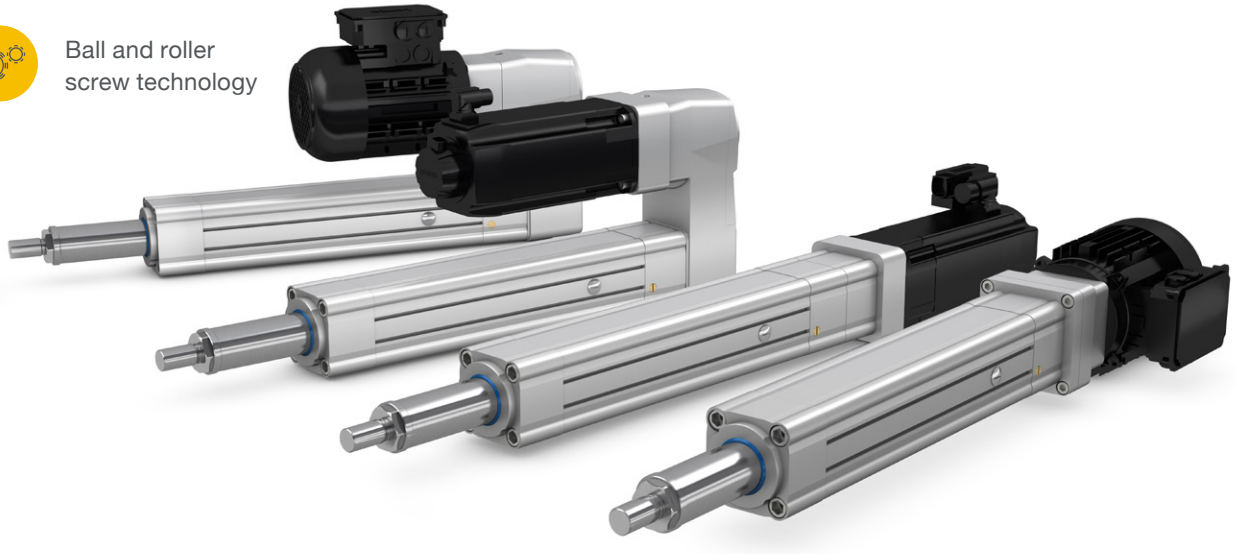
EWELLIX

A Schaeffler Company

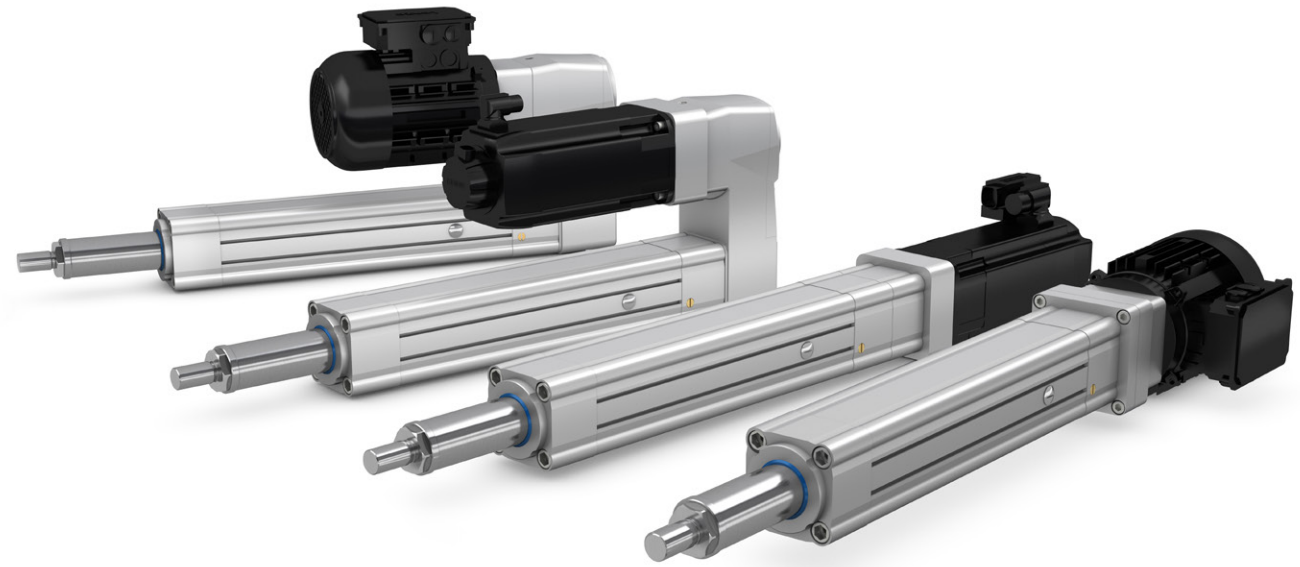
Electric cylinders EMA-100

- Modular architecture
- Long strokes
- High power density
- Ball and roller screw technology



Contents

Electric cylinders EMA-100



Features

- Modular electric cylinder
- Ball-screws or roller-screws
- Inline and parallel gearboxes
- High efficiency
- High level of precision and repeatability
- Wide range of accessories

Benefits

- Energy saving
- Optimal lifetime even at very high forces
- High level of flexibility with variance of body assembly fitting most of the applications
- Fits AC induction motor motors and servo motors
- Accurate positioning

Product description

Ewellix developed an innovative modular electric cylinder platform to address most of the applications in the automation and heavy machinery industries, mainly replacing hydraulic solutions. In this new design, instead of limiting the selection on the “linear unit - gearbox – motor” modules only, Ewellix takes it a step further. The modularity has been extended to the base component level. Within each module, the customer can select the components inside to build a custom-like solution as standard. This concept makes it possible to find the optimal solution for almost every application within its power range with the best performance/cost ratio.

Actuator select

To facilitate customers in defining their own actuator, Ewellix has released an online configurator on Ewellix.com, where you can configure your optimal EMA-100 cylinder in just a few steps. Since the cylinders are assembled with standard components, any customer defined configuration will not influence the lead time.

To meet any space and performance requirements, Ewellix provides inline and parallel gearboxes as well as AC and servo motors. All motors are equipped with specific adapters to keep the same mechanical interface, independent of the selected motor type.

This standardized interface allows customers to also attach their own preferred motor, that customers are already familiar with (motor and drives).

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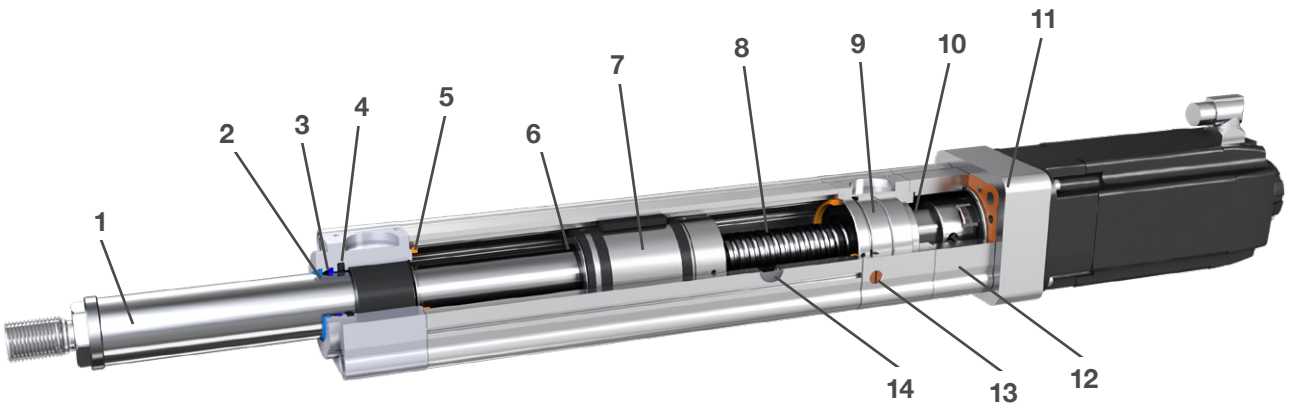
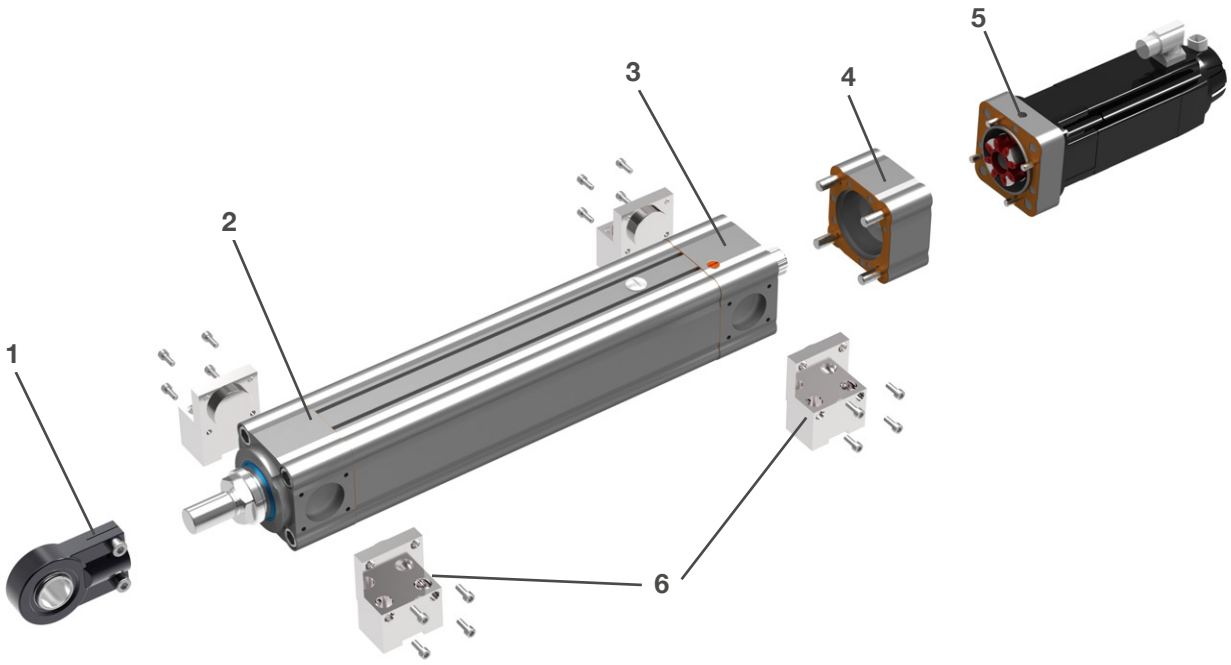


1. Push tube
2. Wiper ring
3. Solid oil ring
4. Sealing ring
5. Rubber bumper
6. Magnet ring for optional proximity sensors
7. Nut with guiding rings and anti-rotation
8. High quality ball and roller screws with low axial play and low friction
9. High quality bearings
10. Radial shaft sealing ring
11. Motor adapter and motor
12. Gearbox
13. Sinter filter for high airflow
14. Relubrication port

System interfaces

The EMA-100 modular system comprises different components that are connected to each other through standardized interfaces.

Each component provides a unique function for the complete system and is connected as shown below.



1. Front attachment: mechanical connection between the actuator and the moving part of the application. It is screwed to the push tube through the standard male thread
2. Front housing: component that supports the push tube, through a dedicated bushing, also including the front sealing package
3. Bearing housing: component that contains the set of ball bearings that support the screw shaft
4. Gearbox: connecting module between the linear unit and the motor adapter. Is available in parallel or inline versions, with different reduction ratios
5. Motor adapter: connecting module between the gearbox and the electric motor
6. Housing attachments: actuator body attachments, connected to the fix part of the application. Depending on the attachment type, they can be installed on the different housings - front, bearing or gearbox

Performance overview of linear units

Linear unit	Screw type	F_{max} Max dynamic axial force kN	F_{0max} Max static axial force kN	V_{max} Max linear speed mm/s
EMA-100-1-BA	Ball screw 32×10	23	52	260
EMA-100-1-BB	Ball screw 40×10	57	60	210
EMA-100-1-BC	Ball screw 40×20	60	60	750
EMA-100-1-RA	Roller screw 30×10	82	82	890

Performance overview of complete actuator

Linear unit	Motor	Rated motor power	Adapter	Gearing ratio	F_{c0} Continuous force at zero speed	F_{p0} Peak force at zero speed	V_{max} Max. linear speed
–		kW	–		kN	kN	mm/s
EMA-100-1-BA	1FK7044	1,4 kW	Inline	1:1	2,4	7	260
			Parallel - Spur	4:1	8	23	193
				10:1	20,1		76
				25:1	23		30
	1FK7064	2,5 kW	Inline	1:1	6,4	17,1	260
			Parallel - Spur	4:1	21,2	23	193
				10:1	23		76
				25:1			30
	1FK7086	3,75 kW	Inline	1:1	15	23	260
			Parallel - Spur	4:1	23	23	193
				10:1			76
				25:1			30
	1FK7105	8,2 kW	Inline	1:1	23	23	260
			Parallel - Spur	4:1	23	23	193
				10:1			76
				25:1			30
EMA-100-1-BB/ CB	1FK7044	1,4 kW	Inline	1:1	2,4	6,9	210
			Parallel – Belt	1:1	2,2	6,2	210
				2:1	4,3	12,5	
			Parallel - Spur	4:1	8	23	193
				10:1	20,1	57	76
				25:1	51		30
	1FK7064	2,5 kW	Inline	1:1	6,4	17,1	210
			Parallel – Belt	1:1	5,8	15,4	210
				2:1	11,5	30,8	
			Parallel - Spur	4:1	21,2	56,5	193
				10:1	53,4	57	76
				25:1			30
	1FK7086	3,75 kW	Inline	1:1	14,9	56	210
			Parallel – Belt	1:1	12	50,5	210
				2:1	26,9	40,1	
			Parallel - Spur	4:1	49,5	57	193
				10:1	53,4		76
				25:1			30
	1FK7105	8,2 kW	Inline	1:1	25,6	57	210
			Parallel – Belt	1:1	12	53,4	210
				2:1	36,5	40,1	
			Parallel - Spur	4:1	53,4	57	193
				10:1			76
				25:1			30
	MA-B0-N11	1,4 kW	Parallel - Spur	4:1	10,6	40,9	214
				10:1	26,9	57	85
				25:1	53,4		33

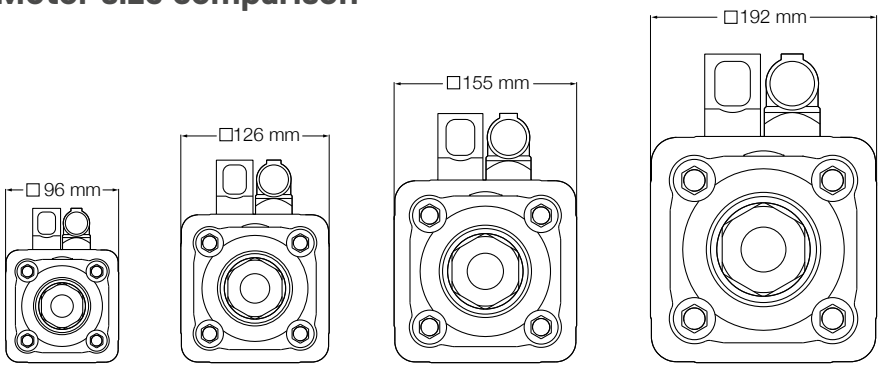
Linear unit	Motor	Rated motor power	Adapter	Gearing ratio	F_{c0} Continuous force at zero speed	F_{p0} Peak force at zero speed	V_{max} Max. linear speed
–		kW	–		kN	kN	mm/s
EMA-100-1-BC	1FK7044	1,4 kW	Inline	1:1	1,2	3,5	750
			Parallel – Belt	1:1	1,1	3,1	750
				2:1	2,2	6,2	
			Parallel - Spur	4:1	4	11,5	385
				10:1	10	29	153
				25:1	25,5	60	60
	1FK7064	2,5 kW	Inline	1:1	3,2	8,5	750
			Parallel – Belt	1:1	2,9	7,7	750
				2:1	5,8	15,4	500
			Parallel - Spur	4:1	10,6	28,3	386
				10:1	26,7	60	153
				25:1			60
	1FK7086	3,75 kW	Inline	1:1	7,5	28	750
			Parallel – Belt	1:1	6	25,2	750
				2:1	13,5	20	750
			Parallel - Spur	4:1	24,7	60	386
				10:1	26,7		153
				25:1			60
	1FK7105	8,2 kW	Inline	1:1	12,8	40	750
			Parallel – Belt	1:1	6	26,7	750
				2:1	18,3	20	500
			Parallel - Spur	4:1	26,7	60	386
				10:1			153
				25:1			60
	MA-B0-N11	1,4 kW	Parallel - Spur	4:1	5,5	21,2	428
				10:1	13,9	53,6	170
				25:1	26,7	60	67
EMA-100-1-RA	1FK7044	1,4 kW	Inline	1:1	2,3	6,5	890
			Parallel – Belt	1:1	2	5,9	890
				2:1	4,1	11,8	667
			Parallel - Spur	4:1	7,5	21,6	193
				10:1	18,9	54,6	76
				25:1	48	82	30
	1FK7064	2,5 kW	Inline	1:1	6	16,1	890
			Parallel – Belt	1:1	5,4	14,5	890
				2:1	10,9	29	625
			Parallel - Spur	4:1	20	53,2	193
				10:1	50,3	82	76
				25:1			30
	1FK7086	3,75 kW	Inline	1:1	14,1	52,8	890
			Parallel – Belt	1:1	11,3	47,5	890
				2:1	25,3	37,7	500
			Parallel - Spur	4:1	46,6	82	193
				10:1	50,3		76
				25:1			30
	1FK7105	8,2 kW	Inline	1:1	24,1	75,4	833
			Parallel – Belt	1:1	11,3	50,3	833
				2:1	34,4	37,7	417
			Parallel - Spur	4:1	50,3	82	193
				10:1			76
				25:1			30

Motors

Servo motors

The Siemens motors provided by Ewellix come with a differential resolver or multi-turn encoder, a shaft-end with keyway and a holding brake. In addition, they are equipped with a Drive-CLiQ interface. A rotating plug adapter simplifies the connection and cable routing in all installation positions.

Motor size comparison



1,4 kW *2,5 kW* *3,75 kW* *8,2 kW*

For more information, please visit the following sites:

Motor:
www.siemens.com/motors
Frequency converters:
www.siemens.com/sinamics
Automation systems:
www.siemens.com/simotion
Controls:
www.siemens.com/simatic
Engineering software:
www.siemens.com/sizer
Support worldwide:
www.siemens.de/service

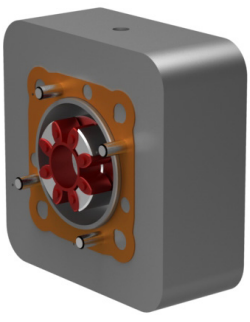
Motor technical data

Motor type		**Servo motor 1,4 kW** 1FK7044-4CH71-1UH0	**Servo motor 2,5 kW** 1FK7064-4CF71-1RB0	**Servo motor 3,75 kW** 1FK7086-4CF71-1RB0	**Servo motor 8,2 kW** 1FK7105-2AF71-1RB0
Designation	Unit				
Rated power (100K)	kW	1,4	2,5	3,75	8,2
Rated speed (100K)	min^{-1}	4 500	3 000	3 000	3 000
Max permissible speed	min^{-1}	9 000	7 500	6 000	5 000
Rated current	A	3,9	7,6	5,7	18
Rated torque (100K)	Nm	3	8	6,5	26
Static torque (100K)	Nm	4,5	12	28	48
Peak torque	Nm	13	32	105	150
Brake holding torque	Nm	4	13	22	43
Inertia with brake	10^{-4} kgm^2	1,62	8,5	25,5	162
Weight with brake	kg	8	16,8	26	43,5
Sensor type	–	Resolver	Multiturn encoder	Multiturn encoder	Multiturn encoder

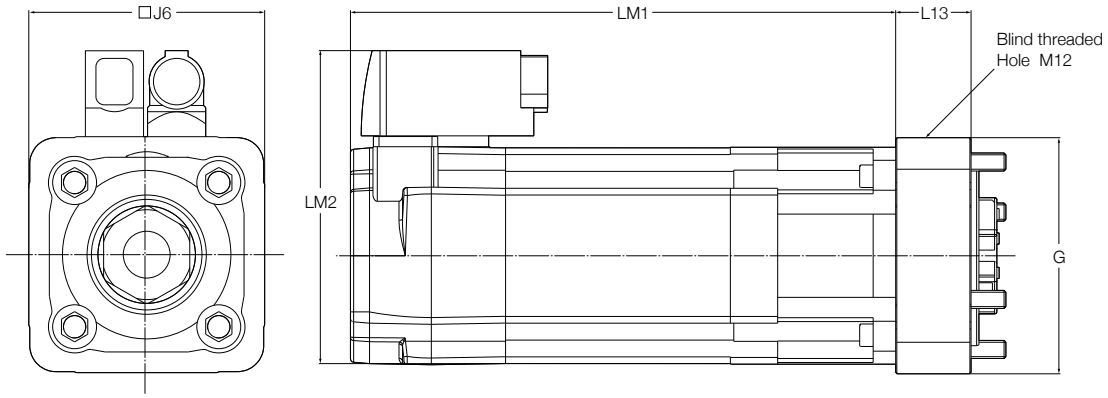
Motor adapter

The modular system of EMA-100 enables the use of virtually any kind of motor.

The motor adapter module makes your motor fit the entire EMA-100 range, independent of the configuration. In fact, thanks to the standardized mechanical interface,this module can be directly attached to any inline or parallel gearbox. Sealings, screws and half coupling parts are included in the package to make it plug and play. Each motor adapter is provided with blind threaded hole M12 to screw an eye bolt for easier actuator handling.



Dimensional drawing



Ordering key	Motor type	Motor			Motor adapter	
		LM1	LM2	J6	G	L13
–		mm				
MK-100-MS-B0-A11	1FK7044-4CH71-1UH0	242,5	139,5	☐ 96	☐ 105	45,5
MK-100-MS-B0-A12	1FK7064-4CF71-1RB0	302,5	167,5	☐ 126	☐ 125	55,5
MK-100-MS-B0-A13	1FK7086-4CF71-1RB0	309,5	216,5	☐ 155	☐ 139	63,5
MK-100-MS-B0-A14	1FK7105-2AF71-1RB0	340	253	☐ 192	☐ 192,5	85,5

Third party motors

In order to attach your preferred motor to the gearbox, Ewellix offers motor adapter flanges for the most common motor types. If your motor does not fit the following specifications, please contact Ewellix.

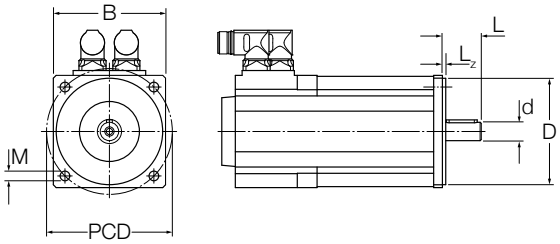


Table 1

Type	D [mm]	PCD [mm]	L [mm]	M	B [mm]	L_z [mm]	d [mm]
AA1	80	100	40	M6	≥ D + 6	< 7	19
AA2	110	130	50	M8	≥ D + 6	< 7	24
AA3	130	165	58	M10	≥ D + 6	< 7	32
AA4	180	215	80	M12	≥ D + 6	< 7	38
CC1	80	100	40	M6	≥ D + 6	< 7	16
CC2	110	130	40	M8	≥ D + 6	< 7	19
CC3	130	165	50	M10	≥ D + 6	< 7	24
CC4	70	90	40	M5	≥ D + 6	< 7	19
CC5	110	145	55	M8	≥ D + 6	< 7	22

Servo motor selection

The table below is a guidance to understand the performance levels that can be reached by using a gearbox and Siemens servo motor with Ewellix linear units.

Assumptions: Stroke 500 mm, low acceleration and constant force. If max force and speed is not applied during full stroke, smaller motor might be possible to select, mean torque is the main limiting factor for the motor selection.

Actuator is applying max force and speed 80% of the time and 20% is low to no load. Max load 100% of the time is possible if motor is sized appropriately to avoid overheating. Use Ewellix online performance calculator tool or contact Ewellix.

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Max dynamic axial force [kN]

	5 to 10	11 to 20	21 to 40	41 to 76	77 to 160	161 to 300	301 to 500	501 to 750	751 to 890
82	Gear ratio 25:1 RA 1FK7064	Gear ratio 25:1 RA 1FK7064	Gear ratio 10:1 RA 1FK7086	Gear ratio 10:1 RA 1FK7105					
60	Gear ratio 25:1 BB/RA 1FK7064	Gear ratio 25:1 BB/RA 1FK7064	Gear ratio 10:1 BB/RA 1FK7086	Gear ratio 10:1 BB/RA 1FK7086	Gear ratio 4:1 BB/RA 1FK7105				
48	Gear ratio 25:1 BB/RA 1FK7044	Gear ratio 25:1 BB/RA 1FK7044	Gear ratio 10:1 BB/RA 1FK7064	Gear ratio 10:1 BB/RA 1FK7086	Gear ratio 4:1 BB/RA 1FK7105				
34	Gear ratio 25:1 BB 1FK7044	Gear ratio 25:1 BB 1FK7044	Gear ratio 10:1 BB 1FK7064	Gear ratio 10:1 BB 1FK7064	Gear ratio 4:1 BB/RA 1FK7086	Gear ratio 4:1 BC/RA* 1FK7105			
23	Gear ratio 25:1 BB 1FK7044	Gear ratio 25:1 BB 1FK7044	Gear ratio 10:1 BB 1FK7064	Gear ratio 10:1 BB 1FK7064	Gear ratio 4:1 BB 1FK7086	Gear ratio 4:1 BC 1FK7105	Gear ratio 1:1 BC*/RA 1FK7105	Gear ratio 1:1 RA 1FK7105	Gear ratio 1:1 RA 1FK7105
16	Gear ratio 25:1 BA/BB** 1FK7044	Gear ratio 25:1 BA/BB** 1FK7044	Gear ratio 10:1 BA/BB** 1FK7044	Gear ratio 10:1 BA/BB** 1FK7044	Gear ratio 4:1 BB 1FK7064	Gear ratio 4:1 BC 1FK7086	Gear ratio 1:1 BC*/RA 1FK7105	Gear ratio 1:1 BC*/RA 1FK7105	Gear ratio 1:1 RA 1FK7105
12	Gear ratio 25:1 BA/BB** 1FK7044	Gear ratio 25:1 BA/BB** 1FK7044	Gear ratio 10:1 BA 1FK7044	Gear ratio 10:1 BA/BB** 1FK7044	Gear ratio 4:1 BB 1FK7064	Gear ratio 4:1 BC 1FK7086	Gear ratio 1:1 BC*/RA 1FK7086	Gear ratio 1:1 BC*/RA 1FK7105	Gear ratio 1:1 RA 1FK7105
8	Gear ratio 25:1 BA 1FK7044	Gear ratio 25:1 BA 1FK7044	Gear ratio 10:1 BA 1FK7044	Gear ratio 10:1 BA 1FK7044	Gear ratio 4:1 BA/BB** 1FK7044	Gear ratio 4:1 BC 1FK7064	Gear ratio 2:1 BC 1FK7086	Gear ratio 2:1 BC 1FK7086	Gear ratio 1:1 RA 1FK7086
4	Gear ratio 25:1 BA 1FK7044	Gear ratio 25:1 BA 1FK7044	Gear ratio 10:1 BA 1FK7044	Gear ratio 10:1 BA 1FK7044	Gear ratio 4:1 BA 1FK7044	Gear ratio 4:1 BC 1FK7044	Gear ratio 2:1 BC 1FK7064	Gear ratio 2:1 BC 1FK7064	Gear ratio 1:1 RA 1FK7064
0									

Linear speed [mm/s]

* Gear ratio 2:1 needed

** Longer lifetime

Legend

Row description	
Row 1	Gear ratio
Row 2	Ball or roller screw type
Row 3	Selected Servo motor

Ball or roller screw type	
BA	Ball screw 32x10
BB/BC	Ball screw 40x10
BC	Ball screw 40x20
RA	Roller screw 30x10

Rated power | Servo motor	
1 400 W	1FK7044
2 500 W	1FK7064
3 750 W	1FK7086
8 200 W	1FK7105

AC induction motors

Examples of linear unit, parallel gearbox and IEC AC motor combinations

The table below is a guidance to understand the performance levels that can be reached by using spur gearbox (GB-100-GS) or belt gearbox (GB-100-GB) (↳ page 15) with standard IEC AC asynchronous motors, in terms of maximum dynamic axial force and linear speed.

In particular, by selecting the desired force and speed range, it's possible to quickly see which combination of screw, gearbox and AC induction motors motors fulfills the application requirements. This is a generic guidance, while the detailed performance values of each mentioned combination should be calculated.

Max dynamic axial force [kN]

	5 to 10	11 to 20	21 to 40	41 to 80	81 to 160	161 to 300	301 to 500	501 to 750
82	Gear ratio 25:1 RA A66	Gear ratio 25:1 RA A68						
60	Gear ratio 25:1 BB/RA A64	Gear ratio 25:1 BB/RA A65						
48	Gear ratio 25:1 BB/RA A64	Gear ratio 25:1 BB/RA A63	Gear ratio 10:1 BB/RA A67					
34	Gear ratio 25:1 BB/RA A62	Gear ratio 25:1 BB/RA A63	Gear ratio 10:1 BB/RA A67					
23	Gear ratio 25:1 BB/RA A62	Gear ratio 25:1 BB/RA A61	Gear ratio 10:1 BB/RA A65	Gear ratio 4:1 BB/RA A68				
16	Gear ratio 25:1 BB/RA A62	Gear ratio 25:1 BB/RA A61	Gear ratio 10:1 BB/RA A63	Gear ratio 4:1 BB/RA A68	Gear ratio 2:1 BB A68			
12	Gear ratio 25:1 BB A62	Gear ratio 25:1 BC A61	Gear ratio 10:1 BB A62	Gear ratio 10:1 BC A61	Gear ratio 10:1 BC A63			
8	Gear ratio 25:1 BB A62	Gear ratio 25:1 BB/BC A61/A62	Gear ratio 10:1 BB A62	Gear ratio 10:1 BB/BC A61/A62	Gear ratio 4:1 BB A63	Gear ratio 1:1 BB/RA A68		
4	Gear ratio 25:1 BB A62	Gear ratio 25:1 BB/BC A61/A62	Gear ratio 25:1 BC A61	Gear ratio 4:1 BB A62	Gear ratio 2:1 BB A64	Gear ratio 2:1 BC A66	Gear ratio 2:1 BC A67	Gear ratio 1:1 BC A67
0								

Linear speed [mm/s]

Legend

Row description	
Row 1	Gear ratio
Row 2	Ball or roller screw type
Row 3	Selected Servo motor

Ball or roller screw type	
BA	Ball screw 32x10
BB/BC	Ball screw 40x10
BC	Ball screw 40x20
RA	Roller screw 30x10

Rated power | AC Motors	
750 W	A61/A62/A64
1 100 W	A63/A66
2 200 W	A65/A68
3 000 W	A67

IEC AC Motors

The Siemens SIMOTICS low-voltage electric motors provided by Ewellix comes with a holding brake and PTC thermistor as standard.

It is a SIMOTICS GP 1LE1 self-ventilated aluminium motor with standard terminal box.

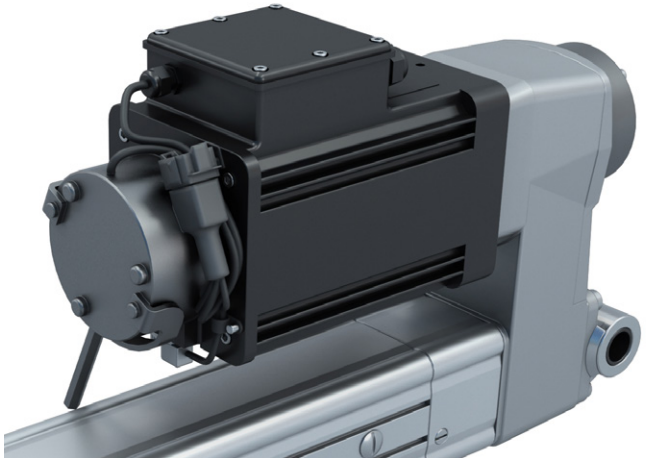
In addition, the motors are equipped with a two channel rotary pulse encoder as feedback.

Motor type[1] Designation	Size	Type	Rated power	Rated speed	Rated current	Rated torque	Efficiency level	Motor weight	Motor inertia	Brake inertia
			kW	RPM	A	Nm	–	kg	kgm²	kgm²
A61	IEC-71-2	2 poles / with encoder	0,55	2 850	1,34	1,8	IE2	7	0,00045	0,000013
A62	IEC-71-4	4 poles / with encoder	0,37	1 410	0,99	2,6	IE2	7	0,00095	0,000013
A63	IEC-80-2	2 poles / with encoder	1,1	2 885	2,25	3,6	IE3	12	0,0013	0,000045
A64	IEC-80-4	4 poles / with encoder	0,75	1 450	1,75	4,9	IE3	14	0,0029	0,000045
A65	IEC-90-2	2 poles / with encoder	2,2	2 910	4,2	7,2	IE3	19	0,0031	0,00016
A66	IEC-90-4	4 poles / with encoder	1,1	1 440	2,4	7,3	IE3	16	0,0036	0,00016
A67	IEC-100-2	2 poles / with encoder	3	2 920	5,6	9,8	IE3	26	0,0054	0,00036
A68	IEC-100-4	4 poles / with encoder	2,2	1 465	4,4	14,3	IE3	30	0,014	0,00036

[1] Voltage 400 VΔ, 50Hz

AC induction motor, e-MOVEKIT

With this AC induction motor most hydraulic application use cases for mobile machinery can be fulfilled. This motor together with the quick start e-MOVEKIT or the system integration e-MOVEKIT allows for a plug-and-play solution for a wide variety of applications running on 24 VDC battery power. This motor provides high power in a small footprint and was specially designed for the application in linear actuators. The included fail-safe electromagnetic brake allows for a safe operation state in every situation.



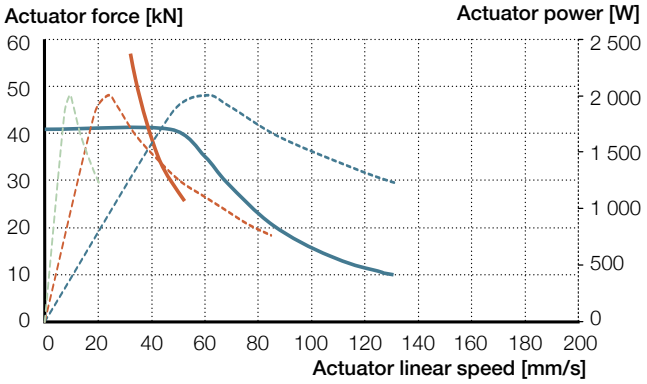
Technical data

Designation	Symbol	Unit	Data
Motor Type	-	-	Nidec AC induction motor, 1.4kW, with EM-brake
Ordering key	-	-	B0-N11
Rated output power	PM	kW	1.4
Bus voltage	U	V DC	24
Rated voltage	U_{rated}	V AC	16
Rated current	I_{rated}	A	85
Rated speed	n_{rated}	rpm	2 050
Maximum speed	n_{max}	rpm	3 000
Rated torque (S3–15%)	M_{rated}	Nm	6.05
Peak torque (S2–2 min)	M_{peak}	Nm	25
Speed sensor	-	-	2x 64 pulse quadrature encoder
Temperatur sensor	-	-	PT1000
Brake type	-	-	Electromagnetic
Brake voltage level	U_{brake}	V DC	24
Brake power level	P_{brake}	W	25
Manual brake release	-	-	lever

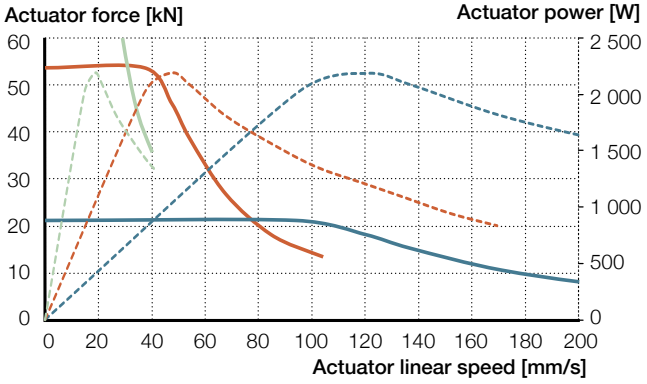
Performance diagram

Speed-load diagrams (S2–2 min)

EMA-100-1-BB/CB



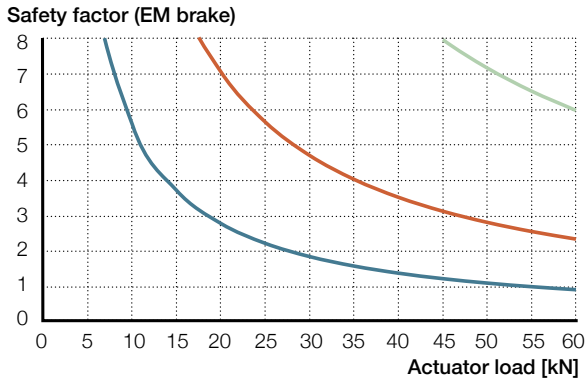
EMA-100-1-BC



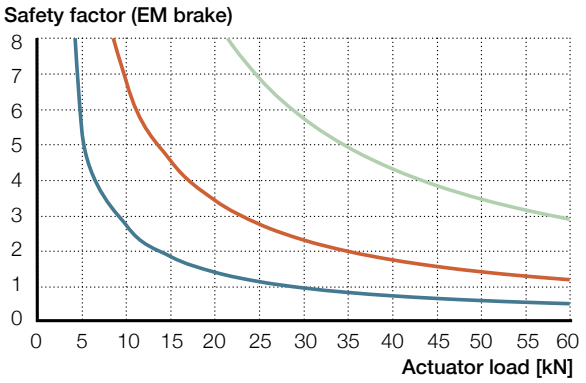
Actuator force	Gearing ratio 4:1	Gearing ratio 10:1	Gearing ratio 25:1
Actuator power	Gearing ratio 4:1	Gearing ratio 10:1	Gearing ratio 25:1

Safety factor load diagrams

EMA-100-1-BB/CB

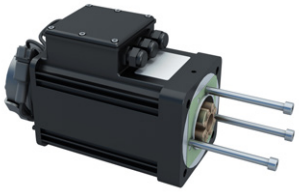


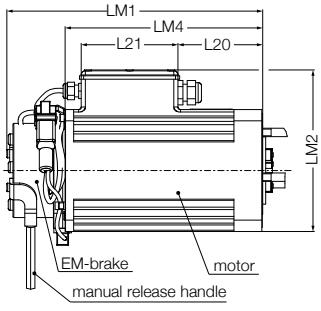
EMA-100-1-BC

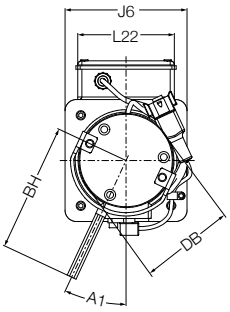


Gearing ratio 4:1 — Gearing ratio 10:1 — Gearing ratio 25:1

Dimensional drawing



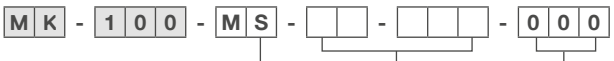




Type	LM1	LM2	LM4	L20	L21	L22	J6	A1	BH	DB
–	mm									
MK-100-MA-B0-N11	304,2	192	234,8	100,8	115	□115	145	25°	153	Ø 112

Ordering key

Motor unit



Type

A	Interface according to IEC AC XX B14A
S	Interface according to Siemens servo motor

Delivery

Motor supplied and mounted by Ewellix

Servo motor

B0-A11	Siemens 1FK7044-4CH71-1UH0
B0-A12	Siemens 1FK7064-4CF71-1RB0
B0-A13	Siemens 1FK7086-4CF71-1RB0
B0-A14	Siemens 1FK7105-2AF71-1RB0

AC motor

B0-A61	Siemens 1LE1001-0CA32-2KB4-Z=F01+F11+G11
B0-A62	Siemens 1LE1001-0CB32-2KB4-Z=F01+F11+G11
B0-A63	Siemens 1LE1003-0DA32-2KB4-Z=F01+F11+G11
B0-A64	Siemens 1LE1003-0DB32-2KB4-Z=F01+F11+G11
B0-A65	Siemens 1LE1003-0EA02-2KB4-Z=F01+F11+G11
B0-A66	Siemens 1LE1003-0EB02-2KB4-Z=F01+F11+G11
B0-A67	Siemens 1LE1003-1AA42-2KB4-Z=F01+F11+G11
B0-A68	Siemens 1LE1003-1AB42-2KB4-Z=F01+F11+G11
B0-N11	Nidec AC induction motor, 1.4kW, with EM-brake

Motor adapter only

00-AA1	Siemens 1FK7044 series
00-AA2	Siemens 1FK7064 series
00-AA3	Siemens 1FK7086 series
00-AA4	Siemens 1FK7105 series
00-AC1	IEC AC 71 B14A
00-AC2	IEC AC 80 B14A
00-AC3	IEC AC 90 B14A
00-AC4	IEC AC 100 B14A
00-XXX	Customized flanges, dimension see table on page 9

Customer option

000	No option

Gearboxes

Introduction to gearboxes

Ewellix offers several types of gearboxes. They vary in shape, technology, ratio and lubrication.

Different shapes allow to meet challenging build-in situations. Parallel gearboxes shorten the retracted length while inline gearboxes optimize cross section.

Our technologies and ratios allow to optimize input requirements so that motor cost can be reduced.

Several accessories and options such as manual override, rear attachment, centrifugal and holding brakes are available to meet the various applications.

Inline gearbox

Inline gearboxes consist of a housing which fits on one side to the linear unit and on the other side to the motor adapter with the matching coupling. The coupling can be pushed on the shaft of the linear unit and locked by a screw. The counterpart of the coupling is delivered with the motor adapter.

The inline gearbox transmits the motor torque (max. 150 Nm) directly to the linear unit with a gear ratio 1:1 and is maintenance-free.

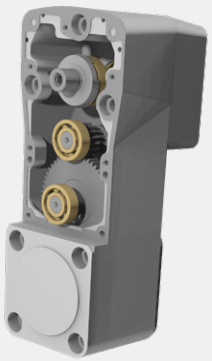
Parallel gearbox

Parallel gearbox consists of one housing which fits on one side to the linear unit and on the other side to the motor adapter with the matching coupling. The coupling is already mounted on the input shaft of the gearbox and locked by a screw. The counterpart of the coupling is delivered with the motor adapter. Ewellix offer the parallel gearbox into options Spur gear box and Belt gear box.

Spur gear variant

The parallel gearbox transmits the motor torque through three stage spur gear directly to the linear unit (max. output torque 300 Nm). Three gear ratios are available and it is maintenance free. The ratios allow to keep motor torques low and therefore save motor cost.

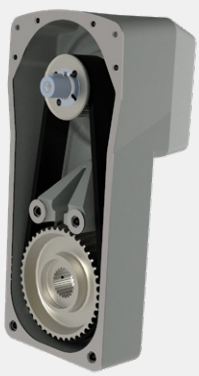
Ewellix offers bio-degradable oil for high duty cycles while still being eco-friendly. When oil leaks must be avoided the oil-free gearboxes are a good solution.



Belt gear variant

A belt transmits the torque from the motor shaft to the linear unit. This version allows higher linear unit speed while keeping noise at lower level.

The belt gear is available with a light rear cover if retracted length and cost must be optimized. For additional features such as rear attachment, manual override, centrifugal or holding brakes the standard rear cover is the best choice.

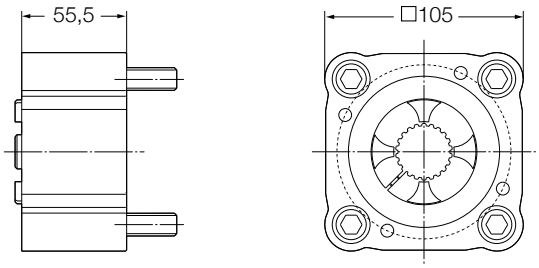


Inline gearboxes

Technical data

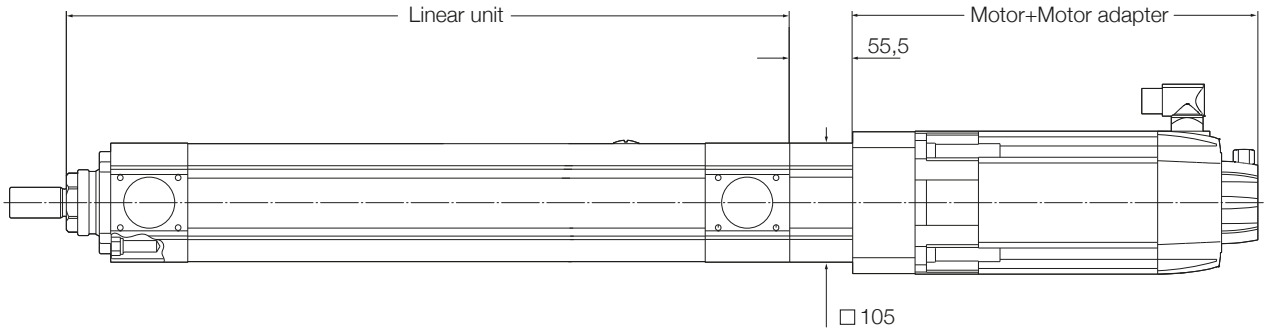
Gearbox type		GB-100-GI-AA
Short designation	**Unit**	
Type	–	Inline
Gear reduction	–	1
Nominal output torque	Nm	75
Max. output torque	Nm	150
Max. input speed	r/min	11 000
Efficiency	%	100
Weight	kg	1
Length	mm	55,5

Dimensional drawing



All dimensions in mm

Complete actuator



All dimensions in mm

Parallel gearboxes

Technical data

Gearbox type		GB-100-GB-CAC	GB-100-GB-CEC	GB-100-GB-CAD	GB-100-GB-CED	GB-100-GS-CBB	GB-100-GS-CCB	GB-100-GS-CDB	GB-100-GS-CBA	GB-100-GS-CCA	GB-100-GS-CDA
Short designation	**Unit**										
Type	–	Belt				Spur					
Cover	–	Standard		Light		Standard					
Lubrication	–	None				Grease			Bio-degradable oil		
Gear reduction	–	1	2	1	2	3,89	9,82	24,95	3,89	9,82	24,95
Nominal output torque	Nm	63	90	63	90	100					
Max. peak output torque	Nm	90	117	90	117	150	300		150	300	
Max. input power	W	9 500	6 000	9 500	6 000	2 100			3 000		
Max. input speed	r/min	8 000				4 500					
Max pull load	kN	30 kN when using rear attachment				–					
Max push load	kN	36 kN when using rear attachment				–					
Service interval	–	Replace belt every 6 years				None					
Efficiency	%	90				85					
Weight	kg	11,5	9,7	10	8	9					
Length	mm	81				98,5					

Manual override

The parallel gearbox has a manual override as built-in functionality. The gearbox can be manually operated through a hexagonal key located on the gearbox motor axis. As standard, the access to this key is covered by a plate (↳ **fig. 1**). On request, it's possible to have a round opening for direct access (↳ **fig. 2**).

On request gearbox accessories

It's possible to mount an electromagnetic brake (↳ **fig. 3**) on the gearbox or other devices like an absolute position encoder.

Speed limiting centrifugal brake

When safety is non-negotiable, a centrifugal brake (↳ **fig. 4**) can be a useful device. It is recommended together with a electro-mechanical brake on the motor. When releasing such a brake, the applied load may cause a rapid retraction of the machine, if no centrifugal brake is used. A centrifugal brake can be adjusted to the application in order to limit the retracting speed to a safe value. The centrifugal brake is mounted similar to an electromagnetic brake (↳ **fig. 3**).
For technical details see page 21.

Fig. 1

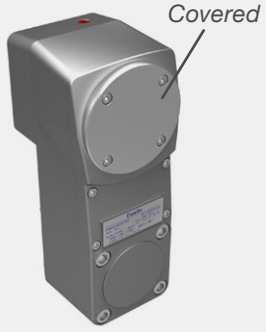


Fig. 2

On request

Fig. 3

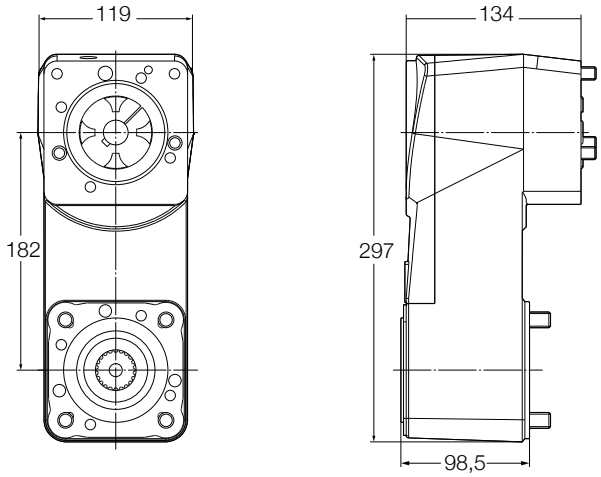
On request

Fig. 4

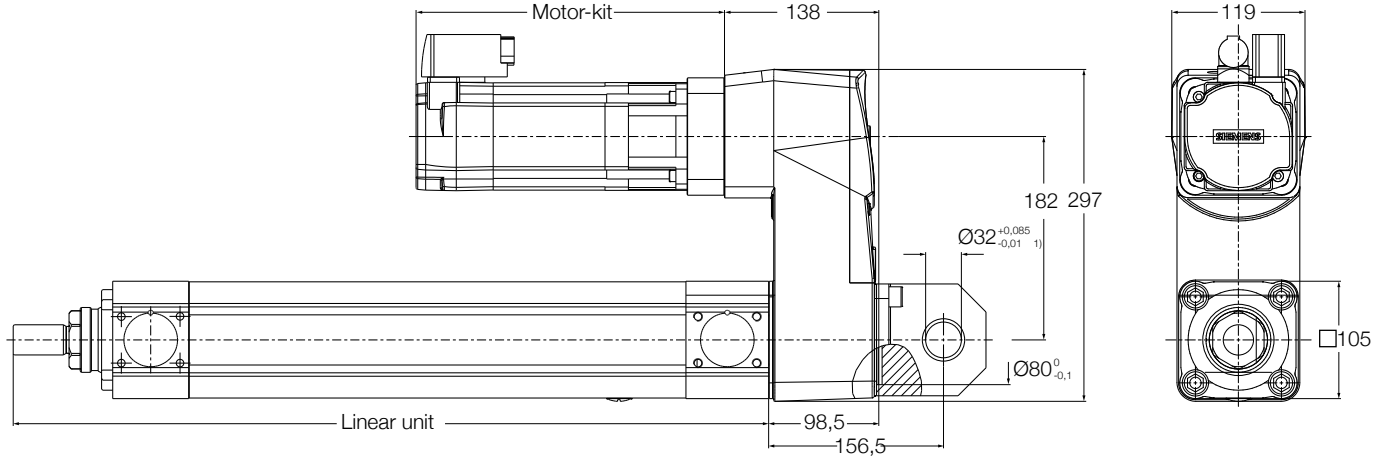
Spur gearbox

Dimensional drawing

All dimensions in mm



Complete actuator

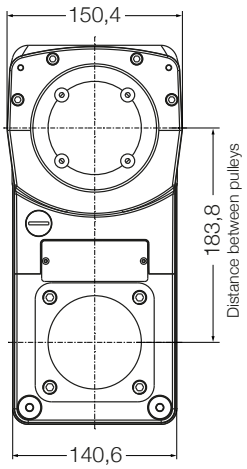


1) Recommended shaft tolerance: f7

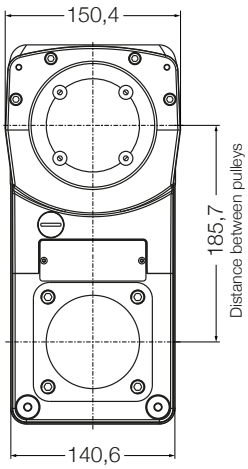
Belt gearbox

Dimensional drawing

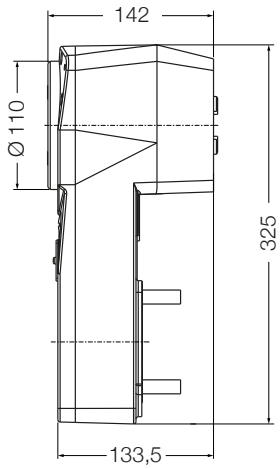
All dimensions in mm



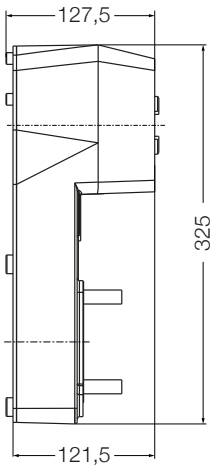
Gear reduction 1:1



Gear reduction 2:1

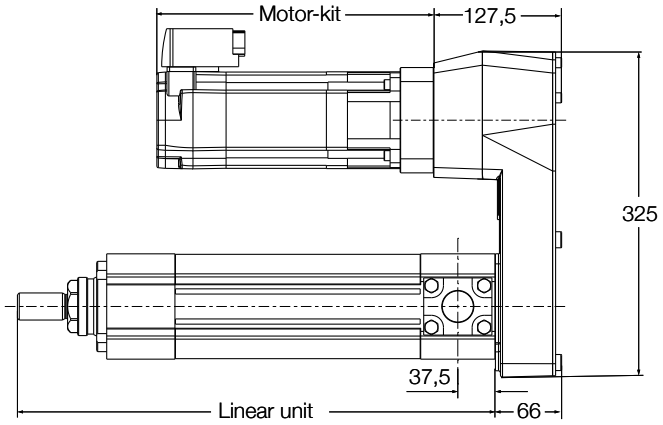


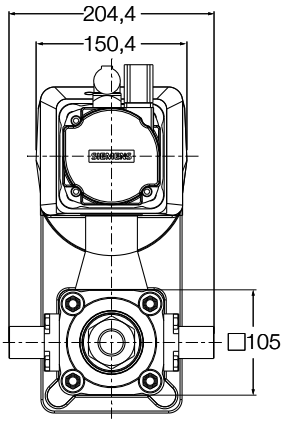
Standard rear cover



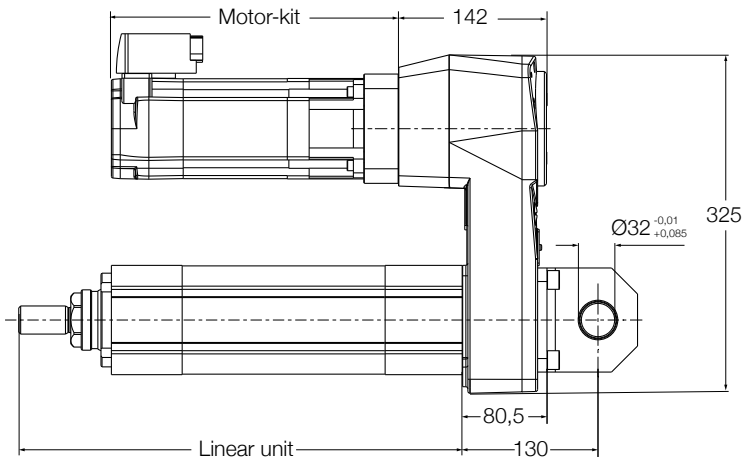
Light rear cover

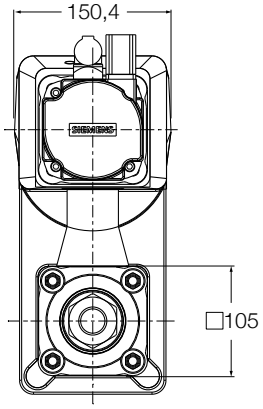
Complete actuator - Thin cover





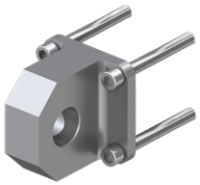
Complete actuator - Thick cover

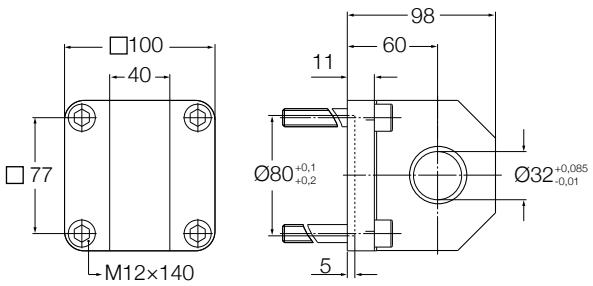




Ordering key rear attachment option
see page 20

Rear attachment



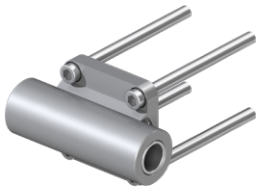


Ordering key
Spur gearbox
ZBE-377921

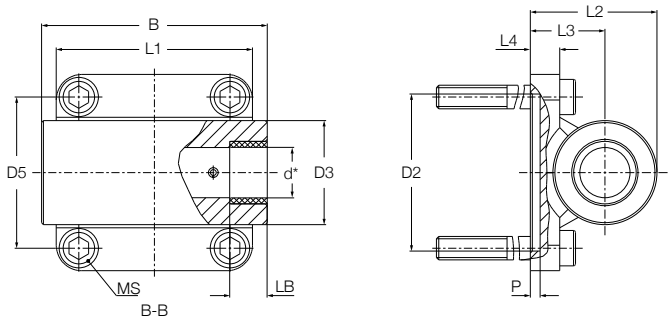
Belt gearbox
ZBE-00251333

[1] Recommended shaft tolerance: f7

Rear attachment - bar type



*Recommended shaft tolerance: Ø25.38-25.43



Ordering key
Spur gearbox
ZBE-377933

Belt gearbox
N/A

Type	d +0,33 +0,13	LB	B [1] +1 −1	L1	L2	L3	L4	D2 +0,2 +0,1	D3 +0,3 −0,3	P	D5	MS	weight
–	mm											–	kg
Spur gearbox													
ZBE-377933-0115	Ø25,4	19,5	115	□ 100	64,5	38	15	Ø80	Ø53	5	□ 77	M12x140	2,96
ZBE-377933-0155	Ø25,4	19,5	155	□ 100	64,5	38	15	Ø80	Ø53	5	□ 77	M12x140	3,5

[1] Are available in different dimensions on request, up to 245 mm

Centrifugal Brake Option Type B

The centrifugal brake is a device to limit the actuator linear speed in case of motor brake failure to a defined max. speed. The centrifugal brake can also be used to lower the application in case of electric power failure in a controlled manor. Ewellix can provide one standard configuration for the centrifugal brake. Depending on the application needs a customer specific configuration of the centrifugal brake can be made in collaboration with Ewellix.

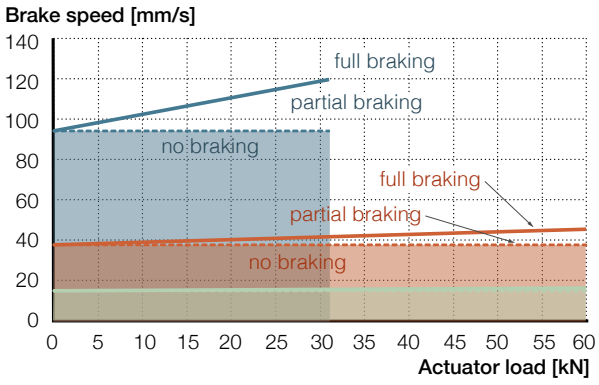
Performance data

Gearbox Type:	GB-100-GS-CBA-XX		GB-100-GS-CCA-XX		GB-100-GS-CDA-XX	
Screw Type	V_{Cinit}	V_{Cmax}	V_{Cinit}	V_{Cmax}	V_{Cinit}	V_{Cmax}
EMA-100-1-X**B**…-…-…A-…	94,2 mm/s	119,9 mm/s	37,3 mm/s	47,5 mm/s	14,7 mm/s	18,7 mm/s
EMA-100-1-X**C**…-…-…A-…	188,4 mm/s	239,8 mm/s	74,6 mm/s	95 mm/s	29,4 mm/s	37,4 mm/s

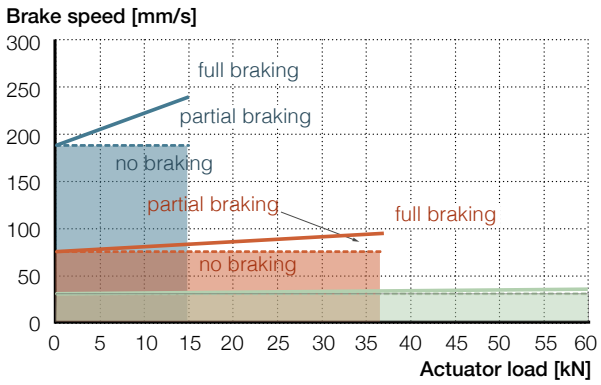
V_{Cinit}: linear unit speed when centrifugal brake gets engaged
V_{Cmax}: linear unit speed for maximal actuator load

Performance diagram

EMA-100-1-BB/CB



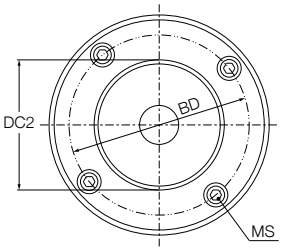
EMA-100-1-BC

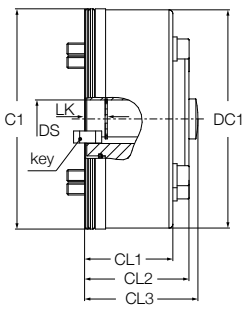


Gearing ratio 4:1 — Gearing ratio 10:1 — Gearing ratio 25:1

Different speed configurations are available on request.

Dimensions





Type	C1 $^{-0,1}_{-0,3}$	DC1	DC2	CL1	CL2	CL3	DS	LK	key	MS	BD	weight
–	mm								–	–	mm	kg
ZBE-377939	Ø110	Ø109	Ø65	44,1	52,1	56,6	Ø19 G7	10,3	6×6×14	M6x55	Ø90	2,24

Ordering key

Gearbox unit

GB - 100 - GI - AAA - 00 - 000

Type
I Inline
B Belt (Not possible to combine with linear unit BA)
S Spur

Size
A Inline Servo motors
B Inline Asynchronous motors
C Parallel Gear

Ratio
A 1 : 1 (inline and belt only)
B 4 : 1 (spur only, ↳ page 17 for exact ratio)
C 10 : 1 (spur only, ↳ page 17 for exact ratio)
D 25 : 1 (spur only, ↳ page 17 for exact ratio)
E 2 : 1 (belt only)

Options
A Spur and inline gearbox, bio degradable oil and housing
B Spur gearbox, grease lubrication
C Belt gearbox, rear cover for rear attachment or brakes, IP54S
D Belt gearbox, light rear cover (no rear attachment or brakes), IP40S

Rear attachment
0 No
B Rear attachment 0°
C Rear attachment 90°
D Rear Attachment, bar type, L = 115 mm. 0° * (spur only)
E Rear Attachment, bar type, L = 155 mm, 0° * (spur only)

Free parameter
0 No accessory
B Centrifugal Brake Type B (engagement speed: 2200rpm)

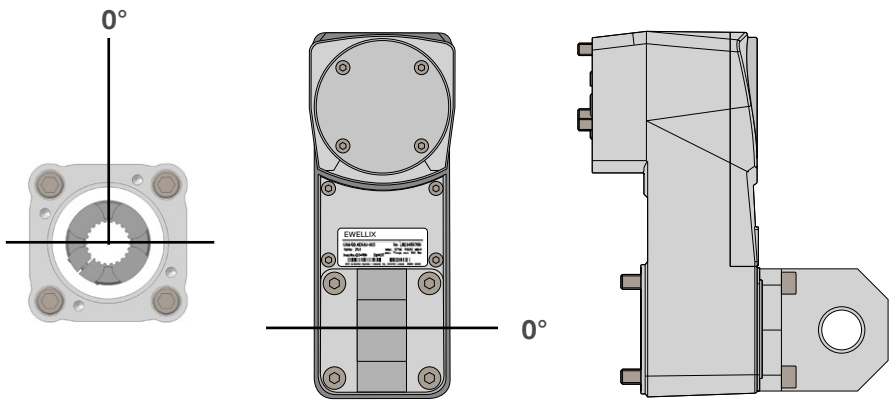
Customer option
000 No option

* different length available on request

Mounting position parallel gearbox rear attachment

The 0° reference for the parallel gearbox rear attachment is the gearbox itself. The rear attachment can be turned in 90° step (↳ **fig. 4**).

Fig. 4
Gearbox orientation



Complete actuator combinations

The built-in modularity of the EMA-100 actuator allows customers to create tailor-made solutions through a vast number of standard components.

Considering the different types and sizes of screws, gearboxes, motors, push tubes, bearing units, sealing kits and attachments available, several hundreds of combinations are possible.

Each of them can deliver a unique performance to fulfill even the most demanding application requirements.

For that reason, the following pages are presenting datasheets only or the linear units for one of the possible actuator combinations (i.e. linear units with 4 screws - inline adapter - servo motors), as an example.

On Ewellix.com you will be able to configure your EMA-100 actuator and download the 3D files of your configuration.

Click here to open

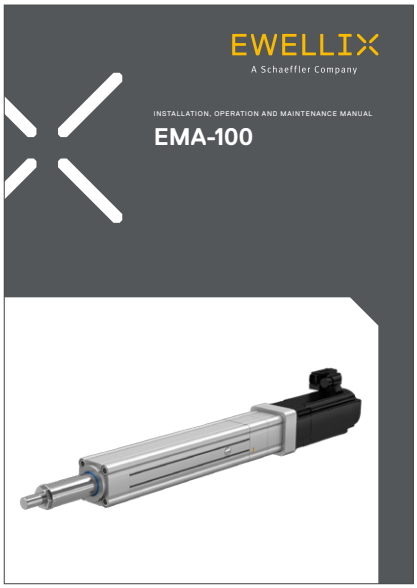
Manuals

Supporting documents are available for download on ewellix.com

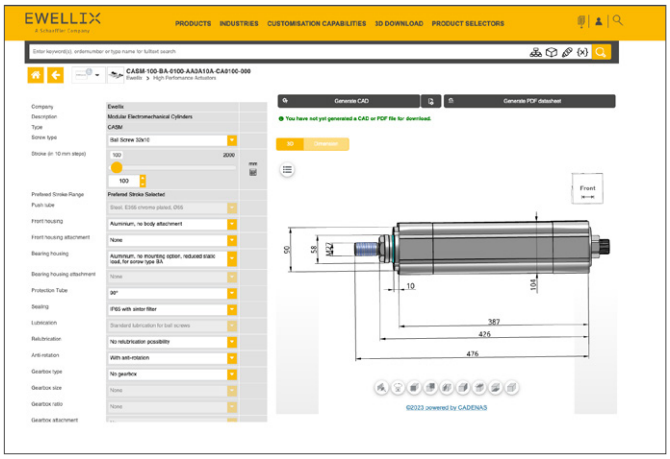
- operating manual

3D models

Product configurators for 3D models are available on ewellix.com



Operating manual



3D model configurator

EMA-100

Linear unit

Technical data

Designation	Symbol	Unit	EMA-100-1-BA	EMA-100-1-BB EMA-100-1-CB*	EMA-100-1-BC	EMA-100-1-RA
Performance Data						
Max. dynamic axial force[1]	F_{max}	kN	23	57	60	82
Max. dynamic axial force L10[2]	F_{L10}	kN	22	57	60	50
Max. static axial force	F_{0max}	kN	52	60	60	82
Dynamic load capacity	C	kN	27,1	71	41,3	106
Maximum torque to reach F_{max}	T_{max}	Nm	43	107	225	163
Max. linear speed	v_{max}	mm/s	260	210	750	890
Max. rotational speed	n_{max}	1/min	1 560	1 260	2 250	5 340
Max. acceleration	a_{max}	m/s^2	6	6	12	12
Duty cycle	D_{unit}	%	100	100	100	100[5]
Mechanical Data						
Screw type	–	–	Ball screw	Ball screw	Ball screw	Roller screw
Screw diameter	d_{screw}	mm	32	40	40	30
Screw lead	p_{screw}	mm	10	10	20	10
Lead accuracy	–	–	G9	G9	G9	G5
Stroke[3] [4]	s	mm	50…2 000	50…2 000	50…2 000	50…1 000
Internal overstroke each side	s_0	mm	2	2	2	2
Backlash	$s_{backlash}$	mm	0,2	0,2	0,2	0,2
Efficiency	η_{lu}	%	> 85	> 85	> 85	> 80
Inertia @ 0 mm stroke	J_{lu}	kgm^2	0,00041	0,00051	0,00051	0,00045
Δ Inertia per 100 mm	ΔJ	kgm^2	0,000064	0,000144	0,000138	0,000063
Weight @ 0 mm stroke	m_{lu}	kg	11	12,7	12,3	12,5
Δ weight per 100 mm	Δm	kg	2,4	2,7	2,7	2,4
Environment						
Ambient temperature	$T_{ambient}$	°C	–20…+50	–20…+50	–20…+50	–10…+50
Max. humidity	ϕ	%	95	95	95	95
Degree of protection	IP	–	54S	54S	54S	54S

* Back-up nut, for more information see page 31

[1] Buckling limitation for long strokes, also limited by accessories and configurations. Please check the EMA-100 configuration tool on ewellix.com

[2] Maximum dynamic axial force usable to apply the theoretical lifetime calculation (L10)

[3] Preferred stroke range:
from 50 to 1 000 mm stroke is by 50 mm step (50, 100, 150, …, 900, 950, 1 000)
from 1 000 to 2 000 mm stroke is by 100 mm step (1 100, 1 200, …, 1 900, 2 000, valid for BA, BB and BC screw type excluding RA one)
For all other strokes, out of the preferred range, consider an additional 1 week on standard leadtime. Please contact Ewellix

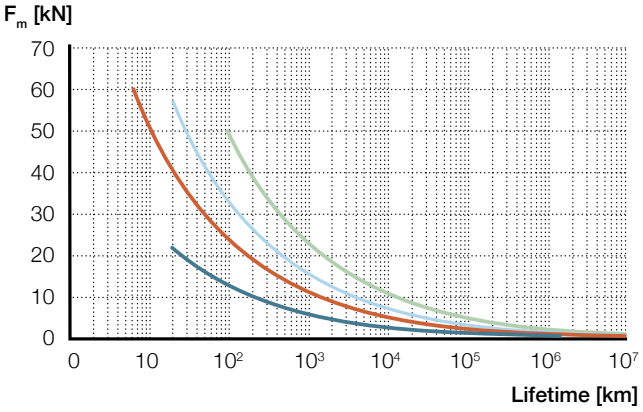
[4] Longer strokes are available at longer lead times, please contact Ewellix for more information.

[5] Permitted average output power < 450 W

Ordering key

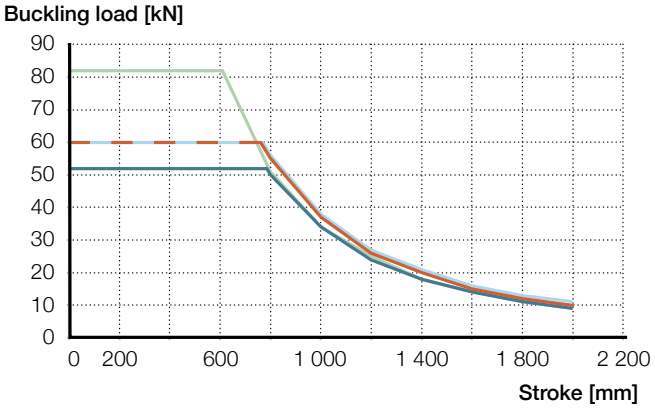
See page 32

Performance diagram



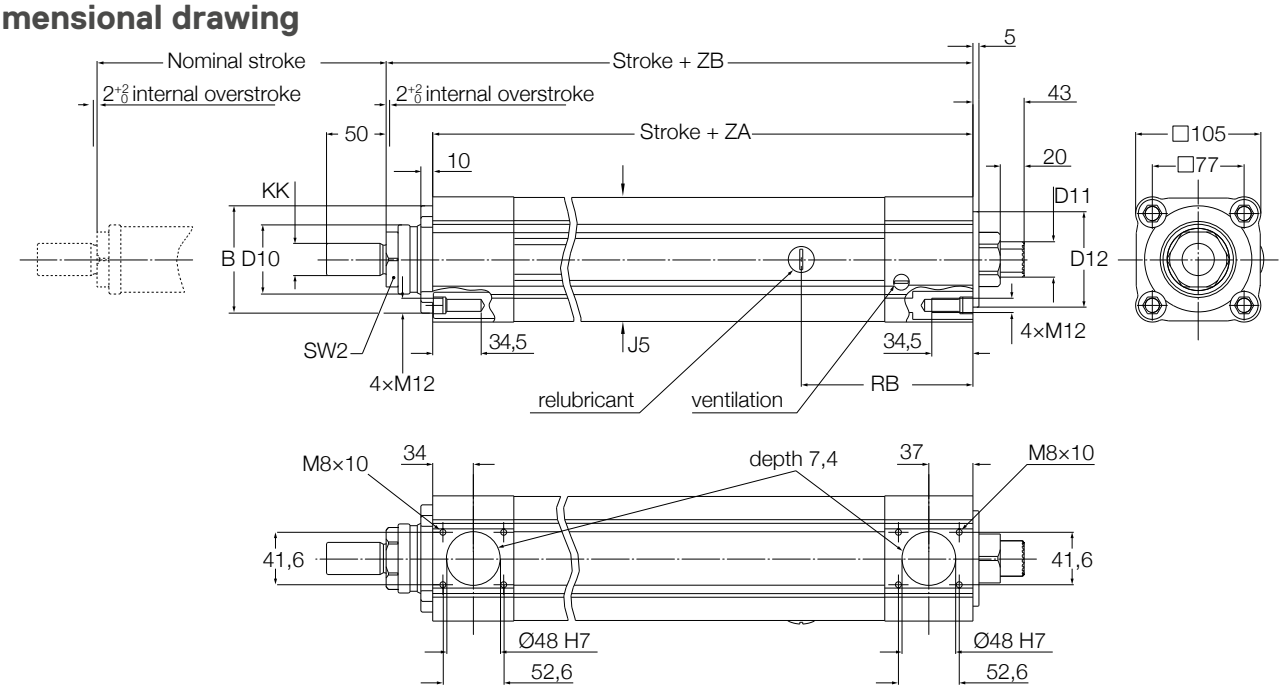
- EMA-100-1-BA
- EMA-100-1-BB / EMA-100-1-CB
- EMA-100-1-BC
- EMA-100-1-RA

Buckling load diagram

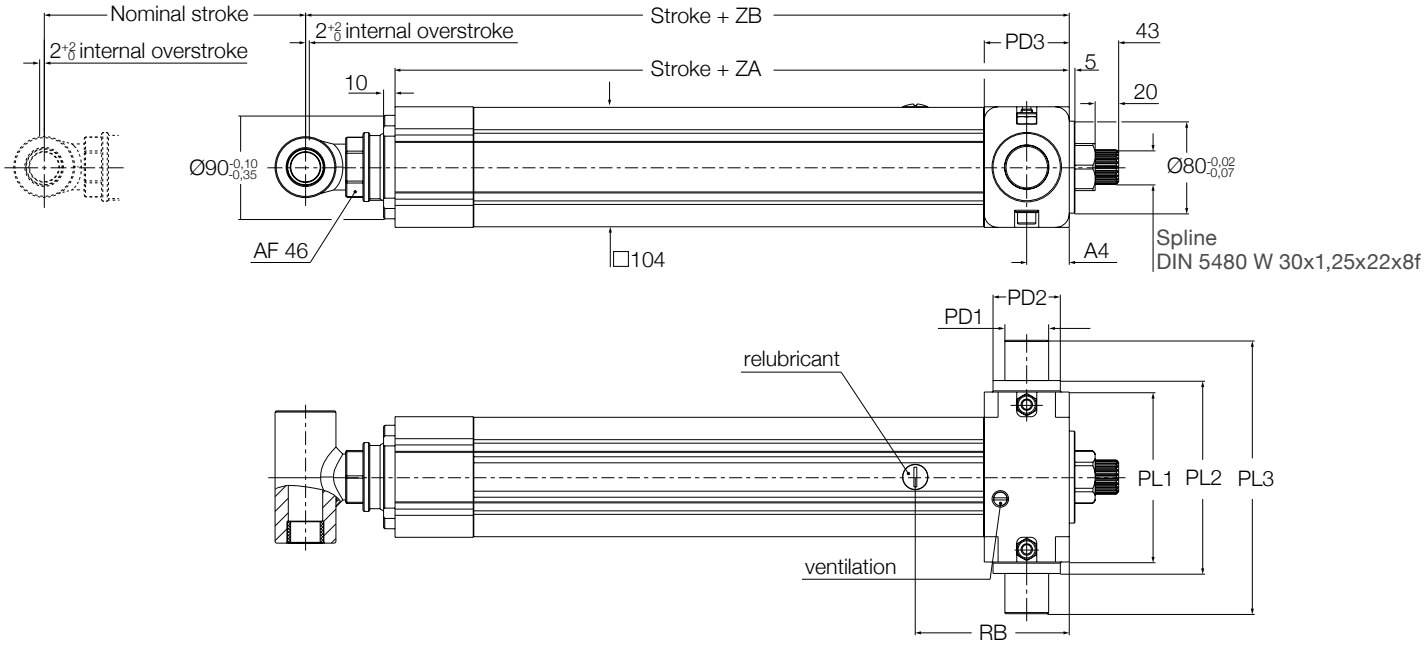


- EMA-100-1-BA
- EMA-100-1-BB / EMA-100-1-CB
- EMA-100-1-BC
- EMA-100-1-RA

Dimensional drawing



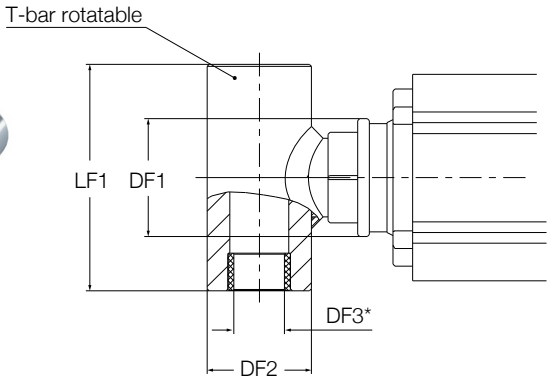
Linear Unit	J5	ZA	ZB	B	D10	KK	RB	D12	SW2	D11
–	mm					–	mm		–	–
EMA-100-1-xx-xxxx-**A**… [Standard version]	□ 104	287±1,5	326±2	Ø90 -0,10 -0,35	Ø58	M27x2	134	Ø80 -0,02 -0,07	AF 46	Spline DIN 5480 W 30x1,25x22x8f
EMA-100-1-**CB**-xxxx-**A**… [Ball screw 40x10 with back-up nut]	□ 104	301±1,5	340±2	Ø90 -0,10 -0,35	Ø58	M27x2	148	Ø80 -0,02 -0,07	AF 46	Spline DIN 5480 W 30x1,25x22x8f



Linear Unit	ZA	ZB	RB	PL1	PL2	PL3	PD1	PD2	PD3	A4
–	mm									
EMA-100-1- xx- xxxx-xxx**E1**xx [High performace pivot housing]	287±1,5	365±2	134	14,8	168	238	Ø38,1	Ø58,5	74	37
EMA-100-1- xx- xxxx-**C**xxxxxx [Push tube with T-bar, L 115mm]	287±1,5	365±2	134	–	–	–	–	–	–	–
EMA-100-1- xx- xxxx-**D**xxxxxx [Push tube with T-bar, L 155mm]	287±1,5	365±2	134	–	–	–	–	–	–	–
EMA-100-1- **CB**-xxxx-**C**xxxxxx [Ball screw 40x10 with back-up nut with T-bar]	301±1,5	379±2	148	–	–	–	–	–	–	–

Front attachment T-bar

The front attachment provides a drop in-replacement for the common attachment points found in hydraulic cylinders. To help the assembly, the front attachment is rotatable. If the front attachment is chosen, also the Anti-rotation option needs to be chosen.



*Recommended shaft tolerance: Ø25.38-25.43

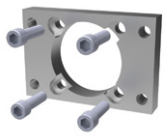
Linear Unit	DF1	DF2	DF3	LF1
–	mm			
EMA-100-1- xx- xxxx-**C**xxxxxx [Push tube with T-bar, L 115mm]	Ø60	Ø53	Ø25,53 - 25,73	115 ±1
EMA-100-1- xx- xxxx-**D**xxxxxx [Push tube with T-bar, L 155mm]	Ø60	Ø53	Ø25,53 - 25,73	155 ±1

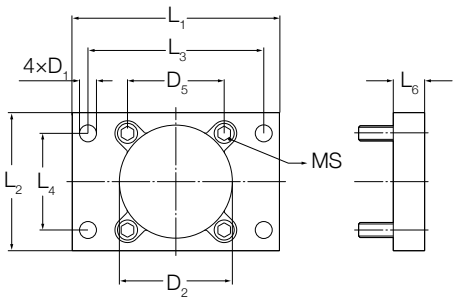
Options

The following parts are available as options and can be ordered directly through the typekey. It is not necessary (but optional) to order as extra lines if already configured and selected in the typekey.

Front Plate

Can not be used with push tube option T-bar, option C & D



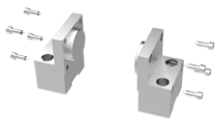


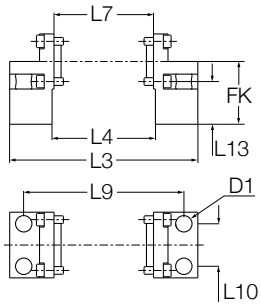
Ordering key
ZBE-377918

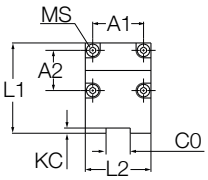
Type –	MS –	L_1 mm	L_2	L_3	L_4	D_1	D_5	D_2	L_6	m kg
ZBE-377918	M12 × 40	165	109	140	77	Ø13,5	□ 77	Ø90	25	2,1

Foot Mount

Only possible with "Front housing and attachments" option "B- Aluminum, with body attachment" and "Rear housing B1 or D1"







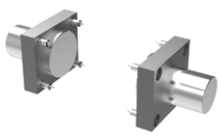
Ordering key
ZBE-377920

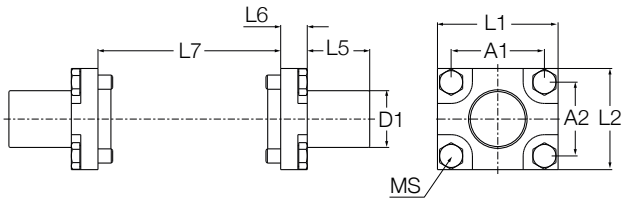
Load limit see graph on page 31.

Type –	MS –	L_1 mm	L_2	L_3	L_4	L_7	FK	A_1	A_2	L_9	L_{10}	KC	C0	L_{13}	D_1	m kg
ZBE-377920	M8 × 18	93,5	68	194,8	107	103	65	52,6	41,6	165,8	44	5,4	25	44	Ø17	2,8

Pivot Attachment

Only possible with "Front housing and attachments" option "B- Aluminum, with body attachment" and "Rear housing B1 or D1"





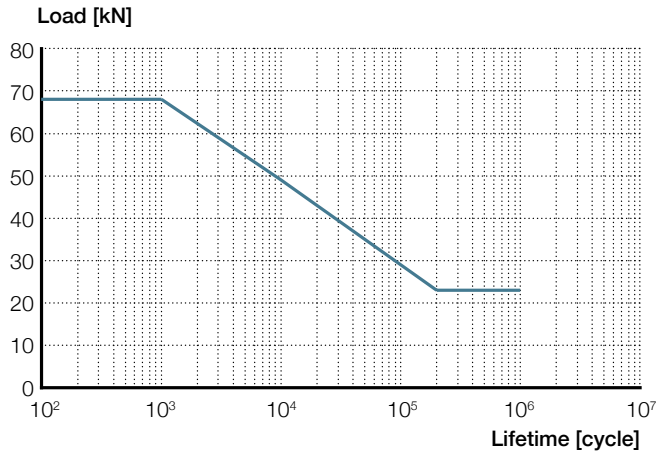
Ordering key
ZBE-377919

Load limit see graph on page 31.

Type –	MS –	L_1 mm	L_2	A_1	A_2	L_5	L_6	L_7	D_1	m kg
ZBE-377919	M8 × 18	68	57	52,6	41,6	35,2	15	103	Ø32	1,5

Housing Attachment

Load rating and lifetime limitation of the pivot attachment (ZBE-377919) and foot mount (ZBE-377920), see graph below. If higher performance is needed, switch to the high performance pivot housing option E1.



Back-up nut

The back-up nut is a feature that can be added to the main nut. It is not in contact with the screw during normal operation and will prevent the actuator from collapsing if the main nut fails. It can be used to safely retract the actuator but creates high friction on the screw. Once the back-up nut is engaged the actuator must be replaced. Back-up nut in only available for push load, solutions for pull available on request.

Ingress protection

The linear unit is available with the following ingress protection options (note that IP ratings are valid if the bearing housing is sealed by Ewellix gearbox or others with similar sealing performances):

Option B: IP54S

Protected against dust and water spray if standing still.

Option C: IP65 with sinter filter

Requiring sinter filter to be protected from dust and water. As a consequence it is required to face sinter filter downwards to protect it from rain. If not possible to protect the sinter filter, and to ensure ingress protection level, please take option D (see below).

In addition, and due to the use of solid oil ring and single lip wiper on the front, performances are restricted to avoid premature wear on the sealing. It restricts performances to the following:

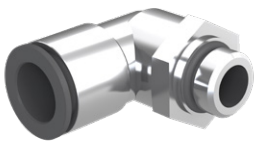
Max linear speed	Vmax	35 mm/s
Lifetime distance driven	L	100 km

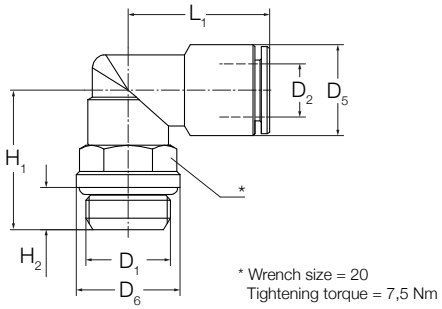
Option D: IP65 with hose

If selected, a dedicated interface valve is provided and mounted on the linear unit, allowing the actuator to breath. A hose (not provided by Ewellix) need to be connected to this interface valve in order to supply it with clean air.

It still restricts performances as indicated for Option C.

Interface valve





G thread with sealing ring							
Connections	**Tubing O.D.**						**Weight/ piece**
D1	**D2**	**D5**	**D6**	**H1**	**H2**	**L1**	
–	Ø	Ø	Ø				g
G 1/4	12	19	16	25,5	6,5	28,5	58,5

Ordering key

Linear unit

Screw type

BA	Ball screw 32 × 10
BB	Ball screw 40 × 10
BC	Ball screw 40 × 20
RA	Roller screw 30 × 10
CB	Ball screw 40x10 with back-up nut*

Stroke

–	Stroke in mm

Push tube

A	E355 chrome plated, Ø55, with connection thread M27
C	E355 chrome plated, Ø55, with T-bar, L = 115 mm [1]
D	E355 chrome plated, Ø55, with T-bar, L = 155 mm [1]

Front housing and attachments

A	Aluminum, no mounting option
B	Aluminium, with body attachment

Front housing attachment

0	None
A	Front plate 90° mounting position
B	Front plate 0° mounting position
C	Pivot attachment (trunnion brackets to be ordered separately)
D	Foot mount, 0° mounting position
E	Foot mount, 180° mounting position

Rear housing

A1	Aluminum, no mounting option, reduced static load, for screw type BA [2]
B1	Aluminum, prepared for pivot or foot mounting, reduced static load, for screw type BA [2]
C1	Aluminum, no mounting option, for all screw types
D1	Aluminum, prepared for pivot or foot mounting, for all screw types
E1	Aluminium, high performance pivot housing, for all screw types

Rear housing attachment

0	None (must be selected with option Rear housing E1)
C	Pivot attachment (trunnion brackets to be ordered separately)
D	Foot mount, 0° mounting position
E	Foot mount, 180° mounting position

Protection tube

A	Aluminium, 90°, recommended for parallel
B	Aluminium, 180°
C	Aluminium, 270°
D	Aluminium, 0°, recommended for inline

* backup nut works on push only

[1] Requires anti-rotation, different lengths available on request

[2] Maximum static axial force limited to 31 kN, axial play of 0,3 mm.

EMA - 100 - 1 - BC - 0100 - AA0C10A - BA1100 - 000

Sealing
B IP54S
C IP65 with sinter filter
D IP65 with hose

Lubrication
A Standard Lubrication for ball screws
B Standard Lubrication for roller screws

Relubrication
0 No relubrication possibility
1 With relubrication possibility

Anti-rotation
0 No anti-rotation
1 With anti-rotation

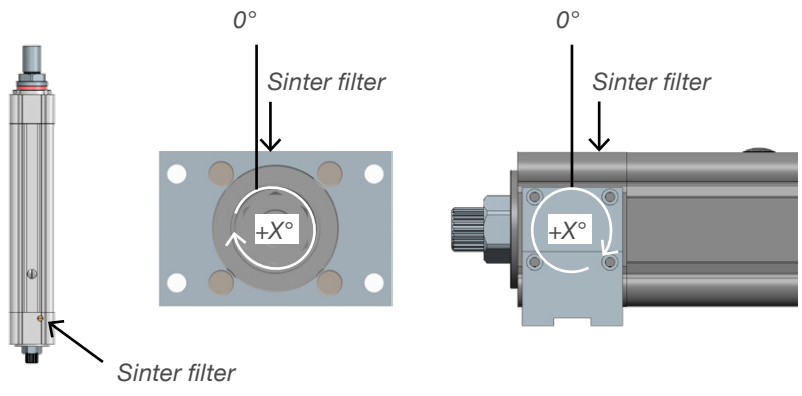
Free parameter
00 Empty

Customer option
000 No option

Mounting position front plate and foot mount

The 0° reference for the linear unit is the sinter filter position. The front plate can be turned in 90° steps clockwise. The foot mount can be turned in 180° steps clockwise.

Fig. 5



EMA-100-1-BA

Electric cylinder servo motor, inline configuration

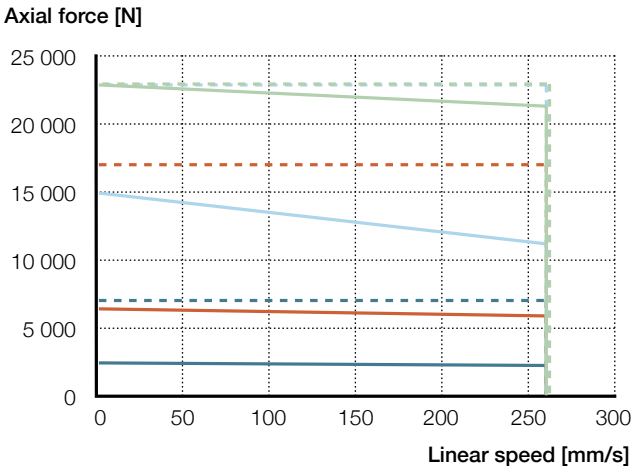
Technical data

Designation	Symbol	Unit	1FK7044	1FK7064	1FK7086	1FK7105
Performance Data						
Continuous force @ zero speed	F_{c0}	kN	2,4	6,4	15	23
Continuous force @ max. speed	F_c	kN	2,2	5,9	11,2	21,4
Peak force @ zero speed	F_{p0}	kN	7	17,1	23	23
Peak force @ max. speed	F_p	kN	7	17,1	23	23
Dynamic load capacity	C	kN	27,1	27,1	27,1	27,1
Holding force (motorbrake option)	F_{Hold}	kN	3,5	9,1	16,1	23
Max. linear speed	v_{max}	mm/s	260	260	260	260
Max. acceleration	a_{max}	m/s^2	6	6	6	6
Duty cycle	D	%	100	100	100	100
Mechanical Data						
Screw type	–	–	Ball screw	Ball screw	Ball screw	Ball screw
Screw diameter	d_{screw}	mm	32	32	32	32
Screw lead	p_{screw}	mm	10	10	10	10
Lead accuracy	-	-	G9	G9	G9	G9
Stroke[1) 2)]	s	mm	50…2 000	50…2 000	50…2 000	50…2 000
Internal overstroke each side	s0	mm	2	2	2	2
Backlash	$s_{backlash}$	mm	0,2	0,2	0,2	0,2
Gear reduction	i	-	1	1	1	1
Efficiency	η	%	77	79	79	80
Inertia @ 0 mm stroke	J	10^{-4} kgm^2	6,16	12,4	26,9	159
Δ Inertia per 100 mm	ΔJ	10^{-4} kgm^2	0,64	0,64	0,64	0,64
Inertia of optional brake	J_{brake}	10^{-4} kgm^2	0,36	1	3,50	8
Weight @ 0 mm stroke	m	kg	19,8	28,7	37,8	56,4
Δ weight per 100 mm	Δm	kg	2,4	2,4	2,4	2,4
Weight of optional brake	m_{brake}	kg	0,6	1,4	3	4,5
Electrical Data						
Motor type	–	–	Servo	Servo	Servo	Servo
Nominal voltage	U	V DC	600	600	600	600
Nominal current	I	A	3,9	7,6	5,7	18
Peak current	I_{peak}	A	5,4	10,8	21,5	31
Nominal power	P	kW	1,4	2,5	3,75	8,2
Environment & Standards						
Ambient temperature	$T_{ambient}$	°C	–20…+50	–20…+50	–20…+50	–20…+50
Max. humidity	ϕ	%	95	95	95	95
Degree of protection	IP	–	54S	54S	54S	54S

[1)] Preferred stroke range:
from 50 to 1 000 mm stroke is by 50 mm step (50, 100, 150, …, 900, 950, 1 000)
from 1 000 to 2 000 mm stroke is by 100 mm step (1 100, 1 200, …, 1 900, 2 000)
For all other strokes, out of the preferred range, consider an additional 1 week on standard leadtime. Please contact Ewellix.

[2)] Longer strokes are available at longer lead times, please contact Ewellix for more information.

Performance diagram



Dimensional drawing

See page 42

Ordering key

See page 46

EMA-100-1-BB

Electric cylinder servo motor, inline configuration

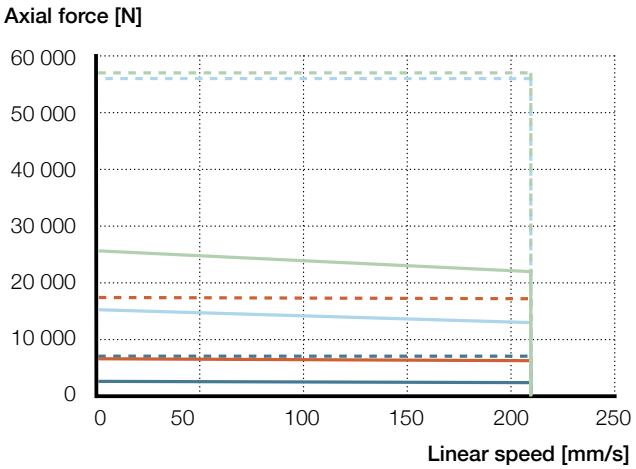
Technical data

Designation	Symbol	Unit	1FK7044	1FK7064	1FK7086	1FK7105
Performance Data						
Continuous force @ zero speed	F_{c0}	kN	2,4	6,4	14,9	25,6
Continuous force @ max. speed	F_{c}	kN	2,2	6,1	12,8	21,9
Peak force @ zero speed	F_{p0}	kN	6,9	17,1	56	57
Peak force @ max. speed	F_{p}	kN	6,9	17,1	56	57
Dynamic load capacity	C	kN	71	71	71	71
Holding force (motorbrake option)	F_{Hold}	kN	3,5	9,1	16,1	29,3
Max. linear speed	v_{max}	mm/s	210	210	210	210
Max. acceleration	a_{max}	m/s^2	6	6	6	6
Duty cycle	D	%	100	100	100	100
Mechanical Data						
Screw type	–	–	Ball screw	Ball screw	Ball screw	Ball screw
Screw diameter	d_{screw}	mm	40	40	40	40
Screw lead	p_{screw}	mm	10	10	10	10
Lead accuracy	-	-	G9	G9	G9	G9
Stroke[1) 2)]	s	mm	50…2 000	50…2 000	50…2 000	50…2 000
Internal overstroke each side	s0	mm	2	2	2	2
Backlash	$_{sbacklash}$	mm	0,2	0,2	0,2	0,2
Gear reduction	i	–	1	1	1	1
Efficiency	η	%	77	79	79	80
Inertia @ 0 mm stroke	J	10^{-4} kgm^2	7,16	13,4	27,9	160
Δ Inertia per 100 mm	ΔJ	10^{-4} kgm^2	1,44	1,44	1,44	1,44
Inertia of optional brake	J_{brake}	10^{-4} kgm^2	0,36	1	3,5	8
Weight @ 0 mm stroke	m	kg	21,5	30,4	39,5	58,1
Δ weight per 100 mm	Δm	kg	2,7	2,7	2,7	2,7
Weight of optional brake	m_{brake}	kg	0,6	1,4	3	4,5
Electrical Data						
Motor type	–	–	Servo	Servo	Servo	Servo
Nominal voltage	U	V DC	600	600	600	600
Nominal current	I	A	3,9	7,6	5,7	18
Peak current	I_{peak}	A	5,4	10,8	21,5	31
Nominal power	P	kW	1,4	2,5	3,75	8,2
Environment & Standards						
Ambient temperature	$T_{ambient}$	°C	–20…+50	–20…+50	–20…+50	–20…+50
Max. humidity	ϕ	%	95	95	95	95
Degree of protection	IP	–	54S	54S	54S	54S

[1)] Preferred stroke range:
from 50 to 1 000 mm stroke is by 50 mm step (50, 100, 150, …, 900, 950, 1 000)
from 1 000 to 2 000 mm stroke is by 100 mm step (1 100, 1 200, …, 1 900, 2 000)
For all other strokes, out of the preferred range, consider an additional 1 week on standard leadtime. Please contact Ewellix.

[2)] Longer strokes are available at longer lead times, please contact Ewellix for more information.

Performance diagram



1FK7044	F_{cont}	F_{peak}
1FK7064	F_{cont}	F_{peak}
1FK7086	F_{cont}	F_{peak}
1FK7105	F_{cont}	F_{peak}

Dimensional drawing

See page 42

Ordering key

See page 46

EMA-100-1-BC

Electric cylinder servo motor, inline configuration

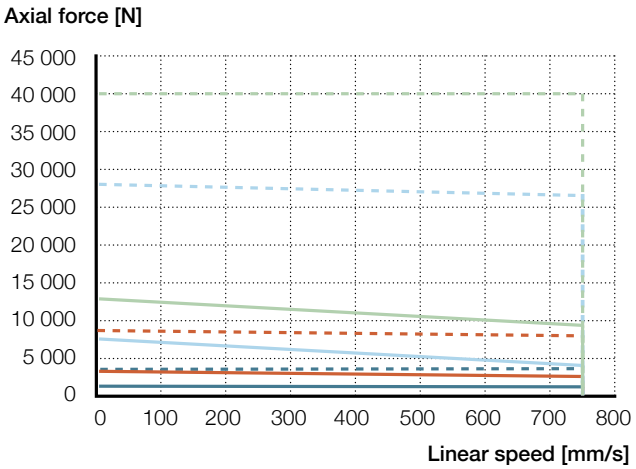
Technical data

Designation	Symbol	Unit	1FK7044	1FK7064	1FK7086	1FK7105
Performance Data						
Continuous force @ zero speed	F_{c0}	kN	1,2	3,2	7,5	12,8
Continuous force @ max. speed	F_c	kN	1,1	2,5	4	9,3
Peak force @ zero speed	F_{p0}	kN	3,5	8,5	28	40
Peak force @ max. speed	F_p	kN	3,5	8	26,7	40
Dynamic load capacity	C	kN	41,3	41,3	41,3	41,3
Holding force (motorbrake option)	F_{Hold}	kN	1,7	4,5	8	14,7
Max. linear speed	v_{max}	mm/s	750	750	750	750
Max. acceleration	a_{max}	m/s^2	12	12	12	12
Duty cycle	D	%	100	100	100	100
Mechanical Data						
Screw type	–	–	Ball screw	Ball screw	Ball screw	Ball screw
Screw diameter	d_{screw}	mm	40	40	40	40
Screw lead	p_{screw}	mm	20	20	20	20
Lead accuracy	-	–	G9	G9	G9	G9
Stroke[1) 2)]	s	mm	50…2 000	50…2 000	50…2 000	50…2 000
Internal overstroke each side	s0	mm	2	2	2	2
Backlash	$s_{backlash}$	mm	0,2	0,2	0,2	0,2
Gear reduction	i	-	1	1	1	1
Efficiency	η	%	77	79	79	80
Inertia @ 0 mm stroke	J	10^{-4} kgm^2	7,16	13,4	27,9	160
Δ Inertia per 100 mm	ΔJ	10^{-4} kgm^2	1,38	1,38	1,38	1,38
Inertia of optional brake	J_{brake}	10^{-4} kgm^2	0,36	1	3,5	8
Weight @ 0 mm stroke	m	kg	21,1	30	39,1	57,7
Δ weight per 100 mm	Δm	kg	2,7	2,7	2,7	2,7
Weight of optional brake	m_{brake}	kg	0,6	1,4	3	4,5
Electrical Data						
Motor type	–	–	Servo	Servo	Servo	Servo
Nominal voltage	U	V DC	600	600	600	600
Nominal current	I	A	3,9	7,6	5,7	18
Peak current	I_{peak}	A	5,4	10,8	21,5	31
Nominal power	P	kW	1,4	2,5	3,75	8,2
Environment & Standards						
Ambient temperature	$T_{ambient}$	°C	–20…+50	–20…+50	–20…+50	–20…+50
Max. humidity	ϕ	%	95	95	95	95
Degree of protection	IP	–	54S	54S	54S	54S

[1)] Preferred stroke range:
from 50 to 1 000 mm stroke is by 50 mm step (50, 100, 150, …, 900, 950, 1 000)
from 1 000 to 2 000 mm stroke is by 100 mm step (1 100, 1 200, …, 1 900, 2 000)
For all other strokes, out of the preferred range, consider an additional 1 week on standard leadtime. Please contact Ewellix.

[2)] Longer strokes are available at longer lead times, please contact Ewellix for more information.

Performance diagram



1FK7044	F_{cont}	F_{peak}
1FK7064	F_{cont}	F_{peak}
1FK7086	F_{cont}	F_{peak}
1FK7105	F_{cont}	F_{peak}

Dimensional drawing

See page 42

Ordering key

See page 46

EMA-100-1-RA

Electric cylinder servo motor, inline configuration

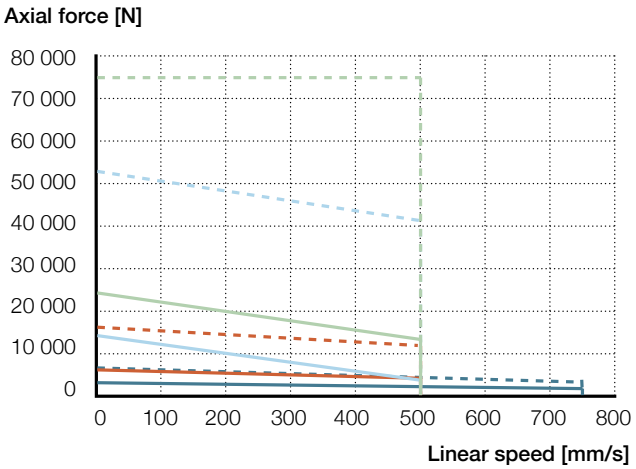
Technical data

Designation	Symbol	Unit	1FK7044	1FK7064	1FK7086	1FK7105
Performance Data						
Continuous force @ zero speed	F_{c0}	kN	2,3	6	14,1	24,1
Continuous force @ max. speed	F_c	kN	1,5	4	3,5	13,1
Peak force @ zero speed	F_{p0}	kN	6,5	16,1	52,8	75,5
Peak force @ max. speed	F_p	kN	6,3	11,6	39,2	75
Dynamic load capacity	C	kN	106	106	106	106
Holding force (motorbrake option)	F_{Hold}	kN	3,7	9,6	17	31
Max. linear speed	v_{max}	mm/s	890	890	890	833
Max. acceleration	a_{max}	m/s^2	12	12	12	12
Duty cycle	D	%	100	100	100	100
Mechanical Data						
Screw type	–	–	Roller screw	Roller screw	Roller screw	Roller screw
Screw diameter	d_{screw}	mm	30	30	30	30
Screw lead	p_{screw}	mm	10	10	10	10
Lead accuracy	–	–	G5	G5	G5	G5
Stroke[1) 2)]	s	mm	50…1 000	50…1 000	50…1 000	50…1 000
Internal overstroke each side	s0	mm	2	2	2	2
Backlash	$s_{backlash}$	mm	0,2	0,2	0,2	0,2
Gear reduction	i	–	1	1	1	1
Efficiency	η	%	73	74	74	75
Inertia @ 0 mm stroke	J	10^{-4} kgm^2	6,56	12,8	27,3	159
Δ Inertia per 100 mm	ΔJ	10^{-4} kgm^2	0,63	0,63	0,63	0,63
Inertia of optional brake	J_{brake}	10^{-4} kgm^2	0,36	1	3,5	8
Weight @ 0 mm stroke	m	kg	21,3	30,2	39,3	57,9
Δ weight per 100 mm	Δm	kg	2,4	2,4	2,4	2,4
Weight of optional brake	m_{brake}	kg	0,6	1,4	3	4,5
Electrical Data						
Motor type	–	–	Servo	Servo	Servo	Servo
Nominal voltage	U	V DC	600	600	600	600
Nominal current	I	A	3,9	7,6	5,7	18
Peak current	I_{peak}	A	5,4	10,8	21,5	31
Nominal power	P	kW	1,4	2,5	3,75	8,2
Environment & Standards						
Ambient temperature	$T_{ambient}$	°C	–10…+50	–10…+50	–10…+50	–10…+50
Max. humidity	ϕ	%	95	95	95	95
Degree of protection	IP	–	54S	54S	54S	54S

[1)] Preferred stroke range:
from 50 to 1 000 mm stroke is by 50 mm step (50, 100, 150, …, 900, 950, 1 000)
For all other strokes, out of the preferred range, consider an additional 1 week on standard leadtime. Please contact Ewellix.

[2)] Longer strokes are available at longer lead times, please contact Ewellix for more information.

Performance diagram



1FK7044	F_{cont}	F_{peak}
1FK7064	F_{cont}	F_{peak}
1FK7086	F_{cont}	F_{peak}
1FK7105	F_{cont}	F_{peak}

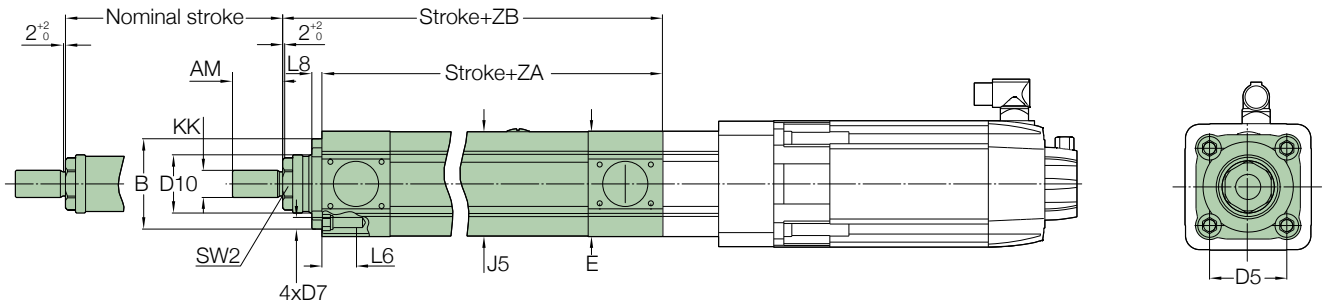
Dimensional drawing

See page 42

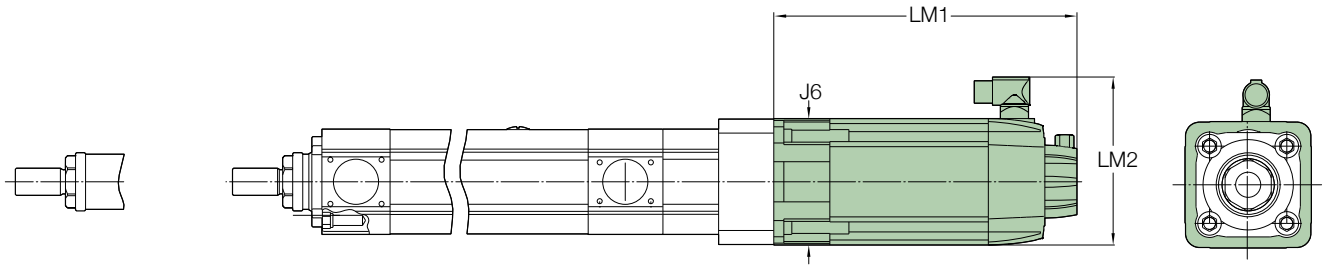
Ordering key

See page 46

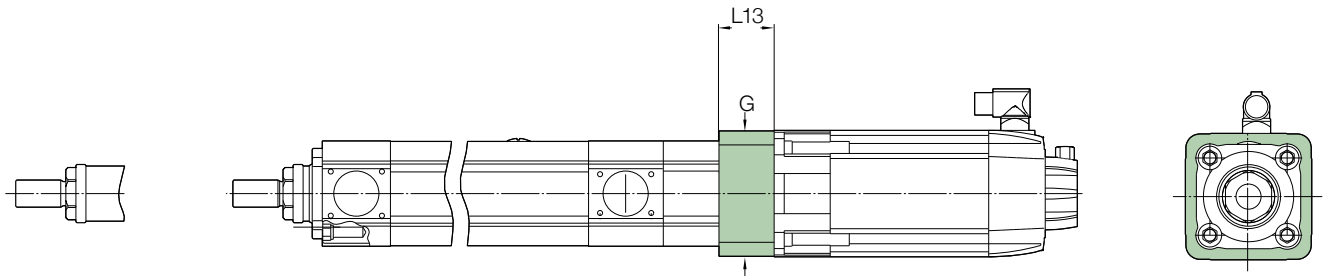
Dimensional drawing



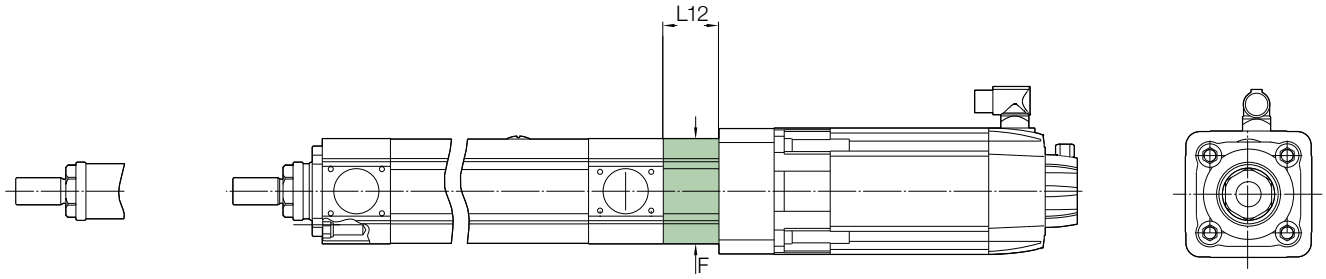
Linear Unit	KK	SW 2	D7	J5	E	ZA	ZB	L8	B	D10	AM	D5	L6
–	–	–	–	mm									
EMA-100-1-xx-xxxx-A…	M27 × 2	AF 46	M12	☐ 104	☐ 105	287±1,5	326±2	10	Ø90 -0,10 -0,35	Ø58	50	☐ 77	34,5
EMA-100-1-CB-XXXX-A...	M27 × 2	AF 46	M12	☐ 104	☐ 105	301±1,5	340±2	10	Ø90 -0,10 -0,35	Ø58	50	☐ 77	34,5



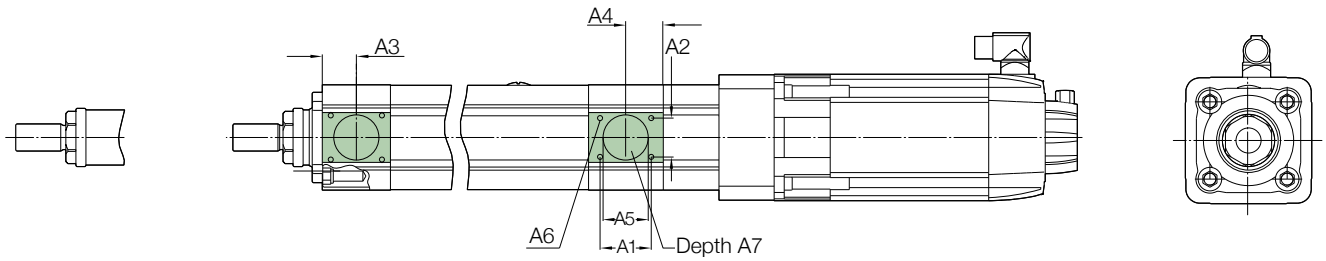
Motor	LM1	LM2	J6
–	mm		
MK-100-MS-xO-A11-000	242,5	139,5	☐ 96
MK-100-MS-xO-A12-000	302,5	167,5	☐ 126
MK-100-MS-xO-A13-000	309,5	216,5	☐ 155
MK-100-MS-xO-A14-000	340	253	☐ 192



Motor adapter	G	L13
–	mm	
MK-100-MS-x0-A11-000	☐ 105	44,5
MK-100-MS-x0-A12-000	☐ 125	54,5
MK-100-MS-x0-A13-000	☐ 139	62,5
MK-100-MS-x0-A14-000	☐ 192,5	85,5



Gearbox	i	F	L12
–	–	mm	
GB-100-GI-AAA-00-000	01:01	☐ 105	55,5



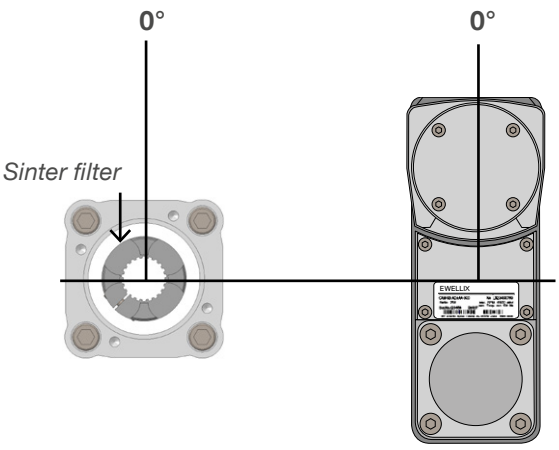
Optional Mounting Possibility	A6	A1	A2	A3	A4	A5	A7
–	–	mm					
EMA-100-1-xx-xxxx-…	M8 × 10	52,6	41,6	34	37	Ø48 H7	7,4

Mounting positions

For a complete actuator assembly, the gearbox is used as the 0° reference for all connected modules (↳ **fig. 6**).

Fig. 6

Gearbox reference

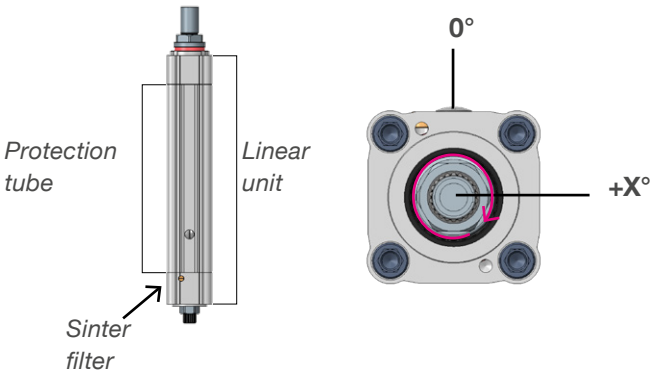


Mounting position protection tube

The 0° reference for the protection tube is the sinter filter position. The protection tube can be turned in 90° steps clockwise (↳ **fig. 7**). Parallel gearbox mounting positions have some limitations: protection tube with relubrication port can be mounted at 90° - 180° - 270° (0° is not possible) (↳ **fig. 8**).

Fig. 7

Linear unit reference

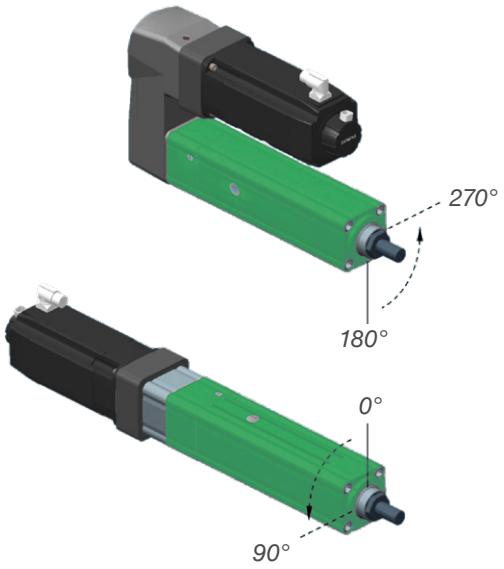


Orientation recommendation

For parallel version, recommended linear unit mounting position is 0° and protection tube mounting position is 90° (270° also possible).

Fig. 8

Linear unit orientation



Mounting positions motor

The 0° reference for the motor is the electric connector outlet position. The motor can be turned in 90° steps clockwise (↳ **fig. 9**). Parallel gearbox mounting position have some limitations: Motor from sizes Servo 8x / IEC AC 80 and bigger can be mounted at 0° - 90° - 270° (180° is not possible) (↳ **fig. 10**).

Fig. 9

Reference motor adapter

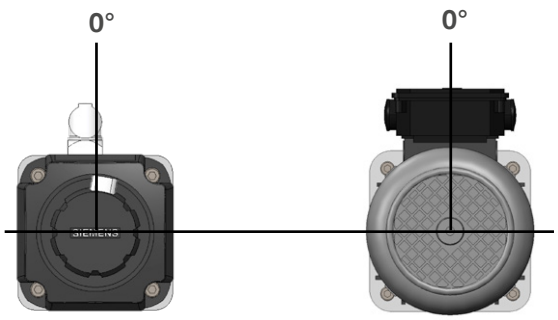
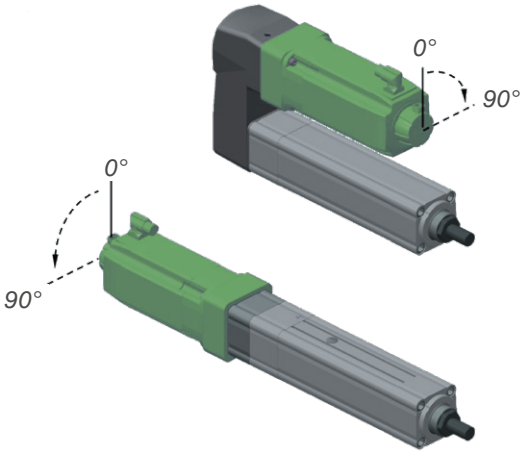


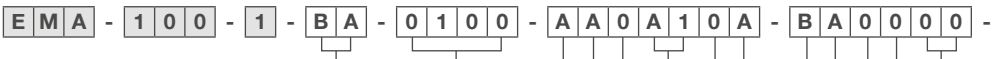
Fig. 10

Motor adapter orientation



Ordering key Complete actuator

Linear unit



Screw type

BA	Ball screw 32 × 10
BB	Ball screw 40 × 10
BC	Ball screw 40 × 20
RA	Roller screw 30 × 10
CB	Ball screw 40x10 with back-up nut*

Stroke

–	Stroke in mm

Push tube

A	E355 chrome plated, Ø55, with connection thread M27
C	E355 chrome plated, Ø55, with T-bar, L = 115 mm [1]
D	E355 chrome plated, Ø55, with T-bar, L = 155 mm [1]

Front housing and attachments

A	Aluminum, no mounting option
B	Aluminium, with body attachment

Front housing attachment

0	None
A	Front plate 90° mounting position
B	Front plate 0° mounting position
C	Pivot attachment (trunnion brackets to be ordered separately)
D	Foot mount, 0° mounting position
E	Foot mount, 180° mounting position

Rear housing

A1	Aluminum, no mounting option, reduced static load, for screw type BA [2]
B1	Aluminum, prepared for pivot or foot mounting, reduced static load, for screw type BA [2]
C1	Aluminum, no mounting option, for all screw types
D1	Aluminum, prepared for pivot or foot mounting, for all screw types
E1	Aluminium, high performance pivot housing, for all screw types

Rear housing attachment

0	None (must be selected with option Rear housing E1)
C	Pivot attachment (trunnion brackets to be ordered separately)
D	Foot mount, 0° mounting position
E	Foot mount, 180° mounting position

Protection tube

A	Aluminium, 90°, recommended for parallel
B	Aluminium, 180°
C	Aluminium, 270°
D	Aluminium, 0°, recommended for inline

Sealing

B	IP54S
C	IP65 with sinter filter
D	IP65 with hose

Lubrication

A	Standard Lubrication for ball screws
B	Standard Lubrication for roller screws

Relubrication

0	No relubrication possibility
1	With relubrication possibility

Anti-rotation

0	No anti-rotation
1	With anti-rotation

Free parameter

00	Empty

* backup nut works on push only

[1] Requires anti-rotation, different lengths available on request

[2] Maximum static axial force limited to 31 kN, axial play of 0,3 mm.

Gearbox

- G I - A A A - 0 0 -

Type

I	Inline
B	Belt (Not possible to combine with linear unit BA)
S	Spur

Size

A	Inline Servo motors
B	Inline Asynchronous motors
C	Parallel Gear

Ratio

A	1 : 1 (inline and belt only)
B	4 : 1 (spur only, ↳ page 17 for exact ratio)
C	10 : 1 (spur only, ↳ page 17 for exact ratio)
D	25 : 1 (spur only, ↳ page 17 for exact ratio)
E	2 : 1 (belt only)

Options

A	Spur and inline gearbox, standard lubrication and housing
B	Spur gearbox, grease lubrication
C	Belt gearbox, rear cover for rear attachment or brakes, IP54S
D	Belt gearbox, light rear cover (no rear attachment or brakes), IP40S

Rear attachment

0	No
B	Rear attachment 0°
C	Rear attachment 90°
D	Rear Attachment, bar type, L = 115 mm. 0° * (spur only)
E	Rear Attachment, bar type, L = 155 mm, 0° * (spur only)

Free parameter

0	No accessory
B	Centrifugal Brake Type B (engagement speed: 2 200 rpm)

* Different length available on request

Motor kit

- MA - B0 - A11 - A0 - 000

Type

A	Interface according to IEC AC XX B14A
S	Interface according to Siemens servo motor

Delivery

Motor supplied and mounted by Ewellix

Servo motor

B0-A11	Siemens 1FK7044-4CH71-1UH0
B0-A12	Siemens 1FK7064-4CF71-1RB0
B0-A13	Siemens 1FK7086-4CF71-1RB0
B0-A14	Siemens 1FK7105-2AF71-1RB0

AC motor

B0-A61	Siemens 1LE1001-0CA32-2KB4-Z=F01+F11+G11
B0-A62	Siemens 1LE1001-0CB32-2KB4-Z=F01+F11+G11
B0-A63	Siemens 1LE1003-0DA32-2KB4-Z=F01+F11+G11
B0-A64	Siemens 1LE1003-0DB32-2KB4-Z=F01+F11+G11
B0-A65	Siemens 1LE1003-0EA02-2KB4-Z=F01+F11+G11
B0-A66	Siemens 1LE1003-0EB02-2KB4-Z=F01+F11+G11
B0-A67	Siemens 1LE1003-1AA42-2KB4-Z=F01+F11+G11
B0-A68	Siemens 1LE1003-1AB42-2KB4-Z=F01+F11+G11
B0-N11	Nidec AC induction motor, 1.4kW, with EM-brake

Motor adapter only

00-AA1	Siemens 1FK7044 series
00-AA2	Siemens 1FK7064 series
00-AA3	Siemens 1FK7086 series
00-AA4	Siemens 1FK7105 series
00-AC1	IEC AC 71 B14A
00-AC2	IEC AC 80 B14A
00-AC3	IEC AC 90 B14A
00-AC4	IEC AC 100 B14A
00-XXX	Customized flanges, dimension see table on page 9

Mounting position linear unit

A	0°, recommended for parallel (standard if no gearbox is selected)
B	90°
C	180°
D	270°

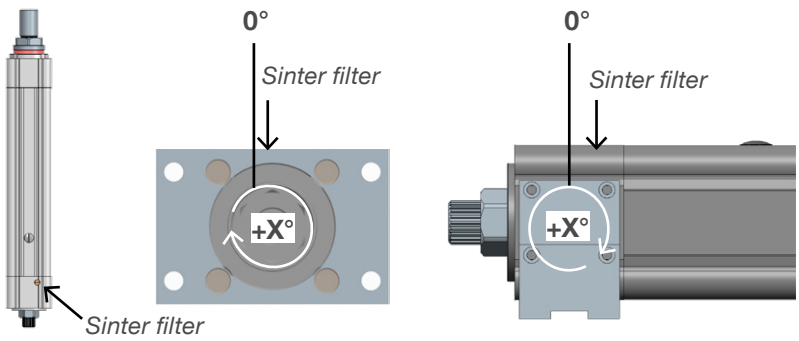
Mounting position motor

0	no motor kit selected
A	0°
B	90°
C	180° (Inline Gearbox only)
D	270°

Customer option

000	No option

Fig. 5



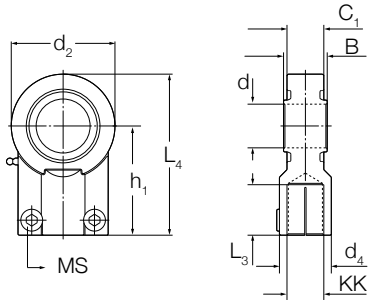
Mounting position front plate and foot mount

The 0° reference for the linear unit is the sinter filter position. The front plate can be turned in 90° steps clockwise. The foot mount can be turned in 180° steps clockwise.

Accessories

EMA-100

Push tube attachments
Rod End



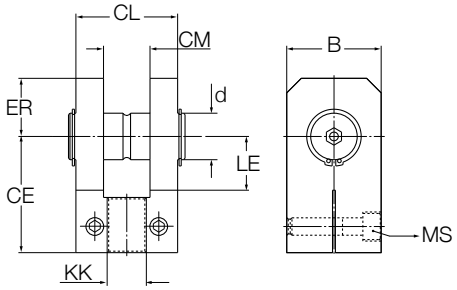
Technical info
Dynamic load rating: C=65,6 kN

Static load rating: C=100 kN

Ordering key
Rod End Ø32: ZBE-377900 (According to DIN8132 standard)

Type	KK	MS	L_3	B	C_1	d	d_4	L_4	h_1	d_2	m_2
–	–	–	mm								kg
ZBE-377900	M27 × 2	M10	37	32	28	Ø32	Ø40	119	80	76	1,2

Rod Clevis

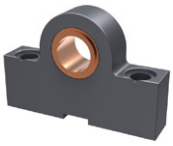


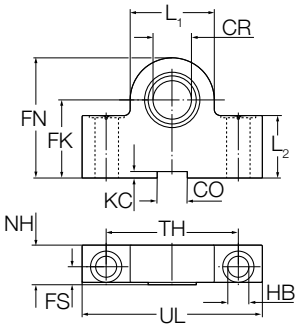
Technical info
Nominal force: 50 kN

Ordering key
Rod Clevis Ø32: ZBE-377917 (According to DIN8132 standard)

Type	KK	MS	CL	CM	LE	CE	ER	d	B	m
–	–		mm							kg
ZBE-377917	M27 × 2	M12	70	32	42	80	40	Ø32	65	2,7

Trunnion Bracket Centric



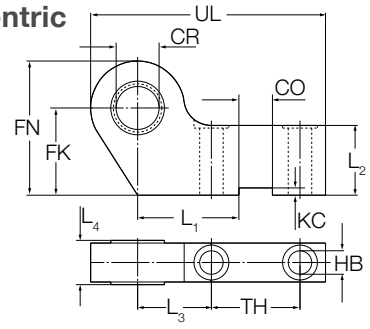


Technical info
Nominal force: 50 kN

Ordering key
Trunnion Bracket Centric Ø32: ZBE-377902 (According to ISO8132 standard)

Type	CR	FN	FK	HB	NH	TH	UL	CO	KC	FS	L_1	L_2	m
–	mm												kg
ZBE-377902	Ø32	100	65	Ø17,5	33	110	150	25	5,4	15	70	52	4,7

Trunnion Bracket Eccentric

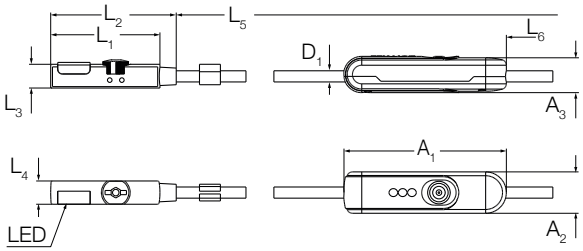


Technical info
Nominal force:
50 kN

Ordering key
ZBE-377910

Type –	CR mm	FN	FK	TH	HB	L_3	UL	CO	KC	L_4	L_2	L_1	m kg
ZBE-377910	Ø32	100	65	66	Ø17,5	55	175	25	5,4	33	52	75,5	4,2

Proximity Switch



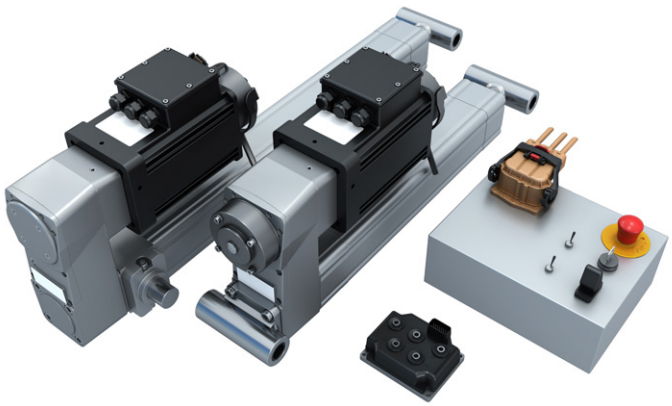
Ordering key
ZSC-377925

Type –	L_1 mm	L_2	L_3	L_4	L_5	D_1	A_1	A_2	A_3	L_6	m kg
ZSC-377925	23,5	27	5,5	5	2 000	Ø2,4	35	8,9	7,9	1 765	0,016

Please refer to Balluff datasheet BMF 235K H-PO-C-A2-PU-02 for detailed technical information.

e-MOVEKIT

The e-MOVEKIT allows users to unlock the benefits of fully electrified actuation for their equipment, without the hassle of sizing and designing the complete control system.



System description

The e-MOVEKIT is a complete system offer that consists of all components required to drive a linear actuator in mobile machines that use 24V batteries. It was tested according to industry standards.

The system allows for linear movements controlled by analog inputs or through CAN commands. It also offers features that make it easy to replace hydraulic systems like:

- Easily integrate the actuator into an existing system
- Start using electromechanics with little knowledge required (system integration e-MOVEKIT, quick start e-MOVEKIT)
- Build prototypes quickly / perform feasibility studies
- Purchase all components from a single supplier
- Get support from one supplier (one stop shop)
- Reduce amount of technical interfaces
- Reduce complexity of the system
- Recuperate energy: battery can be charged by recuperating energy when the system is driven (and not actively driving) e.g., when moving down in a lifting device. This increases overall efficiency and can increase the availability. Alternatively, the customer can reduce the battery size compared to a standard hydraulic system
- Operate the actuator in industries that are sensitive to contamination e.g., food industry, server farms or clean rooms
- Oil free
- Reduced maintenance interval and efforts
- Fully documented performance and environmental testing for mobile requirements

Control system

To make integration into any system as simple and smooth as possible, Ewellix provides several motor control options. With these controllers we can offer the optimal performance in any application.

Quick start e-MOVEKIT

The quick start e-MOVEKIT is designed for customers unfamiliar with electromechanical actuators. It comes with all the components needed to start testing straight out of the box, including the motor controller with all the input controls and cables needed to drive the actuator within the application. The quick start e-MOVEKIT is ideal for prototyping and concept studies.

System integration e-MOVEKIT

The system integration e-MOVEKIT requires a basic knowledge of motor control techniques. The system is already configured with the motor parameters for motor kit N11. While the integration into the application is defined by the customer.

With the system integration e-MOVEKIT, Ewellix offers a solution for complete one-handed actuator control.

Both kits can be combined with any of the listed actuator configurations. Ewellix configures all motor parameters according to the selected actuator. Both kits are equipped with Curtis instruments' AC F2-A motor controller.

Speed mode

By giving a drive command, the controller will drive the motor at the required speed and adjust the power consumption and torque generation accordingly.

For smooth starts and stops an acceleration ramp can be defined to reduce strain on mechanical components and allow for longer life and a high end feel.

Software features:

- CANopen drive commands
- Analog drive commands (FWD/REV or WIG/WAG)
- Limit switch integration possible, standard for the quick start e-MOVEKIT
- Validated safety detection and error prevention:
  - Un-commanded powered motion
  - Motor braking torque loss

Quick start e-MOVEKIT

The quick start e-MOVEKIT is specially designed to allow easy first prototype integration and build-up of control know-how for electromechanic actuators. The box already contains all necessary components to get started and is truly a plug-and-play solution. The intend of the quick start e-MOVEKIT is to help in the transition from an existing hydraulic system to an all-electric one. The simple and easy to understand control interface allows for fast prototype testing inside the application.

To prevent any damage to the actuator during the first setup and building the know-how about controlling electromechanics actuators inside the application the actuators ordered together with the quick start e-MOVEKIT comes equipped with limit switches that prevent an overtravel into the physical end stops of the actuator.

Quick start e-MOVEKIT contains:

- Control box
- Motor power cable
- Motor control cable
- Limit switch sensor
- Limit switch extension cable

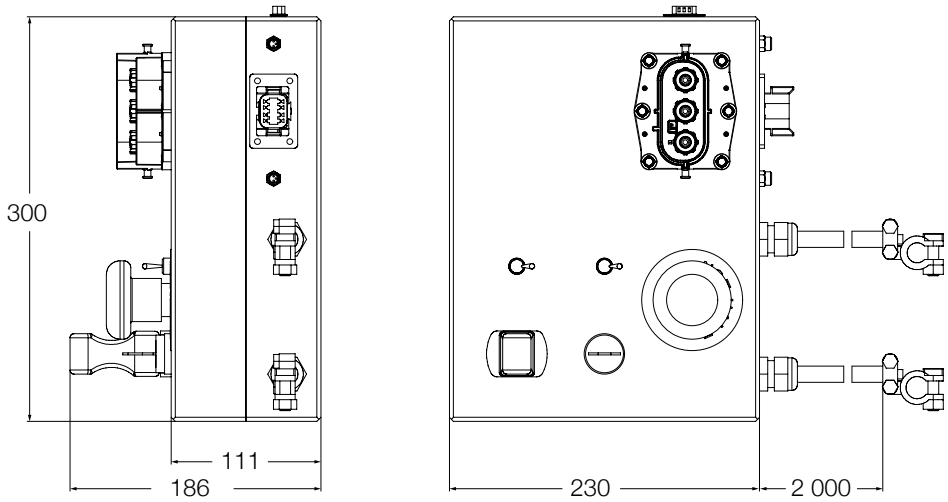
To be ordered separately:

- Linear unit
- Nidec N11 motor
- Attachments & accessories
- Battery 24 V DC (not available from Ewellix)

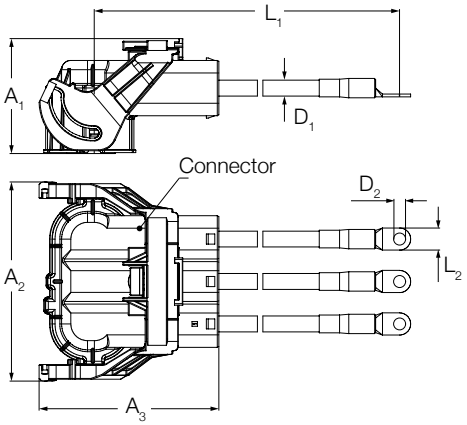
Performance data

Designation	Symbol	Unit	Data
Controller type	–	–	AC F2-A-200-001
Interlock	–	–	integrated
Nominal voltage range	–	–	24
Minimum voltage	U_{min}	V DC	12
Burnout voltage	U_{burn}	V DC	8
Maximum voltage	U_{max}	V DC	30
Maximum current [S2-2 min]	I_{max}	A RMS	200
Maximum current [S2-60 min]	I_{max}	A RMS	67
Designed life	–	–	8 000
Current protection (Fuse)	–	–	250
Environmental rating	IP	–	65/67

Dimensions

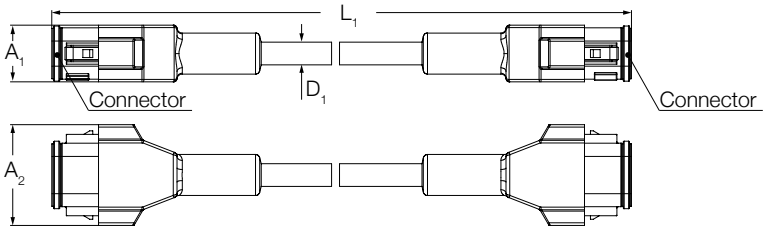


Motor power cable for quick start e-MOVEKIT



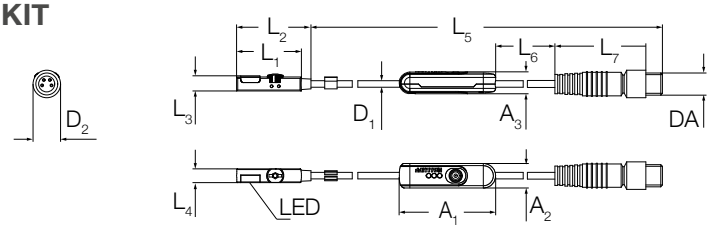
Type	L1	L2	A1	A2	A3	D1	D2	Connector
–	mm							–
ZKA-377946	2 063	12	77	121,9	120	Ø 8,7	Ø 6,5	Ampenol 3 PIN plugh right angle HVSL1000 08 3 A 1 25

Motor control cable for quick start e-MOVEKIT



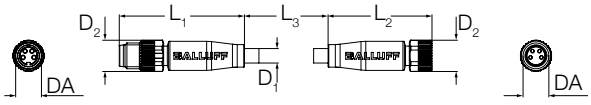
Type	L_1	A_1	A_2	D_1	Connector
–	mm				–
ZKA-377945	2 063	22	39	Ø 8,7	Deutsch DT06-08SA

Proximity switch for quick start e-MOVEKIT



Type	L_1	L_2	L_3	L_4	L_5	L_6	L_7	DA	D_1	D_2	A_1	A_2	A_3
–	mm							–	mm				
ZSC-377942	23,5	27	5,5	5	574	600	33	M8×1	Ø2,4	Ø10	35	8,9	7,9

Extension cable for proximity switch



Type	L_1	L_2	L_3	DA	D_1	D_2
–	mm			–		
ZSC-377943	38,8	32,2	2 000	M8×1	Ø4,7	Ø9,7

System integration e-MOVEKIT

The system integration e-MOVEKIT allows for an integration into any mobile application. The controller comes pre-configured to run with the AC induction motor and allows for a direct integration and gives high flexibility for the integration into any application.

The system integration e-MOVEKIT is targeted for customers that want to realize a product in small series and like to have one single source for all components necessary to control an electromechanical actuator.

System integration e-MOVEKIT contains:

- Motor controller
- Motor profile pre-setup

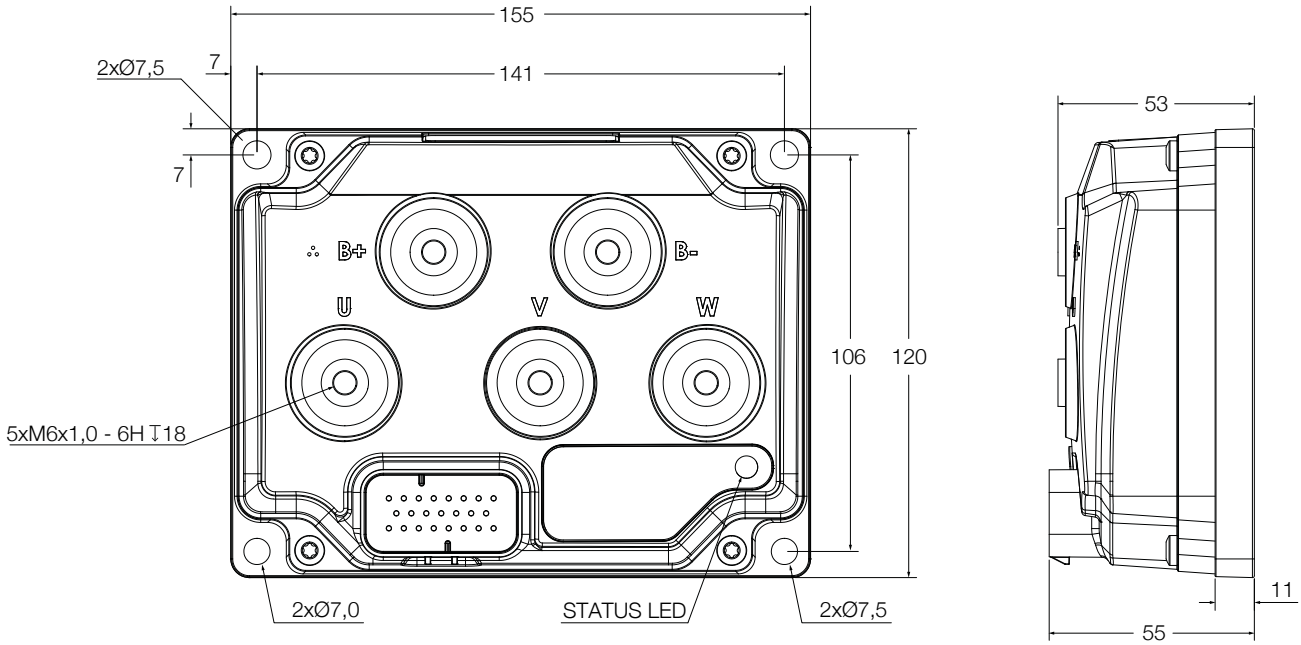
To be ordered separately:

- Linear unit
- Nidec N11 motor
- Motor power cable
- Motor control cable
- Attachments & accessories
- Battery 24 VDC (not available from Ewellix)

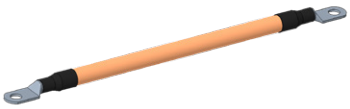
Performance data

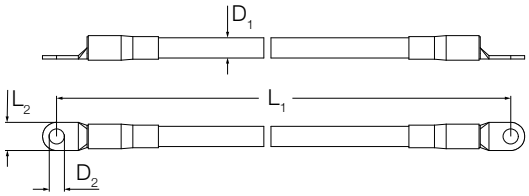
Designation	Symbol	Unit	Data
Controller type	–	–	Curtis AC F2-A 24-200-001
Nominal voltage range	–	–	24
Minimum voltage	U_{min}	V DC	12
Burnout voltage	U_{burn}	V DC	8
Maximum voltage	U_{max}	V DC	30
Maximum current [S2-2 min]	I_{max}	A RMS	200
Maximum current [S2-60 min]	I_{max}	A RMS	67
Storage ambient temperature	T_{amb_stor}	°C	-40 to +95
Operation ambient temperature	T_{amb_op}	°C	-40 to +50
Designed life	–	–	8 000
Environmental rating	IP	–	65/67

Dimensions



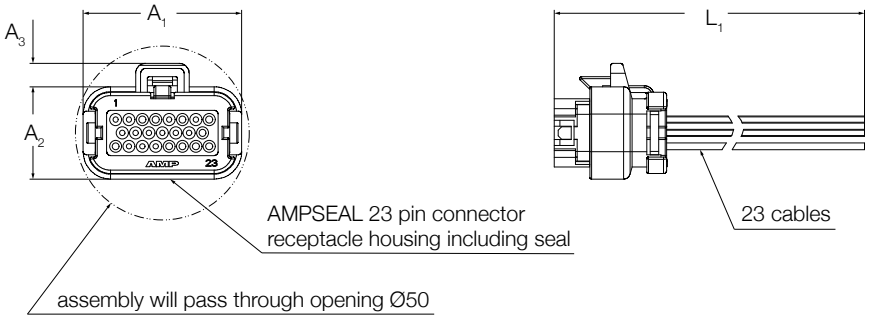
Motor power cable for system integration e-MOVEKIT





Type –	L_1	L_2	D_1	D_2
ZKA-377947	2 054	12	Ø 8,7	Ø 6,2

23pin AMPSEAL - Pre-assembled connector for I/O to the motor controller



Type –	L_1 mm	A_1	A_2	A_3
ZKA-377944	1 000	47,4	27,6	7

Ordering key

e-MOVEKIT

Type

Q	Quick start e-MOVEKIT (including cables, sensors)
S	System integration e-MOVEKIT (excluding cables) [1]

Motor type

N	Nidec AC induction motor, 1.4kW, with EM-brake

Gearbox Size

C	Small Parallel Gear

Gearbox Ratio

B	4:1 (spur only, see page 17 for exact ratio)
C	10:1 (spur only, see page 17 for exact ratio)
D	25:1 (spur only, see page 17 for exact ratio)

Screw Type

A	Ball screw 32x10
B	Ball screw 40x10
C	Ball screw 40x20

Speed

Linear Unit speed in mm/s [2]

Other options - Sensor

0	No sensor integration
1	integrated magnetic limit switches (automatically selected with quick start e-MOVEKIT)

Customer option

000	No option

[1] Cables for system integration e-MOVEKIT will be bought as ZKA- items
[2] Speed for options with limit switch is limited to 90 mm/s , available as standard in 10 mm/s increments, different max. speeds available on request

Compliances EMA-100 Actuator

These compliances are only applicable for an actuator configured with the Full System Offer components and is not valid for other configurations.

Testing results are applicable for following components:

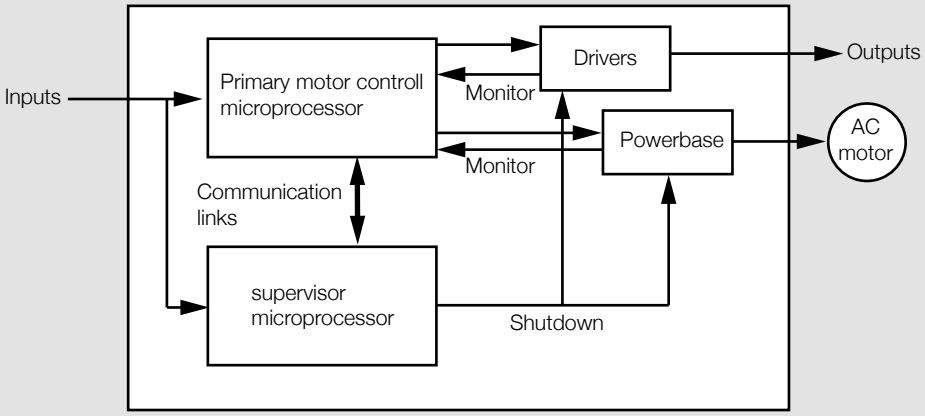
- Linear unit BB, BC, CB
- AC Induction Motor - MA-B0-N11
- Parallel spur gearbox
- Centrifugal brake
- Rear attachment bar type
- Front attachment option (T-bar)
- High performance pivot housing (E1)

Test	Standard	Performance
Static Safety [1]	ANSI/SAIA A92.20-2018	Safety Factor: 2x F_{max} with no plastic deformation*
Mechanical Overload [1]	ANSI/SAIA A92.20-2018	Safety Factor: 2.5x F_{max} without material failure/collapse*
Ball Screw System	ANSI/SAIA A92.20-2018 Section 4.5.4.3	Compliant for option EMA-100-1-CB
Corrosion Protection [1] / Salt Mist	DIN EN ISO 9227:2017 NSS ASTM B 117 – 18	• Salt Spray Test: NaCl-Solution 50 ±5 g L-1 pH: 6.5 – 7.2 • Test temperature: 35 ±2°C • Test duration: 120h • Salt spray quantity: 1.5 ±0.5 m L h-1 per 80 cm ^{2} • Not red or white rust bleed-out
	DIN EN ISO 9227:2017 NSS	• Salt Spray Test: NaCl-Solution 50 ±5 g L-1 pH: 6.5 – 7.2 • Test temperature: 35 ±2 °C • Test duration: 480 h • Salt spray quantity: 1.5 ±0.5 m L h-1 per 80 cm^2 • White rust bleed-out
Ingress Protection [1]	IEC 60529:13 (edition 2.2)	IP 54S IP 65
		Pressure washer save [1]
Vibrations [1]	EN 60068-2-64:2008 MIL-STD 810G Method 514.6, Annex C, Figure 514.6C-1 MIL-STD 810G Method 514.6, Annex C, Figure 514.6C-2 MIL-STD 810G Method 514.6, Annex D, Figure 5104.6D-9	Full Performance after test
	EN 61373 Cat. 1B:2010 Railway applications	• Random function test: duration: 10 m • Random-endurance test: - Duration: 5 h - Mechanical shock: • Shock acceleration amplitude: 50 m/s^2 • Duration of nominal shock: 30 ms • Numbers of shocks per plane: 18
Temperature [1]	MIL-STD-810G Method 501.5, Procedure II – Operation with constant temperature condition MIL-STD-810G Method 502.5, Procedure II – Operation with constant temperature condition	• High temperature test: - Operating temperature: +49 °C - Storage temperature: +65°C • Low temperature test: - Operating temperature: -18 °C - Storage temperature: -30°C
Others	RoHS directive 2011/95/EU compliant REACH regulation (EC) No 1907/2006 compliant Dodd Frank Act compliant	

* Depending on stroke configuration.

[1] All requirements verified through testing (component and actuator).

Compliances system integration e-MOVEKIT

Test	Standard
EMC	Designed to the requirements of EN 12895:2015
Safety	Designed to the requirements of EN 1175-1:1998+A1:2010, EN ISO 13849-1:2015 Category 2 Uncommanded powerd motion PL: d Motor braking torque PL: C
Supervision system	
UL	UL recognized component per UL583
Ingress protection	IP65 per IEC60529
Temperature	Controller linearly reduces maximum current limit with an internal heatsink Temperature from 85°C to 95°C; complete cutoff occurs above 95°C and bellow -40°C
Others	RoHS directive 2011/95/EU compliant REACH regulation (EC) No 1907/2006 compliant Dodd Frank Act compliant

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