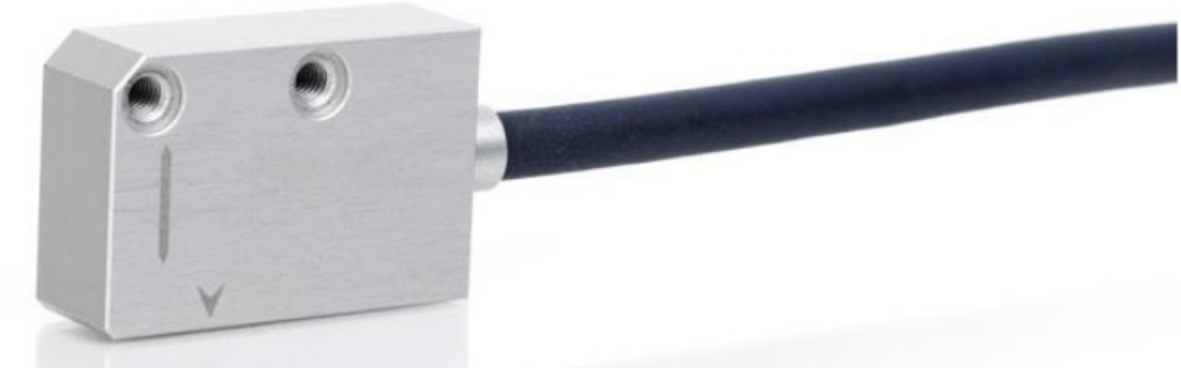
Sensata MAG100NFL030 Magnetic Linear Encoder Instruction Manual

Contents

Sensata

Sensata MAG100NFL030 Magnetic Linear Encoder



Specifications
MAGNETIC LINEAR ENCODER Mod. MAG100NFL030

- **Repeatability:** 2+2mm
- **Cable:** 12 wires
- **Output type:** TTL differential quadrature
- **Maximum measuring frequency:** 300 kHz
- **Power supply:** External (E)
- **Operating temperature:** –
- **Storage temperature:** –
- **Humidity:** 100% not condensed
- **Weight of reading head:** 40 g

Product Usage Instructions

1. **MAGNETIC BAND MPx00 FIXING**
   Recommended fixing of support SP. Ensure the following steps are followed:
   1. **Step 1:** Attach the support SP securely in place.
   2. **Step 2:** Install the magnetic band MPx00 according to the provided dimensions and drilling diagram.
   3. **Step 3:** Ensure proper alignment tolerances are maintained.
2. **MAG100NFL030 READING HEAD MOUNTING**
   Mount the reading head according to the overall and mounting dimensions of the encoder. Follow the provided instructions for proper installation.
3. **EXTERNAL ZERO REFERENCE MOUNTING**
   Mount the external zero reference according to the specified dimensions for accurate readings.
4. **OUTPUT SIGNALS**
   The output signals should be connected as per the electrical connections diagram provided. Ensure correct wiring and connections for optimal performance.
5. **ELECTRICAL CONNECTIONS**
   Follow the specified color-coding for cable wires and ensure a secure connection to avoid damage to the reading head.
6. **USE AND MAINTENANCE**
   Regularly inspect and maintain the encoder to ensure proper functionality and longevity.
7. **TECHNICAL PARAMETERS**
   Refer to the technical parameters section for detailed information on various specifications and characteristics of the encoder components.

Frequently Asked Questions (FAQ)

- **Q: What should I do if the reading device cannot read complementary signals?**
  A: If the reading device cannot read complementary signals, isolate the unused wires one by one to prevent damage to the reading head.
- **Q: How should I handle electromagnetic interferences?**
  A: Avoid locating the cable next to devices that may cause electromagnetic interferences. Maintain a minimum spacing of 200mm and use EMC filters if needed.
- **Q: What is the maximum cable length supported for the reading head?**
  A: The maximum cable length supported is LMAX=3m for the reading head cable and LMAX=22m for cable

extension.

MAGNETIC LINEAR ENCODER Mod. MAG100NFL030

Operating Instructions

1. **PRELIMINARY REMARKS**

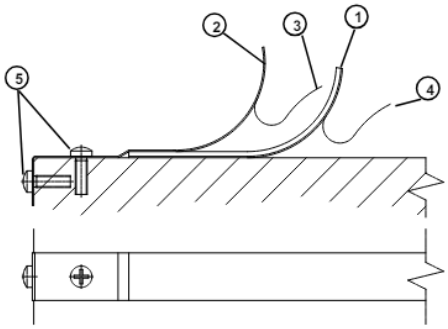
   Before proceeding with the installation of the product, please read carefully all the following instructions:

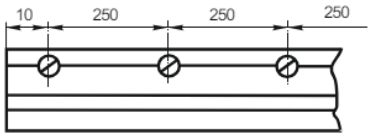
   - Observe scrupulously all notes of this manual. Particularly what concerns the mechanical mounting and electrical wiring.
   - During working process please remove all shavings, dust, etc. which do not allow the mobile parts to slide freely. We suggest to use a protection cover in order to prevent hitting from tools or parts which may accidentally fall down.
   - Verify that all the tools used for mounting are strictly demagnetized!

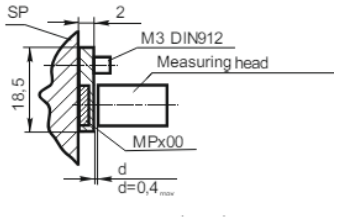
2. 2) MAGNETIC BAND MPx00 FIXING

   - In order to make the system more precise, magnetic band (1) must be 80mm (40mm for each side) longer than the measuring length of the machine: (ML), i.e.: L= ML + 80 мм. The band shall be centered on ML.
   - Magnetic band can be fixed on any kind of non-magnetic surface.
   - For a better protection of magnetic band from shavings, liquid sprinklings, dust, etc. we suggest to always use protective cover band CV (2), already equipped with a double-sided adhesive tape (3) or the aluminum support SP, which keeps the magnetic band in proper position without using the bi-adhesive (see following drawing).
   - The best gluing temperature is between 20°C and 30 °C; avoid making the gluing when temperature is below 10°C.
   - In case of stocking magnetic band at a lower or higher temperature than the machine, it is advisable to wait for some hours before gluing. The adhesion of glued parts is completed after at least 48 hours.

     Make the gluing of magnetic strip as follows:
   - Clean carefully the fixing surface from oil, grease or any kind of dirt, using trace-free solvents.
   - Raise up few centimeters of adhesive protection (4) and place magnetic band properly, lightly pushing on the initial adhesive zone.
   - Proceed with the placing of the band, removing progressively the adhesive protection and making a uniform pressure. If possible, use a small manual roller.
   - Proceed as above to glue the protective stainless steel cover band on the magnetic band, after its accurate cleaning.
   - Use the exceeding part of protective cover band for mechanical fixing and “ground” connection of the structure by means of screws M3x8 (5).
   - **Recommended fixing of support SP**



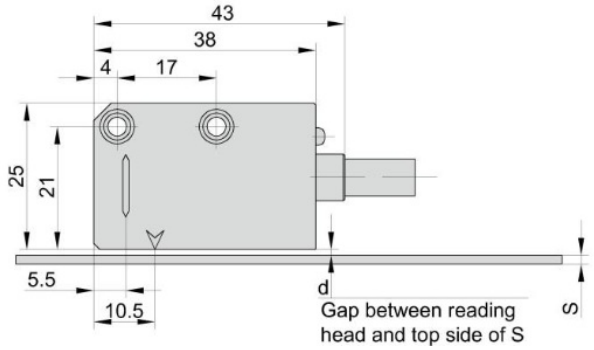


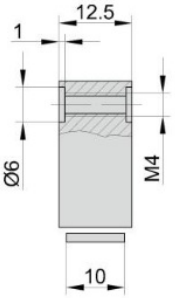


- **Notes:**
- It is not possible to use protective cover band CV with protective aluminum support SP.

3. **RESISTANCE TO CHEMICAL AGENTS**
   - **LOW-INPACT AGENTS** :Formic acid, lactic acid, formaldehyde 40%, glycerin 93˚C, hexane, isooctane, linseed oil, cotton oil, soybean oil, mineral oil.
   - **MEDIUM-IMPACT AGENTS:** Acetylene, acetone, acetic acid, oleic acid, stearic acid 70˚C , seawater, ammonia, gasoline, ether isopropyl, petroleum, vapor.
   - **STRONG-IMPACT AGENTS**: Nitric acid, benzene, dimethylbenzene, tetraethyl furan, nitrobenzene, solvent, toluene, carbon tetrachloride, turpentine, trichloroethylene.
   - Protect magnetic band from external magnetic fields. Contact with any permanent magnet can irrecoverably damage the magnetic band.
4. **MAG100NFL030 READING HEAD MOUNTING**
   - Proceed to fix magnetic reading head using the M4 threaded holes.
   - As an alternative you can use them as passing holes for screws M3x18.
   - The reading head can be mounted in any position, keeping the active side, marked by arrows, towards the surface of magnetic band. Once mounting is carried, place cables and move manually the reading head for the total run, in order to be sure it can freely slide without any obstacle.
   - Check that aligning tolerances between reading head and magnetic band are respected along the whole run. Any positioning error must be corrected.
   - The brackets or supporting arms should be adequately sized and made rigid to exclude any flex or vibration that could compromise the accuracy of the system
   - OVERALL AND MOUNTING DIMENSIONS OF ENCODER

DIMENSIONS AND DRILLING DIAGRAM

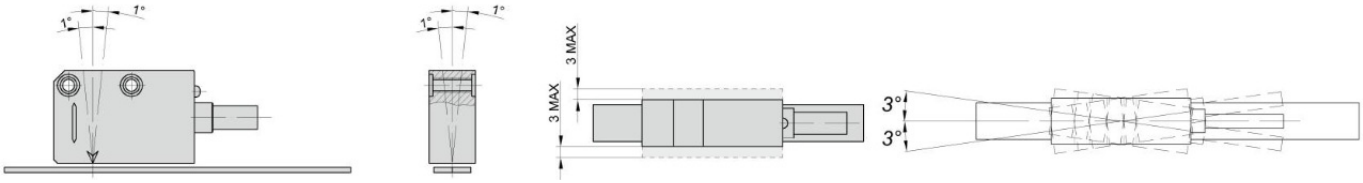




S (mm)	MPx00	MPx00+CV
D (mm)	0.2/1.4	1.1max

d - distance between reading head and top side of S

ALIGNMENT TOLERANCES



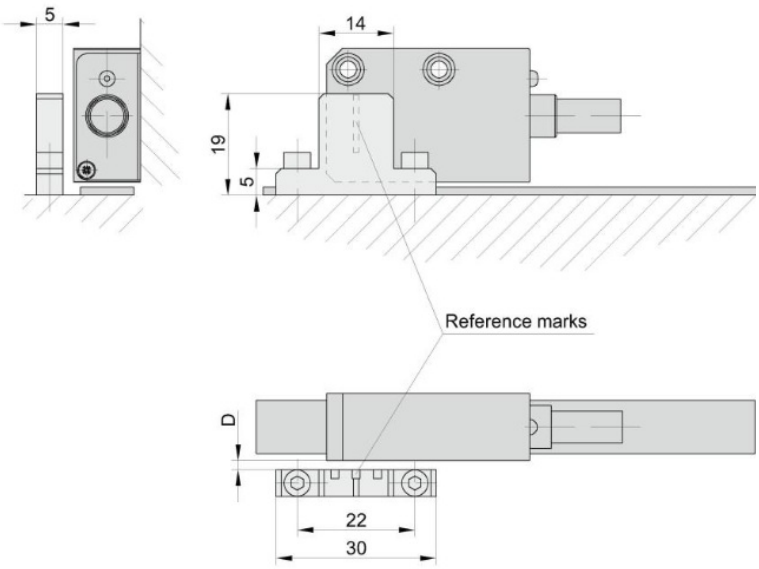
EXTERNAL ZERO REFERENCE MOUNTING

For the installation of the external zero reference (magnet) proceed as follows:

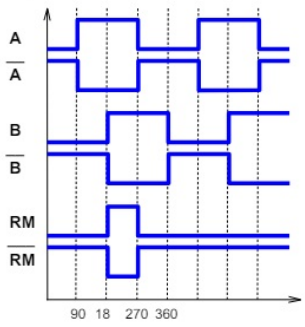
- Both reading head and magnetic band have to be previously fixed to the machine, in their final position.
- Place the reading head where you need the zero position and move it around some millimeters until the index red led turns on.
- Place the base of the reference parallel to the magnetic band, at a D distance from the reading head (see following drawing). Make the notch, located on the upper part of the reference, roughly correspond with the vertical one on the body of the
  reading head.
- Mark on the machine the position of M3 fixing holes of reference activator.
- Drill the fixing holes and tighten the reference by M3x12, screws, keeping the active part (magnets) toward the reading head. The slots permit a displacement, parallels to the magnetic band, in order to get an accurate positioning of reference.
- Make a working test in both ways of moving.
- Do not touch or place reference closer to the band, since magnetic band will be irrecoverably damaged.

	D (mm)	
MAG	$1_{NOM.}$	2_{max}

D – distance between external zero signal actuator and reading head



6) OUTPUT SIGNALS



ELECTRICAL CONNECTIONS

Circuit	Color of cable wires	Pin number, 9D Connector
A	Pink	2
/A	Grey	3
B	White	4
/B	Brown	5
RM	Yellow	8
/RM	Green	9
0V	Blue	6
+5V	Red	7
Shield	Shield	– – –

- Shield is connected to case of connector
- Reading head is set up with a TTL differential quadrature output. If the reading device cannot read complementary signals, it is necessary to isolate the unused wires one by one. It is important to note that the connection of the unused wires can damage the reading head and it does not guarantee its immunity from interferences.
- Only make connection when power supply is switched off.
- Avoid locating the cable next to any devices which may cause electromagnetic interferences (motors, solenoid valves, inverters). Make sure a minimum spacing of 200 mm exists between the cable and any device that may cause electromagnetic interference. If interferences are detected, act on the source of disturbance using EMC filters.
- If cable extensions are needed, it is necessary to use shielded cables with a section at least 0.5mm² for power supply and 0.14 mm² for signals.
- Verify the correct connection and the continuity of the shield which has to be connected to an earthing node with very low impedance (0).
- Reading head is supplied with a 12-wire cable Ø 6 mm, standard cable length is 3m. If longer lengths are required, considering the following maximum values:
- LMAX=3m (reading head cable);
- LMAX=22m (3m reading head cable + cable extension).
- To balance the TTL differential quadrature output, you have to use the RL=120 . Respect the minimum cable's winding radius of 60mm.

In case of cable extension, the electrical connection between the body of the connectors and the cables shield must be ensured.

USE AND MAINTENANCE

- The magnetic band and the reading head don't require any particular maintenance. An accurate installation, conforming to mounting instructions and a correct use guarantee the quality and good operation.
- In case of malfunction please contact the manufacturer for repair or exchange of faulty components.
- Verify again all mounting tolerances whenever it happens something which can modify the correct alignment of

the system. In order not to compromise the precision of the band, do not stress it mechanically. Band has to be rolled always in the same way (active part toward outside), with a diameter not less than 250mm.

TECHNICAL PARAMETERS

MAG READING HEAD

GENERAL CHARACTERISTICS	
Repeatability	± 1 increment
Cable	12 wires
Output type	TTL differential quadrature
Maximum measuring frequency	300 kHz
Power supply	5 VDC ± 5%
Current consumption with load	140 mA max (for 5V and Zo=120W)
Phase displacement	90° ± 5° electrical
Vibration resistance	300m/s^2 (55Hz÷2000Hz)
Shock resistance	1000m/s^2 (11ms)
Class of protection	IP 67 DIN 40050/IEC 529
Operating temperature	0° ÷ 50°C
Storage temperature	-20° ÷ 80°C
Humidity	100% not condensed
Weight of reading head	40 g
Electrical protections	Inversion of power supply polarity Short circuit on output port
Reference signal	External (E)1
Pole pitch	2+2mm
Resolution	10mm
Accuracy[2]	± 15mm
Maximum speed	12m/s (MTM-F100)

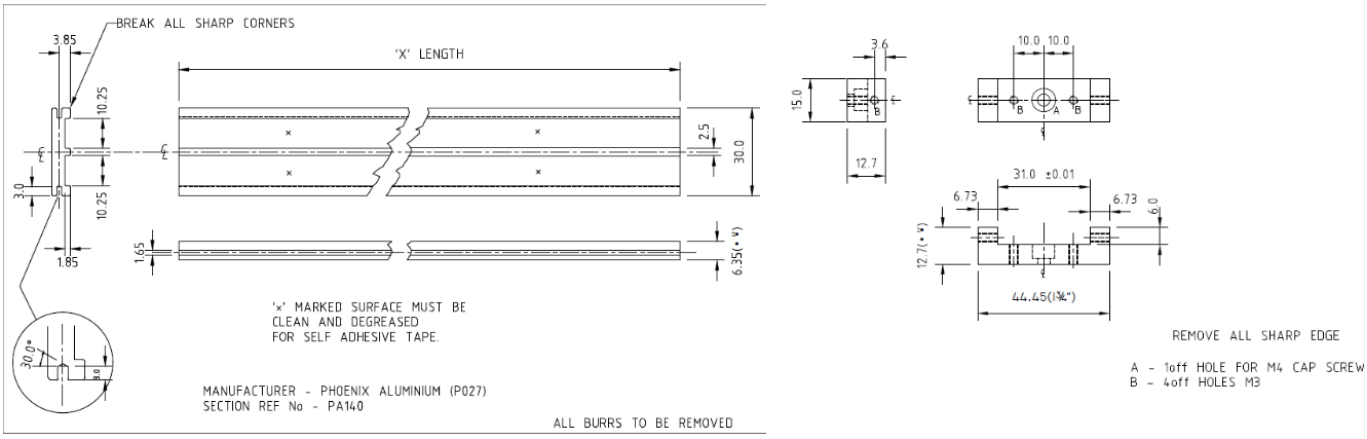
MAGNETIC BAND MP TECHNICAL CHARACTERISTICS

GENERAL CHARACTERISTICS	
Accuracy at 200 C	± 150m/m
Width	10mm
Thickness	1.3mm
Maximum length	20m
Thermal expansion factor	10.5 x 10^{-6} °C^{-1} t ref.=20°C ±0.1°C
Operating temperature	130 mm MIN
Storage temperature	0° : 70°C
Operating temperature	-20° 80°C
Weight of magnetic band	65 g/m
Weight of cover	25 g/m

PROTECTIVE COVER BAND CV

- Width, mm 10
- Thickness, mm 0,3
- Material stainless steel

BACKINGBAR OPTION



WARRANTY

- The warranty term is 12 months from the day of the encoders shipping.
- The Manufacturer warrants within the warranty term to replace or repair faulty encoder free of charge on conditions that installation, operation and storage rules have been observed by the Customer.
- The Manufacturer warranty does not cover faulty encoder if encoder was installed improperly not keeping to Operating Instruction requirements, if during encoder operation mechanical and electrical parameters exceed permissible values and if Customer individually repaired and disassembled an encoder.
- The Manufacturer declines any responsibility for damages to people or properties deriving from the use of the encoder, including any loss of profit or any other direct, indirect or incidental loss.

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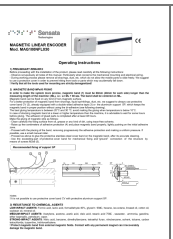	Sensata MAG100NFL030 Magnetic Linear Encoder [pdf] Instruction Manual MAG100NFL030 Magnetic Linear Encoder, MAG100NFL030, Magnetic Linear Encoder, Linear Encoder, Encoder

References

- Newall Measurement Systems - Linear Encoders and Digital Readouts (DRO) - Digital Readout Systems and IP67 Linear Encoders
- Newall Electronics - Digital Readout (DRO) and Linear Encoders
- Sensata Technologies: Sensing is What We Do
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- Newall Electronics - Digital Readout (DRO) and Linear Encoders
- Sensata Technologies: Sensing is What We Do
- User Manual

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