



**Innovation  
right to the point.**

**Optical distance detection.  
Low cost and compact  
due to PMD technology.**



ifm electronic



**HERMES  
A W A R D  
2 0 0 5**

efector *pmd*  
Winner of the  
Hermes Award 2005.



Photoelectric sensors  
[www.ifm-electronic.com/pmd](http://www.ifm-electronic.com/pmd)





For industrial applications

# The new benchmark in distance detection.

Collision avoidance on an overhead conveyor: The **efector pmd** sensor monitors distances between products.

**efector pmd** in logistics: The sensor detects to what extent shelves are occupied.

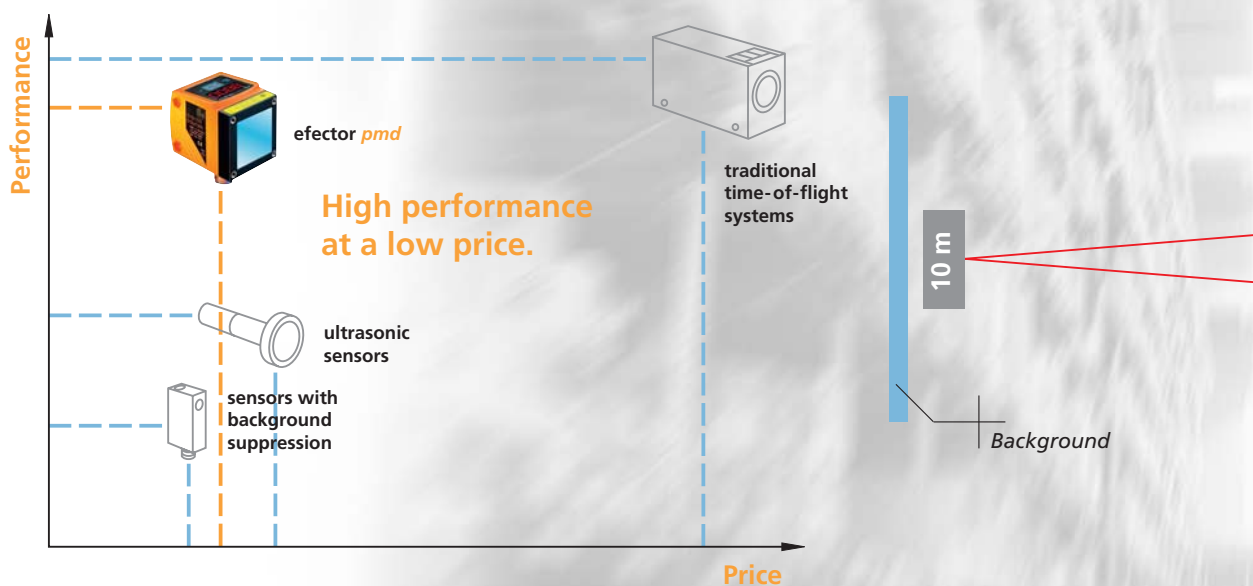


Collision avoidance



"Shelf occupied" detection

Optical sensors with background suppression and ultrasonic sensors are compact and low-cost alternatives for distance detection but have shorter ranges. Traditional time-of-flight systems offer an improved level of performance but are much higher in cost. The **efector pmd** sensor combines the advantages of these systems: range of 10 m at an extremely attractive price.





## Time-of-flight principle in PMD technology.

Distance detection using the **efector pmd** sensor:

Non-contact distance detection up to a range of 10 m.

PMD Smart Pixel with integrated signal evaluation.

Visible red light class II laser for easy alignment.

4-digit alphanumeric display.

Simple set-up, installed and adjusted within seconds.

2 adjustable switch points, switching and analogue outputs.

Robust and compact metal housing for industrial applications.

Excellent price / performance ratio.

The **efector pmd** laser sensor from ifm electronic is designed for distance detection to within a millimetre at high ranges.

It operates to the time-of-flight principle: The transmitted light takes a certain period of time to travel to the object and back to the sensor. This period of time is directly proportional to the distance travelled.

### PMD technology.

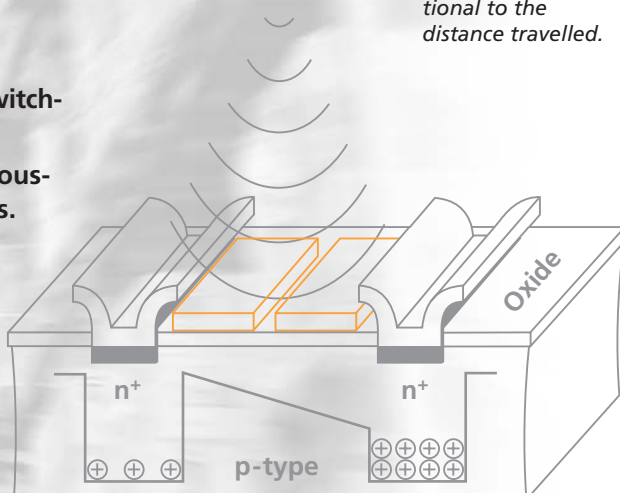
signal evaluation are integrated on a single silicon chip called a Photonic Mixer Device (PMD).

Advantage: This innovative design by ifm offers maximum performance in a compact, industrially compatible housing – at a fraction of the price of traditional systems.

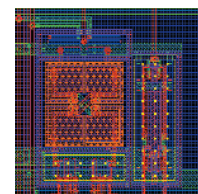
Traditional time-of-flight sensors use a photodiode as receiver element. Additional external electronics is used for signal acquisition and processing.

Disadvantage: This sensor design is expensive, large in size and therefore often not suitable for industrial position sensing.

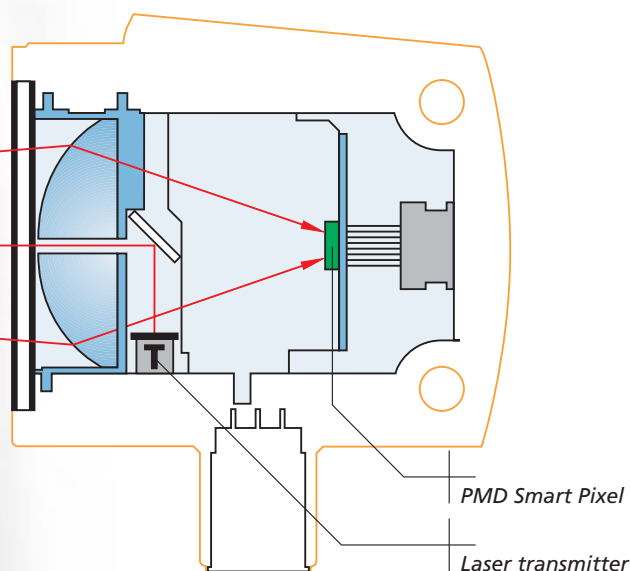
In comparison, the PMD sensor's receiver element is a "System-on-Chip" design. Both sensor element and electronics for



Schematic illustration of the PMD Smart Pixel. The charge distribution relates to the distance.

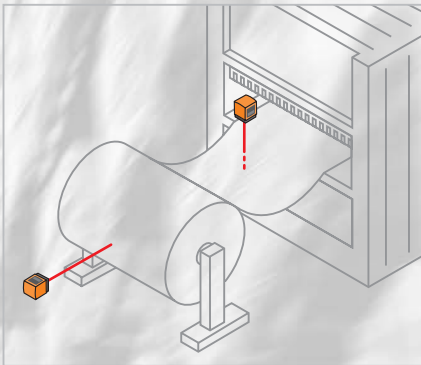


Heart of the innovative "Smart Pixel" receiver element – PMD.



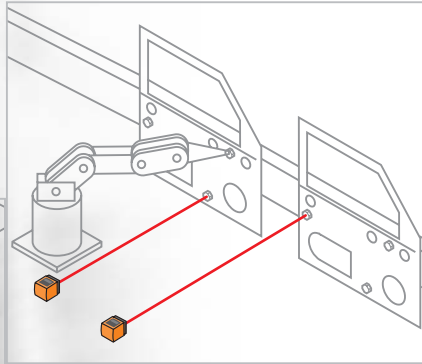


Developed for a broad range of applications.



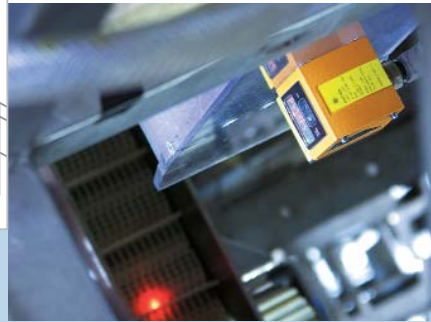
To monitor the position of an object in a continuous process, the sensor can be programmed to switch two separate outputs at preset distances. Typical application: web tension monitoring.

**Two switch points for more flexibility.**



The efector *pmd* sensor is used for detection with background suppression at distances up to 10 m. Thanks to the light spot size of only 6 mm the sensor accurately detects small objects such as a nut on a car panel.

**Long range background suppression.**



The efector *pmd* sensor can provide an analogue signal (4...20 mA) that is proportional to the object-to-sensor distance.

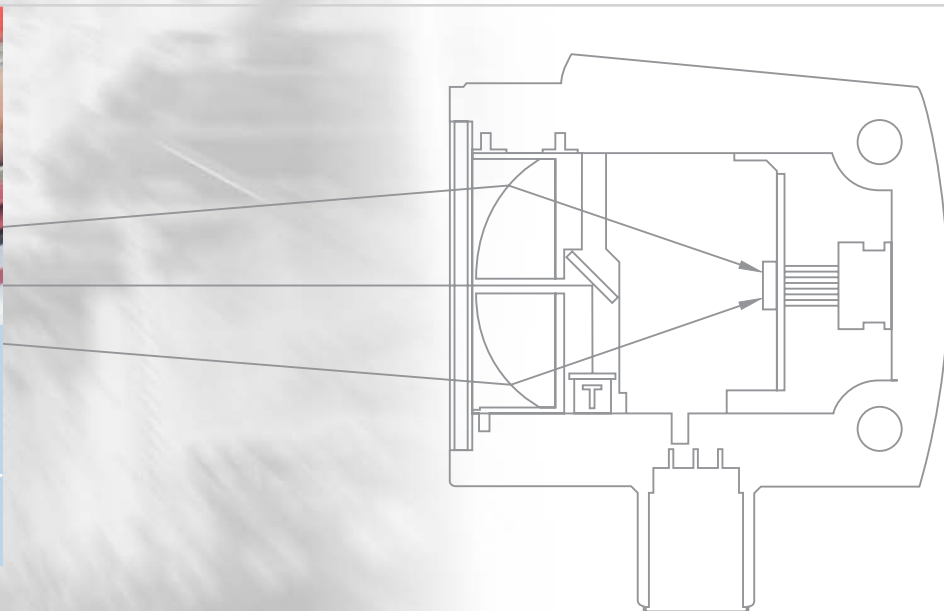
The analogue output can be scaled. An application for this is level monitoring as shown here at a portioning system.

**Absolute distance detection.**



The sensor's 4-digit alphanumeric display precisely indicates the measured distance. The parameters are simply set via pushbutton.

**Pushbutton set-up.**





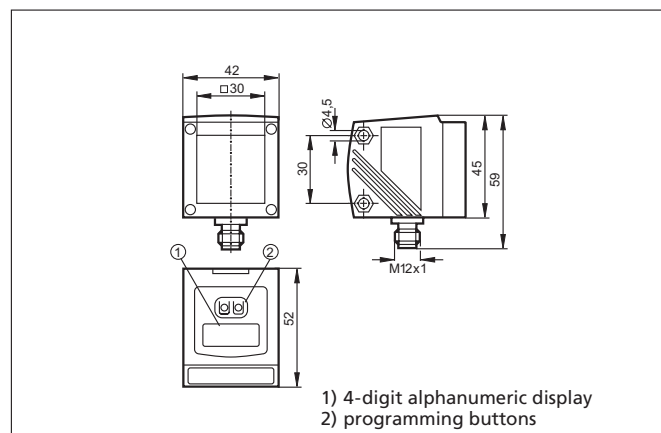
## Technical data efector *pmd* sensor

Application	Distance detection
Electrical design	DC PNP
Output 1	normally closed/open programmable
Output 2	normally closed/open programmable or analogue (4...20 mA, scaleable)
Measuring range [m]	0.2...10 (background suppression < 10...19)
Order no.	O1D100
Light source	visible laser light, laser protection class 2
Light spot diameter [mm]	6 (range max. 10 m)
Operating voltage [V]	10... 30 DC
Current consumption [mA]	< 150
Sampl. rate / switch. freq. [Hz]	max. 50, adjustable
Function display	
Switching status LED	2 x yellow
Operation LED	green
Programming options	normally closed/open, window function, analogue output
Distance value, programming	via a 4-digit alphanumeric display
Short-circuit protection, pulsed	•
Rev. polarity / overl. protection	•
EMC	EN 60947-5-2
Operating temperature [°C]	-10...60
Protection	IP 65 III
Material	housing: die-cast zinc; front pane: glass, LED window: polycarbonate
Connection	M12 connector

Measuring range [mm]	Repeatability* [mm]		Accuracy* [mm]	
	white (90 % remission)	grey (18 % remission)	white (90 % remission)	grey (18 % remission)
200...1,000	± 4	± 4.5	± 14	± 15
1,000...2,000	± 4.5	± 6	± 14.5	± 16
2,000...4,000	± 13.5	± 14.5	± 23.5	± 24
4,000...6,000	± 19	± 21	± 29	± 31
6,000...10,000	± 37	–	± 47	–

The values specified for repeatability and accuracy refer to a sampling frequency of 1 Hz. At a higher sampling frequency, which is adjustable on the unit, these values increase.

\* Values for constant ambient conditions, statistical error 3 Sigma



### Sockets

Description	Order no.
M12 socket, straight, 5 m orange, PVC cable	E10662
M12 socket, straight, 10 m orange, PVC cable	E10663
M12 socket, angled, 5 m orange, PVC cable	E10700
M12 socket, angled, 10 m orange, PVC cable	E10701

### Accessories

Description	Order no.
Mounting set	E2D101

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