Potentiometric displacement sensors

Models 8710, 8712

Description

Based on their technology, potentiometric displacement sensors consistently make use of sliding components. The resistance track is trimmed in special process to minimize friction and stick-slip for long stability and measuring quality. The double supported rod is equipped with durable, low-friction, narrow-tolerance plain bearings which ensure a long service life and high measuring accuracy too.

Model 8710 is designed without spring. Mechanical linkage using joint with take up of play, M4 thread. At model 8712 a pre-stressed spring presses sensor tip against the measurement object. Tip with M 2.5 thread and stainless steel ball. The bore at rod end serves for coupling retraction units.

The stainless steel pallet is recessed into the sensor tip. The bore in the connecting rod stop at the rear serves for coupling retraction units.

Application

These displacement sensors are used for direct measurement, testing and monitoring of mechanical displacements. The spring-loaded control rod at model 8712 eliminates the need coupling with the measurement object. A prerequisite for a very long life duration of the devices is a parallel alignment of the direction of motion of the measurement object with the control rod.

Areas of application are:

- Displacement on electromagnets, hydraulic cylinders, switches and buttons.
- Measurements of deformation, bending, indentation.

- Measurement ranges: 0 ... 10 mm to 0 ... 150 mm
- Linearity: up to 0.05 % full scale
- Life duration: 10⁴ operations
- Resolution: 0.01 mm
- Displacement speed up to 10 m/s
## Electrical Ratings

### Resistance:
- Measuring range 10 mm and 25 mm: 1 kΩ
- Measuring range 50 mm up to 150 mm: 5 kΩ

### Tolerance on resistance:
± 20 %

### Maximum operating voltage:
- Measuring range 10 mm: 14 V
- Measuring range 25 mm: 25 V
- Measuring range 50 mm ... 150 mm: 50 V

### Recommended operating current in the slider circuit:
< 0.1 µA

### Maximum current in the slider circuit:
10 mA

### Insulation resistance:
> 100 MΩ at 500 V

### Voltage resistance:
500 V rms at 50 Hz

## Environmental Conditions

### Working temperature range:
-30 °C ... 100 °C

### Storage temperature range:
-50 °C ... 120 °C

### Temperature coefficient:
- of the connection resistor: max. -200 ± 200 ppm/K
- of the voltage divider: < 1.5 ppm/K

## Mechanical Values

### Linearity deviation:
see table

### Resolution:
0.01 mm

### Service life (overtravel):
> 10^6 at 2.5 m/s and < 0.1 µA slider current

### Displacement force, horizontal: 8712 only
≤ 4 N

### Displacement speed:
max. 10 m/s

### Protection:
IP 40 in compliance with DIN 40050

### Material:
- Housing: Aluminium, anodised
- Control rod: High-grade steel AISI 303

### Fixing:
Brackets with variable longitudinal distance

### Electrical connection:
Connector, 5-pole (matting connector, model 9991 included, see accessories)

### Important:
The excellent characteristics of the sensors are particularly evident when the slider load in the voltage divider < 0.1 µA. If the measuring chain requires higher currents, it is advisable to use an operational amplifier connected as a voltage follower (I < 0.1 µA), (see diagram above).

## Technical Data

### Model 8710

<table>
<thead>
<tr>
<th>Order code</th>
<th>Measuring range</th>
<th>A</th>
<th>B**</th>
<th>C</th>
<th>Linearity*</th>
<th>Total weight</th>
<th>Movable weight</th>
<th>Dissipation at 40 °C (0W 120 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8710 - 25</td>
<td>0 ... 25 mm</td>
<td>63</td>
<td>30</td>
<td>107</td>
<td>± 0.2 % F. S.</td>
<td>83 g</td>
<td>32 g</td>
<td>0.6 W</td>
</tr>
<tr>
<td>8710 - 50</td>
<td>0 ... 50 mm</td>
<td>88</td>
<td>55</td>
<td>157</td>
<td>± 0.1 % F. S.</td>
<td>102 g</td>
<td>40 g</td>
<td>1.2 W</td>
</tr>
<tr>
<td>8710 - 75</td>
<td>0 ... 75 mm</td>
<td>113</td>
<td>830</td>
<td>207</td>
<td>± 0.1 % F. S.</td>
<td>121 g</td>
<td>48 g</td>
<td>1.8 W</td>
</tr>
<tr>
<td>8710 - 100</td>
<td>0 ... 100 mm</td>
<td>138</td>
<td>105</td>
<td>257</td>
<td>± 0.1 % F. S.</td>
<td>140 g</td>
<td>56 g</td>
<td>2.5 W</td>
</tr>
<tr>
<td>8710 - 150</td>
<td>0 ... 150 mm</td>
<td>188</td>
<td>155</td>
<td>357</td>
<td>± 0.05 % F. S.</td>
<td>140 g</td>
<td>56 g</td>
<td>3.6 W</td>
</tr>
</tbody>
</table>

* without mounting parts ** mechanical stroke

### Model 8712

<table>
<thead>
<tr>
<th>Order code</th>
<th>Measuring range</th>
<th>A</th>
<th>B**</th>
<th>C</th>
<th>D</th>
<th>Linearity*</th>
<th>Total weight</th>
<th>Movable weight</th>
<th>Dissipation at 40 °C (0W 120 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8712 - 10</td>
<td>0 ... 10 mm</td>
<td>48</td>
<td>15</td>
<td>32</td>
<td>108</td>
<td>± 0.3 % F. S.</td>
<td>60 g</td>
<td>18 g</td>
<td>0.2 W</td>
</tr>
<tr>
<td>8712 - 25</td>
<td>0 ... 25 mm</td>
<td>63</td>
<td>30</td>
<td>32</td>
<td>138</td>
<td>± 0.2 % F. S.</td>
<td>75 g</td>
<td>23 g</td>
<td>0.6 W</td>
</tr>
<tr>
<td>8712 - 50</td>
<td>0 ... 50 mm</td>
<td>88</td>
<td>55</td>
<td>40</td>
<td>186</td>
<td>± 0.1 % F. S.</td>
<td>95 g</td>
<td>33 g</td>
<td>1.2 W</td>
</tr>
<tr>
<td>8712 - 100</td>
<td>0 ... 100 mm</td>
<td>138</td>
<td>105</td>
<td>40</td>
<td>296</td>
<td>± 0.1 % F. S.</td>
<td>140 g</td>
<td>50 g</td>
<td>2.2 W</td>
</tr>
</tbody>
</table>

* without mounting parts ** mechanical stroke

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### Accessories

#### Model 8702

- Coupling joint

#### Model 8707

- Sensor tip (pellet ø =3)
  (1 unit included at 8710)

#### Model 8710-Z001

- Assembly (4 Brackets + 4 M4 screws)
  (1 set included)

#### Model 9991

- Mating connector, 5-pole
  (1 unit included)

#### Model 99130

- Cable, length 3 m
  one end mating connector of sensor, other end free

#### Model 99209-591A-0090030

- Cable for DIGIFORCE® 9310
  length 3 m

#### Electronic devices for connecting these sensors

Refer to section 9 of the catalog.

#### Option WKS

Factory calibration 6 points, 20 % increment