



DMP: Position finders ensure precise fine positioning in warehousing and handling systems



Light emitted from the DMP and reflected by a reflector is centred in the middle of the receiver field by adjusting the handling unit on which the DMP is mounted.

Switching outputs and analogue outputs (depending on the device variant), one for the x-axis and one for the y-axis, provide the required control information.

When the light distribution is concentrated at the centre of the receiver array, fine positioning has been completed successfully and

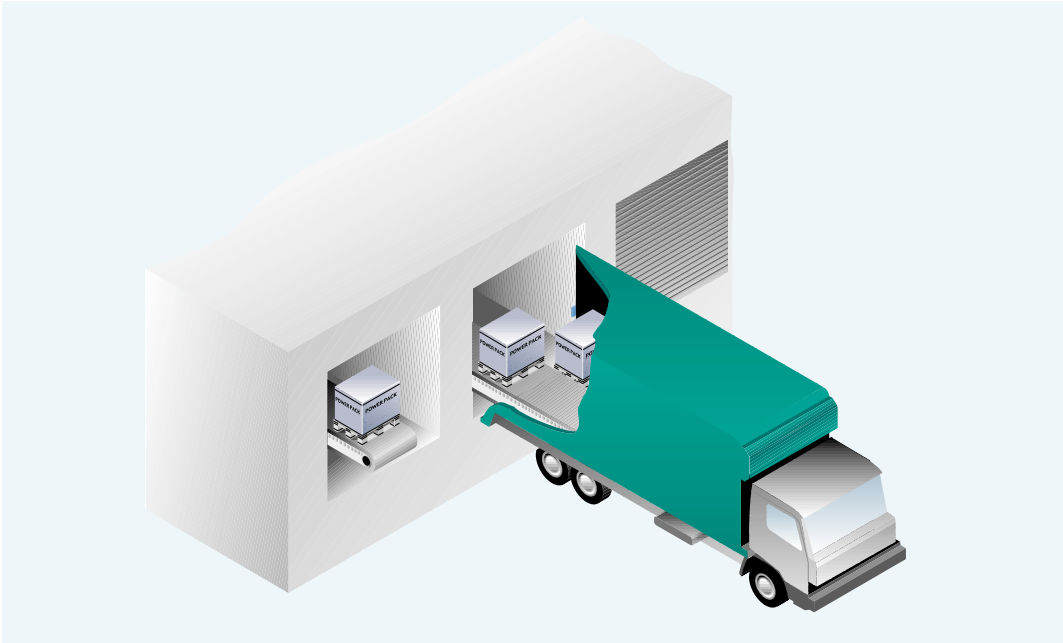
load handling can begin. The device is available for the following scanning ranges (depending on the type of reflector used):

- 200 mm – 500 mm (PL 22)
- 500 mm – 1,200 mm (PL 50 A) and
- 500 mm – 2,000 mm (PL 80 A).

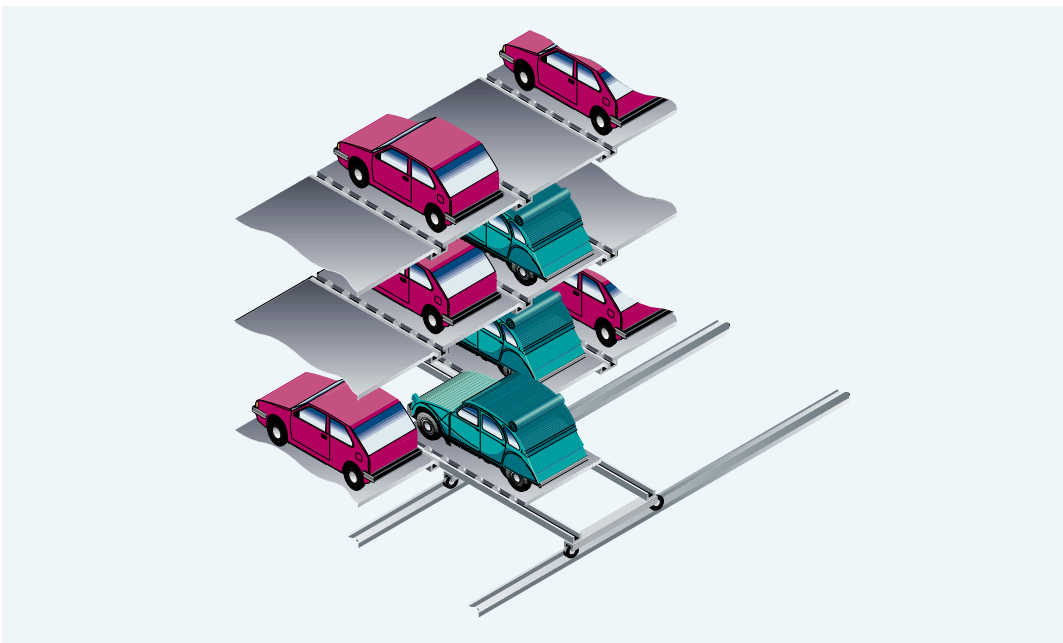
Problems can often arise during positioning procedures in warehousing and handling systems, such as transfer or docking stations. Geometrical conditions may change as a result of variables dependent on temperature, load or even steel structures. This makes reliable automatic positioning difficult and frequently even impossible.

The DMP position finder solves this problem. The device is based on a new technology which measures the distribution of light over a 32 x 32 bit receiver array.

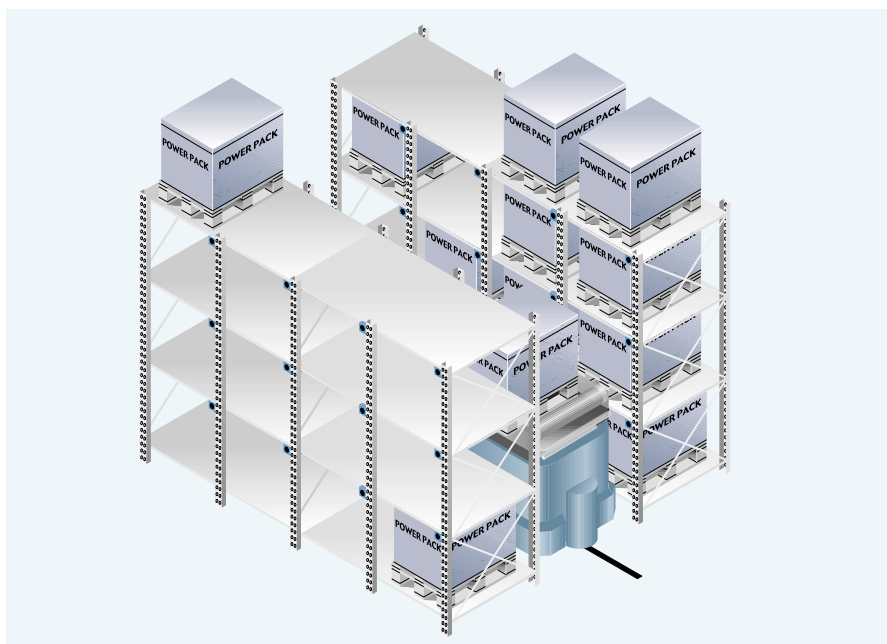
► Docking transport vehicles at loading ramps being unloaded automatically using handling vehicles – no longer a dream of the future. The DMP ensures positioning with millimetre precision.



► The DMP used to ensure precise positioning so that vehicles in automatic car parks are placed in their parking space safely and with millimetre accuracy.



► Handling vehicles usually approach high-bay storage racks fully automatically. The DMP provides pin-point positioning to ensure that they reach their destination accurately.



	Scanning range 200...2000 mm
	Position finders

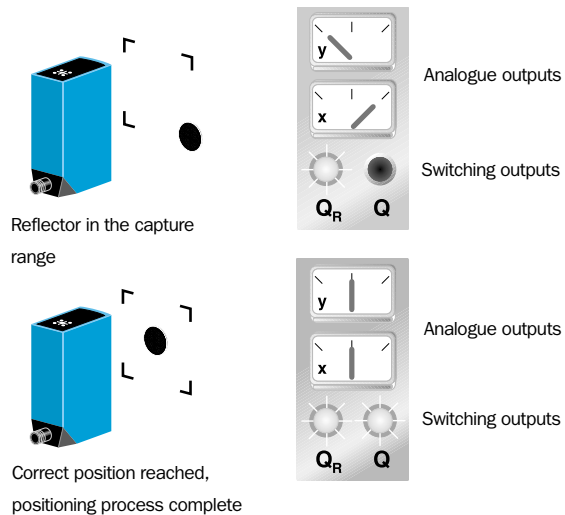
Principle of operation

Based on a new technology, a two-dimensional receiver array allows fine positioning in both the x- and y-axis. The device works on the auto-collimation principle. The transmission light emitted by the DMP is returned by the reflector and mapped on the receiver-array. The position of the reflector is determined from this image. The reflected light is concentrated in the centre of the receiver-array, by tracking the handling unit. This process creates the required fine positioning and the load handling can begin.

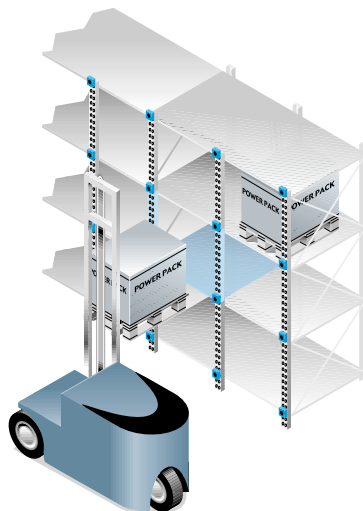
The handling unit is pre-positioned via the central control unit in the capture range (visual range) of the DMP, in which the reflector is detected by the DMP. After rough positioning, the DMP can then be used to control the drives for fine positioning up to the final position. Two analogue outputs are available for fine positioning, one for the x- and one for the y-axis, and two switching outputs (Q_R "reflector detected", Q "correct position"). The relative distance of the reflector to the middle point of the receiver array, is continually signalled by the analogue outputs.

The switching output Q_R switches as soon as the reflector is mapped in the capture range (visual range) of the DMP (→ "reflector detected").

The switching output Q switches as soon as the reflector is mapped in the centre of the receiver array (→ "correct position").

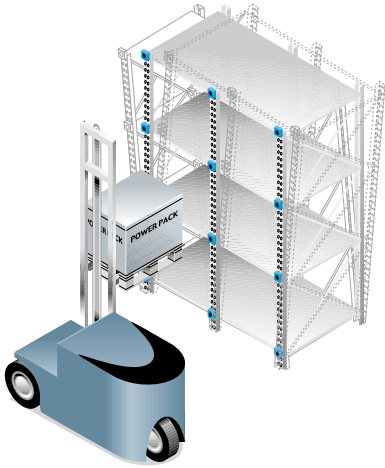


Advantage 1



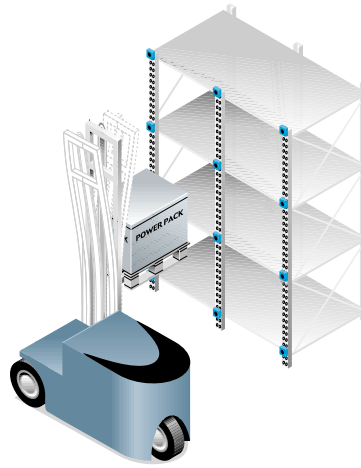
◀ The target can be directly approached using the stationary reflector, attached to each shelf, as a reference point.

Advantage 2



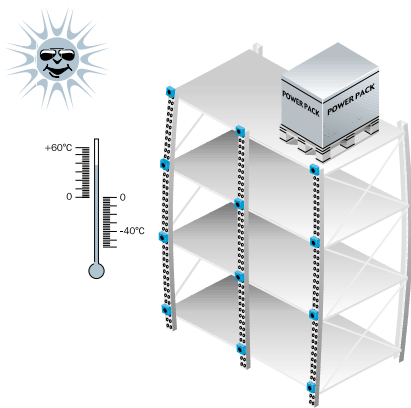
◀ Tolerances in the steel structure have no effect on positioning accuracy.

Advantage 3

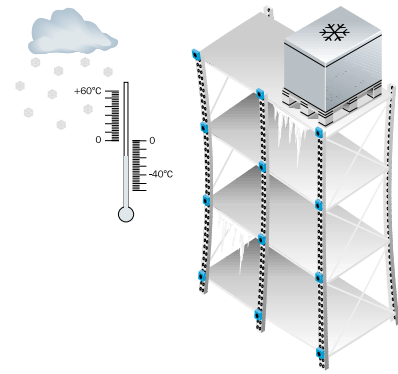


◀ There are no problems from mast fluctuations, which occur when high-bay stackers accelerate and decelerate.

Advantage 4

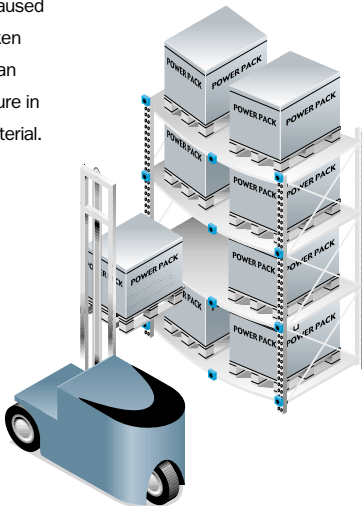


◀ Tolerance changes caused by fluctuations in temperature have no influence on positioning accuracy. ▶



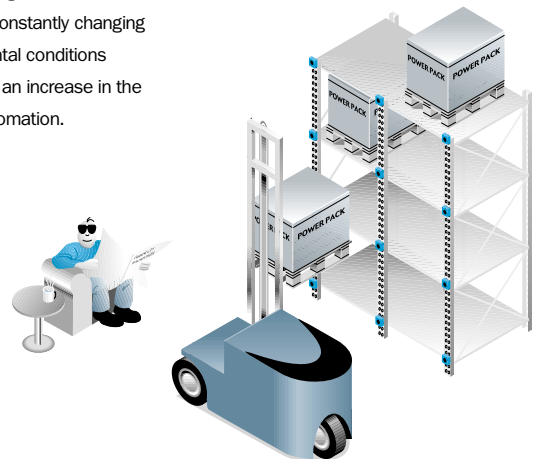
Advantage 5

▶ Tolerance changes caused by varying loads are taken into account and allow an optimum racking structure in terms of space and material.




Advantage 6

▶ Precise control of rack shelves using the DMP, even with constantly changing environmental conditions – results in an increase in the level of automation.



DMP Position finders with switching outputs

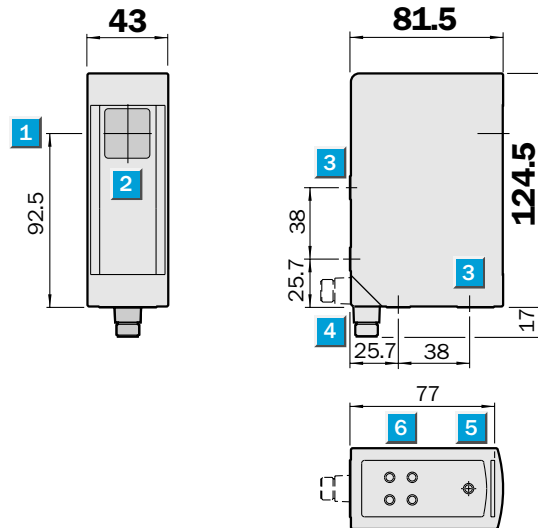

Scanning range
 200...2000 mm

Position finders

- Five switching outputs
- Integrated software
- Simple adjustment



Dimensional drawing

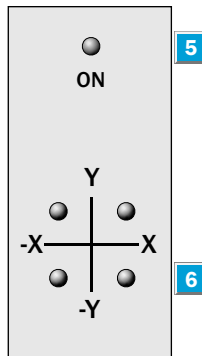


Adjustments possible

DMP 2-P21111

DMP 2-N21111

- 1** Centre of optical axis, sender/receiver
- 2** Receiver array
- 3** Mounting hole M6 threaded, 8 mm deep
- 4** 8-pin, M 12 plug, rotatable through 90°
- 5** Operating signal
- 6** Alignment aid



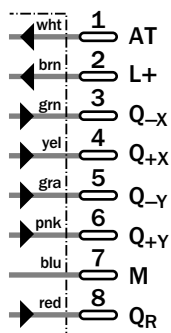
Connection type

DMP 2-P21111

DMP 2-N21111



8-pin, M 12

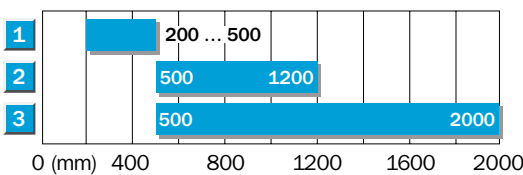


Accessories	page
Cable receptacles	496
Reflectors	520

Technical Data		DMP 2-	P 21111	N 21111										
Scanning range	200 ... 2000 mm (dependent on reflector)													
Repeat accuracy	0.15 mm (at 300 mm scanning range)													
Scanning angle	± 10° in all axes vertical to the reflector (PL 22, PL 50 A, PL 80 A)													
Light source¹⁾, light type	LED, red light													
Supply voltage V_S²⁾	18 ... 30 V DC													
Ripple ³⁾	< 5 V _{SS}													
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													
Blanking input AT														
Blanked (triggered)	PNP: > 18 V ... < V _S max. NPN: 0 V ... V _S (≥ 18 V)													
Free-running	PNP: < 2 V or unswitched NPN: V _S - (≤ 2 V) or unswitched													
Output voltage I_A max.	100 mA													
Switching frequency⁵⁾	250/s													
Response time⁶⁾	3 ms													
Connection type	8-pin, M 12 plug													
VDE protection class⁷⁾	□													
Circuit protection⁸⁾	A, B, C													
Enclosure rating	IP 67													
Ambient temperature T_A⁹⁾														
Operation	- 25 °C ... + 55 °C													
Storage	- 25 °C ... + 75 °C													
Shock load	To IEC 68													
Weight	Approx. 990 g													
Housing material	Metal													

- 1) Average service life 100,000 h at T_A = + 25 °C
- 2) Limit values, reverse-polarity protected
- 3) May not exceed or fall short of V_S tolerances
- 4) Without load
- 5) With light/dark ratio 1:1, no time delay
- 6) Signal transit time with resistive load
- 7) Reference voltage 50 V DC
- 8) A = V_S connections reverse-polarity protected
B = Outputs Q short-circuit protected
C = Interference pulse suppression
- 9) Do not bend below 0 °C

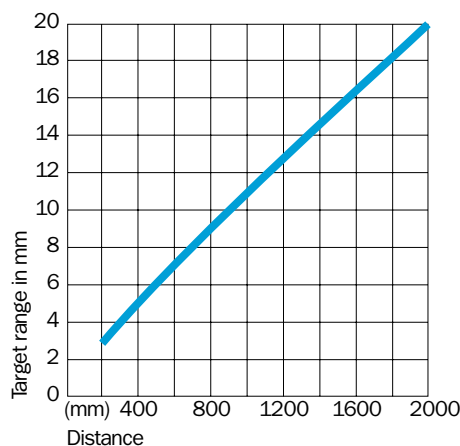
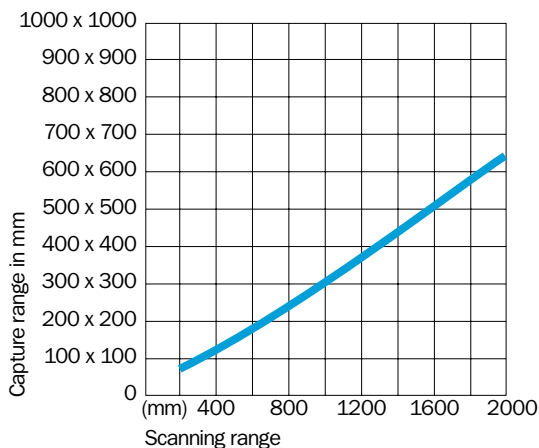
Scanning range



- 1 Scanning range on reflector PL 22
- 2 Scanning range on reflector PL 50 A
- 3 Scanning range on reflector PL 80 A

Order information

Type	Part no.
DMP 2-P21111	1 016 237
DMP 2-N21111	1 016 238



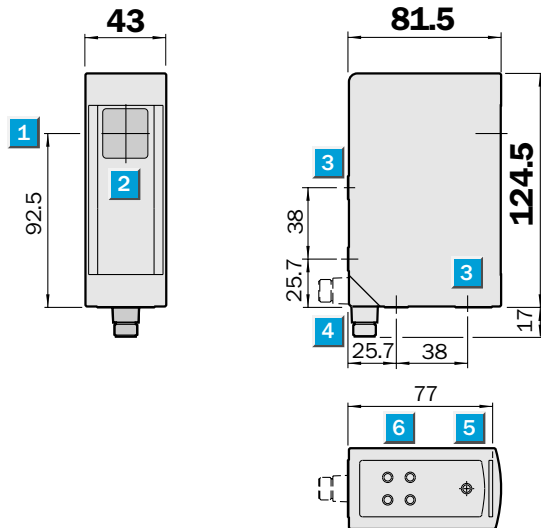
Scanning range
200...2000 mm

Position finders

- Two analogue outputs (for x- and y-axis)
- Two switching outputs
- Integrated software
- Simple adjustment



Dimensional drawing

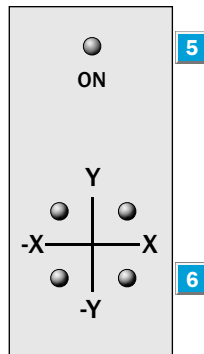


Adjustments possible

DMP 2-P11111

DMP 2-N11111

- 1 Centre of optical axis, sender/receiver
- 2 Receiver array
- 3 Mounting hole M6 threaded, 8 mm deep
- 4 8-pin, M 12 plug, rotatable through 90°
- 5 Operating signal
- 6 Alignment aid



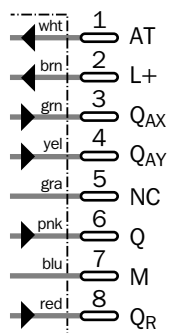
Connection type

DMP 2-P11111

DMP 2-N11111



8-pin, M 12

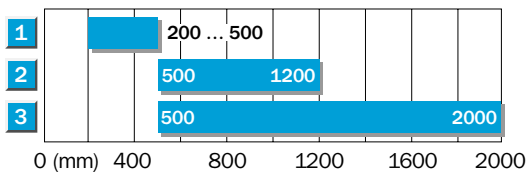


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Current consumption ⁴⁾	< 250 mA														
Switching outputs	PNP: HIGH = V _S - ≤ 2 V / LOW = 0 V NPN: HIGH = V _S / LOW ≤ 2 V														
Operating mode	Permanent or synchronised														
Blanking input AT															
Blanked (triggered)	PNP: > 18 V ... < V _S max. NPN: 0 V ... V _S (≥ 18 V)														
Free-running	PNP: < 2 V or unswitched NPN: V _S - (≤ 2 V) or unswitched														
Output voltage I_A max.	100 mA														
Analogue output⁵⁾	4 mA ... 20 mA (within the capture range) 3 mA (outside the capture range)														
Switching frequency⁶⁾	250/s														
Response time⁷⁾	3 ms														
Connection type	8-pin, M 12 plug														
VDE protection class⁸⁾	□														
Circuit protection⁹⁾	A, B, C														
Enclosure rating	IP 67														
Ambient temperature T_A¹⁰⁾															
	Operation - 25 °C ... + 55 °C Storage - 25 °C ... + 75 °C														
Shock load	To IEC 68														
Weight	Approx. 990 g														
Housing material	Metal														

- | | | | |
|---|--|--|--|
| 1) Average service life 100,000 h at T _A = + 25 °C | 3) May not exceed or fall short of V _S tolerances | 5) On R _{Lmax} = 700 W | 9) A = V _S connections reverse-polarity protected |
| 2) Limit values, reverse-polarity protected | 4) Without load light/dark ratio 1:1, no time delay | 6) Light/dark ratio 1:1, no time delay | B = Outputs Q short-circuit protected |
| | | 7) Signal transit time with resistive load | C = Interference pulse suppression |
| | | 8) Reference voltage 50 V DC | 10) Do not bend below 0 °C |

Scanning range



- 1 Scanning range on reflector PL 22
- 2 Scanning range on reflector PL 50 A
- 3 Scanning range on reflector PL 80 A

Order information

Type	Part no.
DMP 2-P11111	1 016 235
DMP 2-N11111	1 016 236

