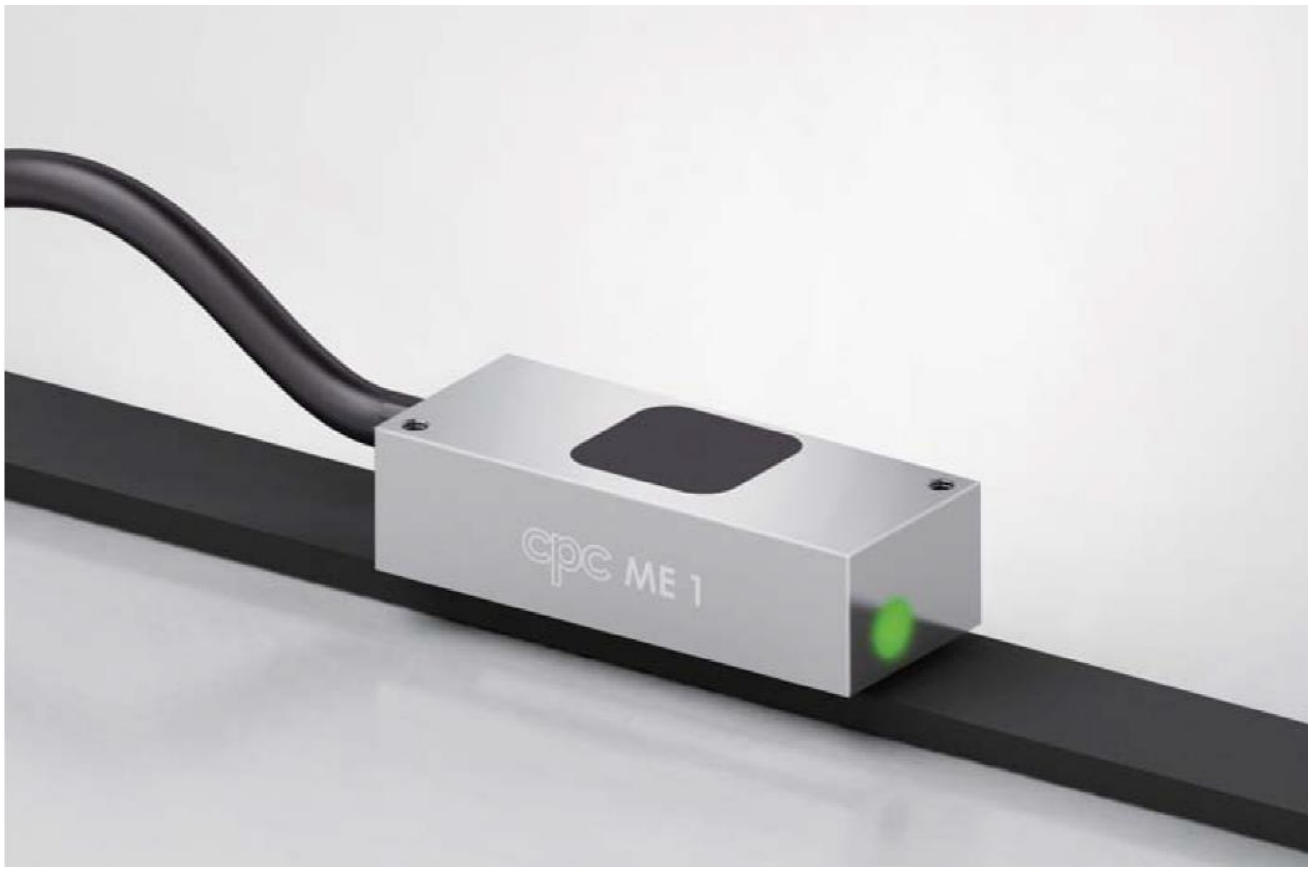
CHIEFTEK PRECISION CO., LTD.



Magnetic Encoder ME1 Series

Datasheet

Ver. 1.2

Table of Contents

Disclaimer

1. Information furnished by cpc is believed to be accurate and reliable. However, no responsibility is assumed by cpc for its use, nor for any infringements of patents or other rights of third parties which may result from its use. cpc doesn't grant any license under its patent rights, nor the rights of others.
2. In addition, cpc assumes no responsibility for any errors that may appear in this document and for any claims or damages arising from information contained in this document.
3. The product specified in this document has been developed, produced, tested and documented in accordance with the relevant standards. cpc is not responsible for damages, accidents, or injuries caused by any deviation from the configuration and installation described in this guide;
4. Furthermore, cpc is not responsible for the performance of new measurements or ensuring that regulatory requirements are met.
5. The product specified in this document is not assumed to be used in critical application including, but not limited to, medical equipment, transportation, aerospace and nuclear instruments, undersea equipment, power plant equipment, as well as disaster prevention and crime prevention equipment.
6. We reserve the right to modify our products, including its hardware and software design, in order to improve its design and/or performance. The information in this document is subject to change without notice and does not represent a commitment by cpc.
7. Specifications are subject to change without notice.
8. Performance specification beyond those specified by safety regulations are guaranteed by design and not subject to production test.
9. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete.
10. cpc assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using cpc products.

Revision History

Version	Date	Description	Remarks
1.0	November 2017	Initial release	--
1.1	June, 2018	First revision	Amended dimension info (Ch. 4).
1.2	September, 2018	Second revision	Added the accuracy and the linear expansion coefficient of scale (Ch. 6).

Contact Us

Headquarters

Chieftek Precision Co., Ltd.

NO.3, Dali 1st Rd., Xinshi Dist., Southern Taiwan Science Park,

Tainan City. 741-45, Taiwan (R.O.C.) 3

TEL: +886-6-505-5858

FAX: +886-6-505-5959

Email : service@mail.chieftek.com

China

Chieftek Machinery Kunshan Co., Ltd. ()

No.1188, Hongqiao Rd, Kunshan, Jiangsu, P.R. China 1186

Tel : +86-512-55252831

Fax : +86-512-55252851

Email : cn.service@mail.chieftek.com

Europe

cpc Europa GmbH

Industriepark 314, D-78244 Gottmadingen, Germany

Tel : +49-7731-59130-38

Fax : +49-7731-59130-28

Email : info@cpc-europa.de

USA

Chieftek Precision USA Co., Ltd.

4881 Murietta Street. Chino, CA. 91710

TEL: +1-909-628-9300

FAX: +1-909-628-7171

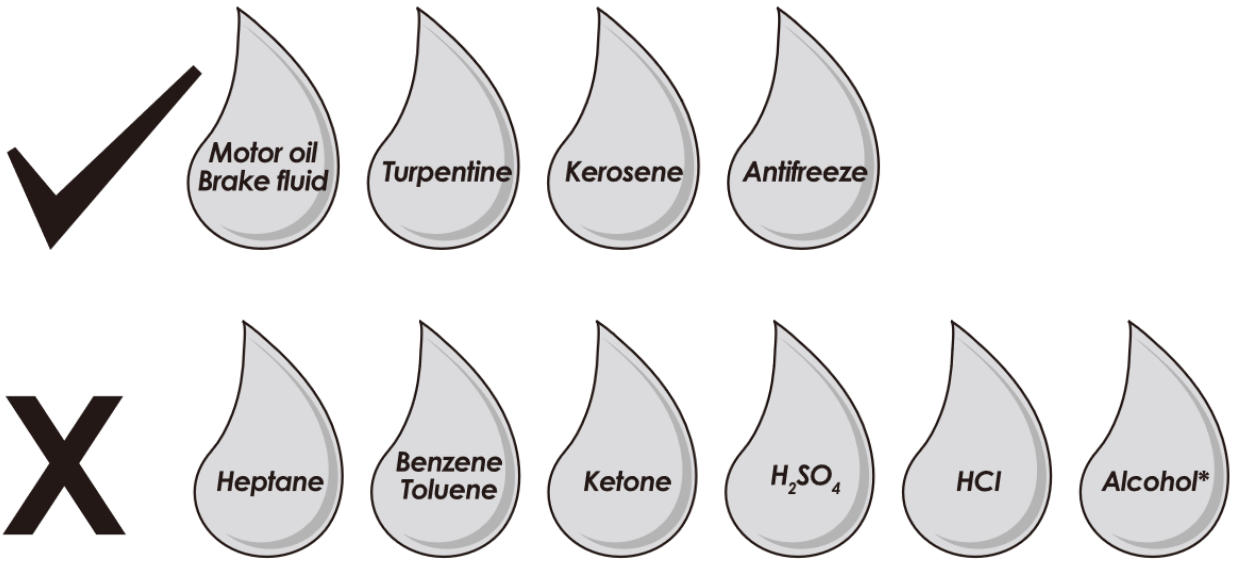
Email : info@usa.chieftek.com

1. Product Features

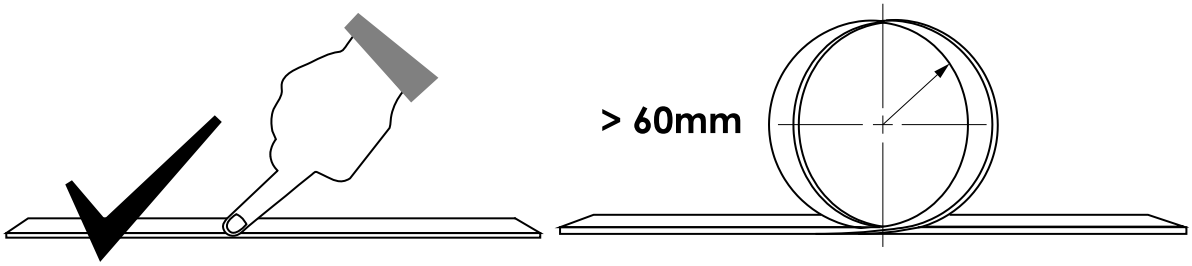
- Compact and durable design.
- Customer selectable resolutions.
- Index sensor included.
- Status LED.
- Magnetic stick-on reference mark.
- Scale lengths up to 50 m.

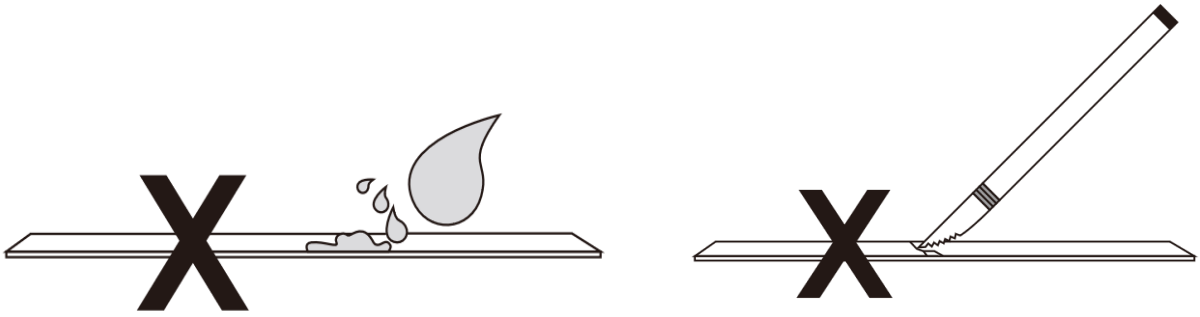
2. Storage and Handling

Please pay attention to the dos and don’ts:

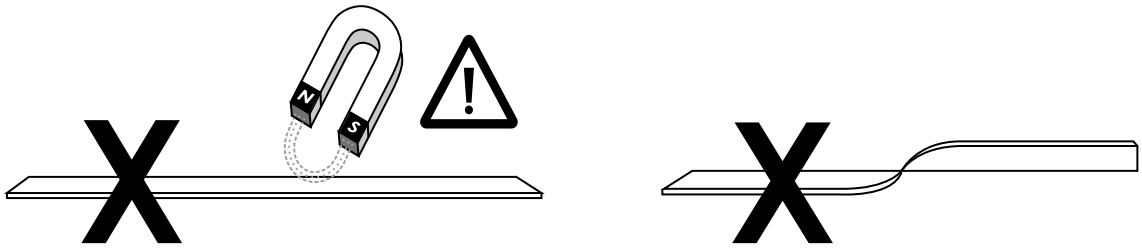


*Use of alcohol for cleaning is acceptable; however, do not immerse the scale in alcohol.





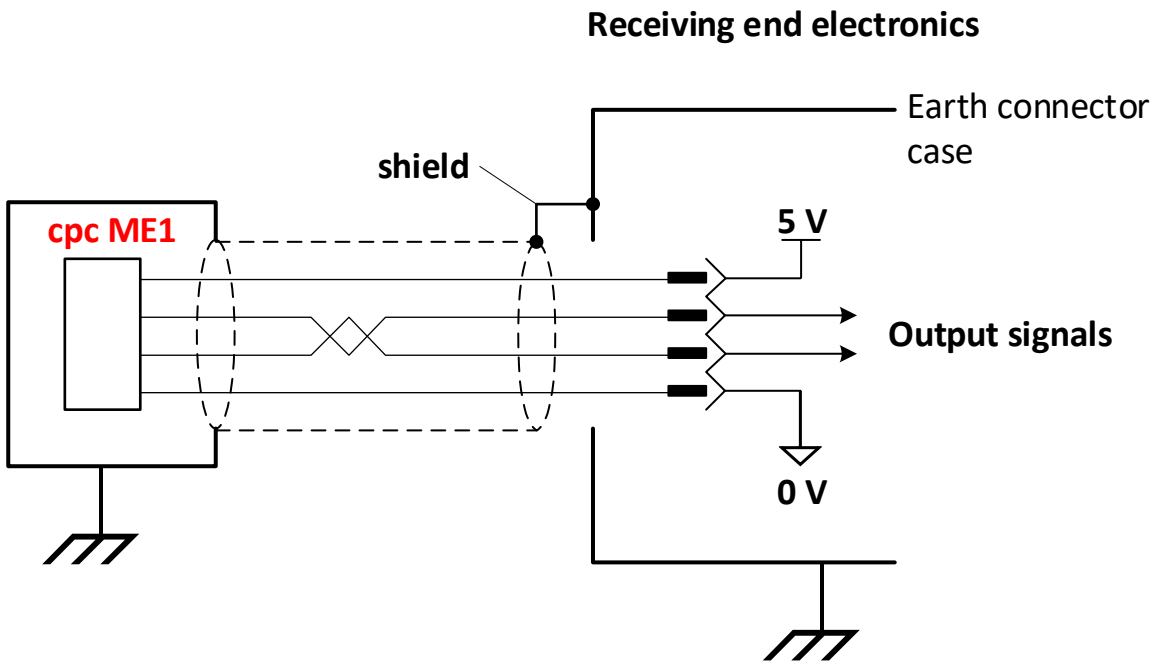
*Do not drop the liquid mentioned above onto the scale.



Warning:

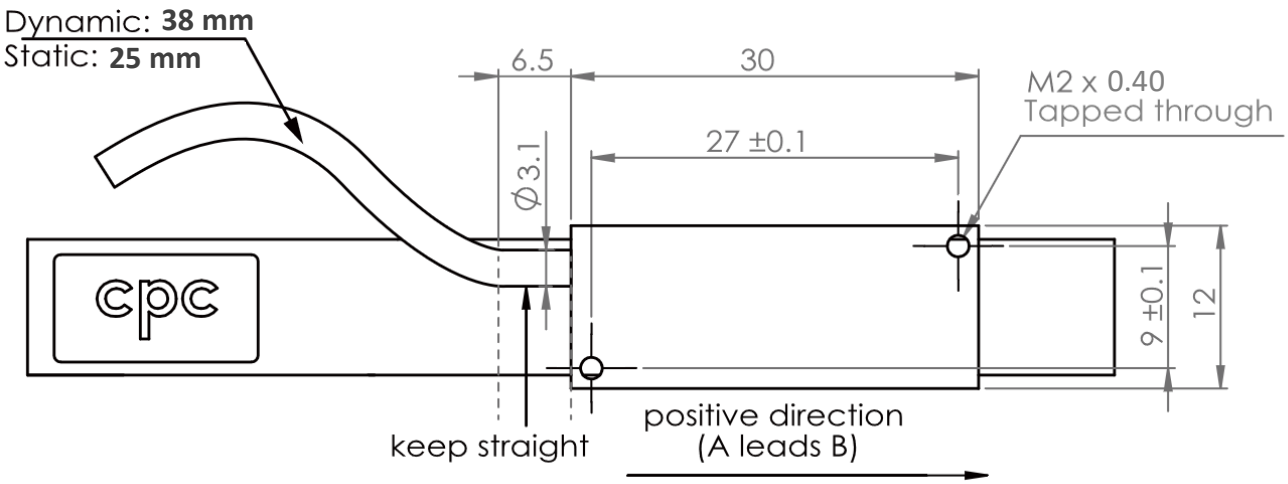
The cpc magnetic scale should not be exposed to magnetic field densities higher than 5 mT on its surface.

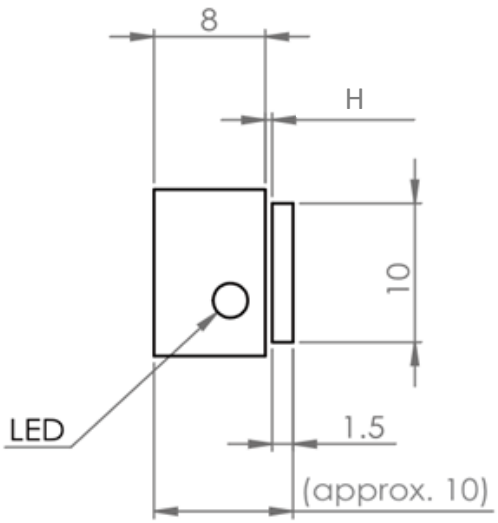
3. Electrical Connections



4. Dimensions

- **Readhead and Scale**





Unit: mm

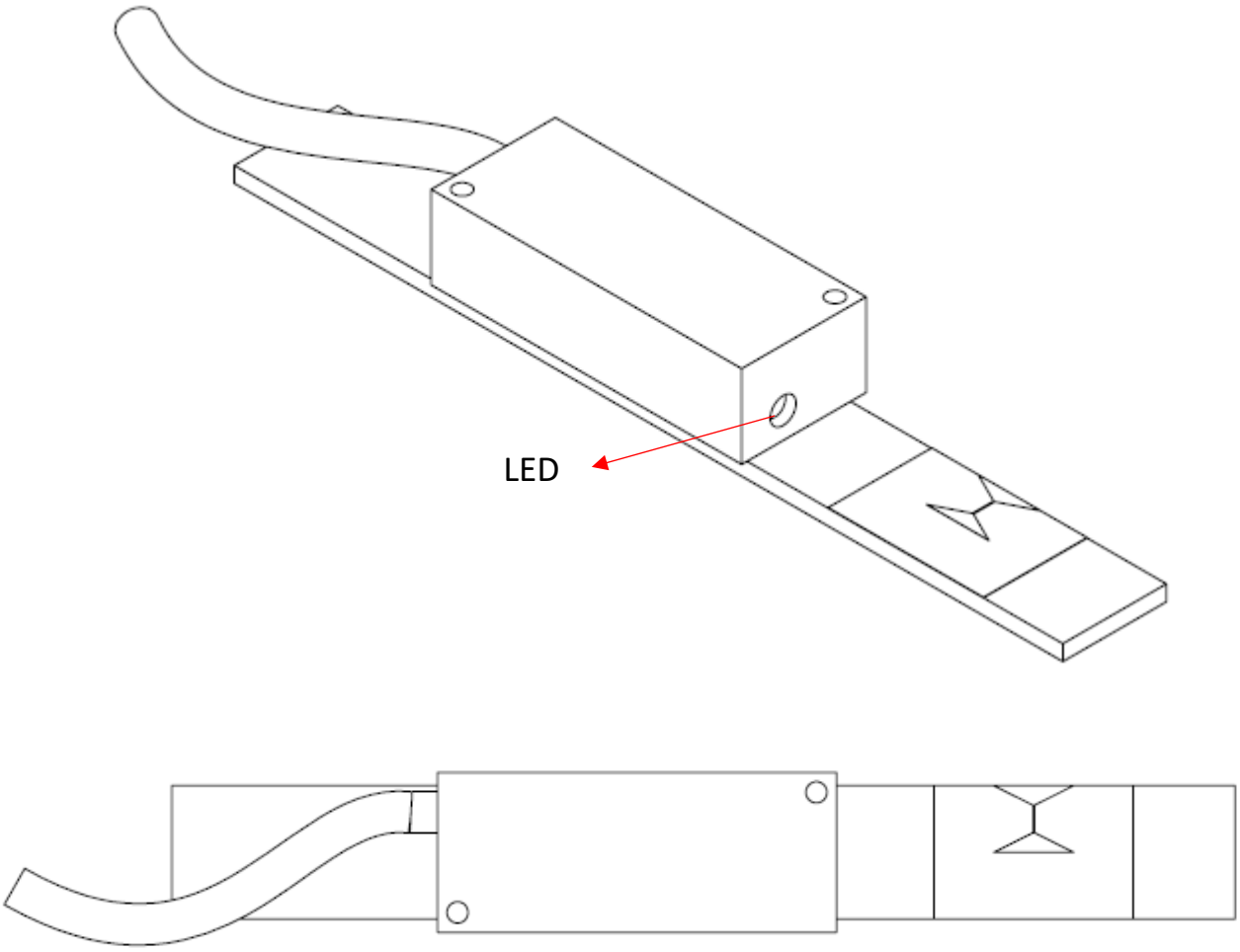
- A 0.3 mm thick label is enclosed with the product.

Magnetic Stick-on Reference Mark	Scale Thickness	H (Recommended Ride Height)
O	1.5 ± 0.15 mm	0.3 ~ 0.8 mm
X	1.5 ± 0.15 mm	0.1 ~ 0.8 mm

5. Installation

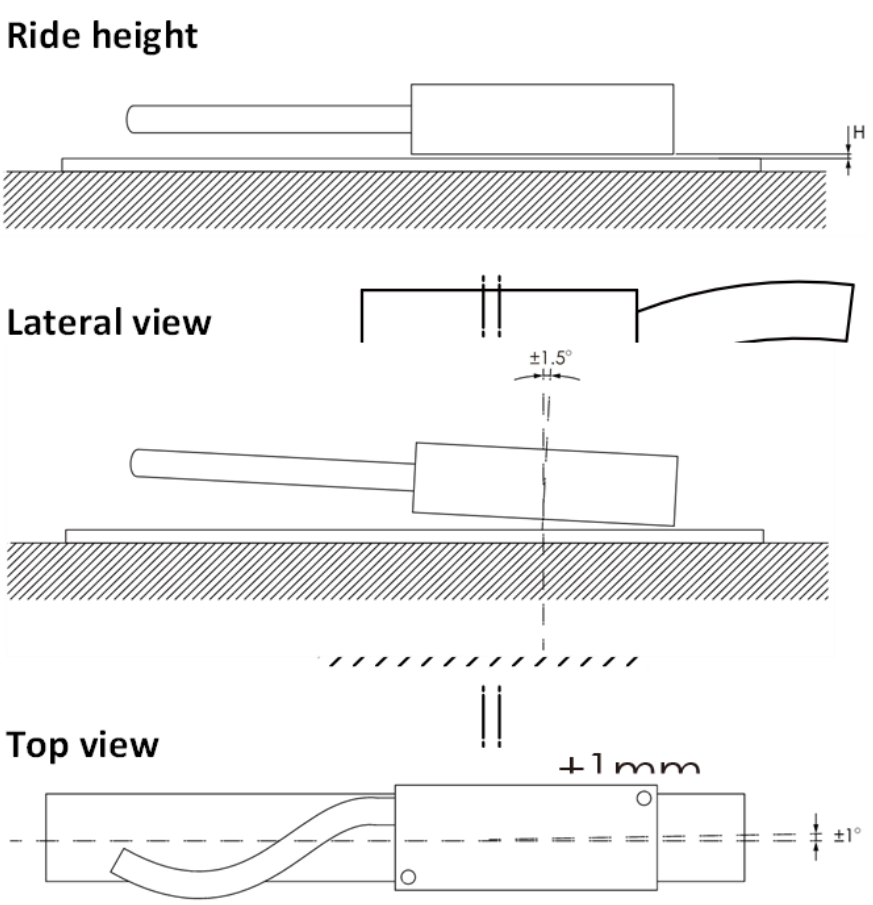
5.1 Direction of the Stick-on Reference Mark

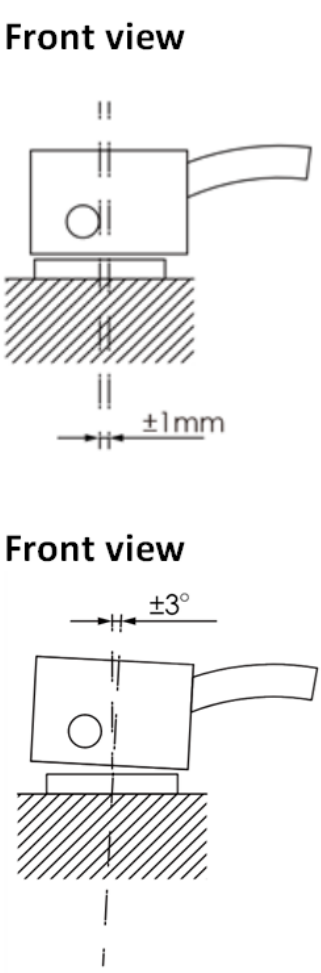
When applying the magnetic stick-on reference mark to the scale, the arrow sign of the reference mark should be oriented to **the opposite side of the LED**. **Please see the illustration below.**



5.2 Tolerances

Please make sure to center the readhead and align it to the surface and edge.
Installation tolerances are shown as below.





6. Technical Specifications

<table>
<tr><th>Specification</th><th>ME1 Series</th></tr>
<tr><td colspan="2">System</td></tr>
<tr><td>Maximum length for ME1 scale</td><td>50 m</td></tr>
<tr><td>Pole length</td><td>2 mm / 1 mm</td></tr>
<tr><td>Sinusoidal period length</td><td>2 mm / 1 mm</td></tr>
<tr><td>Available resolution and maximum speed</td><td>*For analog output type, resolution code is 000.
1 mm scale
<table><tr><th>Resolution (µm)</th><th>max. travel speed (m/s)</th><th>resolution code</th></tr><tr><td>0.5</td><td>3</td><td>005</td></tr><tr><td>1</td><td>6</td><td>010</td></tr><tr><td>2</td><td>13</td><td>020</td></tr><tr><td>5</td><td>20</td><td>050</td></tr><tr><td>10</td><td>20</td><td>100</td></tr></table>
2 mm scale (standard)
<table><tr><th>Resolution (µm)</th><th>max. travel speed (m/s)</th><th>resolution code</th></tr><tr><td>1</td><td>6</td><td>010</td></tr><tr><td>2</td><td>13</td><td>020</td></tr><tr><td>5</td><td>20</td><td>050</td></tr><tr><td>10</td><td>20</td><td>100</td></tr></table></td></tr>
<tr><td>Linear expansion coefficient for scale</td><td>~ 17 x 10^{-6}/K</td></tr>
<tr><td>Accuracy grade for scales</td><td>±20 µm/m</td></tr>
<tr><td>Repeatability</td><td>Less than 1.5 unit of resolution while moving in the same direction.</td></tr>
<tr><td>Mass</td><td>• Readhead only without connector: 5.92 g
• 1 meter cable: 16 g</td></tr>
<tr><td colspan="2">Cable</td></tr>
<tr><td>Voltage drop over cable</td><td>~ 50 mV/m – with 120 Ω load</td></tr>
<tr><td>Cable</td><td>• Ø3.10 ± 0.2 mm.
• Shielded; with a temperature resistance up to +105 °C.
• 8-wire cable: 8 x 30 AWG (26 x 0.05 mm strands).</td></tr>
<tr><td colspan="2">Environment</td></tr>
<tr><td>Operating temperature</td><td>-40 ~ 85 °C</td></tr>
</table>

7. Electrical Specifications

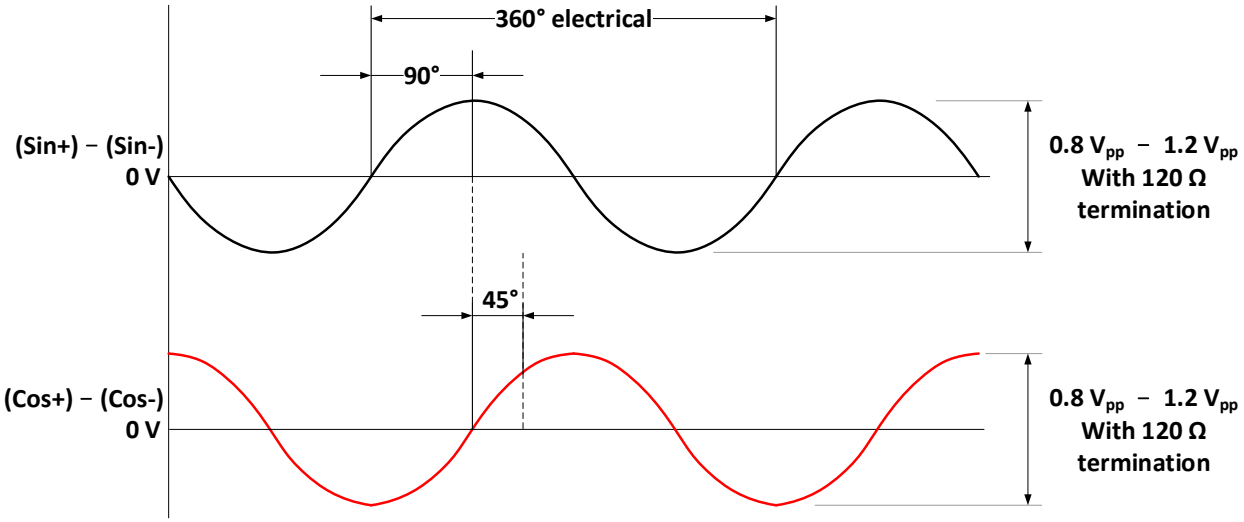
7.1 Analog Output Signals

7.1.1 Electrical specifications

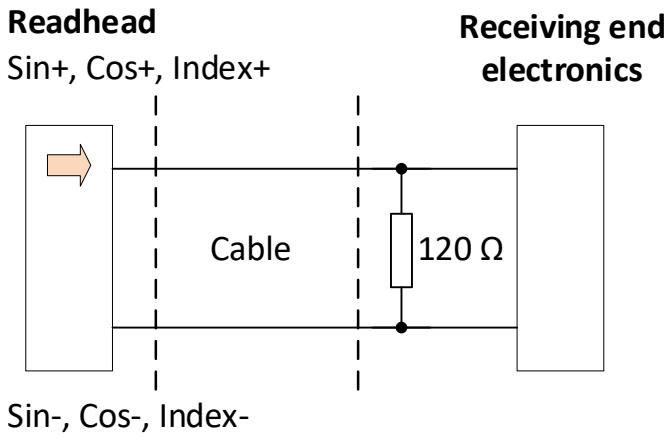
Electrical Specification	Analog output signals
Power supply	4.5 V ~ 5.5 V
Power consumption	< 40 mA
Voltage drop over cable	~ 50 mV/m – with 120 Ω load
Output signals	Sin, Cos, Index
Sine / cosine signals	0.8 V_{pp} ~ 1.2 V_{pp}
Reference signal	0.8 V_{pp} ~ 1.2 V_{pp}
Termination	Z_0 = 120 Ω
Cable length	100 m

* Please consider voltage drop over cable.

Timing diagram



Suggestion for signal termination



7.1.2 Connections

Color	Signal
Blue	Gnd
Red	5 V
Brown	Cos+
Green	Cos-
Grey	Sin+
Yellow	Sin-
Pink	Index+
White	Index-

7.2 Digital Output Signals

7.2.1 Electrical specifications

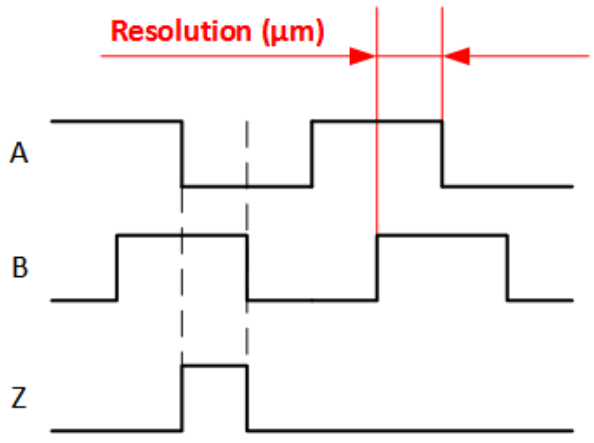
Electrical Specification	Digital output signals
Power supply	4.5 V ~ 5.5 V
Power consumption	< 35 mA (without load)
Voltage drop over cable	~ 50 mV/m – with 120 Ω load
Output signals	3 square-wave differential signals: A and A-; B and B-; Z and Z-
Reference signal	1 or more square-wave pulse differential signal Z and Z-
Maximum load	I_L < 100 mA max. for each output
Cable length	100 m

* Please consider voltage drop over cable.

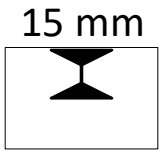
7.2.2 Connections

Color	Signal
Blue	Gnd
Red	5 V
Brown	A
Green	A-
Grey	B
Yellow	B-
Pink	Z
White	Z-

Timing diagram



8. Magnetic Stick-on Reference Mark



(Thickness: **0.22** mm)

9. Status LED

LED	Status	Possible reason
Green	Signal strength is sufficient.	-
Red flashing	1. Poor signal strength 2. Frequency of input signal is too high.	• Incorrect direction of readhead. • Readhead installation has deviated from the tolerances. • The scale is demagnetized. • Power supply voltage is too low. • Frequency of input signal is too high.

10. Response Time

	ME1
Set-up time	≦ 30 ms
Conversion time	< 250 ns

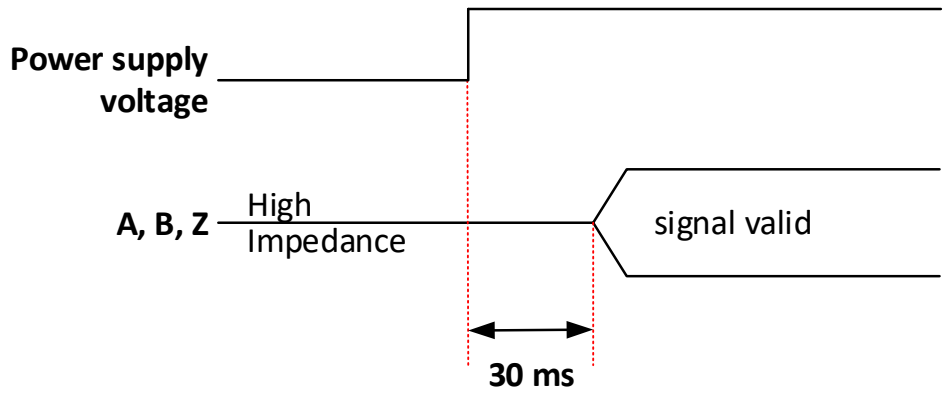
- **Set-up time**:

  The time duration required for the readhead to begin generating the position information after power-on.

- **Conversion time**:

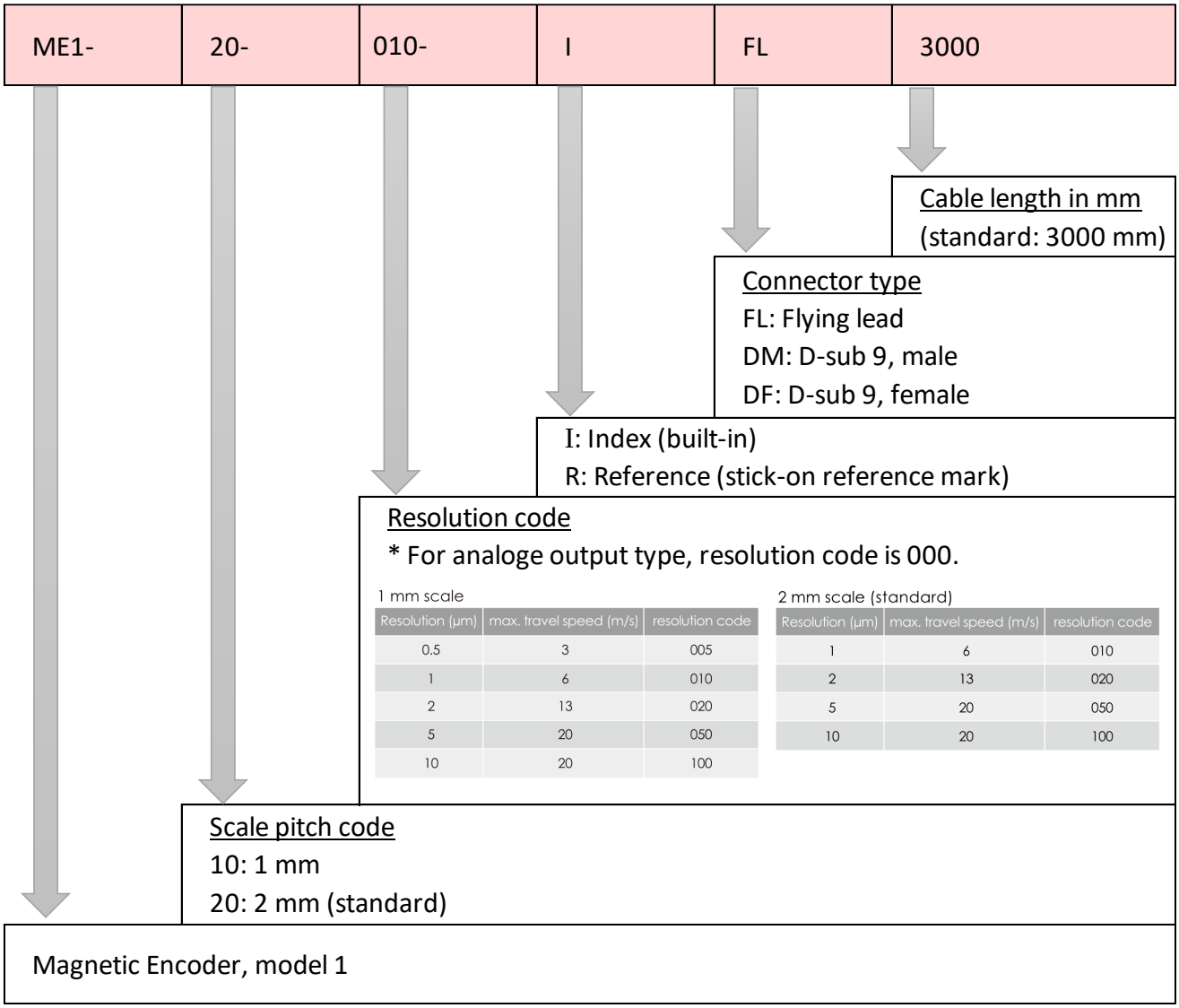
  The time duration required for the readhead to convert the position information into an output signal.

Diagram of set-up time

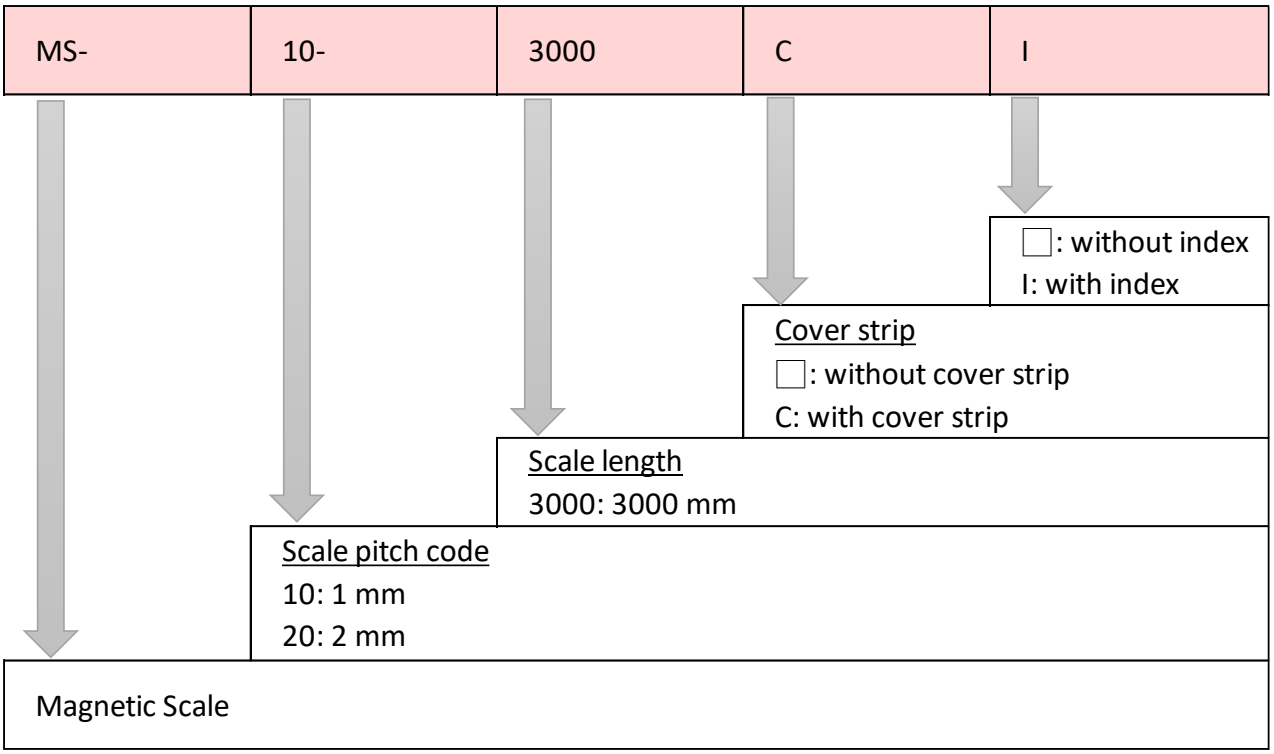


11. Part Numbering

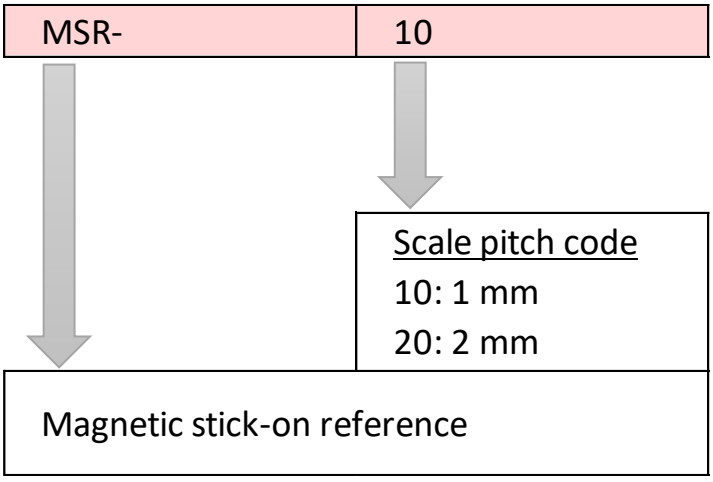
11.1 Readhead Part Numbering



11.2 Magnetic Scale Part Numbering



11.3 Magnetic Stick-on Reference Mark Part Numbering



End of Document