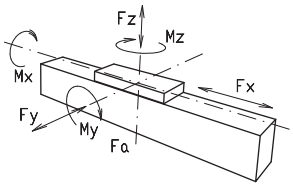
Positioning system DSM 160P, 200P

Linear motor drive

Function:
This unit consists of a rectangular aluminium profile with 2 integrated rail guidance. The linear motor DSM unit is based on the principle of a linear, synchronous AC motor.
The guiding profile is fitted with permanent magnets as stator (secondary part). The carriage is fitted with the actuator (primary part). The magnetic attraction causes a force between carriage and guiding profile also in the absence of current. This force can be used for the initial tension of the bearings. Several carriages (primary parts) can be driven independently on one guiding profile. A special design of the carriage geometry results in the guiding profile being covered. This prevents small parts from falling into the system, so that clean-room applications are possible.

Fitting position: As required. Max. length 3.000 mm without joints.
Carriage mounting: By threaded holes.
Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.
Repeatability ± 0,05mm mm. Repeated accuracy max. ± 0,05mm up to 3.000 mm

Forces and torques



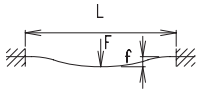
F_z = external force by load
F_a = magnetic attraction force
F_{zm} = maximum force in consideration of motor power
$F_{zm} = F_z + F_a$

Size	160			200		
Motor size	1	2	3	1	2	3
permitted dyn.Forces*	10000 km			10000 km		
F_a (N)	1200	1800	5500	3600	5500	11000
F_{zm} (N)	1590	2800	7030	4990	7640	13860
F_z (N)	1775	1775	3550	4092	4092	8184
M_x (Nm)	160	128	153	357	231	462
M_y (Nm)	373	351	532	769	556	1540
M_z (Nm)	222	261	328	585	654	906
C (N)	7800			22800		
Number of runner blocks	4	4	8	4	4	8
All forces and torques related to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fzm}{Fzm_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq 1{,}5$						
Motor specifications Fx						
Motor size	1	2	3	1	2	3
Carriage weight (kg)	4,8	5,3	7,1	10,9	11,4	16,9
Weight primary part (kg)	1,4	3,7	5,2	4,5	6,4	8,4
permanent (N)	115	271	406	383	574	766
Max. (N) 1s	323	607	911	868	1301	1735
Moving force without current						
N	30	30	60	40	40	80
Geometrical moments of inertia of aluminium profile						
I_x mm⁴	2,13 x10⁶			4,81 x10⁶		
I_y mm⁴	12,3 x10⁶			26,0 x10⁶		
Elastic modulus N/mm²	70000			70000		

* referred to life-time

Formula: DSM P

Deflection:



$$f = \frac{F * L^3}{E * I * 192}$$

f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm²)
I = second moment of area (mm⁴)

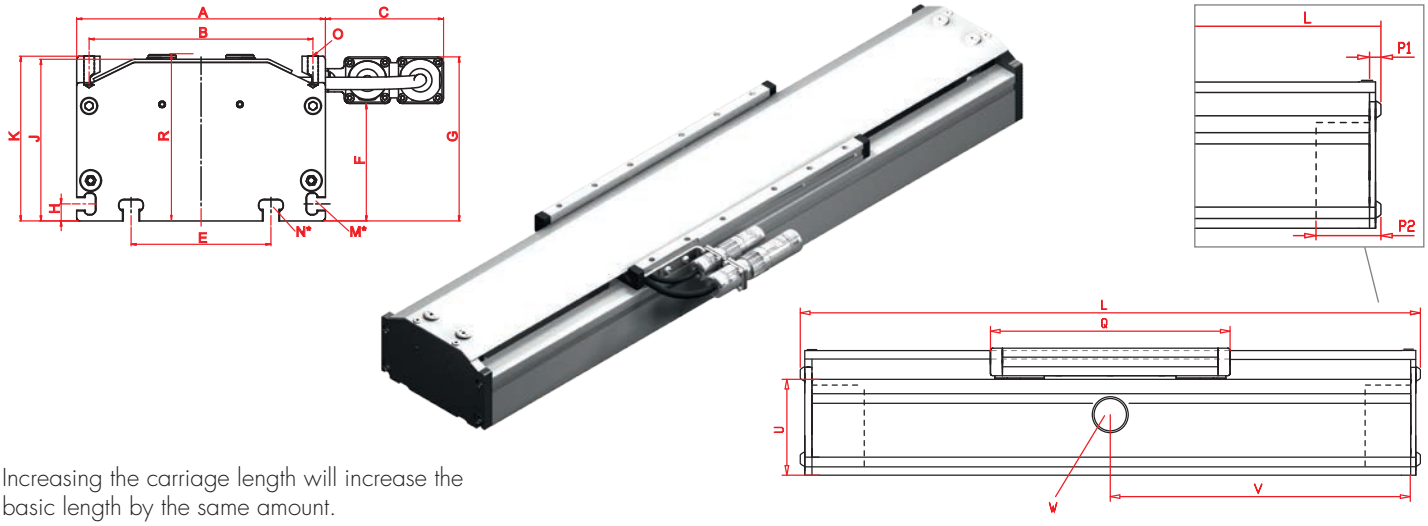
Nominal lifetime:

$$L = \left(\frac{C}{F}\right)^3 \times 10^5$$

C = Dynamic load faktor (N)
F = Middle load (N)

Positioning system DSM 160P, 200P

Dimensions (mm)



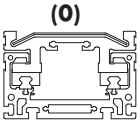
Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to chapter 2.2 page 2 V = Q + 100 mm W = servicing position

Size ❒	Basic length L	A	B	C	E	F	G	H	J	K	M for	N for	O for	R	P1	P2	U	Basic weight Motor size 1/2/3	Weight per 100mm Motor size 1/2/3
DSM 160P	Q + 108	160	144	76	90	76	106	11	104	106	M 6	M 8	M 8	107	9	57	80	12,1/15/20	1,7/2,1/2,1
DSM 200P	Q + 126	200	182	76	140	96	126	15	128	129	M 8	M 10	M 10	130	10	62	100	26,1/29,6/36,8	2,8/2,8/2,8

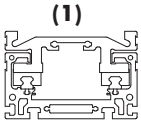
0 **Choice of guide body profile:**

(0)



without internal profile and cover bands

(1)



without internal profile without cover bands

Stainless version upon request.

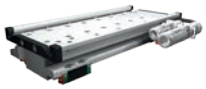
1 **Measurement system:**

(1) Measurement system LE100/1 5V Resolution 0.05 **(2)** Measurement system LE100/1 10,5-30V Resolution 0.05 **(3)** Hall sensor **(4)** Measurement system provided by customer

1 **Plug:**

(1) Plug Pos. 1

(2) Plug Pos. 2



(3) open unconnected cable end

1 **Motor size:**

(1) Motor size 1 with Q_1 **(2)** Motor size 2 with Q_2 **(3)** Motor size 3 with Q_3
(4) Supply with Q_1* **(5)** Supply with Q_2* **(6)** Supply with Q_3*
* = provided by customer

Dimensioning criteria for motor output						
	l_p ❒	b_p ❒	h_{ps} ❒	Q_1	Q_2	Q_3
160	Q-70	71	50	316	360	461
200	Q-70	85	62	410	444	610

l_p = length primary part; b_p = width primary part;
h_{ps} = height primary part + height secondary part + interspaces primary-/secondary part

For standard carriage length see 'Q' in table.
The carriages can be delivered in any non-standard length upon request; the longer the carriage, the greater the load capacity. For digital controllers and linear encoder refer to chapter 9.1 page 12.

1500 Basic length + stroke = total length

DSM	160P	0	0	1	1	0	0	1	01500
Pos.		1	2	3	4	5	6	7	

Sample ordering code:
DSM160P, Bahr Modultechnik Linear motor, standard body profile, Measurement system LE100/1 5V, Plug Pos. 1, motor size 1, 1094mm stroke