

PERFORMANCES AND FEATURES

- Pull-Push load up to 5 000 N
- Linear speed up to 64 mm/s
- Standard stroke lengths:
100, 150, 200, 250, 300, 400, 500 mm
- Ball screw BS 14 x 5 (technical details on page 66)
- Aluminium alloy housing and rear attachment with bronze bush
- Anodized aluminium outer tube
- Chrome-plated steel push rod – tolerance f7
- Stainless steel AISI 303 front attachment with bronze bush
- 12, 24 or 36 V DC motor with electromagnetic noise suppressor (motor features details on page 69)

(BRAKE NOT AVAILABLE)

- Duty cycle with max load:
50% over 10 min at (-10 ... +40) °C
- Standard motor mounting position as per sketch (right-hand, code RH)

- Standard protection IP 65
 - Test IP6X according to EN 60529 §12 §13.4-13.6
 - Test IPX5 according to EN 60529 §14.2.5 (tests made with not running actuator)
- Long-life lubrication, maintenance free

ACCESSORIES

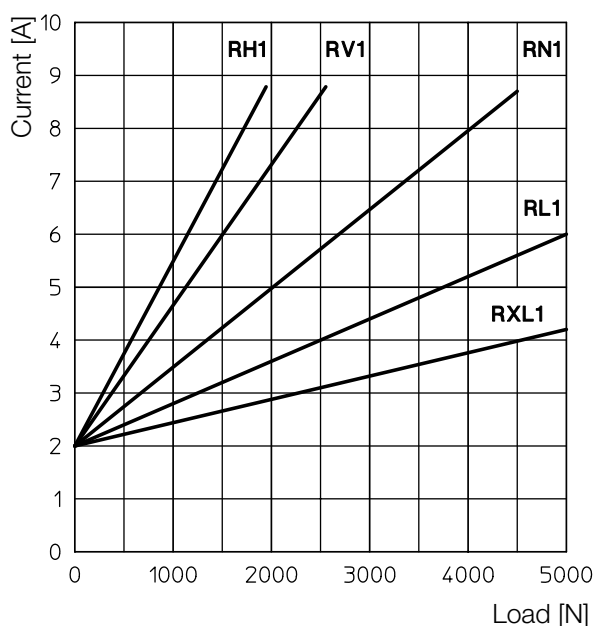
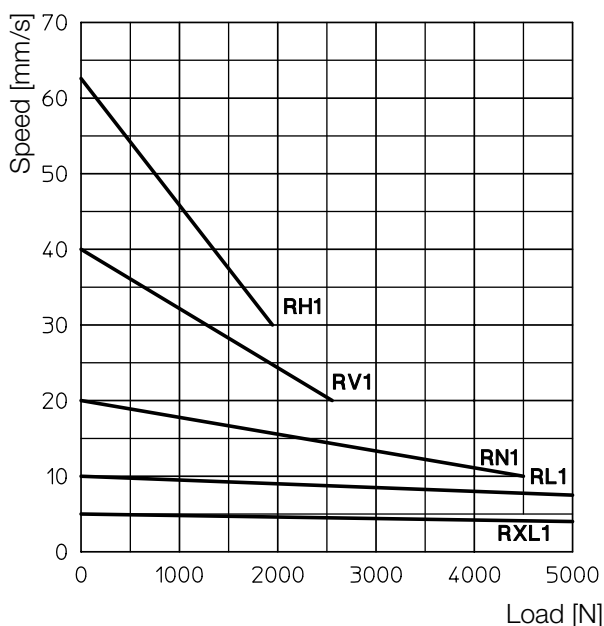
- Stainless steel push rod (code SS)
- Rear bracket (code SP)
- Mechanical overload protection: safety clutch (code FS)
- Two adjustable stroke end reed switches (code FCM)
- Extra switch for intermediate position

OPTIONS

- Motor mounting position on opposite side (left-hand, code LH)
- Fixing attachment turned at 90° (code RPT 90)

PERFORMANCES with 24 V DC motor

(Performances with 12 V DC motor: same load, linear speed 10 % less, electrical consumption 2 times more)



Self-locking conditions

Brake motor not available. Therefore the statically self-locking condition is not achievable. Information about statically self-locking conditions with pull or push load on page 68.

ORDERING CODE EXAMPLE

BSA 08	RL2	C200	CC 24 V	FCM				
Actuator	Selected ratio	Required stroke	Motor	Stroke end switches	Accessories			Options

12.1 Ball screws

Rolled ball screw, tolerance class IT7.

Screws material: steel 42 CrMo 4 (UNI EN 10083-1) induction hardening treatment for surface hardness 58÷61 HRc

Nuts material: steel 18 NiCrMo 5 (UNI EN 10084) hardened and ground, surface hardness 58÷61 HRc, with balls surface microfinishing.

Standard axial backlash between screw and nut lower than 0.1 mm.

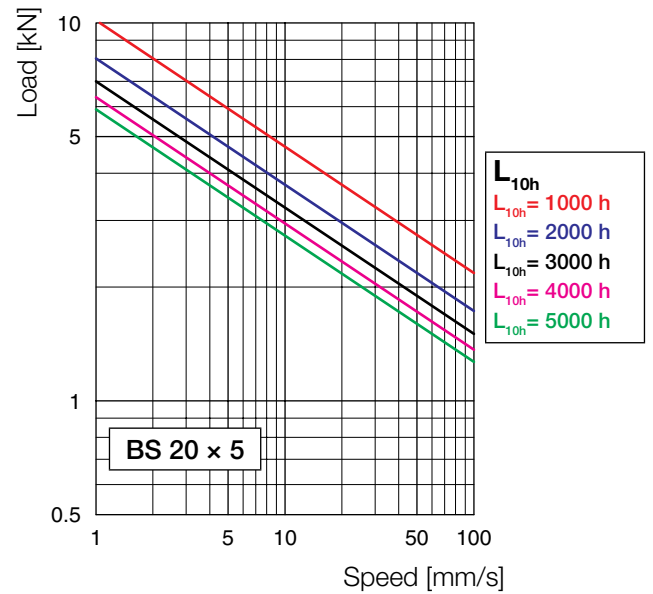
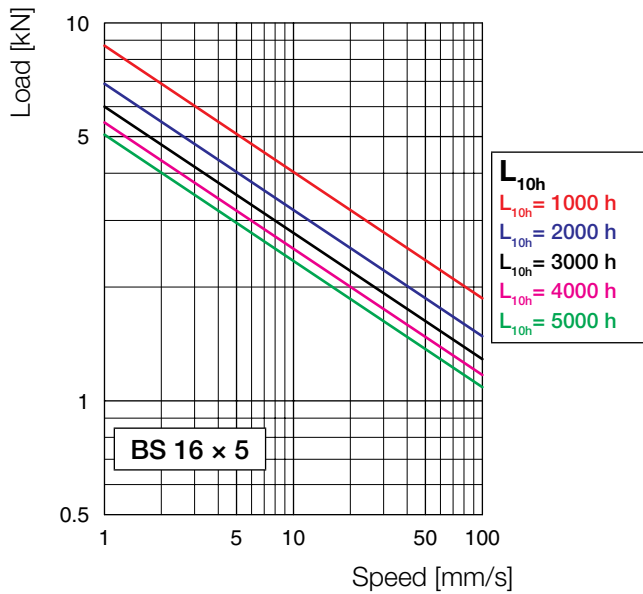
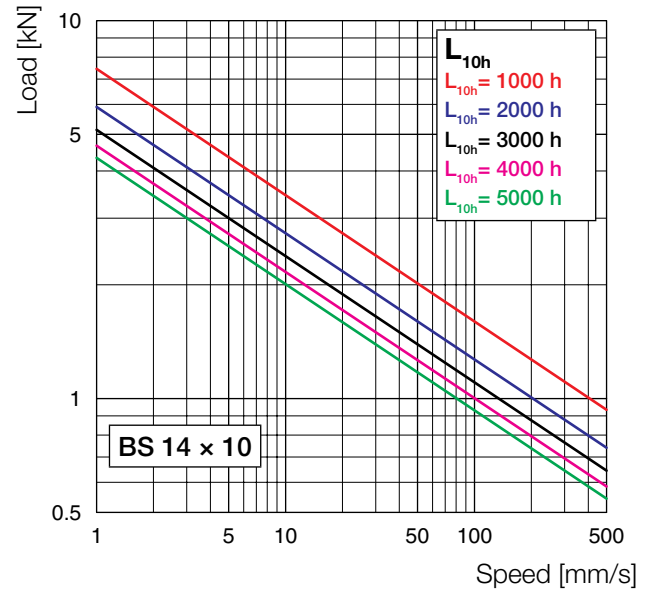
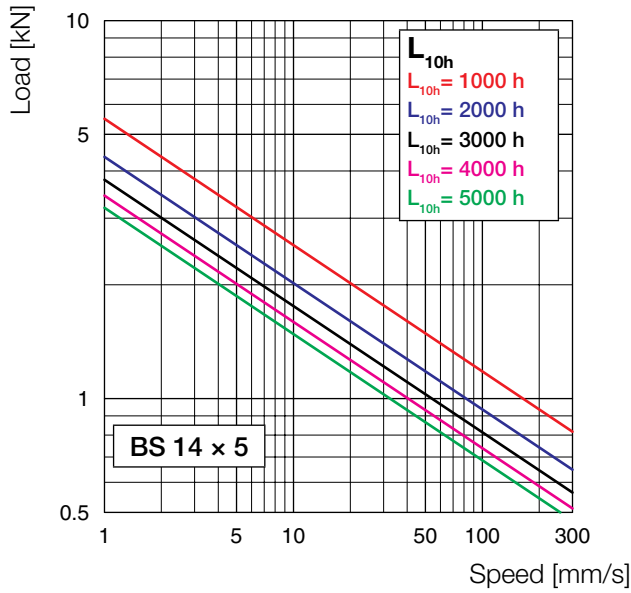
Executions with zero backlash or preloaded available on request.

Rolled ball screws and ball nuts are completely made in Italy, in-house manufactured by Servomech SpA S.U, Bologna.

Actuator	Ball screw	Ball diameter [mm]	Nr of ball circuits	Dynamic load C_a [N]	Static load C_{0a} [N]
BSA 08	BS 14 × 5	3.175	2	4 900	6 200
BSA 10	BS 14 × 5	3.175	2	4 900	6 200
BSA 11	BS 14 × 10	3.175	2	5 300	6 900
CLB 25	BS 14 × 5	3.175	2	4 900	6 200
	BS 14 × 10	3.175	2	5 300	6 900
CLB 27	BS 16 × 5	3.175	3	7 800	11 400
BSA 12	BS 20 × 5	3.175	3	9 100	15 400
UBA 0	BS 14 × 5	3.175	2	4 900	6 200
	BS 14 × 10	3.175	2	5 300	6 900

Static and dynamic load according to norm ISO 3408 and DIN 69051

Ball screws LOAD - LIFETIME diagram



12. GENERAL FEATURES

12.3 DC MOTORS

Motors with interchangeable brushes (actuators ATL 10, UAL 0, BSA 10, BSA 11, UBA 0, CLB 25, CLB 27)

Permanent magnet DC motors, without fan, available with or without brake.

Long-life brushes, easy to replace.

Bipolar power supply cable 2 x 1 mm², 1.5 m length. Motor weight: 1.3 kg.

Output power	70 W		Rated speed	3000 rpm	
Rated current	3.7 A (24 V)	8.4 A (12 V)	Rated torque	0.22 Nm	
Peak current	18 A (24 V)	30 A (12 V)	Peak torque	1.1 Nm	
Resistance	0.85 Ohm (24 V)	0.23 Ohm (12 V)	Inductance	1.34 mH (24 V)	0.36 mH (12 V)
Protection class	IP 54		Insulation class	F	

MOTOR BRAKE: Normally closed holding brake activated by DC electromagnet available on request.

Brake separately wired with bipolar cable 2 x 1 mm², 1 m length.

Motor with brake total weight: 1.8 kg.

Power supply: 0.4 A a 24 V; 0.85 A a 12 V	Braking torque: 0.5 Nm
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WARNING! The motor brake is normally closed; to open it, a constant rated voltage power supply is required. With lower voltage, the brake does not open.

Motors with non-interchangeable brushes (linear actuators LMR, ATL, CLA, LMP, LMI Series)

Permanent magnet DC motors, without fan.

The brake is not available; the brushes are not interchangeable.

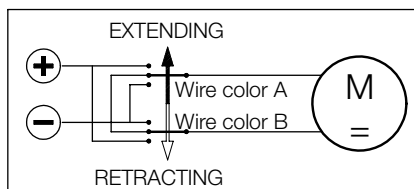
Standard motors winding has insulation class B.

These motors have open enclosures: the actuator is fitted with proper motor outer protections which allow to reach motor Protection Class IP 65.

The performance diagrams concerning actuators with DC motor stated in this catalogue, show the input power variation depending on the load variation.

This allows to select power supply / drivers properly.

Motor wires connection – Actuator push rod travelling direction

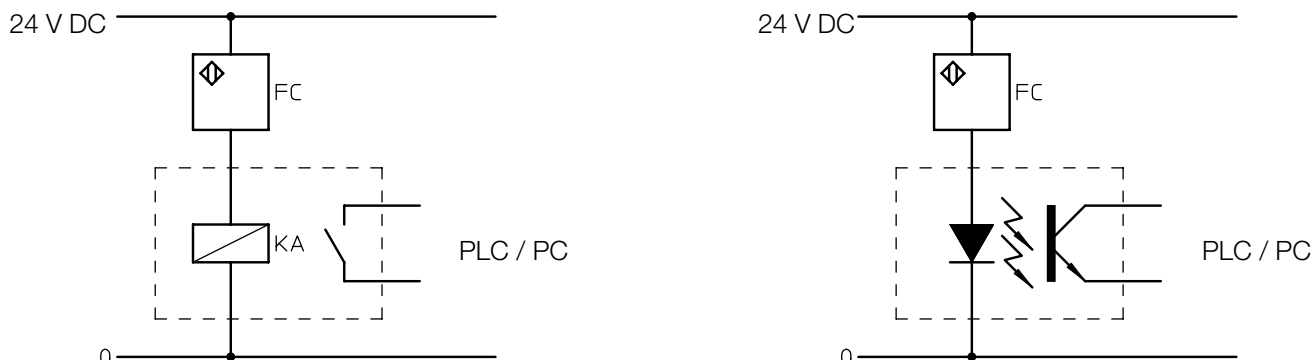


Actuator with DC motor, RIGHT-HAND mounting	LMR 01	LMR 03	ATL 02	ATL 05	ATL 08	ATL 12	CLA 20	CLA 25
Wire color A	red	red	brown	brown	brown	red	brown	brown
Wire color B	black	black	blue	blue	blue	blue	blue	blue

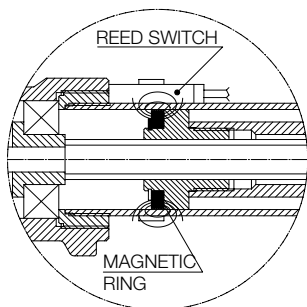
Actuator with DC motor, LEFT-HAND mounting	LMR 01	LMR 03	ATL 02	ATL 05	ATL 08	ATL 12	CLA 20	CLA 25
Wire color A	red	red	blue	blue	blue	blue	blue	blue
Wire color B	black	brown	brown	brown	brown	red	brown	brown

GENERAL NOTE

In case the linear actuator is used in an application where the stroke end switches must be connected to PLC or PC, we suggest to make the connection with a galvanic separation circuit.



13.1 Magnetic stroke end switches (reed) FCM (linear actuators ATL, BSA, UAL, UBA Series, LMI 02 and LMP 03)



The magnetic field of the ring fixed on the nut activates the reed contact of the switch locked on the protective tube with a clamp.

The position of the switches along the tube is easily adjustable.

The switches used to determine any intermediate position (between L_c and L_a) will switch over in two different positions, depending on the push rod motion direction (extending or retracting).

WARNING! The magnetic reed-switches can work only if connected to a wiring control circuit in order to activate the electric relay. Do not connect them in series between the power supply and the electric motor!

REED CONTACT RATED VALUE

	DC	AC
Rated voltage	(3 ... 130) V	(3 ... 130) V
Max. commutable power	20 W	20 VA
Max. commutable current	300 mA (resistive load)	
Max. inductive load	3 W	

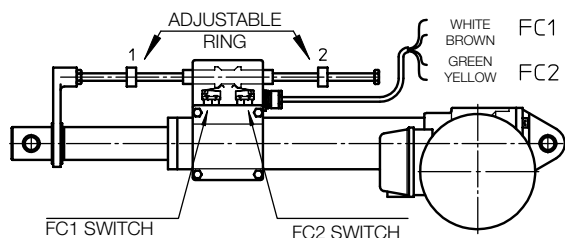
Standard: NC switch (normally closed contact) equipped with signalling LEDs and protective varistor against voltage peaks.

Standard cable length 2 m; wires 2 × 0.75 mm²

Different configurations available on request: NO (normally open); CS (exchanging contact).

For more information please contact our Technical Dpt.

13.2 Electric stroke end switches FCE (actuators ATL 10, ATL 12, BSA 10, BSA 12)



Two electric switches, installed inside a sealed plastic box, are activated by two adjustable rings through a shaft collar.

Standard switches are wired on the NC contact, cable length 1.5 m; wires 4 × 0.75 mm²

On request, they can be wired on the NO contact or on the switch-over contact CS (for available configurations please contact our Technical Dpt).

Min retracted length L_c is adjusted by ring 1. FC1 switch is connected with the WHITE and the BROWN cables.

Max extended length L_a is adjusted by ring 2. FC2 switch is connected with the YELLOW and the GREEN cables.

The position of the brass rings along the stainless steel supporting rod is easily adjustable.

CONTACT RATED VALUE

Voltage	Max current	
	Resistive load	Inductive load
250 Vac	5 A	3 A
30 Vdc	5 A	0.1 A
125 Vdc	1.4 A	-

WARNING! The electric reed switches can work only if connected to a wiring control circuit in order to activate the electric relay. Do not connect them in series between the power supply and the electric motor!

14.2 LME 02 - Electronic dynamic braking

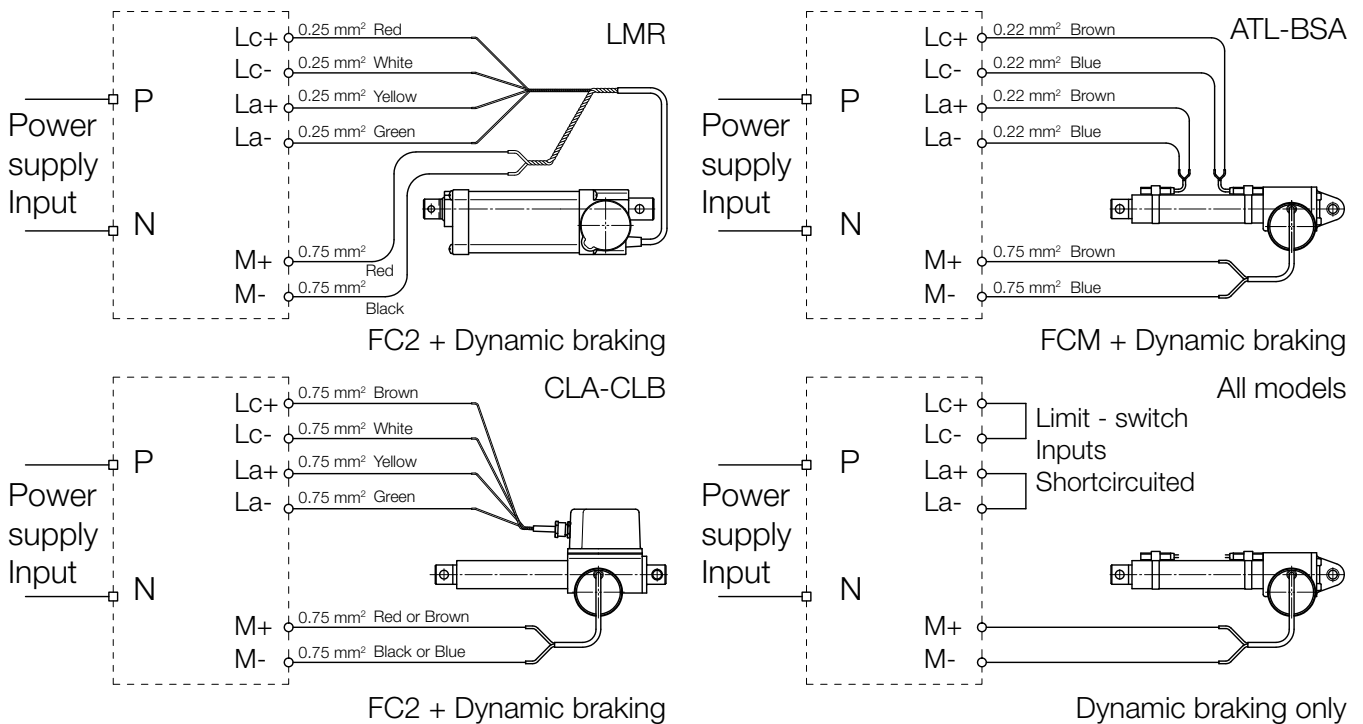
Small size DC motors fitted on many of Linearmech actuators are not available with mechanical brake (operation and/or static brake). There is no accuracy on actuator's stop position without the mechanical brake on the motor, when switching off the power on motor itself. The uncertainty depends on the speed, the load inertia and other factors such as actuator's performances and efficiency.

Thanks to the new Linearmech **LME 02** control is possible to: power supply the actuator with 12 or 24Vdc; manage electromechanical limit switches (FCE, FC2) or magnetic limit sensors (FCM); dynamic braking the actuator when the motor is switched off, by closing in short circuit the motor (slowing down the motor rotor and the load).

When the motor is switched off, it is closed in short circuit. This condition, with the actuator in still position, increases the self-locking capacity of the actuator. This is an help to hold the position and the load even when the ratio and the pitch of linear actuator's screw are non self-locking. When the "Electronic dynamic braking" does not ensure the desired accuracy, it is recommended to use different solutions with brake motors. The "Electronic dynamic braking" is more effective on low speed linear actuators. The effectiveness lowers while speed and efficiency increase (acme screws with more starts or ball screws).

Please contact our Technical Dept. for more details.

The LME 02 control device can be connected to the actuator according to the following wiring diagrams.



WORKING MODE

LME 02 device must be fitted between power supply and actuator motor according to the above wiring diagrams. Actuator push rod moves forward (FW) or reverse (REV), depending on power supply polarization on LME02 input pins.

Input pin "P" -> + Vdc	FW
Input pin "N" -> 0 Vdc	movement
Input pin "P" -> 0 Vdc	REV
Input pin "N" -> + Vdc	movement

Powering on this device the actuator push rod moves. The actuator stops when power supply is switched off or limit switches positions are reached (same running conditions as per actuators with FC2X but with the advantage that switches do not cut off the motor current). In both conditions, the "Electronic dynamic braking" is active. The braking is held even without power supply.

The switch FC2X (see pages 73 and 74) is an internal wiring between power supply and electric motor in order to switch off the power supply directly, without relays, when the limit positions are reached.

TECHNICAL FEATURES	Power supply	12 or 24 Vdc	Peak current	15 A
	Nominal current	10 A	Intervention time	20 ms