

- **Model MPD: Profile version**
- **Model MSD: Rod version**
- **Measuring strokes from 25 to 7600 mm**
- **Contactless, robust system**
- **Resolution up to 1 µm**
- **Up to 20 positions measurable simultaneously**
- **Speed signal (optional)**
- **Transmission rate up to 12 MBaud**
- **Parameterisable via the bus**
- **Protection types up to IP 67**
- **Operating temperature range -40°C ... +75°C**
- **Rod version pressure stability up to 350 bar**



Structure and operation

The displacement transducers operate according to the principle of run time measurement between two points of a magnetostrictive waveguide. One point is determined by a moveable position magnet, whose distance from the null point corresponds to the section to be measured. The run time of an emitted impulse is directly proportionate to this section. Conversion to a digital measuring signal takes place in the downstream electronics.

The waveguide is housed in a pressure-resistant stainless steel tube or extruded profile. To the rear of this is a die-cast aluminium housing containing the electronics in SMD technology.

In the rod version, the position magnet is located in a ring, which is guided over the rod without contact. In the profile version, it is located either in a slider, which is linked to the moving part of the machine via a ball joint, or it moves as a liftable position magnet, without wear, over the profile.

Standard measuring strokes

- Up to 1000 mm in 50 mm steps
- Up to 5000 mm in 250 mm steps (profile version: MPD)
- Up to 7600 mm in 250 mm steps (rod version: MSD)

Profibus characteristics

The magnetostrictive displacement transducers, whose interface is based on the Siemens ASIC SPC3, meet all Profibus-DP requirements (EN 50170) and can be connected directly to the field bus. Their measured data are converted to displacement-proportionale, bus-capable output signals in the sensor and are transmitted directly to the control system.

The profibus interface is designed for serial, bit-synchronous data transmission of max. 12 MBaud according to the RS485 standard. In addition to useful data transmission, the software integrated into the sensor supports extensive monitoring and diagnostic functions, which can be configured using the GSD file during installation. The most important key data for the displacement sensors with Profibus-DP interface include:

Sensor output signals:

- 3 bytes of displacement data
- 1 byte of status and error messages (displacement)
- 3 bytes of speed data (optional)
- 1 byte of status and error messages (speed)

Sensor input signals:

- Control byte
- Preset value

Selectable parameters:

- Errorhandling
- Measuring direction: Forwards/backwards
- Resolution
- Measuring cycle: Non-synchronised or synchronised (optional)
- Various data formats (Motorola, Intel)

Address setting:

The slave address is set by a class 2 master with the aid of the profibus service SetSlaveAddress via the bus. If this is not available the address can also be set with the TWK profibus hand-held programmer PMD-01 for connector M16 (data sheet No. 11190) or PMD-02 for connector M12 (datasheet No. 11450). The default address is **125**.

GSD file:

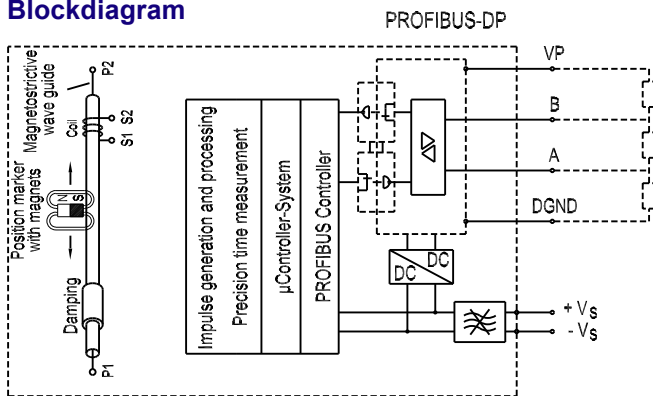
The GSD file for integrating the sensor into the profibus master system and the profibus manual in PDF format are contained in the enclosed diskette.

Diagnosis

The LEDs (green/red) in the sensor head are used for adjustment and additionally provide information on the sensor status.

Green	Red	Meaning
On	Off	Normal function
On	On	Magnet not in the setting range, incorrect number of magnets
Flashing	On	Programming mode
Flashing	Flashing	Waiting for master parameterisation

Blockdiagram



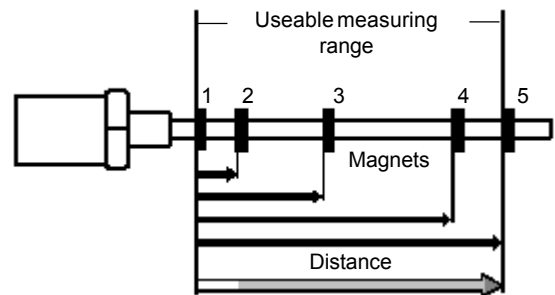
Technical data

- Supply voltage range V_s : 24VDC (+20 / -15%)
- Supply current I_s : 90 mA (typical)
- Resolution
 - Displacement in μm : 1, 5, 10, 20, 50, 100, 200, 500, 1000
 - Speed: Resolution of 5 μm :
0.64 mm/s up to 500 mm
0.43 mm/s up to 2000 mm
0.21 mm/s up to 4500 mm
0.14mm/s up to 7600 mm
For a resolution of 2 mm:
2.5 times smaller
- Linearity: $< \pm 0.01\%$ (min. $\pm 50 \mu\text{m}$)
- Repeatability: $< \pm 0.001\%$ (min. $\pm 2.5 \mu\text{m}$)
- Hysteresis: $< 4 \mu\text{m}$
- Temperature drift: $< 15 \text{ ppm} / ^\circ\text{C}$
- Measuring cycle time: 0.5 ms (for 500 mm) to 3.1 ms (for 7600 mm) for 1 magnet, each further magnet + 0.05 ms, with speed measurement: + 0.03 ms
- Operating temperature range: $- 40 ^\circ\text{C}$ to $+ 75 ^\circ\text{C}$
- Dew point, humidity: 90% rel. humidity, no condensation
- Shock test: 100 g to IEC Standard 68-2-27
- Vibration test: 15 g / 10 to 2000 Hz to IEC Standard 68-2-6

- Protection type
 - Profile: IP 65
 - Rod: IP 67
- Operating pressure for rod: Max. 350 bar
- EMC test: EN 50081-1, EN 50082-2, EN 61000-4-2/3/4/6
- **Output:**
 - Interface: Profibus-DP to EN 50 170
 - Signal transmission: Differential signal as per RS485
 - Transmission rate: Max. 12 MBit/s
 - Default address: 125
- **Mating connector M16:**
 - Connection type: 2 x 6-pin connector M 16
 - Housing: Metal (straight or angled 90°)
- Contacts: 1 x socket and 1 x pins, Ag
- Wire connection: Soldering
- Connection cross-section: Max. 0.75 mm²
- Cable strain relief: Pg 9
- Max. cable diameter: 8 mm
- **Mating connector M8 / M12:**
 - Connection type: 2 x 5-pin M12x1, B-coded
1 x 4-pin M8 x 1
 - Housing: Nickel-plated brass, straight
 - Contacts: CuZn, CuSn
 - Wire connection: Screws
 - Connection cross-section: M8, max. 0.5 mm²
M 12, max. 0.75 mm²
 - Max. cable diameter: M8 = 5 mm ; M12 = 8 mm

Multi-magnet measurement

Profibus sensor MSD enables max. 20 positions or max. 5 positions and 5 speeds to be measured simultaneously with one sensor. Please note that the distance between the individual magnets must be at least 75 mm in this case.



Order code format

■ Displacement transducer

MPD 1 / 1000 S 020 - 1 L 01

- Electrical and mechanical variants*
- L = Connector version M16
M = Connector version M8 / M12
- Number of magnets: 1 - 20
- Resolution= 20 μ m
(Can be set via profibus)
- Signal curve:
S = Positively ascending on movement from the flange towards rod end
(Can be set via profibus)
- Measuring stroke in mm

MSD design

MSD (rod):

- 1 = With threaded connection M 18 x 1.5
- 2 = With threaded connection 16 UN F 3/4"

MPD (profile):

- 1 = Position slider central ball joint
- 2 = Position slider front ball joint
- 3 = Lifiable position magnet

Model
MPD = Profile version
MSD = Rod version

* The basic versions according to the data sheet bear the number 01. Deviations are identified with a variant number and are documented in the factory.

Cable outlet and speed signal on request.

Scope of delivery:

Rod: Sensor, nut (order magnet separately)
Profile: Sensor, 1 position magnet, 2 mounting clamps up to 1250 mm + 1 clamp for each additional 500 mm.

Accessories:

- Position magnets for MSD
 - PR02** Standard position ring (\varnothing 33 mm)
 - PR03** Lifiable position magnet
 - PR04** Position ring up to 100 °C (\varnothing 25.4 mm)
- Position magnets for MPD
 - PS01** Position slider, central ball joint
 - PS02** Position slider, front ball joint
 - PR03** Lifiable position magnet
- Available position magnets data sheet 11469
- Mating connector version L (M16) -order separately-
 - STK6GS47** Socket, straight
 - STK6GP48** Pins, straight
 - STK6WS51** Socket, angled 90°
 - STK6WP65** Pins, angled 90°
 - STK6GP49** Bus terminating connector (pins)

- Mating connector straight version M (M8 / M12) -order separately-
 - STK5GS67** Socket (M12)
 - STK5GP68** Pins (M12)
 - STK5GP69** Bus terminating connector (pins M12)
 - STK4GS64** 24 VDC supply (M8)
- Installation material
 - MB-MP-01** Mounting clamps for profile version
 - NT-MP-01** M5 sliding block for profile version
- Programming devices
 - PMD-03** Profibus hand-held programmer (data sheet 12439)

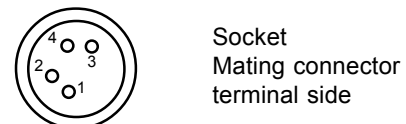
Electrical connections version L (M16) *



Pin	Signal
1	RxD / TxD-N (bus)
2	RxD / TxD-P (bus)
3	DGND (with device socket, for terminal resistance)
4	VP +5 VDC (with device socket, for terminal resistance)
5	+V _S (+24 VDC)
6	-V _S (0 VDC)

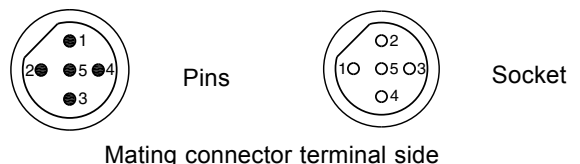
Electrical connections version M (M8/M12) *

Connection M8 (24 VDC)



Pin	Signal
1	+V _S (+24 VDC)
2	not connected
3	-V _S (0 VDC)
4	not connected

Connection M12 (bus IN/OUT) *



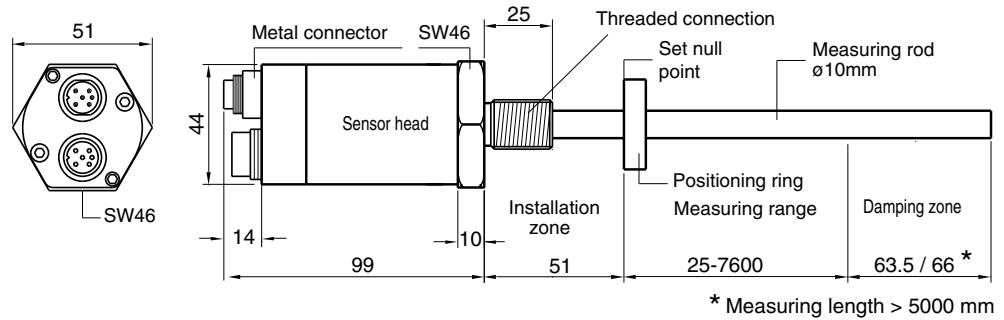
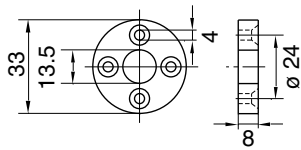
Pin	Signal
1	VP +5 VDC (terminal resistance)
2	RxD / TxD-N (bus)
3	DGND (with device socket, for terminal resistance)
4	RxD / TxD-P (bus)
5	Screen

* The mating connector is always shown.



Dimensions in mm

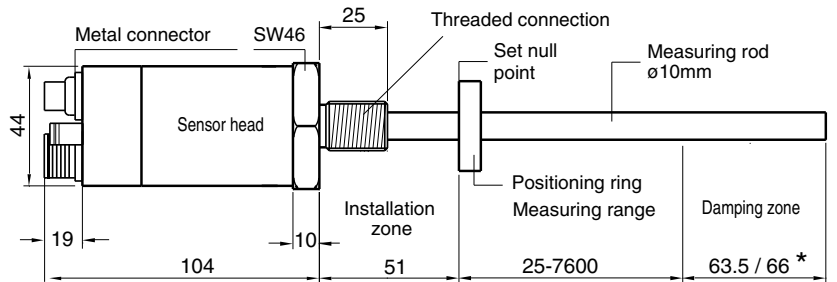
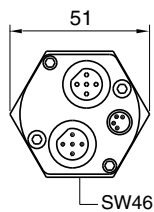
Model: MSD (rod version)



* Measuring length > 5000 mm

With measuring strokes of 1000 mm and over, mechanical rod support is recommended.

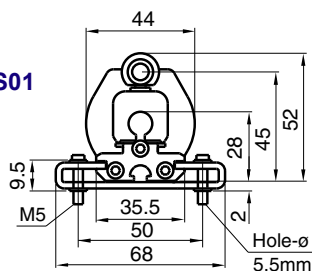
The sensor's fastening should be manufactured from non-magnetic materials (e.g.: brass, plastic). Note installation instruction **MWA10318** on installation in magnetisable materials.



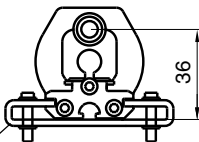
* Measuring length > 5000 mm

Model: MPD (profile version)

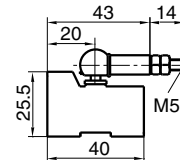
PS01



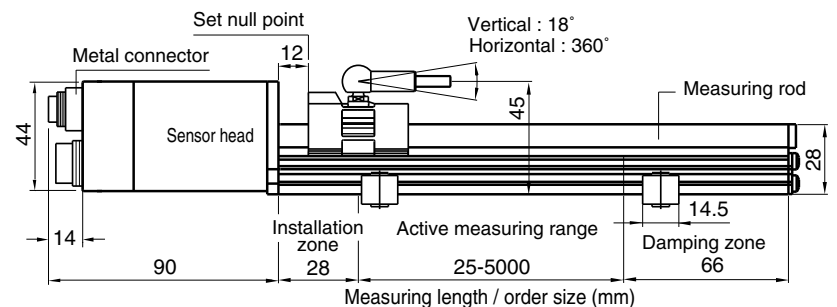
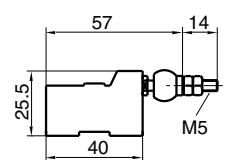
PS02



Central ball joint PS01

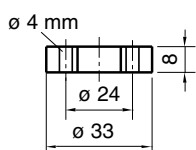
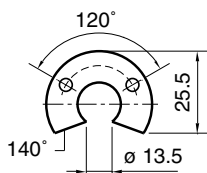
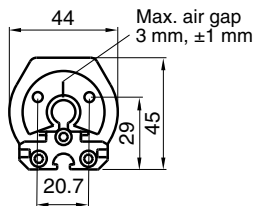


Front ball joint PS02

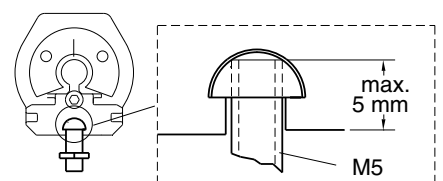
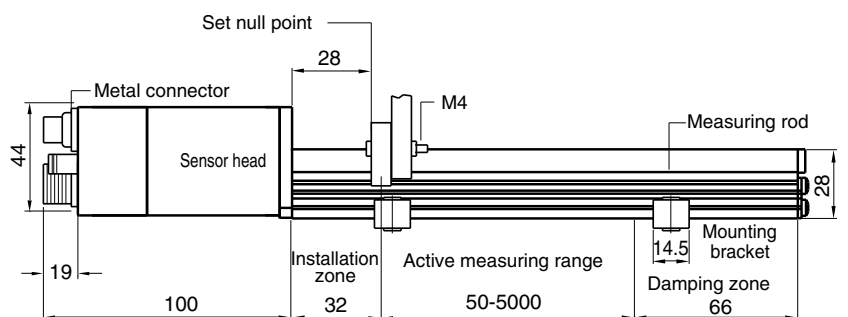


Mounting clamps MB-MP-01

Liftable position magnet PR03



Liftable position magnet Wherever possible, use non-magnetisable material for fastening this. If magnetisable material is used, the position magnet must be mounted via a non-magnetisable spacer washer with a minimum thickness of 5 mm using non-magnetisable bolts.



M5 Sliding block (NT-MP-01):
Studded nut in T slot

Note: On installation of the MAGNOSENS, careful shielding from magnetic and electromagnetic fields must be ensured. The cable shield must be mounted on the connector and connected to ground at the evaluation electronics. All data sheets and manuals are also available in the Internet under www.twk.de.