



**MLS-1  
MAGNETIC LINEAR ENCODER  
SYSTEM**

**magnetic measuring scale and  
free floating unguided sensor head**

## MLS-1 Sensor Systems:

### Features;



- **High resolution up to 0,001 mm resolution**
- **Sturdy metal case**
- **Best technology in small dimensions**
- **Shielded metal enclosure**
- **Easy mounting by gluing**
- **Contact-less and wear free system**
- **High resistance to vibrations to knocks**
- **Protection class IP67**
- **Resistant to humidity**
- **High accuracy**
- **Reliability reading transducer**
- **Measuring lengths of up to 100 m.**
- **Connection cable up to 50 m.**
- **Signal processing as standard with encoders**

### MLS-1 Magnetic Linear Encoder Systems:

The purpose of these sensors is to measure linear displacements on industrial machines & automation systems. High precision Magnetic Linear Encoder MLS-1 System operates incremental principle. It consist of a sensing head and a magnetically encoded tape. Magnetic tapes are commonly made from a magnetic tape itself made from Strontium ferrite bonded into a plastic or rubber (elastomer) matrix which is then bonded onto a steel support. The sensing head glides over the tape, which is magnetized with alternating polarity, with a gap of up to 2,5 mm. Thus, since the system works on the principle of magnetism, unlike optical systems it is highly immune to contamination from oils, dust etc. The tape has alternating magnetic north/south poles 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 output signal equivalent to that of an incremental encoder or a linear scale. Resolution is up to 1  $\mu$ m. Distance (gaps) of up to 2,5 mm (approx. 50 % of the pole width) above the magnetic tape are permitted. Also, accuracy classes of  $\pm 5 \mu$ m is achieved. These properties make it ideal for use in harsh, dusty industrial environments such as found in the wood industry.



### Magnetic Scales, what do I need them for?

Beacuse, magnetic scales are attracting more and more interest even in areas and applications where "conventional" and expensive glass scales were predominant so far.

In today's life, many problems can be solved by introducing position or angle measurement. Using Magnetic scales has become easy, even if you need non standard products.

### Applications:

**The MLS-1 Magnetic Linear Encoder Systems, the magnetic tape B5 are incremental systems without contact for linear measures.** The capacity to measure distances longer than a meter (moreover up to 100 m), easy assembling, absence of parts that contact/rub, a waterproof transducer and a water-oil-dust-shaving resistant strip make this system suitable for a large number of applications, while taking position measurements of machinery within industries such as: machine tools, automatic-, wood-, marble-, glassworking, pvc cutting, lathes, milling, grinding, welding machinery, etc. The measure transducer integrates in the same device, a sensor sensitive to a magnetic field, an electronic signals conversion circuit, and an output circuit. The sensor running on the magnetic tape produces a signal which, opportunely amplified and worked out, is changed into an incremental position signal for interfacing with displays, PLC, CNC, axes control, etc.

## TECHNICAL SPECIFICATIONS :

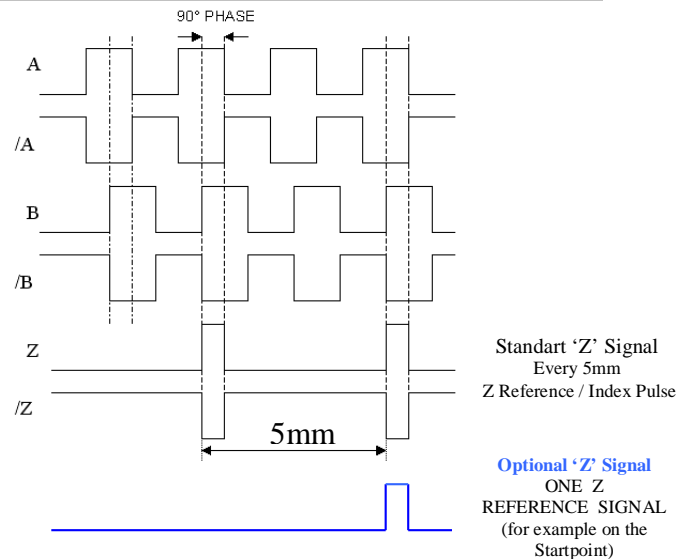
### Mechanical properties

Resolution Types	5 $\mu\text{m}$ , 10 $\mu\text{m}$ , 25 $\mu\text{m}$ and 62,5 $\mu\text{m}$ or on request
Output Circuit	Push-Pull or TLL RS 422 Line Driver
Output Signals	A, /A, B, /B, Z, /Z
Input Current	Max. 40mA per channel
Power Supply	10...30VDC $\pm\%20$ or 5VDC $\pm\%5$
Dimension	See drawing
Housing Material	Aluminium
Connections	Up to 100m cable length on request
Gap between tape and sensor	Up to 2.5mm ( Depend on pole pitch )
Travel Velocity	3 m/s
Magnetic Tape Type	B5 nitrile rubber temperature magnetic tape
Measure Accuracy	$\pm 1$ Increment
Repetability	$\pm 1$ Increment
Operating temperature range	-25...+85 $^{\circ}$
Protection Class	IP67

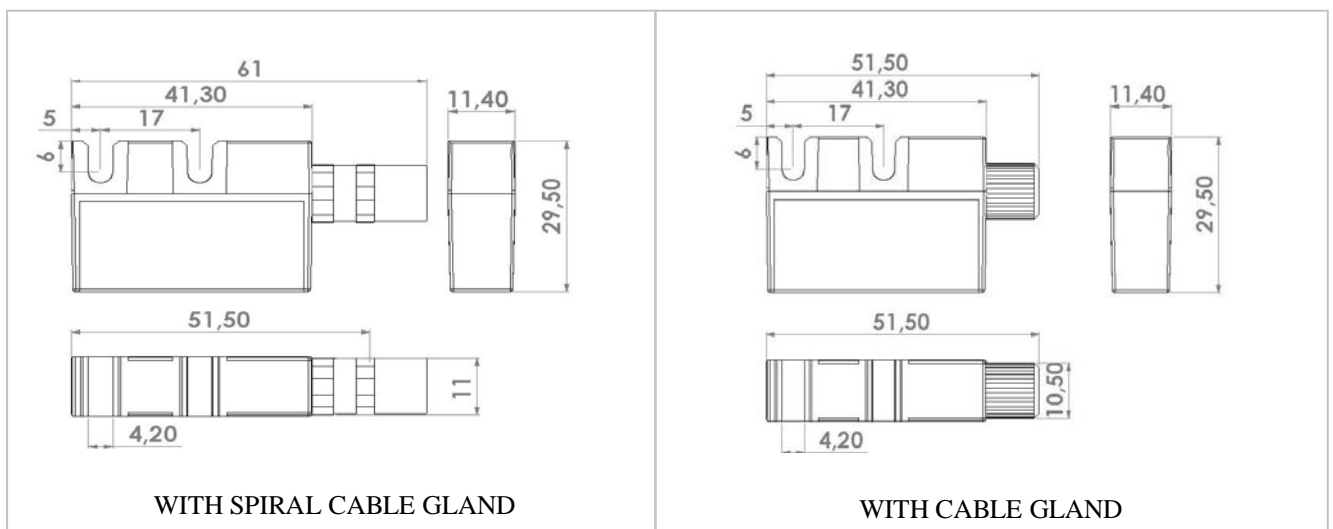
## ELECTRICAL CONNECTIONS :

Signal Name	Open cable end Cable Colour	Conn. D-sub, (9 pin) Pin no.
A	<b>YELLOW</b>	<b>1</b>
/B	<b>WHITE</b>	<b>2</b>
5V or 24V	<b>RED</b>	<b>3</b>
0 V	<b>BLACK</b>	<b>4</b>
/A	<b>BLUE</b>	<b>5</b>
B	<b>GREEN</b>	<b>6</b>
/Z	<b>GRAY</b>	<b>7</b>
Z	<b>PINK</b>	<b>8</b>
GROUND	<b>SHIELD</b>	<b>9</b>

## SIGNAL TYPES :



## DIMENSIONS :



**B5 Magnetic Tape:**



- Easy splicing and assembling
- Resistant to moisture and many fluids
- Extensive ruggedness against dust etc.
- The highly rugged, flexible

The highly rugged, flexible plastic magnetic tape can be applied to a machine tool easily. With a special industrial adhesive layered strip, B5 Magnetic Tape can be attached to the overside of the profile system.

The magnetic material is magnetised in defined and even distances and works as a solid measure. The magnetic scale retains its firmness by means of a spring steel base.

The magnetic band is supplied with a non-magnetic stainless steel cover for physical protection; for its fixing an adhesive tape is pre-mounted. As shown below, the B5 magnetic tape is composed by three layers:

- 1 - A flexible magnetic tape made of plastic material
- 2 - A magnetised steel tape used to create a shield against any external magnetic disturb. Although, it's glued to the upper plastic layer in order to supply the correct mechanical consistency to the magnetic tape.
- 3 - The third part is the most rigid one and therefore is supplied separately due to transport and application needs. It must be stick to layer 1 by the user. The steel tape is magnetically neutral and employed to mechanically protect the magnetic tape.



**B5 Magnetic Tape Structure**

**MAGNETIC TAPE SPECIFICATIONS :**

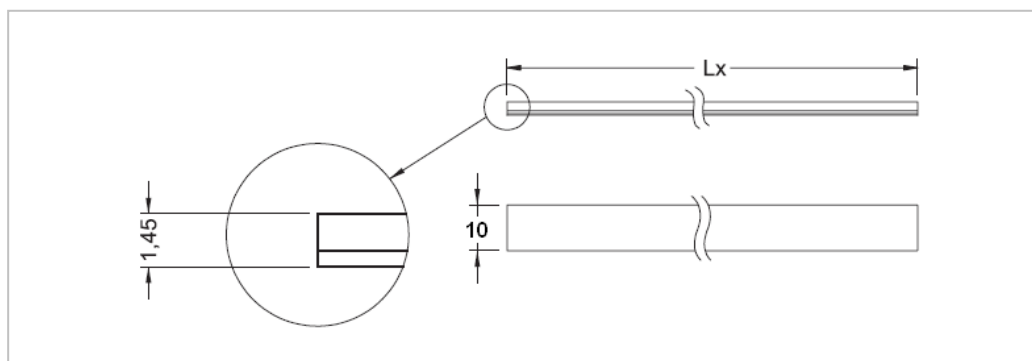
**Environmental conditions**

Operating temperature	-40°C to +120°C
Storage temperature	-40°C to +120°C
Water Protection	CrNi 17 7 stainless steel carrier nitrile rubber high temperature magnetic tape

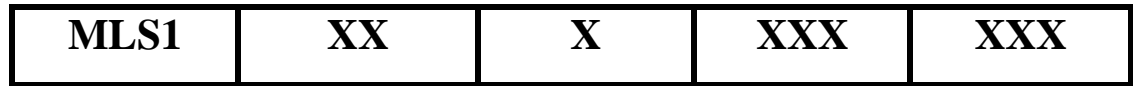
**Mechanical properties**

Width	10 mm
Thickness	1,2 mm
Length	Up to 100 m
Number of tracks	1
Pole pitch	1 mm; 2 mm, 5 mm
Absolute pole pattern possible	yes
Accuracy	±0,04mm/m up to 50m length
Linear expansion coefficient	(11 ±1 ) x 10-6 / K

**MAGNETIC TAPE DIMENSIONS :**



## ORDERING CODE :



**Model**

**Resolution**  
 05 = 5 μm  
 10 = 10 μm  
 25 = 25 μm  
 62 = 62,5 μm

**Power Supply and Output**  
**PPL** : 24 VDC ±%20 Power Supply  
       : 24 VDC Push-Pull Output  
  
**TTL** : 5 VDC ±%5 Power Supply  
       : 5 VDC TTL RS422 Line Driver Output  
  
**Option** : 24 VDC ±%20 Power Supply  
           : 5 VDC TTL RS422 Line Driver Output  
           Please on request !

**Signal Output Type**  
 2 = A, B  
 3 = A, B, Z  
 4 = A, /A, B, /B  
 6 = A, /A, B, /B, Z, /Z  
  
 Z-Signal: Standart = every 5mm  
           \* Optional = One Z reference signal (for example on Startpoint)

**Cable Length**  
 5M = 5M  
 10M = 10M  
  
 \* optional between 5M to 50M

**E.g. = MLS105-PPL-2-5M**

MLS1 = MLS1 Series  
 05 = 5 μm resolution  
 PPL = Push Pull signal output and 24 VDC Power Supply  
 2 = A, B signal output  
 5M = 5 meter cable

## ATEKSENSOR TECHNOLOGY AG