

Fast 4xB

Toothed belt axis

Product manual

V1.0, 02.2022



1 Introduction

1.1 Overview of product properties

The toothed belt axes excel with outstanding flexibility in terms of motor mounting as well as numerous options such as roller guide or recirculating ball bearing guide. The toothed belt axes lend themselves for dynamic positioning of loads over short and long distances.

The toothed belt axes can be equipped with up to 3 carriages for moving multiple or long loads. If heavy or large loads are to be positioned, you can use a second portal axis mounted in parallel.

1.1.1 Product family

The linear axes product family consists of the following sizes:

- FAST 42B - cross section axis body 60 x 60 mm (2.36 x 2.36 in)
- FAST 43B - cross section axis body 80 x 80 mm (3.15 x 3.15 in)
- FAST 44B - cross section axis body 110 x 110 mm (4.33 x 4.33 in)

The sizes differ in terms of outer dimensions, drive data, payload capacities and maximum stroke.

1.2 Product overview

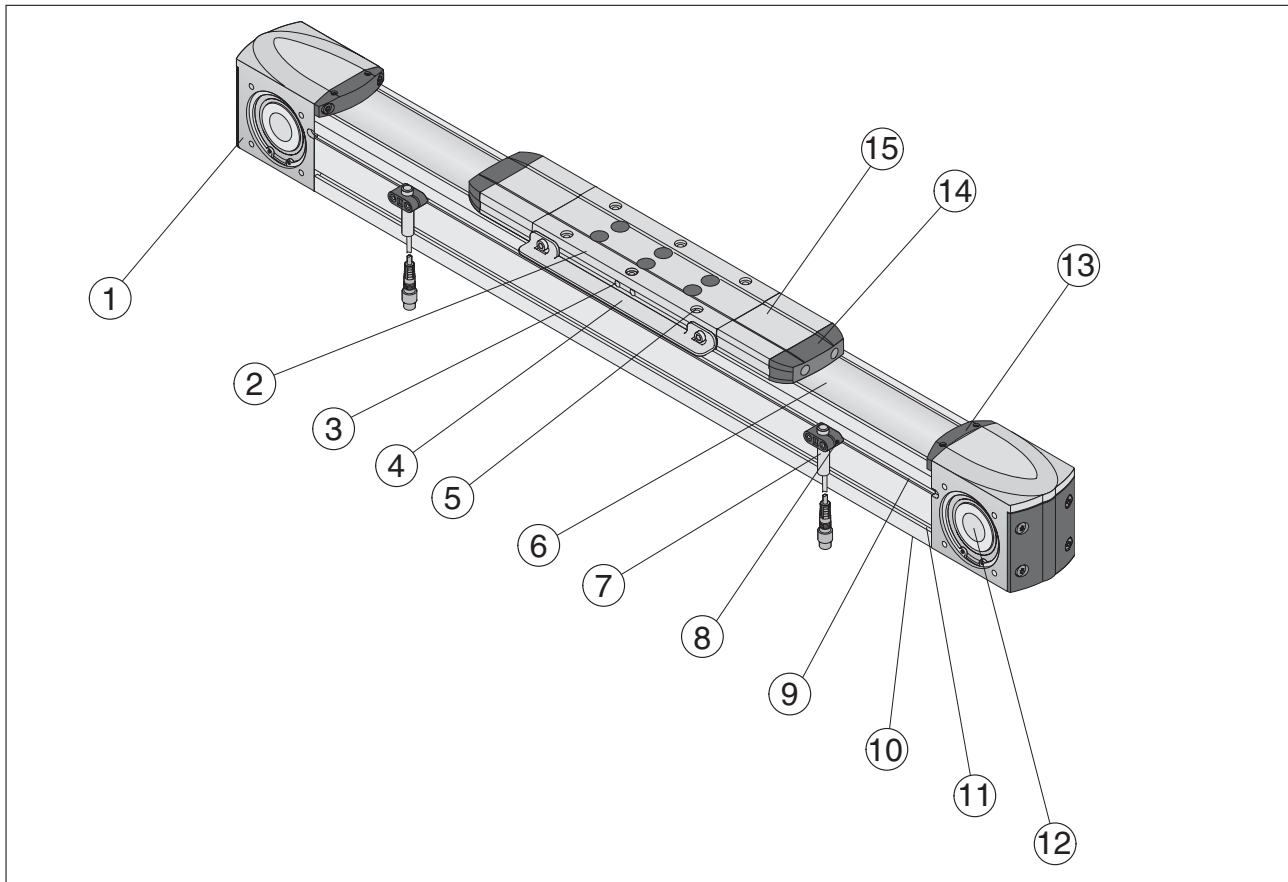


Figure 1: Product overview toothed belt axis

- (1) End block
- (2) Carriage
- (3) Grease nipples, 3 pieces
- (4) Contact plate sensor
- (5) Threads for fastening the payload
- (6) Cover strip
- (7) Sensor with cable and connector
- (8) Sensor holder
- (9) T slot for fastening the sensor holder
- (10) Axis body
- (11) T slot for fastening the axis body
- (12) Hollow shaft for elastomer coupling or shaft extension
- (13) Clamp fastener for cover strip
- (14) Rubber buffer
- (15) Strip deflection

1.4 Type code

	FAST4	2	B	R	M	1000	A	2	B	A	XXX	R
Product designation FAST4 = Portal axis												
Size - cross section axis body 2 = 60 x 60 mm (2.36 x 2.36 in) 3 = 80 x 80 mm (3.15 x 3.15 in) 4 = 110 x 110 mm (4.33 x 4.33 in)												
Drive element B = Toothed belt H = Support axis (without drive)												
Guide type R = Roller guide (sizes 1, 2, 3) B = Recirculating ball bearing guide (sizes 2, 3, 4)												
Feed per revolution M = 155 mm (6.10 in) for size 2, M = 205 mm (8.07 in) for size 3, M = 264 mm (10.39 in) for size 4 N = Support axis												
Stroke xxxx = in mm (maximum stroke per size see Technical Data)												
Limit switch ¹⁾ A = 2 x PNP sensors as normally closed contacts, not wired C = 2 x PNP sensors as normally open contacts, not wired E = 2 x NPN sensors as normally closed contacts, not wired G = 2 x NPN sensors as normally open contacts, not wired N = No sensors, no contact plate												
Carriages (all driven) 1 = Type 1 (sizes 2, 3, 4) 2 = Type 2 4 = Type 4												
Options N = Without B = With cover strip C = Increased corrosion resistance, with cover strip A = Antistatic toothed belt, without cover strip A = Increased corrosion resistance, antistatic toothed belt, without cover strip L = Antistatic toothed belt, with cover strip												
Number of carriages ²⁾ A = One carriage B = Two carriages C = Three carriages												
Distance between carriages Minimum distance between 2 carriages: see table dimensional drawings 000 to 999 in mm XXX = With a single carriage												
Drive interface (see Figure 4) R = Right L = Left H = Without (hollow shaft at both ends) N = Support axis												

1) Cable length 100 mm (3.94 in), connector at one cable end, other versions and extension cables as accessories.

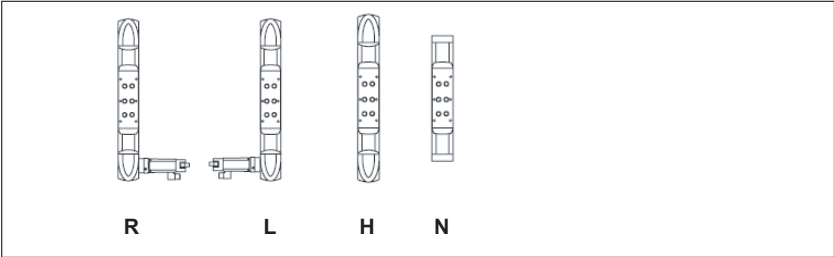


Figure 2: Drive interface

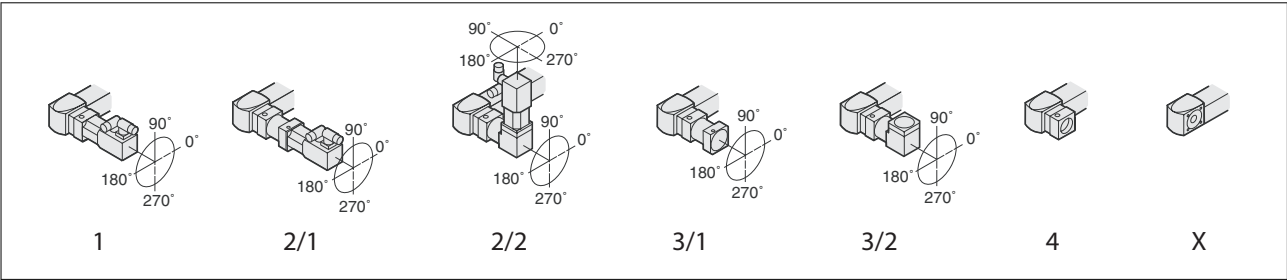


Figure 3: Mounting direction motor and gearbox

If you have questions concerning the type code, contact our sales office.

Designation customized version

In the case of a customized version, the type code contains one or several dollar signs "\$". Example: FAST 42BR\$1200C1NB100R

Contact your machine vendor if you have questions concerning customized versions.

2 FAST 42

2.1 Technical data FAST 42B

Value pairs with / without cover strip are separated by "/".

Technical data portal axis		FAST 42BR			FAST 42BB		
Drive element		Toothed belt 25HTD-5M			Toothed belt 25HTD-5M		
Guide type		Roller guide (W06)			Recirculating ball bearing guide (size 15)		
Payload	kg (lb)	12 (26.46)			25 (55.12)		
Carriage type		Type 1	Type 2	Type 4	Type 1	Type 2	Type 4
Carriage length	mm (in)	303 / 206 (11.93 / 8.11)	363 / 266 (14.29 / 10.47)	483 / 386 (19.02 / 15.20)	303 / 206 (11.93 / 8.11)	363 / 266 (14.29 / 10.47)	483 / 386 (19.02 / 15.20)
Feed per revolution	mm (in)	155 (6.10)			155 (6.10)		
Effective diameter toothed belt pulley	mm (in)	49.338 (1.9424)			49.338 (1.9424)		
Maximum feed force $F_{X_{max}}$ ¹⁾	N	800 (179.85)			800 (179.85)		
Maximum velocity ²⁾	m/s (ft/s)	8 (26.25)			5 (16.40)		
Maximum acceleration ²⁾	m/s ² (ft/s ²)	20 (65.62)			20 (65.62)		
Maximum driving torque M_{max} ¹⁾	Nm (lb·in)	20 (177.01)			20 (177.01)		
Breakaway torque 0 stroke axis	Nm (lb·in)	1.2 (10.62)			1.8 (15.93)		
Breakaway torque per additional carriage ³⁾	Nm (lb·in)	0.2 (1.77)			0.8 (7.08)		
Moment of inertia 0 stroke axis	kgcm ² (oz·in·s ²)	8.8 / 7.7 (1.25 / 1.09)	10.1 / 9.0 (1.43 / 1.27)	12.9 / 11.8 (1.83 / 1.67)	9.6 / 8.5 (1.36 / 1.20)	10.6 / 9.5 (1.50 / 1.35)	12.9 / 11.8 (1.83 / 1.67)
Moment of inertia per additional carriage ³⁾	kgcm ² (oz·in·s ²)	6.5 / 5.4 (0.92 / 0.76)	7.9 / 6.8 (1.12 / 0.96)	10.7 / 9.6 (1.52 / 1.36)	7.3 / 6.2 (1.03 / 0.88)	8.4 / 7.3 (1.19 / 1.03)	10.7 / 9.6 (1.52 / 1.36)
Moment of inertia per 1 m of stroke	kgcm ² (oz·in·s ²)	1.2 (0.17)			1.2 (0.17)		
Moment of inertia per 1 kg of payload	kgcm ² (oz·in·s ²)	6.1 (0.86)			6.1 (0.86)		
Maximum force F_{dynmax} ¹⁾	Nm (lb·in)	660 (5841.49)			2810 (24870.60)		
Maximum force $F_{zdynmax}$ ¹⁾	Nm (lb·in)	430 (3805.82)			2810 (24870.60)		

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves)

2) Load- and stroke-dependent

3) All carriages driven

Technical data portal axis		FAST 42BR			FAST 42BB		
Maximum torque $M_{y_{dynmax}}$ ¹⁾	Nm (lb-in)	18 (159.31)	31 (274.37)	56 (495.64)	74 (654.96)	194 (1717.04)	362 (3203.97)
Maximum torque $M_{z_{dynmax}}$ ¹⁾	Nm (lb-in)	28 (247.82)	48 (424.84)	87 (770.01)	74 (654.96)	194 (1717.04)	362 (3203.97)
Max. torque $M_{x_{dynmax}}$ ¹⁾	Nm (lb-in)	9 (79.66)			19 (168.16)		
Mass 0 stroke axis	kg (lb)	4.7 / 3.9 (10.36 / 8.60)	5.2 / 4.4 (11.46 / 9.70)	6.2 / 5.4 (13.67 / 11.90)	5.2 / 4.3 (11.46 / 9.48)	5.7 / 4.8 (12.57 / 10.58)	6.7 / 5.8 (14.77 / 12.79)
Mass per additional carriage (with axis body)	kg (lb)	2.5 / 1.9 (5.51 / 4.19)	3.0 / 2.4 (6.61 / 5.29)	3.9 / 3.3 (8.60 / 7.28)	2.9 / 2.2 (6.39 / 4.85)	3.4 / 2.7 (7.50 / 5.95)	4.4 / 3.7 (9.70 / 8.16)
Mass per 1 m of stroke	kg (lb)	4.6 (10.14)			5.6 (12.35)		
Moving mass carriage	kg (lb)	1.1 / 0.9 (2.43 / 1.98)	1.3 / 1.2 (2.87 / 2.65)	1.8 / 1.6 (3.97 / 3.53)	1.2 / 1.0 (2.65 / 2.20)	1.4 / 1.2 (3.09 / 2.65)	1.8 / 1.6 (3.97 / 3.53)
Maximum stroke ¹⁾	mm (in)	5540 / 5660 (218.11 / 222.83)	5480 / 5600 (215.75 / 220.47)	5360 / 5480 (211.02 / 215.75)	5540 / 5660 (218.11 / 222.83)	5480 / 5600 (215.75 / 220.47)	5360 / 5480 (211.02 / 215.75)
Minimum stroke ²⁾	mm (in)	130 (5.12)			9 (0.35)		
Repeatability ³⁾	mm (in)	± 0.05 (0.002)			± 0.05 (0.002)		
Diameter motor shaft	mm (in)	6.35 ... 20 (0.25 ... 0.79)			6.35 ... 20 (0.25 ... 0.79)		
Cross section axis body (W x H)	mm (in)	60 x 60 (2.36 x 2.36)			60 x 60 (2.36 x 2.36)		
Axial area moment of inertia I_x I_y	mm ⁴	435390 651610			435390 651610		
Modulus of elasticity (aluminum) E	N/mm ²	72000			72000		
Load rating linear guide C_{stat}	N (lbf)	2230 (501.32)			24200 (5440.38)		
Load rating linear guide C_{dyn}	N (lbf)	3950 (888.00)			14200 (3192.29)		
Service life ⁴⁾	km (mi)	30000 (18641)			30000 (18641)		

1) Inquire for greater stroke with recirculating ball bearing guide

2) Minimum stroke required for lubrication of the linear guide

3) Load- and stroke-dependent

Technical data support axis		FAST 42HR			FAST 42HB		
Breakaway force 0 stroke axis	N (lbf)	8 (1.80)			30 (6.74)		
Breakaway force per additional carriage	N (lbf)	8 (1.80)			30 (6.74)		
Mass 0 stroke axis	kg (lb)	3.1 / 2.4 (6.83 / 5.29)	3.6 / 2.9 (7.94 / 6.39)	4.6 / 3.9 (10.14 / 8.60)	3.6 / 2.8 (7.94 / 6.17)	4.1 / 3.3 (9.04 / 7.28)	5.1 / 4.3 (11.24 / 9.48)
For further data (if applicable) see:		FAST 42BR			FAST 42BB		

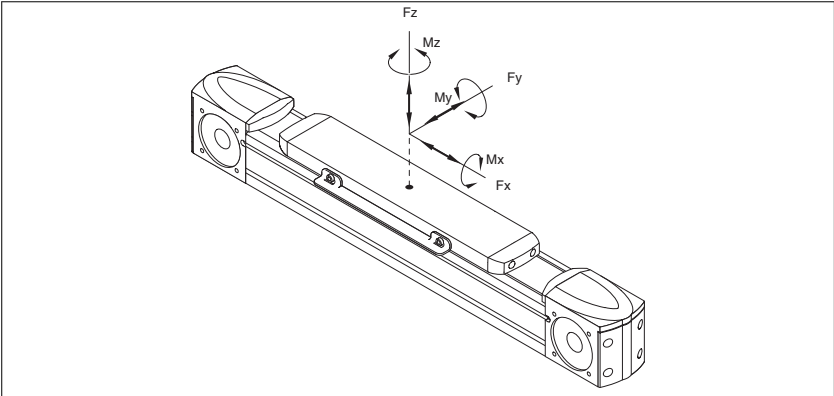


Figure 4: Forces and torques

2.2 Characteristic curves FAST 42BR

Maximum feed force F_x

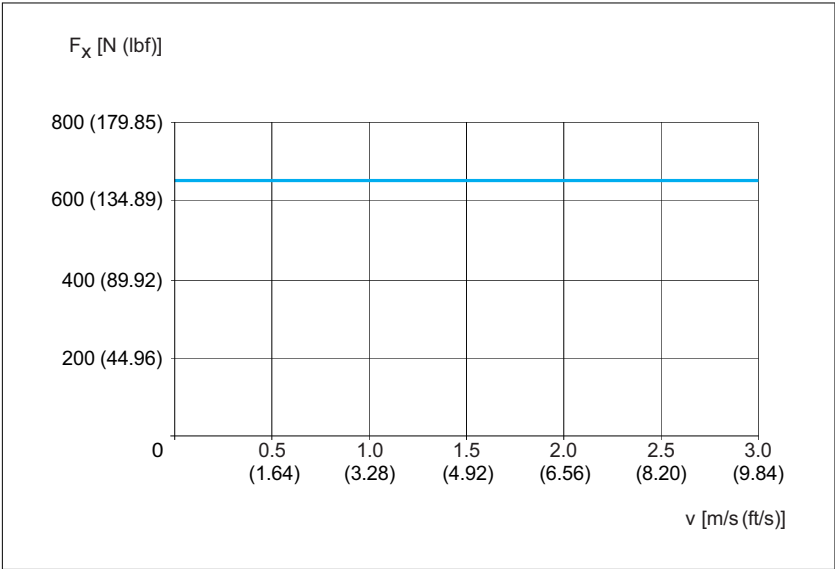


Figure5: FAST 42BR Maximum feed force F_x

Maximum force $F_{y_{dyn}}$

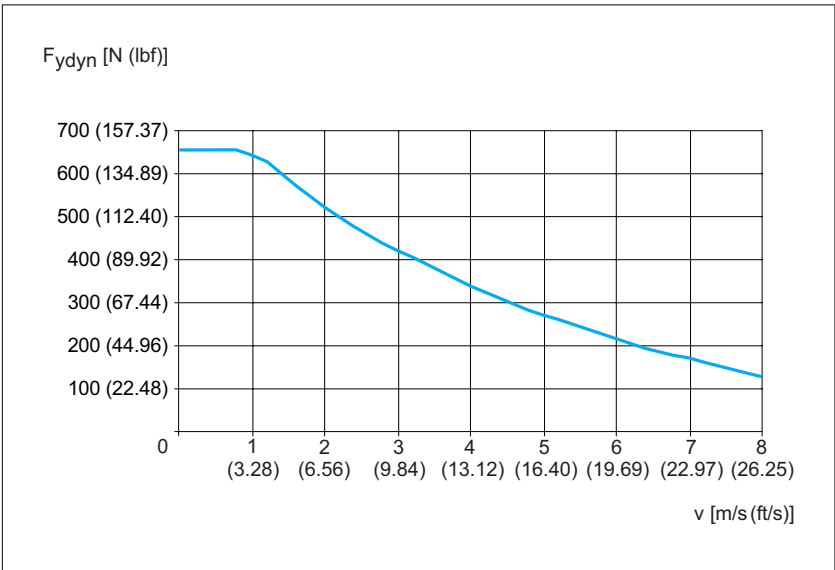


Figure 6: FAST 42BR Maximum force $F_{y_{dyn}}$

Maximum force F_{zdyn}

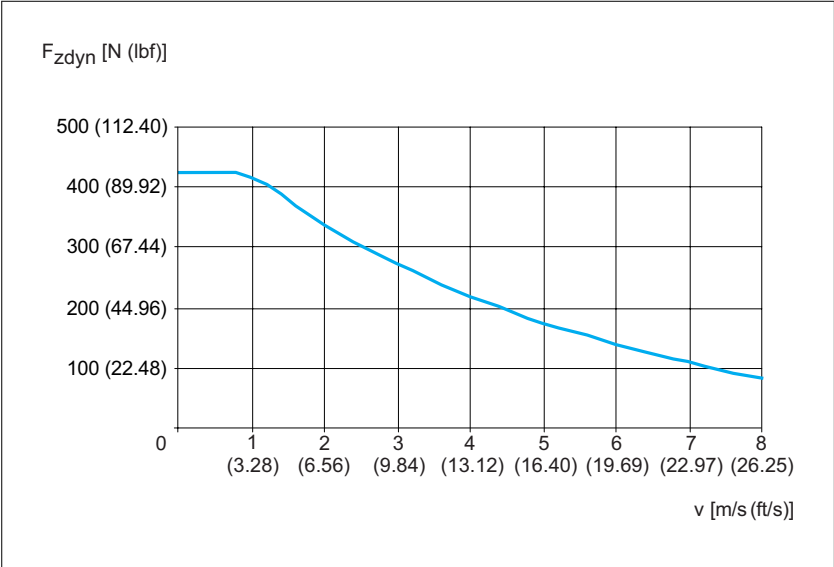


Figure 7: FAST 42BR Maximum force F_{zdyn}

Maximum driving torque M_{max}

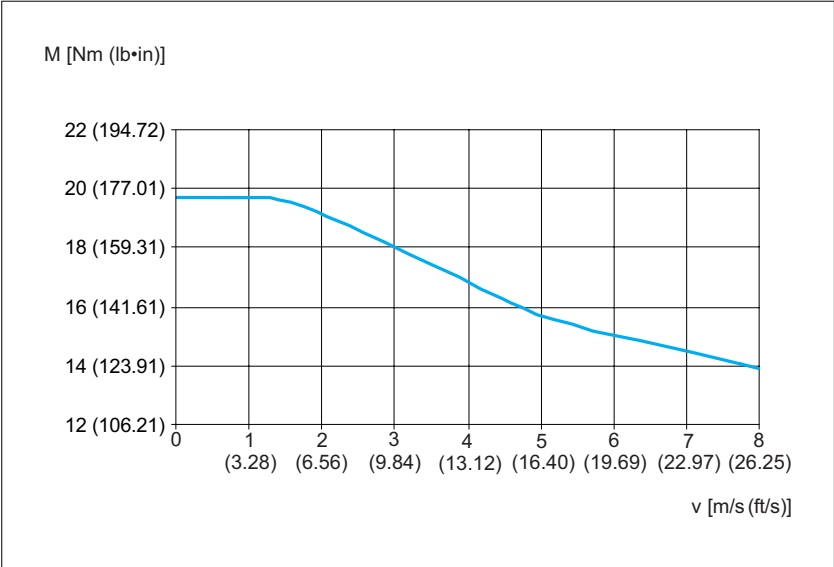


Figure 8: FAST 42BR Maximum driving torque M_{max}

Maximum torque carriage M_{xdyn}

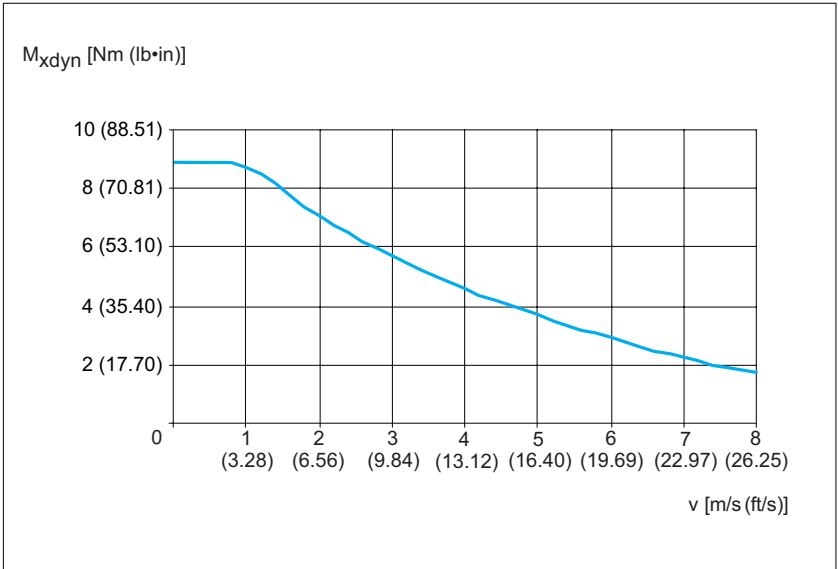


Figure9: FAST 42BR Maximum torque carriage M_{xdyn}

Maximum torque carriage M_{ydyn}

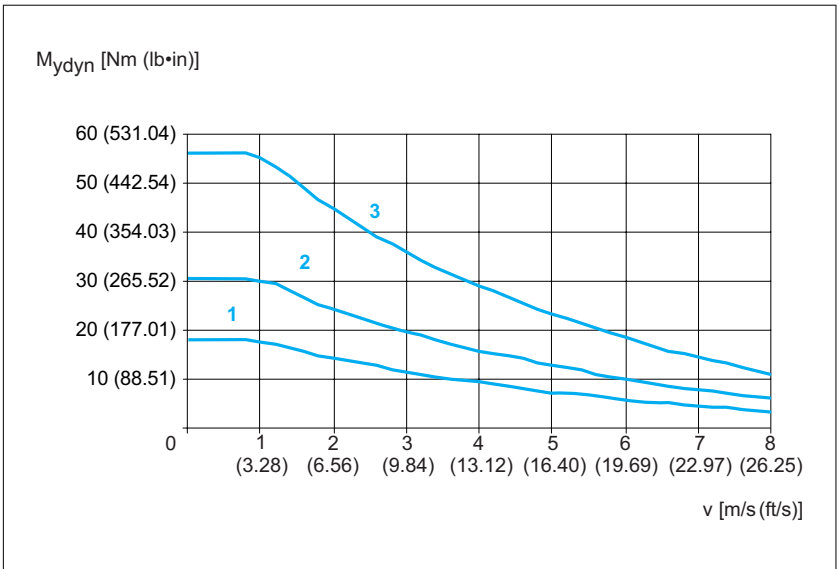


Figure 10: FAST 42BR Maximum torque carriage M_{ydyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Maximum torque carriage M_{zdyn}

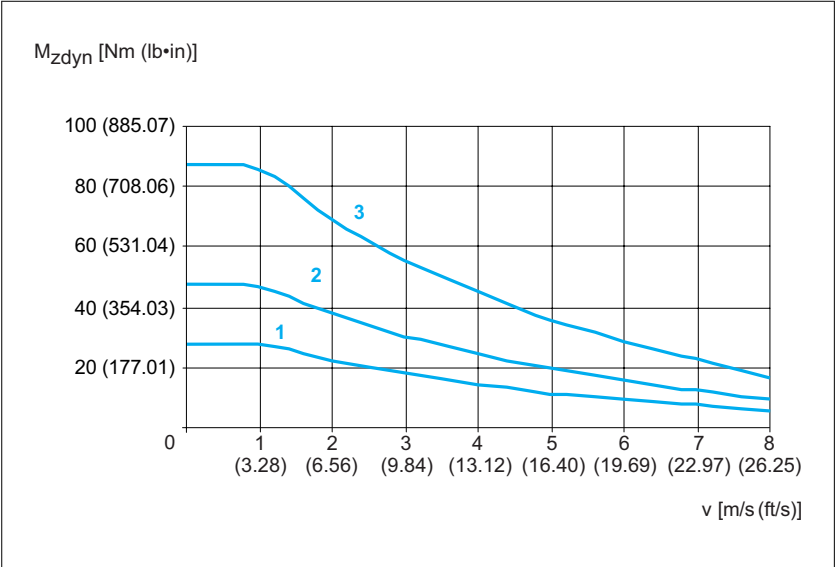


Figure 11: FAST 42BR Maximum torque carriage M_{zdyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Service life load curve

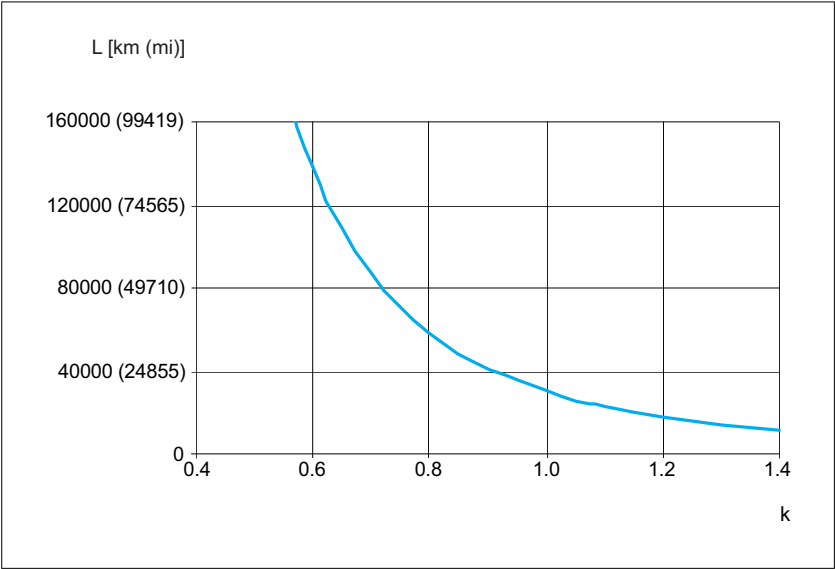


Figure 12: FAST 42BR Service life load curve

Maximum deflection In order to limit deflection of the linear axis at long strokes, the axis must be supported. The diagram below shows the deflection f [mm (in)] of the linear axis with respect to the support distance S [mm (in)] and the acting force F [N (lbf)]. Excessive deflection reduces the service life of the linear axis.

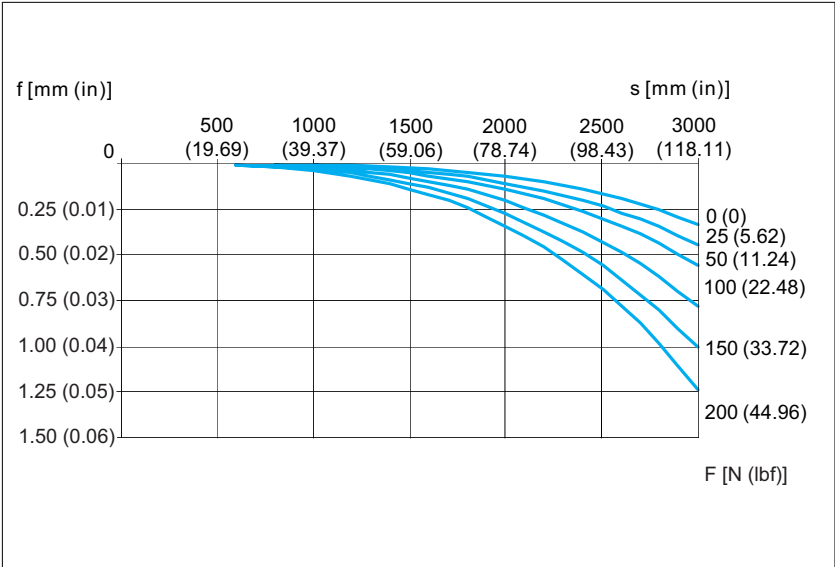


Figure 13: FAST 42BR Maximum deflection

2.3 Characteristic curves FAST 42BB

Maximum feed force F_x

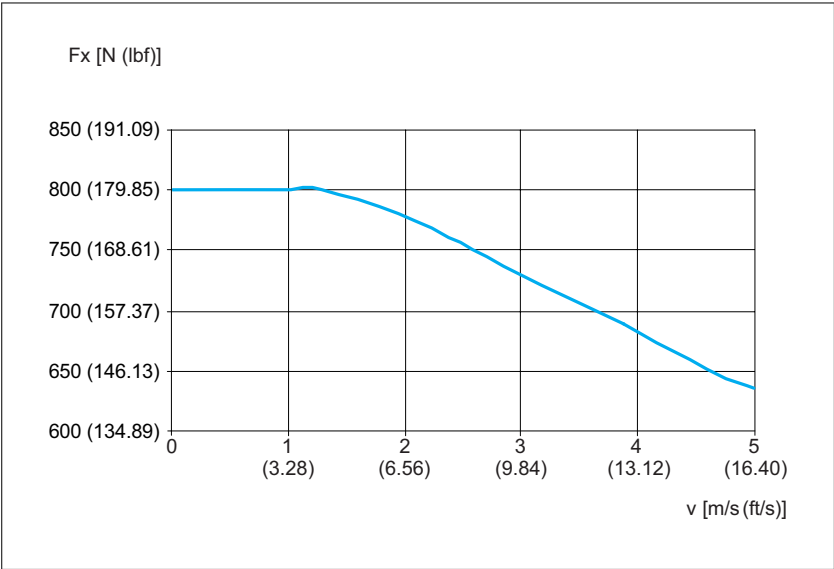


Figure 14: FAST 42BB Maximum feed force F_x

Maximum force $F_{y\text{dyn}}$

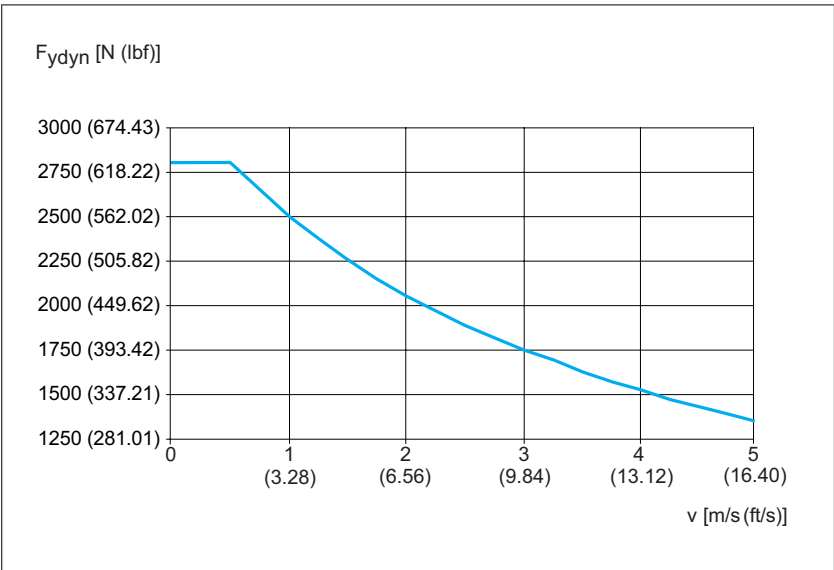


Figure 15: FAST 42BB Maximum force $F_{y\text{dyn}}$

Maximum force F_{zdyn}

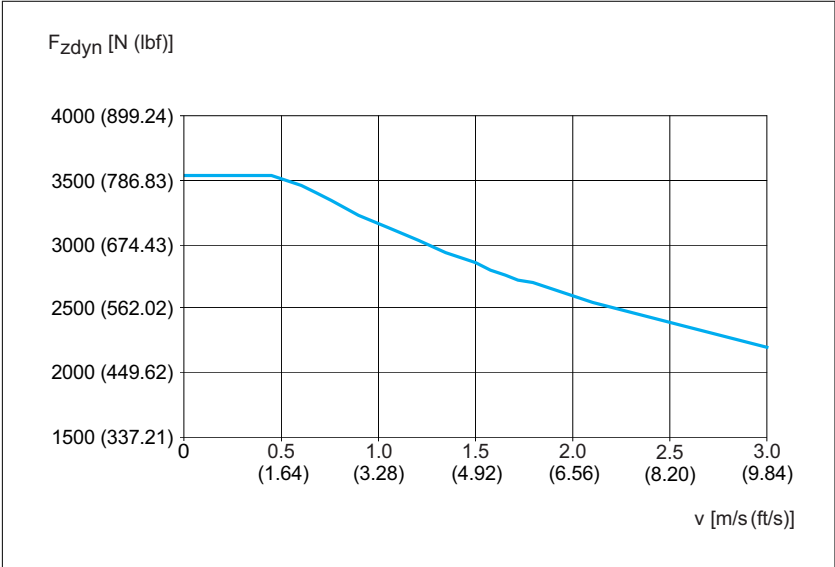


Figure 16: FAST 42BB Maximum force F_{zdyn}

Maximum driving torque M_{max}

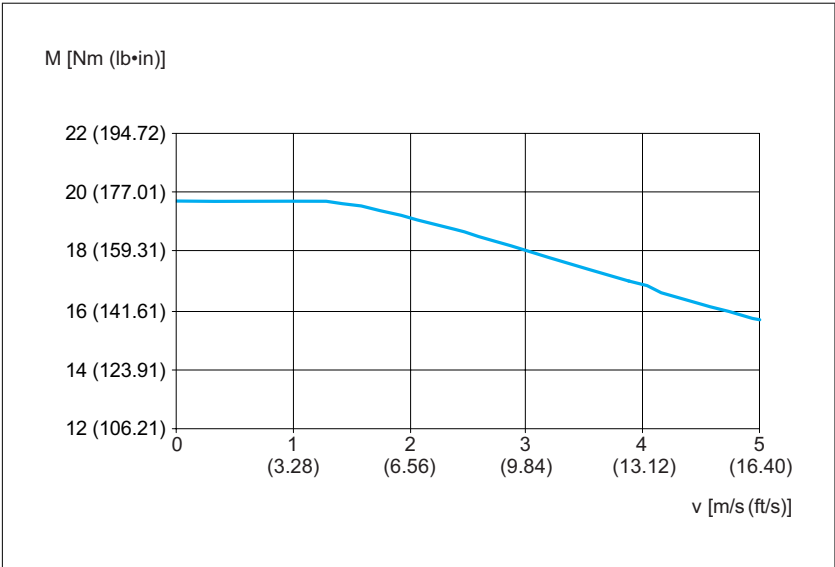


Figure 17: FAST 42BB Maximum driving torque M_{max}

Maximum torque carriage M_{xdyn}

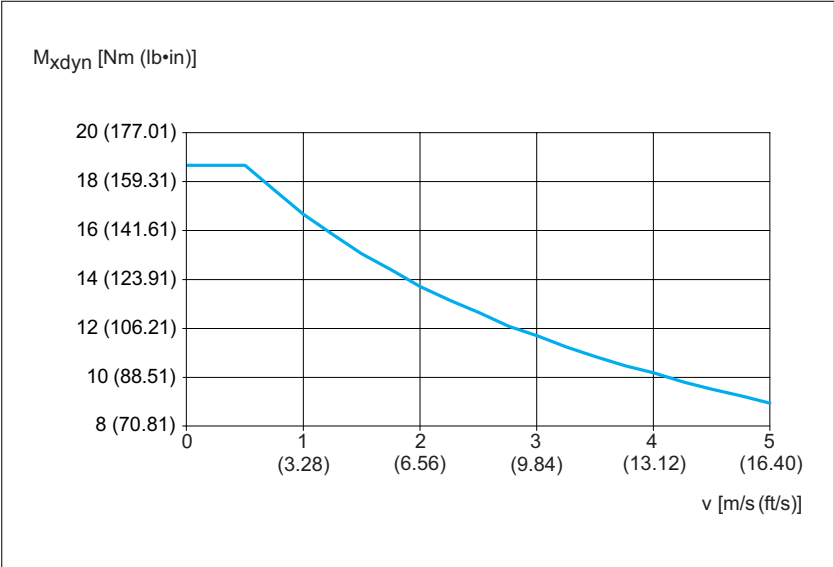


Figure 18: FAST 42BB Maximum torque carriage M_{xdyn}

Maximum torque carriage M_{ydyn}

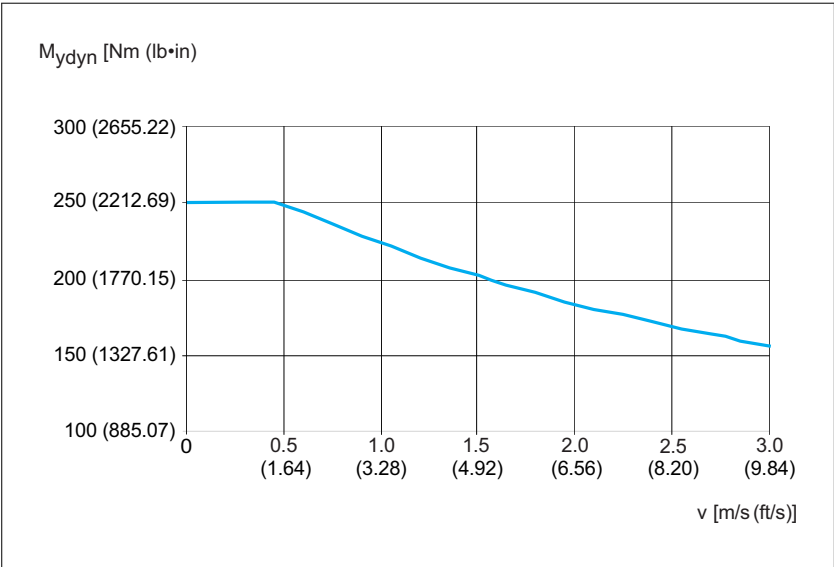


Figure 19: FAST42BB Maximum torque carriage M_{ydyn}

Maximum torque carriage M_{zdyn}

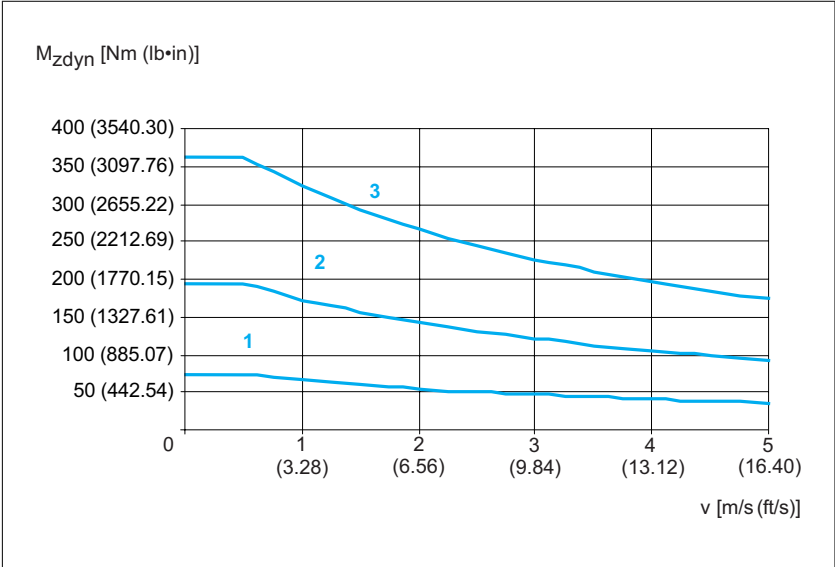


Figure 20: FAST 42BB Maximum torque carriage M_{zdyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Service life load curve

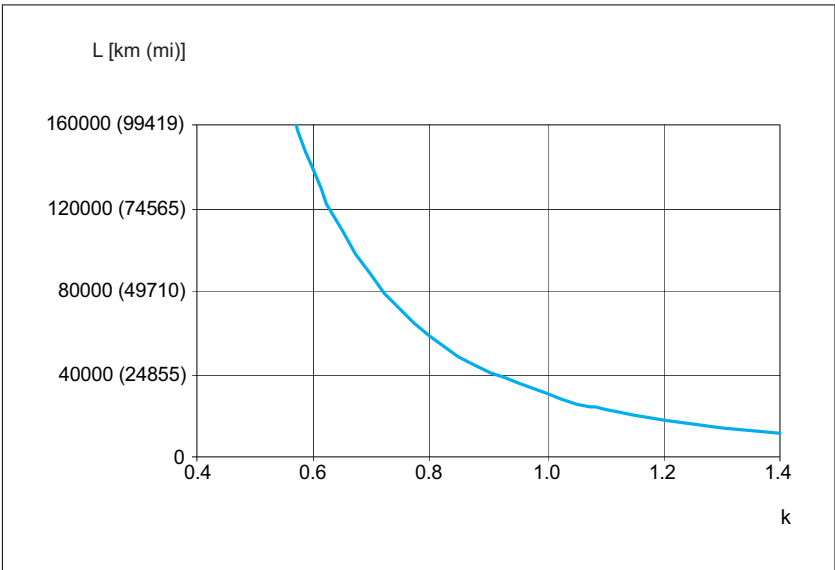


Figure 21: FAST 42BB Service life load curve

Maximum deflection In order to limit deflection of the linear axis at long strokes, the axis must be supported. The diagram below shows the deflection f [mm (in)] of the linear axis with respect to the support distance S [mm (in)] and the acting force F [N (lbf)]. Excessive deflection reduces the service life of the linear axis.

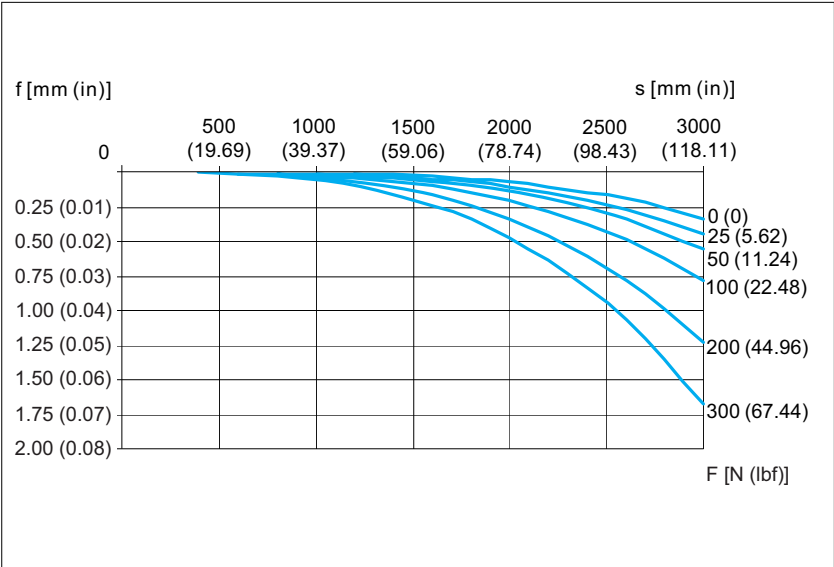


Figure 22:FAST 42BB Maximum deflection

2.3 Dimensional drawings FAST 42B

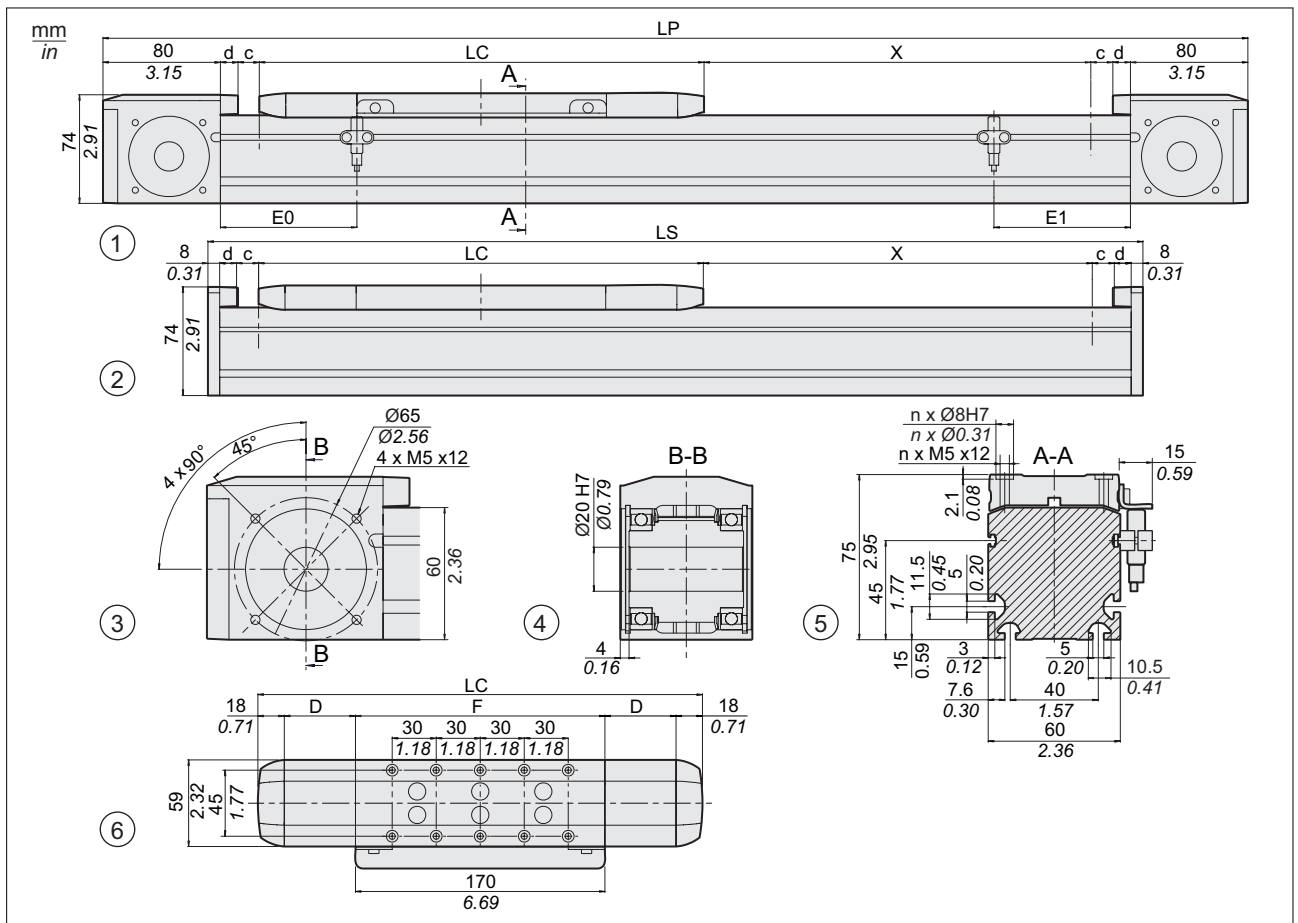


Figure 23: Dimensional drawings FAST 42B

- (1) Portal axis
- (2) Support axis
- (3) End block
- (4) Section of end block
- (5) Section of axis
- (6) Carriage type 1 (types 2 and 4 have more tapped holes for mounting)

Carriage type			Type 1		Type 2		Type 4	
Cover strip			No	Yes	No	Yes	No	Yes
Total length of portal axis ¹⁾	LP	mm (in)	396 + X (15.59 + X)	516 + X (20.31 + X)	456 + X (17.95 + X)	576 + X (22.68 + X)	576 + X (22.68 + X)	696 + X (27.40 + X)
Total length of support axis	LS	mm (in)	252 + X (9.92 + X)	372 + X (14.65 + X)	312 + X (12.28 + X)	432 + X (17.01 + X)	432 + X (17.01 + X)	552 + X (21.73 + X)
Stroke	X	mm (in)	See technical data		See technical data		See technical data	
Carriage length	LC	mm (in)	206 (8.11)	303 (11.93)	266 (10.47)	363 (14.29)	386 (15.20)	483 (19.02)
Profile length of carriage	F	mm (in)	170 (6.69)		230 (9.06)		350 (13.78)	
Number of tapped holes for mounting ²⁾	n		10		14		22	
Distance between tapped holes		mm (in)	30 ±0.03 (31.18 ±0.0012)		30 ±0.03 (31.18 ±0.0012)		30 ±0.03	
Limit switch position at drive end	E0	mm (in)	33 (1.30)	93 (3.66)	33 (1.30)	93 (3.66)	33 (1.30)	93 (3.66)
Limit switch position opposite drive end	E1	mm (in)	33 (1.30)	93 (3.66)	93 (3.66)	153 (6.02)	213 (8.39)	273 (10.75)
Stroke reserve up to mechanical stop	c	mm (in)	15 (0.59)		15 (0.59)		15 (0.59)	
Length of cover strip clamp	d	mm (in)	-	11.5 (0.45)	-	11.5 (0.45)	-	11.5 (0.45)
Deflection of cover strip	D	mm (in)	-	48.5 (1.91)	-	48.5 (1.91)	-	48.5 (1.91)
Minimum distance between 2 carriages		mm (in)	40 (1.57)	90 (3.54)	40 (1.57)	90 (3.54)	40 (1.57)	90 (3.54)

1) In the case of axes with more than one carriage, you must add the carriage length (LC) and the distance between the carriages for each additional carriage.

2) Prepared for locating rings (see Accessories)

2.4 FAST 43

2.4.1 Technical data FAST 43B

Technical data portal axis		PAS43BR			PAS43BB		
Drive element		Toothed belt 30HTD-5M			Toothed belt 30HTD-5M		
Guide type		Roller guide (W10)			Recirculating ball bearing guide (size 20)		
Payload	kg (lb)	25 (55.12)			60 (132.28)		
Carriage type		Type 1	Type 2	Type 4	Type 1	Type 2	Type 4
Carriage length	mm (in)	364 / 244 (14.33 / 9.61)	434 / 314 (17.09 / 12.36)	574 / 454 (22.60 / 17.87)	364 / 244 (14.33 / 9.61)	434 / 314 (17.09 / 12.36)	574 / 454 (22.60 / 17.87)
Feed per revolution	mm/rev.	205 (8.07)			205 (8.07)		
Effective diameter toothed belt pulley	mm (in)	65.254 (2.5691)			65.254 (2.5691)		
Maximum feed force $F_{x_{max}}$ ¹⁾	N (lbf)	1100 (247.29)			1100 (247.29)		
Maximum velocity ²⁾	m/s (ft/s)	8 (26.25)			5 (16.40)		
Maximum acceleration ²⁾	m/s ² (ft/s ²)	20 (65.62)			20 (65.62)		
Maximum driving torque M_{max} ¹⁾	Nm (lb-in)	36 (318.63)			36 (318.63)		
Breakaway torque 0 stroke axis	Nm (lb-in)	2.5 (22.13)			3.5 (30.98)		
Breakaway torque per additional carriage ³⁾	Nm (lb-in)	0.3 (2.66)			1.3 (11.51)		
Moment of inertia 0 stroke axis	kgcm ² (oz-in-s ²)	33.7 / 29.3 (4.77 / 4.15)	38.5 / 34.1 (5.45 / 4.83)	48.1 / 43.7 (6.81 / 6.19)	35.5 / 31.1 (5.03 / 4.40)	39.5 / 35.1 (5.59 / 4.97)	47.9 / 43.5 (6.78 / 6.16)
Moment of inertia per additional carriage ³⁾	kgcm ² (oz-in-s ²)	24.4 / 20.1 (3.46 / 2.85)	29.2 / 24.9 (4.14 / 3.53)	38.9 / 34.6 (5.51 / 4.90)	26.2 / 21.9 (3.71 / 3.10)	30.2 / 25.9 (4.28 / 3.67)	38.6 / 34.3 (5.47 / 4.86)
Moment of inertia per 1 m of stroke	kgcm ² (oz-in-s ²)	2.5 (0.35)			2.5 (0.35)		
Moment of inertia per 1 kg of payload	kgcm ² (oz-in-s ²)	10.7 (1.52)			10.7 (1.52)		

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves)

2) Load- and stroke-dependent

3) All carriages driven

2 Technical Data

FAST 4xB

Technical data portal axis		FAST 43BR			FAST 43BB		
Maximum force $F_{y_{dynmax}}^{1)}$	N (lbf)	1760 (395.66)			4410 (991.41)		
Maximum force $F_{z_{dynmax}}^{1)}$	N (lbf)	1040 (233.80)			4410 (991.41)		
Maximum torque $M_{y_{dynmax}}^{1)}$	Nm (lb·in)	51 (451.39)	87 (770.01)	160 (1416.12)	162 (1433.82)	379 (3354.43)	687 (6080.46)
Maximum torque $M_{z_{dynmax}}^{1)}$	Nm (lb·in)	86 (761.16)	148 (1309.91)	271 (2398.55)	162 (1433.82)	379 (3354.43)	687 (6080.46)
Max. torque $M_{x_{dynmax}}^{1)}$	Nm (lb·in)	29 (256.67)			42 (371.73)		
Mass 0 stroke axis	kg (lb)	10.6 / 8.9 (23.37 / 19.62)	11.6 / 9.9 (25.57 / 21.83)	13.6 / 11.9 (29.98 / 26.24)	11.8 / 9.9 (26.01 / 21.83)	12.6 / 10.7 (27.78 / 23.59)	14.6 / 12.7 (32.19 / 28.00)
Mass per additional carriage (with axis body)	kg (lb)	5.2 / 3.8 (11.46 / 8.38)	6.2 / 4.8 (13.67 / 10.58)	8.2 / 6.8 (18.08 / 14.99)	5.9 / 4.3 (13.01 / 9.48)	7.0 / 5.4 (15.43 / 11.90)	9.1 / 7.5 (20.06 / 16.53)
Mass per 1 m of stroke	kg (lb)	8.0 (17.64)			9.5 (20.94)		
Moving mass carriage	kg (lb)	2.3 / 1.9 (5.07 / 4.19)	2.8 / 2.4 (6.17 / 5.29)	3.7 / 3.3 (8.16 / 7.28)	2.5 / 2.1 (5.51 / 4.63)	2.9 / 2.5 (6.39 / 5.51)	3.7 / 3.2 (8.16 / 7.05)
Maximum stroke ²⁾	mm (in)	5450 / 5600 (214.57 / 220.47)	5380 / 5530 (211.81 / 217.72)	5240 / 5390 (206.30 / 212.20)	5450 / 5600 (214.57 / 220.47)	5380 / 5530 (211.81 / 217.72)	5240 / 5390 (206.30 / 212.20)
Minimum stroke ³⁾	mm (in)	175 (6.89)			11 (0.43)		
Repeatability ⁴⁾	mm (in)	± 0.05 (0.0012)			± 0.05 (0.0012)		
Diameter motor shaft	mm (in)	12 ... 25 (0.47 ... 0.98)			12 ... 25 (0.47 ... 0.98)		
Cross section axis body (W x H)	mm (in)	80 x 80 (3.15 x 3.15)			80 x 80 (3.15 x 3.15)		
Axial area moment of inertia I_x I_y	mm ⁴	1285260 1867210			1285260 1867210		
Modulus of elasticity (aluminum) E	N/mm ²	72000			72000		
Load rating linear guide C_{stat}	N (lbf)	4850 (1090.32)			38400 (8632.66)		
Load rating linear guide C_{dyn}	N (lbf)	8500 (1910.88)			22300 (5013.24)		
Service life ⁵⁾	km (mi)	30000 (18641)			30000 (18641)		

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves).

2) Inquire for greater stroke with recirculating ball bearing guide

3) Minimum stroke required for lubrication of the linear guide

4) Load- and stroke-dependent

Technical data support axis		FAST 43HR			FAST 43HB		
Breakaway force 0 stroke axis	N (lbf)	10 (2.25)			40 (8.99)		
Breakaway force per additional carriage	N (lbf)	10 (2.25)			40 (8.99)		
Mass 0 stroke axis	kg (lb)	6.7 / 5.0 (14.77 / 11.02)	7.7 / 6.0 (16.98 / 13.23)	9.7 / 8.0 (21.38 / 17.64)	7.5 / 5.6 (16.53 / 12.35)	8.5 / 6.6 (18.74 / 14.55)	10.6 / 8.7 (23.37 / 19.18)
For further data (if applicable) see:		FAST 43BR			FAST 43BB		

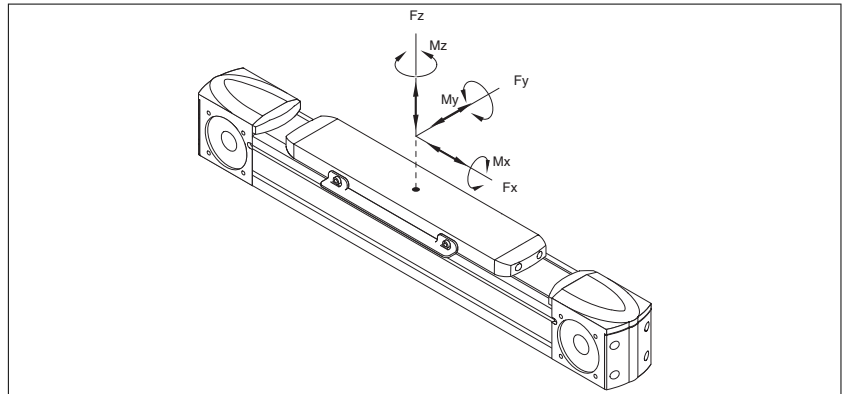


Figure 24: Forces and torques

2.4.2 Characteristic curves FAST 43BR

Maximum feed force F_x

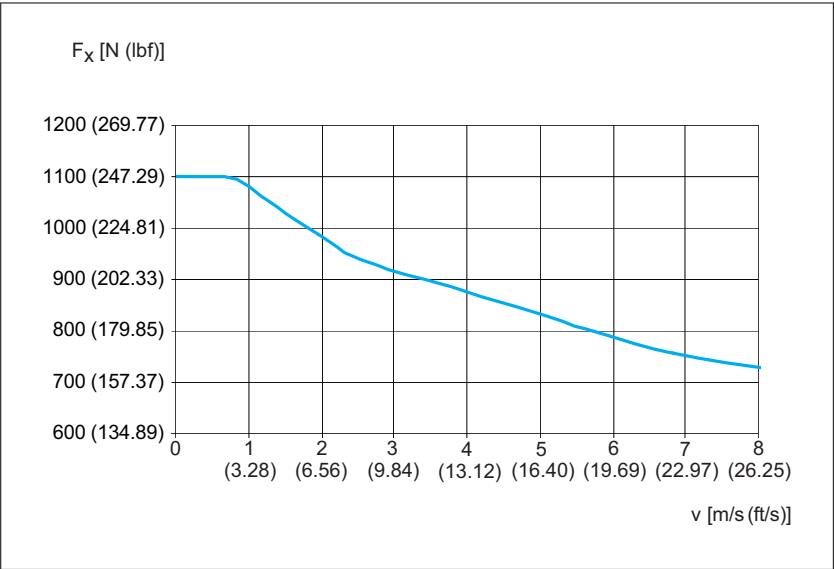


Figure 25: FAST43BR Maximum feed force F_x

Maximum force $F_{y\text{dyn}}$

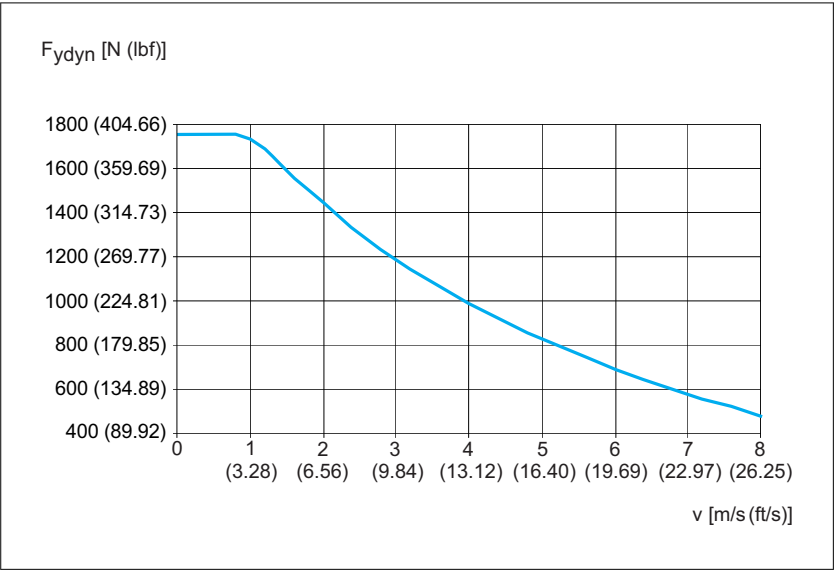


Figure 26: FAST 43BR Maximum force $F_{y\text{dyn}}$

Maximum force F_{zdyn}

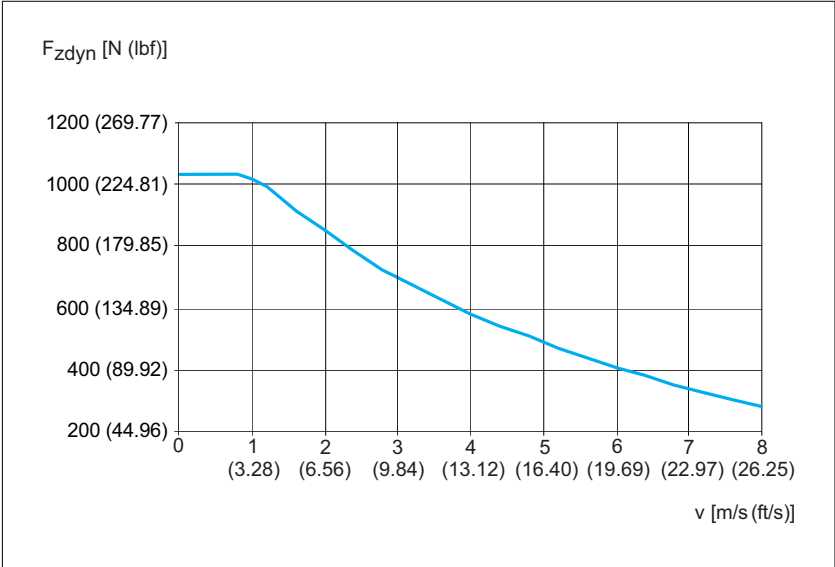


Figure 27: FAST 43BR Maximum force F_{zdyn}

Maximum driving torque M_{max}

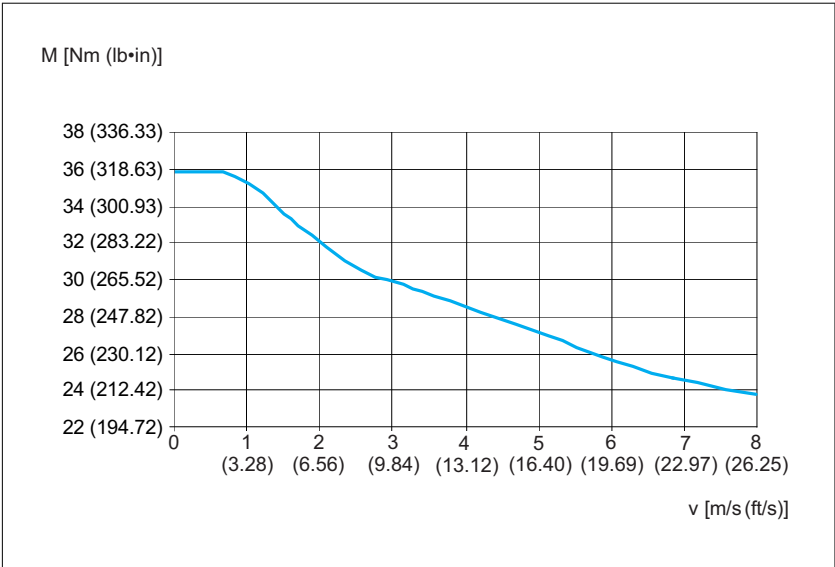


Figure 28: FAST 43BR Maximum driving torque M_{max}

Maximum torque carriage M_{xdyn}

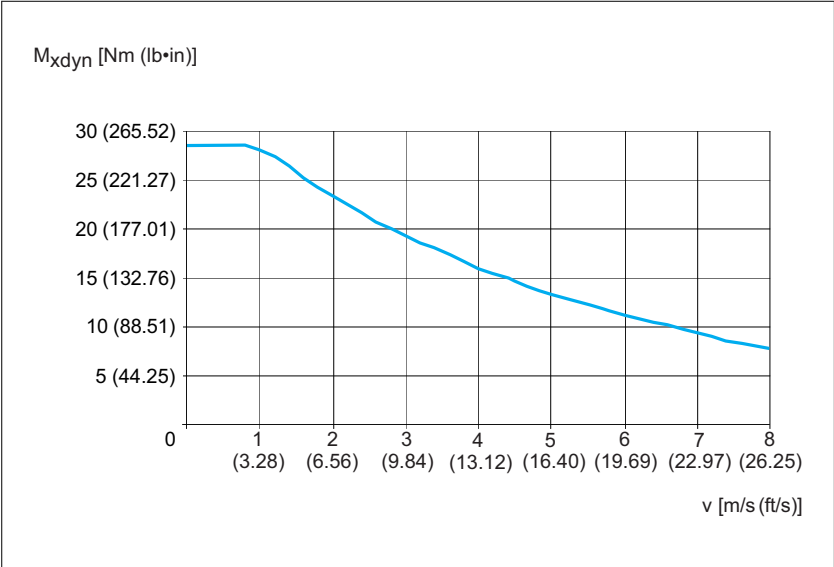


Figure 29: FAST 43BR Maximum torque carriage M_{xdyn}

Maximum torque carriage M_{ydyn}

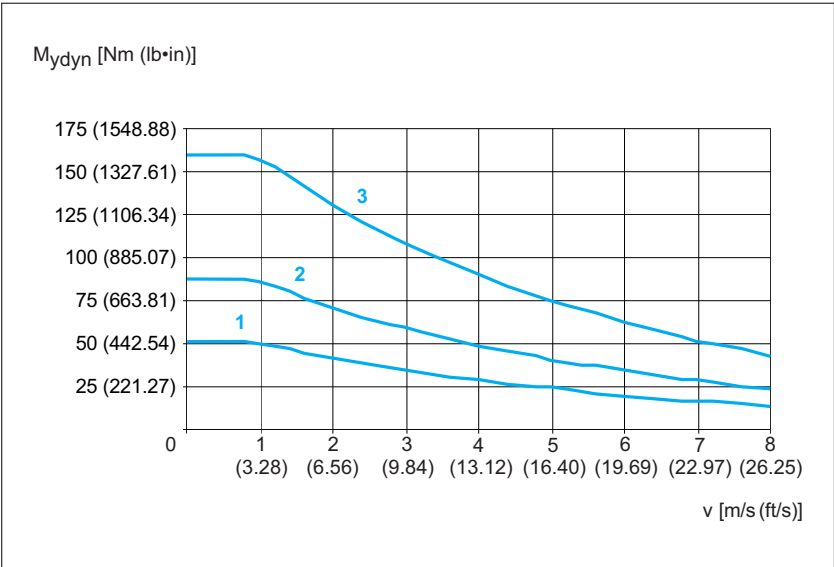


Figure 30: FAST 43BR Maximum torque carriage M_{ydyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Maximum torque carriage M_{zdyn}

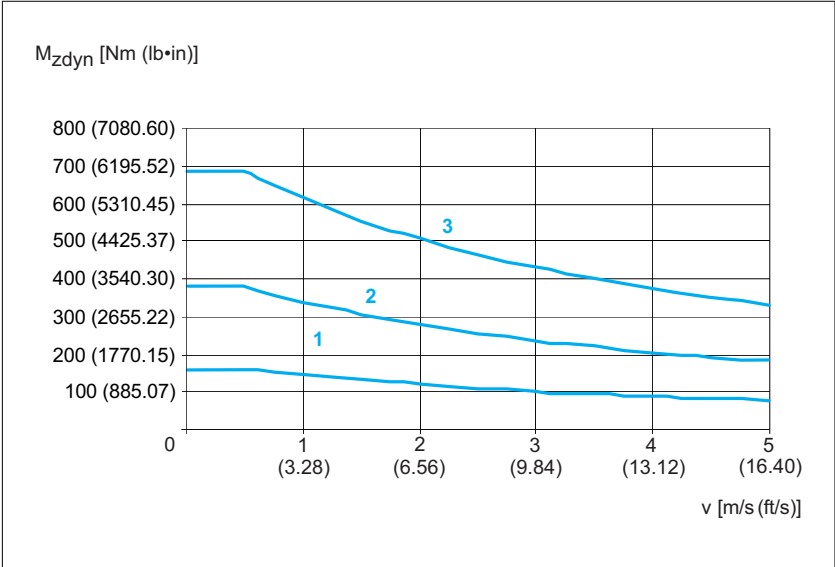


Figure 31: FAST 43BR Maximum torque carriage M_{zdyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Service life load curve

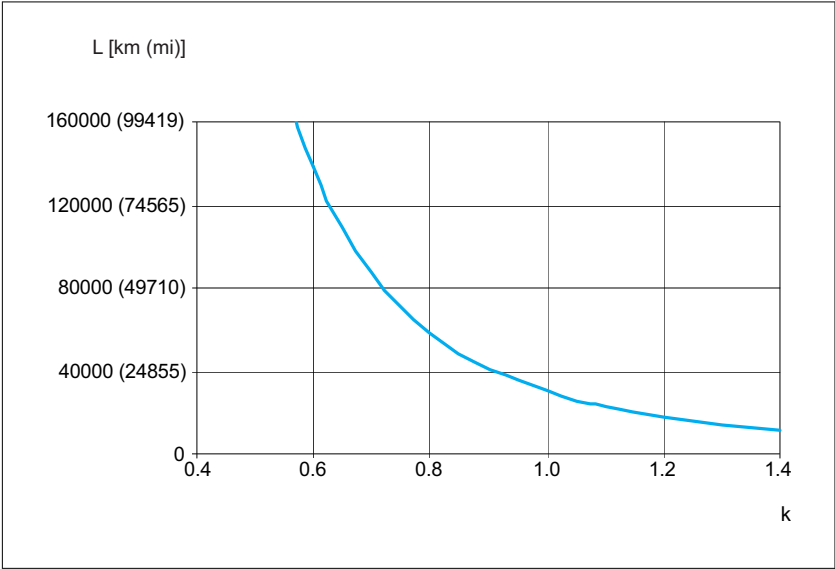


Figure 32: FAST 43BR Service life load curve

Maximum deflection In order to limit deflection of the linear axis at long strokes, the axis must be supported. The diagram below shows the deflection f [mm (in)] of the linear axis with respect to the support distance S [mm (in)] and the acting force F [N (lbf)]. Excessive deflection reduces the service life of the linear axis.

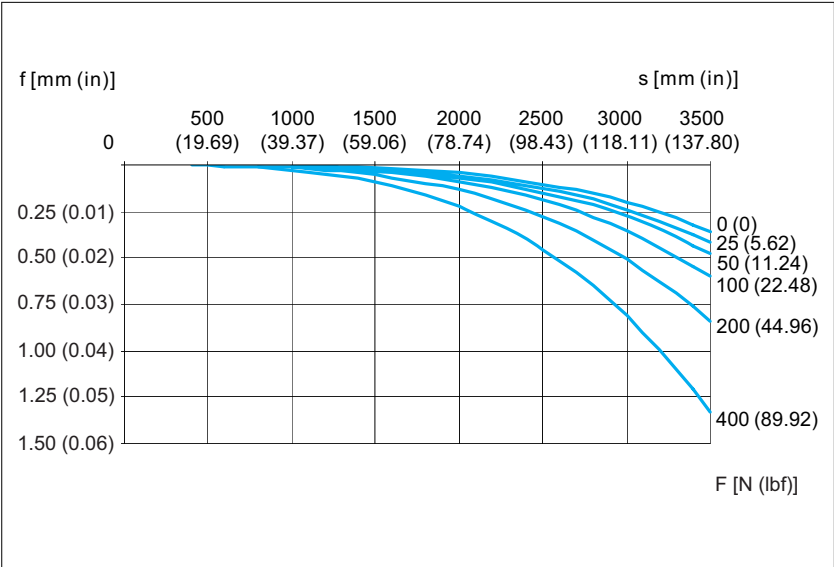


Figure 33: FAST 43BR Maximum deflection

2.4.3 Characteristic curves FAST 43BB

Maximum feed force F_x

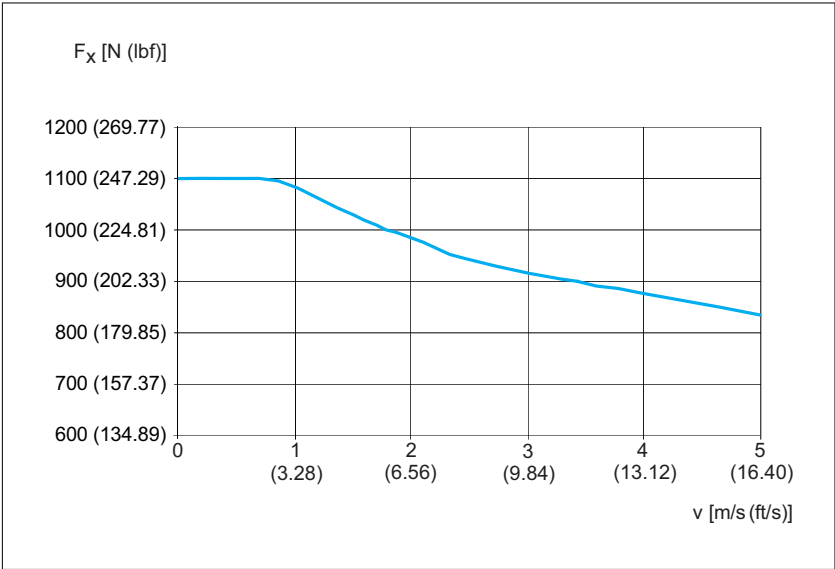


Figure 34: FAST 43BB Maximum feed force F_x

Maximum force $F_{y\text{dyn}}$

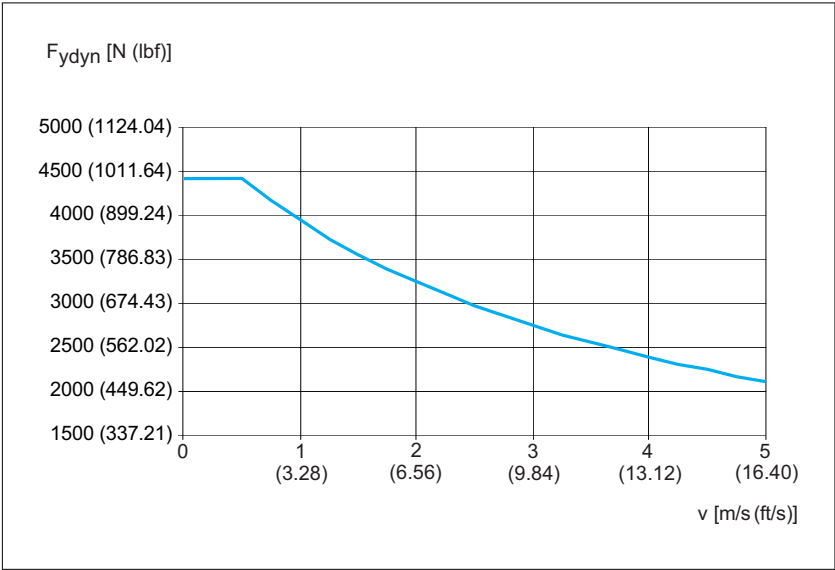


Figure 35: FAST 43BB Maximum force $F_{y\text{dyn}}$

Maximum force F_{zdyn}

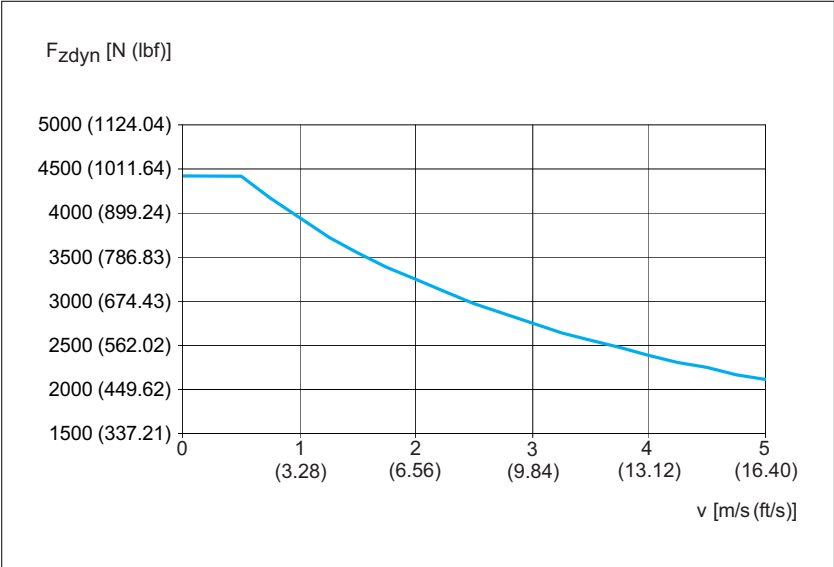


Figure 36: FAST 43BB Maximum force F_{zdyn}

Maximum driving torque M_{max}

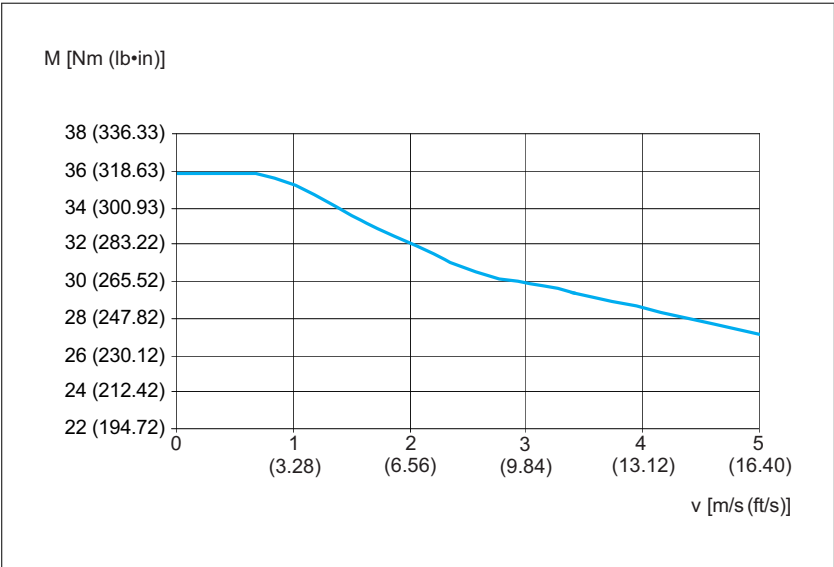


Figure 37: FAST 43BB Maximum driving torque M_{max}

Maximum torque carriage M_{xdyn}

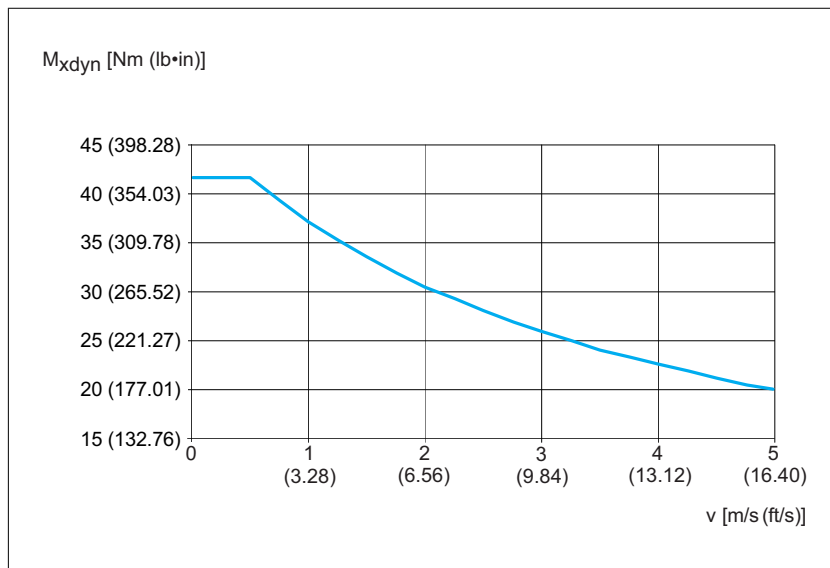


Figure 38: FAST 43BB Maximum torque carriage M_{xdyn}

Maximum torque carriage M_{ydyn}

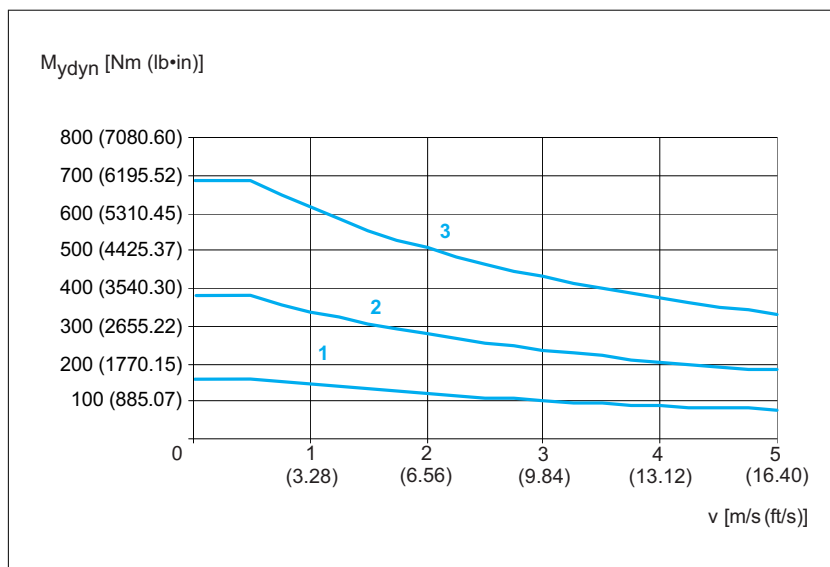


Figure 39: FAST 43BB Maximum torque carriage M_{ydyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Maximum torque carriage M_{zdyn}

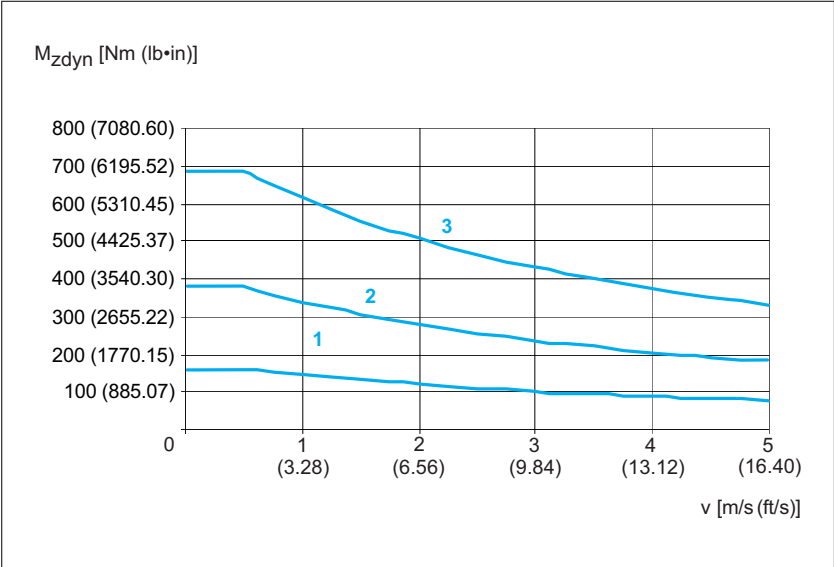


Figure 40: FAST 43BB Maximum torque carriage M_{zdyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Service life load curve

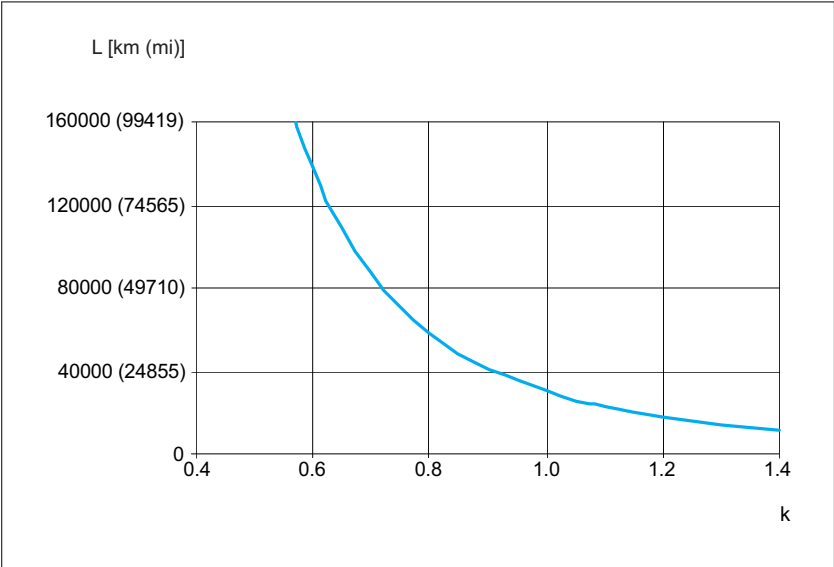


Figure 41: FAST 43BB Service life load curve

Maximum deflection

In order to limit deflection of the linear axis at long strokes, the axis must be supported. The diagram below shows the deflection f [mm (in)] of the linear axis with respect to the support distance S [mm (in)] and the acting force F [N (lbf)]. Excessive deflection reduces the service life of the linear axis.

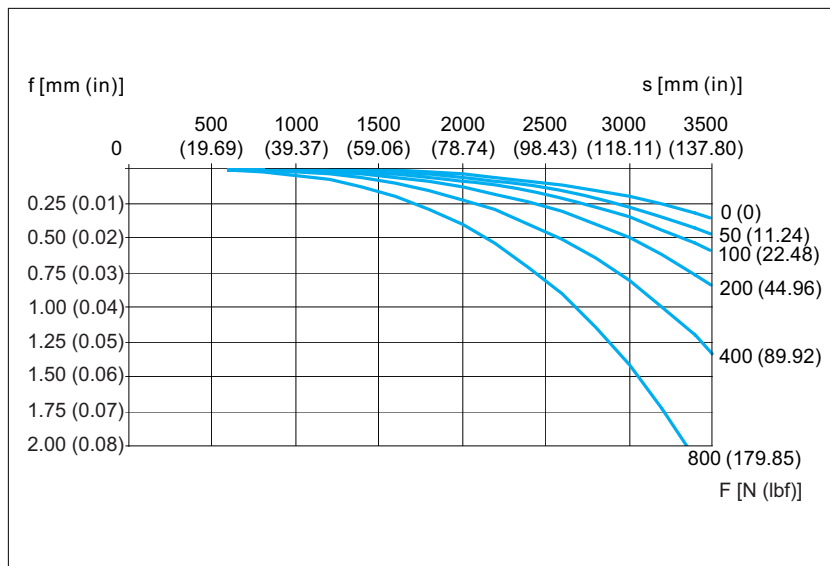


Figure 42: FAST 43BB Maximum deflection

2.4.4 Dimensional drawings FAST 43B

Dimensional drawings FAST 43B

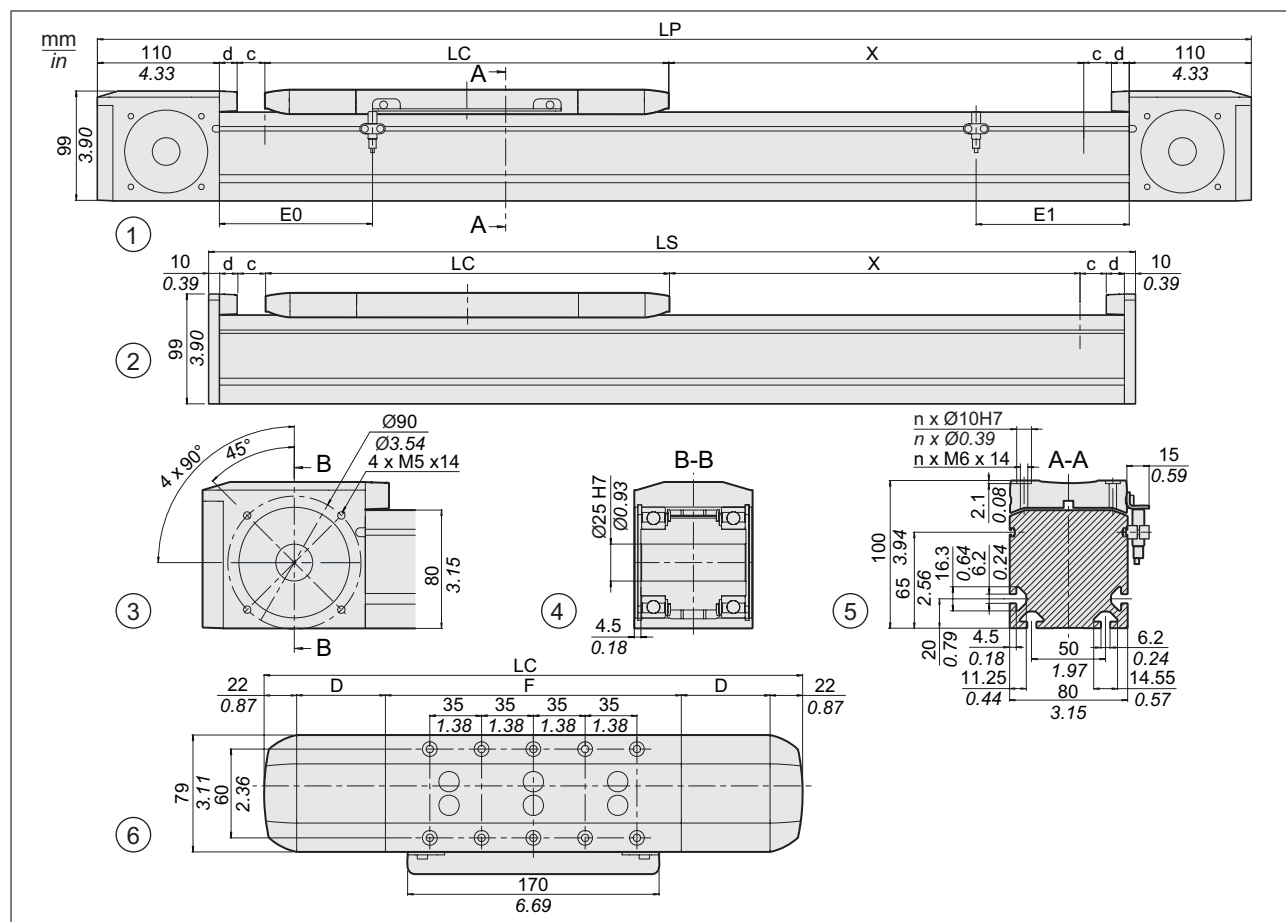


Figure 43: Dimensional drawings FAST 43B

- (1) Portal axis
- (2) Support axis
- (3) End block
- (4) Section of end block
- (5) Section of axis
- (6) Carriage type 1 (types 2 and 4 have more tapped holes for mounting)

Carriage type			Type 1		Type 2		Type 4	
Cover strip			No	Yes	No	Yes	No	Yes
Total length of portal axis ¹⁾	LP	mm (in)	514 + X (20.24 + X)	664 + X (26.14 + X)	584 + X (22.99 + X)	734 + X (28.90 + X)	724 + X (28.50 + X)	874 + X (34.41 + X)
Total length of support axis	LS	mm (in)	314 + X (12.36 + X)	464 + X (18.27 + X)	384 + X (15.12 + X)	534 + X (21.02 + X)	524 + X (20.63 + X)	674 + X (26.54 + X)
Stroke	X	mm	See technical data		See technical data		See technical data	
Carriage length	LC	mm (in)	244 (9.61)	364 (14.33)	314 (12.36)	434 (17.09)	454 (17.87)	574 (22.60)
Profile length of carriage	F	mm (in)	200 (7.87)		270 (10.63)		410 (16.14)	
Number of tapped holes for mounting ²⁾	n		10		14		22	
Distance between tapped holes		mm (in)	35 ±0.03 (1.38 0.0012)		35 ±0.03 (1.38 0.0012)		35 ±0.03 (1.38 0.0012)	
Limit switch position at drive end	E0	mm (in)	63 (2.48)	138 (5.43)	63 (2.48)	138 (5.43)	63 (2.48)	138 (5.43)
Limit switch position opposite drive end	E1	mm (in)	63 (2.48)	138 (5.43)	133 (5.24)	208 (8.19)	273 (10.75)	348 (13.70)
Stroke reserve up to mechanical stop	c	mm (in)	25 (0.98)		25 (0.98)		25 (0.98)	
Length of cover strip clamp	d	mm (in)	-	15 (0.59)	-	15 (0.59)	-	15 (0.59)
Deflection of cover strip	D	mm (in)	-	60 (2.36)	-	60 (2.36)	-	60 (2.36)
Minimum distance between 2 carriages		mm (in)	45 (1.77)	110 (4.33)	45 (1.77)	110 (4.33)	45 (1.77)	110 (4.33)

1) In the case of axes with more than one carriage, you must add the carriage length (LC) and the distance between the carriages for each additional carriage.

2) Prepared for locating rings (see Accessories)

2.5 FAST 44

2.5.1 Technical data FAST 44BB

Value pairs with / without cover strip are separated by "/".

Technical data portal axis		FAST 44BB		
Drive element		Toothed belt 50HTD-8M		
Guide type		Recirculating ball bearing guide (size 25)		
Payload	kg (lb)	100 (220.46)		
Carriage type		Type 1	Type 2	Type 4
Carriage length	mm (in)	470 / 310 (18.50 / 12.20)	560 / 400 (22.05 / 15.75)	740 / 580 (29.13 / 22.83)
Feed per revolution	mm/rev.	264 (10.39)		
Effective diameter toothed belt pulley	mm (in)	84.034 (3.3084)		
Maximum feed force $F_{x_{max}}^{1)}$	N (lbf)	2600 (584.50)		
Maximum velocity $^{2)}$	m/s (ft/s)	5 (16.40)		
Maximum acceleration $^{2)}$	m/s ² (ft/s ²)	20 (65.62)		
Maximum driving torque $M_{max}^{1)}$	Nm (lb·in)	110 (973.58)		
Breakaway torque 0 stroke axis	Nm (lb·in)	4.5 (39.83)		
Breakaway torque per additional carriage $^{3)}$	Nm (lb·in)	2.1 (18.59)		
Moment of inertia 0 stroke axis	kgcm ² (oz·in·s ²)	121.2 / 105.1 (17.16 / 14.88)	137 / 120.9 (19.40 / 16.99)	169.2 / 153.1 (23.96 / 21.68)
Moment of inertia per additional carriage $^{3)}$	kgcm ² (oz·in·s ²)	89.6 / 73.5 (12.69 / 10.41)	105.4 / 89.3 (14.93 / 12.65)	137.6 / 121.5 (19.49 / 17.21)
Moment of inertia per 1 m of stroke	kgcm ² (oz·in·s ²)	11.2 (1.59)		
Moment of inertia per 1 kg of payload	kgcm ² (oz·in·s ²)	17.7 (2.51)		
Maximum force $F_{y_{dynmax}}^{1)}$	N (lbf)	6270 (1409.55)		
Maximum force $F_{z_{dynmax}}^{1)}$	N (lbf)	6270 (1409.55)		
Maximum torque $M_{y_{dynmax}}^{1)}$	Nm (lb·in)	256 (2265.79)	665 (5885.75)	1209 (10700.55)
Maximum torque $M_{z_{dynmax}}^{1)}$	Nm (lb·in)	256 (2265.79)	665 (5885.75)	1209 (10700.55)
Max. torque $M_{x_{dynmax}}^{1)}$	Nm (lb·in)	68 (601.85)		

1) The maximum permissible dynamic forces and torques decrease at increasing velocities (see characteristic curves)

2) Load- and stroke-dependent

3) All carriages driven

Technical data portal axis		FAST 44BB		
Mass 0 stroke axis	kg (lb)	25.4 / 21.0 (56.00 / 46.30)	27.8 / 23.4 (61.29 / 51.59)	32.5 / 28.1 (71.65 / 61.95)
Mass per additional carriage (with axis body)	kg (lb)	12.9 / 9.3 (28.44 / 20.50)	15.3 / 11.7 (33.73 / 25.79)	20.1 / 16.5 (44.31 / 36.38)
Mass per 1 m of stroke	kg (lb)	16.9 (37.26)		
Moving mass carriage	kg (lb)	5.1 / 4.2 (11.24 / 9.26)	6.0 / 5.1 (13.23 / 11.24)	7.8 / 6.9 (17.20 / 15.21)
Maximum stroke ¹⁾	mm (in)	5310 / 5510 (209.06 / 216.93)	5220 / 5420 (205.51 / 213.39)	5040 / 5240 (198.43 / 206.30)
Minimum stroke ²⁾	mm (in)	13 (0.51)		
Repeatability ³⁾	mm (in)	± 0.05 (0.0012)		
Diameter motor shaft	mm (in)	12 ... 32 (0.47 ... 1.26)		
Cross section axis body (W x H)	mm (in)	110 x 110 (4.33 x 4.33)		
Axial area moment of inertia I _x I _y	mm ⁴	4713490 6624690		
Modulus of elasticity (aluminum) E	N/mm ²	72000		
Load rating linear guide C _{stat}	N (lbf)	52400 (11779.99)		
Load rating linear guide C _{dyn}	N (lbf)	31700 (7126.44)		
Service life ⁴⁾	km (mi)	30000 (18641)		

1) Inquire for greater stroke with recirculating ball bearing guide

2) Minimum stroke required for lubrication of the linear guide

3) Load- and stroke-dependent

Technical data support axis		FAST 44HB		
Breakaway force 0 stroke axis	N (lbf)	50 (11.24)		
Breakaway force per additional carriage	N (lbf)	50 (11.24)		
Mass 0 stroke axis	kg (lb)	17.1 / 12.8 (37.70 / 28.22)	19.5 / 15.2 (42.99 / 33.51)	24.3 / 20.0 (53.57 / 44.09)
For further data (if applicable) see:		FAST 44BB		

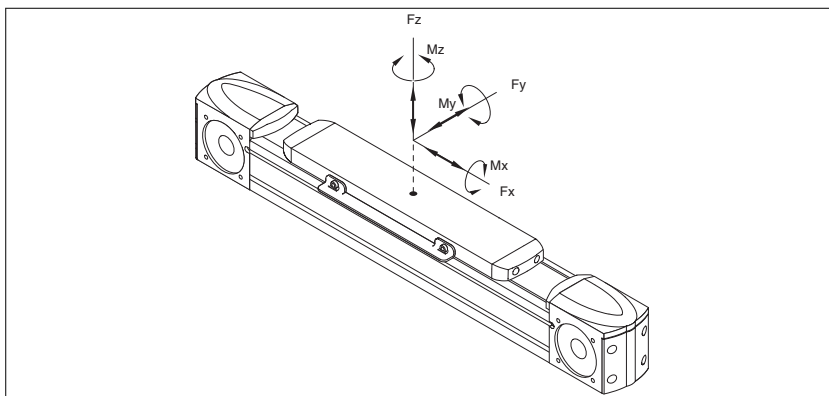


Figure 44: Forces and torques

2.5.2 Characteristic curves FAST 44BB

Maximum feed force F_x

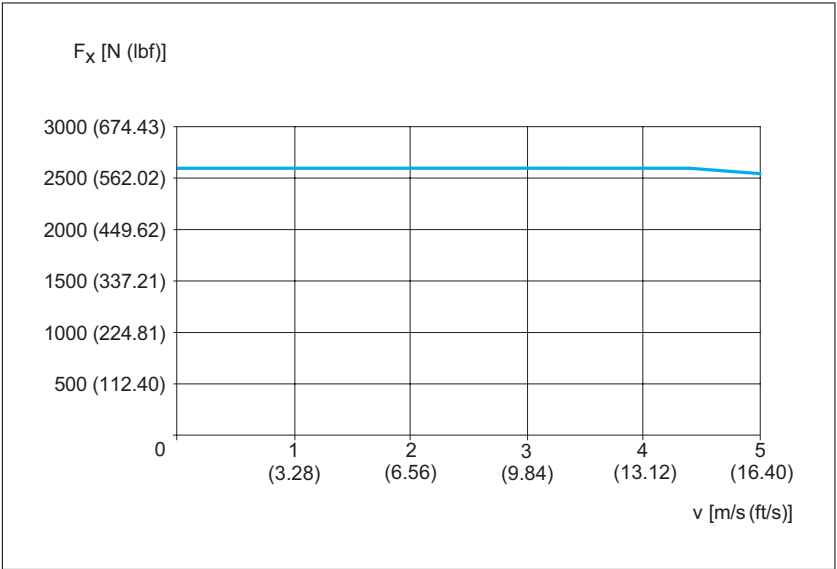


Figure 45: FAST 44BB Maximum feed force F_x

Maximum force $F_{y\text{dyn}}$

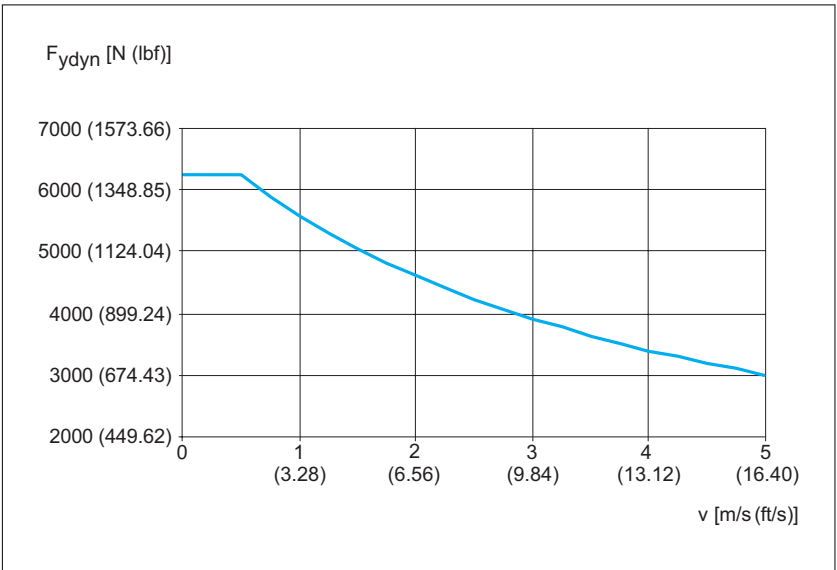


Figure 46: FAST 44BB Maximum force $F_{y\text{dyn}}$

Maximum force F_{zdyn}

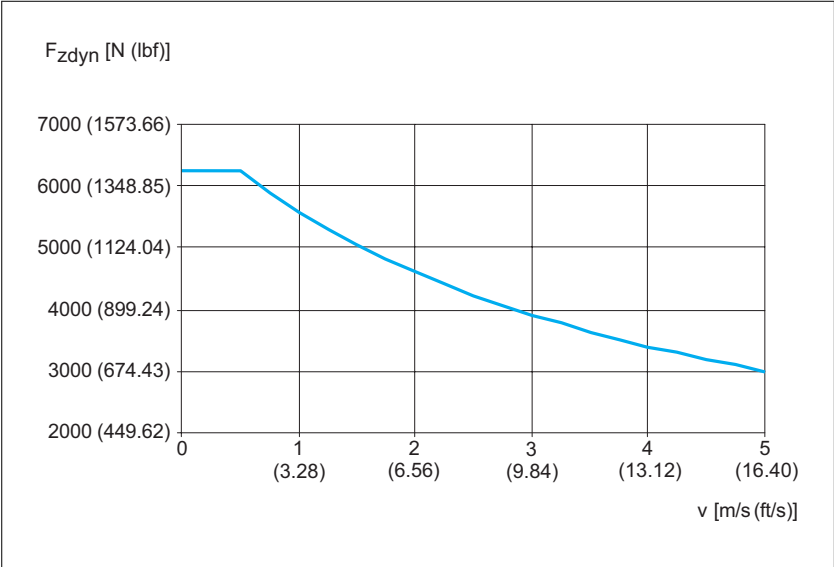


Figure 47: FAST 44BB Maximum force F_{zdyn}

Maximum driving torque M_{max}

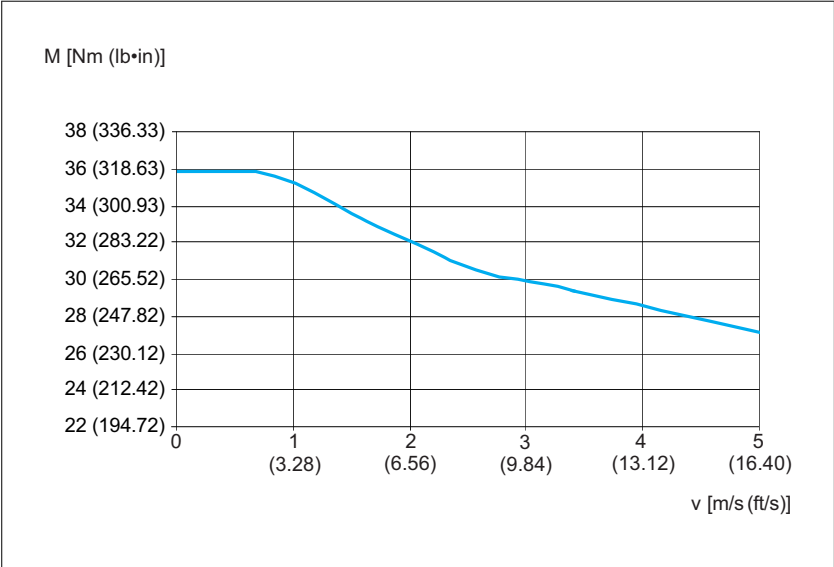


Figure 48: FAST 44BB Maximum driving torque M_{max}

Maximum torque carriage M_{xdyn}

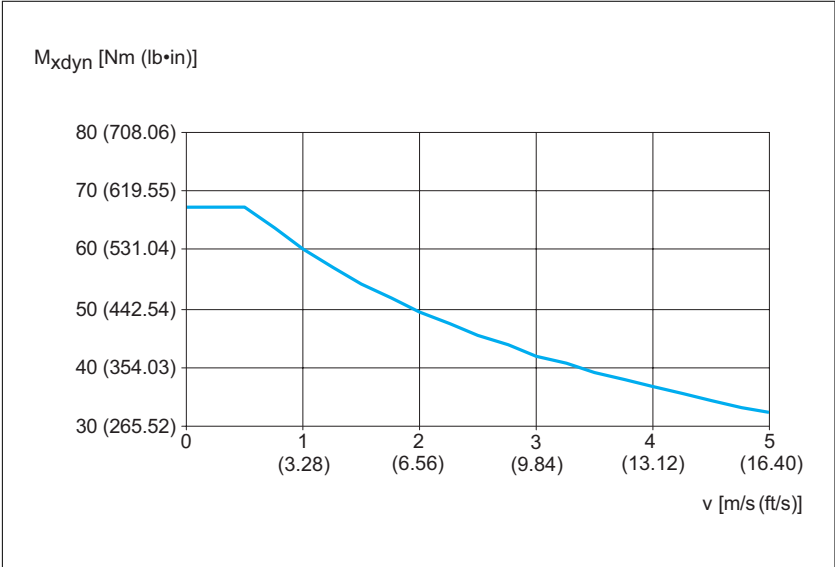


Figure 49: FAST 44BB Maximum torque carriage M_{xdyn}

Maximum torque carriage M_{ydyn}

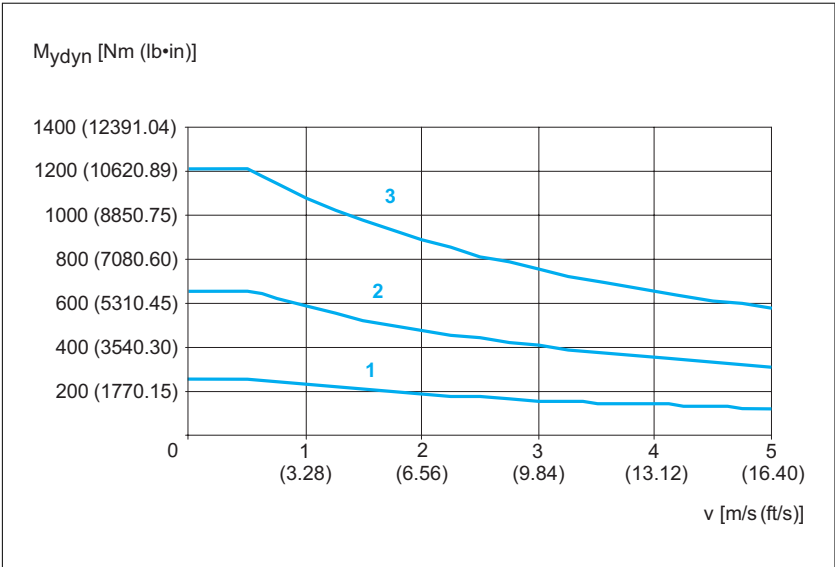


Figure 50: FAST 44BB Maximum torque carriage M_{ydyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Maximum torque carriage M_{zdyn}

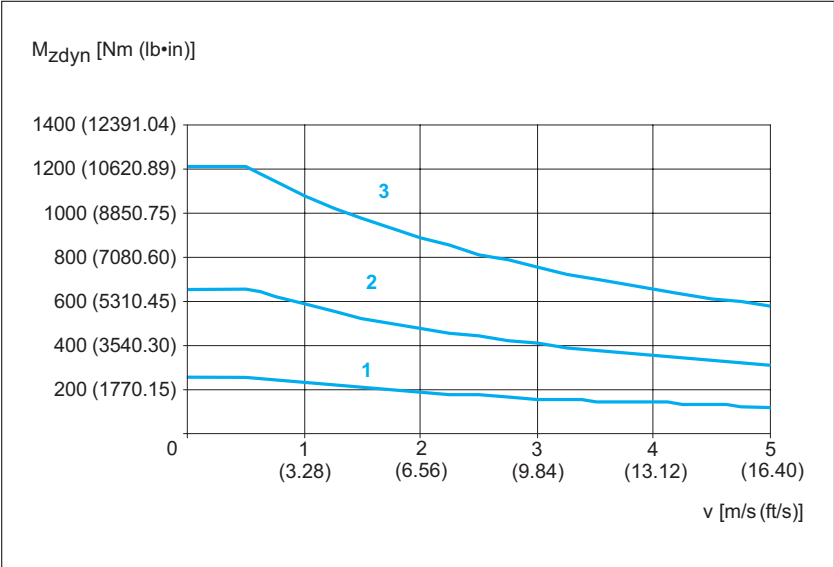


Figure 51: FAST 44BB Maximum torque carriage M_{zdyn}

- (1) Carriage type 1
- (2) Carriage type 2
- (3) Carriage type 4

Service life load curve

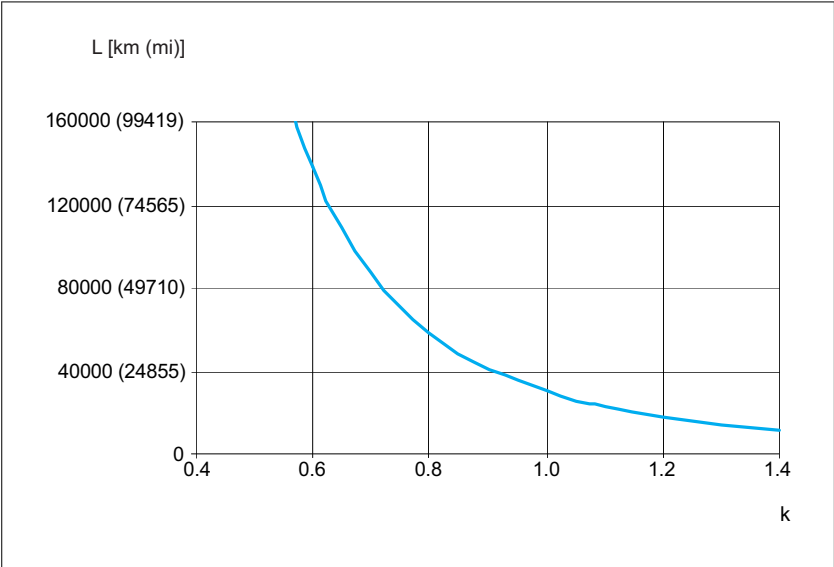


Figure 52: FAST 44BB Service life load curve

Maximum deflection In order to limit deflection of the linear axis at long strokes, the axis must be supported. The diagram below shows the deflection f [mm (in)] of the linear axis with respect to the support distance S [mm (in)] and the acting force F [N (lbf)]. Excessive deflection reduces the service life of the linear axis.

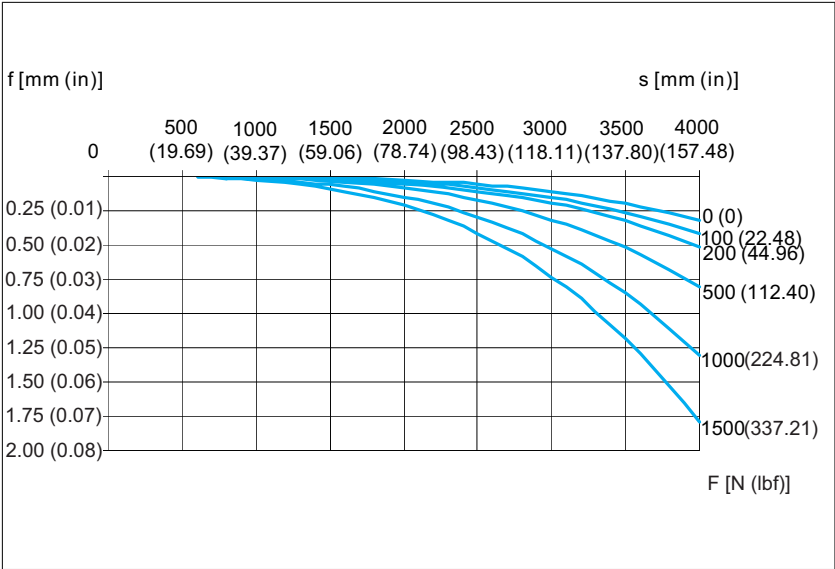


Figure 53: FAST 44BB Maximum deflection

2.5.3 Dimensional drawings FAST 44BB

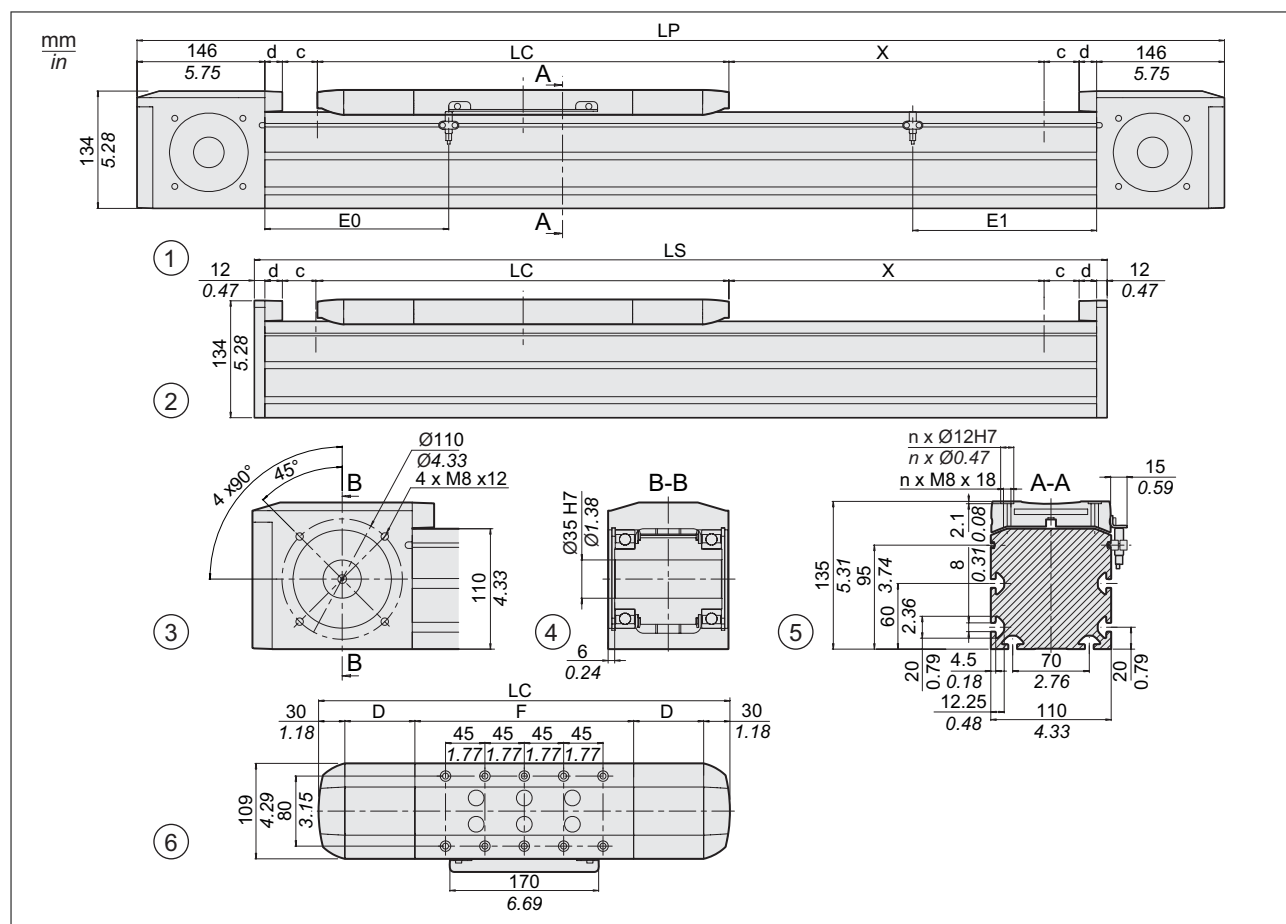


Figure 54: Dimensional drawings FAST 44BB

- (1) Portal axis
- (2) Support axis
- (3) End block
- (4) Section of end block
- (5) Section of axis
- (6) Carriage type 1 (types 2 and 4 have more tapped holes for mounting)

2.6 Service life

The service life of the product is a function of the mean forces and torques that act in the system. If multiple forces and torques act simultaneously, use the following formula to calculate the load k .

$$\frac{F_y}{F_{y\max}} + \frac{F_z}{F_{z\max}} + \frac{M_x}{M_{x\max}} + \frac{M_y}{M_{y\max}} + \frac{M_z}{M_{z\max}} = k$$

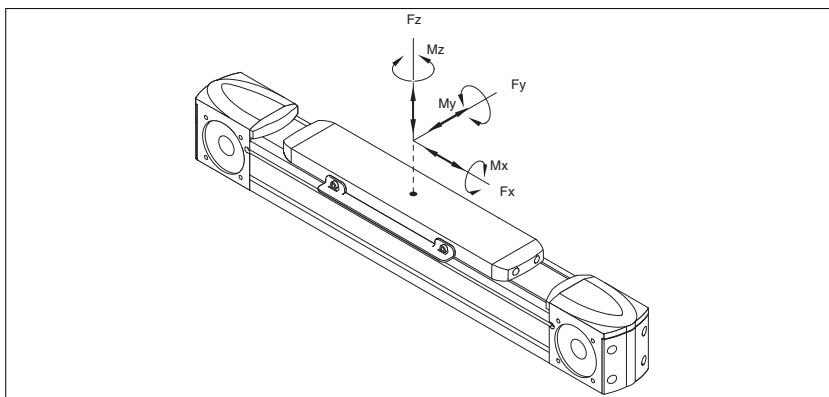


Figure 55: Forces and torques

The service life of the axis (in km) can be approximated using the load factor and the service life - load characteristic curve.

The application-specific load values appear in the numerator.

The numerator contains the maximum permissible forces and torques. These forces and torques decrease at increasing velocities, see characteristic curves in chapter "2 Technical Data".