

# MAGNETIC FIELD SENSORS

## FOR POSITION DETECTION ON HYDRAULIC CYLINDERS

The patented Magnetic Field Sensors from Pepperl+Fuchs considerably simplify the detection of position on thick-walled hydraulic cylinders.

Our magnetic field sensors render ferromagnetic materials “transparent” so that actuating components can be detected “through the wall”.



### Requirements:

- Piston with magnet system
- Cylinder of magnetisable material as, for example, Fe 360 steel, commonly used for hydraulic components.

### Advantages:

- Zero-contact detection of the piston
- Freely positionable sensor
- Simple and protected installation
- No holes in the cylinder required
- Detection of intermediate and end positions

### User friendly:

- 2 LEDs as switching indicators
- Output antivalent (N.O. and N.C.)
- Series in pnp and npn available
- Cable or plug connector



### Principle of operation:



**1.** After the magnet system has traversed the full cylinder stroke, a remanent magnetic field remains in the cylinder wall. This field is aligned in accordance with the polarity of the magnet system.



**2.** The magnetic field sensor detects the polarity of this remanence.



**3.** As the piston approaches the sensor, the stronger field of the magnet system predominates and the sensor switches due to the polarity reversal of the field.

# THE COMPLETE SYSTEM

In the Pepperl+Fuchs solution you get more than just a sensor – you get a complete system for position detection on hydraulic cylinders.

This problem solving package contains the following:

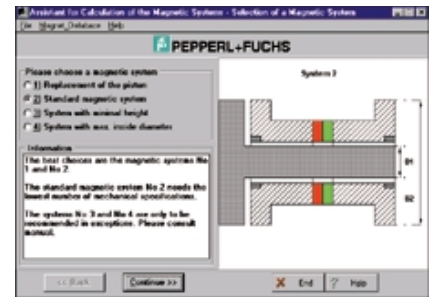
- Magnetic field sensor
- MagCalc software
- Magnet system tester
- Accessories such as magnets and fixing material.

## MagCalc software

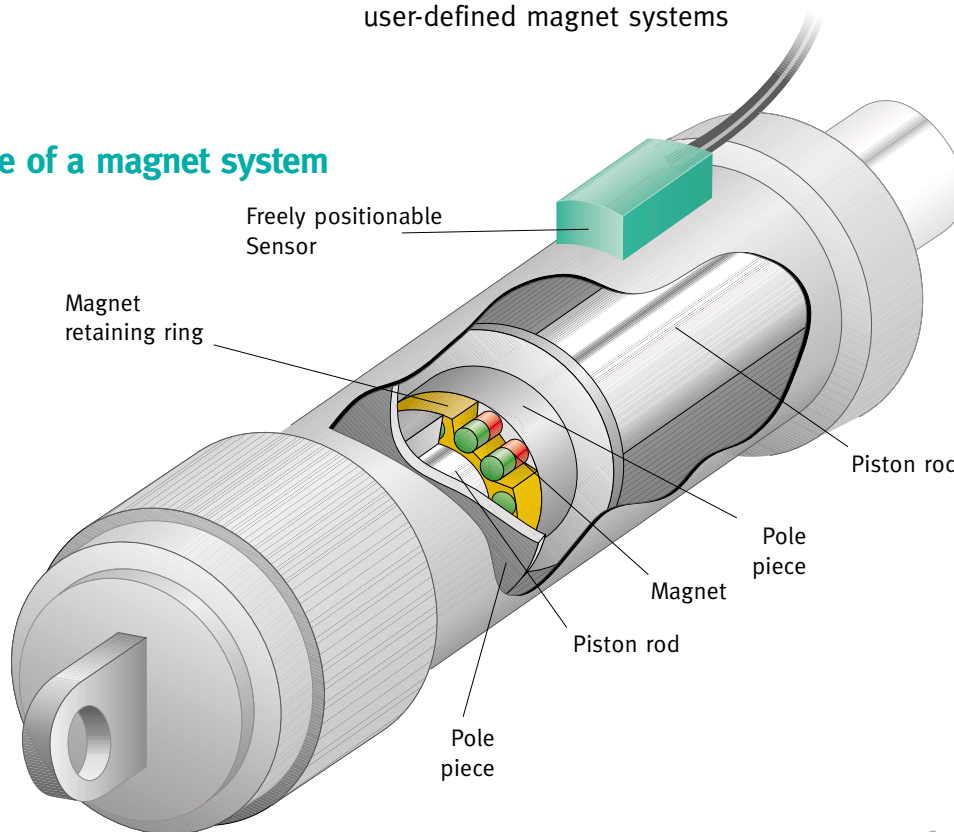
This user-friendly Windows program supports you in the calculation of the required magnet system.

### Advantages:

- 4 magnet systems to choose from
- Simple to operate
- On-line help
- Graphics to clarify the results
- Data base with standard and user-defined magnet systems



## Example of a magnet system



## Magnet system tester MT01

The magnet system tester enables you to check whether an adequate magnetic field has been generated allow the magnetic field sensor to function.

Simply align the tester with the piston and hold the test button depressed. The LEDs show whether the magnet system is functioning correctly.

### Advantages:

- Battery operated hand-held device
- Optical strip display comprising 10 LEDs
- Measurement of the flux density on the cylinder surface
- Easy handling
- High security of function
- Rapid fault detection



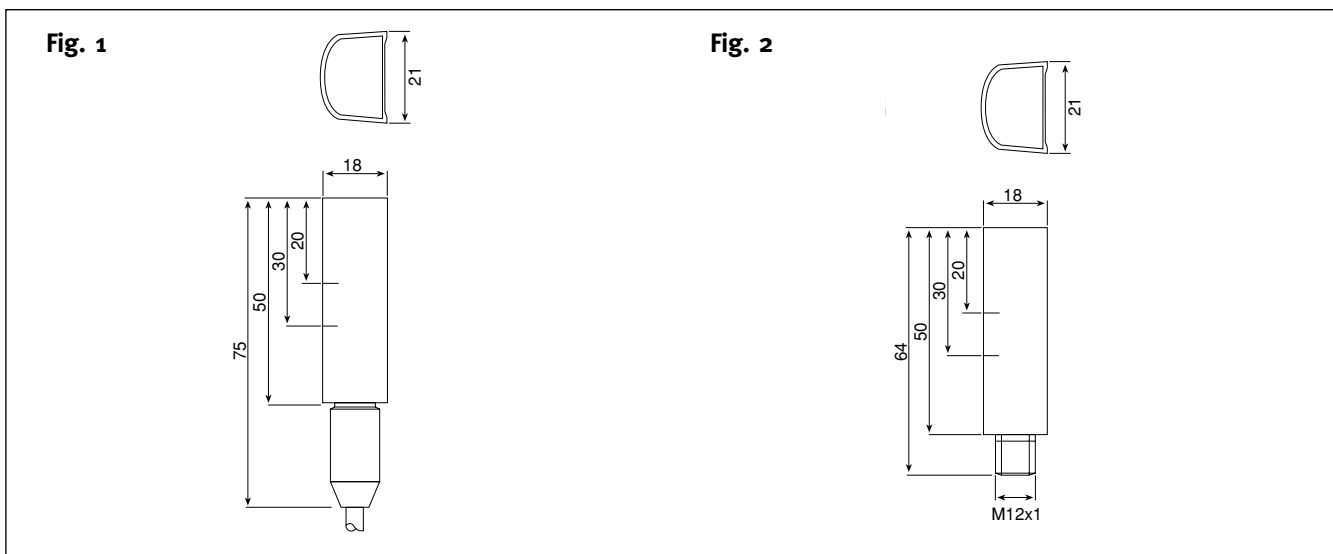
*Try out our interesting power package for yourself!*

# TECHNICAL DATA

Type code	MB-F32-A2 (Fig. 1)	MB-F32-A2-V1 (Fig. 2)	MB-F32-A0 (Fig. 1)	MB-F32-A0-V1 (Fig. 2)
Switch output	antivalent pnp. (N.O. and N.C.)	antivalent pnp. (N.O. and N.C.)	antivalent npn	antivalent npn
Switching indicators				
Output 1	LED, red	LED, red	LED, red	LED, red
Output 2	LED, yellow	LED, yellow	LED, yellow	LED, yellow
Operating width $s_w$ <sup>1)</sup>	typ. 50 mm	typ. 50 mm	typ. 50 mm	typ. 50 mm
Switching hysteresis $H$ <sup>1)</sup>	typ. 5 mm	typ. 5 mm	typ. 5 mm	typ. 5 mm
Repeatability <sup>1)</sup>	typ. 0.5 mm	typ. 0.5 mm	typ. 0.5 mm	typ. 0.5 mm
Operating voltage $U_g$	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Operating current $I_b$	100 mA	100 mA	100 mA	100 mA
Zero load current $I_o$	30 mA	30 mA	30 mA	30 mA
Voltage drop $U_d$	1.5 V	1.5 V	1.5 V	1.5 V
Short circuit protection	pulsed	pulsed	pulsed	pulsed
Ambient temperature	-25...+85 °C	-25...+85 °C	-25...+85 °C	-25...+85 °C
Protection class to DIN 40050	IP67	IP67	IP67	IP67
Connection type	2 m, PVC cable, 4 wire <sup>2)</sup>	M12x1 4 pin connector, M12x1	2 m, PVC cable, 4 wire <sup>2)</sup>	M12x1 4 pin connector, M12x1
Conductor cross section	0.5 mm <sup>2</sup>		0.5 mm <sup>2</sup>	

1) Measuring set-up: Piston speed 0.5 m/s; cylinder with O/D 46 mm, wall thickness 3 mm, operating width: Distance between on and off switch points.  
Switching hysteresis: Directionally dependent switch point shift

2) The PVC cable is oil, petrol and weather resistant, UV resistant, flame retardant (UD 1061/2464), flame resistant in the stated range and not subject to cold fracture.



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# FACTORY AUTOMATION

MAGNETIC FIELD SENSORS –

STEEL BECOMES TRANSPARENT

