SIMPLE AND NON-CONTACT

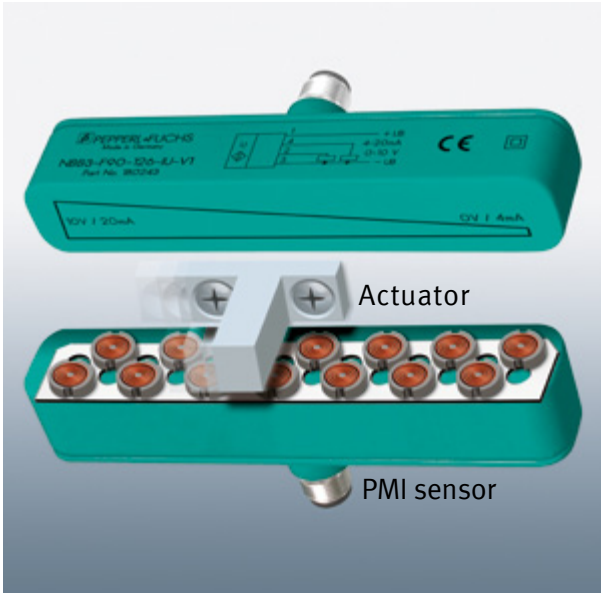
PMI INDUCTIVE POSITIONING MEASURING SYSTEMS

PEPPERL+FUCHS

A NEW DIMENSION FOR INDUCTIVE SENSORS

FROM SWITCH TO POSITIONING MEASURING TECHNOLOGY

The PMI inductive position measuring technology combines the robust operation principle of an inductive proximity switch with the precision of a position measurement and angular positioning system. With PMI sensors, simple actuation targets of steel are used to produce a position or angle-proportionate output signal. In addition to these analog current and voltage outputs, switching point outputs can be configured by the user. The PMIs provide functional flexibility and save installation costs as well as additional costs for binary sensors.



The inside of the sensor contains a coil array. In passing a simple steel actuator, the sensor supplies a distance-proportional analog output signal.

NON-CONTACT AND INDUCTIVE

Non-contact position measuring technology is invaluable in machine and plant engineering. The reaction-free measuring prevents wear and measurement errors. The inductive functional principle has proven itself over a period of decades in long-term industrial use. It is contamination-resistent and completely maintenance free.

SIMPLE STEEL ACTUATOR

The PMI technology requires moving machine modules for position detection, not resonators or magnets as actuating elements. Because a steel sheet or square steel bar is sufficient as an actuating element, it can be implemented simply as a part of the machine module to be monitored. This increases flexibility in construction and saves on costs for expensive actuators.

COMBINED MEASURING AND SWITCHING FUNCTIONS

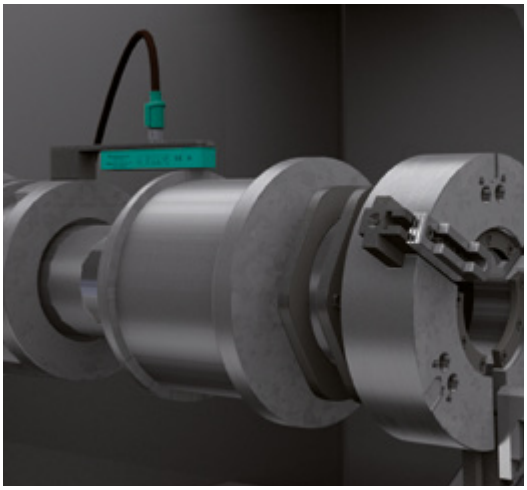
The inductive position sensor combines measuring and switching functions in one device. The travel range of a machine module or a machine element can be evaluated to determine the position proportional to an analog value and also discrete positions can be detected and output by a separate logic output switch state. The PMI combines several functions in a single device that traditionally required three separate sensors. In addition to reducing the cost of the devices themselves, the cost for mounting and inventory of several devices is also reduced.

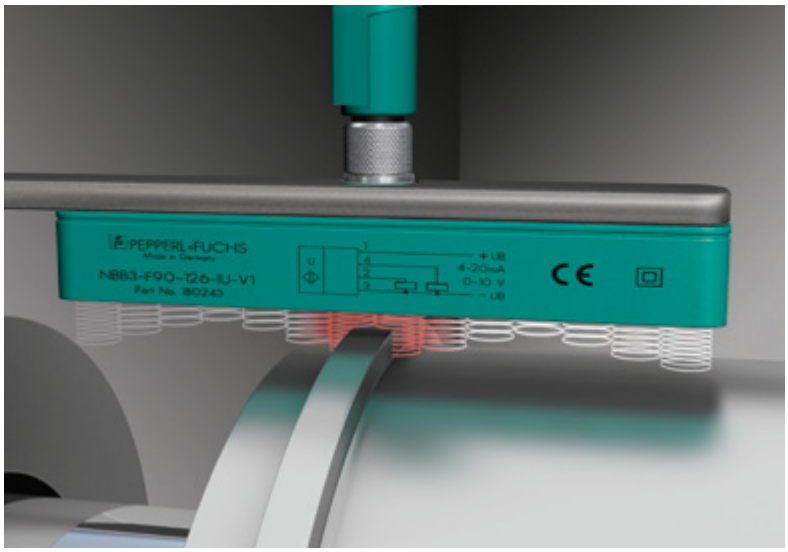
F90 – THE ALL-ROUNDER

The PMI-F90 design is not only available as a pure measuring sensor with distance-proportional current or voltage output signal, but also as a measuring and switching sensor.

In three different housing lengths, it offers the user 80, 104 and 120 mm measurement ranges.

Various measurement lengths, but the same connection interfaces make it easy to interchange the sensors.





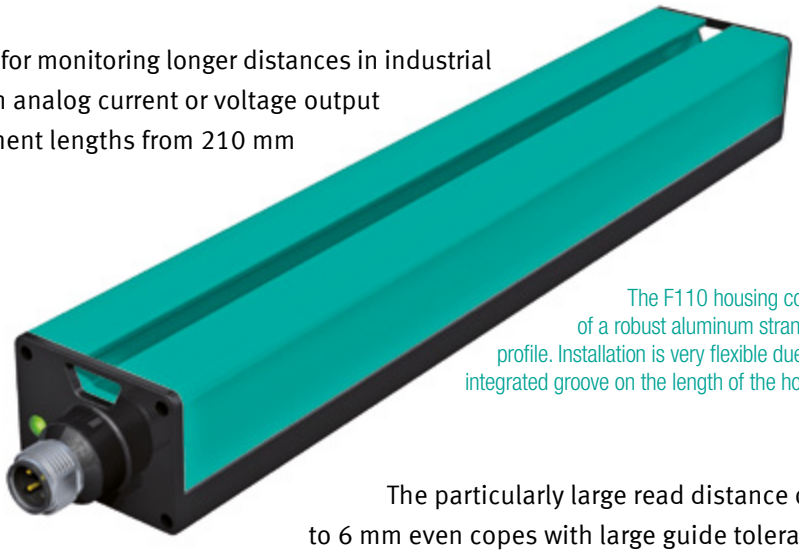
The PMI sensor generates an inductive field. This field shifts along the sensitive surface and detects the metallic target in the detection range of the inductive field. The sensor calculates the current position of the targets and provides outputs either as a distance-proportional analog signal or as a definable switching position.

TECHNICAL DATA

General data	PMI80-F90-IU-V1	PMI80-F90-IE8-V15	PMI104-F90-IU-V1	PMI104-F90-IE8-V15	PMI120-F90-IU-V1	PMI120-F90-IE8-V15
Functions	measuring	measuring & switching	measuring	measuring & switching	measuring	measuring & switching
Measurement range [mm]	80	80	104	104	120	120
Read distance [mm]	1 … 3	1 … 3	1 … 3	1 … 3	1 … 3	1 … 3
Nominal ratings						
Resolution [µm]	125	125	125	125	125	125
Linearity [mm]	± 0.4	± 0.4	± 0.4	± 0.4	± 0.4	± 0.4
Repeatability [mm]	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
Output signals						
Analog output [0-10 V]	■	-	■	-	■	-
Analog output [4-20 mA]	■	■	■	■	■	■
Switching output PNP NO	-	2x switching point	-	2x switching point	-	2x switching point
Digital output	-	-	-	-	-	-
Mechanical data						
Housing dimensions (l x w x h) [mm]	102 x 23 x 22	102 x 23 x 22	126 x 23 x 22	126 x 23 x 22	142 x 23 x 22	142 x 23 x 22
Degree of protection [IP]	67	67	67	67	67	67

F110 – THE LARGE DESIGN

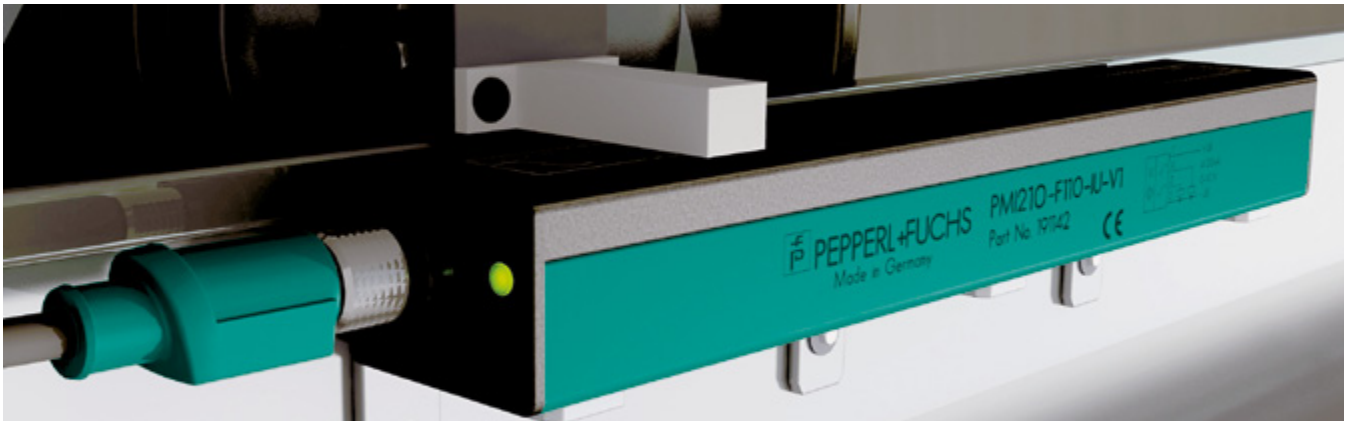
The PMI-F110 design is particularly suitable for monitoring longer distances in industrial and heavy machine building. It produces an analog current or voltage output signal and is available in various measurement lengths from 210 mm to almost a meter.



The F110 housing consists of a robust aluminum strand cast profile. Installation is very flexible due to an integrated groove on the length of the housing.

Easy to install with flexible, sliding fasteners.

The particularly large read distance of up to 6 mm even copes with large guide tolerances for the machine module to be detected. Even severe contamination from grease or mechanical abrasion of the measurement system does not affect it.



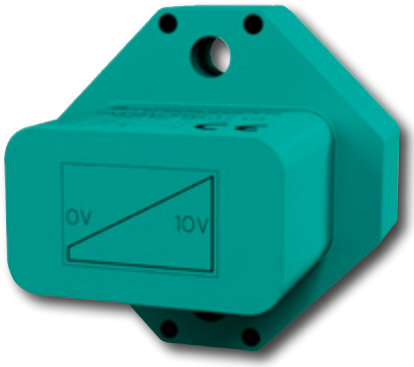
Due to the large read distance of the PMI-F110 of up to 6 mm, exact position detection is also possible on vibrating or high-tolerance machine parts.

TECHNICAL DATA

General data	PMI210-F110-IU-V1	PMI360-F110-IU-V1	PMI510-F110-IU-V1	PMI810-F110-IU-V1	PMI960-F110-IU-V1
Functions	measuring	measuring	measuring	measuring	measuring
Measurement range [mm]	210	360	510	810	960
Read distance [mm]	1 … 6	1 … 6	1 … 6	1 … 6	1 … 6
Nominal ratings					
Resolution [µm]	210	360	550	950	960
Linearity [mm]	± 0.4	± 0.4	± 0.6	± 0.8	± 0.9
Repeatability [mm]	± 0.2	± 0.2	± 0.4	± 0.4	± 0.4
Output signals					
Analog output [0-10 V]	■	■	■	■	■
Analog output [4-20 mA]	■	■	■	■	■
Switching output PNP NO	-	-	-	-	-
Digital output	-	-	-	-	-
Mechanical data					
Housing dimensions (l x w x h) [mm]	250 x 41x 30.5	400 x 41x 30.5	550 x 41 x 30.5	850 x 41 x 30.5	1000 x 41 x 30.5
Protection class [IP]	65	65	65	65	65

F112 – THE PRECISE DESIGN

The PMI-F112 design not only offers a very space-saving housing design, but also has the highest measurement accuracy of all PMI products. Its voltage output can scale to any measurement distance ranging from 1 to 14 mm. In addition to the conventional voltage output, the PMI14V-F112 is also equipped with a digitally communicating IO-Link interface. This interface provides the intelligent sensor with a wide range of customer-specific parameterization possibilities.



In addition to a conventional voltage output interface, the smallest F112 design of the PMI family is available as an IO-Link sensor.

IO-Link

The compact F112 design fits into almost every corner. It can reliably detect even the smallest of movements.

TECHNICAL DATA

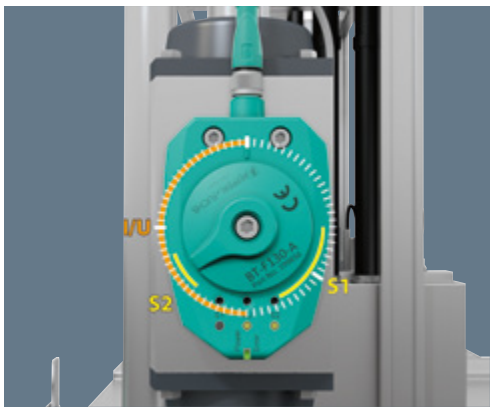
General data	PMI14V-F112-U-V3	PMI14V-F112-U-IO-V31
Functions	measuring	measuring
Measurement range [mm]	1 … 14	1 … 14
Read distance [mm]	1 … 2.5	1 … 2.5
Nominal ratings		
Resolution [µm]	33	33
Linearity [mm]	± 0.3	± 0.3
Repeatability [mm]	± 0.05	± 0.05
Output signals		
Analog output [0 to 10 V]	■	■
Analog output [4 to 20 mA]	-	-
Switching output PNP NO	-	-
Digital output	-	IO-Link
Mechanical data		
Housing dimensions (l x w x h) [mm]	35 x 35 x 30.5	35 x 35 x 30.5
Degree of protection [IP]	67	67

F130 – THE ANGLE SENSOR

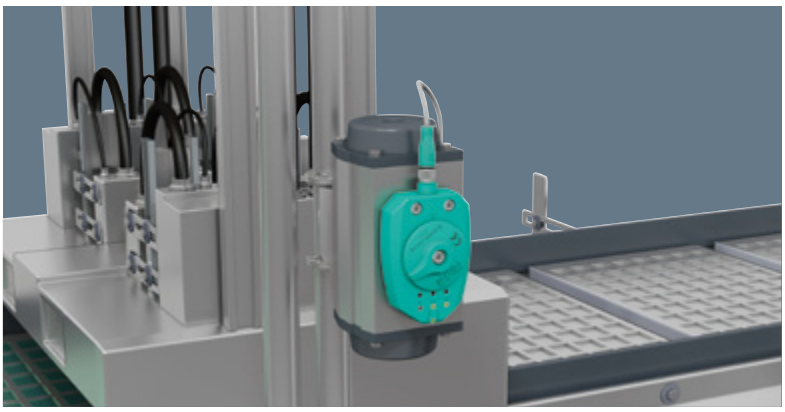
A steel target is inserted in the BT-F130 actuator. A functional angular positioning system is formed when the rotating target holder is inserted in the round opening of the PMI-F130 that contains the measuring coils.

The PMI-F130 determines the angular position of a metallic actuator which is integrated in the rotating target holder. Three versions are available: a pure angle-measuring sensor with distance-proportional current/voltage output, a combined measuring and switching sensor, as well as a pure switching sensor. While the combined sensor can be used as an analog positional feedback sensor with separate ON/OFF switch on valves in process technology, the pure switching PMI-F130 with three separate programmable signaling zones is an ideal electronic substitute for small switch control solutions up to 3 switching cams.

With the PMI360DV, both the measuring and switching ranges can be parameterized according to type. The measuring range is scalable to the operating angle between 90° and 360°. In addition, the measurement direction is selectable as clockwise or counter-clockwise. The switch outputs are connected as a parameterable signaling zone, with which the zone width can be set.



With the PMI-F130 angle measurement systems, the voltage or current signal is output porportional to the target angular position. Separate switch outputs are available with programmable signaling zones (S1, S2). These zones can also be arranged so that they overlap.



Example of application: the angle measurement system monitors the opening angle of a valve actuator.

The mechanical dimensions and mounting holes of the PMI-F130 are adapted to the standard bore hole pattern for positional feedback sensors in process technology. Therefore the device can be installed as a digital/analog positional feed back sensor on almost any fitting without great expense.

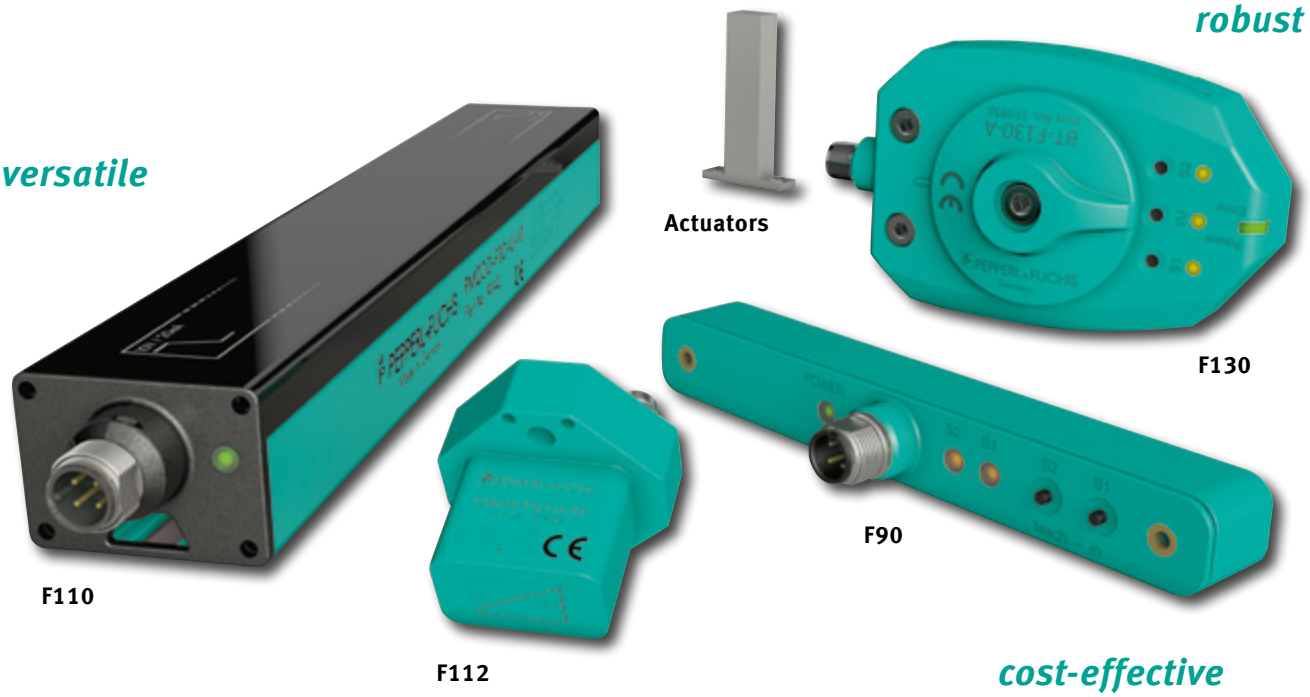
TECHNICAL DATA

General data	PMI360DV-F130-IU-V15	PMI360DV-F130-IU2E2-V15	PMI360DV-F130-3E2-V15	PMI360DV-F130-R2-V15
Functions	measuring	measuring & switching	switching	digital
Measurement range [degrees]	0 … 360	0 … 360	-	0 … 360
Read distance [mm]	1 … 2	1 … 2	1 … 2	1 … 2
Nominal ratings				
Resolution [degrees]	0,2	0,2	0,2	0,1
Linearity [degrees]	± 0.5	± 0.5	-	-
Repeatability [degrees]	± 1.2	± 1.2	-	-
Output signals				
Analog output [0 to 10 V]	■	■	-	-
Analog output [4 to 20 mA]	■	■	-	-
Switching output PNP NO	-	2x signaling zones	3x signaling zones	
Digital output	-	-	-	RS232
Mechanical data				
Housing dimensions (l x w x h) [mm]	110 x 76.5 x 26	110 x 76.5 x 26	110 x 76.5 x 26	110 x 76.5 x 26
Degree of protection [IP]	67	67	67	67

AT A GLANCE

versatile

robust



Actuators

F110

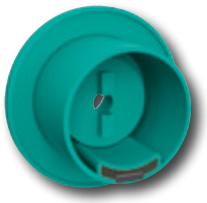
F112

F130

F90

cost-effective

Target
BT-F130-A



Target
BT-F90-W
(Uses M5
mounting screws)

Mounting bracket
MH-F90

Target
BT-F110-G
(Uses M5
mounting screws)

Target
BT-F110-W
(Uses M5
mounting screws)

Mounting bracket
MH-F110

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