

ORIGA HMR Electromechanical Linear Actuators



Profile designs

- Basic profile for assembling directly to the machine base
- Reinforced profile for self-supporting assembly



Mounting systems

- Integrated T-slots for attaching from below and from the side



Protection classes

- Without cover: IP20
- With cover: IP54



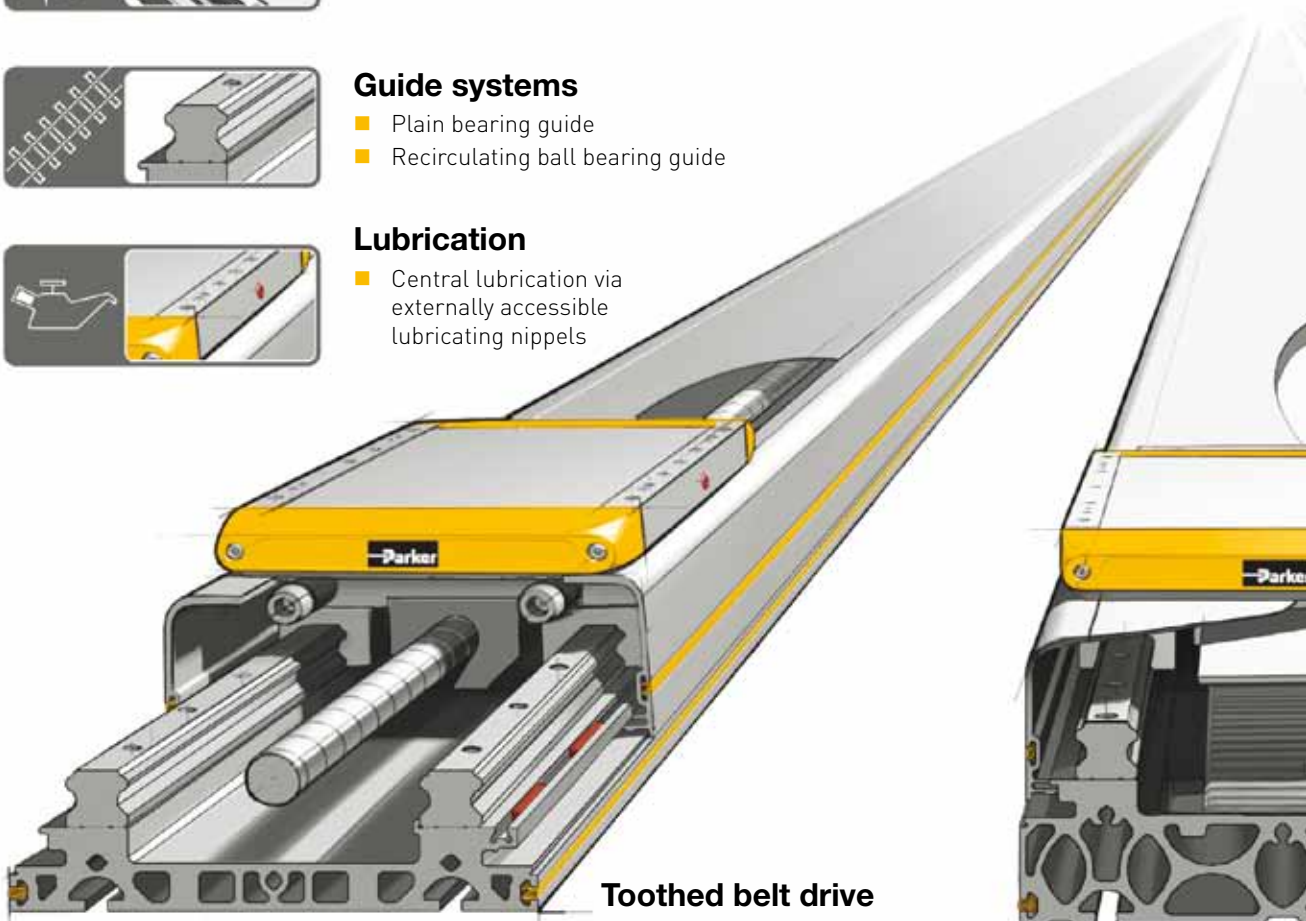
Guide systems

- Plain bearing guide
- Recirculating ball bearing guide



Lubrication

- Central lubrication via externally accessible lubricating nipples



Toothed belt drive

The solution for fast path and position control for medium loads

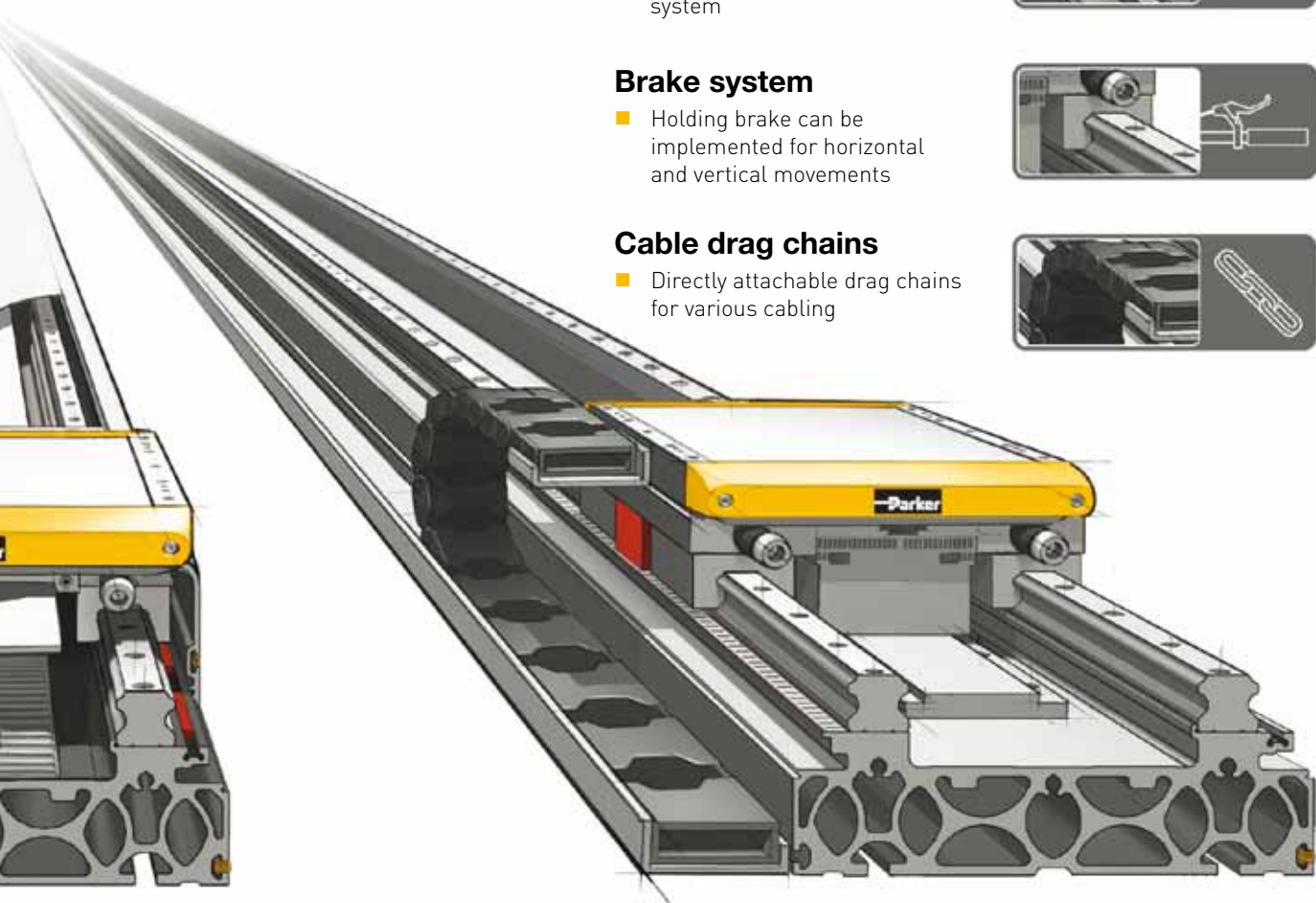


Screw drive

The solution for precise path and position control for heavy loads



We drive the future - with screw, toothed belt or linear motor.



Position sensing

- Integrated, adjustable position switch for end positions and homing



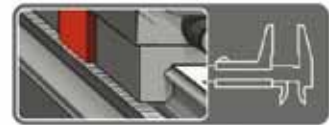
Impact protection

- Integrated shock absorbers for both end positions



Distance measurement

- Contact-free, incremental displacement measuring system



Brake system

- Holding brake can be implemented for horizontal and vertical movements



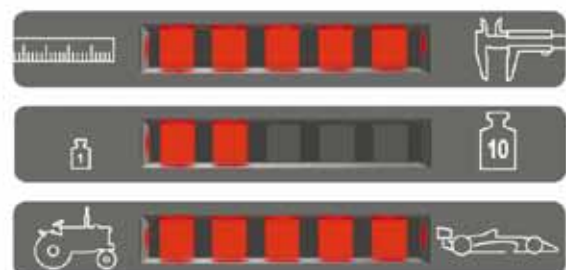
Cable drag chains

- Directly attachable drag chains for various cabling



Linear drive

The solution for fast travel with the greatest possible dynamics and precision



Origa Linear Drives

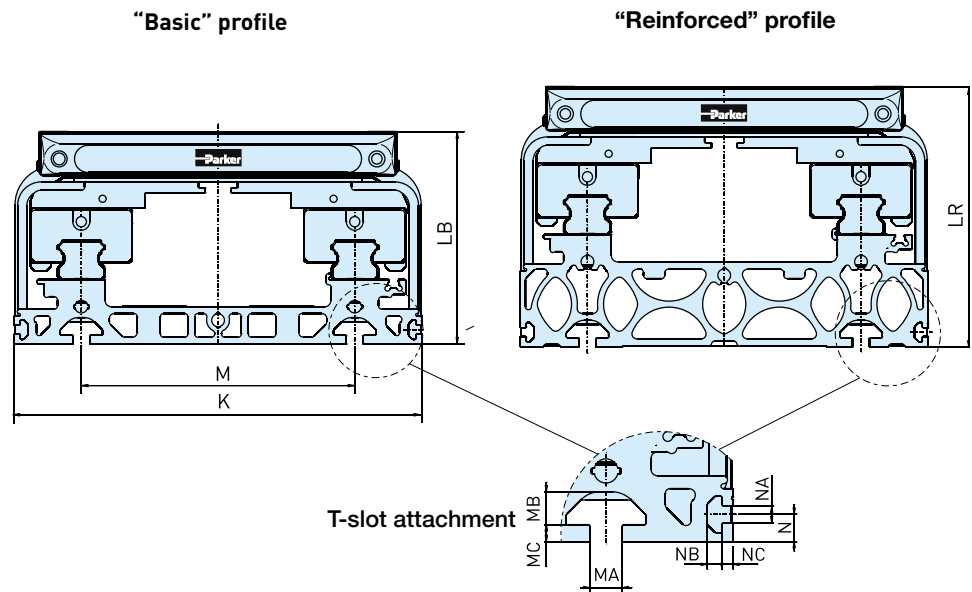
Size 150, 180, 240 mm

HMR Series

Profile versions

Designs:

- Basic
- Reinforced



The HMR linear drive system can be equipped with a “basic” or “reinforced” profile as standard.

The “basic” profile is suitable for fitting directly to a machine base that has a corresponding support surface.

The “reinforced” profile, on the other hand, is the preferred choice for self-supporting systems or for use in conjunction with a base surface offering limited support.

Dimension table - Profile versions

Size	K	LB	LR	M	MA	MB	MC	N	NA	NB	NC
HMRx150	150.0	90.0	114.0	96.0	6.2	6.8	3.0	6.5	5.2	4.6	3.5
HMRx180	180.0	111.5	134.5	116.0	8.0	7.8	4.5	8.5	5.2	4.5	3.5
HMRx240	240.0	125.0	153.0	161.0	10.0	10.2	5.3	8.5	5.2	4.5	3.5

Dimensions in mm

Origa Linear Drives

Size 150, 180, 240 mm

HMR Series

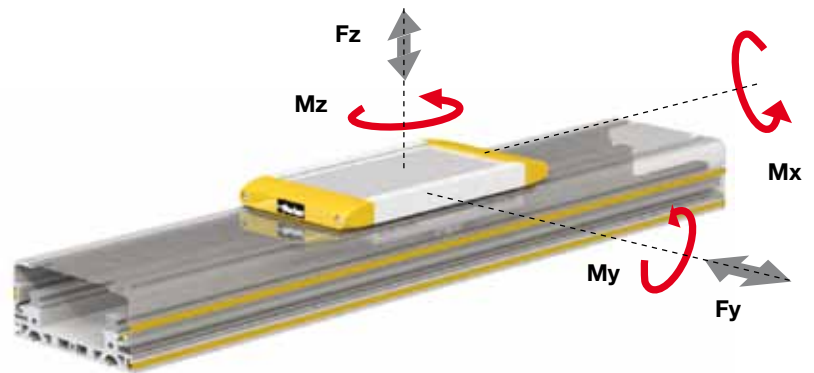
Ball Bearing Guide

Load requirements for guides and installation size.

The occurring loads, forces and bending moments depend on the application. The mass of the construction attached to the carriage has a center of gravity. This mass creates static forces ($F = m \cdot g$) and bending moments ($M = m \cdot g \cdot l$).

Additional dynamic moments ($M = m \cdot a \cdot l$) arise in dependence of the acceleration during travel. Care should be taken when selecting suitable guides that the permissible sum of loads does not exceed 1.

Loads, Forces and Moments



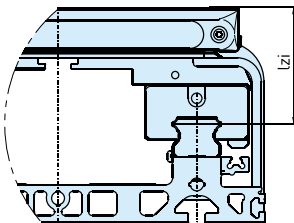
Combined loads

The maximum permissible load for linear drives subject to simultaneous multiple loads, forces and bending moments are calculated using the formula below. Maximum permissible loads must not be exceeded.

$$L = \frac{F_y}{F_{y(max)}} + \frac{F_z}{F_{z(max)}} + \frac{M_x}{M_{x(max)}} + \frac{M_y}{M_{y(max)}} + \frac{M_z}{M_{z(max)}} \leq 1$$

The sum of all loads must under no circumstance be > 1.

Internal lever arm l_{zi}



Dimension table - l_{zi}

Product size	l_{zi}
HMR-150	[mm] 50.0
HMR-180	[mm] 57.5
HMR-240	[mm] 68.0

Maximum permissible load based on a service life of 8000 km

Product size	HMRx15	HMRx18	HMRx24	HMRx15	HMRx18	HMRx24
Carriage	Standard			Tandem		
Max. permissible force						
F_{Z8000} F_{Y8000}	[N] 6,000	11,000	18,200	9,000	16,500	27,300
Max. bending moment						
M_{X8000}	[Nm] 290	640	1,460	435	960	2,190
M_{Y8000}	[Nm] 380	840	1,660	570	1,260	2,490
M_{Z8000}	[Nm] 380	840	1,660	570	1,260	2,490

Maximum permissible load based on a service life of 2540 km

Product size	HMRx15	HMRx18	HMRx24	HMRx15	HMRx18	HMRx24
Carriage	Standard			Tandem		
Max. permissible force						
F_{Z2540} F_{Y2540}	[N] 8,800	16,200	26,600	13,200	24,300	39,900
Max. bending moment						
M_{X2540}	[Nm] 430	940	2,150	645	1,410	3,225
M_{Y2540}	[Nm] 560	1,230	2,430	840	1,845	3,645
M_{Z2540}	[Nm] 560	1,230	2,430	840	1,845	3,645

Ball Screw

Size 150, 180, 240 mm

HMRS Series



Technical Data HMRS

Product size				HMRS15		HMRS18		HMRS24	
Type of screw				20x5	20x20	25x10	25x25	32x10	32x32
Pitch	p	[mm]		5	20	10	25	10	32
Max. speed	v_{max}	[m/s]		0.25	1.00	0.50	1.25	0.50	1.60
Max. acceleration	a_{max}	[m/s ²]		10		10		10	
Max. order stroke		[mm]		2500		3400		4000	

Thrust force and torque

Max. thrust force	$F_{a_{max}}$	[N]	2600	2600	4800	4800	5500	5500
	F_{A2540}	[N]	1800	2160	3300	3960	3500	4880
Max. torque at drive shaft	M_{amax}	[Nm]	2.2	9.0	8.3	20.8	9.5	30.4
	M_{A2540}	[Nm]	1.6	7.5	5.7	17.1	6.1	27.0
No load torque	M_0	[Nm]	0.7	0.9	0.9	1.0	1.0	1.1

Stroke dependent speed

Max. permissible speed at order stroke	200mm	250	1000	500	1250	500	1600
	400mm	250	1000	500	1250	500	1600
	600mm	250	1000	500	1250	500	1600
	800mm	169	678	382	956	423	1354
	1000mm	122	486	277	694	312	997
	1200mm	91	366	211	526	239	765
	1400mm	71	285	165	413	189	605
	1600mm	57	228	133	333	153	491
	1800mm	47	187	109	274	127	406
	2000mm	39	156	92	229	107	342
	2200mm	33	132	78	195	91	291
	2400mm	28	113	67	167	79	251
	2600mm	-	-	58	145	68	219
	2800mm	-	-	51	128	60	193
	3000mm	-	-	45	113	53	171
	3200mm	-	-	40	100	48	152
	3400mm	-	-	-	-	43	137
	3600mm	-	-	-	-	39	123
	3800mm	-	-	-	-	35	112
4000mm	-	-	-	-	32	102	

Ball Screw

Size 150, 180, 240 mm

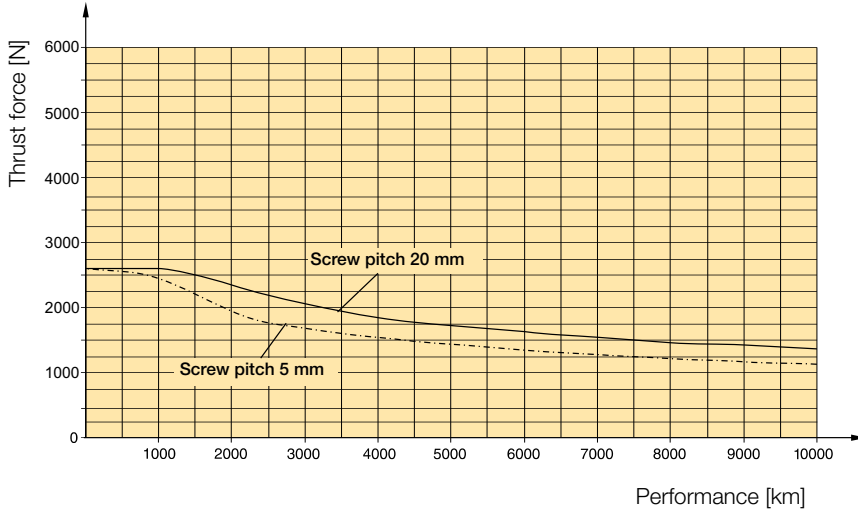
HMRS Series

Performance expectancy depends on the application's required force.

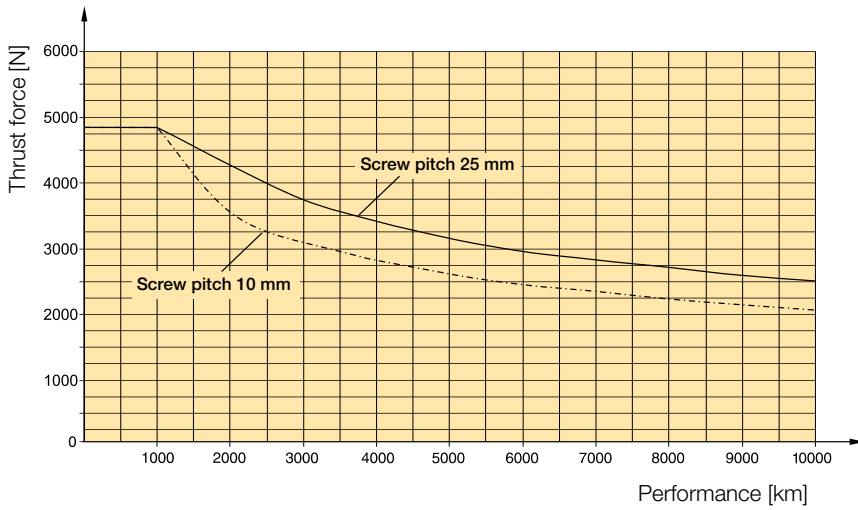
An increase in force will reduce performance

Performance / thrust force

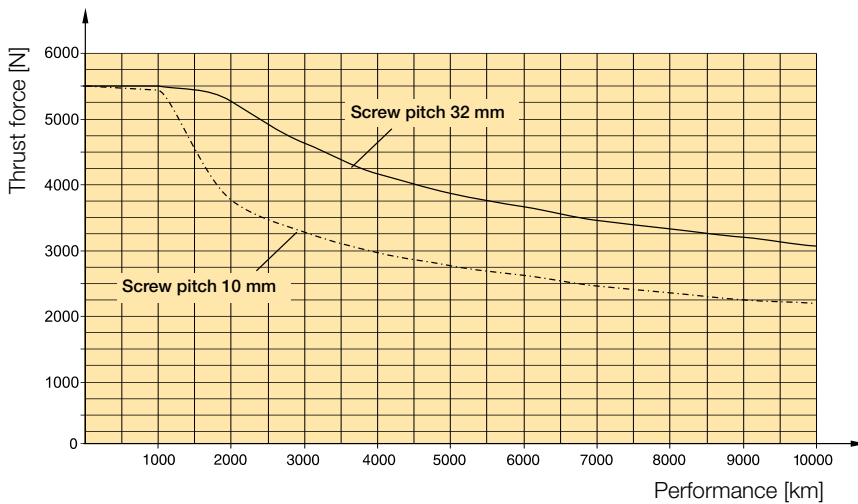
HMR-150 Performance / thrust force



HMR-180 Performance / thrust force



HMR-240 Performance / thrust force

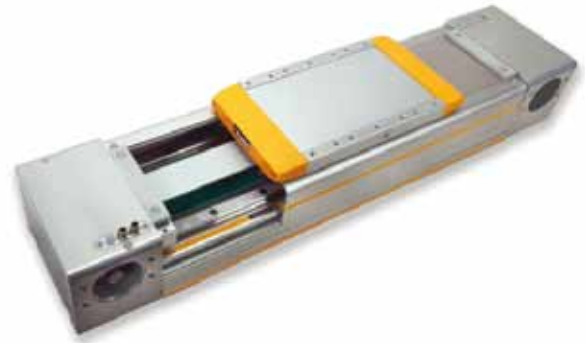
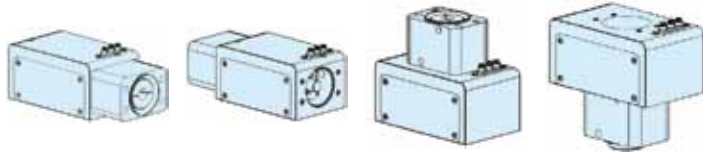


Belt Drive

Size 150, 180, 240 mm

HMRB Series

Description Motor mounting position



horizontal	upright
090° / 270°	000° / 180°
BD, DD	AP, CP, AD, CD

Type and orientation of the belt is given by the motor mounting position.

Technical Data HMRB

Production size

HMRB15

Motor mounting position			090°/270°	000°/180°
Lead constant	$s_{lin.}$	[mm]	100	125
Max. speed	$v_{max.}$	[m/s]	5	
Max. acceleration	$a_{max.}$	[m/s ²]	50	
Repeatability		[μm]	±50	
Max. order stroke		[mm]	6000	

Thrust force and torque

Max. thrust force	$F_{Amax.}$	[N]	1050	630
Max. torque on drive shaft	$M_{Amax.}$	[Nm]	17	13
No load torque	M_0	[Nm]	1.2	1.2

Production size

HMRB18

Motor mounting position			090°/270°	000°/180°
Lead constant	$s_{lin.}$	[mm]	130	150
Max. speed	$v_{max.}$	[m/s]	5	
Max. acceleration	$a_{max.}$	[m/s ²]	50	
Repeatability		[μm]	±50	
Max. order stroke		[mm]	6000	

Thrust force and torque

Max. thrust force	$F_{Amax.}$	[N]	1300	1000
Max. torque on drive shaft	$M_{Amax.}$	[Nm]	27	24
No load torque	M_0	[Nm]	2.0	2.0

Production size

HMRB24

Motor mounting position			090°/270°	000°/180°
Lead constant	$s_{lin.}$	[mm]	160	224
Max. speed	$v_{max.}$	[m/s]	5	
Max. acceleration	$a_{max.}$	[m/s ²]	50	
Repeatability		[μm]	±50	
Max. order stroke		[mm]	6000	

Thrust force and torque

Max. thrust force	$F_{Amax.}$	[N]	4000	3750
Max. torque on drive shaft	$M_{Amax.}$	[Nm]	101	134
No load torque	M_0	[Nm]	4.0	4.0

Belt Drive

Size 150, 180, 240 mm

HMRB Series

The permissible thrust force from the table is depending on speed level and order stroke length.

The minimum thrust force value must not be exceeded in the application.

Information:

Limiting the torque from the motor may avoid exceeding permitted thrust force.

Valid Action Forces HMRB

Version motor mounting position				
Product size		HMRB15		
Motor mounting position			090°/270°	000°/180°
Thrust force F_A corresponding to speed v	$F_{v<1}$	[N]	1050	630
	$F_{v<2}$	[N]	990	630
	$F_{v<3}$	[N]	930	630
	$F_{v<4}$	[N]	890	630
	$F_{v<5}$	[N]	840	630
Thrust force F_A corresponding to order stroke length OS	$F_{A(OS<1000)}$	[N]	1050	630
	$F_{A(OS<2000)}$	[N]	820	490
	$F_{A(OS<3000)}$	[N]	570	340
	$F_{A(OS<4000)}$	[N]	445	265
	$F_{A(OS<5000)}$	[N]	365	215
$F_{A(OS<6000)}$	[N]	305	185	
Product size		HMRB18		
Motor mounting position			090°/270°	000°/180°
Thrust force F_A corresponding to speed v	$F_{v<1}$	[N]	1300	1000
	$F_{v<2}$	[N]	1300	1000
	$F_{v<3}$	[N]	1300	1000
	$F_{v<4}$	[N]	1300	1000
	$F_{v<5}$	[N]	1300	1000
Thrust force F_A corresponding to order stroke length OS	$F_{A(OS<1000)}$	[N]	1300	1000
	$F_{A(OS<2000)}$	[N]	1000	775
	$F_{A(OS<3000)}$	[N]	710	550
	$F_{A(OS<4000)}$	[N]	550	430
	$F_{A(OS<5000)}$	[N]	450	350
$F_{A(OS<6000)}$	[N]	380	295	
Product size		HMRB24		
Motor mounting position			090°/270°	000°/180°
Thrust force F_A corresponding to speed v	$F_{v<1}$	[N]	4000	3750
	$F_{v<2}$	[N]	4000	3380
	$F_{v<3}$	[N]	3650	3140
	$F_{v<4}$	[N]	3370	2950
	$F_{v<5}$	[N]	3200	2800
Thrust force F_A corresponding to order stroke length OS	$F_{A(OS<1000)}$	[N]	4000	3750
	$F_{A(OS<2000)}$	[N]	4000	3360
	$F_{A(OS<3000)}$	[N]	3370	2440
	$F_{A(OS<4000)}$	[N]	2860	1880
	$F_{A(OS<5000)}$	[N]	2350	1540
$F_{A(OS<6000)}$	[N]	2000	1300	

Example:

HMRB18 with motor mounting position 1 (090° front), speed $v = 2$ m/s ($F = 710$ N) and order stroke length OS ($F = 1.088$ N). The maximum permissible thrust force $F = 710$ N must not be exceeded.

Protection Class

HMR Series

Versions:

IP20 - without cover

IP54 - with cover

HMR got developed for various environment conditions. The basic design has an IP20 protection class.

HMR can be equipped with a cover to correspond to an IP54 protection class if a higher rating is required.

Version - Protected Class IP20



Version - Protected Class IP54



Impact Protection

HMR Series

HMR can be equipped with impact protection. The mounted structure shock absorbers can compensate the energy released by unintentional impact and afford protection against mechanical damage.

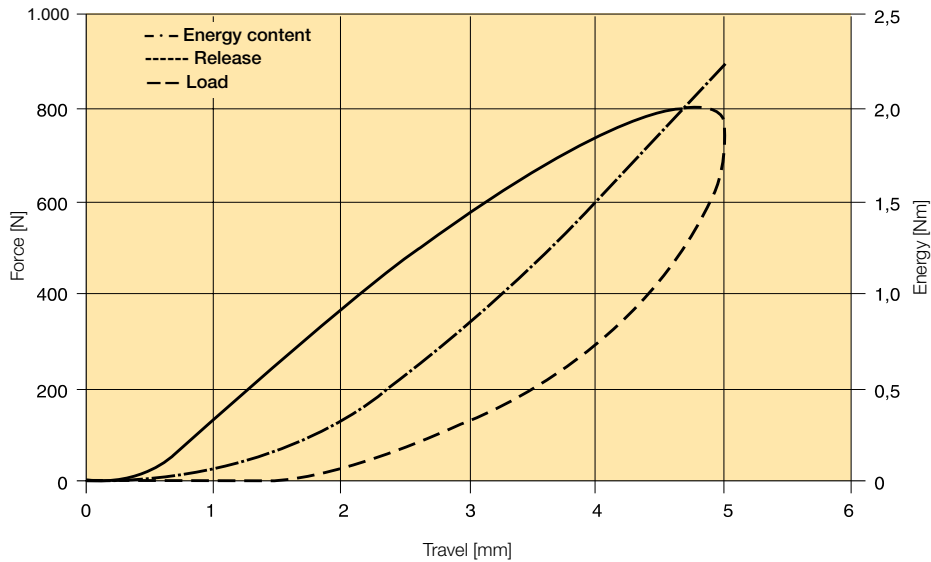
Two structure shock absorbers are fitted to each side of the carriage prior to delivery.



Shock absorbers for impact protection

Product size	HMRx15	HMRx18	HMRx24
Shock absorber	TA12-5	TA17-7	TA17-7
Energy absorption	3.0 Nm	8.5 Nm	8.5 Nm
Maximum stroke	5.0 mm	7.0 mm	7.0 mm

Distance-force and energy-distance characteristic curve (dynamic) – production size HMR-145



Distance-force and energy-distance characteristic curve (dynamic) – production size HMR-175, HMR-225

