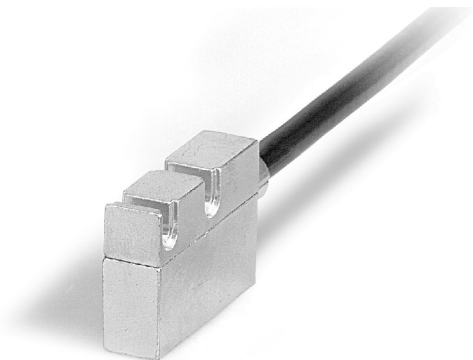


## User manual

# SMS (1Vpp)

## Description

This manual describes products of the SMS series. The purpose of these sensors is to measure linear or angular displacements on industrial machines and automation systems. The measurement system includes a magnetic tape and a magnetic sensor. The tape has alternating magnetic north/south poles which are magnetized at a certain distance, called the pole pitch. As the sensor is moved along the magnetic tape, it detects the displacement and produces an sine-cosine output signal equivalent to that of an incremental encoder or a linear scale. The flexibility of the tape allows it to be used for both linear and angular applications. The sensor has to be matched with MT10 magnetic tape.



## Chapters

- 1 Safety summary
- 2 Identification
- 3 Installation
- 4 Mounting recommendations
- 5 Electrical connections
- 6 Output signals
- 7 Maintenance
- 8 Troubleshooting
- 9 Dimensional drawing

## 1 - Safety summary

For electrical connection follow strictly the notes on general catalogue. With reference to the directive 89/336/CEE about electromagnetic compatibility you must respect the following precaution:

- sensor head should be installed as close as possible to your control unit;
- always use shielded cables and twisted if possible, with a cross section between 0.14mm<sup>2</sup> and 0.5 mm<sup>2</sup>;
- avoid running the sensor cable near high voltage power cables (e.g. drive cables) in order to reduce influences of electric noise;
- install EMC filters on sensor power supply if needed;
- we recommend that the sensor head be mounted as far as possible from any capacitive or inductive noise source such as motors, relays and switching devices.

Connect according to the chapter 5: "Electrical connection".

## 2 - Identification

The sensor can be identified by the label's data (ordering code, serial number). This information is listed in the delivery document. For technical features of the product to make reference at the technical catalogue.

## 3 - Installation

Install the device according to the protection level provided. Protect the system against knocks, friction, solvents and respect the environmental characteristics of the product.

Be sure that the system is mounted where hard or sharp objects (e.g. metal chips) do not come into contact with the magnetic scale and the bottom of the sensor head. If these conditions cannot be avoided provide a wiper or pressurized air.

## 4 - Mounting recommendations

### 4.1 Mounting tolerances

Check planarity and parallelism between sensor and magnetic tape using a feeler gauge (see fig.1). Avoid contact between the parts. Sensor can be fixed by means of two M3 screws over the buttonholes.

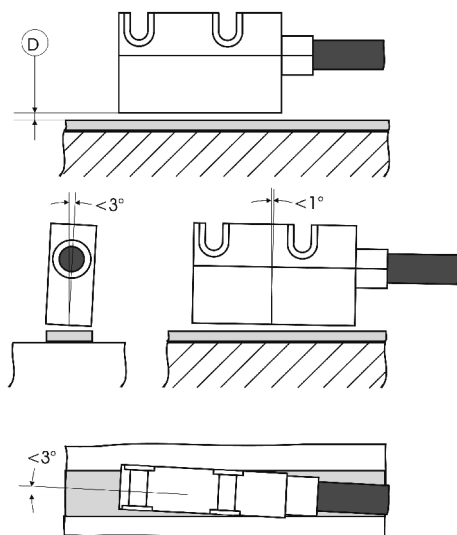


fig.1

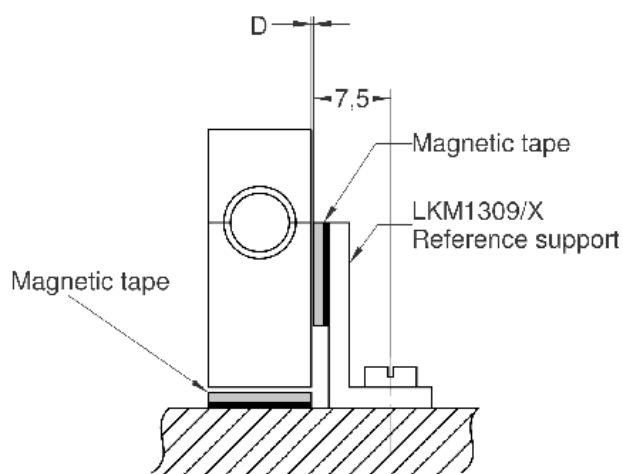
Sensor	Max Gap (D) Sensor/Magnetic tape
SMS	0.5 mm <sup>(1)</sup>
SMS	0.2 mm <sup>(2)</sup>

<sup>(1)</sup> Without cover strip

<sup>(2)</sup> With cover strip

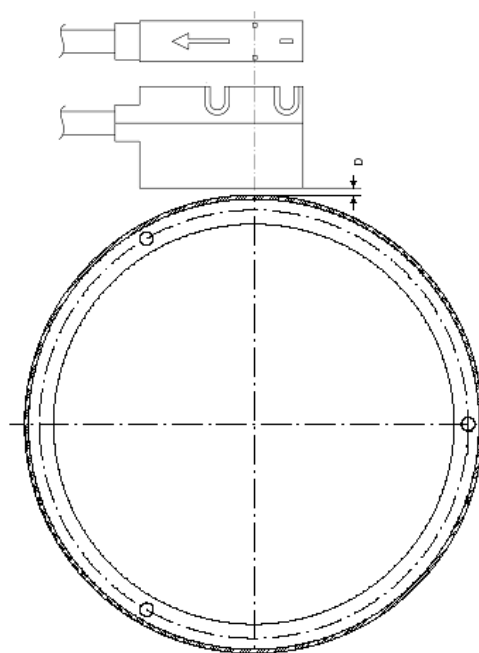
### 4.2 Mounting tolerances with reference "R" and LKM-1309/1

Make sure that the gap between sensor and LKM-1309/1 is respected. Avoid contact between the parts.



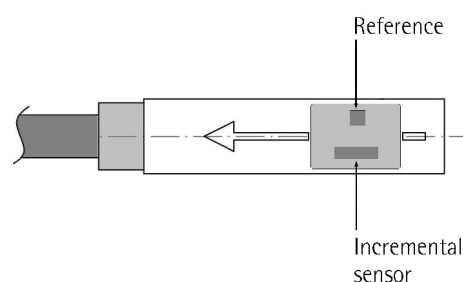
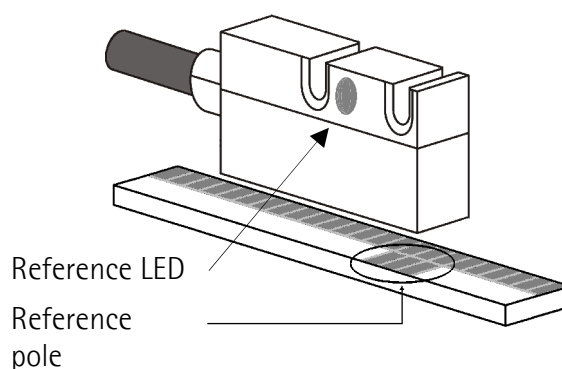
Sensor	Max Gap (D) Sensor / LKM-1309/1
SMS	0.2 mm

### 4.3 Mounting position with magnetic rings



Sensor	Max Gap (D) Sensor/Magnetic ring
SMS	0.4 mm

### 4.2 Mounting position with reference "Z"



## 5 - Electrical connections

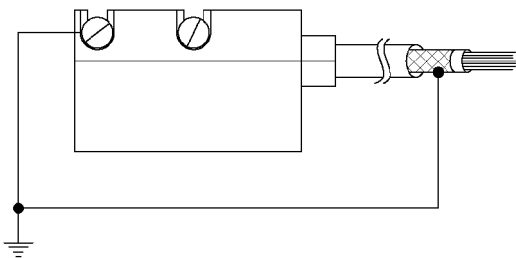
Colour	Function
Yellow	A
Blue	/A
Green	B
Orange	/B
White	0
Grey	/0
Black	0Vdc GND
Red	+Vdc

### 5.1 Specifications of the cable

Wires :  $6 \times 0.14\text{mm}^2 + 2 \times 0.22\text{mm}^2$   
 Screening : Copper  
 External  $\varnothing$  :  $\varnothing 5.4 \text{ mm} \pm 0.2 \text{ mm}$  ( $\varnothing 0.21\text{in} \pm 0.01\text{in}$ )  
 Impedance :  $6 \times 148 \Omega/\text{Km}$ ,  $2 \times 91 \Omega/\text{Km}$

#### NOTE:

- follow safety summary quoted in chapter 1;
- while connecting, power must be switched OFF;
- check correct connections before switching ON;
- we recommend that the sensor head be mounted as far as possible from any capacitive or inductive noise source such as motors, relays and switching devices;
- total length of connection cable from sensor to receiving device should not exceed 50 m (55');
- the shield of the cable, the case of the sensor and 0Vdc wire should be connected to ground (GND).

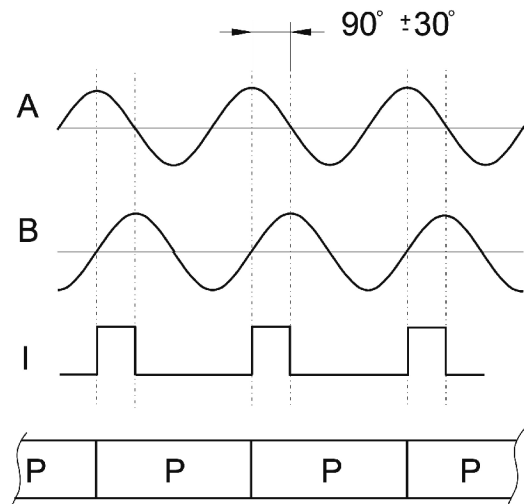


## 6 - Output signals

As the sensor is moved along the magnetic tape, it detects the displacement and produces an output signal equivalent to that of an incremental encoder or a linear scale. The frequency of output signals is proportional to the displacement speed of the sensor.

### 6.1 Index "I"

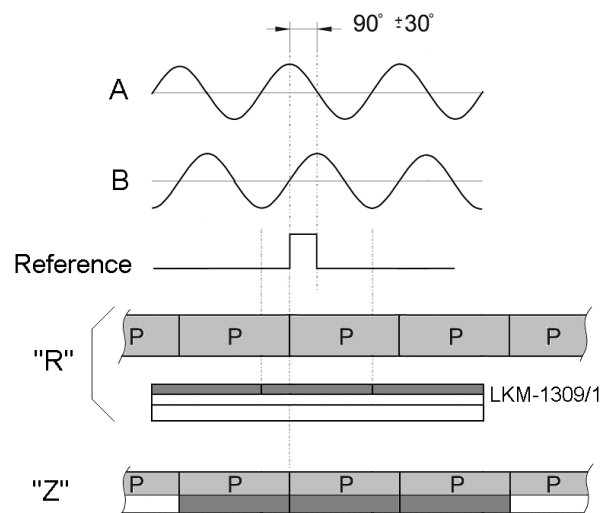
With ordering code "N" the output signal "I" is not provided.



### 6.2 Reference "R" and reference "Z"

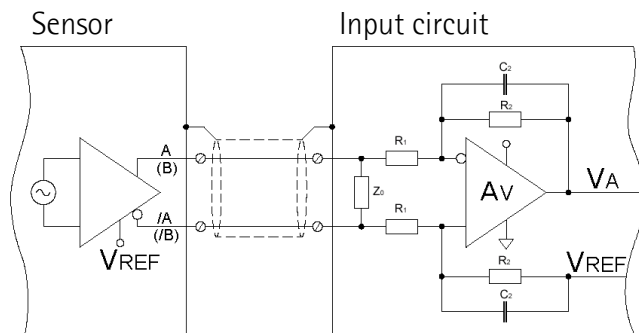
With ordering code "R" and in combination with LKM-1309/1.

With ordering code "Z" and in combination with special magnetic tape.

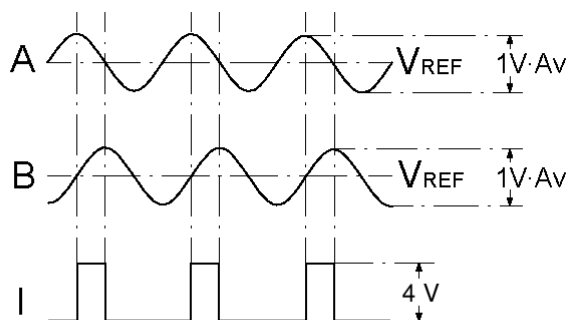


### 6.3 Voltage signals

The signal levels refer to the difference between the associated outputs, recommended input circuit of the subsequent electronics for each signal is reported below:



$$V_{REF} = 2,5V \pm 0,5V \quad V_A = 1V_{pp} \cdot A_v \quad A_v = R_2/R_1$$



### 7 - Maintenance

The magnetic measurement system doesn't need any particular maintenance but as with all precision devices it must be handled with care. From time to time we recommend the following operations:

- check the gap between sensor and magnetic tape along the measuring length. Wear of the machine may increase the tolerances;
- the surface of the magnetic tape should occasionally be cleaned using a soft cloth to remove dust, chips, moisture etc.

### 8 - Troubleshooting

The following list shows some typical errors that occur during installation and operation of the magnetic measurement system.

#### Problem:

The system doesn't work (no pulse output):

- the tape or sensor has been mounted incorrectly (the active part of the tape doesn't face the sensor's active side);
- a magnetic piece or tape is in between the sensor and the tape. Only non-magnetic materials are allowed between sensor and tape;
- the sensor touches the tape because tolerance gap between sensor and tape are not observed. Check sensor's active side if damaged;
- the sensor has been damaged by short circuit or wrong connection.

#### Problem:

The measured values are inaccurate:

- the gap between sensor and tape is not observed along the total measurement length;
- the connection cable runs near to high voltage cable or shield is not connected correctly;
- a section of the magnetic tape has been damage mechanically or magnetically along the measuring length;
- the measuring error is caused by torsion of the machine structure. Check parallelism and symmetry of machine movement.

### 9 - Dimensional drawing

Check details on product catalogue.

Rev	Man. Vers.	Description
0	1.0	1st issue
1	1.1	Modification of electrical connection table. Add chapter 6.3: "Voltage signals". Add Index "Z".