



DMP Position finder

For accurate positioning in warehouse and conveying areas

SICK
Sensor Intelligence.

SENSICK DMP Position finder

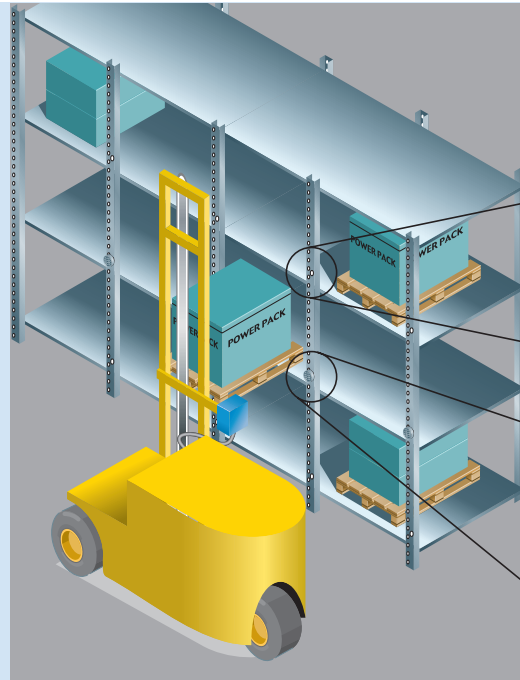
The DMP position finders are opto-electronic sensors used for fine positioning with millimetre precision, for example in warehouse and conveying areas.

At transfer and storage locations, movement in the steelwork caused by temperature and load variations make reliable positioning impossible. The DMP position finder has been developed in order to solve this problem. The sensors are specifically used for fine positioning in x- and y- directions.

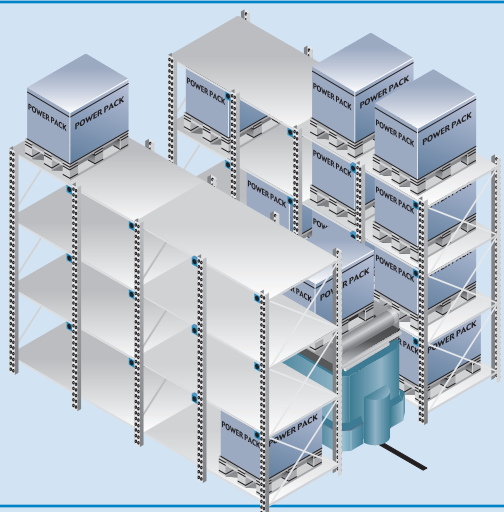
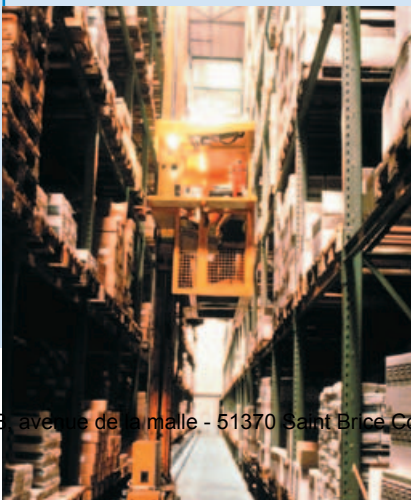
Industries and applications

> The DMP position finders are designed for applications reliant on extremely accurate transfer operations.

- For precise positioning of storage and retrieval units in high-bay warehouses,
- for automatic rail installation machines,
- for positioning of car elevators in automated car parks,
- for transfer stations between static and mobile handling transport systems,
- for the docking of driverless transport systems with pinpoint accuracy,
- many other applications.



> High-bay warehouses/
Storage and retrieval units



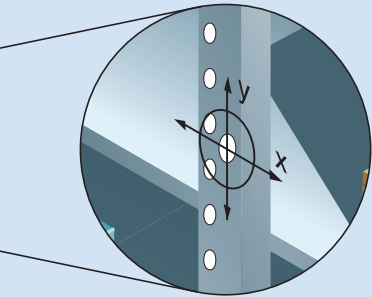
> Automated truck unloading





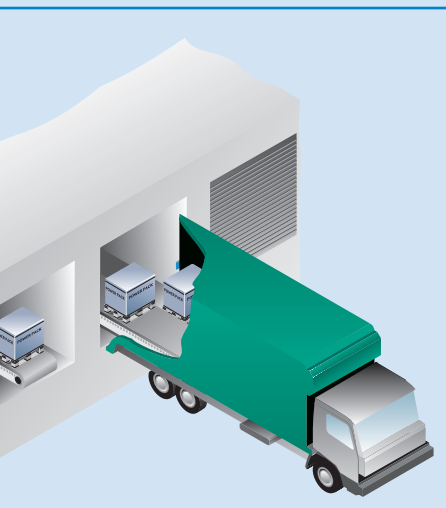
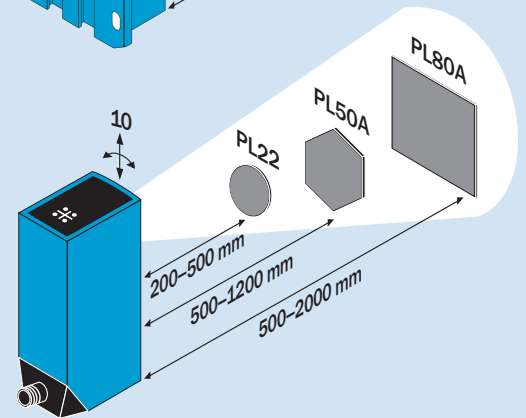
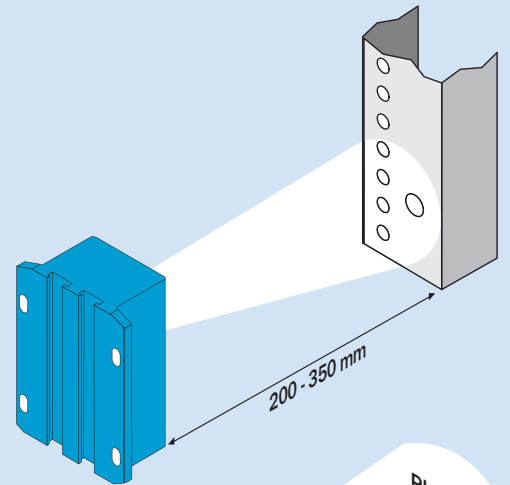
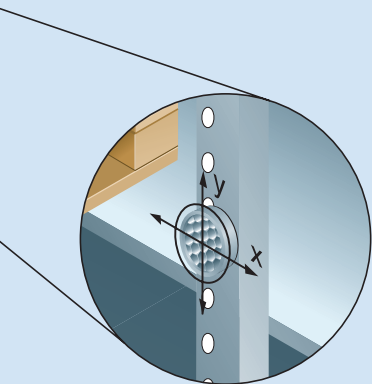
DMP3

The reflector-less DMP3 is recommended for working ranges from 200 to 350 mm. The device is a camera-based sensor for fine positioning on holes or coloured dots.

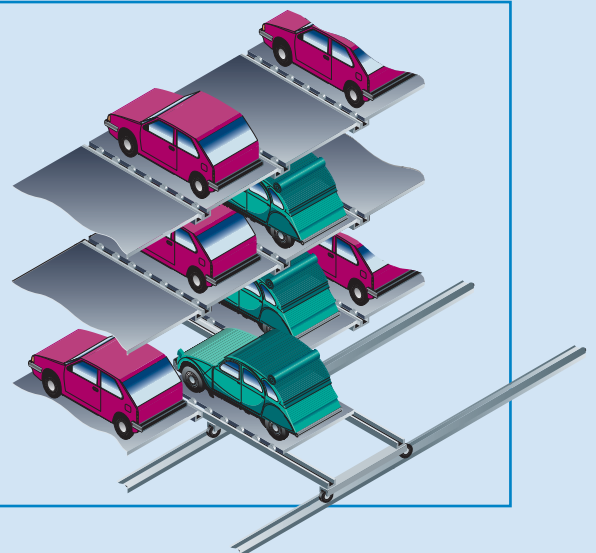


DMP2

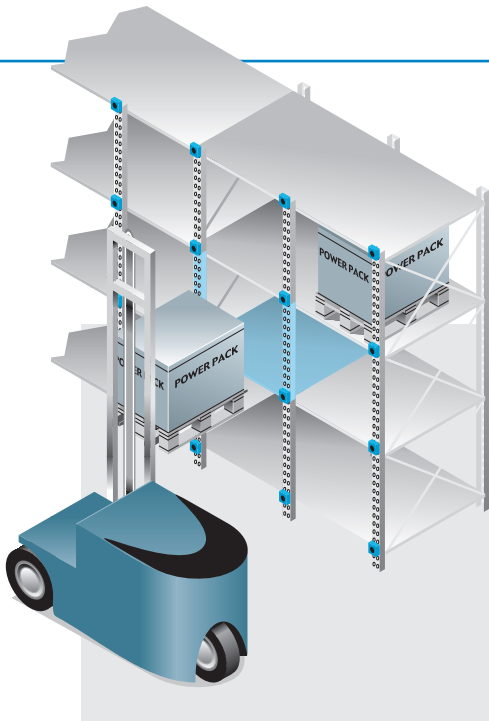
The DMP2 is used for greater working ranges up to 2000 mm. This sensor works with reflectors. Both devices always adapt to the current, actual conditions on site and thus enable secure entry and exit operations or even docking operations, with pinpoint accuracy.



> Automated parking systems

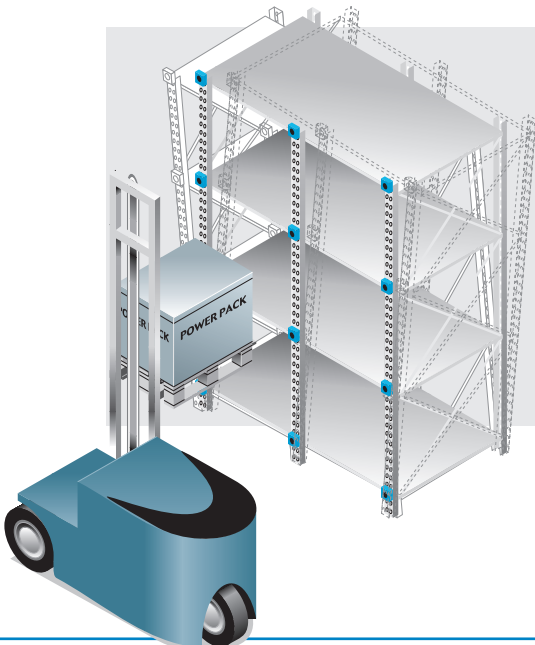


DMP3 and DMP2 Position finder – many advantages.



Direct target approach by fixed reference point or reflector.

The DMP3 orientates itself onto pre-taught holes or coloured dots in the storage system, identified by the camera-based sensor. The DMP2 uses reflectors attached to each storage bay.



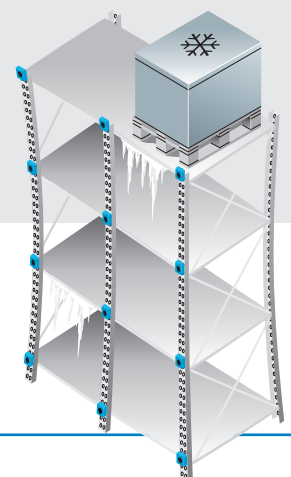
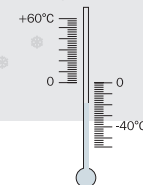
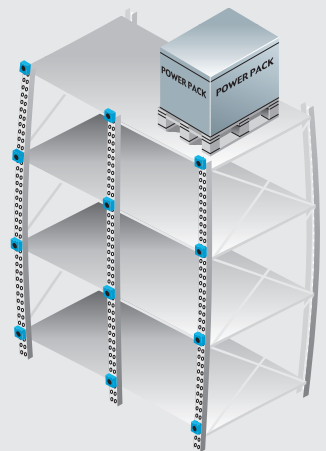
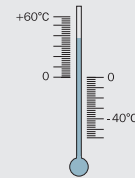
Compensation for tolerances in steel construction allow accurate positioning.

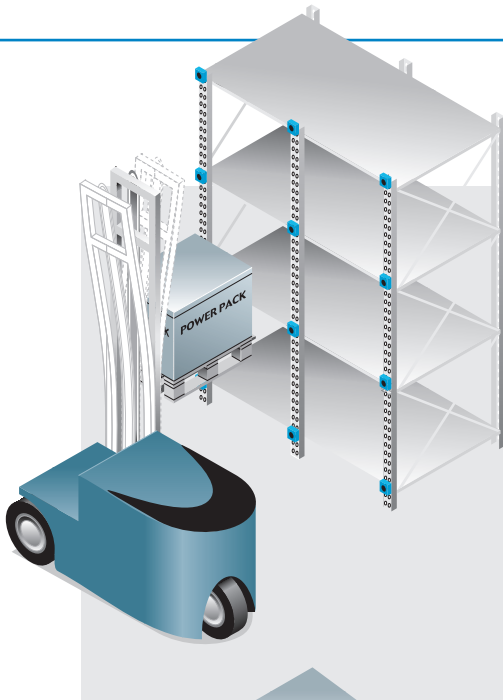
In high-bay storage bins, there can be tolerance-dependent storage measurements due to uneven warehouse floors in addition to material-dependent tolerances in the construction. These tolerances do not influence the accuracy of the DMP sensors.



Temperature-dependent tolerances do not have any influence on the positioning accuracy.

Temperature fluctuations can lead to changes in storage area dimensions, with loading and unloading operations becoming a non-calculable risk. The DMP sensors ensure reliable loading and unloading always based on the actual conditions.





Compensation is made for inconsistencies in the travel of the storage and retrieval unit caused by acceleration and deceleration.

Acceleration and deceleration of high-bay stackers involves variations of the mast which require compensation in the case of automatic positioning. The DMP sensors take these variations into account, thus ensuring reliable positioning of the goods.



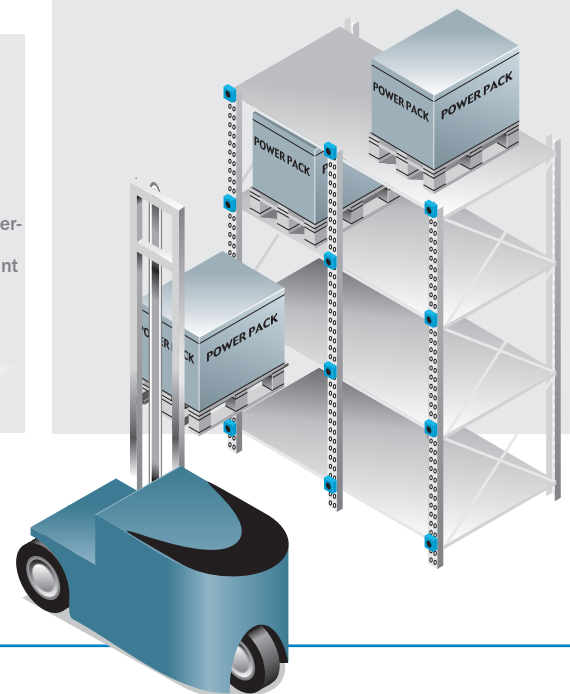
Increasing the degree of automation by using the DMP3s and DMP2s.

Even for constantly changing ambient conditions, the DMPs facilitate the precise selection of storage bays, and similar, and thus permit automatic loading and unloading sequences.



Changing location measurements caused by weight are compensated for.

The loading and unloading of pallets etc. generates weight-related tolerances in the storage area dimensions, which are rendered irrelevant when using the DMPs for positioning operations. The DMPs permit a space-saving and material-optimised bay construction.



DMP3 and DMP2 Position finder – Simple, in principle.

DMP3 and DMP2 operating principle

The DMP position finders are opto-electronic sensors with a two-dimensional receiver element and are used – following rough positioning – for optical, non-contact fine positioning of a handling unit or moving unit in x- and y- direction.

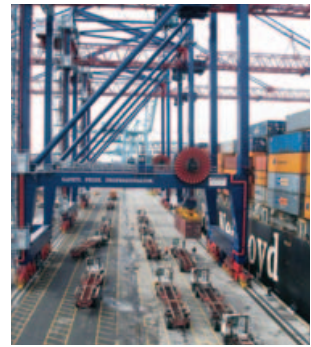


A position display with four LEDs simplifies alignment by providing a visual indication of the state of the switching outputs.



The basic principle – autocollimation

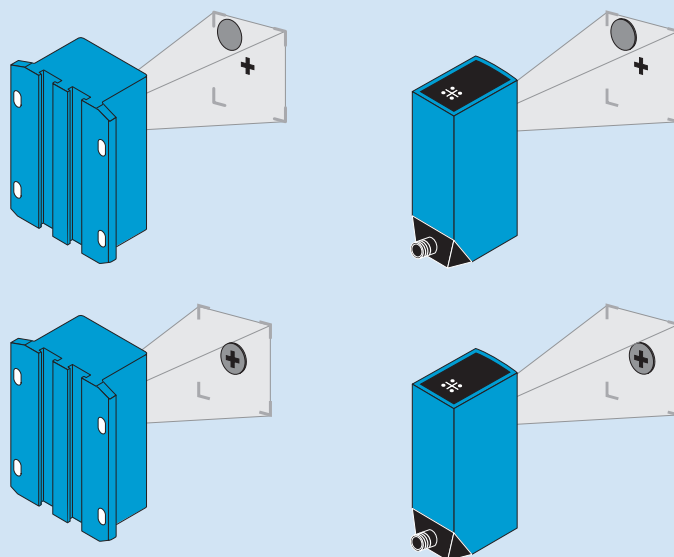
The DMP sensors operate according to the autocollimation principle: the light emitted by the sensor is reflected, in case of the DMP3, from the periphery of the hole, ie. the internal diameter, by a sticker or, in the case of the DMP2, by a reflector and mapped to the receiver array of the sensor. From this image, the position of the hole, sticker or reflector is determined.



FEATURES

	DMP3	DMP2
Light source	LED, infrared	Red light
Target/reference	Hole or coloured dot	Reflector
Range on hole/coloured dot	200 ... 350 mm	-
Scanning range with reflector PL22	-	200 ... 500 mm
Scanning range with reflector PL50A	-	500 ... 1.200 mm
Scanning range with reflector PL80A	-	500 ... 2.000 mm
Teach-in	Two different positions with Teach-in button	-
Scanning angle	$\pm 10^\circ$ in all axis	$\pm 10^\circ$ in all axis
	-	Vertical to the reflector
Supply voltage	18 ... 30 V DC	18 ... 30 V DC
Outputs	4 x Q (Q _{X'} , Q _{+X'} , Q _{Y'} , Q _{+Y'})	2 x Q _{Analogue} (Q _{AX'} , Q _{AY'}), 1 x Q _R /
	-	4 x Q (Q _{X'} , Q _{+X'} , Q _{Y'} , Q _{+Y'}), 1 x Q _R
	M12, 8-pin	M12, 8-pin
	(DMP2-compatible)	
Ambient temperature	-40 ... +50 °C with heating	-25 ... +55 °C
Enclosure rating	IP 54	IP 67

The handling or transfer unit is moved until the centre point of the reflected light is in the middle of the receiver array. This operation leads to the fine positioning required, and the load handling can begin.

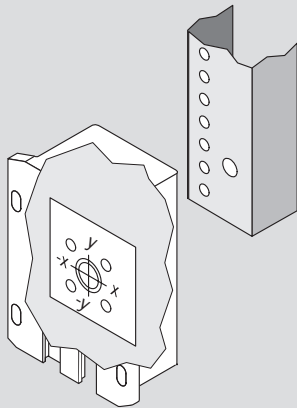


DMP3 and DMP2 Position finder – Connections made easy.

Switching output and crosshairs

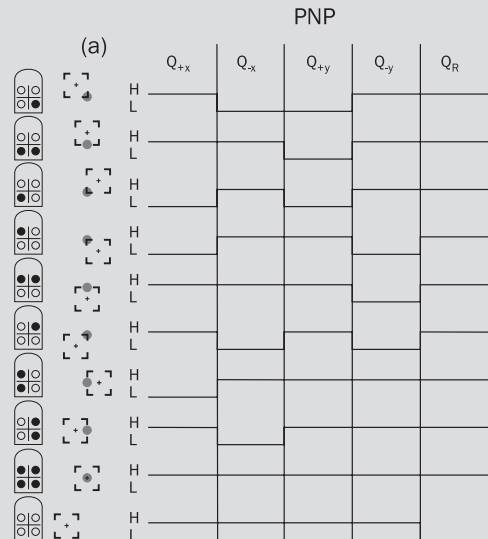
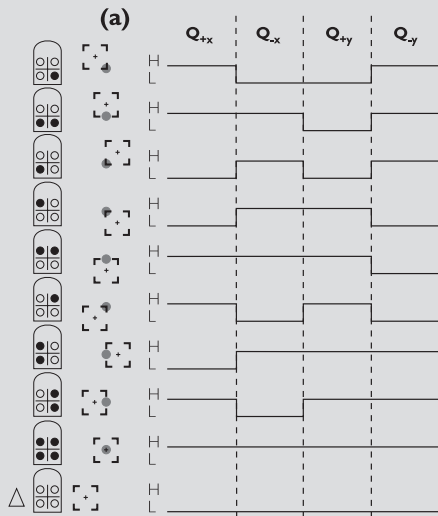
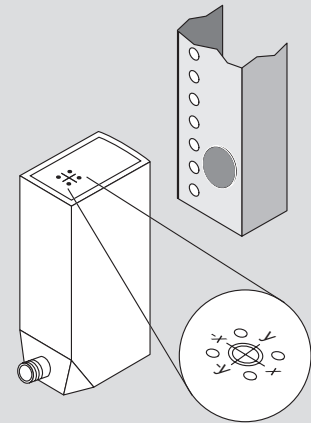
The four LEDs in the crosshairs of the DMP3 significantly simplify positioning. Moreover, the corresponding switching behaviour of the switching outputs Q_{+x} , $Q_{+x'}$, Q_{-y} and Q_{+y} can be easily read.

DMP3



Toleranzbereich Tolerance	 $Q_{+x} = 1$ $Q_{-x} = 0$ $Q_{+y} = 0$ $Q_{-y} = 1$	 $Q_{+x} = 1$ $Q_{-x} = 1$ $Q_{+y} = 0$ $Q_{-y} = 1$	 $Q_{+x} = 0$ $Q_{-x} = 1$ $Q_{+y} = 0$ $Q_{-y} = 1$
	 $Q_{+x} = 1$ $Q_{-x} = 0$ $Q_{+y} = 1$ $Q_{-y} = 1$	 $Q_{+x} = 1$ $Q_{-x} = 1$ $Q_{+y} = 1$ $Q_{-y} = 1$	 $Q_{+x} = 0$ $Q_{-x} = 1$ $Q_{+y} = 1$ $Q_{-y} = 1$
	 $Q_{+x} = 1$ $Q_{-x} = 0$ $Q_{+y} = 1$ $Q_{-y} = 0$	 $Q_{+x} = 1$ $Q_{-x} = 1$ $Q_{+y} = 1$ $Q_{-y} = 0$	 $Q_{+x} = 0$ $Q_{-x} = 1$ $Q_{+y} = 1$ $Q_{-y} = 0$
	Toleranzbereich Tolerance		

DMP2





From rough to fine positioning

The handling or transfer unit is repositioned by the central control system ensuring it is in the detection range of the DMP. Following this rough positioning, the DMP position finder takes over the fine control of the drives until the final position is reached.

DMP3

– with switching output (Q_{-X} , Q_{+X} , Q_{-Y} , Q_{+Y})

Two switching outputs for the x- and two for the y-axis continuously report the relative distance of the hole/sticker from the centre of the receiver array.

DMP2

– with analogue (Q_{AX} , Q_{AY}) and switching output (Q , Q_R)

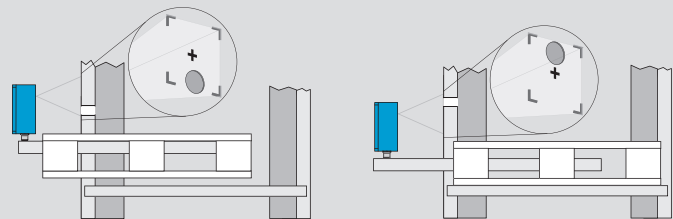
One analogue output for the x- and one for the y-axis continuously reports the relative distance of the reflectors from the centre of the receiver array. The switching output Q switches as soon as the reflector is in the detection range of the DMP (reflector detected). The switching output Q_R switches when the reflector is mapped in the centre of the receiver array (“correct position”).

– with switching output (Q_{-X} , Q_{+X} , Q_{-Y} , Q_{+Y} , Q_R)

Two switching outputs for the x- and two for the y-axis continuously report the relative distance of the reflector from the centre of the receiver array. The switching output Q_R switches when the reflector is mapped in the centre of the receiver array (“correct position”).

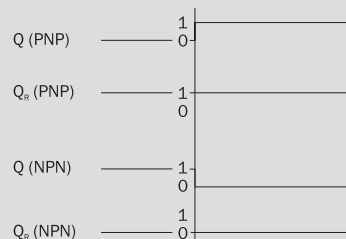
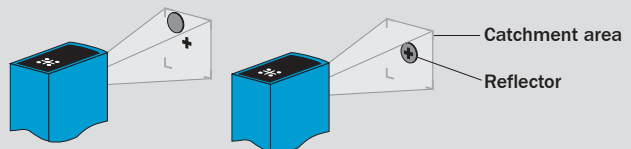
DMP3 – Teach-in for two different target positions

The DMP3 offers an additional feature: two different positions can be taught in within the detection range: thus, loading and unloading of the storage bay can be performed even more accurately.



DMP2 – with analogue (Q_{RX} , Q_{RY}) and switching output (Q , Q_R)

The behaviour of the outputs Q (= “correct position”) or Q_R (= “reflector detected”) each for PNP or NPN.



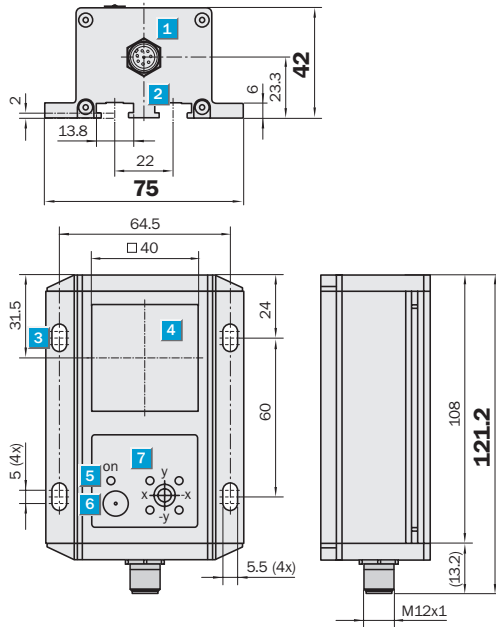
DMP3 Position finder with switching outputs

Scanning range
200 ... 350 mm

Position finder

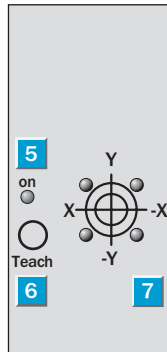
- Four switching outputs
- Integrated evaluation
- Simple operation
- Teach-in: two different positions

Dimensional drawing



Adjustments possible

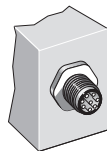
DMP3-xxxx



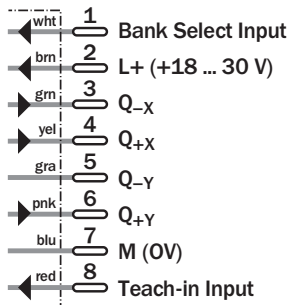
- 1 Connection plug M12, 8-pin
- 2 T-rail for mounting
- 3 Fixing hole
- 4 Optical axis
- 5 LED green, power indicator
- 6 Teach button
- 7 Four LEDs, position indicator

Connection type

DMP3-xxxx



8-pin, M12



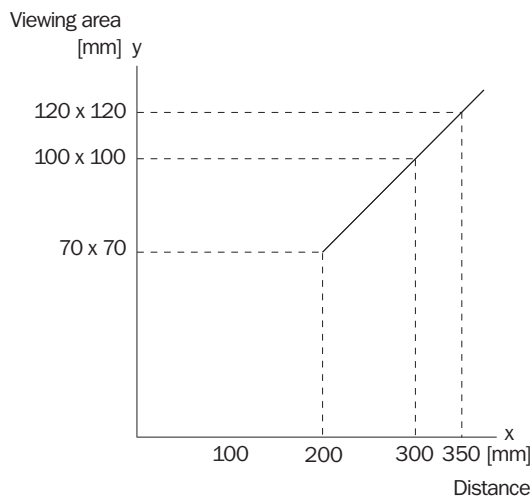
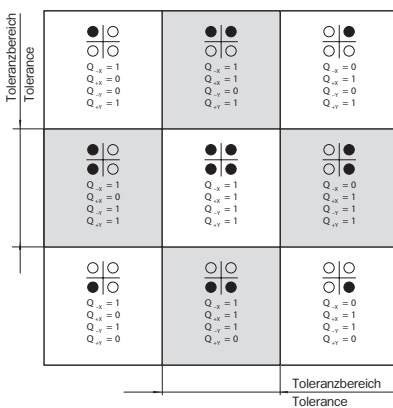
Accessories

Cable receptacle

Technical data		DMP3-	B1111	B1211							
Scanning range	200 ... 350 mm (Hole diameter 10 ... 20 mm)										
Repetition accuracy RW	0.15 mm (at 300 mm RW)										
Scanning angle	± 10°										
Light sender, light source	LED, infrared, Class 1M										
Supply voltage V_s ¹⁾	18 ... 30 V DC										
Ripple ²⁾	< 5 V _{pp}										
Current consumption ³⁾	< 250 mA										
Current consumption with heating	< 1.3 A										
Switching outputs	HIGH = $V_s - \leq 2$ V/LOW ≤ 2 V										
Operating mode	Permanent										
Teach-in Input											
Active	> 7 V ... < V_s max										
Inactive	0 V ... < 2 V or unconnected										
Bank Select Input											
Bank 1	0 V ... < 2 V or unconnected										
Bank 2	> 7 V ... < V_s max										
Output current I_a max.	100 mA total										
Switching frequency	20/s										
Connection type	M12 plug, 8-pin										
VDE protection class	⚡										
Enclosure rating	IP 54										
Ambient temperature ⁴⁾	Operation: 0 ... +50 °C without heating Operation: -40 ... +50 °C with heating Storage: -40 ... +70 °C										
Shock resistance	According to IEC 68										
Weight	Approx. 450 g										
Housing material	Aluminium/zinc die-cast										

1) Limit values, reverse-polarity protected 4) Do not bend cable below 0 °C
 2) Must be within V_s tolerances
 3) Without load

Switching states	Viewing area	Order information
		Type
		DMP3-B1111
		DMP3-B1211
		Order no.
		1042918
		1042919



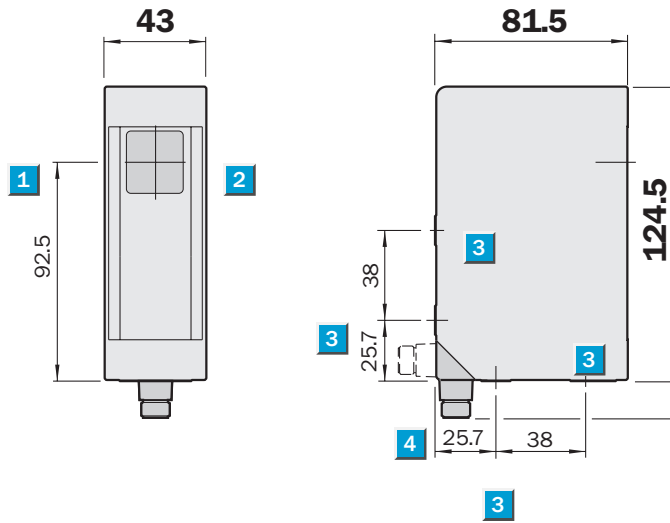
DMP2 Position finder with switching outputs

Scanning range
200 ... 2000 mm

Position finder

- Five switching outputs
- Integrated software
- Simple operation

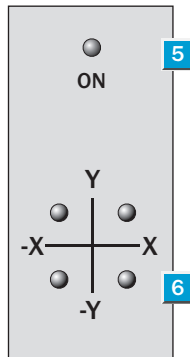
Dimensional drawing



Adjustments possible

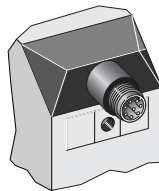
DMP2-P21111
DMP2-N21111

- 1 Middle of the optic axis
- 2 Receiver
- 3 Threaded mounting hole M6, 8 mm deep
- 4 Connection plug M12, 8-pin, 90° rotatable
- 5 Power indicator
- 6 Alignment aid

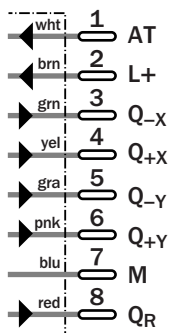


Connection type

DMP2-P21111
DMP2-N21111



8-pin, M12



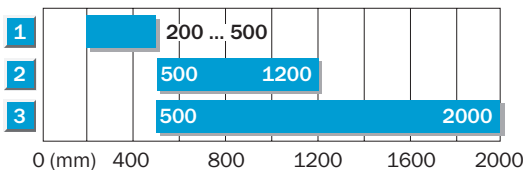
Accessories

Cable receptacle
Reflectors

Technical data		DMP2	-P	-N								
			21111	21111								
Scanning range	200 ... 2,000 mm (depending on reflector)											
Repetition accuracy RW	0.15 mm (at 300 mm RW)											
Scanning angle	± 10° in all axis vertical to the reflector (PL22, PL50A, PL80A)											
Light sender ¹⁾, light source	LED, red light											
Supply voltage V_s ²⁾	18 ... 30 V DC											
Ripple ³⁾	< 5 V _{pp}											
Current consumption ⁴⁾	< 250 mA											
Switching outputs	PNP: HIGH = V _s - ≤ 2 V/LOW = 0 V NPN: HIGH = V _s /LOW ≤ 2 V											
Operating mode	Permanent or synchronized can be selected											
Blanking input AT												
Blanked (triggered)	PNP: > 18 V ... < V _s max. NPN: 0 V ... V _s (≥ 18 V)											
Free-running	PNP: < 2 V or unconnected NPN: V _s - (≤ 2 V) or unconnected											
Output current I_A max.	100 mA											
Switching frequency ⁵⁾	250/s											
Response time ⁶⁾	3 ms											
Connection type	M12 plug, 8-pin											
VDE protection class ⁷⁾	□											
Circuit protection	A, B, C											
Enclosure rating	IP 67											
Ambient temperature ⁸⁾	Operation -25 ... +55 °C Storage -25 ... +75 °C											
Shock resistance	According to IEC 68											
Weight	Approx. 990 g											
Housing material	Zinc											

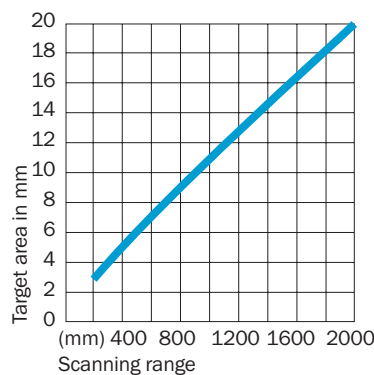
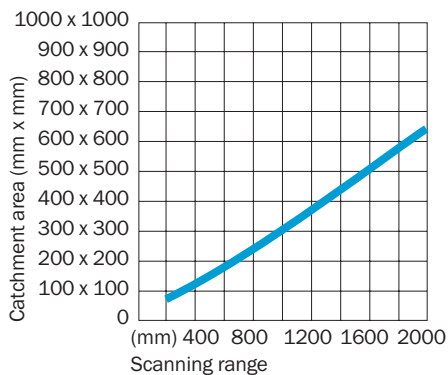
1) Average service life 100,000 h (at T_A = 25 °C)
 2) Limit values, reverse-polarity protected
 3) Must be within V_s tolerances
 4) Without load
 5) With light/dark ratio 1 : 1, no time delay
 6) With resistive load
 7) Reference voltage 50 V DC
 8) Do not bend cable below 0 °C

Scanning range **Order information**



- 1 Scanning range on reflector PL22
- 2 Scanning range on reflector PL50A
- 3 Scanning range on reflector PL80A

Type	Order no.
DMP2-P21111	1016237
DMP2-N21111	1016238



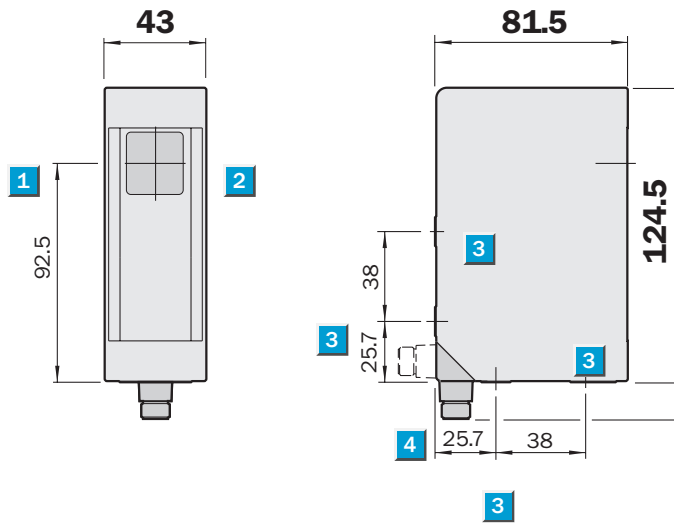
Toleranzbereich	Tolerance			
● ○	○ ○	● ●	○ ○	○ ●
Q ₁ = 1	Q ₂ = 1	Q ₃ = 1	Q ₄ = 1	Q ₅ = 0
Q ₆ = 0	Q ₇ = 0	Q ₈ = 1	Q ₉ = 0	Q ₁₀ = 1
Q ₁₁ = 0	Q ₁₂ = 1	Q ₁₃ = 1	Q ₁₄ = 0	Q ₁₅ = 0
○ ○	○ ○	● ●	○ ○	○ ●
Q ₁₆ = 1	Q ₁₇ = 1	Q ₁₈ = 1	Q ₁₉ = 1	Q ₂₀ = 0
Q ₂₁ = 0	Q ₂₂ = 0	Q ₂₃ = 1	Q ₂₄ = 1	Q ₂₅ = 1
Q ₂₆ = 1	Q ₂₇ = 1	Q ₂₈ = 1	Q ₂₉ = 0	Q ₃₀ = 0
○ ○	○ ○	● ●	○ ○	○ ●
Q ₃₁ = 1	Q ₃₂ = 1	Q ₃₃ = 1	Q ₃₄ = 1	Q ₃₅ = 0
Q ₃₆ = 0	Q ₃₇ = 0	Q ₃₈ = 1	Q ₃₉ = 1	Q ₄₀ = 1
Q ₄₁ = 1	Q ₄₂ = 1	Q ₄₃ = 1	Q ₄₄ = 0	Q ₄₅ = 0

Scanning range
200 ... 2000 mm

Position finder

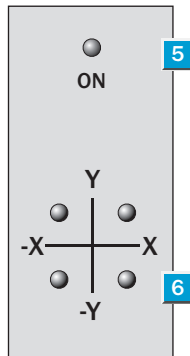
- Two analogue outputs (for x- and y-direction)
- Two switching outputs
- Integrated software
- Simple operation

Dimensional drawing



Adjustments possible

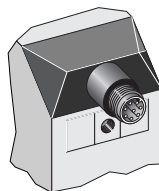
DMP2-P11111
DMP2-N11111



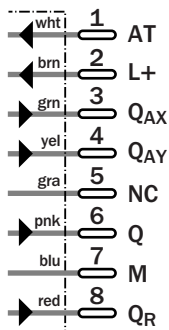
- 1 Middle of the optic axis
- 2 Receiver
- 3 Threaded mounting hole M6, 8 mm deep
- 4 Connection plug M12, 8-pin, 90° rotatable
- 5 Power indicator
- 6 Alignment aid

Connection type

DMP2-P11111
DMP2-N11111



8-pin, M12



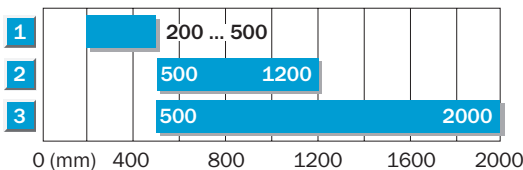
Accessories

Cable receptacle
Reflectors

Technical data		DMP2	-P	-N								
			11111	11111								
Scanning range	200 ... 2,000 mm (depending on reflector)											
Repetition accuracy RW	0.15 mm (at 300 mm RW)											
Scanning angle	± 10° in all axis vertical to the reflector (PL22, PL50A, PL80A)											
Light sender ¹⁾ , light source	LED, red light											
Supply voltage V_S ²⁾	18 ... 30 V DC											
Ripple ³⁾	< 5 V _{PP}											
Current consumption ⁴⁾	< 250 mA											
Switching outputs	PNP: HIGH = V _S - ≤ 2 V/LOW = 0 V NPN: HIGH = V _S /LOW ≤ 2 V											
Operating mode	Permanent or synchronised can be selected											
Blanking input AT												
Blanked (triggered)	PNP: > 18 V ... < V _S max. NPN: 0 V ... V _S (≥ 18 V)											
Free-running	PNP: < 2 V or unconnected NPN: V _S - (≤ 2 V) or unconnected											
Output current I_A max.	100 mA											
Analogausgang ⁵⁾	4 mA ... 20 mA (within catchment area) 3 mA (external to the catchment area)											
Switching frequency	250/s											
Response time	3 ms											
Connection type ⁶⁾	M12 plug, 8-pin											
VDE protection class ⁷⁾	<input type="checkbox"/>											
Circuit protection ⁸⁾	A, B, C											
Enclosure rating	IP 67											
Ambient temperature ⁹⁾	Operation: -25 ... +55 °C Storage: -25 ... +75 °C											
Shock resistance	According to IEC 68											
Weight	Approx. 990 g											
Housing material	Zinc											

1) Average service life 100,000 h (at T_A = 25 °C)
 2) Limit values, reverse-polarity protected
 3) Must be within V_S tolerances
 4) Without load
 5) With R_{L max.} = 700 Ω
 6) With light/dark ratio 1 : 1, no time delay
 7) With resistive load
 8) Reference voltage 50 V DC
 9) Do not bend cable below 0 °C

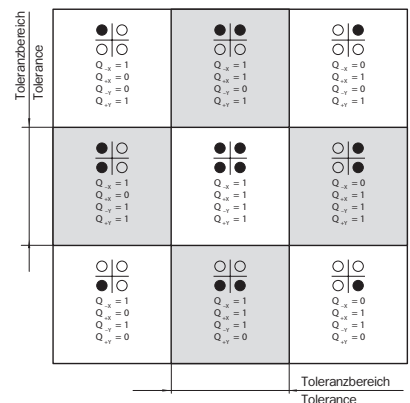
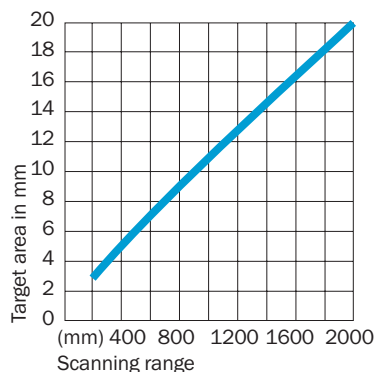
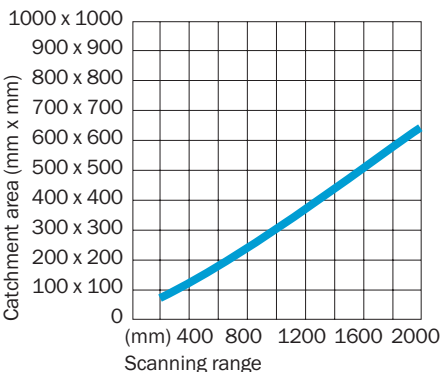
Scanning range



- 1 Scanning range on reflector PL22
- 2 Scanning range on reflector PL50A
- 3 Scanning range on reflector PL80A

Order information

Type	Order no.
DMP2-P11111	1016235
DMP2-N11111	1016236



Australia

Phone +61 3 9497 4100
1800 33 48 02 - tollfree
E-Mail sales@sick.com.au

Belgium/Luxembourg

Phone +32 (0)2 466 55 66
E-Mail info@sick.be

Brasil

Phone +55 11 3215-4900
E-Mail sac@sick.com.br

Ceská Republika

Phone +420 2 57 91 18 50
E-Mail sick@sick.cz

China

Phone +852-2763 6966
E-Mail ghk@sick.com.hk

Danmark

Phone +45 45 82 64 00
E-Mail sick@sick.dk

Deutschland

Phone +49 211 5301-250
E-Mail info@sick.de

España

Phone +34 93 480 31 00
E-Mail info@sick.es

France

Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Great Britain

Phone +44 (0)1727 831121
E-Mail info@sick.co.uk

India

Phone +91-22-4033 8333
E-Mail info@sick-india.com

Israel

Phone +972-4-999-0590
E-Mail info@sick-sensors.com

Italia

Phone +39 02 27 43 41
E-Mail info@sick.it

Japan

Phone +81 (0)3 3358 1341
E-Mail support@sick.jp

Nederlands

Phone +31 (0)30 229 25 44
E-Mail info@sick.nl

Norge

Phone +47 67 81 50 00
E-Mail austefjord@sick.no

Österreich

Phone +43 (0)22 36 62 28 8-0
E-Mail office@sick.at

Polska

Phone +48 22 837 40 50
E-Mail info@sick.pl

Republic of Korea

Phone +82-2 786 6321/4
E-Mail kang@sickkorea.net

Republika Slovenija

Phone +386 (0)1-47 69 990
E-Mail office@sick.si

România

Phone +40 356 171 120
E-Mail office@sick.ro

Russia

Phone +7 495 775 05 34
E-Mail info@sick-automation.ru

Schweiz

Phone +41 41 619 29 39
E-Mail contact@sick.ch

Singapore

Phone +65 6744 3732
E-Mail admin@sicksgp.com.sg

Suomi

Phone +358-9-25 15 800
E-Mail sick@sick.fi

Sverige

Phone +46 10 110 10 00
E-Mail info@sick.se

Taiwan

Phone +886 2 2375-6288
E-Mail sickgrc@ms6.hinet.net

Türkiye

Phone +90 216 587 74 00
E-Mail info@sick.com.tr

USA/Canada/México

Phone +1(952) 941-6780
1 800-325-7425 - tollfree
E-Mail info@sickusa.com

More representatives and agencies
in all major industrial nations at
www.sick.com

SICK

Sensor Intelligence.