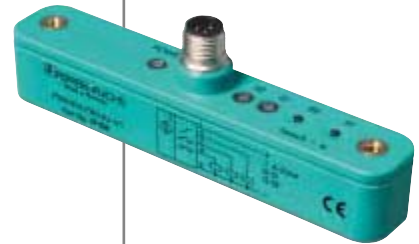




# FLEXIBILITY AND PRECISION IN POSITION DETECTION





## INNOVATIVE SOLUTIONS FOR PRECISE CONTINUOUS POSITION DETECTION

### INDUCTIVE INSTEAD OF MAGNETIC

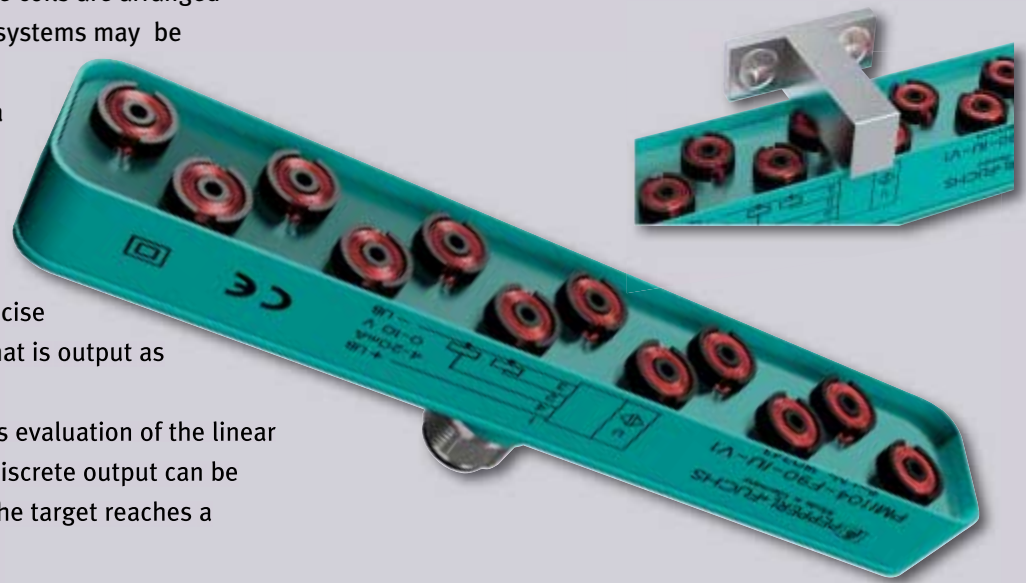
Through continuous innovation and enhancement of the inductive proximity switch, the developers of Pepperl+Fuchs have created a complete family of position detection and angle measurement sensors. They work solely on the inductive – in contrast to magnetic – sensing technology. In a single device, multiple coils are arranged in a way that several coil systems may be simultaneously evaluated based on the position of a single target.

Continuous and cyclic evaluation of the coil systems allows for the calculation of a highly precise absolute position value that is output as an analog signal.

Because of the continuous evaluation of the linear position, a programmed discrete output can be provided to signal when the target reaches a defined position.

### FREE CHOICE OF TARGET

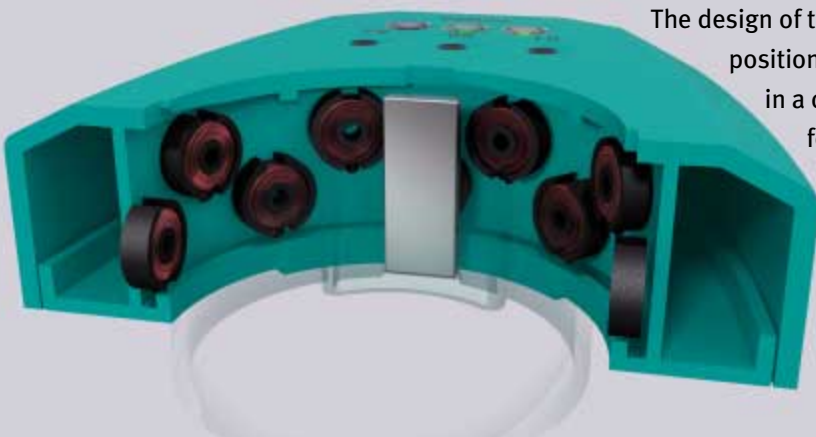
Advantages provided by the inductive system are high precision, robustness and flexibility in target choice. Different from magnetic measurement systems the target may consist of nearly any type of metal. This means that instead of dedicated ferrites, existing screws, pins or other machine parts may be used as the target.



# Inductive instead of magnetic

### PRECISE ANGLE POSITION MEASUREMENT SENSORS

The design of the F130 is the rotational counterpart of the linear position detection system. Because the coils are arranged in a circular pattern, this compact sensor can be used for the contact-free detection of angle positions within 0 ... 360°





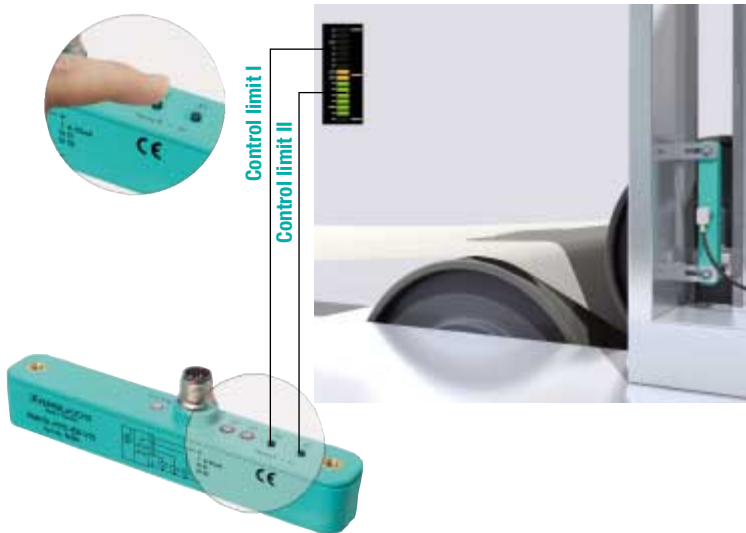
# ROBUST AND WEAR-FREE – F90 SERIES

The compact and robust F90 series design makes contact and wear-free position measurement possible. The F90 is available in the following measurement lengths:

- 80 mm
- 104 mm
- 120 mm.

The F90 position measurement system is available in two versions.

- analog current or voltage output signals
- analog current output signal and two teachable switch points for limit value monitoring.



## OVERVIEW

	PMI80-F90-IU-V1	PMI104-F90-IU-V1	PMI120-F90-IU-V1
Analog output 0 V ... 10 V / 4 mA ... 20 mA	PMI80-F90-IE8-V15	PMI104-F90-IE8-V15	PMI120-F90-IE8-V15
Analog output 4 mA ... 20 mA · 2 Switching points teachable			
<b>Measurement range</b>	0 mm ... 80 mm	0 mm ... 104 mm	0 mm ... 120 mm
<b>Length</b>	102 mm	126 mm	142 mm
<b>Resolution</b>	125 µm		
<b>Detection range</b>	max. 3 mm		
<b>Repeat accuracy</b>	± 0.1 mm		
<b>Temperature drift</b>	± 0.5 mm (–25 °C ... 70 °C)		
<b>Linearity error</b>	± 0.4 mm		

### Accessories:

Pepperl+Fuchs offers cables with matching connector – straight and angled – in various cable lengths.

### Target

**BT-F90-G**



### Target

**BT-F90-W**



### Mounting bracket

**MH-F90**

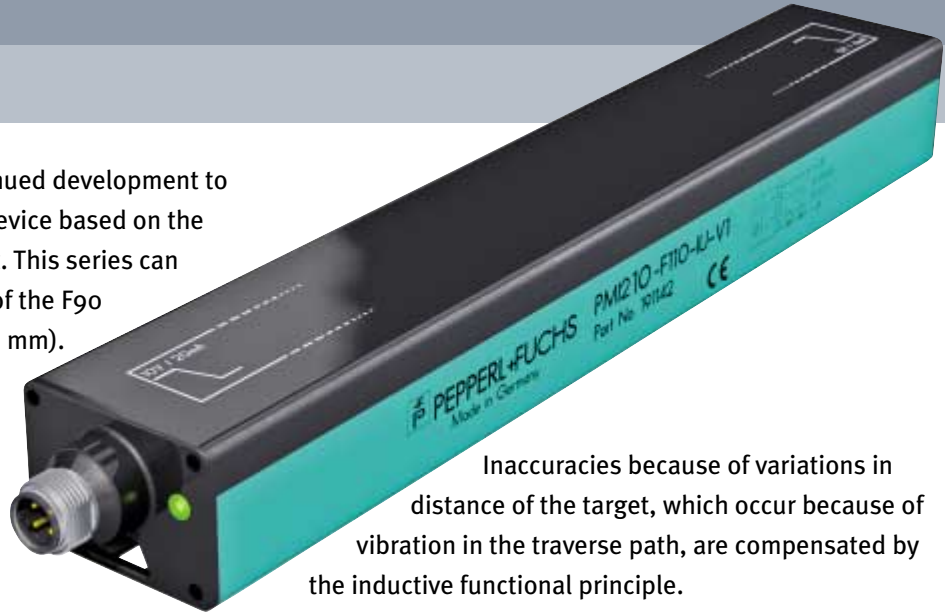


# EXTRA LONG DETECTION RANGE – F110 SERIES

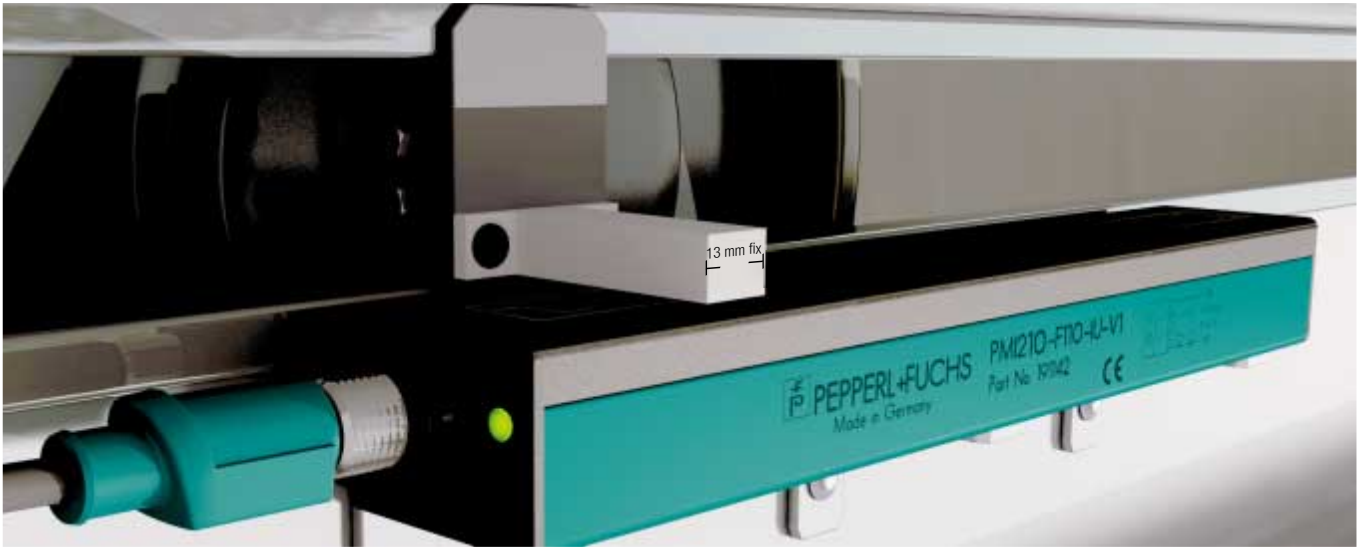
The F110 Series is the result of continued development to achieve a long range measurement device based on the original F90 inductive design concept. This series can reach triple the measurement range of the F90 series with double detection range (6 mm).

These longer length units provide all of the advantages of the F90 design, but with measurement lengths of 210 mm and 360 mm.

Analog output 0 V ... 10 V / 4 mA ... 20 mA



Inaccuracies because of variations in distance of the target, which occur because of vibration in the traverse path, are compensated by the inductive functional principle.



## OVERVIEW

Analog output 0 V ... 10 V / 4 mA ... 20 mA	PMI210-F110-IU-V1	PMI360-F110-IU-V1
<b>Measurement range</b>	0 mm ... 210 mm	0 mm ... 360 mm
<b>Length</b>	250 mm	390 mm
<b>Resolution</b>	210 µm	360 µm
<b>Detection range</b>	————— max. 6 mm —————	
<b>Repeat accuracy</b>	————— ± 0.2 mm —————	
<b>Temperature drift</b>	————— ± 0.5 mm (–25 °C ... 70 °C) —————	
<b>Linearity error</b>	————— ± 0.4 mm —————	



Installation is easy, using slot fasteners that offer mounting flexibility.

### Accessories:

Pepperl+Fuchs offers cables with matching connector – straight and angled – in various cable lengths.

**Target  
BT-F110-G**



**Target  
BT-F110-W**



**Mounitng  
bracket  
MH-F90**





# EXTREMELY COMPACT FOR SPACE-CRITICAL APPLICATIONS – F112

The most compact inductive position detection system on the market, the F112 provides all the advantages of the F90 & F110 inductive position systems but for applications where short measurement length and compact mounting is required. The F112 is the ideal solution for applications where the smallest position changes of machine parts or machine tool components are to be monitored.



- Dimensions 35 mm x 35 mm x 40 mm
- Measurement range 14 mm
- Detection range 2,5 mm



## OVERVIEW

Analogue output 0 V ... 10 V	PMI14V-F112-U-V3
Measurement range	0 mm ... 14 mm
Length	35 mm
Resolution	33 µm
Detection range	max. 2.5 mm
Repeat accuracy	± 0.05 mm
Temperature drift	± 0.5 mm (-25 °C ... 70 °C)
Linearity error	± 0.3 mm



### Accessories:

Pepperl+Fuchs offers cables with matching connector – straight and angled – in various cable lengths.

### Target

BT-F90-G



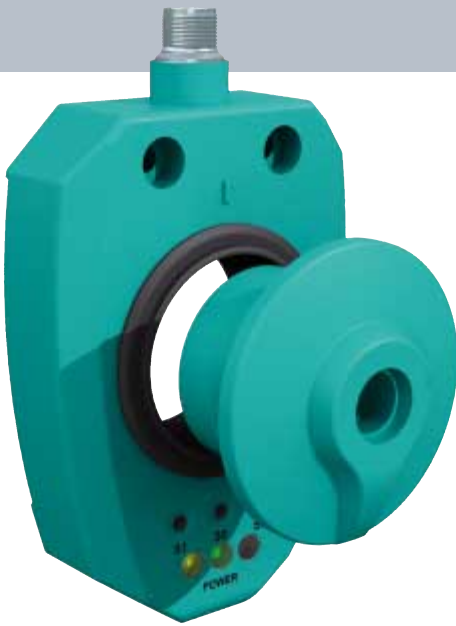
### Target

BT-F90-W





# ANGLE POSITIONS OF 0° TO 360° – F130



The F130 is a 360° angle measurement system with a 4 mA ... 20 mA current output as well as two switching points. Zero-point and position switching points may be easily configured with the assistance of built-in LEDs via TEACH-IN button. The F130 system features wear-free functional operation, high measurement precision and a resolution of 0.4°. Mechanical design and the inductive measurement principle tolerate relatively high variations of the rotational targets position in the axial and radial direction (1 mm to 2 mm). Targets such as the BT-F130-A or customer-specific actuators with a diameter of up to 40 mm can be used.

The device is designed for assembly on standard mounting plates of 80 mm x 30 mm. The zero-point can be set individually depending on the F130 placement.



Target BT-F130-A

## OVERVIEW

Analog output 4 mA ... 20 mA Zero-point + 2 Switching points teachable	<b>PMI360D-F130-IE8-V15</b>
<b>Measurement range</b>	0° ... 360°
<b>Resolution</b>	0.4°
<b>Repeat accuracy</b>	± 0.5 °
<b>Temperature drift</b>	± 1.5° (-25 °C ... 70 °C)
<b>Linearity error</b>	± 1.2°
<b>Diameter</b>	43 mm

**Accessories:** Pepperl+Fuchs offers cables with matching connector – straight and angled – in various cable lengths.



## WE HAVE THE PRODUCT TO SOLVE YOUR MEASUREMENT NEEDS

### HIGH RESOLUTION AND PRECISION

The primary strengths of the inductive linear positioning and angle detection systems are the high resolution and precise measurement capability.

The micro controller based system provides resolutions of up to 33  $\mu\text{m}$ . Allowing for the smallest changes in position to be detected. This makes these inductive measurement systems ideal for high-value applications in a multitude of industries.

Outputting values of analog voltage or current signal based on the simultaneous evaluation of the coil systems provides highly precise and repeatable accuracies of up to  $\pm 0,05$  mm.

### DIFFERENT MEASUREMENT LENGTHS

For the linear position detection three different designs are available.

They cover, depending on the design, measurement lengths of 14 mm to 360 mm and more.

The inductive angle sensor has a measurement range of 0 ... 360°.

### INTEGRATED ERROR DETECTION FUNCTIONS

Intelligent sensors monitor if a target has moved out of the measurement or detection range. Error conditions are represented by a fault current output signal that can be used by the connected SPC.

#### F90 SERIES



#### F110 SERIES



#### F112 SERIES



#### F130 SERIES



# FACTORY AUTOMATION – SENSING YOUR NEEDS



Pepperl+Fuchs sets the standard in quality and innovative technology for the world of automation. Our expertise, dedication, and heritage of innovation have driven us to develop the largest and most versatile line of industrial sensor technologies and interface components in the world. With our global presence, reliable service, and flexible production facilities, Pepperl+Fuchs delivers complete solutions for your automation requirements – wherever you need us.

## Contact

Pepperl+Fuchs GmbH  
Königsberger Allee 87  
68307 Mannheim · Germany  
Tel. +49 621 776-4411 · Fax +49 621 776-27-4411  
E-mail: [fa-info@de.pepperl-fuchs.com](mailto:fa-info@de.pepperl-fuchs.com)

## Worldwide Headquarters

Pepperl+Fuchs GmbH · Mannheim · Germany  
E-mail: [info@de.pepperl-fuchs.com](mailto:info@de.pepperl-fuchs.com)

## USA Headquarters

Pepperl+Fuchs Inc. · Twinsburg · USA  
E-mail: [sales@us.pepperl-fuchs.com](mailto:sales@us.pepperl-fuchs.com)

## Asia Pacific Headquarters

Pepperl+Fuchs Pte Ltd · Singapore  
E-mail: [sales@sg.pepperl-fuchs.com](mailto:sales@sg.pepperl-fuchs.com)

[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

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