Potentiometric Displacement Sensor

Miniature design

Model 8709

Code:	8709 EN
Delivery:	ex stock
Warranty:	24 months

CAD data 2D/3D for this sensor:
Download directly at www.traceparts.com
Info: refer to data sheet 80-CAD-EN

- **Measurable displacements between 0 ... 25 mm and 0 ... 250 mm**
- **Linearity: max. ± 0.05 %**
- **Housing diameter 12.9 mm**
- **Service life: 10^8 movements**
- **Adjustment speed: up to 10 m/s**
- **Integrated cable 1 m**
- **Special versions: Coupling with ball joints or flange fastening by request**

8709 EN

Application

Potentiometric displacement sensors are used for direct, precise measurement of mechanical displacements. The mechanical parts of the measuring equipment must be set-up in such a way that the sliding shaft can move without play or lateral forces.
A special multi-finger slider ensures good contact even when the adjustment speed is high or in the presence of vibration. With its housing diameter of only 12.9 mm, the model 8709 is also suitable for highly compact structures.
The movable fastening clamps allow the user variable options for attaching the sensor without complication.
Optionally available adaptations, such as flange and ball joint versions, extend and complement the range of possible applications.

Typical fields of application include:

- ► Measuring the stroke on riveting machines
- ► Measuring insertion distances
- ► Offset measurements on bearings
- ► Spring travel measurements on axes
- ► Measurements of the movement of hoisting platforms
- ► Length measurements on pipe bending machines

Description

Due to the technology employed in potentiometric displacement sensors, they always operate with a sliding contact system. Special processes are applied to give the resistance tracks low friction, low tendency to stick/slip, resistance to abrasion and long-term stability.
The driving rods are guided in long-life, low-friction sliding bearings with close tolerances; this results in highly precise measurements. Transverse forces reduce the service life and can be avoided by using, for instance, ball joint couplings.
Due to the pump effect, the driving rod has double sliding bearings. All the figures quoted in the data sheet for non-linearity, service life, reproducibility and temperature coefficient apply to the use of the sensor as a voltage divider with a maximum current of 0.1 µA.
A ball joint coupling (see accessories) at the end of the sliding shaft minimizes axial errors between the sensor and the equipment.

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Technical Data

Order Code	Range [mm]	Linearity* +1/-0	Resistance	Dissipation at 40 °C (0W at 120 °C)	Maximum Voltage	Length of Housing **A** [mm]	Distance of Holders (recom.) **B** [mm]	Total Movement **C** [mm]	Mass
8709-5025	0 ... 25	± 0.2 % F.S.	1 kΩ	0.5 W	20 V	74.5	42	30	45 g
8709-5050	0 ... 50	± 0.1 % F.S.	2 kΩ	1 W	40 V	99.5	67	55	55 g
8709-5075	0 ... 75	± 0.1 % F.S.	3 kΩ	1.5 W	60 V	124.5	92	80	65 g
8709-5100	0 ... 100	± 0.1 %F.S.	4 kΩ	2 W	60 V	149.5	117	105	75 g
8709-5125	0 ... 125	± 0.05 %F.S.	5 kΩ	2.5 W	60 V	174.5	142	130	85 g
8709-5150	0 ... 150	± 0.05 %F.S.	6 kΩ	3 W	60 V	199.5	167	155	95 g
8709-5200	0 ... 200	± 0.05 % F.S.	8 kΩ	3 W	60 V	249.5	217	205	115 g
8709-5250	0 ... 250	± 0.05 % F.S.	6 kΩ	3 W	60 V	299.5	267	255	135 g

* without mounting parts

Electrical values

Resistance: refer to table
Tolerance of resistance: ± 20 %
Maximum operating voltage: refer to table
Operating current in the slider circuit: recommended < 0.1 µA
maximum 10 mA
(> 0.1 µA: negative influence to linearity and durability)
Dissipation: refer to table
Insulation resistance: > 100 MΩ at 500 V=, 2 s, 1 bar
Electric strength: < 100 µA at 500 V~, 50 Hz, 2 s,1 bar

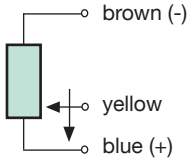
Environmental conditions

Operating temperature range: - 30 °C ... 100 °C
Storage temperature range: - 50 °C ... 120 °C
Influence of temperature:
to resistance - 200 ± 200 ppm/°C
to output voltage < 1.5 ppm/°C

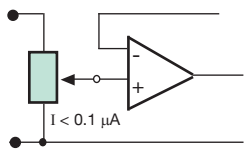
Mechanical values

Non-linearity: refer to table
Resolution: 10 µm
Displacement force, horizontal: ≤ 0.5 N
Displacement speed: ≤ 10 m/s
Vibration resistance: 5 ... 2000 Hz, A_{max} = 0.75 mm, a_{max} = 20 g
Shock resistance: 50 g, 11 ms
Protection class: acc. to EN 60529 IP60
Electrical connection: integrated, shielded cable, length 1 m, diameter 4 mm

Wiring code



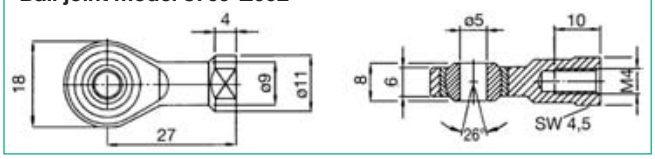
Recommended wiring



Important:
The outstanding properties of these sensors are only available when the slider current in the voltage divider is kept < 0.1 µA. If the measuring chain draws higher currents, the use of an operational amplifier as a voltage follower (I < 0.1 µA) is recommended (see drawing).

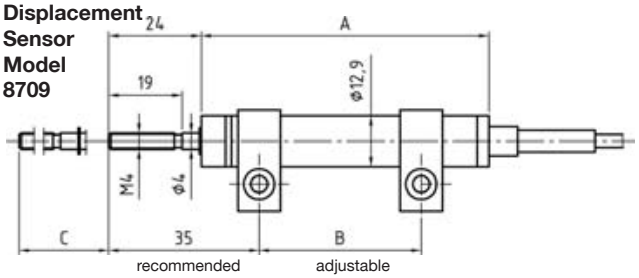
Assembly
Two fastening clamps for mounting purposes are included with the device, see dimensional drawing. The recommended spacings are given in the table.

Ball joint model 8709-Z002

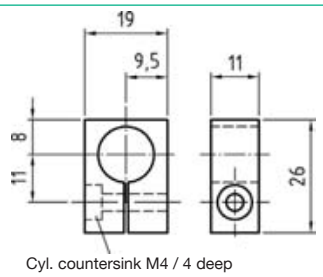


Dimensional drawings

Displacement Sensor Model 8709



Holder Model 8709-Z001



The CAD drawing (3D/2D) for this sensor can be imported online directly into your CAD system.
Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Order Information

Potentiometric displacement sensor **Model 8709-5100**
Range 100 mm

Accessories

Mounting set **Model 8709-Z001**
(2 holders for mounting, refer to drawing)
1 set is part of delivery

Ball joint (refer to drawing, in the lower left) **Model 8709-Z002**
Connector 12 pin, for burster desktop devices **Model 9941**
Connector 9 pin, for DIGIFORCE® 9310 **Model 9900-V209**
Connector 5 pin, for extension **Model 99121**
Mounting of a connector to the sensor cable **Order Code: 99004**
only for connection to SENSORMASTER 9163 desktop version **Order Code: 99002**

Analysis and amplifier units like digital indicator 9180, amplifier 9243 or USB sensor interface 9205 or DIGIFORCE®
refer to section 9 of the catalog

Manufacturer Calibration Certificate (WKS)

Calibration of the sensor with or without evaluation electronics. Calibration with 6 calibration points in 20 % increments.