

# DC/DC Displacement Sensor

## Series 87240

Code: 87240 EN

Delivery: ex stock

Warranty: 24 months



- Ranges 0 ... ± 1.27 mm to 0 ... ± 76.20 mm
- Integrated amplifier
- Free of hysteresis
- Large temperature range from -50° C ... 120° C
- Suitable for operation in hydraulic fluid up to 3 bar
- Protection IP64

### Application

Displacement and all mechanical values which can be converted to displacements (e.g. compressive and tensile force, strain, torque and vibration) may be measured by this DC/DC displacement sensor. Typical application areas are the measurement of displacement and strain on machines, servo systems, vehicles, on test plants, in civil engineering and tunnel construction.

An integrated maintenance-free electronic and a high-level DC output signal provide an easy handling without any problems.

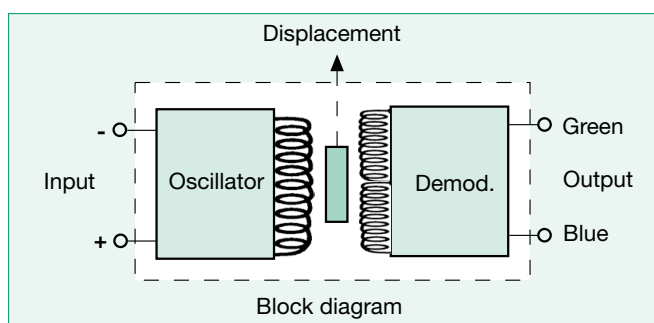
### Description

Displacement sensors of series 87240 convert a displacement into an analog electrical signal. They consist of a differential transformer with moveable core, an oscillator and a demodulator. These components are integrated and encapsulated in a cylindrical housing made of stainless steel. The sensors are energized by DC voltage, which is converted to AC by the oscillator and brought to the primary coil of differential transformer. The voltages induced by the two secondary windings of the transformer are demodulated, filtered and switched inverse to each other. The result is a 0 V signal, if the core is in the center position.

The direction of an axial core displacement is shown by the polarity of the output voltage. The amplitude of the voltage changes proportional to the magnitude of the core's displacement and respectively to the measured deflection.

In and output terminals of the displacement sensor are galvanically insulated and there is no connection to the housing of the sensor.

The mounting of the DC/DC displacement sensor will be done e.g. by a clip enclosing the sensor's housing. The dynamic unit to be measured should be connected to the core of the sensor. To avoid an influence to the magnetic field and the measured value, coupling elements have to consist of a non magnetizable material like brass, aluminium or non-magnetizable steel.



**Technical Data**

Displacement Sensor		Models	87240-000	87241-000	87242-000	87243-000	87244-000	87245-000	87246-000
Measurement Range	[mm]		± 1.27	± 2.54	± 6.35	± 12.70	± 25.40	± 50.80	± 76.20
Extended	[mm]		± 1.8	± 3.8	± 9.5	± 19.0	± 38.1	± 69.5	± 82.5
Nominal F.S. output (output unloaded)									
Excitation VDC:	+ 6 VDC		± 1.3 V	± 2.4 V	± 1.8 V	± 3.1 V	± 4.6 V	± 3.9 V	± 3.3 V
	+ 15 VDC		± 3.4 V	± 6.4 V	± 4.8 V	± 8.3 V	± 12.1 V	± 10.2 V	± 8.7 V
	+ 24 VDC		± 5.5 V	± 10.4 V	± 7.8 V	± 13.5 V	± 18.7 V	± 16.5 V	± 14.1 V
	+ 30 VDC		± 7.0 V	± 13.0 V	± 9.7 V	± 17.0 V	± 24.8 V	± 20.7 V	± 17.7 V
Internal Carrier Frequency	[kHz]		13.0	12.0	3.6	3.4	3.2	1.5	1.4
Ripple of Output Voltage	[% eff]		0.7	0.7	0.8	0.8	0.8	1.0	1.0
Output Resistance	[kΩ]		2.5	3.5	5.2	5.5	5.6	5.5	5.6
Cut-Off Frequency	[Hz]		300	140	115	110	100	110	75
Influence of Temperature	[% Rdg./K]		+ 0.1	+ 0.1	- 0.1	- 0.1	- 0.1	- 0.1	- 0.1
Dimensions:	A [mm]		22.1	28.4	81.5	94.2	119.6	208.5	267.2
	E [mm]		8.6	11.7	36.6	42.9	55.6	100.1	129.3
Weight of Sensor	[g]		22	28	70	80	104	180	220
Core Version 1 (Standard Version, see below)		Models	87C04-000	87C04-004	87C04-010	87C04-011	87C04-012	87C04-013	87C04-014
Dimensions:	B [mm]		14.3	19.1	44.5	47.5	50.8	88.9	88.9
	E [mm]		62.5	67.3	92.7	108.5	132.1	221.0	302.3
Core Weight	[g]		1.6	2.1	3.4	3.8	4.3	7.0	8.1
Core Version 2 (Option, siehe unten)		Models	87C05-002	87C05-009	-	-	-	-	-
Dimension:	B [mm]		14.3	19.1	-	-	-	-	-
	D [mm]		continuous	4.8	-	-	-	-	-

**Electrical values**

Excitation voltage: 6 V DC ... 30 V DC protected against reverse polarity  
 Excitation current: 10 mA (at 6 V DC) ... 50 mA (at 30 V DC)  
 Voltage output: symmetrical to electrical center refer to table  
 Resistance: > 100 kΩ  
 Test voltage: input/output 500 V

**Environmental conditions**

Operation temperature range: - 50 °C ... 120 °C  
 Influence of temperature to measurement signal: refer to table

**Mechanical values**

Non-linearity: measurement range ± 0.5 % F.S  
 extended range ± 1 % F.S  
 Resolution: analog signal  
 Protection class: acc. to EN 60529 IP 64  
 Electrical connection: 4 teflon insulated wires, length 45 cm, color coded  
 Wiring code:  
 red: excitation positive green: signal output  
 black: excitation negative blue: signal output  
 blue is positive, if the core is on the side of the connector wires.

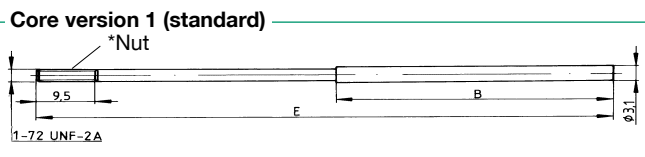
**Order Information**

DC/DC displacement sensor range ± 1.27 mm **Model 87240-000**  
 DC/DC displacement sensor range ± 1.27 mm  
 plug-in connector **Model 87240-000-V001**

**Accessories**

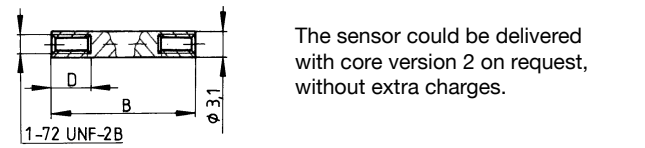
1 set (2 pcs) nuts for the rod thread 1-72 UNF-2A (included in scope of delivery) **Model 87240-Z001**  
 Amplifiers, process indicators like e.g. model 9163 and model 9243  
**please refer for product section 9 of catalog.**

**Dimensional drawings**



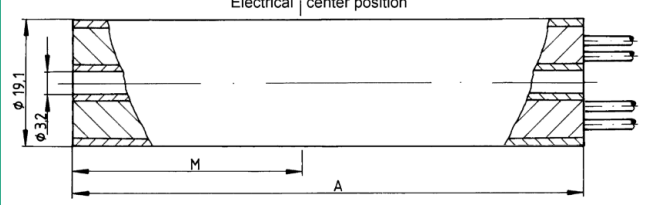
\* 2 nuts are included in scope of delivery.

**Core version 2 (option for model 87240-000 and 87241-000)**



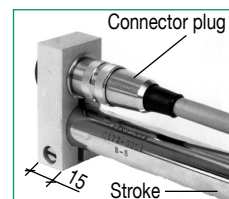
The sensor could be delivered with core version 2 on request, without extra charges.

**Sensor housing**



**Option**

Version with electrical plug-in connector, 5 pin, mating connector model 9991 included **V001**



**Manufacturer Calibration Certificate (WKS)**

Standard manufacture calibration, 20 % increments in raising direction, with or without indicator.