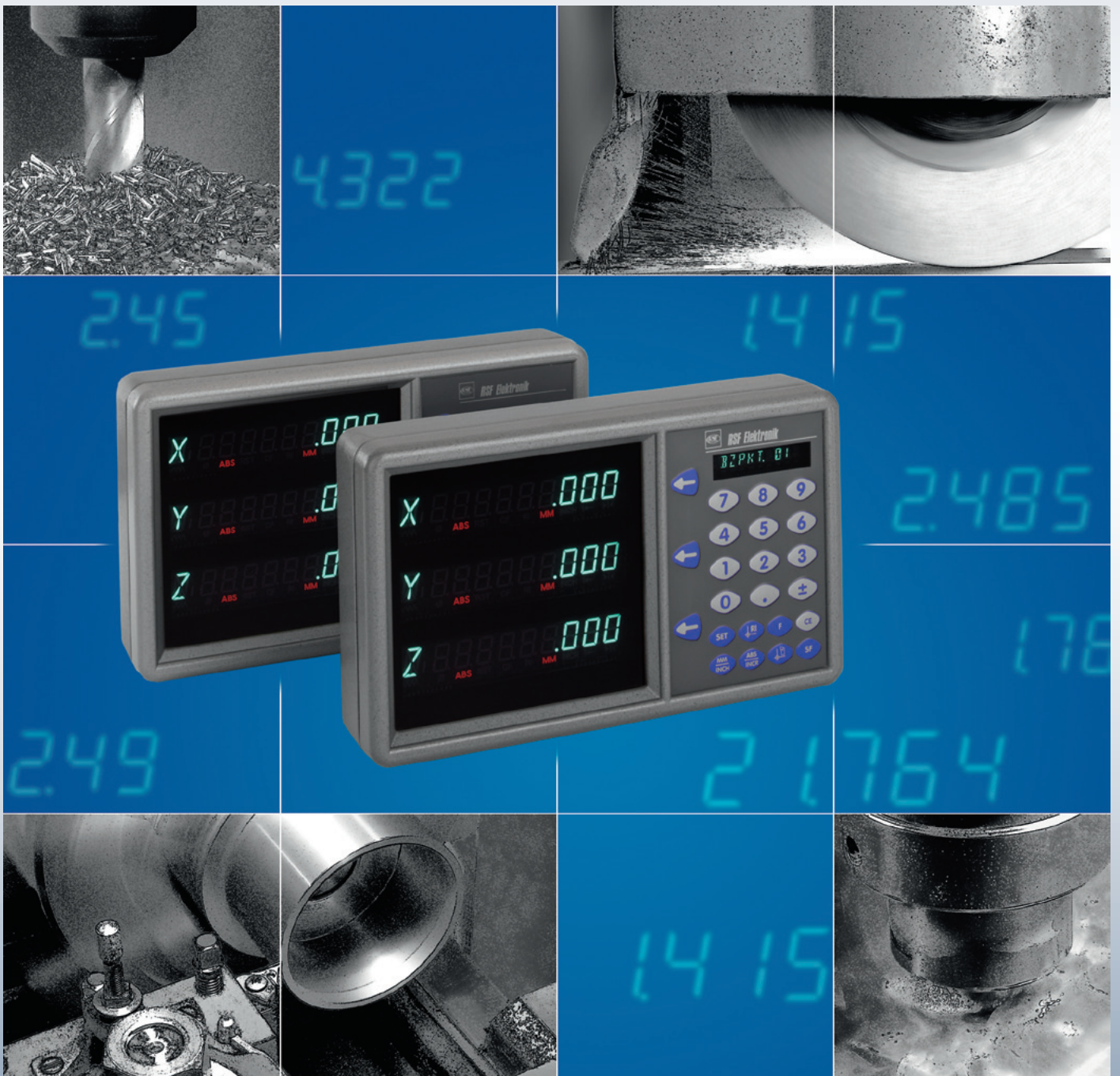




## DIGITAL READOUT SYSTEMS

improve the productivity and accuracy  
of manually operated machines



## RSF ELEKTRONIK GES.M.B.H.



RSF Elektronik was founded 1973 in St. Georgen near Salzburg, Austria.

From the beginning, the objective was to develop and produce Linear and Rotary Encoders and Digital Readouts. Our products were well accepted in the market, and after some years, the company employed more than 100 people.

Due to growth, it was then necessary for RSF Elektronik to move into larger facilities. The company moved in 1978 to our current location. Today, the largest percentage of our shipments are Incremental Linear Encoders.

To guarantee the best possible support, we have built distribution contacts in the most important markets.

Main internal elements of opto-electronic measuring systems are high precision divisions on glass and/or steel carriers. Under the trade name "SENTOP", RSF Elektronik manufactures Precision Graduations in thin layer technology.

Our quality, performance and environment management comply with DIN EN ISO 9001 and DIN EN ISO 14001 standards.

# IMPROVE ACCURACY AND PRODUCTIVITY BY USING A RSF DIGITAL READOUT AND LINEAR ENCODERS

In a competitive market, using the latest technology to improve your productivity is essential. Adding a Digital Readout and Linear Encoders is one of the best ways to make a machine tool more profitable.

**The productivity and value of your machine tool will be increased when using an RSF Elektronik Digital Readout and Linear Encoders.**

Regardless of the machine tool, old or new, standard or special use, **RSF Elektronik has the Digital Readout and Linear Encoders for your machine and application.**

## Advantages of using a Digital Readout and Linear Encoders from RSF Elektronik

- Digital Readouts from RSF Elektronik can be mounted quickly and easily to your machine tool. Installation is simple using available mounting hardware.
- The Digital Readout displays the exact tool position at all times. No longer does the machine operator need to count handwheel turns or keep track of the dial position.
- Linear Encoders from RSF Elektronik measure the machine travel directly at the machine guideway. Lead screw error and backlash have no influence on the measuring accuracy.
- If you have questions during the Digital Readout or Linear Encoder installation, do not hesitate to contact our company or nearest RSF agent.

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# THE DIGITAL READOUT SYSTEM

## A complete Digital Readout system

The system consists of one or more Linear Encoders, commonly referred to as scales, and a Digital Readout. The Linear Encoder measures the machine travel and the Digital Readout (sometimes called a DRO) displays the distance moved or machine table position to the operator.

## RSF Elektronik Linear Encoders

A Linear Encoder consists of two components:

1. the scale (extrusion/glass combination) and
2. the scanning head (reading head).

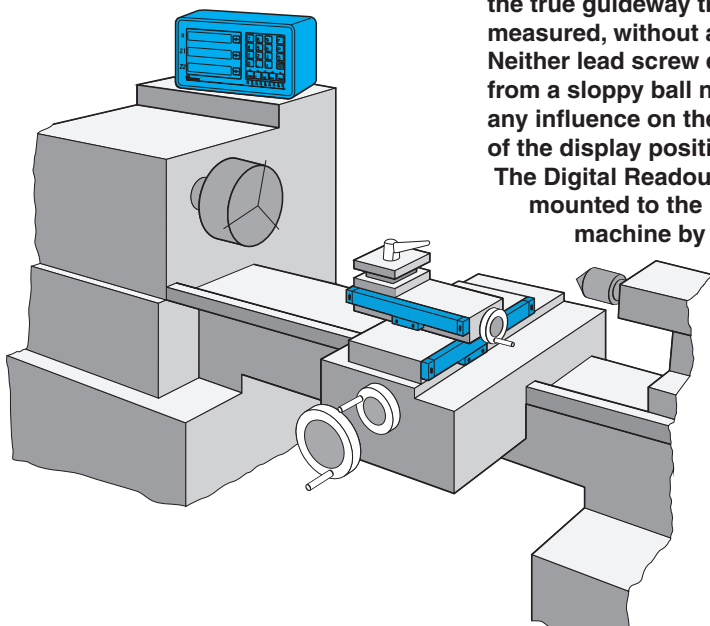
The scale unit consists of a high accuracy graduation pattern printed on glass spar. A metal extrusion holds and protects the glass. Special shaped rubber sealing lips in the extrusion keep out coolants and contamination. The scanning head has a dual guided carriage to maintain alignment with the glass scale. The design of the scanning head carriage allows for a large mounting tolerance without affecting the accuracy of the scale. The glass scale is opto-electrically scanned using LEDs, photodiodes and a reticle.

## RSF Elektronik Digital Readouts

The opto-electronics in the Linear Encoder scanning head convert distance movement into quadrature square wave signals. These signals are transmitted to the Digital Readout, which in turn displays the distance moved or table position. Linear Encoders from RSF have Reference Index marks.

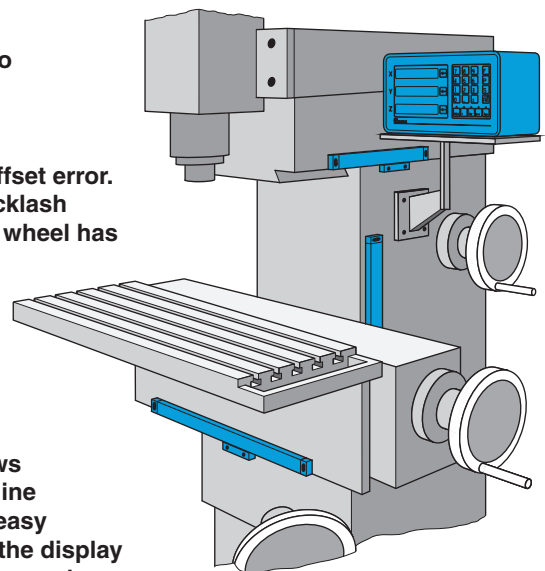
The Reference Index mark are a very useful feature if the Digital Readout loses power or if power is turned off. Linear Encoders from RSF Elektronik are available with distance coded reference marks (**K**): after travelling 20 mm the absolute position will be recalled on the display.

## Mounting a Digital Readout system on your machine?



**To get the best accuracy, a Linear Encoder should be mounted as near as possible to the machine guideway. When mounted at guideway, the true guideway travel is measured, without an ABBE offset error. Neither lead screw error or backlash from a sloppy ball nut or hand wheel has any influence on the accuracy of the display position. The Digital Readout is mounted to the machine by a**

**support arm/tray. This allows the machine operator easy access to the display for operation and reading the display.**



# THE ADVANTAGE OF A DIGITAL READOUT SYSTEM

## Advantages of a Digital Readout System

- In the past, the operator of a machine tool without a Digital Readout had to concentrate on reading and keeping track of the handwheel vernier dial. After a brief review of the Digital Readout operations manual, you will immediately work faster with better accuracy. Scrapped and rejected parts will be reduced.
- The display shows the position in clear and bright digits.
- Digital Readouts from RSF Elektronik have more features than just displaying position. Refer to the specific models for a listing of the features.
- The RSF Digital Readout has a waterproof keypad and a rugged metal housing to ensure error free operation under harsh workshop conditions.

## Profiting from a RSF Elektronik Digital Readout System

- **Minimize your work time at the machine**
- **Reduce the scrap rate and save material**
- **Increase the accuracy and productivity of the machine.**
- **Decrease the time to move to the next position up to 63%.**
- **Investment pay back is achieved very fast.**

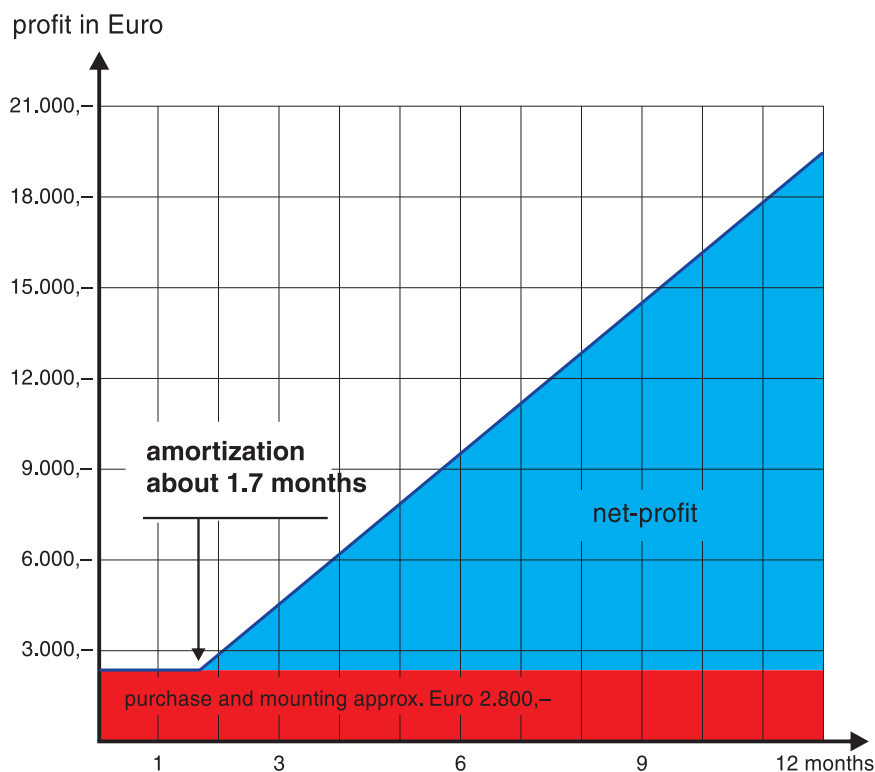
Example: A milling machine with table travel of: 700 x 400 x 450 mm  
 The purchase and the mounting of the digital readout costs:  
 about Euro 2.800,-  
 Profit and production increasing: min. 20%  
 Working time: 135 h/month  
 Machine costs per hour: Euro 60,-

Economies from machine changes:

$$\frac{20\%}{100\%} \times \frac{\text{Euro } 60,-}{\text{h}} \times \frac{135 \text{ h}}{\text{month}} = \text{Euro } 1.620,-/\text{month}$$

Amortization:

$$\frac{\text{Euro } 2.800,-}{\text{Euro } 1.620,-/\text{month}} = 1,7 \text{ months}$$



## DIGITAL READOUTS

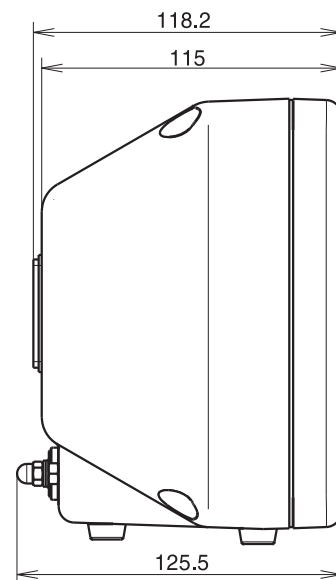
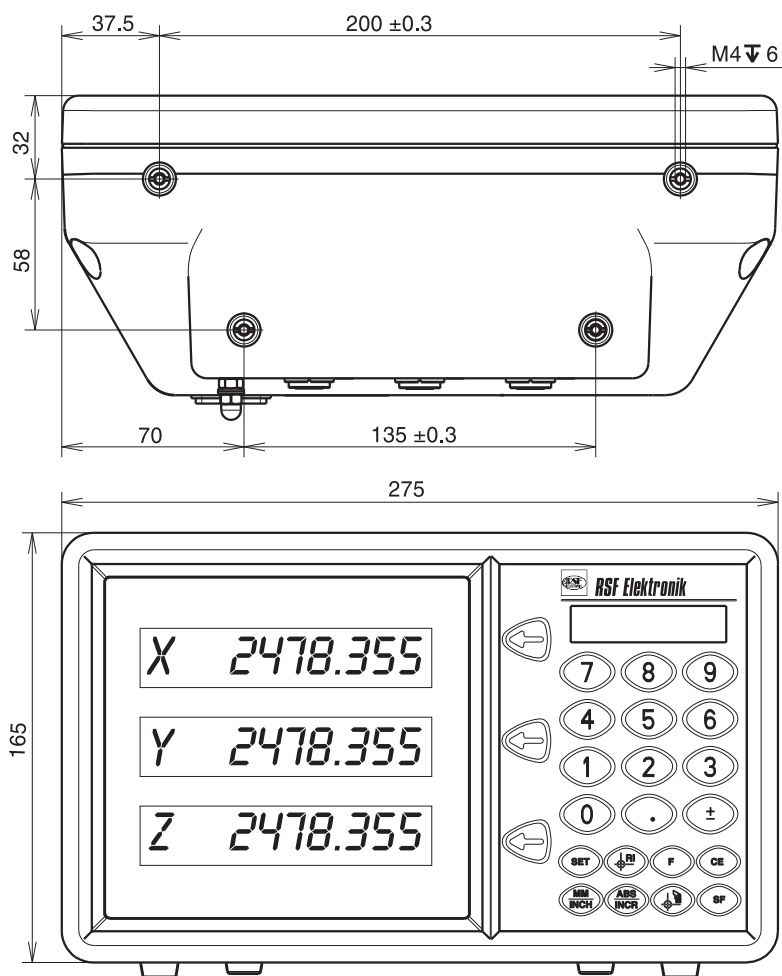
### **Z 710, Z 720, Z 730, Z 715, Z 725, Z 735**

RSF Digital Readouts are easy to use. To speed and simplify the referencing procedure, distance coded reference marks are available. With this feature, the absolute position will be shown on the display after travelling 20 mm. (Features and technical data Page 8 and 9).

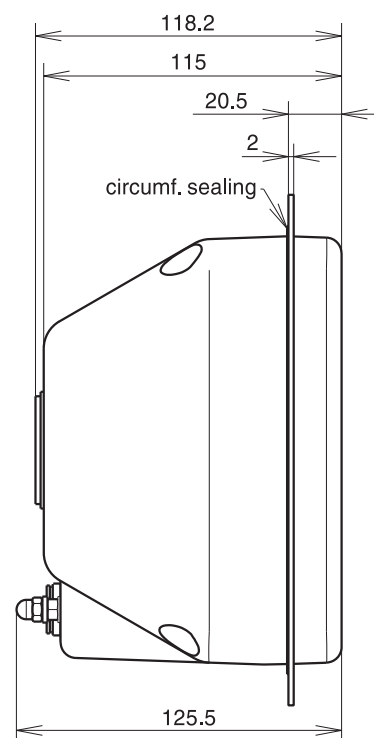
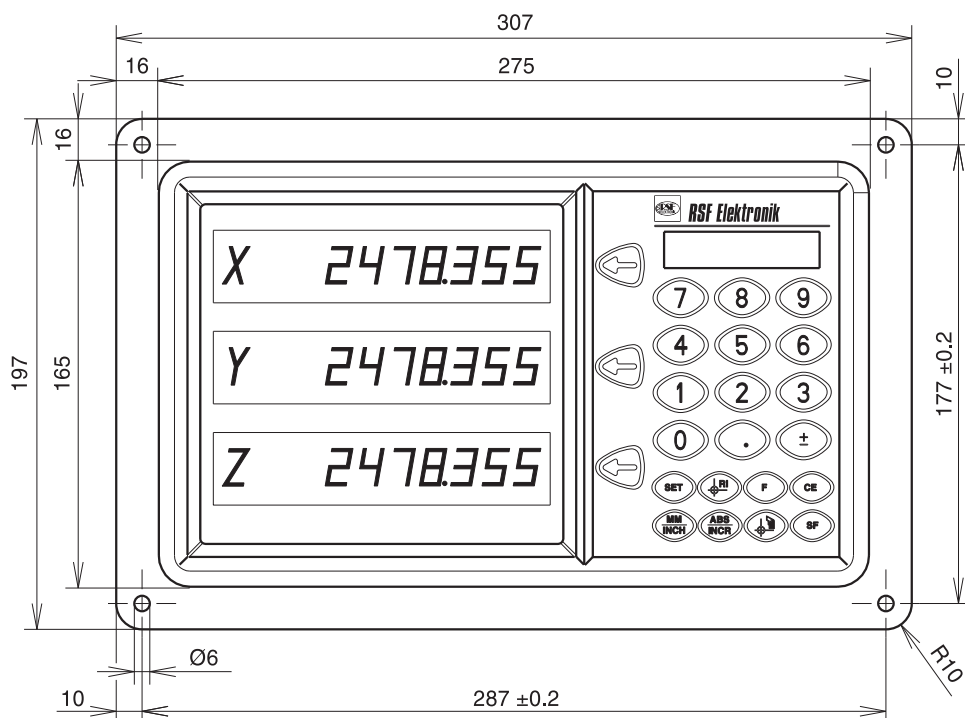


# DIMENSIONS

Z 710, Z 720, Z 730 and Z 715, Z 725, Z 735:





Dimensions 735 P in-built version:



# DIGITAL READOUTS



|  |  |       |                  |  |       |   |
|--|--|-------|------------------|---|-------|---|
| <b>Features:</b>   | Z 710  | Z 720 | Z 730            | Z 715   | Z 725 | Z 735<br>Z 735E <sup>(1)</sup><br>Z 735S <sup>(2)</sup> |
| Number of axis   | 1  | 2     | 3                | 1   | 2     | 3   |
| Programming of system parameters   |  | ●     |                  |   | ●     |   |
| Selectable axis name   |  | ●     |                  |   | ●     |   |
| Switchable for use on a lathe or milling machine   |  | ●     |                  |   | ●     |   |
| Software setup for fixing resolution, measuring step and counting direction  |  | ●     |                  |   | ●     |   |
| Function to delete all parameter   |  | ●     |                  |   | ●     |   |
| Reset- and Preset input<br>(Reset of the displays by pressing one button)  |  | ●     |                  |   | ●     |   |
| Addition/subtraction of the display value with the keyboard  |  | ●     |                  |   | ●     |   |
| Bolt hole pattern, graduated circle function, 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   |  | ●     |                  |   | ●     |   |
| Conversion: mm/inch  |  | ●     |                  |   | ●     |   |
| Centering (divide by 2)  |  | ●     |                  |   | ●     |   |
| Radius/diameter  |  | ●     |                  |   | ●     |   |
| Each axis is adjustable for Rotary or Linear Encoder input.<br>Rotary Encoder input will be displaying decimal-degree or degree.min.sec. |  |       |                  |   | ●     |   |
| Linear error correction programmable   |  | ●     |                  |   | ●     |   |
| Nonlinear axes-error correction  |  | ●     | (4 corr. points) |   | ●     | (100 corr. points)                                      |
| Summing for two axis (Z + Z1)  |  | ●     |                  |   | ●     |   |
| Display for approximation to zero point  |  | ●     |                  |   | ●     |   |
| Feed display   |  |       |                  |   | ●     |   |
| Axes movements with displayed remaining travel way   |  |       |                  |   | ●     |   |



## DIGITAL READOUTS



| Features:   | Z 710 | Z 720 | Z 730 | Z 715 | Z 725 | Z 735                           |
|---|-------|-------|-------|-------|-------|---------------------------------|
|   |       |       |       |       |       | Z 735E<br>Z 735S <sup>(1)</sup> |
| Inbuilt stop-watch  |       |       |       |       | ●     | <sup>(2)</sup>                  |
| Taper function  |       |       |       |       | ●     |                                 |
| Display of spindle speed  |       |       |       |       | ●     |                                 |
| Skew compensation   |       |       |       |       | ●     |                                 |
| Bi-directional RS 232 interface to connect a printer or a personal computer (control system with extern commands)<br>Baudrate and data format are adjustable via software |       |       |       |       | ○     |                                 |
| 8 free programmable switch off and pre-switch off points with relay output, programming to a 0,1 sec. short signal or a direction signal                                  |       |       |       |       | ○     |                                 |
| Analog output   |       |       |       |       | ○     |                                 |
| Edge probe input  |       |       |       |       | ○     |                                 |
| External Reset for each axis  |       |       |       |       | ○     |                                 |
| External input  |       |       |       |       | ○     |                                 |
| Output for constant surface speed   |       |       |       |       | ○     |                                 |
| Special display for spark erosion   |       |       |       |       | ○     |                                 |
| Compensation for grinding wheels  |       |       |       |       | ○     |                                 |

● = standard  
○ = optional with additional price

<sup>(1)</sup> = DRO for spark erosion machines  
<sup>(2)</sup> = DRO for surface grinders

**Technical data:**

**Power supply:**  
85–276 VAC (48–62 Hz)  
switching power supply

**Power consumption:**  
20 VA (3 axes)

**Display:** 8 digits plus sign and one digit for axis display  
**Monitor display:**  
10 digit alphanumeric display

**Color of display:** standard green  
**Height of display:** 14.5 mm

**Overlay:** Polyester, scratchless and resistant against cooling and lubricating fluids. Audible feedback.

**Resolution:** selectable  
(depending on the Linear Encoder)

**Input:** square wave signals +5 V

**Permissible input frequency:** 1 MHz

**Permissible temperature:**  
0 °C to +45 °C (operation)  
–20 °C to +70 °C (storage)

**Environmental sealing DIN 40050:**  
IP 53

**Features:**

- Max. measuring length: 1740 mm
- Small cross-section
- Mounting holes on the extrusion ends; and one center mounting hole provides a more rigid mount for longer measuring lengths
- Distance coded reference marks (**K**)

| Scale model   | System resolution | Accuracy grades * | Grating pitch * | Max. output frequency |           |
|---|-------------------|-------------------|-----------------|-----------------------|-----------|
|   |                   |                   |                 | continuous            | momentary |
| • Square-wave signals with integrated Subdividing Electronics     |                   |                   |                 |                       |           |
| MSA 650.24  | 10 µm             | ± 10 µm/m         | 40 µm           | 1 m/s                 | 2 m/s     |
| MSA 650.23  | 5 µm              | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 2 m/s     |
| MSA 650.64  | 2 µm              | ±5, ±10 µm/m      | 40 µm           | 1 m/s                 | 2 m/s     |
| MSA 650.63  | 1 µm              | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 1 m/s     |
| MSA 650.73  | 0.5 µm            | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 1 m/s     |
| * Other accuracy grades or grating pitches (e.g. Inch) on 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):**

- Distance coded reference marks (**K**):  
after travelling 20 mm the absolute position is available
- 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.
- Optional: one reference mark at any location  
additional reference marks can be selected  
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 temperature:**

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

**Weight (approx.):**

0.8 kg/m (scale spar) + 0.3 kg (scanning head with 3 m cable)

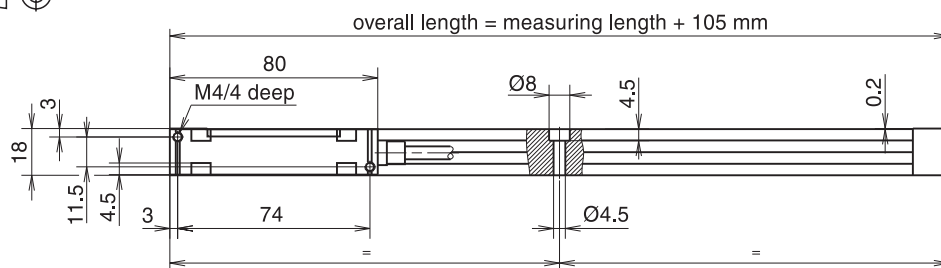
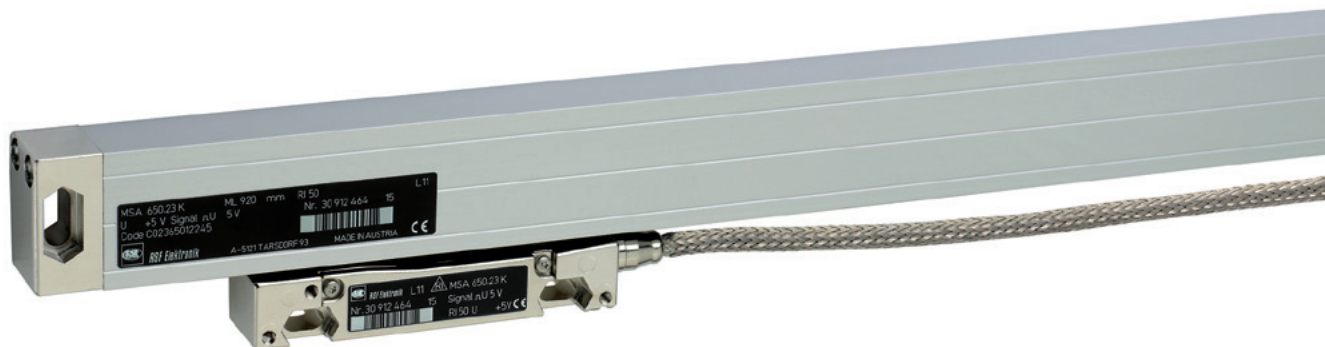
**Signal-outputs(optional):**

- square wave signals (single ended)  
with integrated Subdividing Electronics
- square wave signals (differential)  
via Line Driver RS 422 standard  
with integrated Subdividing Electronics  
MSA 650.23 = times1  
MSA 650.24 = times1  
MSA 650.63 = times5  
MSA 650.64 = times5  
MSA 650.73 = times10

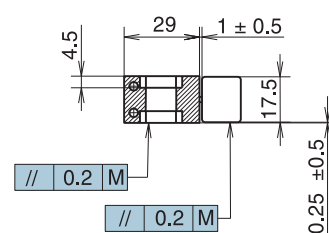
**Power supply:**

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

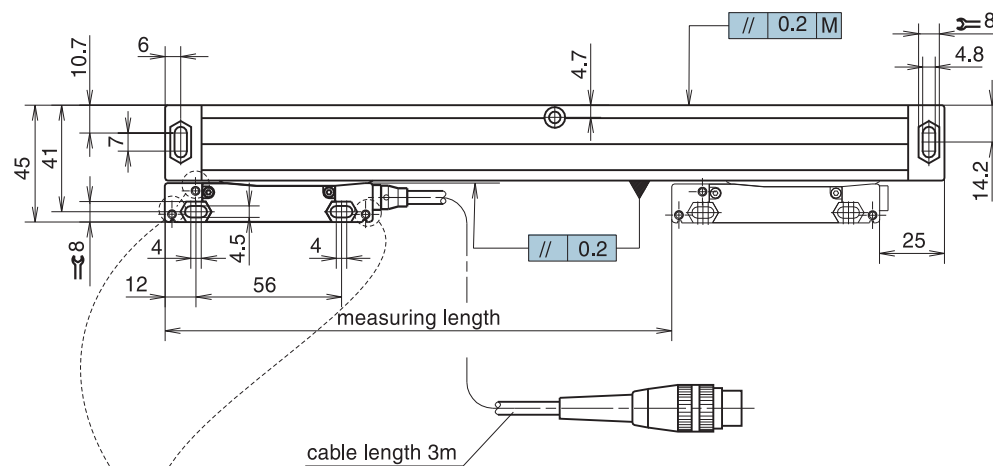
# DIMENSIONS - MOUNTING TOLERANCES - MOUNTING POSSIBILITIES



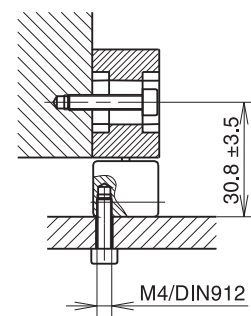
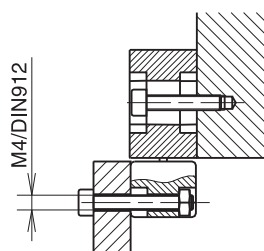
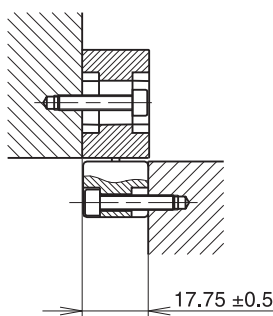
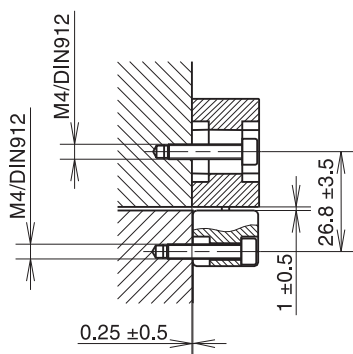
for measuring length over 520 mm scale should be affixed with epoxy resin adhesive (e.g. UHU-plus) cementing gap 0.2 mm or with a screw (e.g. M4 ISO 4762)



M = machine guideway



mounting screws for the easier mounting!  
(included in delivery)



**Features:**

- Max. measuring length: 2240 mm
- Small cross-section
- Mounting holes on top of the extrusion improves vibration rating
- Distance coded Reference marks (**K**)

| Scale model   | System resolution | Accuracy grades<br>* | Grating pitch<br>* | Max. output frequency |           |
|---|-------------------|----------------------|--------------------|-----------------------|-----------|
|   |                   |                      |                    | continuous            | momentary |
| • Square-wave signals with integrated Subdividing Electronics |                   |                      |                    |                       |           |
| MSA 651.24  | 10 µm             | ± 10 µm/m            | 40 µm              | 1 m/s                 | 2 m/s     |
| MSA 651.23  | 5 µm              | ±5, ±10 µm/m         | 20 µm              | 1 m/s                 | 2 m/s     |
| MSA 651.64  | 2 µm              | ±5, ±10 µm/m         | 40 µm              | 1 m/s                 | 2 m/s     |
| MSA 651.63  | 1 µm              | ±5, ±10 µm/m         | 20 µm              | 1 m/s                 | 1 m/s     |
| MSA 651.73  | 0.5 µm            | ±5, ±10 µm/m         | 20 µm              | 1 m/s                 | 1 m/s     |

\* Other accuracy grades or grating pitches (e.g. Inch) on 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):**

- Distance coded reference marks (**K**):  
after travelling 20 mm the absolute position is available
- 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.
- Optional: one reference mark at any location  
additional reference marks can be selected  
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 temperature:**

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

**Weight (approx.):**

0.8 kg/m (scale spar) + 0.3 kg (scanning head with 3 m cable)

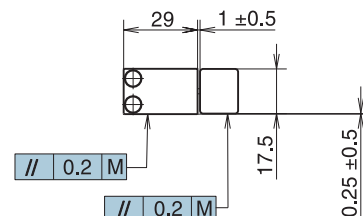
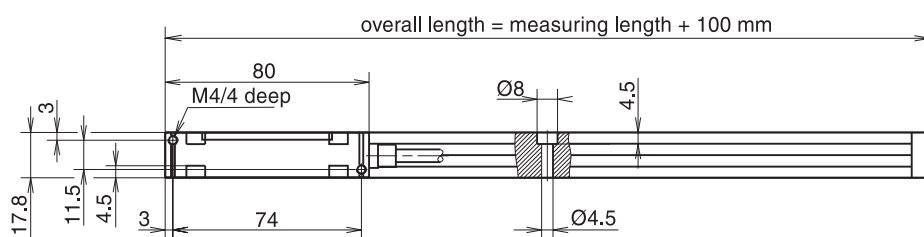
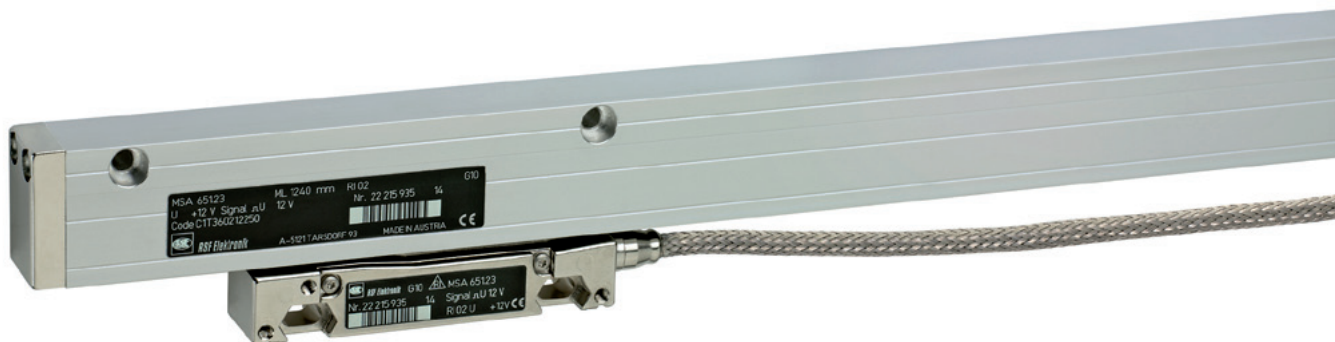
**Signal-outputs(optional):**

- square wave signals (single ended)  
with integrated Subdividing Electronics
- square wave signals (differential)  
via Line Driver RS 422 standard  
with integrated Subdividing Electronics  
MSA 651.23 = times1  
MSA 651.24 = times1  
MSA 651.63 = times5  
MSA 651.64 = times5  
MSA 651.73 = times10

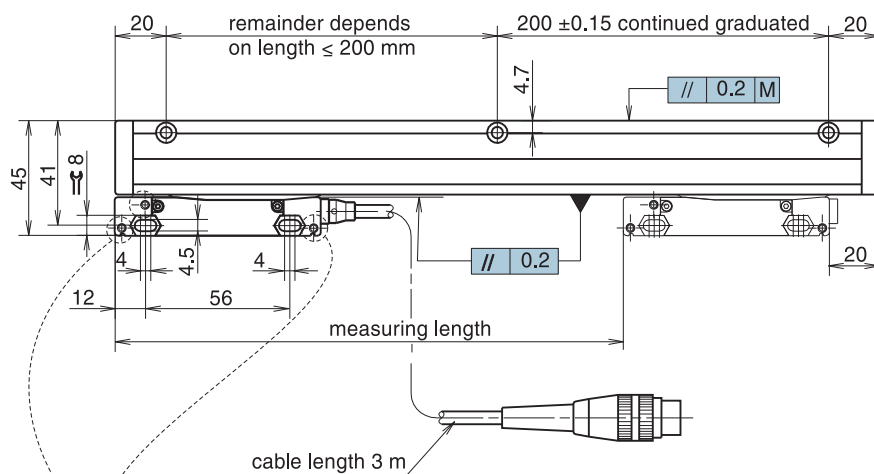
**Power supply:**

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

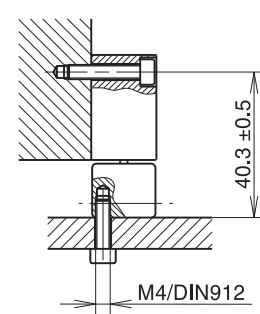
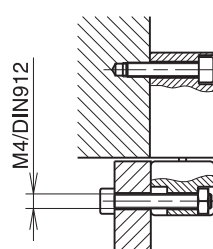
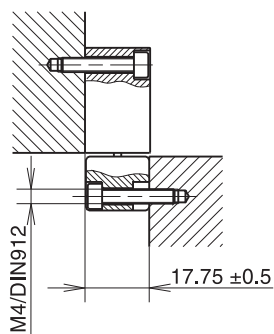
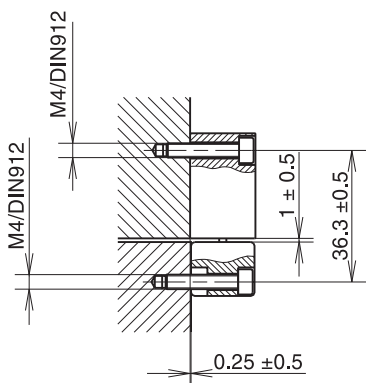
# DIMENSIONS - MOUNTING TOLERANCES - MOUNTING POSSIBILITIES



M = machine guideway



mounting screws for the easier mounting!  
(included in delivery)





**Features:**

- Max. measuring length: 3040 mm
- Rigid mounting
- Large cross-section
- Mounting holes on the extrusion ends and with mounting supports
- Distance coded Reference marks (**K**)

| Scale model  | System resolution | Accuracy grades * | Grating pitch * | Max. output frequency |           |
|--|-------------------|-------------------|-----------------|-----------------------|-----------|
|  |                   |                   |                 | continuous            | momentary |
| <b>• Square-wave signals with integrated Subdividing Electronics</b> |                   |                   |                 |                       |           |
| <b>MSA 350.24</b>  | 10 µm             | ± 10 µm/m         | 40 µm           | 1 m/s                 | 2 m/s     |
| <b>MSA 350.23</b>  | 5 µm              | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 2 m/s     |
| <b>MSA 350.64</b>  | 2 µm              | ±5, ±10 µm/m      | 40 µm           | 1 m/s                 | 2 m/s     |
| <b>MSA 350.63</b>  | 1 µm              | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 1 m/s     |
| <b>MSA 350.73</b>  | 0.5 µm            | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 1 m/s     |

\* Other accuracy grades or grating pitches (e.g. Inch) on 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):**

- Distance coded reference marks (**K**):  
after travelling 20 mm the absolute position is available
- 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.
- Optional: one reference mark at any location  
additional reference marks can be selected  
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

**Permissible temperature:**

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

**Weight (approx.):**

3 kg/m (scale spar) + 0.4 kg (scanning head with 3 m cable)

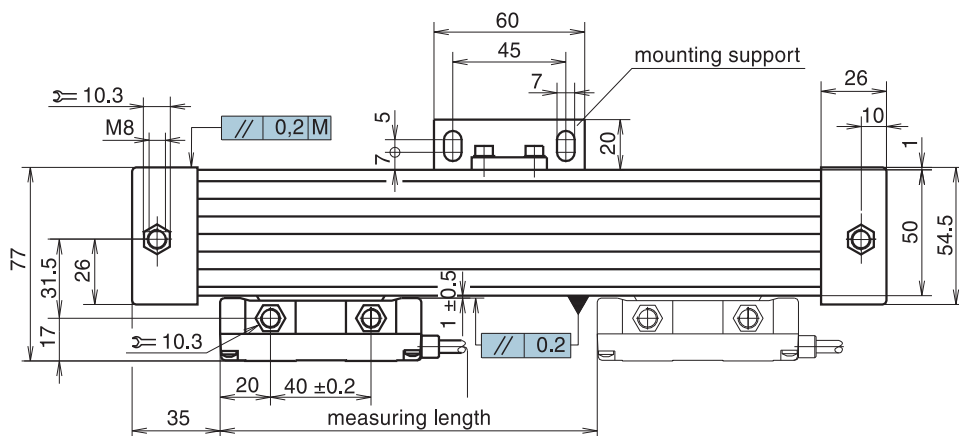
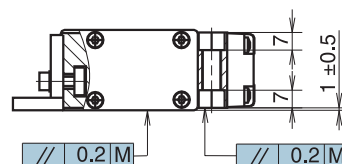
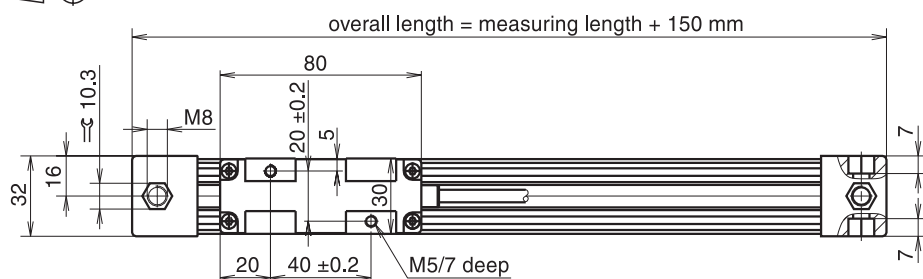
**Signal-outputs(optional):**

- **square wave signals** (single ended)  
**with integrated Subdividing Electronics**
- **square wave signals** (differential)  
**via Line Driver RS 422 standard**  
**with integrated Subdividing Electronics**  
**MSA 350.23 = times1**  
**MSA 350.24 = times1**  
**MSA 350.63 = times5**  
**MSA 350.64 = times5**  
**MSA 350.73 = times10**

**Power supply:**

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

# DIMENSIONS - MOUNTING TOLERANCES - MOUNTING POSSIBILITIES



M = machine guideway

quantity and position of the mounting support per measuring length

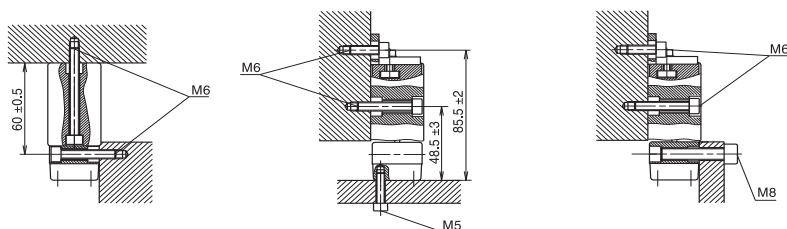
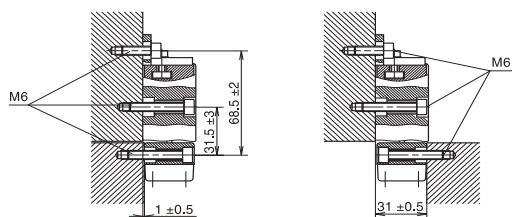
170 - 520 mm

620 - 1020 mm 1x

1140 - 2040 mm 2x

2240 - 3040 mm 3x

cable length 3 m



**Features:**

- Max. measuring length 3040 mm
- Rigid mounting
- Large cross-section
- Mounting holes on the extrusion ends and with mounting supports
- Distance coded Reference marks (**K**)
- Two sets of sealing lips

Optional: the MSA 352 is available with air inlets on extrusion ends.

In addition to the two sets of sealing lips, low pressure air helps to keep out coolants and contamination. The RSF air pressure unit (**Model DA300**) is designed to clean and regulate the encoder air.

| Scale model  | System resolution | Accuracy grades * | Grating pitch * | Max. output frequency |           |
|--|-------------------|-------------------|-----------------|-----------------------|-----------|
|  |                   |                   |                 | continuous            | momentary |
| <b>• Square-wave signals with integrated Subdividing Electronics</b> |                   |                   |                 |                       |           |
| MSA 352.24   | 10 µm             | ± 10 µm/m         | 40 µm           | 1 m/s                 | 2 m/s     |
| MSA 352.23   | 5 µm              | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 2 m/s     |
| MSA 352.64   | 2 µm              | ±5, ±10 µm/m      | 40 µm           | 1 m/s                 | 2 m/s     |
| MSA 352.63   | 1 µm              | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 1 m/s     |
| MSA 352.73   | 0.5 µm            | ±5, ±10 µm/m      | 20 µm           | 1 m/s                 | 1 m/s     |
| * Other accuracy grades or grating pitches (e.g. Inch) on 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):**

- Distance coded reference marks (**K**): after travelling 20 mm the absolute position is available
- 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.
- Optional: one reference mark at any location additional reference marks can be selected 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

**Permissible temperature:**

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

**Weight (approx.):**

3 kg/m (scale spar) + 0.4 kg (scanning head with 3 m cable)

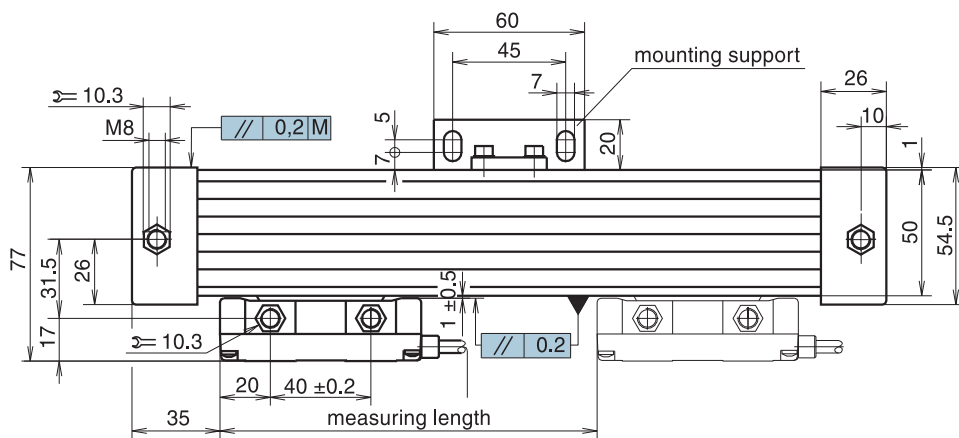
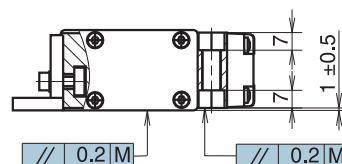
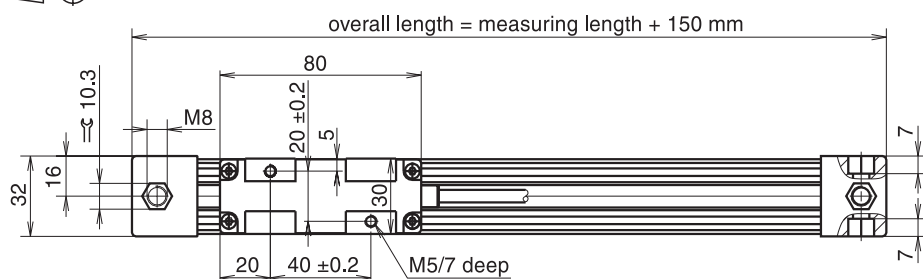
**Signal-outputs(optional):**

- **square wave signals** (single ended) with integrated Subdividing Electronics
- **square wave signals** (differential) via Line Driver RS 422 standard with integrated Subdividing Electronics  
**MSA 352.23** = times1  
**MSA 352.24** = times1  
**MSA 352.63** = times5  
**MSA 352.64** = times5  
**MSA 352.73** = times10

**Power supply:**

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

# DIMENSIONS - MOUNTING TOLERANCES - MOUNTING POSSIBILITIES



M = machine guideway

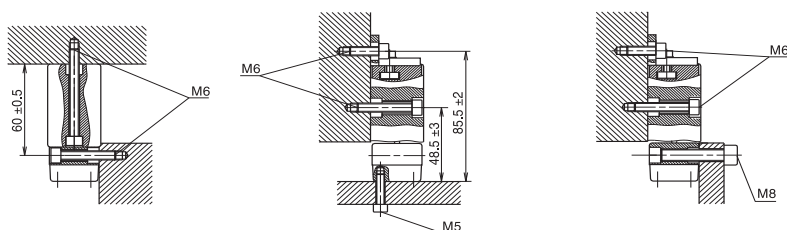
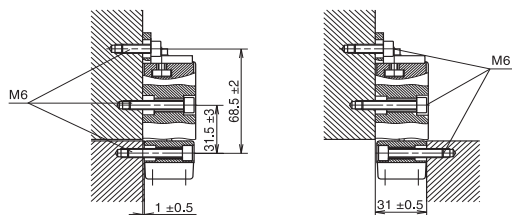
quantity and position of the mounting support per measuring length

170 - 520 mm

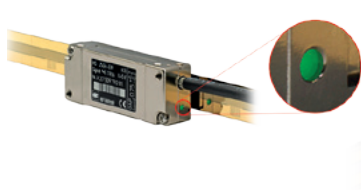
620 - 1020 mm 1x

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

cable length 3 m



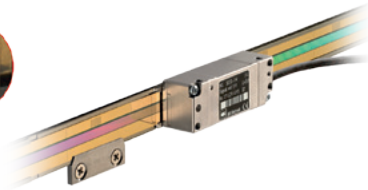
# PRODUCT DIRECTORY



## MS 2x Series

Reflective scanning Linear Encoders with integrated mounting control (only MS 25, MS 26)

- Easy mounting; no test box or oscilloscope needed
- Quality of the scanning signals is directly visible at the reading head via a 3-colored LED
- Two independent switch signals for individual special functions
- Position of reference mark selectable
- High insensitivity against contamination
- High traversing speed
- integrated subdividing: up to times 100 interpolation
- Max. measuring length: Glass scale: 3140 mm Steel tape scale: 20000 mm



## MS 30, MS 31

Reflective scanning Linear Encoders

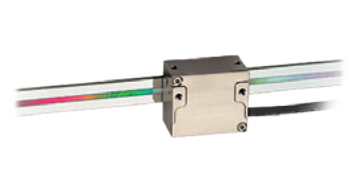
- Two independent switch tracks for individual special functions
- Small dimensions
- Easy mounting as a result of large mounting tolerances
- High traversing speed
- High insensitivity against contamination
- Integrated subdividing up to times 100 interpolation
- Max. measuring length Glass scale: 3140 mm Steel tape scale: 11940 mm



## MS 40

Reflective scanning Linear Encoders with low price and high quality

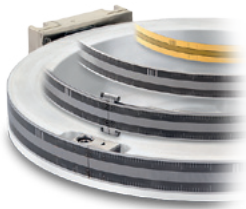
- Small dimensions
- Easy mounting as a result of large mounting tolerances
- High insensitivity against contamination
- High traversing speed
- Integrated subdividing: up to times 100 interpolation
- Max. measuring length: 30000 mm



## MS 82

Interferential Linear Encoders

- Two switch tracks for individual special functions
- Non-contact reflective scanning
- High traversing speed
- Small dimensions
- Scale unit: glass scale or ROBAX® -glass ceramic scale with phase grating
- Max. measuring length: Glass scale: 3140 mm Glass ceramic: 1540 mm



## MSR 40

Modular Rotary Encoders with steel tape scale

Different versions

- Full-circle or segment version
- Grating pitch: 200 µm
- Accuracy of the grating (stretched): ±30 µm/m
- High rotational speed resp. circumferential speed
- Integrated subdividing: up to times 100 interpolation

## MSR 20

- Segment version
- Grating pitch: 40 µm
- Accuracy of the grating (stretched): ±15 µm/m
- High circumferential speed
- Integrated subdividing: up to times 100 interpolation



## UFC 430

USB-Interface-Module

- USB-interface acc. to spec. 2.0
- Available inputs: 1 Vpp max. 200 kHz or TTL (RS 422) max. 500 kHz
- Interpolation: up to times 400 for measuring systems with output 1 Vpp and up to times 4 for measuring systems with square-wave Line Driver signals
- Three 15-pin Sub-D female connectors for 3 encoder inputs
- 32 Bit counter with preset and latch register



## IFC 430R

Encoder-interface-card

- PC interface board for quadrature encoder signal evaluation: times 1, -2 or -4
- Latch logic for measured values
- Three counter channels à 32 bit, one load and two latch registers for each channel
- PC bus
- Signal edge separation: up to 100 ns
- Demo program with examples and driver software

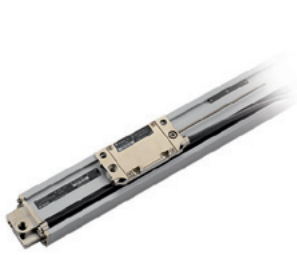


## DIT 10, DIT 30, DIT 48

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)





### MSA 374

- With integrated guide rail system
- For application on presses bending machines and hydraulic cylinders
- Enclosed version
- Roller bearing dual guided scanning carriage
- Free positionable switching magnets for special functions
- Distance coded reference marks
- Mounting holes on the extrusion ends
- Max. measuring length: 720 mm



E.g.: MSA 470

E.g.: MSA 730

### MSA 7xx, MSA 8xx series (small dimensions)

### MSA 4xx, MSA 5xx series (large dimensions)

- Optimized thermal behavior
- Connection cable pluggable (optional)
- Enclosed version
- Distance coded reference marks
- Mounting holes at the ends or along the scale unit for improved vibration stability
- Max. measuring length: 3040 mm



### DG 118, DG 120

Rotary Encoders  
for universal application

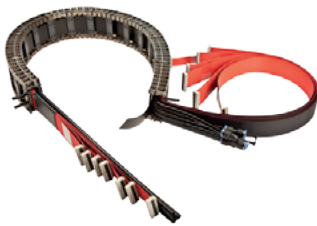
- Standard line/rev.: graduated from 100 to 5400



### ZE-Sx

Subdividing electronics

- For Linear Encoders with sinusoidal voltage signals
- Interpolation: times 5, -10, -20, -25, -50, -100, -200 or -400
- Power supply: +5 V ±5 %
- Output: square-wave signals + reference impulse via Line Driver RS 422 standard



### Cable systems

- Individual cable design
- Hybrid cable
- Trailing cable
- System solutions
- Function control



### SENTOP® precision graduations

- Length graduations on glass, chromium coated
- Length graduations on steel tape, gold coated or polished surface
- Circular graduations on glass, chromium coated
- Graticules
- Antireflex coatings
- Coatings

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Date 10/2010 ■ Art.Nr. 386218-24 ■ Doc.Nr. D386218-00-A-21 ■ Technical adjustments in reserve!



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Ges.m.b.H.

Linear Encoders  
Digital Readouts  
Precision Graduations  
Cable Systems

Certified acc. to  
**DIN EN ISO 9001**  
**DIN EN ISO 14001**