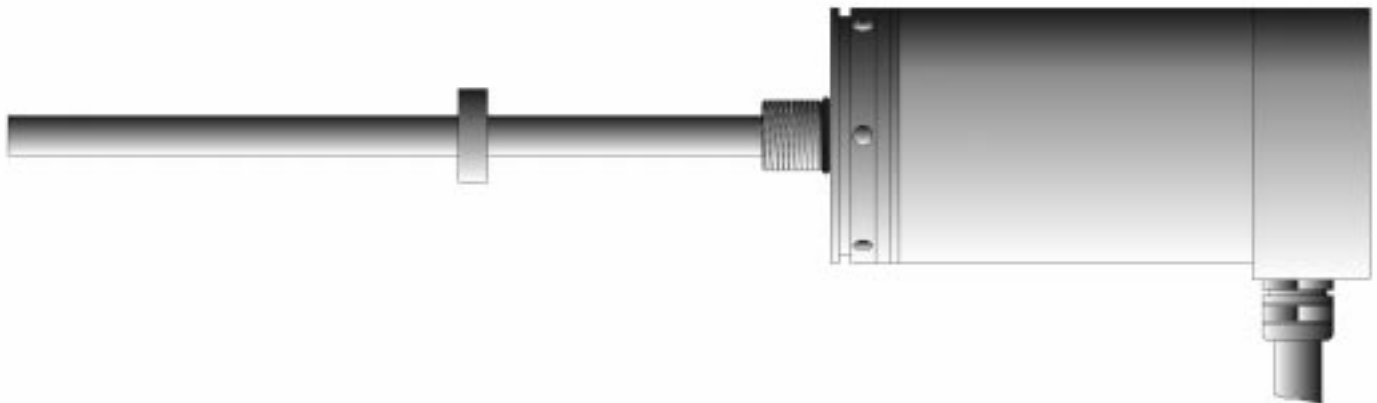


- Compact and robust design for mechanical engineering and industrial plant applications
- With PROFIBUS-DP interface (*process field bus - decentral periphery*)
- Output code: natural binary
- Measuring ranges up to 5000 mm
- DP-slave class 2 functionality in according to *Profibus-Profile for Encoders, No. 3.062*
- Resolution: 0.1 or 0.01 mm
- Transmission speed: 12 MBaud max.



- With connecting cap: T-coupler functionality with integrated addressing facility as well as bus-termination resistors
- With diagnosis LED's for Supply voltage, SRD, Class and Error
- Protection grade IP 65



### Construction and operating principle

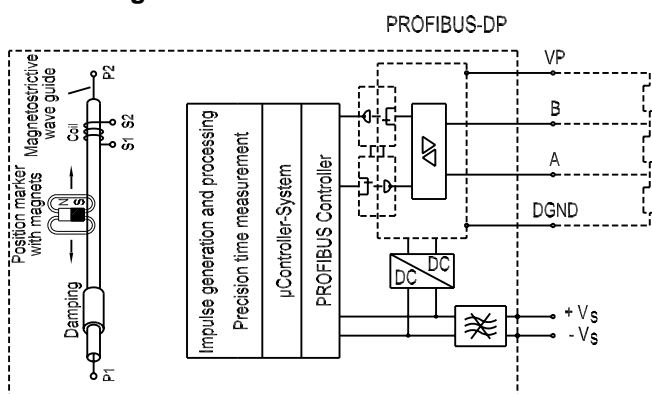
The MAGNOSENS Transducer use the magnetostrictive technology to generate an output signal that is proportional to a linear displacement of a movable position marker ring containing several magnets. A wave guide is located in a stainless steel tube.

The transit time a voltage spike takes from the starting point (zero) to the magnet and back again is proportional to the distance to be measured. The electronic circuit located in the cylindrical head converts the transit time into an output signal as shown by the following block diagram.

### General features

The MRD transducers are designed for connecting directly to PROFIBUS-DP buses as slave stations. The interface is realized with the SPC3 Siemens PROFIBUS controller. The transducers can be operated with transmission speeds of up to 12 MBaud. The protocol is executed in accordance with *DP-slave class 2* functionality as laid down in *Profibus-Profile for Encoders, No. 3.062* and is described in detail in the user manual TZY 10795.

### Block Diagram



### Electrical connecting cap

(T-coupler functionality with integrated addressing)

This variant is designed for the following connection cables and provides the following functions:

- 1 cable for the supply voltage (+  $V_s = 24$  VDC, -  $V_s = 0$  VDC), PG 7 cable gland
- 1 cable for Bus In (A, B), PG 9 cable gland
- 1 cable for Bus Out (A', B'), PG 9 cable gland
- The station address and bus-termination resistors are set with DIP switches in the connecting cap.

## Electrical Data

- Sensor system: Magnetostrictive
- Sensor capacity: max. 24 Bit
- Resolution: max 0.01mm; (0.1mm)
- Linearity: < 0.05 % of measuring range
- Repeatability: ≤ 0.01 mm
- Hysteresis: < 0.05 mm
- Temperature drift: < 0.005 % of measuring range / °C
- Output code: Natural binary
- Code sense: CW or CCW; (programmable)
- Supply voltage range: + 20 VDC to + 30 VDC
- Power consumption:  $P_V \leq 3.8 \text{ W}$   
(Inrush current ≤ 350 mA)
  
- Cycle time: ≤ 2ms (fixed)
  
- Interface: Line driver in acc. with RS 485; galvanic separation is achieved with an opto-coupler. Supply voltage galvanic separation is achieved with DC/DC-converter
  
- Electromagnetic compatibility (EMC): EN 50081-2, EN 50082-2
- Permissible magnetic field: < 3 mT  
At working position the MAGNO-SENS must be carefully screened against magnetic and electro-magnetic fields . (Ref. mounting instructions).

## Mechanical data

- Standard measuring ranges: 100 / 200 / 300 / 400 / 500 / 750 / 1000 / 1500 / > 1500 mm upon request
- Masse: ca. 0.7 kg + 0.02 kg / 100 mm

## Environmental Data

- Operating temperature range: - 20 °C bis + 60 °C
- Storage temperature range: - 25 °C bis + 70 °C
- Permissible rel. humidity: 98 % without condensation
- Resistance to shock: 20g SRS 20 - 2000 Hz
- Resistance to vibration: 3g rms 20 - 2000 Hz
- Max. Pressure load: up to 300 Bar
- Protection grade (DIN 40 050): IP 65
- Connction cap "Z": IP 00 (not mounted)

## Bus Data

- Specification: PROFIBUS-DP, Slave stations SPC3 Siemens PROFIBUS controller
- Data transmission rate: 9.6 kBaud to 12 MBaud
- Manufacturer code: 1962H
- Station address: Default value: 123; to set with DIP switches in acc. with DIN 19245-3, PROFIBUS-DP
- GSD File:
- Diagnosis LEDs\*:
  - UB<sub>s</sub> (green) - V<sub>s</sub> Supply voltage
  - SRD (green) - SRD
  - C (green) - Class
  - Err (red) - Error
- Freeze mode: being supported
- Sync. mode: being supported
- Automatic baud rate search: being supported
- Diagnosis bytes
  - Class 2: 63 Diagnosis bytes
  - Class 1: 16 Diagnosis bytes
- User-Parameter bytes:
  - Class 2: 22 bytes
  - Class 1: 2 bytes
- Configuration options:
  - D0 (1 Word Input, consistent) - Class1
  - D1 (2 Word Input, consistent) - Class1
  - F0 (1 Word Input / Output, consistent) - Class2
  - F1 (2 Word Input / Output, consistent) - Class2

## Parameters which can be programmed (via DDLM\_Set\_Prm / DDLM\_Data\_Exchange / DDLM\_Set\_Slave\_Add)

	Value range	Description of parameter
Code sense	CW, CCW	CW increasing output signal when the positioning ring travels to the rod end CCW decreasing output signal when the positioning ring travels to the rod end
Class 2 functionality	enable / disable	Enable for class 2 functionality
Diagnosis routine	yes / no	Diagnosis routine, at present not supported
Scaling function	enable / disable	Enable for programmed resolution (Default value: 2710hex - 0.01mm)
Measuring step	2710 hex - 0.01 mm 186A0 hex - 0.1 mm	Resolution in mm
Reference value (DDLML-Data_Exchange)	0 to FFFFFFF hex 0 to 16.777.215	Value displayed at the reference point
Cycle time	2 ms	Cycle time of transducer (fixed)

## Mounting instructions

### Mechanical requirements

- When mounting the transducer please observe the following rules :
  - Do not bend the stainless steel tube, avoid radial or axial load,
  - Do not drill or weld at the transducer,
  - Do not open or disassemble the transducer case.
- The accuracy of the measurement depends on the symmetry of the magnetic field geometry. That means, the position marker ring has to be displaced concentricly to the tube. The marker ring must travel contactless along the wave guide tube.

### Electrical requirements

Heavy magnetic and electric interferences at the surrounding of the transducer may impair the precision of the measurement and should be avoided.

### Dependance on magnetic fields

The following values are general guidelines to asses the error due to external magnetic fields when applied axially to the tube.

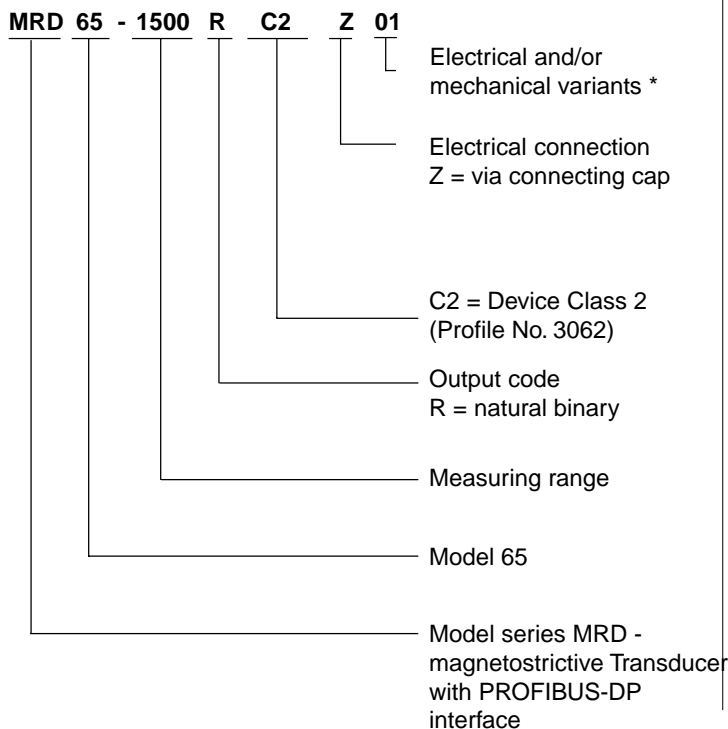
< 3 mT : no error	mT = milli Tesla
3-19 mT : error ≤ 1 mm	
≥ 20 mT : signal unusable	

Ferromagnetic materials may transmit magnetic fields even from a remote source. Mounting accesoires should be out of amagnetic materials. When lodging the wave guide tube into cylindric holes of magnetizable metals 10 mm clearance should be provided.

### Electrical connection

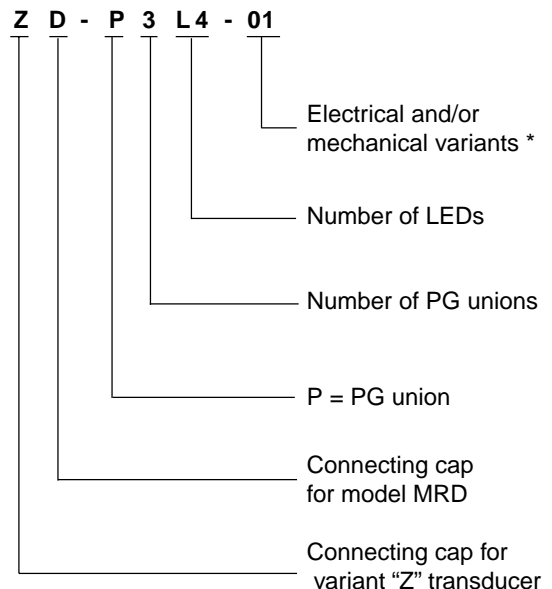
- Connecting cap: (variant Z) T-coupler with 3 PG cable glands; integrated addressing facility and bus-termination resistors; Diagnosis LEDs

### Order code format for encoder



\* The basic versions in accordance with the data sheet bear the code number 01. Variations from the basic version are indicated with a consecutive number and are documented in our works.

### Order code format for connecting cap

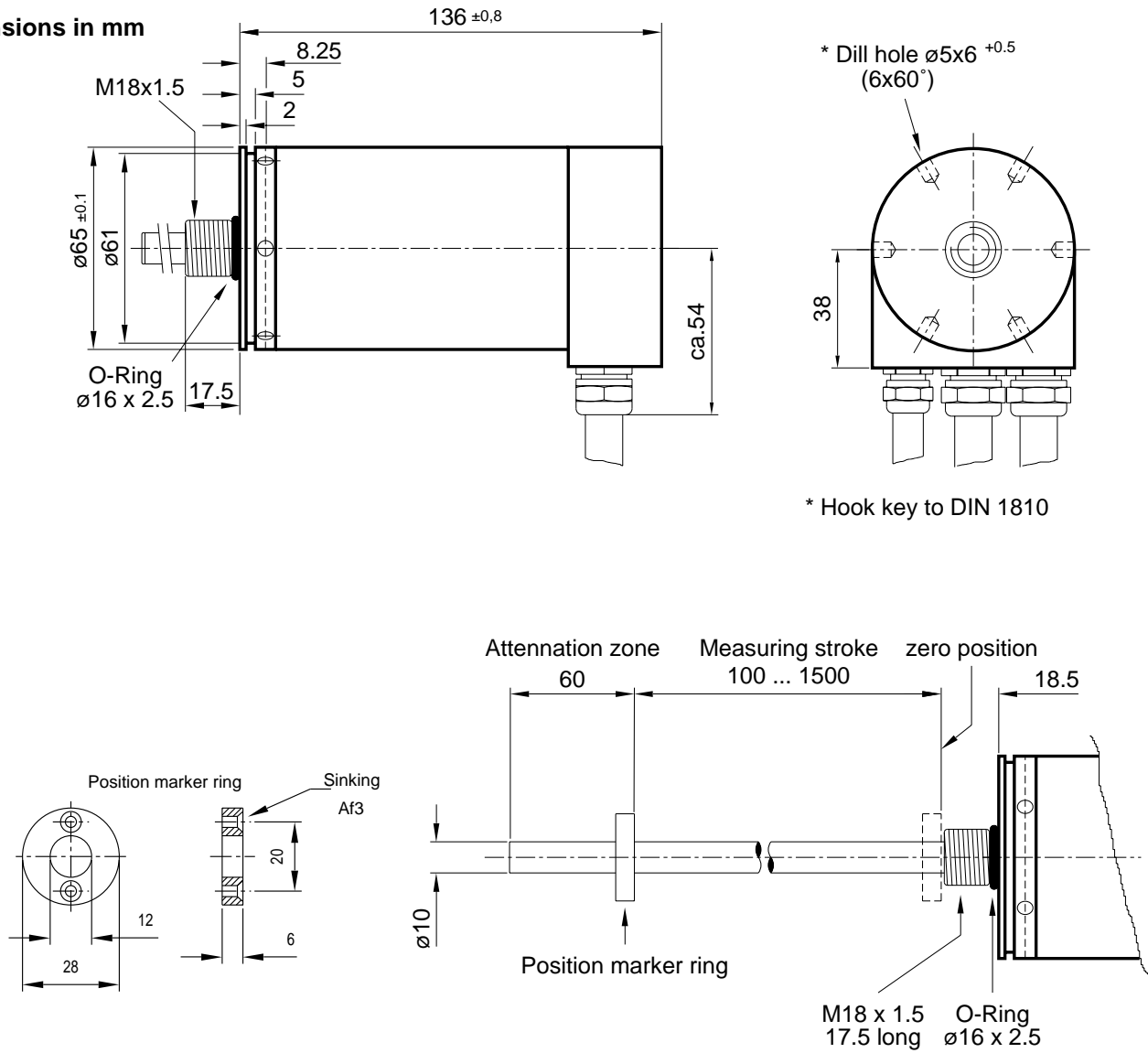


\* The basic versions in accordance with the data sheet bear the code number 01. Variations from the basic version are indicated with a consecutive number and are documented in our works.

## Notes:

- Copies of *Profibus-Profile for Encoders, No. 3.062* can be obtained from: PROFIBUS Nutzerorganisation e.V., Haid und Neu Str. 7, D-76131 Karlsruhe.
- The TWK user manual TZY 10795 as well as the GSD File are supplied with each item.
- Demonstration programmes for encoders in the PROFIBUS-DP-Bus with SIEMENS S7 PLC-Master on request.
- For additional information see README-File on 3.5" - Disc.

## Dimensions in mm



## Connecting cap ZD-P3L4-01

The cap can be separated from the encoder for setting purposes by removing two screws.

