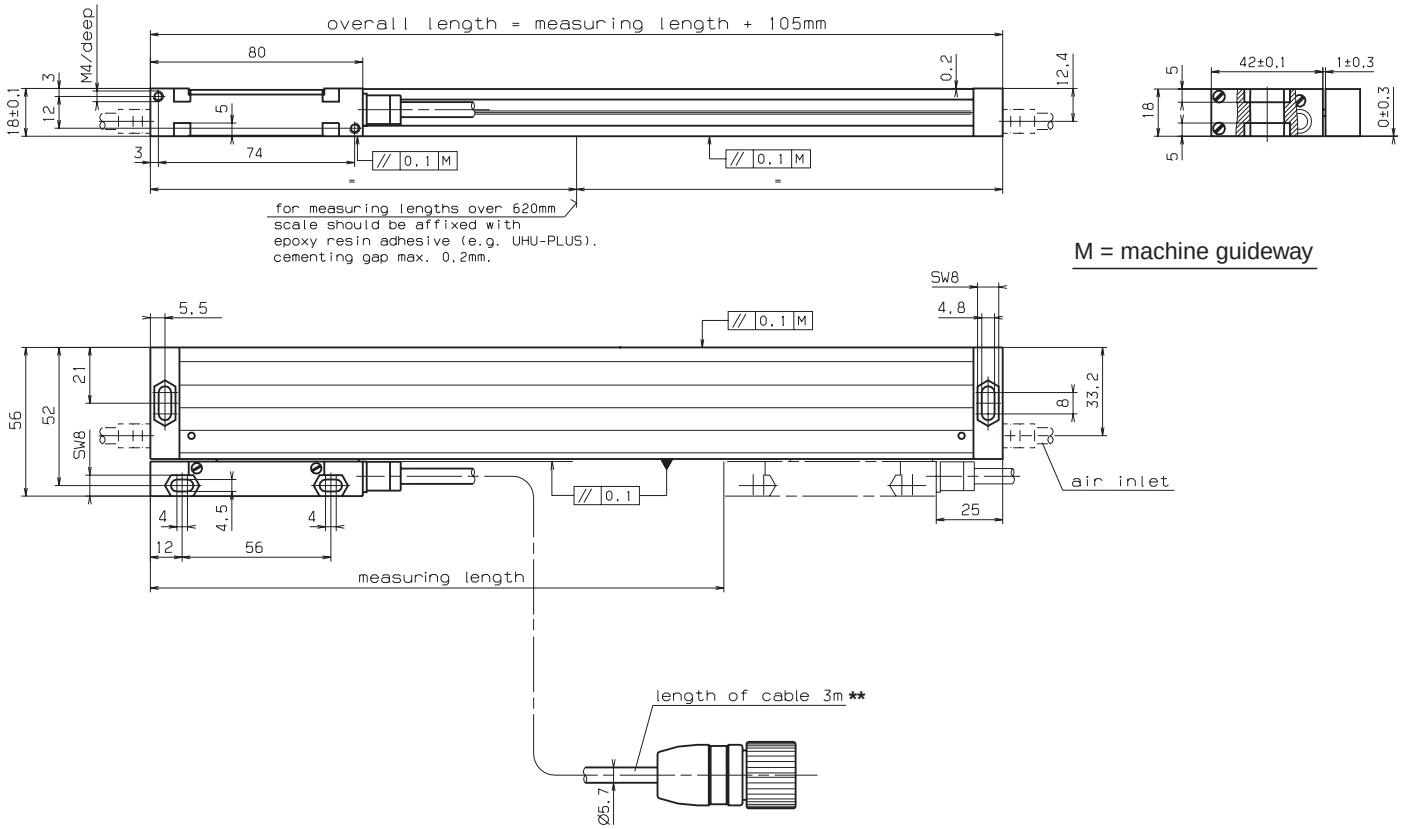
• square wave signals (single ended)
with integrated Subdividing Electronics

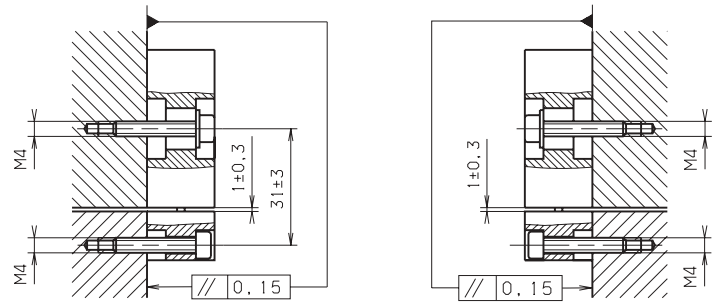
• square wave signals (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 672.23 = times 1
MSA 672.24 = times 1
MSA 672.63 = times 5
MSA 672.64 = times 5
MSA 672.73 = times 10
MSA 672.74 = times 10
MSA 672.51 = times 25

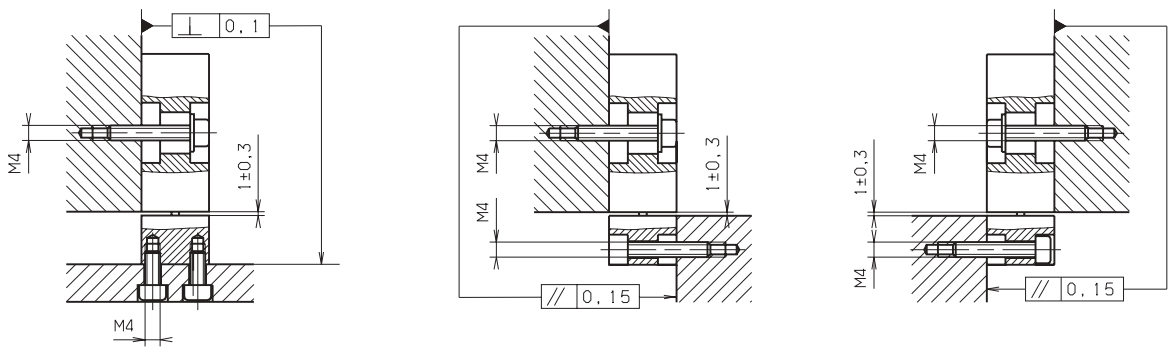
Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 672 Dimensions - Mounting tolerances - Mounting possibilities:







** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 680 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 680.03	depending on external Subdividing	±3, ±5 µm/m	20 µm	1 m/s	2 m/s
MSA 680.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 680.13	depending on external Subdividing	±3, ±5 µm/m	20 µm	1 m/s	2 m/s
MSA 680.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 680.23	5 µm	±5 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 680.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 680.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 680.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 680.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 680.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 820, 920, 1040, 1140, 1240

Measuring type: glass scale

Reference mark (RI): selectable
MSA 680.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 680.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 100 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
0,8 kg/m (scale spar) + 75 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 680.03
MSA 680.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 680.13
MSA 680.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

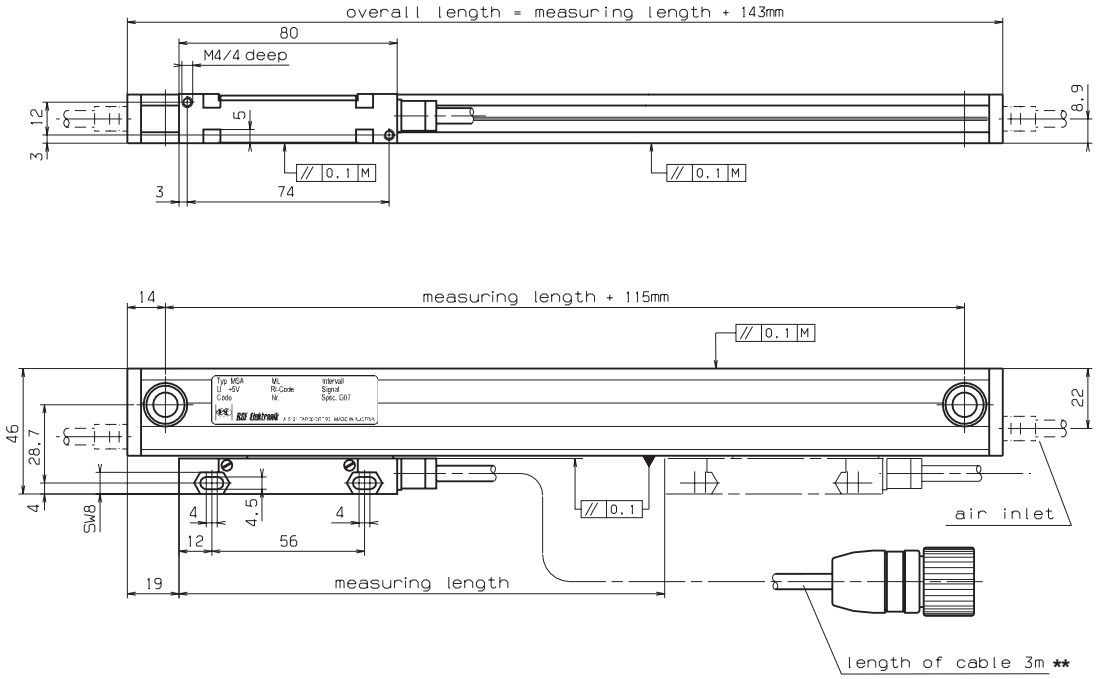
• **square wave signals** (single ended)
with integrated Subdividing Electronics

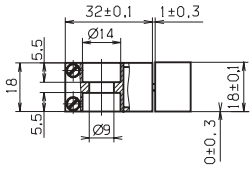
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 680.23 = times 1
MSA 680.63 = times 5
MSA 680.64 = times 5
MSA 680.73 = times 10
MSA 680.74 = times 10
MSA 680.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

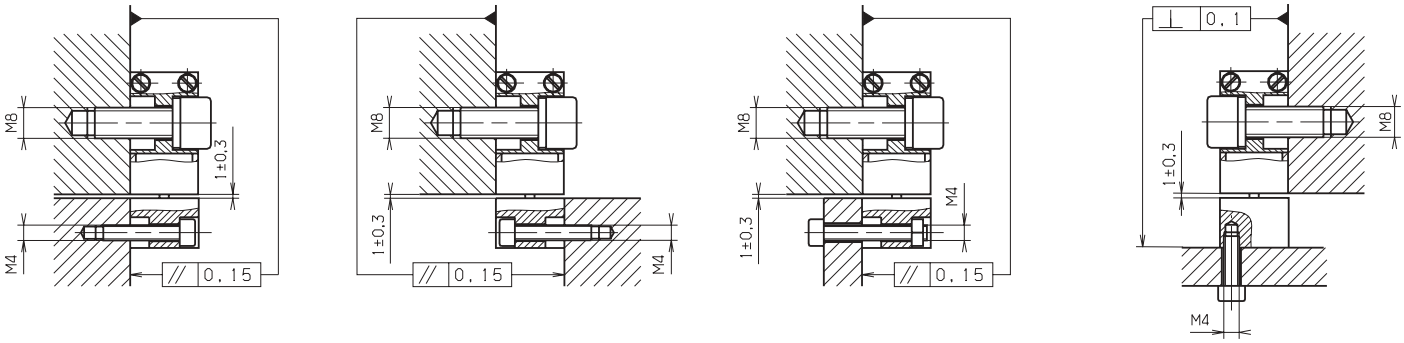
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 680 Dimensions - Mounting tolerances - Mounting possibilities:





M = machine guideway



** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 370 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• Sinusoidal voltage signals 1 V_{pp}					
MSA 370.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 370.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• Sinusoidal micro-current signals					
MSA 370.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 370.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• Square wave Line Driver signals with integrated Subdividing					
MSA 370.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 370.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 370.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 370.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 370.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 370.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 370.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040

Measuring type: glass scale

Reference mark (RI): selectable
MSA 370.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 370.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s^2 (40 to 2000 Hz)
Permissible shock: 300 m/s^2 (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
3 kg/m (scale spar) + 245 g (scanning head without cable)

Signal-outputs (optional):

• sinusoidal voltage signals
MSA 370.03
MSA 370.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V (useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• sinusoidal micro-current signals
MSA 370.13
MSA 370.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

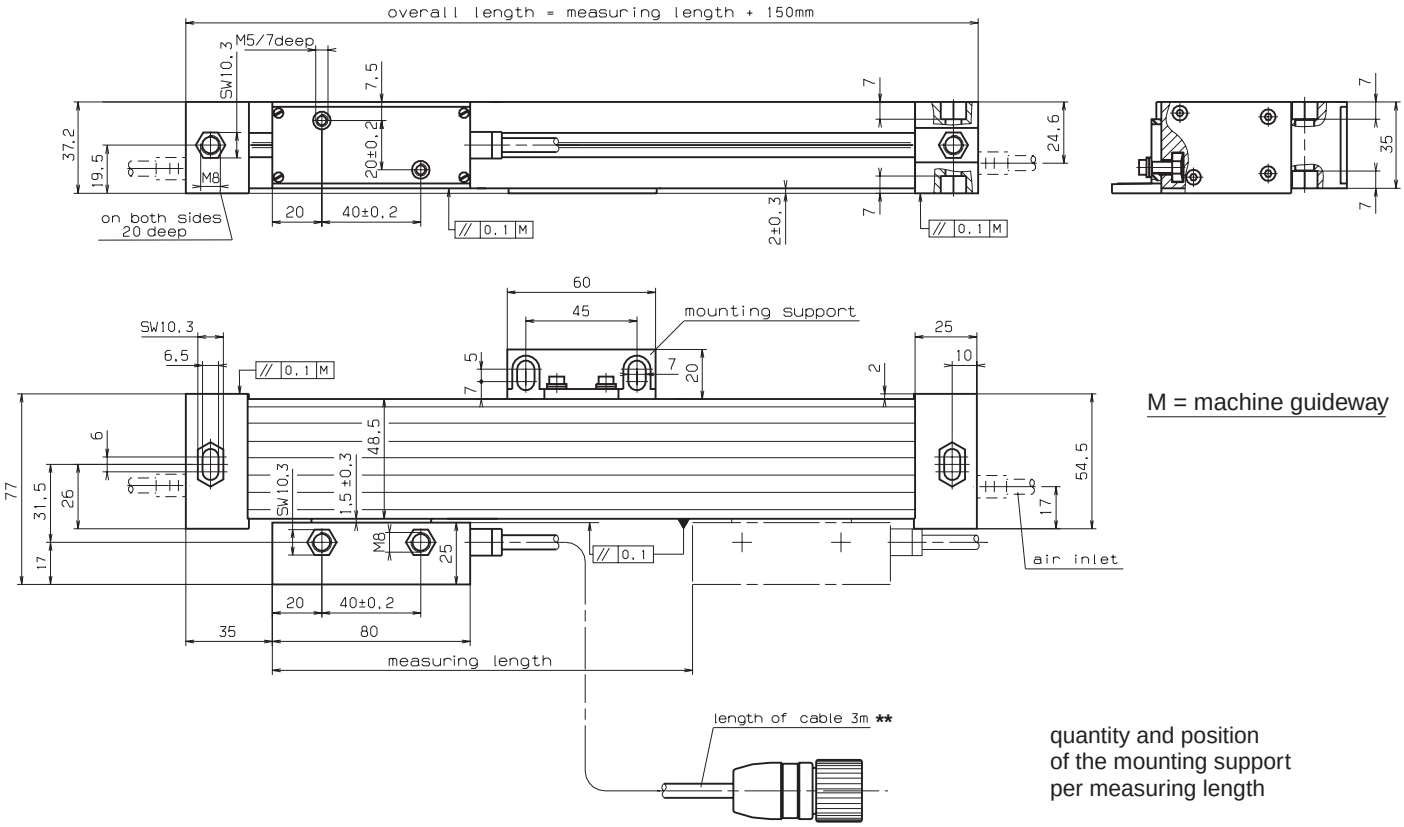
• square wave signals (single ended)
with integrated Subdividing Electronics

• square wave signals (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 370.23 = times 1
MSA 370.24 = times 1
MSA 370.63 = times 5
MSA 370.64 = times 5
MSA 370.73 = times 10
MSA 370.74 = times 10
MSA 370.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

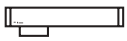
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 370 Dimensions - Mounting tolerances - Mounting possibilities:

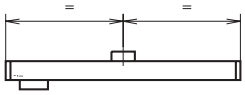


M = machine guideway

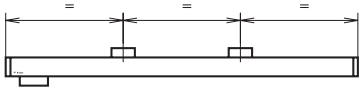
quantity and position
of the mounting support
per measuring length



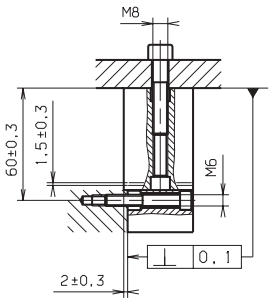
170 - 520 mm

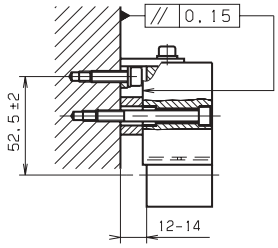


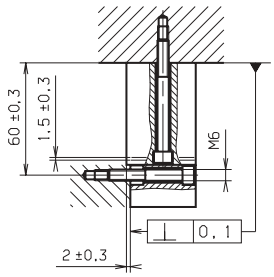
620 - 1020 mm 1x

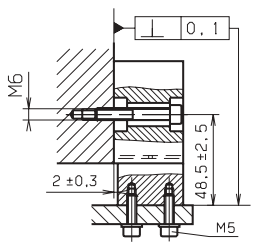


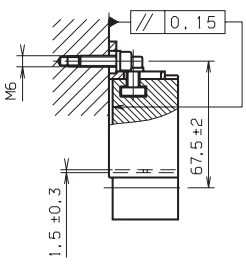
1140 - 2040 mm 2x
2240 - 3040 mm 3x

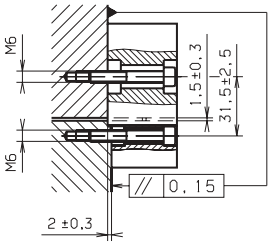


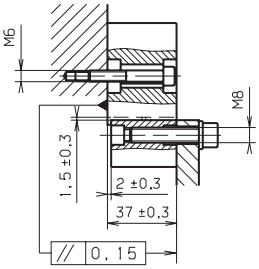












****** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 371 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 371.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 371.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 371.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 371.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 371.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 371.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 371.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 371.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 371.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 371.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 371.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040

Measuring type: glass scale

Reference mark (RI): selectable
MSA 371.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 371.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s^2 (40 to 2000 Hz)
Permissible shock: 300 m/s^2 (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
3 kg/m (scale spar) + 245 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 371.03
MSA 371.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 371.13
MSA 371.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

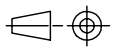
• **square wave signals** (single ended)
with integrated Subdividing Electronics

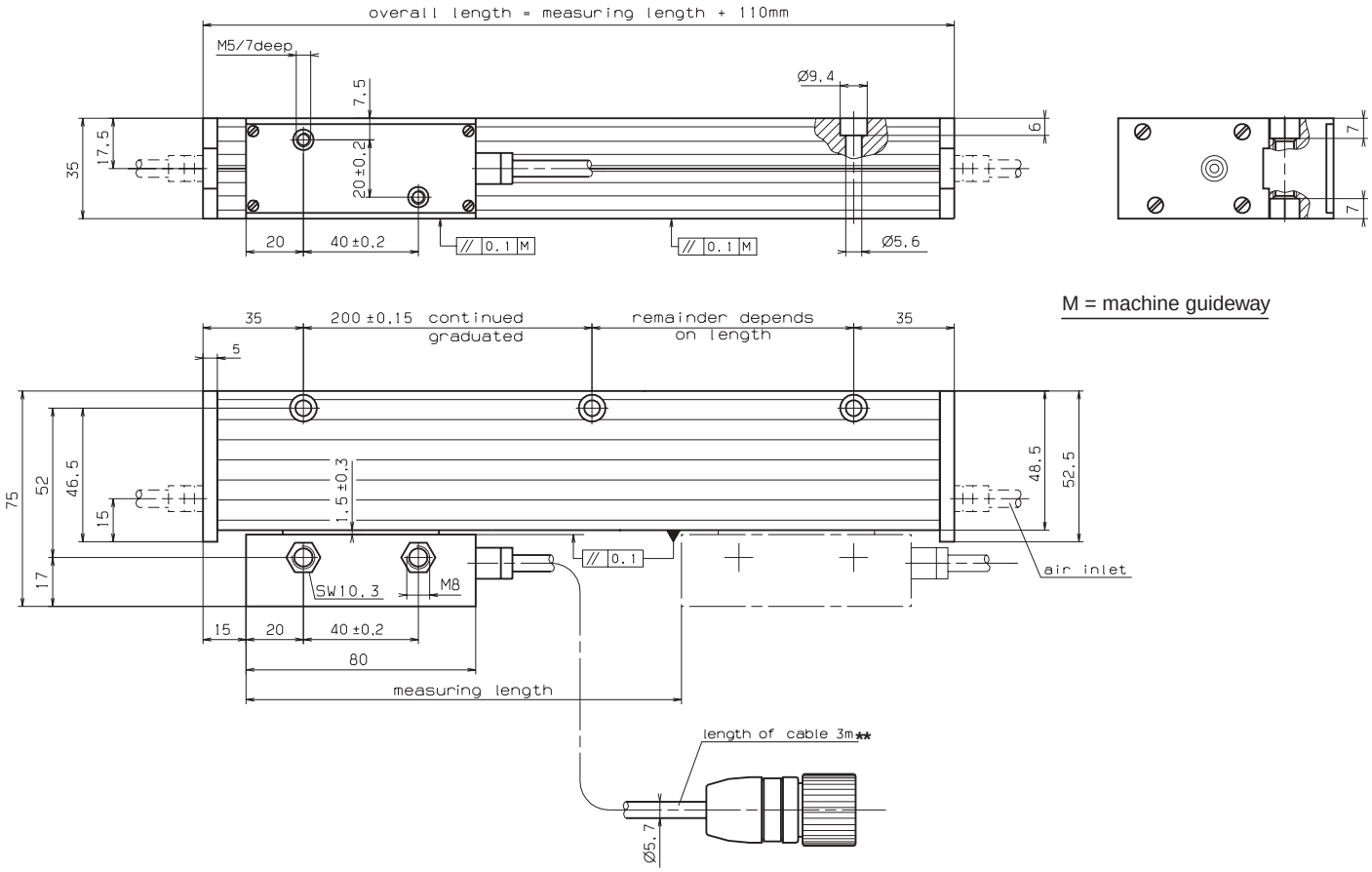
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 371.23 = times 1
MSA 371.24 = times 1
MSA 371.63 = times 5
MSA 371.64 = times 5
MSA 371.73 = times 10
MSA 371.74 = times 10
MSA 371.51 = times 25

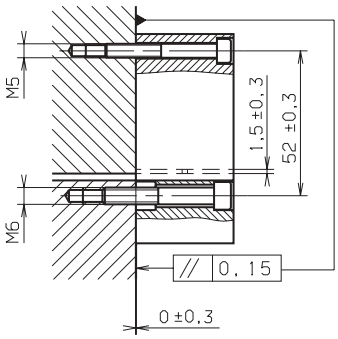
Power supply:
+5 V ±5%, max. 150 mA (unloaded)

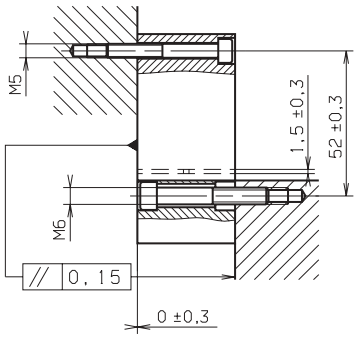
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

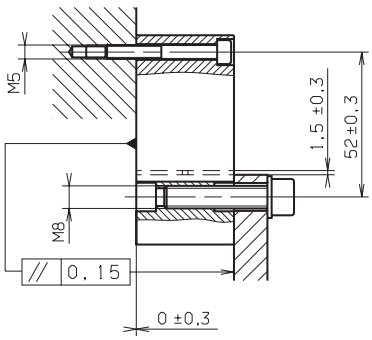
MSA 371 Dimensions - Mounting tolerances - Mounting possibilities:

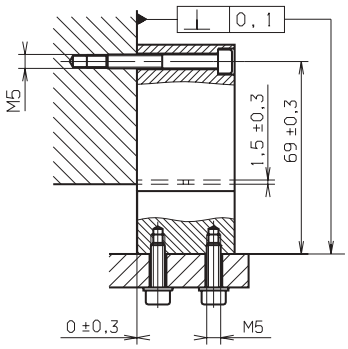












****** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 372 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 372.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 372.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 372.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 372.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 372.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 372.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 372.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 372.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 372.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 372.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 372.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040

Measuring type: glass scale

Reference mark (RI): selectable
MSA 372.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 372.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
< 6 N (two set of sealing lips)

Environmental sealing DIN 40050:
IP 54 (two set of sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s^2 (40 to 2000 Hz)
Permissible shock: 300 m/s^2 (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
3 kg/m (scale spar) + 245 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 372.03
MSA 372.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 372.13
MSA 372.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

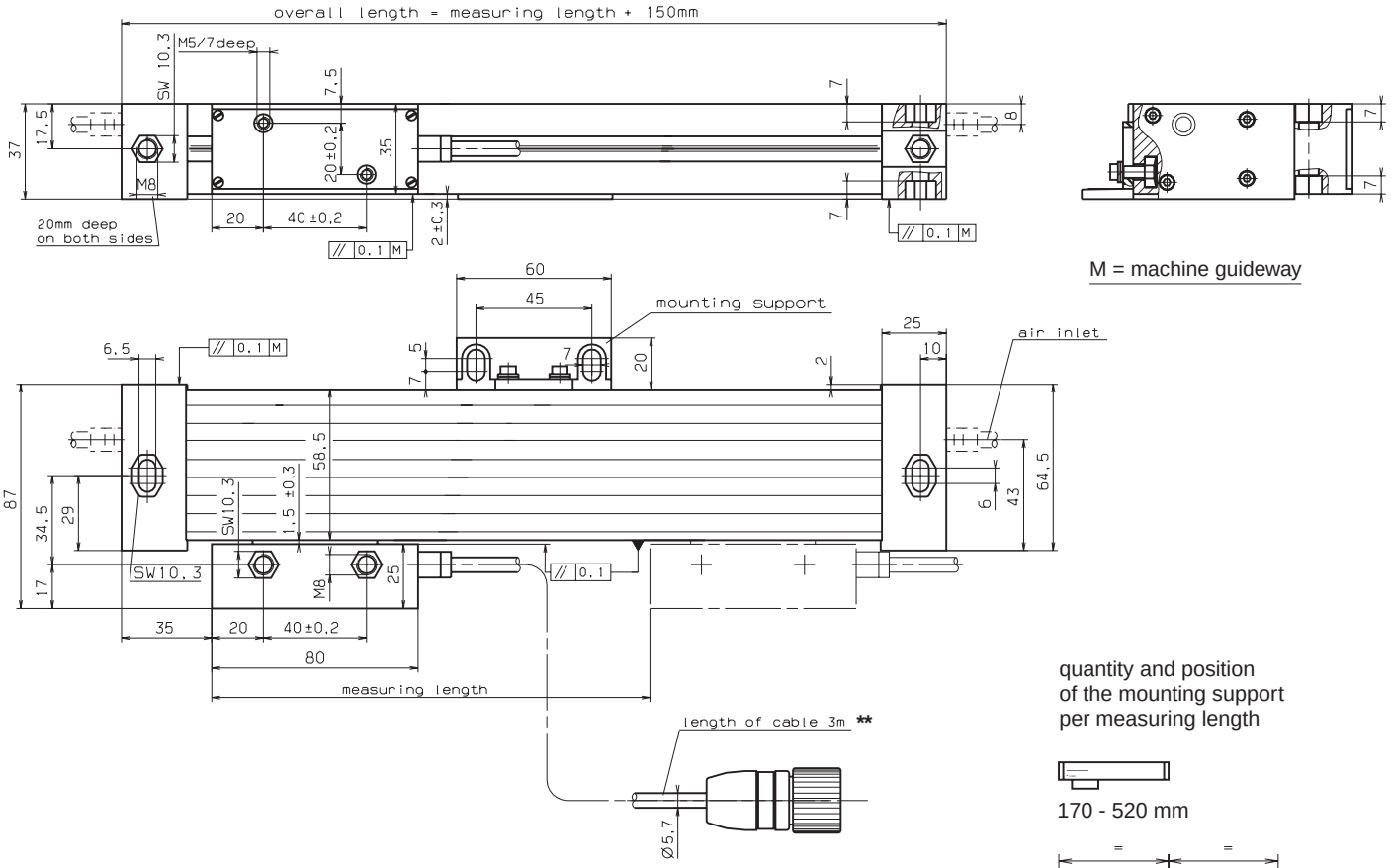
• **square wave signals** (single ended)
with integrated Subdividing Electronics

• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 372.23 = times 1
MSA 372.24 = times 1
MSA 372.63 = times 5
MSA 372.64 = times 5
MSA 372.73 = times 10
MSA 372.74 = times 10
MSA 372.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

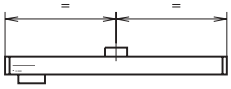
MSA 372 Dimensions - Mounting tolerances - Mounting possibilities:



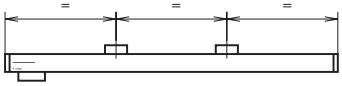
M = machine guideway

quantity and position
of the mounting support
per measuring length

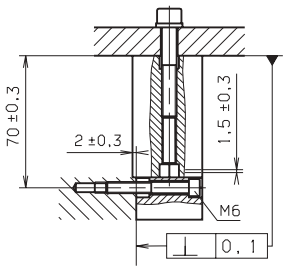
170 - 520 mm

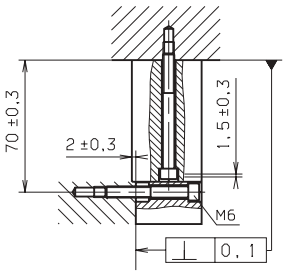


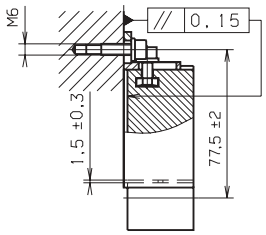
620 - 1020 mm 1x

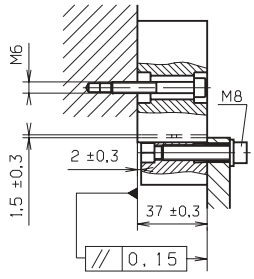


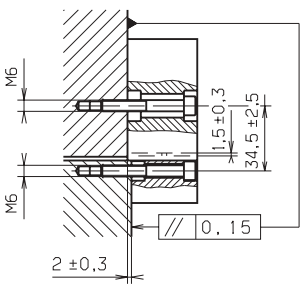
1140 - 2040 mm 2x
2240 - 3040 mm 3x

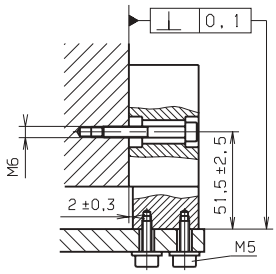


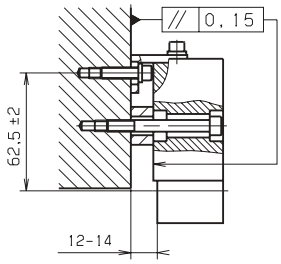












** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 673 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• **Sinusoidal micro-current signals**					
MSA 673.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 673.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 673.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 673.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 673.63	1 µm	±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620
longer measuring lengths on request

Measuring type: glass scale

Reference mark (RI): selectable
MSA 673.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 673.xx:
One Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI`s separated by distances of n x 50 mm.

Required moving force: < 10 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 100 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature: -20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
0,8 kg/m (scale spar) + 200 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal micro-current signals**
MSA 673.13

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

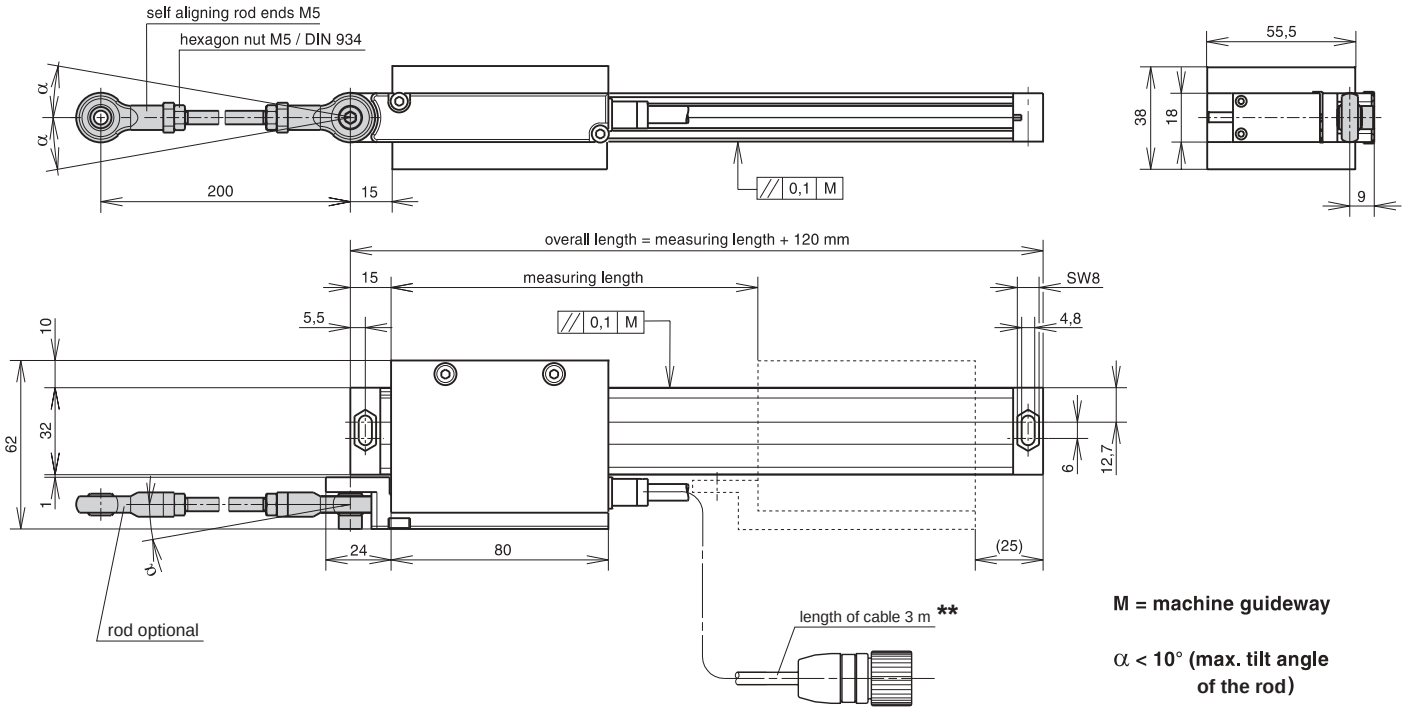
• **square wave signals** (single ended)
with integrated Subdividing Electronics

• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 673.23 = times 1
MSA 673.24 = times 1
MSA 673.63 = times 5
MSA 673.64 = times 5

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 673 Dimensions - Mounting tolerances - Mounting possibilities:



** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 373 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 373.65	5 µm	±5, ±10 µm/m	100 µm	1 m/s (> 500 ns)	1 m/s (> 500 ns)
MSA 373.55	1 µm	±5, ±10 µm/m	100 µm	1,8 m/s (> 500 ns)	1,8 m/s (> 500 ns)

* **Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620
(longer measuring lengths on request)

Measuring type: glass scale

Free positionable switching magnets for special functions:
The position of the 2 switch points (S1 and S2) within the measuring length can be select by the customer (details on page 44 and 45)

Reference mark (RI):
Standard:
One Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI`s separated by distances of n x 50 mm.

Required moving force: < 5 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s² (40 to 2000 Hz)
Permissible shock: 300 m/s² (8 ms)

Permissible temperature: -20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
1,2 kg/m (scale spar) + 245 g (scanning head without cable

Signal-outputs (optional):

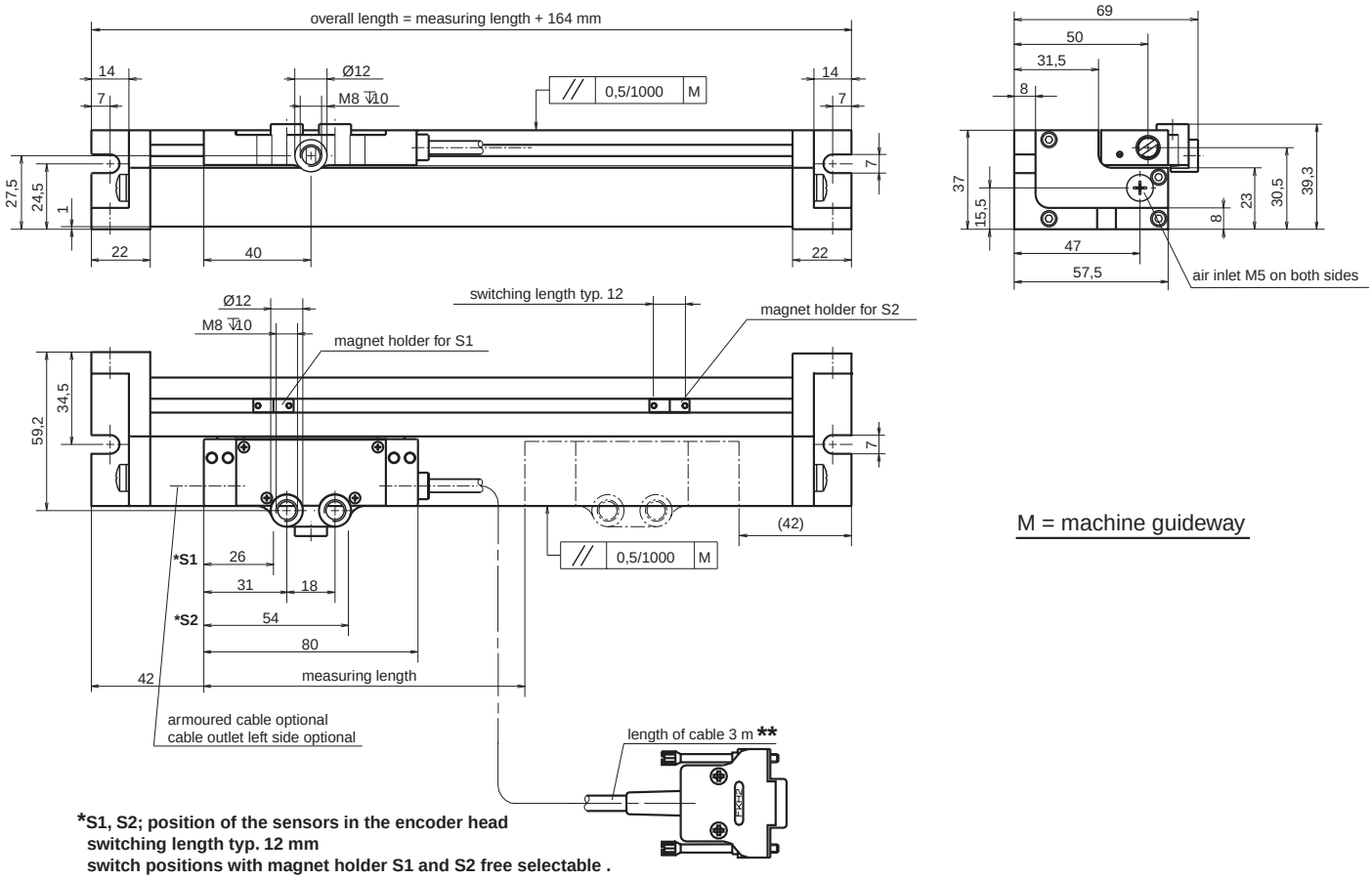
- **square wave signals** (single ended) **with integrated Subdividing Electronics**

- **square wave signals** (differential) **via Line Driver RS 422 standard with integrated Subdividing Electronics**
  MSA 373.65 = times 5
  MSA 373.55 = times 25

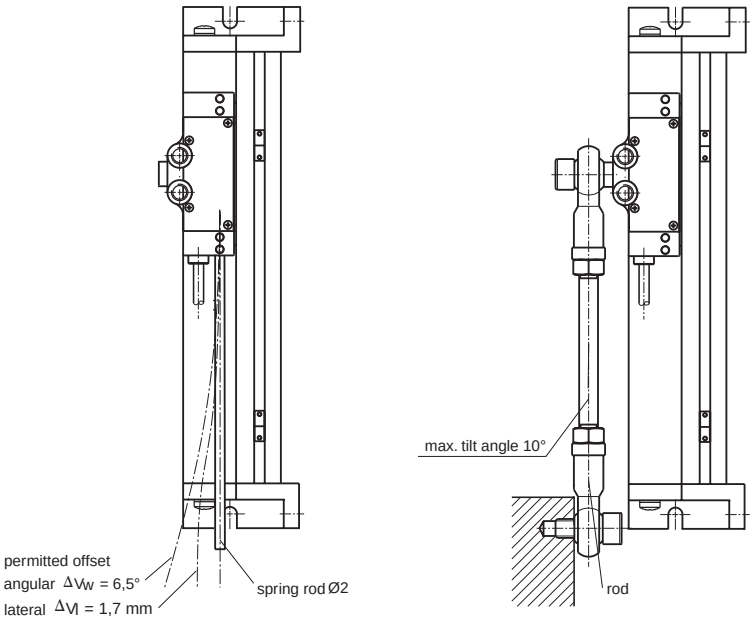
Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 373 Dimensions - Mounting tolerances - Mounting possibilities:



***S1, S2; position of the sensors in the encoder head**
switching length typ. 12 mm
switch positions with magnet holder S1 and S2 free selectable .
place the magnet holder and tighten the set screw
with 1,27 mm allen wrench



**** armoured cable optional**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 690 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 690.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 690.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 690.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 690.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 690.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 690.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 690.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 690.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 690.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 690.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 690.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240

Measuring type: glass scale

Free positionable switching magnets for special functions:
The position of the 2 switch points (S1 and S2) within the measuring length can be select by the customer (details on page 44 and 45)

Reference mark (RI): selectable
MSA 690.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 690.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N, with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 100 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature: -20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.) 0,8 kg/m (scale spar) + 75 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 690.03
MSA 690.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 690.13
MSA 690.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

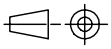
• **square wave signals** (single ended)
with integrated Subdividing Electronics

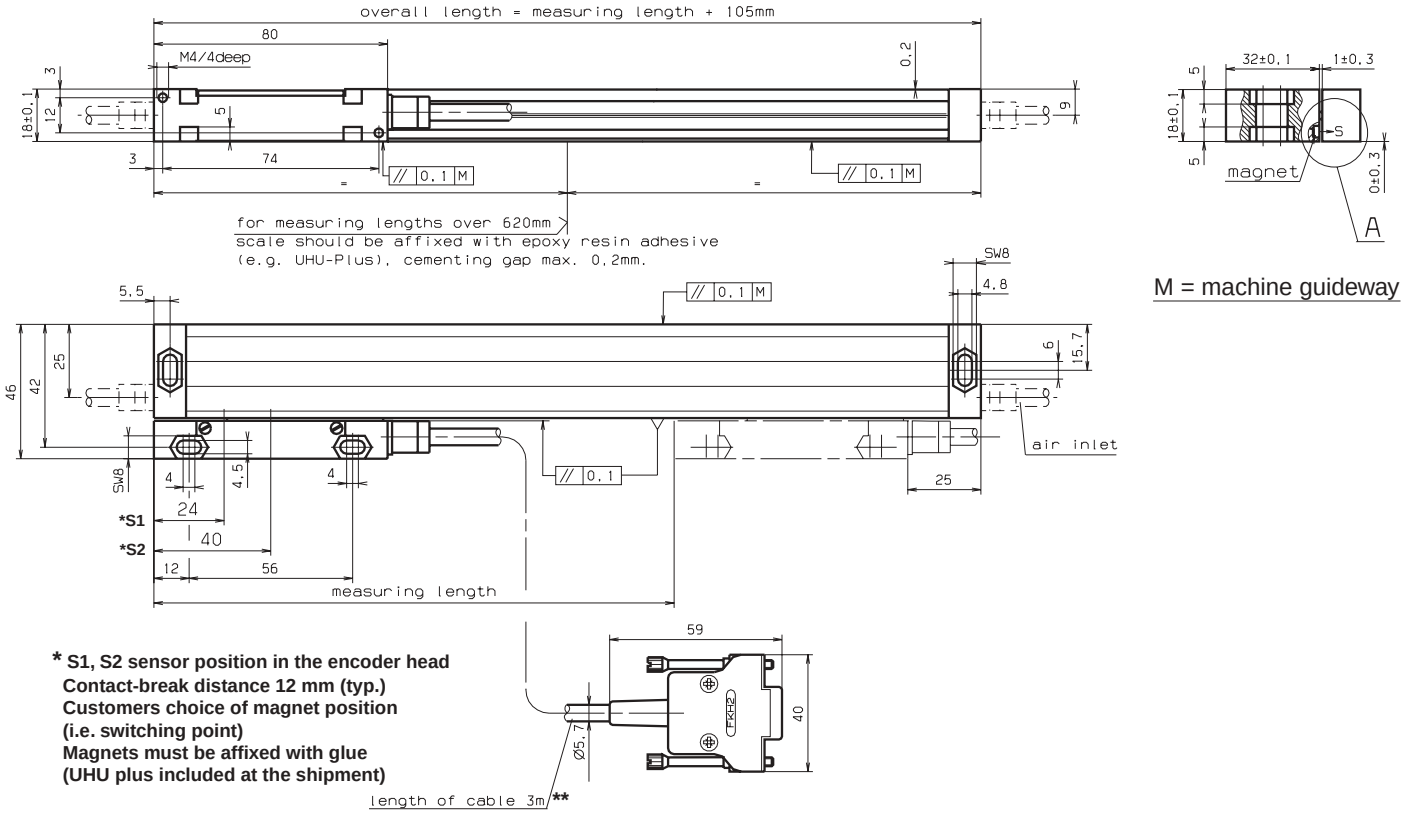
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 690.23 = times 1
MSA 690.24 = times 1
MSA 690.63 = times 5
MSA 690.64 = times 5
MSA 690.73 = times 10
MSA 690.74 = times 10
MSA 690.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

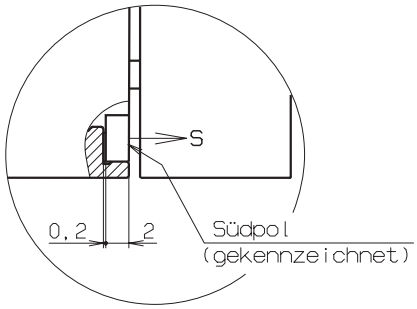
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 690 Dimensions - Mounting tolerances - Mounting possibilities:

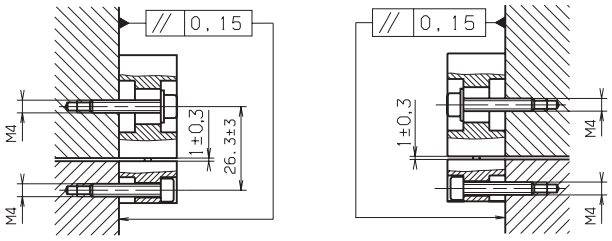


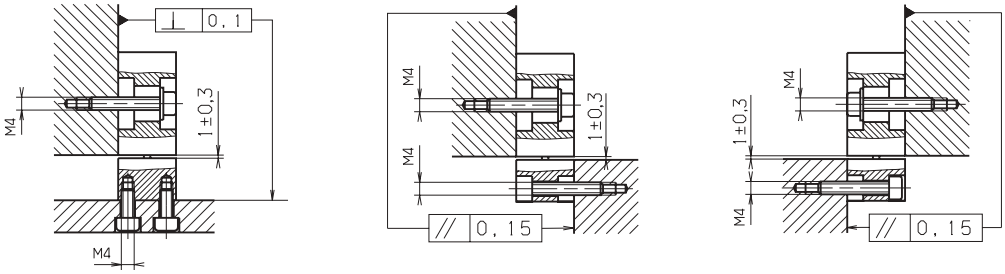


*** S1, S2 sensor position in the encoder head**
Contact-break distance 12 mm (typ.)
Customers choice of magnet position
(i.e. switching point)
Magnets must be affixed with glue
(UHU plus included at the shipment)



Detail: A





****** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 691 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 691.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 691.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 691.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 691.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 691.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 691.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 691.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 691.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 691.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 691.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 691.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,45 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240

Measuring type: glass scale

Free positionable switching magnets for special functions:
The position of the 2 switch points (S1 and S2) within the measuring length can be select by the customer (details on page 44 and 45)

Reference mark (RI): selectable
MSA 691.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 691.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips), IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 100 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature: -20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.) 0,8 kg/m (scale spar) + 75 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 691.03
MSA 691.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 691.13
MSA 691.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

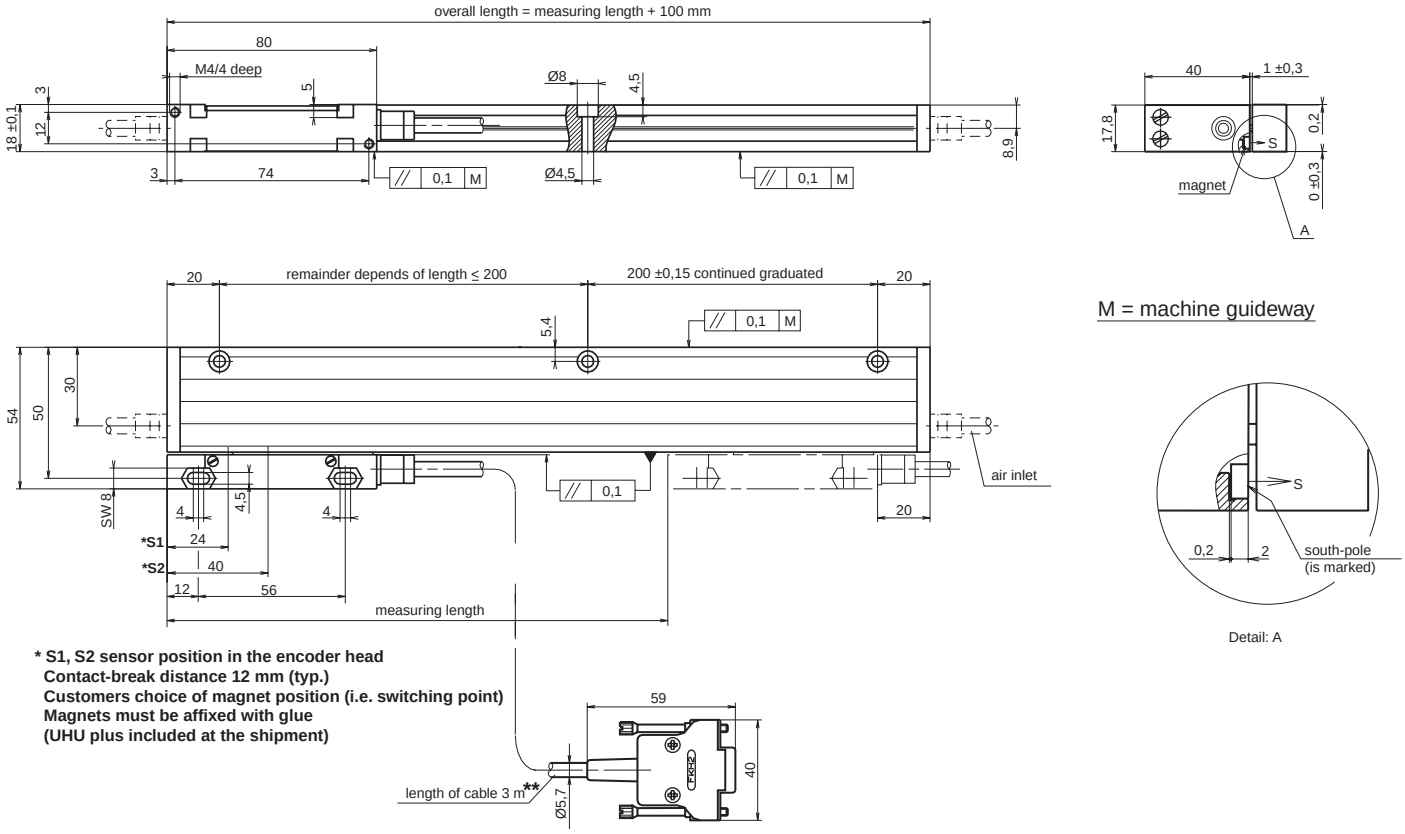
• **square wave signals** (single ended)
with integrated Subdividing Electronics

• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 691.23 = times 1
MSA 691.24 = times 1
MSA 691.63 = times 5
MSA 691.64 = times 5
MSA 691.73 = times 10
MSA 691.74 = times 10
MSA 691.51 = times 25

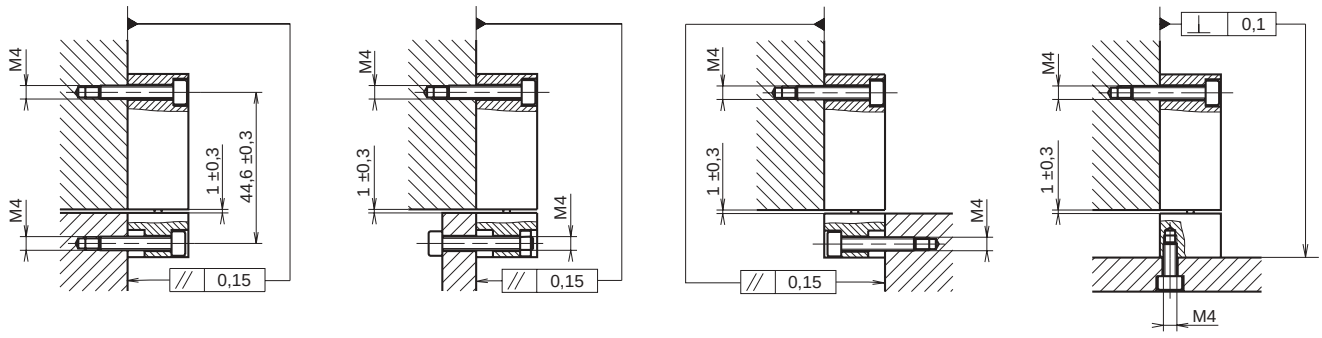
Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 691 Dimensions - Mounting tolerances - Mounting possibilities:



*** S1, S2 sensor position in the encoder head**
Contact-break distance 12 mm (typ.)
Customers choice of magnet position (i.e. switching point)
Magnets must be affixed with glue
(UHU plus included at the shipment)



****** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 390 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 390.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 390.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 390.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 390.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 390.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 390.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 390.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 390.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 390.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 390.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 390.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,3 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040

Measuring type: glass scale

Free positionable switching magnets for special functions:
The position of the 2 switch points (S1 and S2) within the measuring length can be select by the customer (details on page 44 and 45)

Selectable Reference mark (RI):
Standard: A customized positioned switch magnet activates one of the reference marks, which are disposed by distances of n x 50 mm.
The label at the extrusion remarks the position of the first reference mark.

Option: (positioning by works)
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.
The free positionable switching magnets are used for individual function (instead selectable RI-mark).
The switch track (S3) will be accomblished (details on page 44 and 45).

Required moving force: < 3 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s² (40 to 2000 Hz)
Permissible shock: 300 m/s² (8 ms)

Permissible temperature: -20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.) 3 kg/m (scale spar) + 245 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 390.03
MSA 390.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 390.13
MSA 390.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

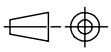
• **square wave signals** (single ended)
with integrated Subdividing Electronics

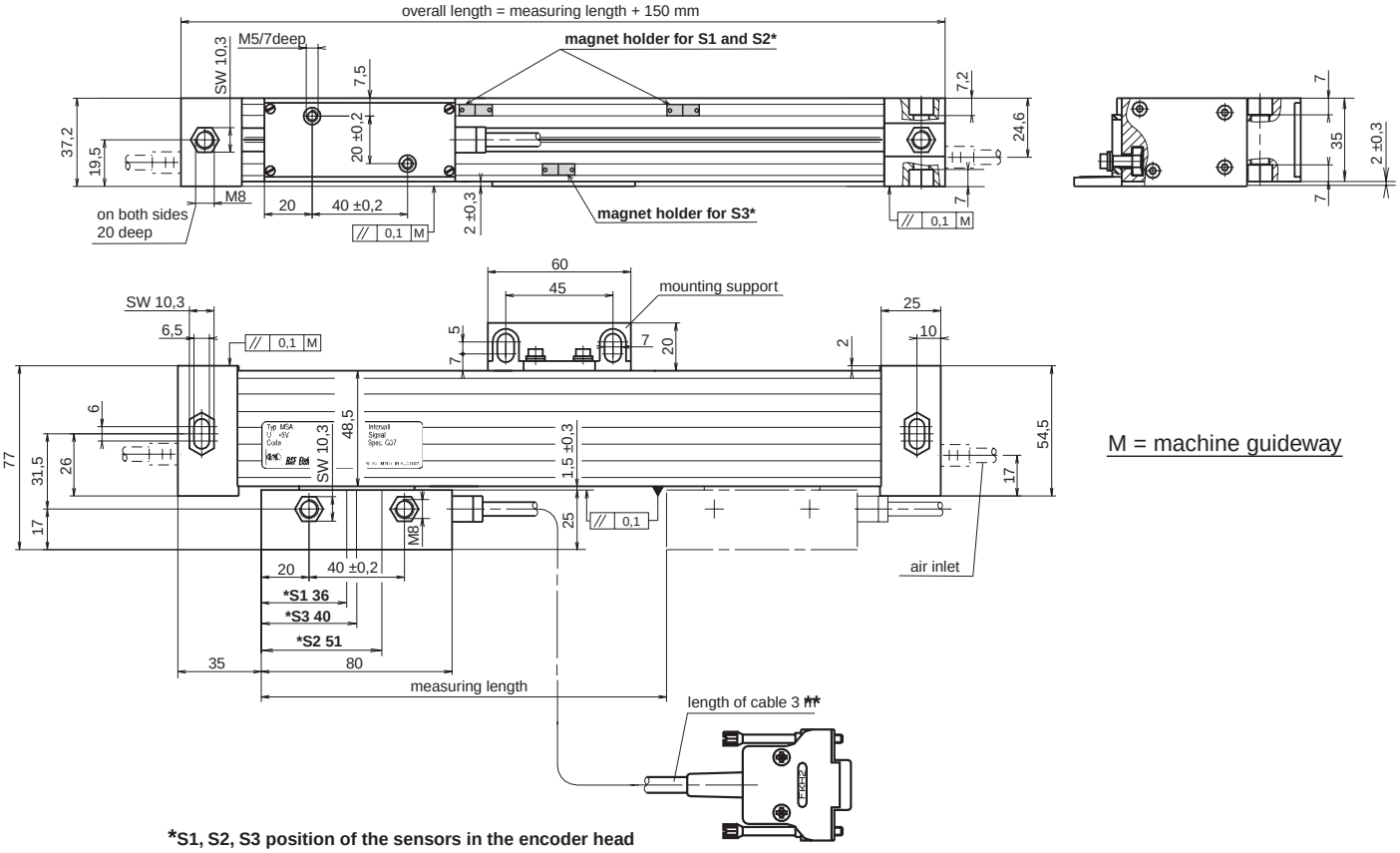
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 390.23 = times 1
MSA 390.24 = times 1
MSA 390.63 = times 5
MSA 390.64 = times 5
MSA 390.73 = times 10
MSA 390.74 = times 10
MSA 390.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

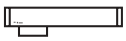
MSA 390 Dimensions - Mounting tolerances - Mounting possibilities:



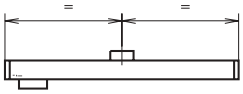


***S1, S2, S3 position of the sensors in the encoder head**
switching length typ. 12 mm
with magnet holder S1 and S2 free selectable switch positions
with magnet holder S3 select the RI-mark
place the magnet holder and tighten the set screw with 1.27 mm allen wrench

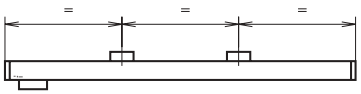
quantity and position
of the mounting support
per measuring length



170 - 520 mm



620 - 1020 mm 1x



1140 - 2040 mm 2x
2240 - 3040 mm 3x

**armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 391 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• **Sinusoidal voltage signals 1 V_{pp}**					
MSA 391.03	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 391.01	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Sinusoidal micro-current signals**					
MSA 391.13	depending on external Subdividing	±3, ±5, ±10 µm/m	20 µm	1 m/s	2 m/s
MSA 391.11	depending on external Subdividing	±2, ±3 µm/m	10 µm	1 m/s	1 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 391.24	10 µm	±10 µm/m	40 µm	1 m/s (> 6,6 µs)	2 m/s (> 3,3 µs)
MSA 391.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 3,3 µs)	2 m/s (> 1,6 µs)
MSA 391.64	2 µm	±5 µm/m	40 µm	1 m/s (> 1,2 µs)	2 m/s (> 600 ns)
MSA 391.63	1 µm	±3, ±5 µm/m	20 µm	1 m/s (> 600 ns)	1 m/s (> 600 ns)
MSA 391.73	0,5 µm	±3, ±5 µm/m	20 µm	1 m/s (> 300 ns)	1 m/s (> 300 ns)
MSA 391.71	0,25 µm	±2, ±3, ±5 µm/m	10 µm	0,5 m/s (> 300 ns)	0,5 m/s (> 300 ns)
MSA 391.51	0,1 µm	±2, ±3, ±5 µm/m	10 µm	0,45 m/s (> 200 ns)	0,3 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240, 2440, 2640, 2840, 3040

Measuring type: glass scale

Switching magnets for special functions:
The position of the 2 switch points (S1 and S2) within the measuring length can be select by the customer (details on page 44 and 45)

Selectable Reference mark (RI):
Standard: A customized positioned switch magnet activates one of the reference marks, which are disposed by distances of n x 50 mm.
The label at the extrusion remarks the position of the first reference mark.

Option: (positioning by works)
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.
The free positionable switching magnets are used for individual function (instead selectable RI-mark).
The switch track (S3) will be accomblished (details on page 44 and 45).

Required moving force: < 3 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 150 m/s² (40 to 2000 Hz)
Permissible shock: 300 m/s² (8 ms)

Permissible temperature: -20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.) 3 kg/m (scale spar) + 245 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal voltage signals**
MSA 391.03
MSA 391.01

Power supply:
+5V ±5%, max. 120 mA (unloaded)

Output signals:
Encoder signals: 0,6 to 1,2 Vpp, typical 1 Vpp
with terminating resistor Zo = 120 Ω
Reference pulse:
0,2 to 0,85 Vss, typical 0,4 V(useable component)
with terminating resistor Zo = 120 Ω

Max. output frequency:
100 kHz (with 3 m cable)

• **sinusoidal micro-current signals**
MSA 391.13
MSA 391.11

Power supply:
+5 V ±5%, max. 120 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

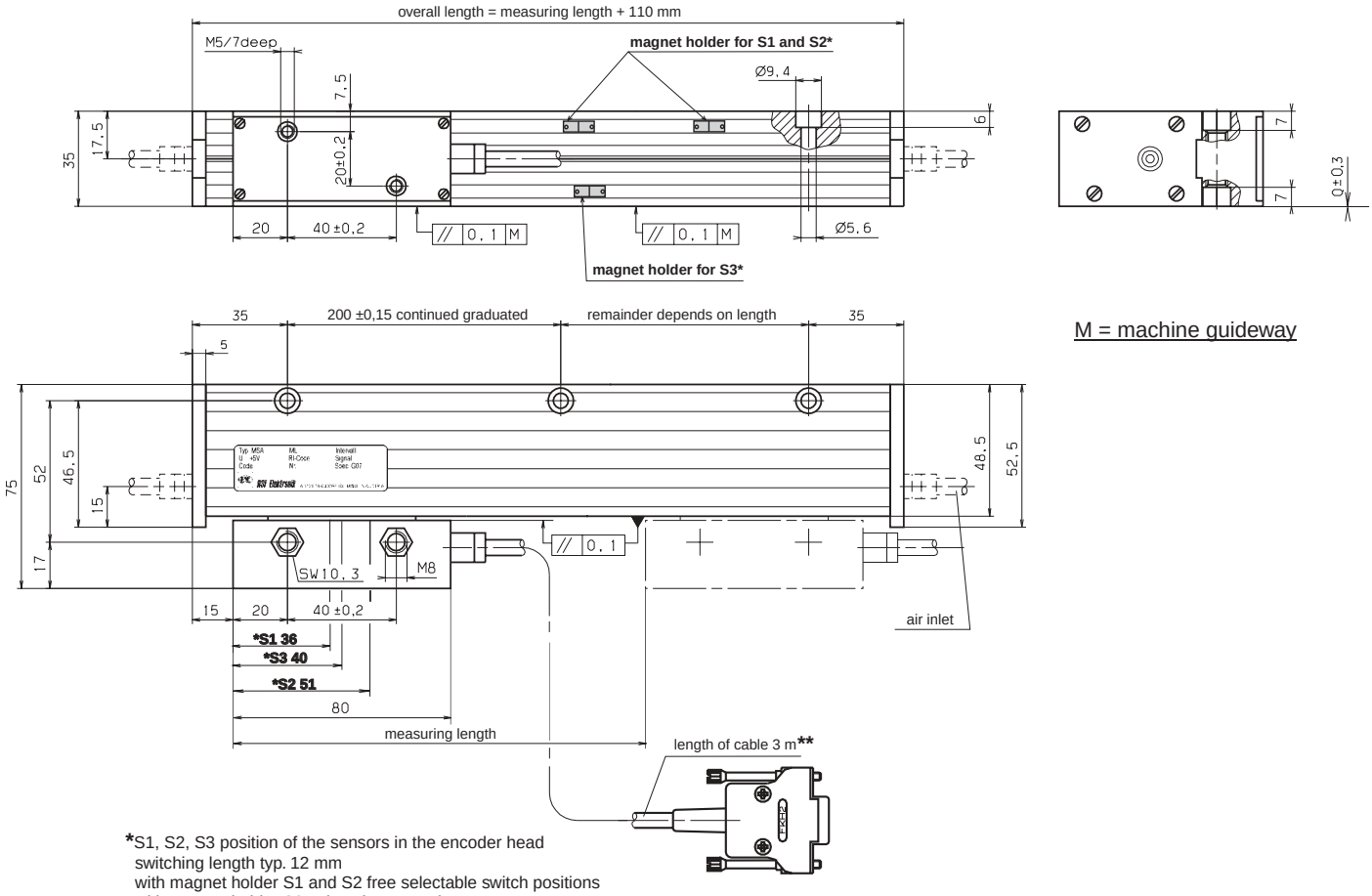
• **square wave signals** (single ended)
with integrated Subdividing Electronics

• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 391.23 = times 1
MSA 391.24 = times 1
MSA 391.63 = times 5
MSA 391.64 = times 5
MSA 391.73 = times 10
MSA 391.74 = times 10
MSA 391.51 = times 25

Power supply:
+5 V ±5%, max. 150 mA (unloaded)

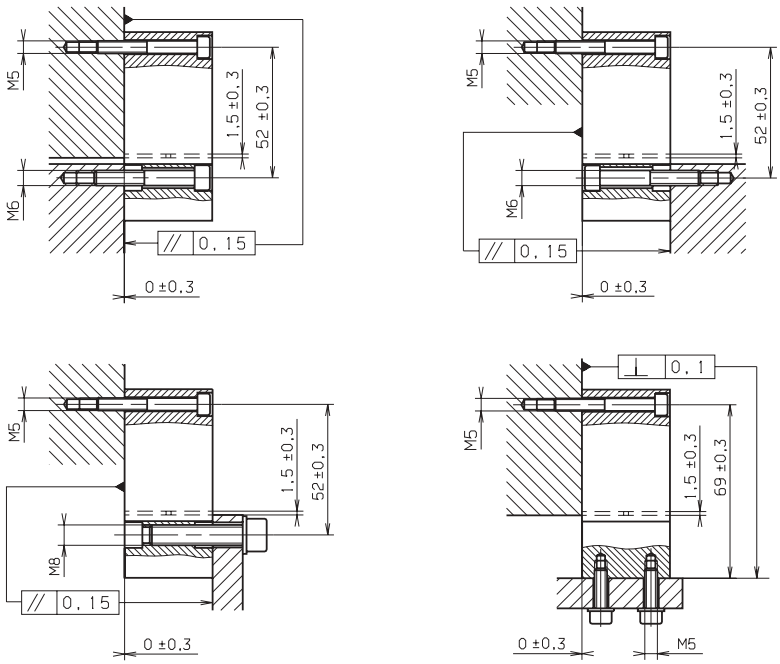
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 391 Dimensions - Mounting tolerances - Mounting possibilities:



M = machine guideway

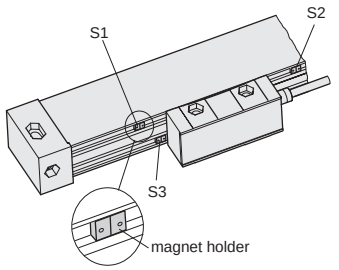
*S1, S2, S3 position of the sensors in the encoder head
switching length typ. 12 mm
with magnet holder S1 and S2 free selectable switch positions
with magnet holder S3 select the RI-mark
place the magnet holder and tighten the set screw with 1.27 mm allen wrench

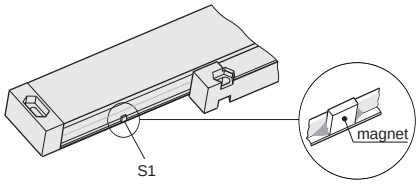


** armoured cable optional

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

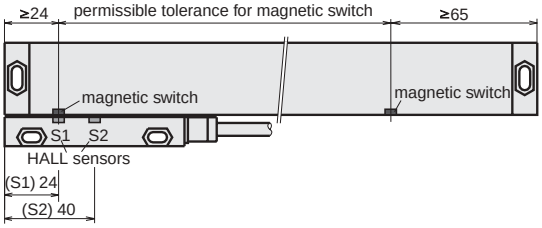
Positioning of the switching magnets



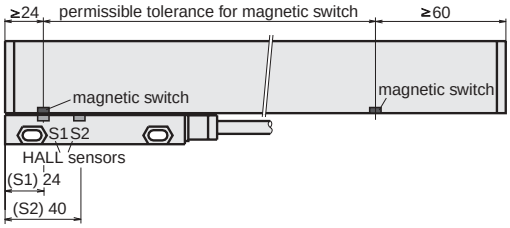


Switch points S1 and S2 for individual function

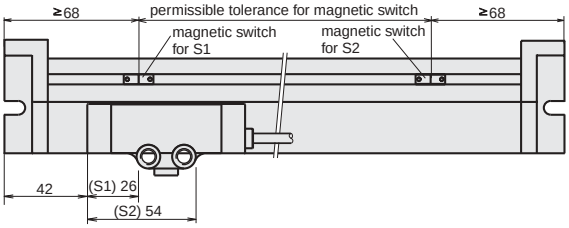
MSA 690



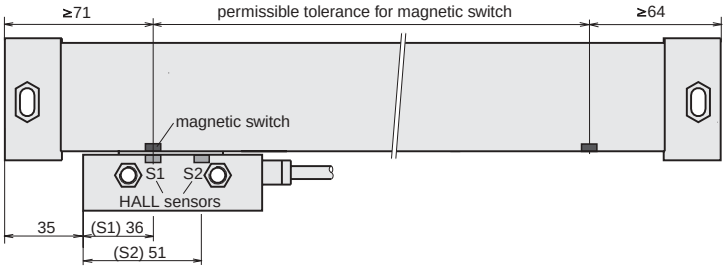
MSA 691



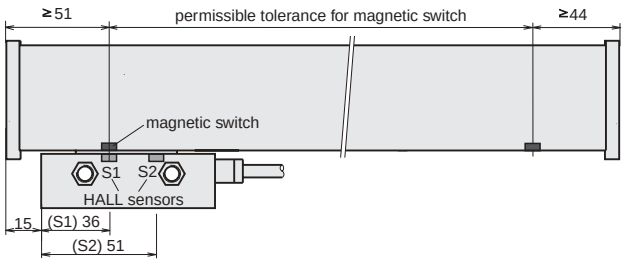
MSA 373



MSA 390

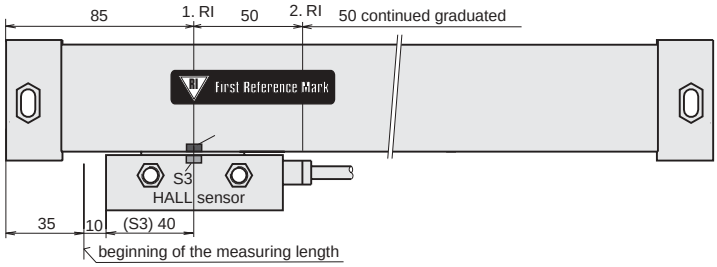


MSA 391

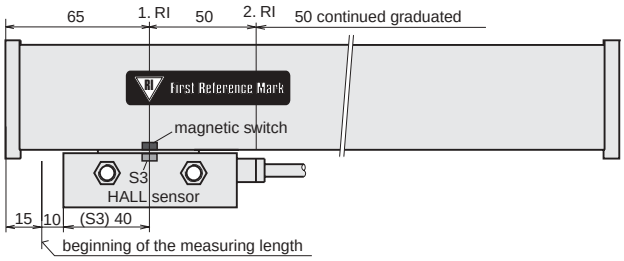


Selectable Reference mark (RI)

MSA 390

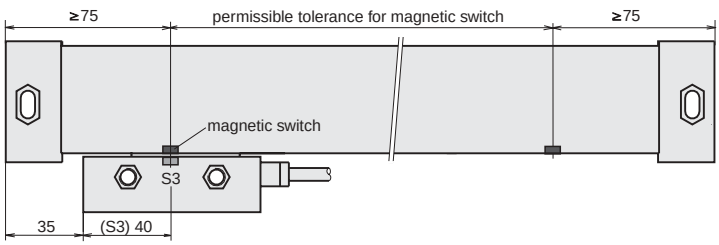


MSA 391

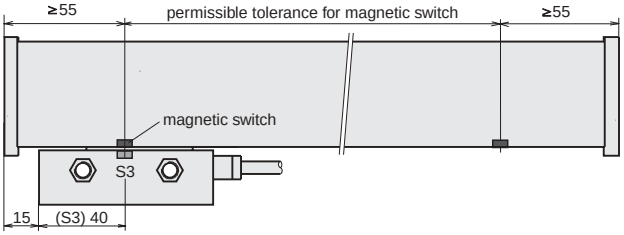


Version without RI-variety: Switch point S3 for additionally individual function

MSA 390



MSA 391

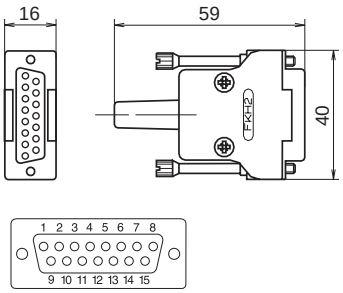


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 690, MSA 691, MSA 390, MSA 391, MSA 373 pin-outs

SUB MIN-D connector 15-pin

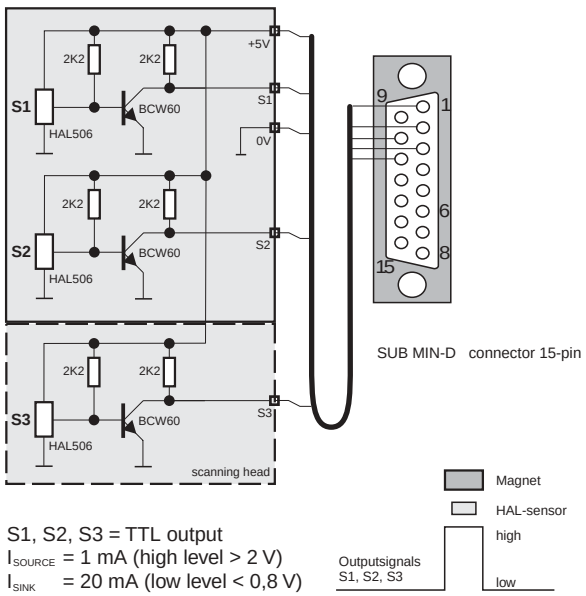
PIN	1*	2**	3	4	5	6	7***	8	9	10	11	12	13	14	15
square wave signals via Line Driver	nc	GND	nc	$\overline{RI}$	$\overline{T2}$	$\overline{T1}$	+5V	+5V	GND	S1	S2	RI	T2	T1	shield
sinusiodal micro-current signals	nc	GND	nc	RI-	90°-	0°-	+5V	+5V	GND	S1	S2	RI+	90°+	0°+	shield
sinusoidal voltage signals	nc	GND	nc	$\overline{RI}$	$\overline{A2}$	$\overline{A1}$	+5V	+5V	GND	S1	S2	RI	A2	A1	shield



* **exception at MSA 390 and MSA 391** (Version without RI-variety): PIN 1 = S3 (switch output)
** PIN 2 = GND (bridge to PIN 9) or sensor
*** PIN 7 = +5V (bridge to PIN 8) or sensor
outer shield on chassis

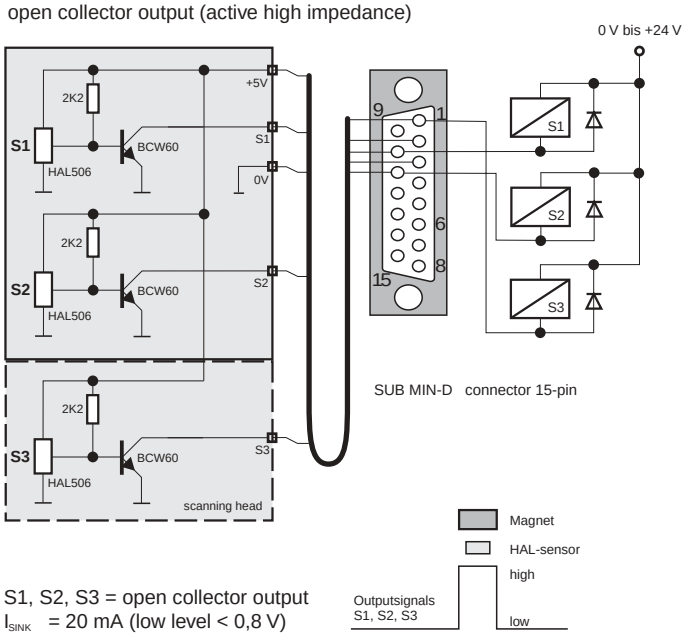
MSA 690, MSA 691, MSA 390, MSA 391, MSA 373 switch signals

Version 1
TTL output (active high)



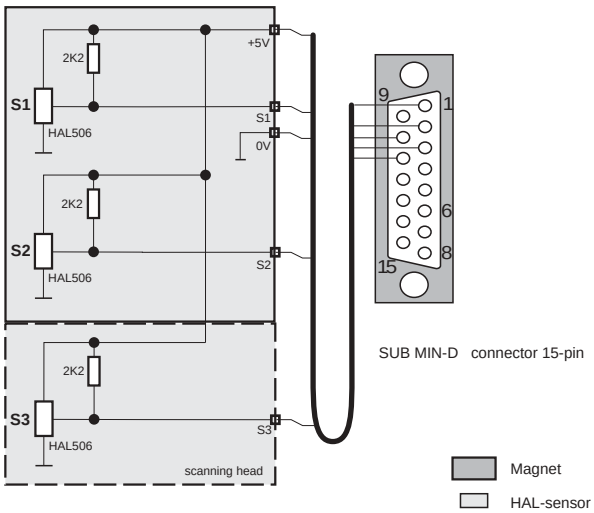
S1, S2, S3 = TTL output
I_{SOURCE} = 1 mA (high level > 2 V)
I_{SINK} = 20 mA (low level < 0,8 V)

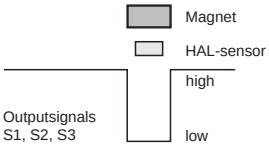
Version 2
open collector output (active high impedance)



S1, S2, S3 = open collector output
I_{SINK} = 20 mA (low level < 0,8 V)

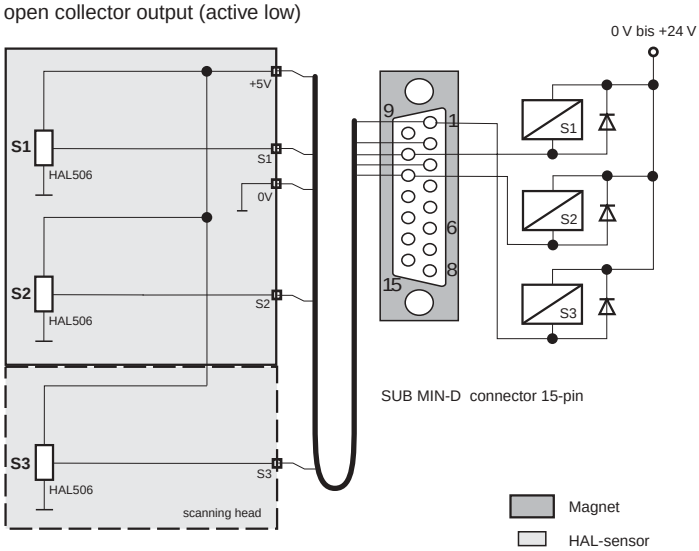
Version 3
TTL output (active low)

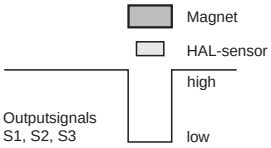




S1, S2, S3 = TTL output
I_{SOURCE} = 1 mA (high level > 2 V)
I_{SINK} = 20 mA (low level < 0,8 V)

Version 4
open collector output (active low)





S1, S2, S3 = open collector output
I_{SINK} = 20 mA (low level < 0,8 V)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 650 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• **Sinusoidal micro-current signals**					
MSA 650.13	depending on external Subdividing	±5, ±10 µm/m	20 µm	1 m/s	2 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 650.24	10 µm	±10 µm/m	40 µm	1 m/s (> 5 µs)	2 m/s (> 2,5 µs)
MSA 650.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 2,5 µs)	2 m/s (> 1,2 µs)
MSA 650.33	2,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 1,2 µs)	1 m/s (> 1,2 µs)
MSA 650.64	2 µm	±5, ±10 µm/m	40 µm	1 m/s (> 800 ns)	2 m/s (> 400 ns)
MSA 650.63	1 µm	±5, ±10 µm/m	20 µm	1 m/s (> 400 ns)	1 m/s (> 400 ns)
MSA 650.73	0,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 200 ns)	1 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740

Measuring type: glass scale

Reference mark (RI): selectable
MSA 650.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 650.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)

Permissible vibration: 80 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
0,8 kg/m (scale spar) + 85 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal micro-current signals**
MSA 650.13

Power supply:
+5 V ±5%, max. 90 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

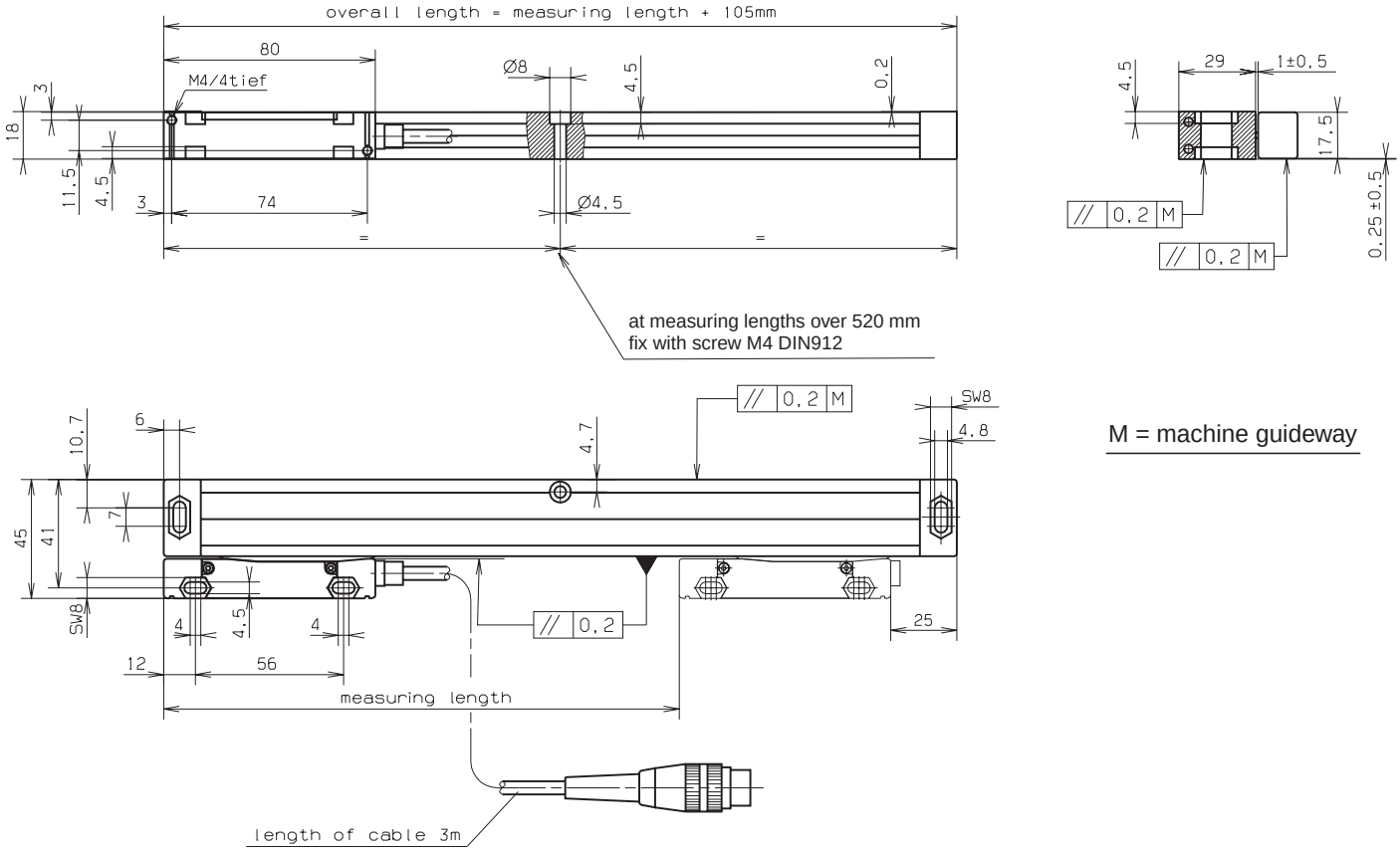
• **square wave signals** (single ended)
with integrated Subdividing Electronics

• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 650.23 = times 1
MSA 650.24 = times 1
MSA 650.33 = times 2
MSA 650.63 = times 5
MSA 650.64 = times 5
MSA 650.73 = times 10

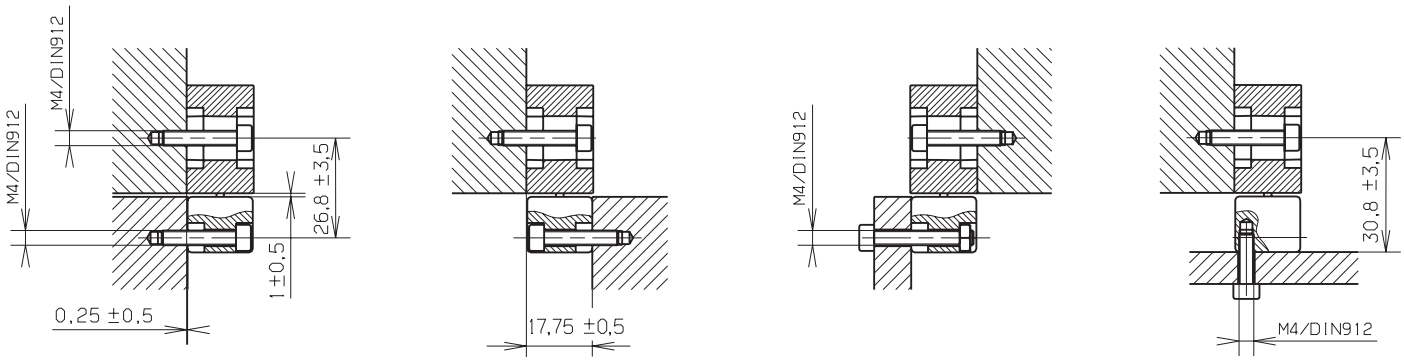
Power supply:
+5 V ±5%, < 150 mA (with interpolation, unloaded)
< 200 mA (without interpolation, unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 650 Dimensions - Mounting tolerances - Mounting possibilities:



M = machine guideway



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 651 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• **Sinusoidal micro-current signals**					
MSA 651.13	depending on external Subdividing	±5, ±10 µm/m	20 µm	1 m/s	2 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 651.24	10 µm	±10 µm/m	40 µm	1 m/s (> 5 µs)	2 m/s (> 2,5 µs)
MSA 651.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 2,5 µs)	2 m/s (> 1,2 µs)
MSA 651.33	2,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 1,2 µs)	1 m/s (> 1,2 µs)
MSA 651.64	2 µm	±5, ±10 µm/m	40 µm	1 m/s (> 800 ns)	2 m/s (> 400 ns)
MSA 651.63	1 µm	±5, ±10 µm/m	20 µm	1 m/s (> 400 ns)	1 m/s (> 400 ns)
MSA 651.73	0,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 200 ns)	1 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240

Measuring type: glass scale

Reference mark (RI): selectable
MSA 651.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 651.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)

Permissible vibration: 80 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
0,8 kg/m (scale spar) + 85 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal micro-current signals**
MSA 651.13

Power supply:
+5 V ±5%, max. 90 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

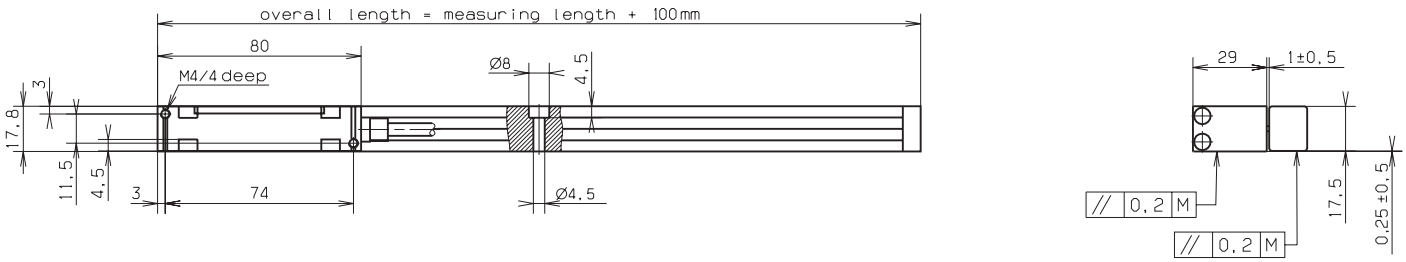
• **square wave signals** (single ended)
with integrated Subdividing Electronics

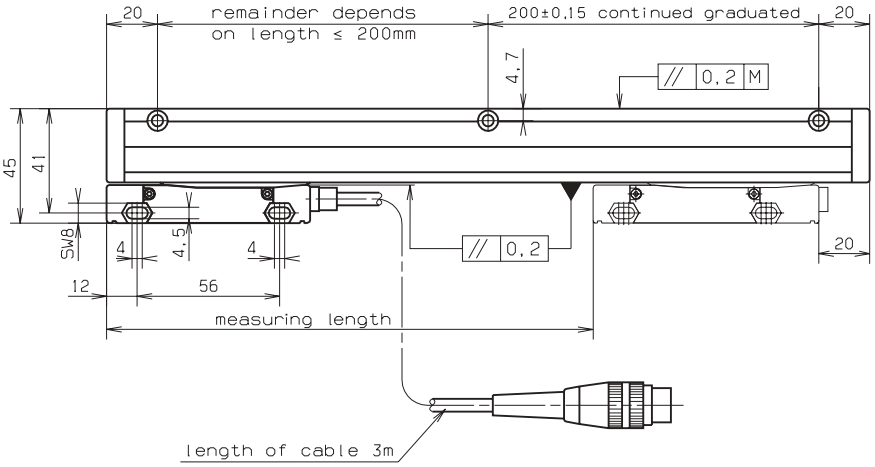
• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 651.23 = times 1
MSA 651.24 = times 1
MSA 651.33 = times 2
MSA 651.63 = times 5
MSA 651.64 = times 5
MSA 651.73 = times 10

Power supply:
+5 V ±5%, < 150 mA (with interpolation, unloaded)
< 200 mA (without interpolation, unloaded)

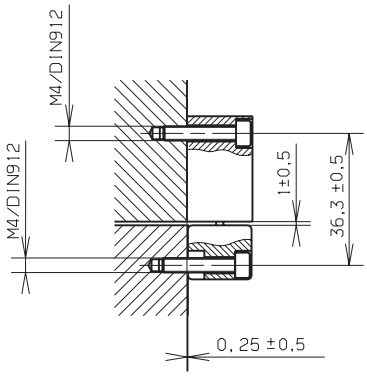
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

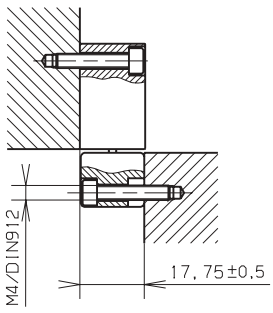
MSA 651 Dimensions - Mounting tolerances - Mounting possibilities:

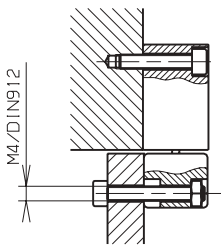


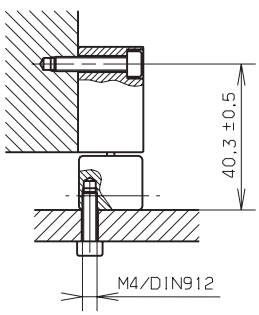


M = machine guideway









Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 350 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	momentary
• **Sinusoidal micro-current signals**					
MSA 350.13	depending on external Subdividing	±5, ±10 µm/m	20 µm	1 m/s	2 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 350.24	10 µm	±10 µm/m	40 µm	1 m/s (> 5 µs)	2 m/s (> 2,5 µs)
MSA 350.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 2,5 µs)	2 m/s (> 1,2 µs)
MSA 350.33	2,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 1,2 µs)	1 m/s (> 1,2 µs)
MSA 350.64	2 µm	±5, ±10 µm/m	40 µm	1 m/s (> 800 ns)	2 m/s (> 400 ns)
MSA 350.63	1 µm	±5, ±10 µm/m	20 µm	1 m/s (> 400 ns)	1 m/s (> 400 ns)
MSA 350.73	0,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 200 ns)	1 m/s (> 200 ns)

* **Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240 2440, 2640, 2840, 3040

Measuring type: glass scale

Reference mark (RI): selectable
MSA 350.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 350.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
with standard sealing lips < 3 N
with low drag sealing lips < 0,2 N

Environmental sealing DIN 40050:
IP 53 (with standard sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 80 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
3 kg/m (scale spar) + 180 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal micro-current signals**
MSA 350.13

Power supply:
+5 V ±5%, max. 90 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

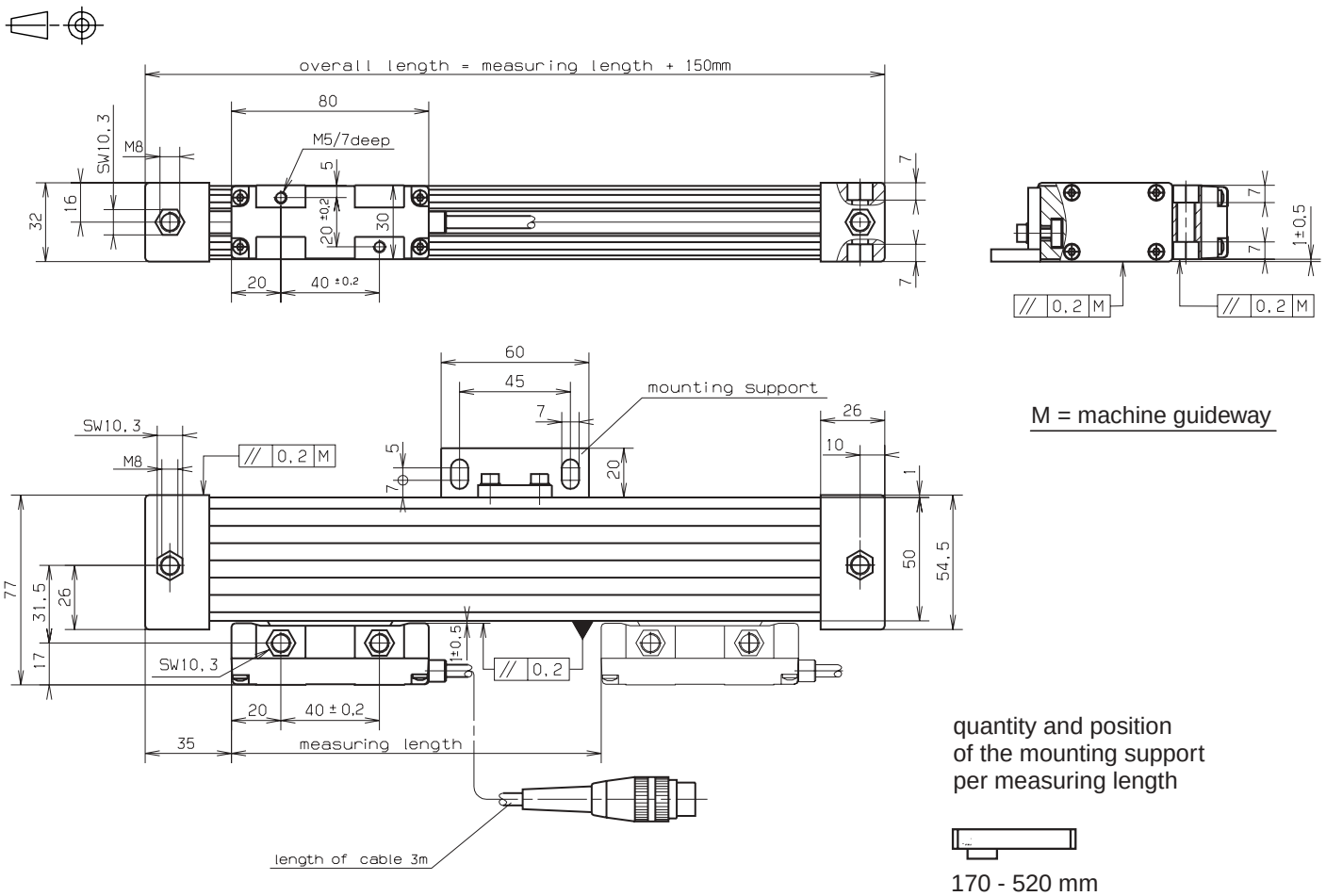
• **square wave signals** (single ended)
with integrated Subdividing Electronics

• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 350.23 = times 1
MSA 350.24 = times 1
MSA 350.33 = times 2
MSA 350.63 = times 5
MSA 350.64 = times 5
MSA 350.73 = times 10

Power supply:
+5 V ±5%, < 150 mA (with interpolation, unloaded)
< 200 mA (without interpolation, unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

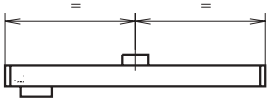
MSA 350 Dimensions - Mounting tolerances - Mounting possibilities:



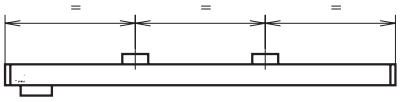
M = machine guideway

quantity and position
of the mounting support
per measuring length

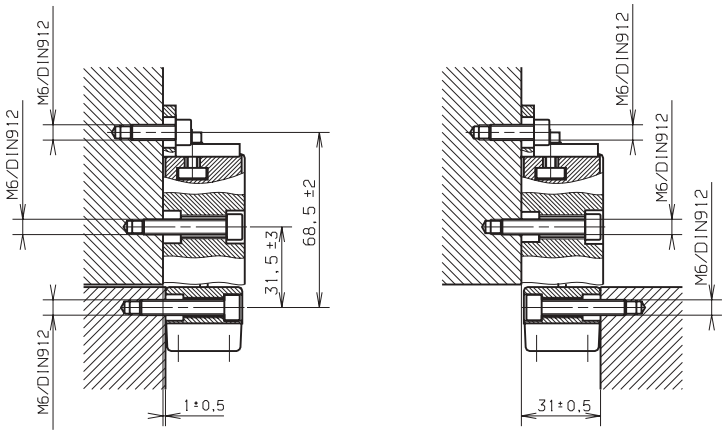
170 - 520 mm

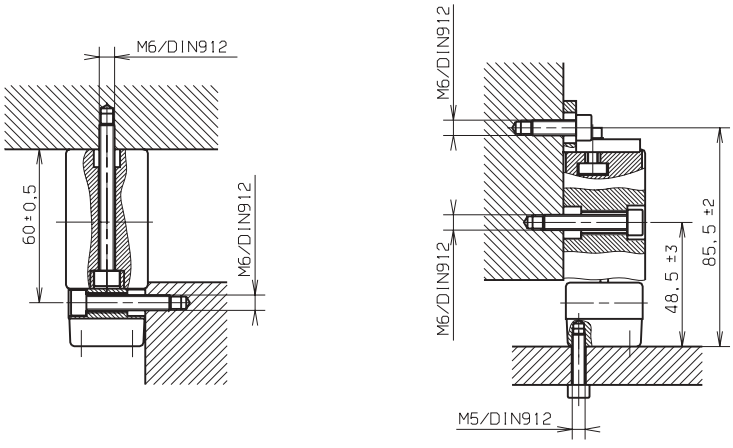


620 - 1020 mm 1x



1140 - 2040 mm 2x
2240 - 3040 mm 3x





Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 352 Technical data

Scale model	System resolution	Accuracy grades *	Grating pitch *	Max. velocity (Edge distance) continuous	Max. velocity (Edge distance) momentary
• **Sinusoidal micro-current signals**					
MSA 352.13	depending on external Subdividing	±5, ±10 µm/m	20 µm	1 m/s	2 m/s
• **Square wave Line Driver signals with integrated Subdividing**					
MSA 352.24	10 µm	±10 µm/m	40 µm	1 m/s (> 5 µs)	2 m/s (> 2,5 µs)
MSA 352.23	5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 2,5 µs)	2 m/s (> 1,2 µs)
MSA 352.33	2,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 1,2 µs)	1 m/s (> 1,2 µs)
MSA 352.64	2 µm	±5, ±10 µm/m	40 µm	1 m/s (> 800 ns)	2 m/s (> 400 ns)
MSA 352.63	1 µm	±5, ±10 µm/m	20 µm	1 m/s (> 400 ns)	1 m/s (> 400 ns)
MSA 352.73	0,5 µm	±5, ±10 µm/m	20 µm	1 m/s (> 200 ns)	1 m/s (> 200 ns)

*** Other accuracy grades or grating pitches (e.g. Inch) upon request**

Standard measuring lengths: (mm)
170, 220, 270, 320, 370, 420, 470, 520, 620, 720, 770, 820, 920, 1040, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040, 2240 2440, 2640, 2840, 3040

Measuring type: glass scale

Reference mark (RI): selectable
MSA 352.xx **K:**
Distance coded Reference marks (**K**): after travelling 20 mm the absolute position will shown on the display.

MSA 352.xx:
Up to measuring length 920 mm one Reference mark in the middle of the measuring length or 35 mm from both ends of measuring length, measuring length 1040 mm and longer, 45 mm from both ends of measuring length.

Option:
One Reference mark at any location, or two or more RI's separated by distances of n x 50 mm

Required moving force:
< 6 N (two set of sealing lips)

Environmental sealing DIN 40050:
IP 54 (two set of sealing lips)
IP 64 with DA300 (DA300 see page 57)

Permissible vibration: 80 m/s² (40 to 2000 Hz)
Permissible shock: 200 m/s² (8 ms)

Permissible temperature:
-20°C to +70°C (storage), 0°C to +50°C (operation)

Weight (approx.)
3 kg/m (scale spar) + 180 g (scanning head without cable)

Signal-outputs (optional):

• **sinusoidal micro-current signals**
MSA 352.13

Power supply:
+5 V ±5%, max. 90 mA

Output signals:
Encoder signals: 7 to 16 µApp,
typical 11,5 µApp at 1 KΩ

Reference pulse: 2 to 8 µA,
typical 5 µA (useable component) at 1 KΩ

Max. output frequency:
100 kHz (with 3 m cable)

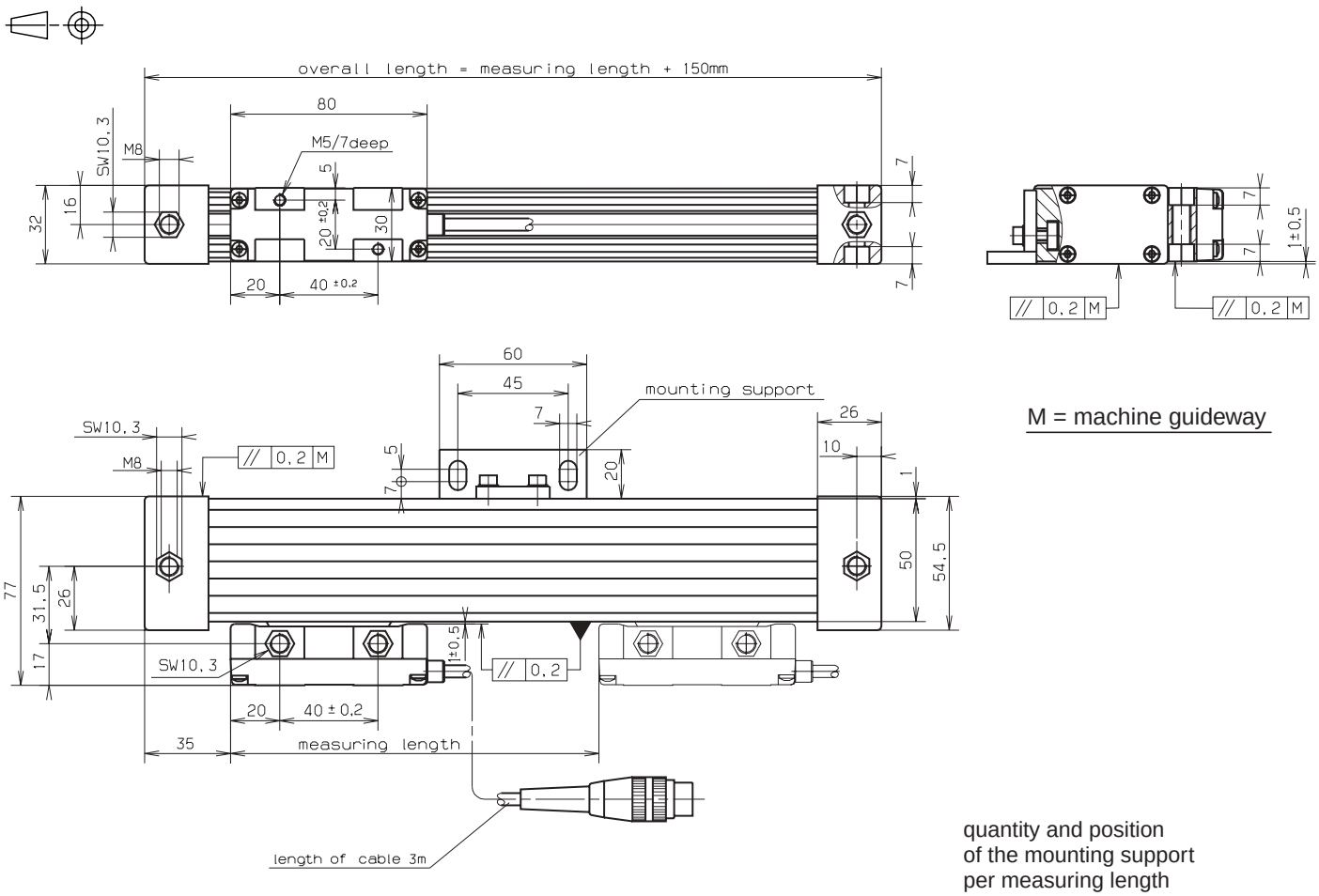
• **square wave signals** (single ended)
with integrated Subdividing Electronics

• **square wave signals** (differential)
via Line Driver RS 422 standard
with integrated Subdividing Electronics
MSA 352.23 = times 1
MSA 352.24 = times 1
MSA 352.33 = times 2
MSA 352.63 = times 5
MSA 352.64 = times 5
MSA 352.73 = times 10

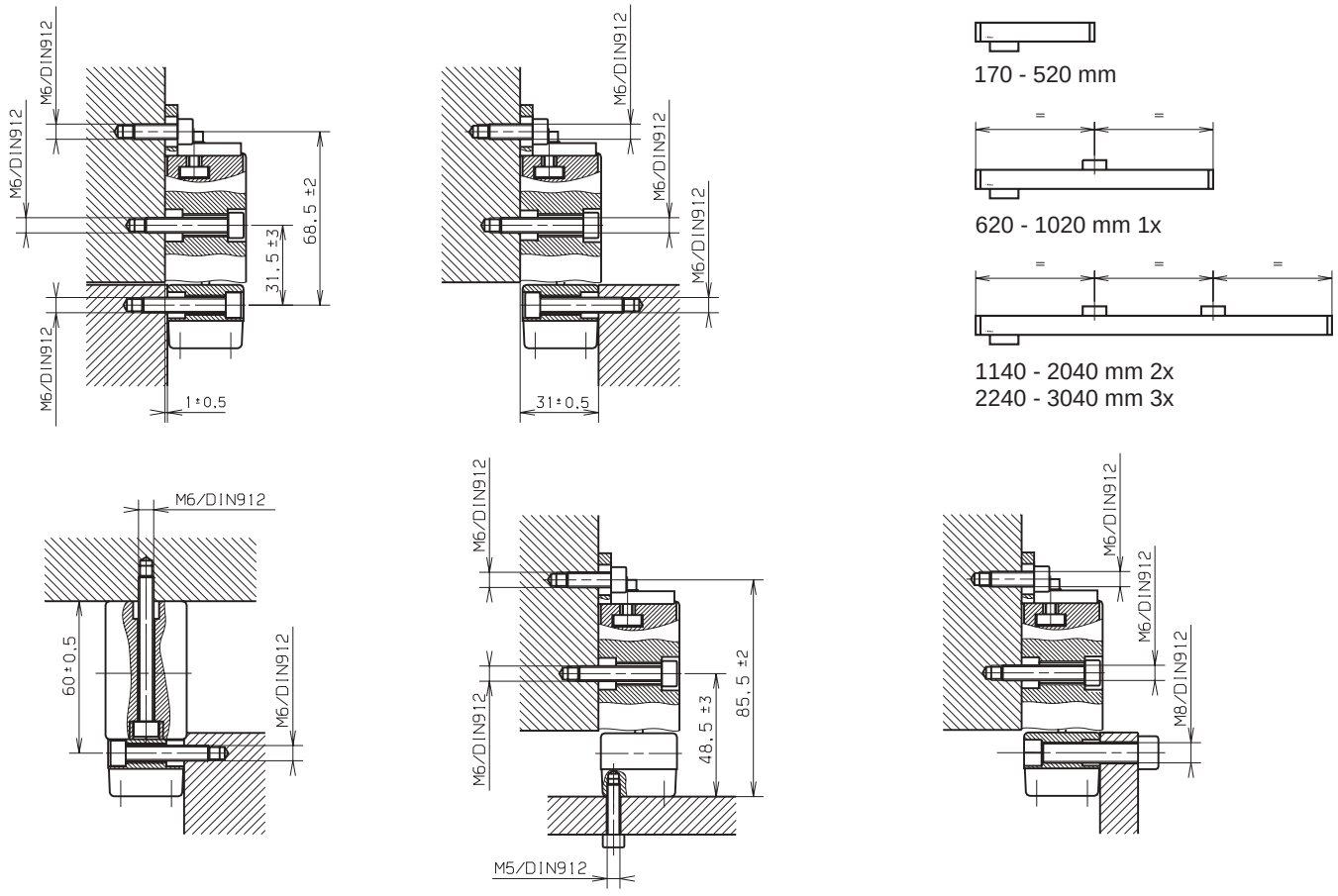
Power supply:
+5 V ±5%, < 150 mA (with interpolation, unloaded)
< 200 mA (without interpolation, unloaded)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

MSA 352 Dimensions - Mounting tolerances - Mounting possibilities:



M = machine guideway



quantity and position
of the mounting support
per measuring length

170 - 520 mm

620 - 1020 mm 1x

1140 - 2040 mm 2x
2240 - 3040 mm 3x

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Subdividing Electronics ZE

ZE-xx Subdividing Electronic is available for applications where the Linear Encoder has a sinusoidal micro-current or sinusoidal voltage output. It is connected between the Linear Encoder and the Control or Digital Readout.

The ZE-xx divides the scale grating pitch to achieve finer resolutions and outputs square wave signals.
In addition, differential (complementary) Line Driver signals are output.
The Subdividing Electronic units are supplied in rugged housings, meeting the sealing requirements of IP 64.

ZE-**S**x
- for Linear Encoders with sinusoidal voltage signals

ZE-**V**x
- for Linear Encoders with sinusoidal micro-current signals

Interpolation:

ZE-S5,	**ZE-V5**	=	times 5
ZE-S10,	**ZE-V10**	=	times 10
ZE-S20,	**ZE-V20**	=	times 20
ZE-S25,	**ZE-V25**	=	times 25
ZE-S50,	**ZE-V50**	=	times 50
ZE-S100,	**ZE-V100**	=	times 100
ZE-S200,	**ZE-V200**	=	times 200
(in preparation)			
ZE-S400,	**ZE-V400**	=	times 400
(in preparation)			

Power supply: +5 V ±5%

Current consumption: 150 mA
- Linear Encoder not connected
- output signals loaded

Connectors:
(pin-outs and dimensions on page 56)
Input: chassis connector female
9-pin FB 91 (ZE-**V**) or 12-pin FB 121 (ZE-**S**)
Output: chassis connector male
12-pin FS 121 or 1 m cable with male connector 12-pin L121

Input signals ZE-Sx:
Encoder signals: sinusoidal voltage signals
0,6 to 1,2 Vpp (1Vss typical)
Reference pulse: 0,2 to 0,85 V
0,2 to 0,85 Vpp
typical 0,4 V (useable component)
with terminating impedance Zo = 120 Ω

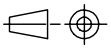
Input signals ZE-Vx:
Encoder signals: sinusoidal micro-current signals 7 to 16 µA Ipp (11,5 µA typical)
Reference pulse: 2 to 8 µA Ipp (5 µA typical)

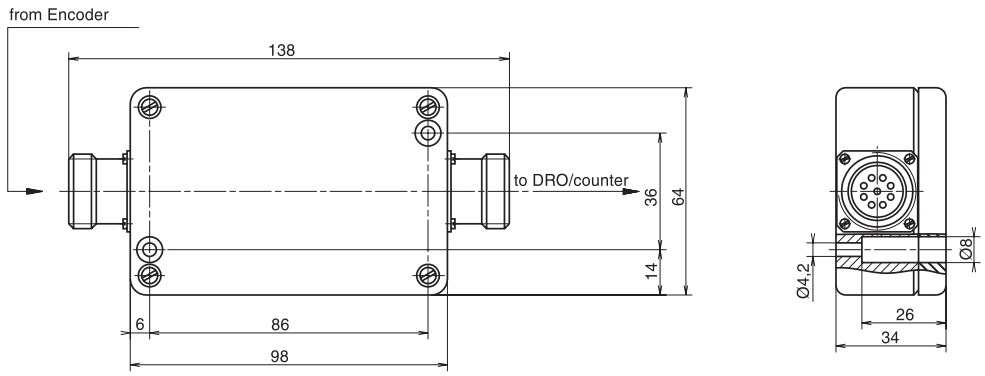
Max. input frequency:

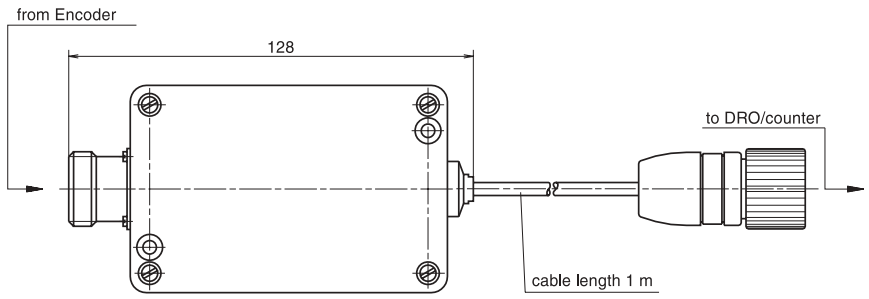
ZE-S5,	**ZE-V5**	=	100 kHz, t_F > 300 ns
ZE-S10,	**ZE-V10**	=	50 kHz, t_F > 300 ns
ZE-S20,	**ZE-V20**	=	56 kHz, t_F > 200 ns
ZE-S25,	**ZE-V25**	=	45 kHz, t_F > 200 ns
ZE-S50,	**ZE-V50**	=	45 kHz, t_F > 100 ns
ZE-S100,	**ZE-V100**	=	22,5 kHz, t_F > 100 ns

Output signals:
Square wave signals + Reference pulse via Line Driver RS 422 standard or single ended phaseshift 90° el.

Dimensions::







Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Interface Card IFC 430R

PC expansion board with PCI interface,
serves to collect and evaluate encoder signals

Latch logic of the count values
- Asynchronous latch individually for each channel by software, encoder reference mark or external signal
- Synchronous latch of several channel by software, timer or external signal
- Output signal for cascading several cards; can be programmed for software sync or timer sync.

Counter operating modes
- Three counter channels (32 bits each) with one load and two latch registers
- Counting of encoder square-wave signals with one-fold, two-fold or four-fold evaluation
- Event counter with direction and clear input
- Integral timer for measuring the pulse widths, the frequency and the velocity.

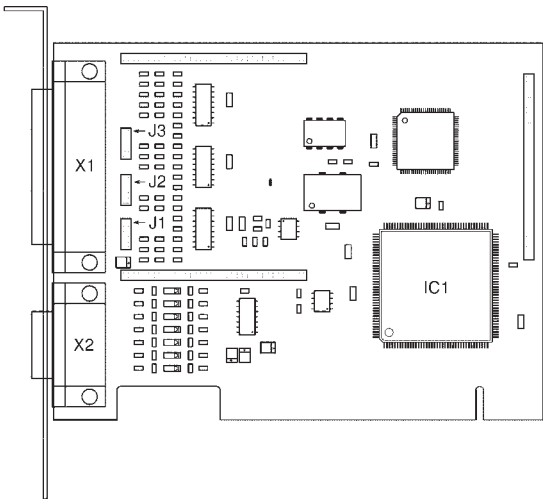
PC bus
- PCI connector, 5 V, 32-bit, 2 x 60 pins
- Target interface (slave) as per specifications Rev. 2.1
- Current consumption at +5 V approx. 0.,5 A, without encoders
- Power supply of the encoders:
  +5 V or +12 V from PCI power supply
  (current consumption depends on encoders connected)

Counter interface (X1)
- Nine RS 422 or. TTL inputs for three encoders with square-wave signals and reference mark
- Maximum input frequency
  5 MHz with delta signals (Line Driver RS 422 standard)
  2 MHz with single-end signals
- Perceives edge distances up to 80 ns
- One TTL input for interfering-signal monitoring
- Separate power supply lines for each encoder

I/O interface (X2)
- Six inputs (3 to 30 V) that can be used as reference pulse inhibitors or as asynchronous latch signals
- One input (3 to 30 V) for synchronous latch of several channels
- One output (TTL) for cascading several cards

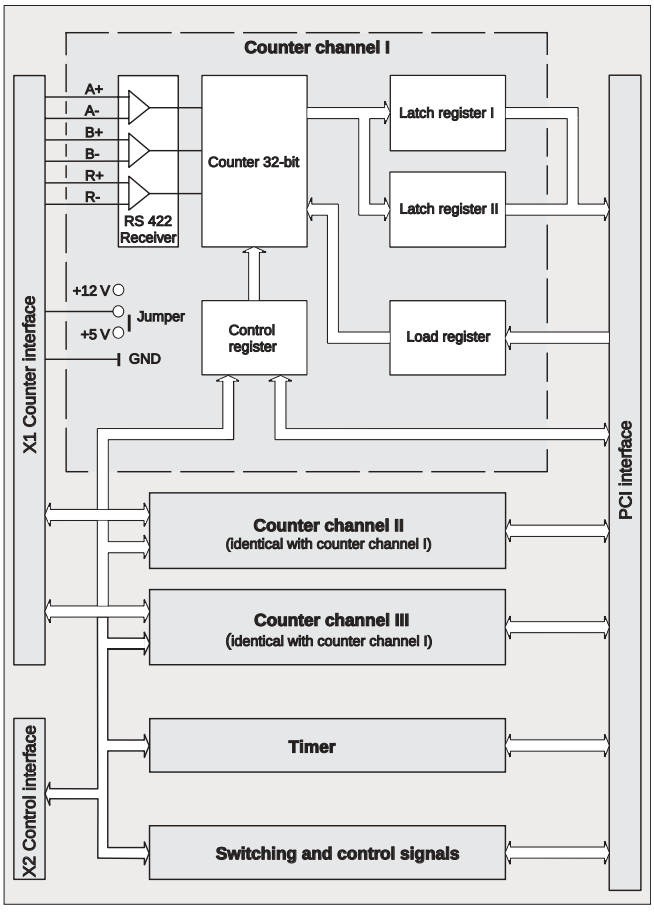
Software
- DLL (Dynamic Link Library) for operation with Windows 95/98/ME and NT
- VxD driver for Windows 95/98/ME
- Sys driver for Windows NT
- Test and demo software with sample programs

Mechanical design and environment
- Dimensions (of the PCB) approx. 120 x 92 mm width = one slot
- Maximum permissible ambient temperature +40°C
- One D-sub female terminal strip, 25-pin for the counter inputs
- One D-sub female terminal strip, 9-pin for the for I/O-signals



X1 = female D-sub terminal strip, 25-pin for counter interface
X2 = female D-sub terminal strip, 9-pin for switching and control signals
J1-J3 = jumper for the selection of the encoder operating voltage (5 V or 12 V)
IC1 = PCI interface

Block Diagram

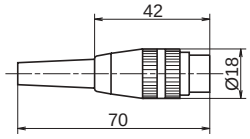


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

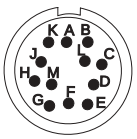
Connectors, pin-outs

DIN

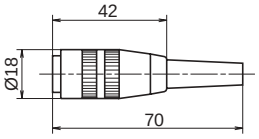
Male connector L 120
12-pin



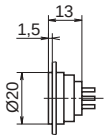
PIN outs connector
view on pins



Female connector K 120
12-pin



Female connector panel mountable F 120 12-pin



L120

PIN	A	B	C	D	E	F	G	H	J	K	L	M	
Voltage signals	inner shield	0 V	A1	$\overline{A1}$	A2	0 V	RI	$\overline{RI}$	0 V	+5 V	$\overline{A2}$	+5 V	(outer shield on chassis)

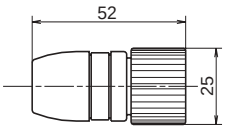
L120, K120, F120

PIN	A	B	C	D	E	F	G	H	J	K	L	M
Square wave signals + LD	shield*	GND	T1/0°	$\overline{T1}$/0°	T2/90°	GND	RI	$\overline{RI}$	GND	5 V	$\overline{T2}$/90°	5 V

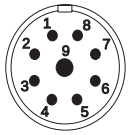
* shield is on housing additional

CONNEI

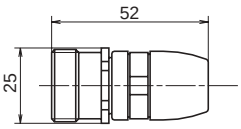
Male connector L 91
9-pin



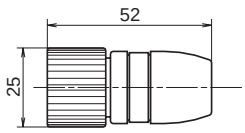
PIN outs connector
view on pins



Female connector K 91
9-pin



Female connector KM 91
9-pin

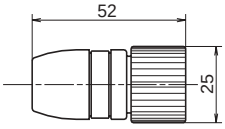


L 91, K 91, KM 91

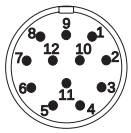
PIN	1	2	3	4	5	6	7	8	9	
Sinusoidal micro-current signals	0°+	0°-	5 V	0 V	90°+	90°-	RI+	RI-	inner shield	(outer shield on chassis)

CONNEI

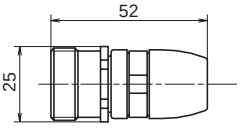
Male connector L 121
12-pin



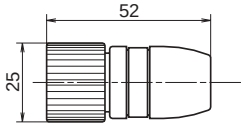
PIN outs connector
view on pins



Female connector K121
12-pin



Female connector KM 121
12-pin



L 121

PIN	1	2	3	4	5	6	7	8	9	10	11	12	
Voltage signals	$\overline{A2}$	+5 V Sensor	RI	$\overline{RI}$	A1	$\overline{A1}$	+5 V	A2	inner shield	GND	GND Sensor	+5 V	(outer shield on chassis)

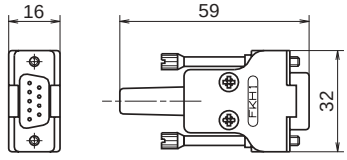
L121, K121, KM 121

PIN	1	2	3	4	5	6	7	8	9	10	11	12
Square wave signals + LD	$\overline{T2}$/90°	5 V	RI	$\overline{RI}$	T1/0°	$\overline{T1}$/0°	5 V	T2/90°	shield*	0 V	0 V	5 V

* shield is on housing additional

SUB MIN-D

Male connector LD 9
9-pin



LD 9

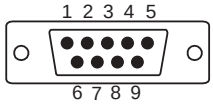
PIN	1	2	3	4	5	6	7	8	9
Square wave signals (single ended)	shield*	RI	T2	T1	+V	nc	nc	nc	GND

LD 9

PIN	1	2	3	4	5	6	7	8	9
Square wave signals (differential)	T1	$\overline{T1}$	T2	$\overline{T2}$	RI	$\overline{RI}$	+5 V	0 V	shield*

* shield is on housing additional

PIN outs
connector
view on pins



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

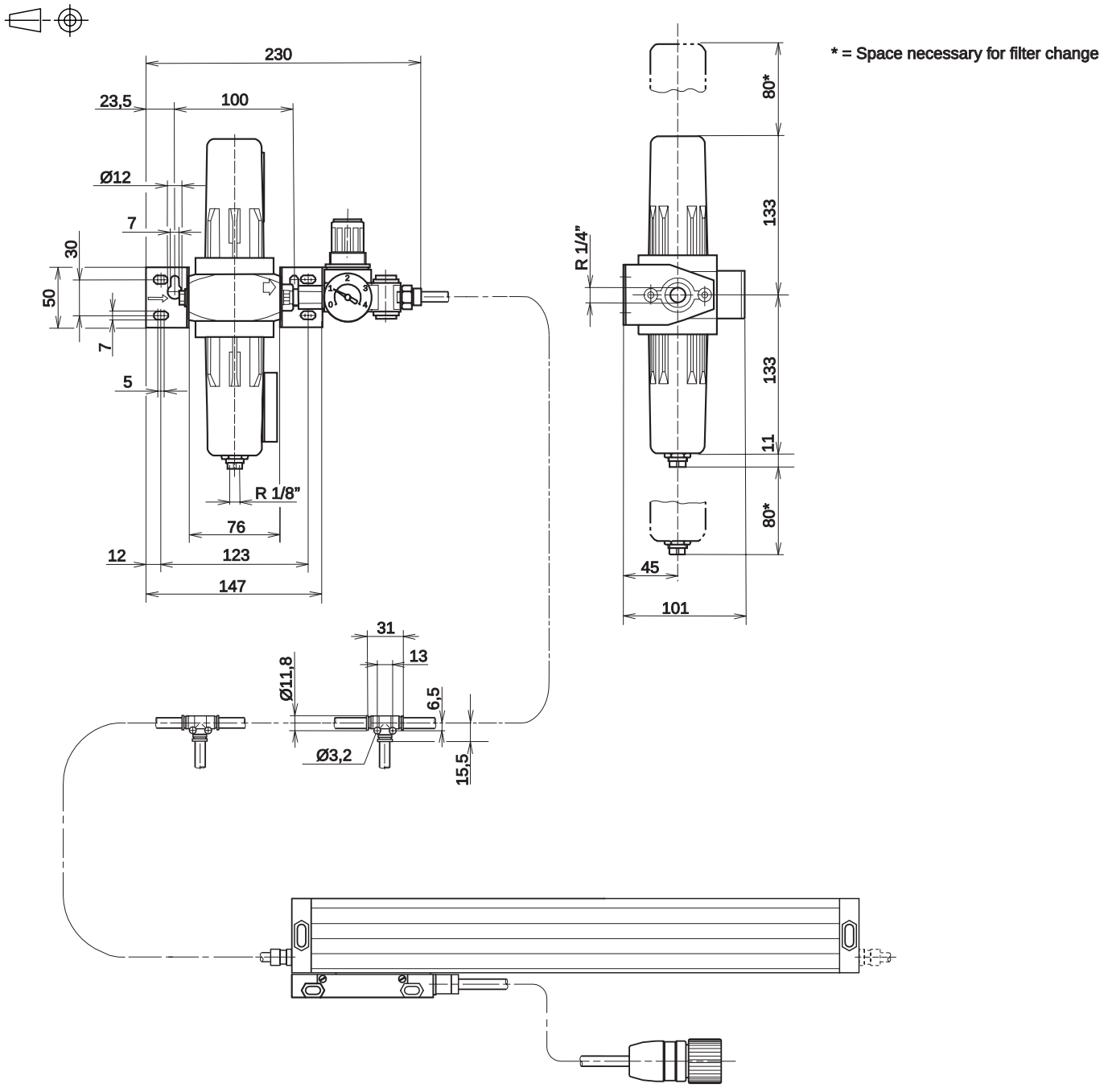
Air Pressure Unit DA300

In harsh environments, where oil and coolant are present, additional precautions should be taken.
To insure fail-safe operation of the Linear Encoder, only "clean" air should be put into the scale housing.
The air should be free from oil mist and water vapor.
The air has to be cleaned using a good filtration system.

The scale cavity should have a maximum overpressure of 0,3 to 0,6 bar at a flow rate of about 4 l/min (per Linear Encoder).
DA300 consists of a pressure regulator with gauge, prefilter, and an automatic drain with microfilter.

The required supply overpressure is min. 4 bar, max. 16 bar.
To avoid measuring errors due to thermal differences, it is absolutely necessary to provide pressurized air that has the same temperature as the machine tool. This is especially important with single sets of sealing lips (see also page 8, sealing).

Dimensions:



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Other RSF-Products



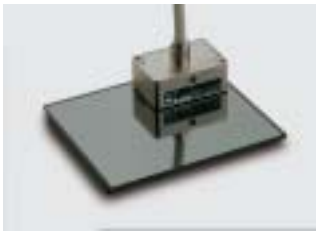
MS 50
Reflective scanning
Linear Encoder
- non-contact reflective scanning
- for high displacement velocities
- small version
- different scale versions
- max. measuring length
  (depends on scale version)
  - glass scale to 3040 mm
  - steel tape scale to 30 m



MS 61
Reflective scanning
Linear Encoder
- two switch tracks
  for individual special function
- non-contact reflective scanning
- for high displacement velocities
- flat version
- different scale versions
- max. measuring length
  (depends on scale version)
  - glass scale to 3040 mm
  - steel tape scale to 30 m



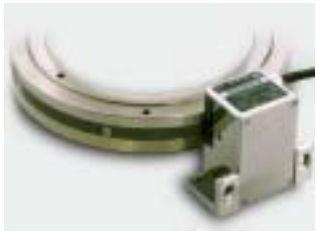
MS 8x
Interferential Linear Encoder
- two switch tracks
  for individual special functions
- non-contact reflective scanning
- for high displacement velocities
- small version
- scale version: glass scale
  or ROBAX glassceramic
  with phase grating
- max. measuring length
  to 2440 mm



TDE 60
Two dimensional Encoder
- non-contact reflective scanning
- small version
- scale version: glass scale
- measuring range 360 x 360 mm



MSG 10
Linear Encoder with
self-guided scanning head
- easy mounting
- for high displacement velocities
- scale version: steel tape scale
  on aluminium carrier
- max. measuring length 400 mm



MSR 50 MS
Modular Ring Rotary Encoder
- steel tape scale on steel ring
- for applications at the robotik,
  on printer and roundtables
- non-contact reflective scanning
- available diameter
  Ø80 mm to Ø165 mm



MSR 50 MK
Modular Ring Rotary Encoder
- steel tape scale on
  sandwich clampingring
- for application at the robotik
  on printers and roundtables
- non-contact reflective scanning
- available diameter
  Ø150 mm to Ø500 mm



DG 118, DG 120
Standard Rotary Encoder
- Rotary Encoder
  for unsiversal application
- standard line/rev.
  graduated from 100 to 5.400



DIT 10, DIT 30, DIT 48
Precision measuring Probes
- for universal applications
- stroke length 10, 30, 48 mm
- mounting on shaft sleeve
- mounting with two tapped
  holes on body (DIT 30, DIT 48)
- with cable lifter
- integrated pneumatic lifter
  optional
- sealing bellows optional
  (DIT 30, DIT 48)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Other RSF-Products





Digital Readouts

Features:	Z 710	Z 720	Z 730	Z 715	Z 725	Z 735 Z 735E (1 Z 735S (2	Z 820	Z 830 Z 830E (1 Z 830S (2	Z 840
number of axis	1	2	3	1	2	3	2	3	4
programming of system parameters		●			●			●	
selectable axis name		●			●			●	
switchable for use on a lathe or milling machine		●			●			●	
programmable resolution and counting direction		●			●			●	
Reset- and Preset input		●			●			●	
addition/subtraction with the keyboard		●			●			●	
bolt hole pattern, rectangular drilling pattern		●			●			●	
Reference mark evaluation (quasi-absolut)		●			●			●	
Hardware test and display test		●			●			●	
99 tool corrections (lathe mode)					●			●	
99 datum points (milling mode)					●			●	
store values for axis display		●			●			●	
absolute/incremental		●			●			●	
mm/inch conversion		●			●			●	
centering (divide by 2)		●			●			●	
radius/diameter		●			●			●	
adjustable for Rotary or Linear Encoder input.					●			●	
linear error correction programmable		●			●			●	
nonlinear axes-error correction					●	100 correction points		●	4 correction points
summing for two axis (Z + Z1)		●			●			●	
axes movements with displayed remaining travel way					●				
display for approximation to zero point		●			●			●	
feed display					●			●	
inbuilt stop-watch					●			●	
taper function					●			●	
display of spindle speed					●			●	
skew compensation					●			●	
Bi-directional RS 232 interface					○			○	
free programmable switch off and pre-switch off points					○			○	
edge probe input					○			●	
output for constant surface speed					○			○	
external Reset for each axis								○	
external input								○	
program store for 500 sets								○	
special display for spark erosion					○			○	
compensation for grinding wheels					○			○	

(1 = DRO for spark erosion machines, (2 = DRO for surface grinders, ● = standard, ○ = optional with the additional price

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP