

## Magnetostrictive Linear Position Sensors

### Model series CHM/CPM with Analog - interface

- CPM model: Profile version
- CHM model: Rod version
- Measuring strokes from 50 to 2500 mm (analogue) to 7600 mm (start / stop)
- Contactless, robust system
- Infinite resolution
- Linearity < 0.01 %
- Measurement signals 0(4) ... 20 mA, 0 ... 10 V, ± 10 V or start/stop signal
- Protection class up to IP 68
- Operating temperature range - 40 °C ... + 85 °C, optionally up to 105 °C
- 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 an analogue 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. Electrical connection is implemented via a circular connector.

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:

##### Analogue and start/stop:

- Up to 1000 mm in 50 mm steps

##### Analogue output:

- Up to 2500 mm in 250 mm steps

##### Start/stop:

- Up to 5000 (profile) / 7600 (rod) mm in 250 mm steps

#### Programming

For adaptation to measuring tasks, the measuring start and end point can be easily adjusted within the measuring range which has been ordered.

Adjustment is carried out externally via the connection cables using the analogue manual programming device CMC -01 (see data sheet 22468).

#### Standard designs

Output signal	Mid-point at
0 - 20 mA	10 mA
4 - 20 mA	12 mA
0 - 10 V	5 V
± 10 V	0 V
Start / Stop	

#### Diagnosis

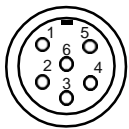
The LEDs (green/red) in the sensor head provide information on the sensor status.

Green	Red	Meaning
On	Off	Normal function
On	On	No magnet
On	Flashing	No external start signal (start/stop)

**Technical data**

- Supply voltage range  $V_S$ : 24 VDC (+20 / -15%)
- Supply current  $I_S$ : 100 mA typical
- Resolution: Analogue: Practically infinite  
Start/stop: 0.1; 0.01; 0.005 mm depending on evaluation electronics
- Linearity: <  $\pm 0.02\%$  (min.  $\pm 50\ \mu\text{m}$ )
- Repeatability: <  $\pm 0.001\%$  (min.  $\pm 2.5\ \mu\text{m}$ )
- Hysteresis: <  $4\ \mu\text{m}$
- Measuring frequency: Analogue: > 1 kHz, start/stop: depending on evaluation electronics and meas. length
- Temperature drift: < 40 ppm / °C
- Op. temperature range: - 40 °C to + 85 °C
- Start / stop: Optionally up to 100 °C
- 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: IP 65
- Profile: IP 67, IP 68 for cable outlet
- Rod: IP 67, IP 68 for cable outlet
- **Current output:**
- Output signal : 0(4) ... 20 mA
- Apparent ohmic resistance: 0 – 500  $\Omega$
- **Voltage output:**
- Output signal: 0...10 VDC / - 10 ... + 10 VDC
- Permissible load:  $\geq 5\ \text{k}\Omega$
- **Start/stop output:** RS422 differential signal
- **Mating connector:**
- Connection type: 6-pin connector M16
- Housing: Die-cast zinc, nickel-plated (straight or angled 90°)
- Contacts: Socket, Ag
- Wire connection: Soldering
- Connection cross-section: Max. 0.75 mm<sup>2</sup>
- Cable strain relief: M12
- Max. cable diameter: 6mm
- Protection type: IP67
- **Cable outlet:**
- Cable type: PVC cable 3 x 2 x 0.14 mm<sup>2</sup>
- Bending radius: Min. 50 mm if routed firmly

**Electrical connections**



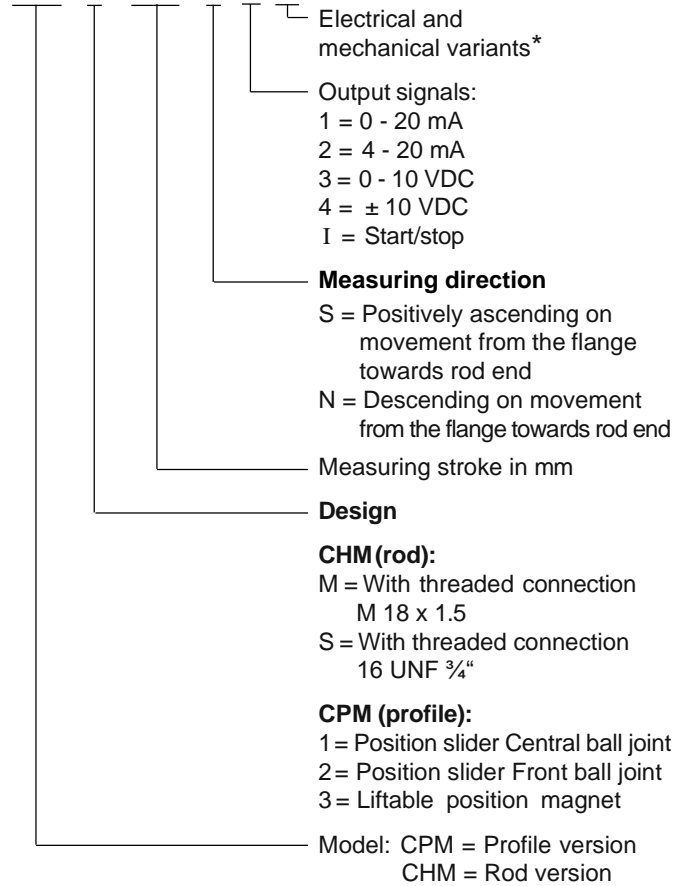
Soldered connection side of mating connector

Pin	Wire	Voltage/current	Start/stop
1	Grey	(0)4 - 20 mA 0 - 10 V, $\pm 10\ \text{V}$	Stop -
2	Pink	Bridged with 6	Stop +
3	Yellow		Start +
4	Green	Bridged with 6	Start -
5	Brown	+UB (+24 VDC)	+UB (+24 VDC)
6	White	-UB (0 VDC)	-UB (0 VDC)

**Order code format**

- Displacement transducer

**CHM M /1000 S 2 01**



Cable outlet on request.

\* 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.

**Scope of delivery:**

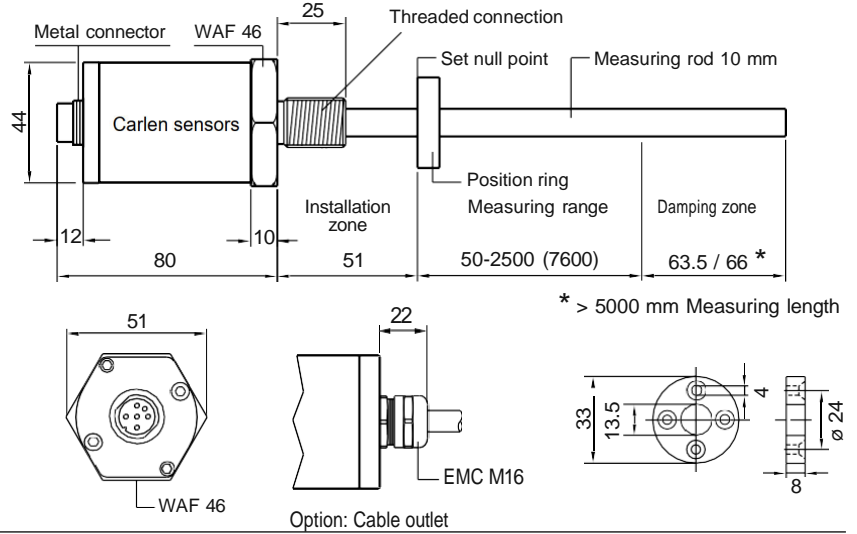
- Rod:** Sensor, nut (order position magnet separately)
- Profile:** Sensor, 1 position magnet, 2 mounting clamps up to 1250 mm + 1 clamp for each additional 500 mm.

**Accessories:**

- Position magnets for CHM  
**CPR02** Standard position ring ( $\varnothing 33\ \text{mm}$ )  
**CPR03** Lifiable position magnet
- Position magnets for CPM  
**CPS01** Position slider, central ball joint  
**CPS02** Position slider, front ball joint  
**CPR03** Lifiable position magnet
- Additional position magnets see datasheet 11469
- Mating connector (order separately)  
**CSTK6GS42** Straight  
**CSTK6WS43** Angled 90°
- Installation material  
**CMB-MP-01** Mounting clamps for profile version  
**CNT-MP-01** M5 sliding block for profile version
- Programming devices  
**CPMC-01** Analogue manual programming device (data sheet 11468)

Dimensions in mm

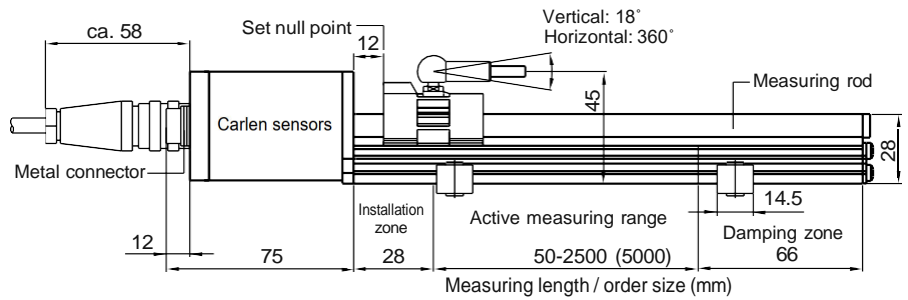
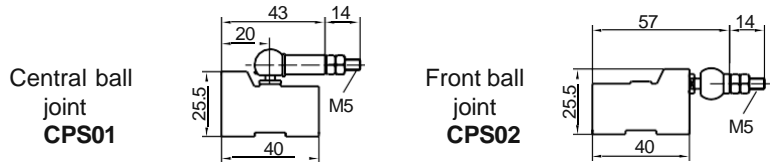
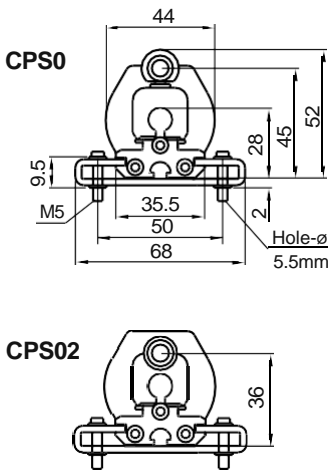
Model: CHM (rod version)



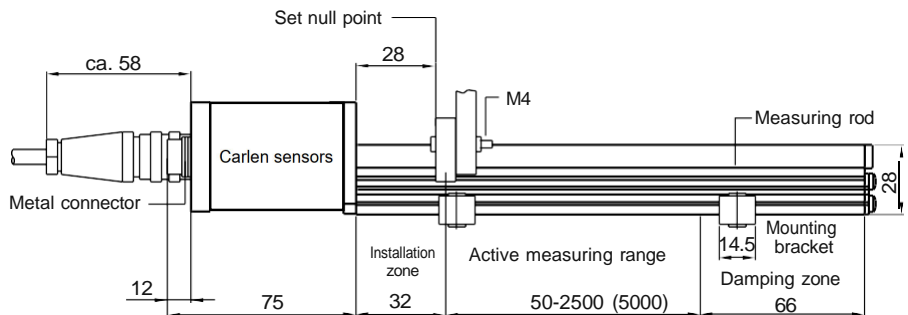
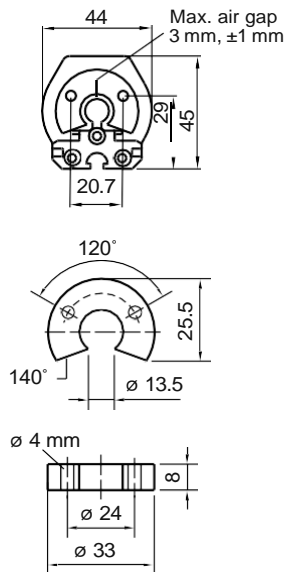
With measuring strokes of 1000 mm and over, mechanical rod support is recommended.

The sensor's fastening should be manufactured from non-magnetic materials (e.g.: brass, plastic). Note installation instruction **MWA22318** on installation in magnetisable materials.

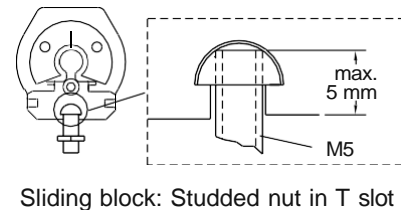
Model: CPM (profile version)



Liftable position magnet CPR03



**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.



**Note:** On installation of the CARLEN sensors, 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.carlen-sensors.com](http://www.carlen-sensors.com)