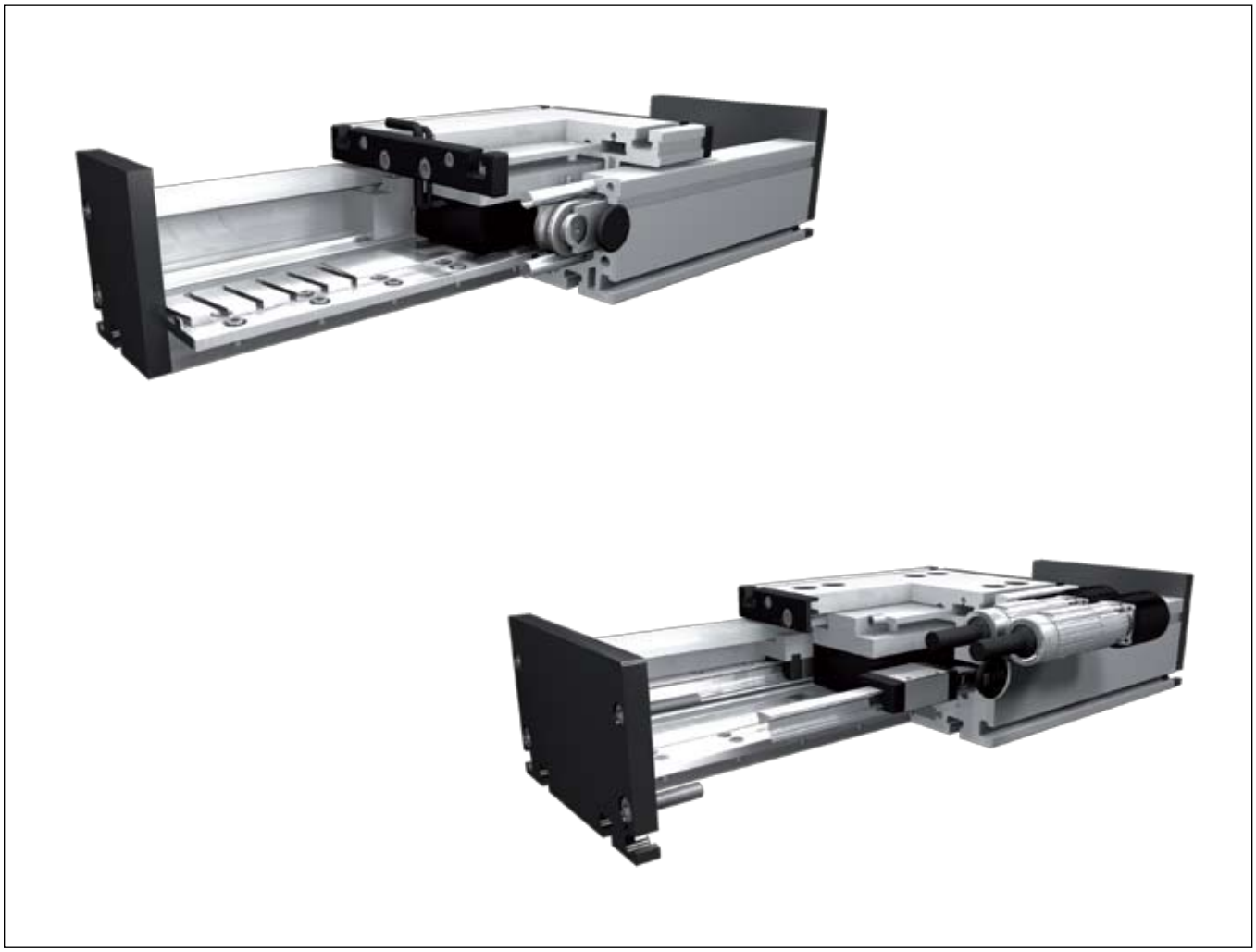


Roller Guide
Modular Linear Actuators
DLM, DLVM

Rail Guide
Modular Linear Actuators
DSM

Modular Linear Actuator
DLM 120, 160, 200

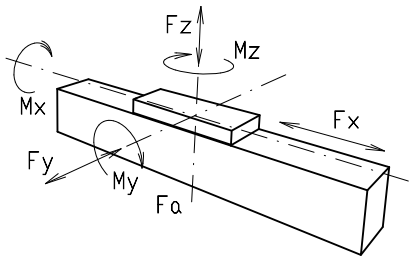
Linear Motor Drive

Specifications

Function:
This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The linear motor DLM 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.

Fitting position: As required. Max. length 6.000 mm without joints.
Carriage mounting: By T-slots.
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 10 or 12 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased. Repeatability ± 0,05 mm. Repeated accuracy max. ± 0,05 bis 4.000 mm, ± 0,1 >4.000 mm.

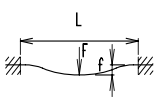
Forces and torques



Size	120			160			200		
Motor size	1	2	3	1	2	3	1	2	3
Forces/Torques $_{dyn}$									
F_a (N)	600	1200	1800	1200	1800	5500	3600	5500	11000
F_{zm} (N)	820	1640	2460	1590	8800	7030	5000	7500	13800
F_y (N)	700	700	470	1500	1000	450	3300	2200	1200
M_x (Nm)	180	90	60	280	190	130	600	400	220
M_y (Nm)	50	100	70	320	210	140	640	420	230
M_z (Nm)	22	33	50	90	100	120	200	170	210
Number of rollers	10	12	12	12	12	12	12	12	12
All forces and torques related to the following: existing values / table values $\frac{Fy}{Fy_{dyn}} + \frac{Fzm}{Fzm_{dyn}} + \frac{Mx}{Mx_{dyn}} + \frac{My}{My_{dyn}} + \frac{Mz}{Mz_{dyn}} \leq \mathbf{1,5}$									
Motor specifications Fx									
Motor size	1	2	3	1	2	3	1	2	3
Carriage weight (kg)	1,7	2,5	3,1	5,1	4,7	5,4	9,4	10,5	12,7
Weight primary part (kg)	0,7	1,4	2,0	1,4	3,7	5,2	4,5	6,4	8,4
permanent (N)	61	115	173	115	271	406	383	574	766
Max. (N) (1sek.)	162	323	485	323	607	911	868	1301	1735
Moving force without current									
N	3	5	6	5	8	9	7	**11**	12
Speed									
(m/sec) max	4			6			6		
Geometrical moments of inertia of aluminium profile									
I_x mm^4	$6,6x10^5$			$22,2x10^5$			$63,8x10^5$		
I_y mm^4	$38,6x10^5$			$122,0x10^5$			$335,0x10^5$		
Elastic modulus N/mm^2	70000			70000			70000		

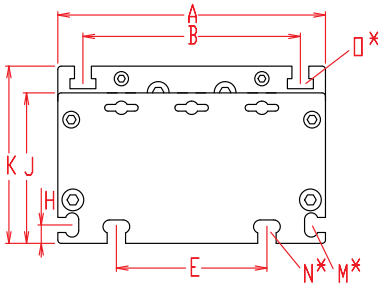
Formula: DLM

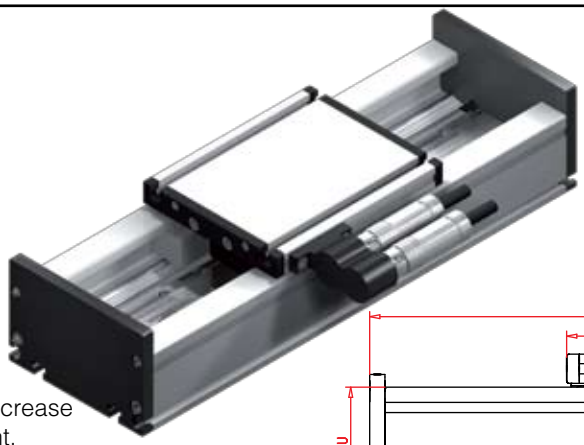
$$f = \frac{F*L^3}{E*I*192}$$

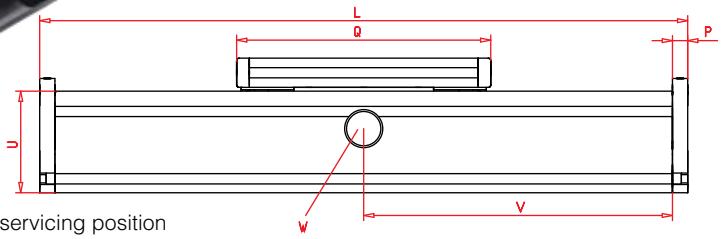


f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

Dimensions (mm)







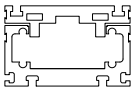
Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to the accessory section V = Q + 100 mm W = servicing position

Size	Basic length L	A	B	E	H	J	K	M for	N for	O for	P	U	Basic weight Motor size 1/2/3	Weight per 100 mm Motor size 1/2/3
DLM 120	Q + 30	120	96	78	10	68	79	M 5	M 6	M 6	10	60	5,2/7,2/9,2 Kg	1,0/1,0/1,0 Kg
DLM 160	Q + 30	160	130	90	11	90	106	M 6	M 8	M 8	12	80	12,6/15,6/20,7 Kg	1,6/2,0/2,0 Kg
DLM 200	Q + 35	200	160	140	15	110	129	M 8	M 10	M 10	15	100	26,9/30,5/37,9 Kg	2,6/2,6/2,6 Kg

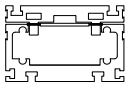
0 **Choice of guide body profile:**

(0)



without internal profile and cover bands

(1)



without internal profile with cover bands (L max. 2000mm)

(3)

with bellows

Stainless version upon request.

1 **Measurement system**

(1) Measurement system LE100 5V Resolution 0.05 **(2)** Measurement system LE100 24V 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						
	$l_p \leq$	$b_p \leq$	$h_{ps} \leq$	Q_1	Q_2	Q_3
120	Q - 70	55	38	196	276	372
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.
For digital controllers and linear encoder refer to chapter 9.1 page 8 .

1500 Basic Length + Stroke + Overtravel** = total length

**Minimum 25mm on each end

DLM	**160**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**01500**
	Pos.	1	2	3	4	5	6	7	

Sample ordering code:
DLM160, Bahr Modultechnik Linearmotor, standard body profile, Measurement system LE100 5V, Plug Pos. 1, motor size 1, 1154 mm stroke.

Modular Linear Actuator
DLVM 200

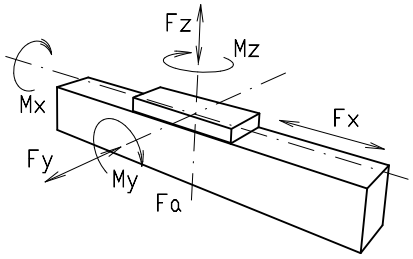
Linear motor drive

Specifications

Function:
This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The linear motor DLVM 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.

Fitting position: As required. Max. length 6.000 mm without joints.
Carriage mounting: By T-slots.
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 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.
Repeatability ± 0,05 mm. Repeated accuracy max. ± 0,05 bis 4.000 mm, ± 0,1 >4.000 mm.

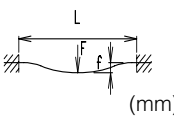
Forces and torques



Size	200
Motor size	3
Forces/Torques $_{dyn}$	
F_a (N)	11000
F_{zm} (N)	13800
F_y (N)	1200
M_x (Nm)	220
M_y (Nm)	230
M_z (Nm)	210
Number of rollers	12
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	3
Carriage weight (kg)	12,7
Weight primary part (kg)	8,4
permanent (N)	766
Max. (N) (1sek.)	1735
Moving force without current	
N	12
Speed	
(m/sec) max	6
Geometrical moments of inertia of aluminium profile	
I_x mm^4	6,38x10^6
I_y mm^4	33,5x10^6
Elastic modulus N/mm^2	70000

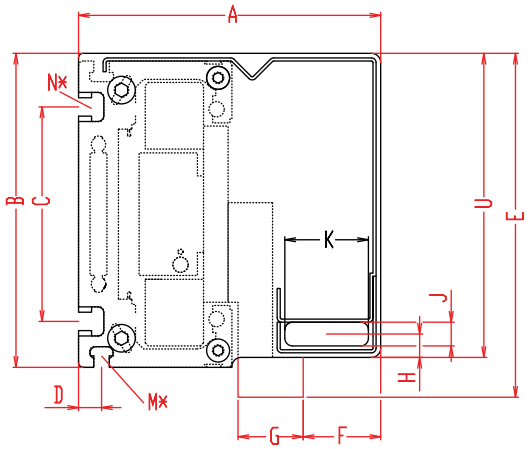
Formula: DLVM

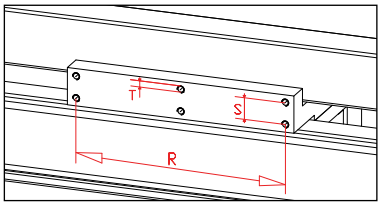
$$f = \frac{F*L^3}{E*I*192}$$

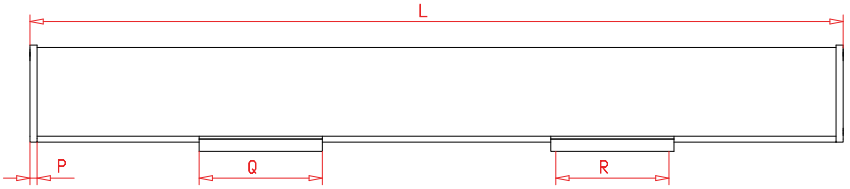


f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

Dimensions (mm)







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

*For slide nuts refer to the accessory section

Size	Basic length L	A	B	C	D	E	F	G	H	J	K	M for	N for	P	Q	R	S	T for	U	Basic weight	Weight per 100 mm
DLVM 200	602	197	205	140	15	224,5	50,5	42,5	15	15,5	54,5	M 8	M10	15	260	240	25	M8	198,5	39,4 kg	2,8 kg

9.1

DLVM	**200**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**01500**
Pos.	1	2	3	4	5	6	7		

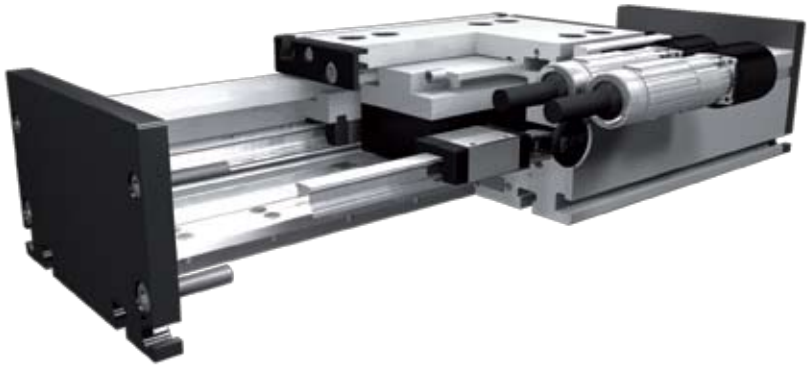
1500

Basic Length + Stroke + Overtravel** = total length
**Minimum 25mm on each end

Sample ordering code:
DLVM200, 898 mm stroke.

Modular Linear Actuator
DSM 120, 160, 200

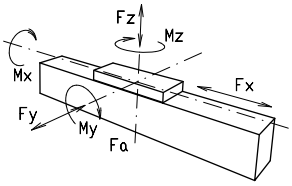
Linear Motor Drive **Specifications**



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.

Fitting position: As required. Max. length 6.000 mm without joints.
Carriage mounting: By T-slots.
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 bis 4.000 mm, ± 0,1 >4.000 mm.

Forces and torques

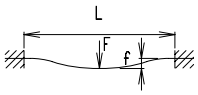


Size	120		160			200		
Motor size	1	2	1	2	3	1	2	3
permitted dyn.Forces*	10000 km		10000 km			10000 km		
F_a (N)	600	1200	1200	1800	5500	3600	5500	11000
F_{zm} (N)	820	1640	1590	2800	7030	4990	7640	13860
F_z (N)	650	500	1775	1775	3550	4092	4092	8184
M_x (Nm)	35	32	160	128	153	357	231	462
M_y (Nm)	40	58	373	351	532	769	556	1540
M_z (Nm)	40	57	222	261	328	585	654	906
C (N)	2310		7800			22800		
Number of runner blocks	6	8	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	1	2	3	1	2	3
Carriage weight (kg)	1,4	2,7	4,8	5,3	7,1	10,9	11,4	16,9
Weight primary part (kg)	0,7	1,4	1,4	3,7	5,2	4,5	6,4	8,4
permanent (N)	61	115	115	271	406	383	574	766
Max. (N) 1sec.	162	323	323	607	911	868	1301	1735
Moving force without current								
N	15	15	30	30	60	40	40	80
Geometrical moments of inertia of aluminium profile								
I_x mm^4	5,60 x10^5		2,13 x10^6			4,81 x10^6		
I_y mm^4	34,19 x10^5		12,3 x10^6			26,0 x10^6		
Elastic modulus N/mm^2	70000		70000			70000		

Formula: DSM

Deflection:

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



f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70000 (N/mm^2)
I = second moment of area (mm^4)

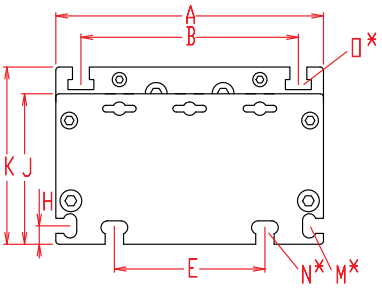
Nominal lifetime:

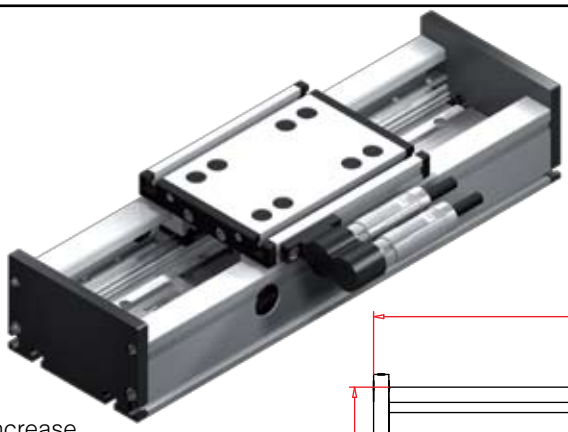
$$L = \left(\frac{C}{F}\right)^3 \quad x10^5$$

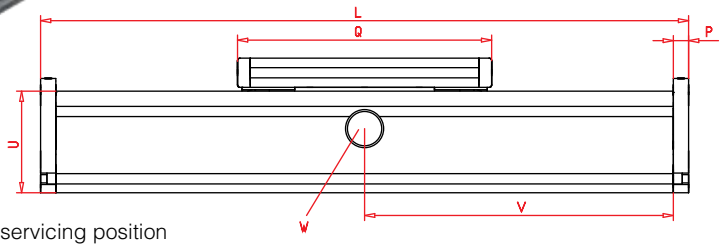
C = Dynamic load faktor(N)
F = Middle load (N)

* referred to life-time

Dimensions (mm)







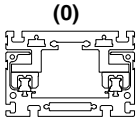
Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to the accessory section V = Q + 100 mm W = servicing position

Size	Basic length L	A	B	E	H	J	K	M for	N for	O for	P	U	Basic weight Motor size 1/2/3	Weight per 100 mm Motor size 1/2/3
DSM 120	Q + 30	120	96	78	10	68	79	M 5	M 6	M 6	10	60	4,8/6,9 kg	1,0/1,0
DSM 160	Q + 30	160	130	90	11	90	106	M 6	M 8	M 8	12	80	12,4/16,7/22,6 kg	1,7/2,0/2,0 kg
DSM 200	Q + 35	200	160	140	15	110	129	M 8	M 10	M 10	15	100	30,0 /33,0 /44,2kg	3,1/3,1/3,1 kg

0 **Choice of guide body profile:**

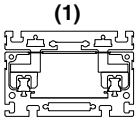
(0)



without internal profile and cover bands

Stainless version upon request.

(1)



without internal profile with cover bands (L max. 2000mm)

(3)

with bellows

1 **Measurement system**

(1) Measurement system LE100 5V Resolution 0.05 **(2)** Measurement system LE100 24V 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
120	Q - 70	55	38	196	276	-
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

1500 Basic Length + Stroke + Overtravel** = total length
**Minimum 25mm on each end

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 8 .

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

Sample ordering code:
DSM160, Bahr Modultechnik Linear motor, standard body profile, Measurement system LE100 5V, Plug Pos. 1, motor size 1, 1154 mm stroke

Linear Motor Controller for DLM - DSM Modular Linear Actuator

Linear Encoder LE100

Non-contact sensor unit with integrated analog signal output (sinus 1 Vss).
Forming an open linear measuring system if combined with magnetic strip and downstream interpolation electronics.

Features:
+ easy mounting
+ insensitive to dust, shavings, humidity
+ signal period 1000 µm (analog)
+ output signals 1 Vss nominal
+ real-time data processing
+ used in combination with magnetic strip MB100

Specifications:

+ Supply voltage	12-24 V DC +/- 20% / 5V optional 5 V DC +/- 5%
+ Power consumption	approx. 30 mA non-loaded
+ Protection	reverse battery protection
+ Connection	flying leads
+ Material of casing	plastic
+ Output circuit	line driver
+ Output signals	sinusA, B, phase-shifted by 90°
+ Output current	I out max. 5 mA per signal path
+ Signal size	approx. 1 Vss
+ Travel speed	max. 5m/s
+ System accuracy	depending on interpolation electronics
+ Gap strip/sensor	0,1 - 0,4 mm (without cover strip)
+ Working temperature	0....+50 °C
+ Storage temperature	-20....+85°C
+ Interference protection class	3, accord. to ICE 801
+ Test mark	CE
+ System of protection	IP 67 accord. to DIN VDE 0470

Possible Mounting Styles