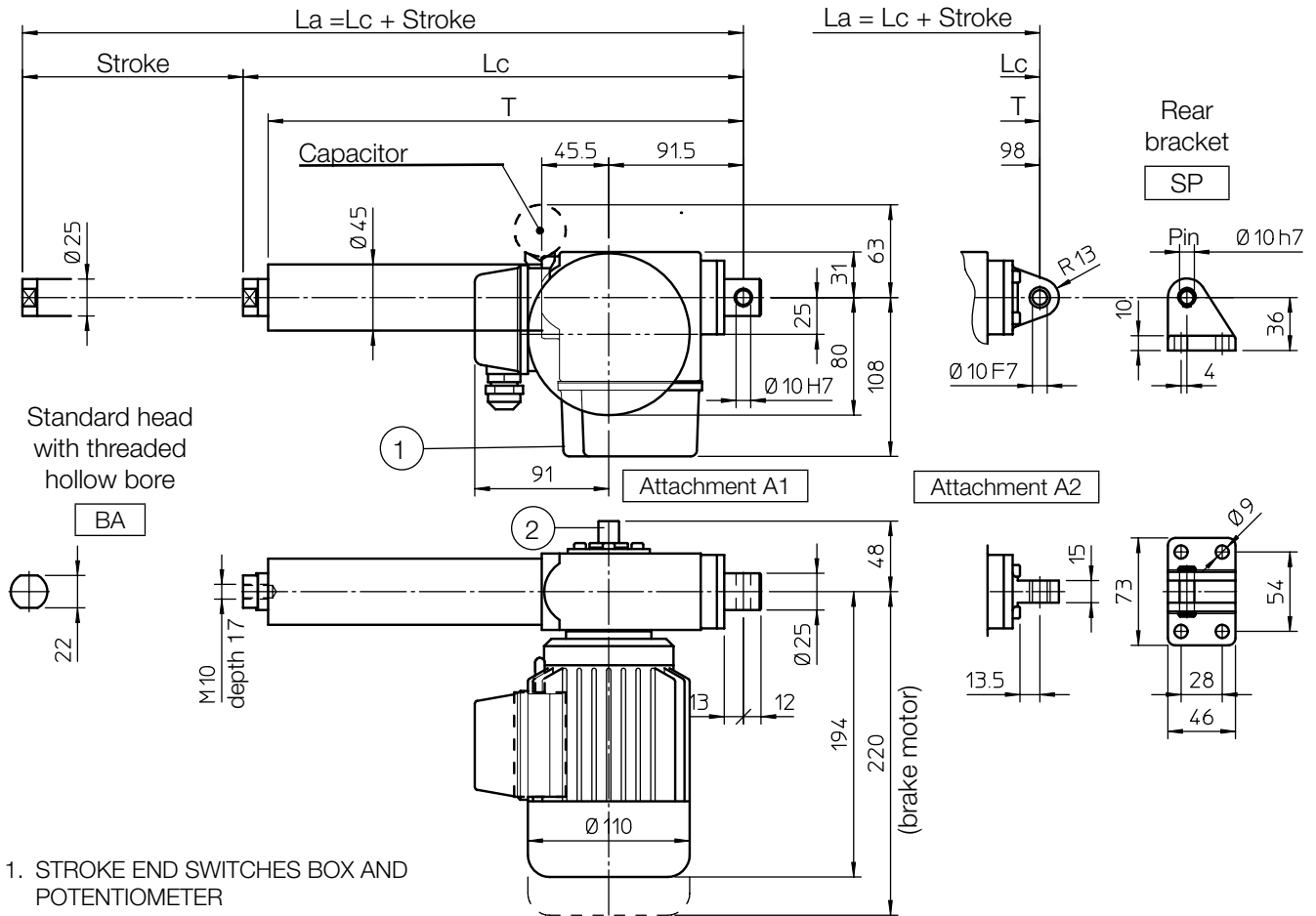


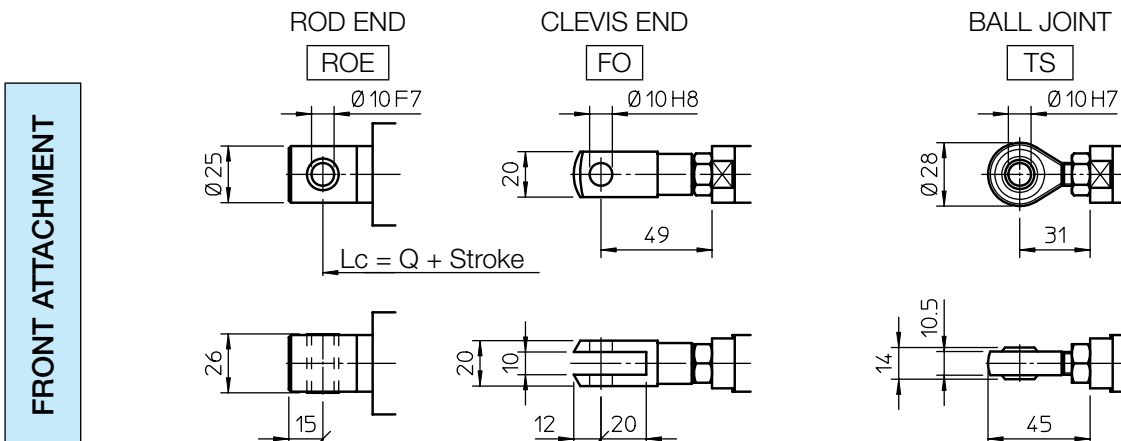
## OVERALL DIMENSIONS



1. STROKE END SWITCHES BOX AND POTENTIOMETER
2. MOTOR SHAFT EXTENSION for:  
Emergency manual activation  
Stroke end switches and potentiometer adjustment

Q [mm]	Attachment A1	Attachment A2
	253	260

STROKE CODE	Actuator - Attachment A1				Actuator - Attachment A2				MASS [Kg]	
	STROKE [mm]	LENGTH [mm]		T [mm]	STROKE [mm]	LENGTH [mm]		T [mm]	standard motor	brake motor
		Lc [mm]	La [mm]			Lc [mm]	La [mm]			
C100	100	348	448	317	100	355	455	324	5.2	5.7
C150	150	398	548	367	150	405	555	374	5.3	5.8
C200	200	448	648	417	200	455	655	424	5.5	6.0
C250	250	498	748	467	250	505	755	474	5.6	6.1
C300	300	548	848	517	300	555	855	524	5.8	6.3
C400	400	648	1048	617	400	655	1055	624	6.1	6.6



## PERFORMANCES AND FEATURES

- Push load up to 5 000 N
- Pull load up to 4 000 N
- Linear speed up to 117 mm/s
- Standard stroke lengths:  
100, 150, 200, 250, 300, 400 mm
- Ball screw BS 14 x 5 or BS 14 x 10  
(technical details on page 66)
- Aluminium alloy housing
- Anodized aluminium outer tube
- Chrome-plated steel push rod – tolerance f7
- Rear attachment:
  - A1: zinc-plated steel rod end with bronze bush
  - A2: aluminium alloy with bronze bush
- Standard head BA or rod end ROE  
in stainless steel AISI 303 with bronze bush
- AC 3-phase or 1-phase motor  
(motor features details on page 70)
- Duty cycle with max load:  
100% over 10 min at (-10 ... +40) °C
- Standard protection IP 55 (IP 54 with brake)
- Standard motor mounting position as per sketch  
(right-hand, code RH)
- Long-life lubrication, maintenance free

## ACCESSORIES

- Different front attachments
- Stainless steel push rod (code SS)
- Rear bracket (code SP)  
with rear attachment A2
- Mechanical overload protection:  
safety clutch (code FS)
- Brakemotor
- Adjustable electric stroke end switches (code FC2)
- Adjustable electric stroke end switches,  
switching off the motor (code FC2X)  
(not available with AC 3-phase motor)
- Extra switch for intermediate position (code FC)
- Rotative potentiometer 5kOhm for positioning control  
(code POR5K)

NOTE: Extra limit switch and rotative potentiometer cannot be selected together

## OPTIONS

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

### PERFORMANCES with AC 3-phase 50 Hz 230/400 V or 1-phase 50 Hz 230 V motor

Ball screw BS 14 x 5				
RATIO	0.09 kW - 4 pole motor		0.12 kW - 2 pole motor	
	LOAD [N]	SPEED [mm/s]	LOAD [N]	SPEED [mm/s]
RH1	2170	29	1490	58
RV1	3270	19	2300	37
RN1	5000	9.5	4230	19
RL1	5000	4.5	5000	9.5
RXL1	5000	2.5	5000	4.5

Ball screw BS 14 x 10				
RATIO	0.09 kW - 4 pole motor		0.12 kW - 2 pole motor	
	LOAD [N]	SPEED [mm/s]	LOAD [N]	SPEED [mm/s]
RH2	1120	58	760	117
RV2	1730	37	1170	75
RN2	3100	19	2220	37
RL2	5000	9.5	3790	19

## Self-locking conditions

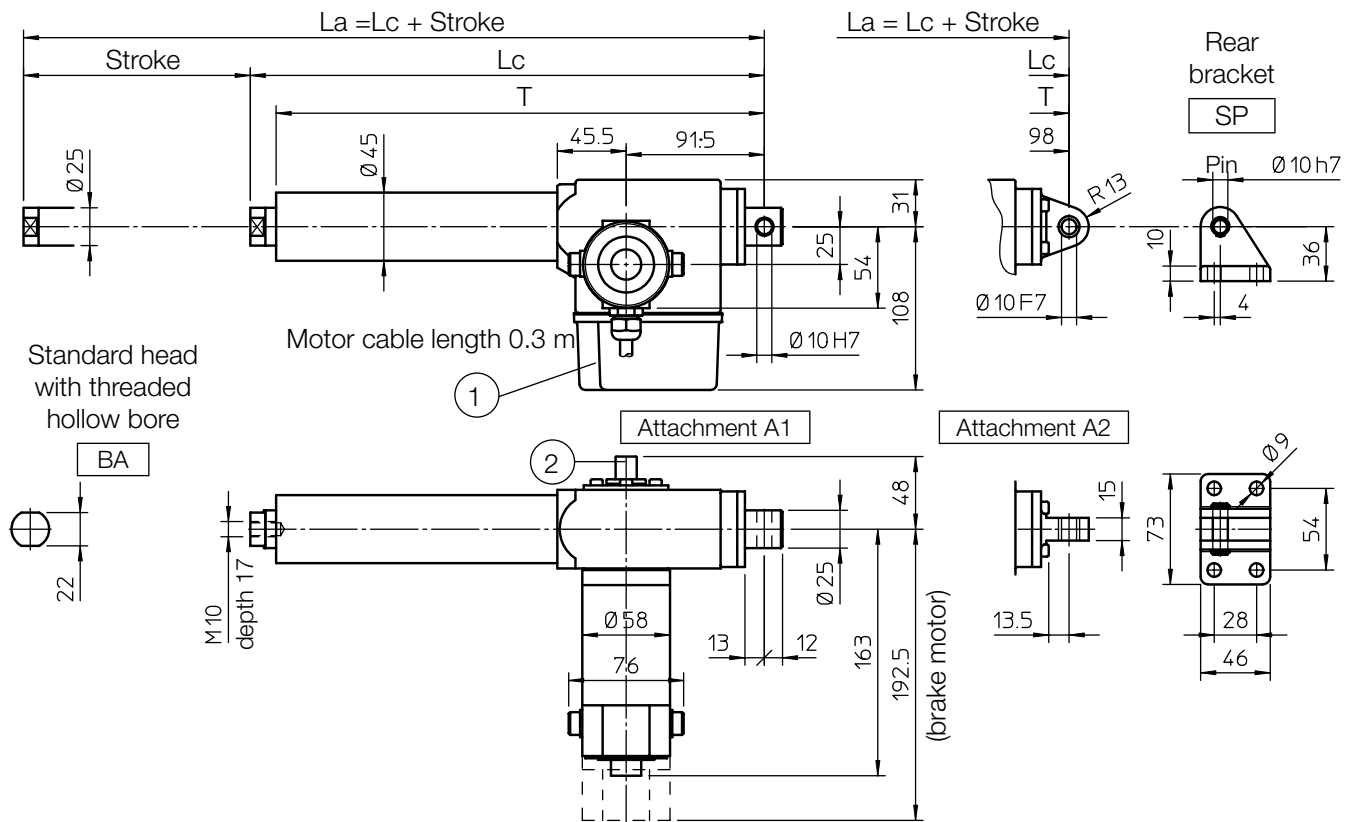
Self-locking condition is achievable with brake motor only.

Information about statically self-locking conditions with pull or push load on page 68.

## ORDERING CODE EXAMPLE

CLB 25	RL1	C200	CA 230/400 V	FC2	POR 5K				
Actuator	Selected ratio	Required stroke	Motor	Stroke end switches	Accessories			Options	

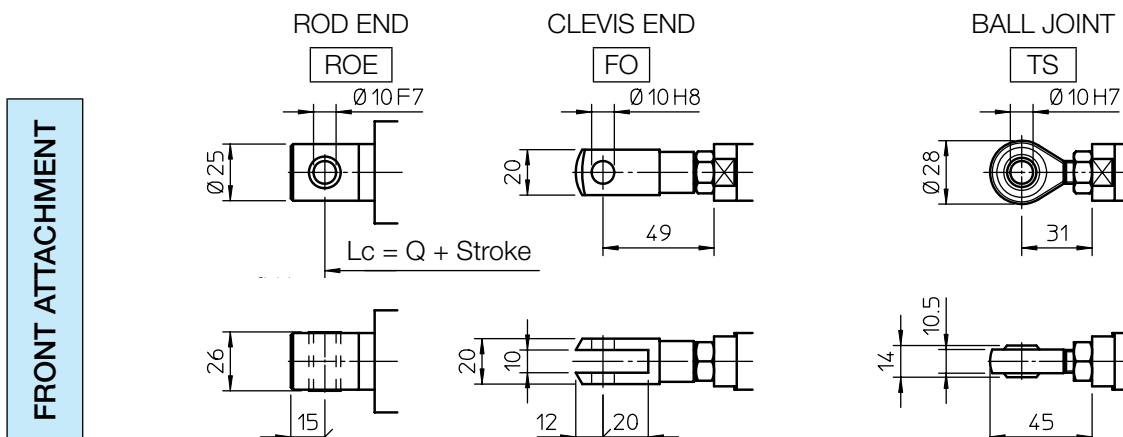
## OVERALL DIMENSIONS



1. STROKE END SWITCHES BOX AND POTENTIOMETER
2. MOTOR SHAFT EXTENSION for:
  - Emergency manual activation
  - Stroke end switches and potentiometer adjustment

Q [mm]	Attachment A1	Attachment A2
	253	260

STROKE CODE	Actuator - Attachment A1			Actuator - Attachment A2			MASS [Kg]
	STROKE [mm]	LENGTH	T [mm]	STROKE [mm]	LENGTH	T [mm]	
C100	100	Lc [mm] 348, La [mm] 448	317	100	Lc [mm] 355, La [mm] 455	324	5.2
C150	150	398, 548	367	150	405, 555	374	5.3
C200	200	448, 648	417	200	455, 655	424	5.5
C250	250	498, 748	467	250	505, 755	474	5.6
C300	300	548, 848	517	300	555, 855	524	5.8
C400	400	648, 1048	617	400	655, 1055	624	6.1



### PERFORMANCES AND FEATURES

- Push load up to 5 000 N
- Pull load up to 4 000 N
- Linear speed up to 125 mm/s
- Standard stroke lengths:  
100, 150, 200, 250, 300, 400 mm
- Ball screw BS 14 x 5 or BS 14 x 10  
(technical details on page 66)
- Aluminium alloy housing
- Anodized aluminium outer tube
- Chrome-plated steel push rod – tolerance f7
- Rear attachment:
  - A1: zinc-plated steel rod end with bronze bush
  - A2: aluminium alloy with bronze bush
- Standard head BA or rod end ROE  
in stainless steel AISI 303 with bronze bush
- 12 or 24 V DC brakemotor  
(motor features details on page 69)
- Duty cycle with max load:  
100% over 10 min at (-10 ... +40) °C
- Standard protection IP 54
- Standard motor mounting position as per sketch  
(right-hand, code RH)
- Long-life lubrication, maintenance free

### ACCESSORIES

- Different front attachments
- Stainless steel push rod (code SS)
- Rear bracket (code SP)  
with rear attachment A2
- Mechanical overload protection:  
safety clutch (code FS)
- Adjustable electric stroke end switches  
(code FC2)
- Adjustable electric stroke end switches,  
switching off the motor (code FC2X)
- Extra switch for intermediate position (code FC)
- Rotative potentiometer 5kOhm  
for positioning control  
(code POR5K)

NOTE: Extra limit switch and rotative potentiometer cannot be selected together

### 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)

Ball screw BS 14 x 5			
RATIO	LOAD [N]	SPEED [mm/s]	CURRENT [A]
RH1	800	63	4
RV1	1260	40	4
RN1	2350	20	4
RL1	4130	10	4
RXL1	5000	5	3

Ball screw BS 14 x 10			
RATIO	LOAD [N]	SPEED [mm/s]	CURRENT [A]
RH2	410	125	4
RV2	640	80	4
RN2	1200	40	4
RL2	2100	20	4

### Self-locking conditions

Self-locking condition is achievable with brake motor only.

Information about statically self-locking conditions with pull or push load on page 68.

### ORDERING CODE EXAMPLE

CLB 25	RL1	C200	CC 24 V	FC2	POR 5K				
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.

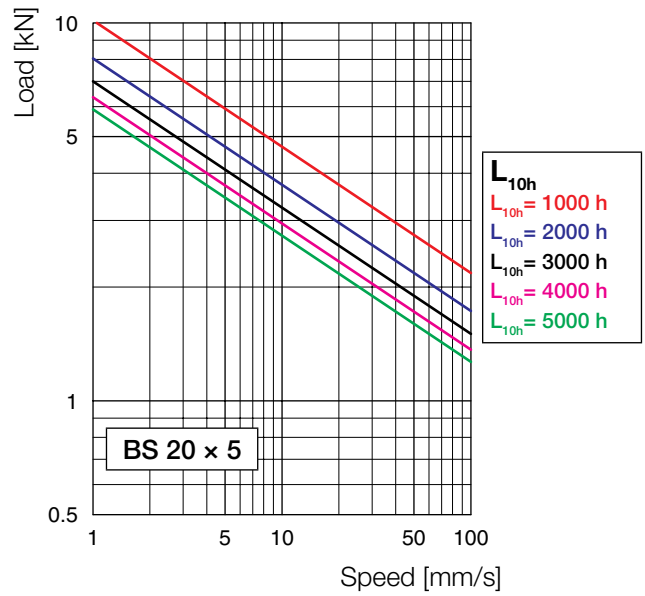
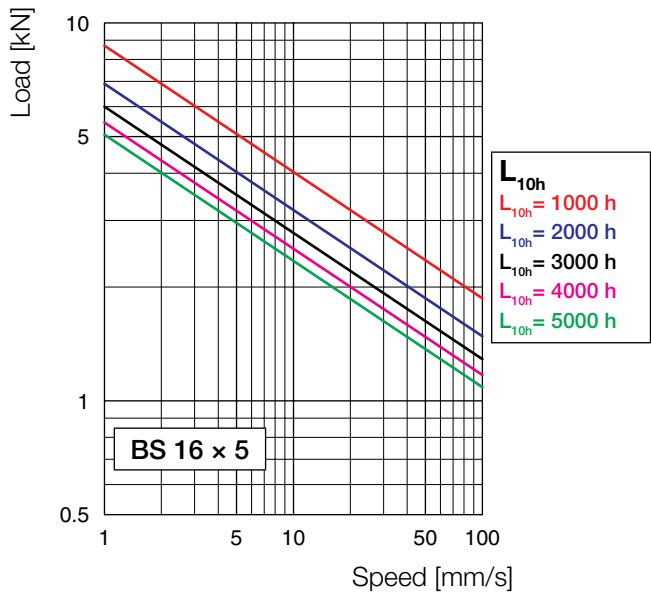
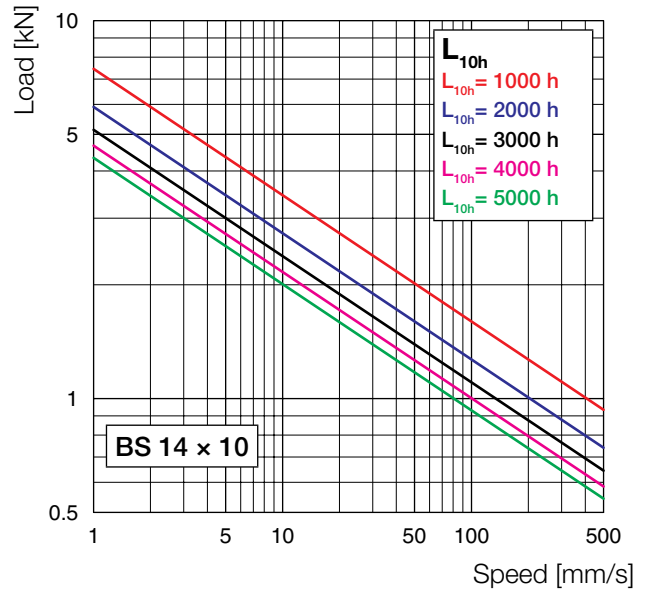
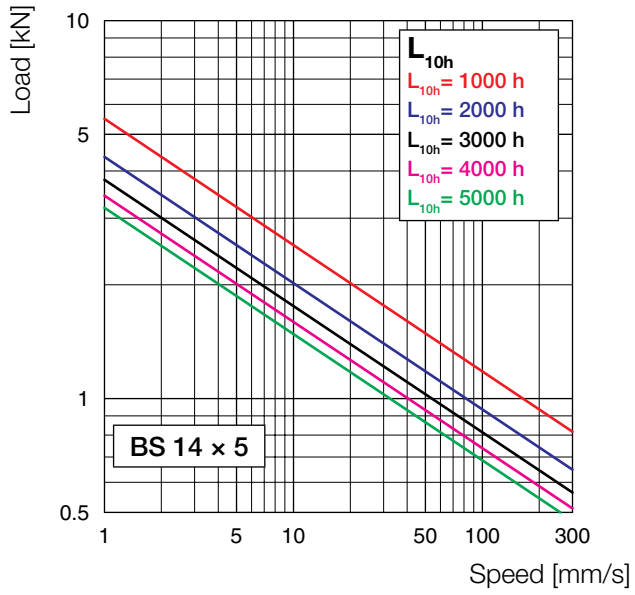
Executions with zero backlash or preloaded available on request.

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 mm<sup>2</sup>, 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 mm<sup>2</sup>, 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
---	------------------------

**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.

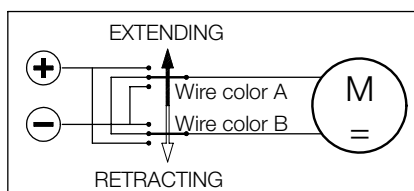
Standard motors winding has insulation class B.

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

12.4 AC MOTOR							
Actuator	Motor	Power kW	N° of poles	Input voltage Vca	Frequency Hz	Rated current A	Capacitor uF
ATL 02	AC 3-phase	0.06	2	230/400	50	0,7-0,4	-
	AC 1-phase	0.06		230		0.68	5
ATL 10	AC 3-phase	0.12	2	230/400	50	0,81-0,46	-
		0.09	4			0,8-0,45	-
	AC 1-phase	0.12	2	230		2.6	12.5
		0.09	4			1.6	12.5
ATL 12	AC 3-phase	0.25	2	230/400	50	1,3-0,75	-
		0.18	4			1,1-0,66	-
	AC 1-phase	0.25	2	230		2.1	20
		0.18	4			1.9	16
CLA 20	AC 3-phase	0.06	2	230/400	50	0,7-0,4	-
	AC 1-phase	0.06		230		0.68	5
CLA 25 CLA 25S CLA 25M	AC 3-phase	0.12	2	230/400	50	0,81-0,46	-
		0.09	4			0,8-0,45	-
	AC 1-phase	0.12	2	230		2.6	12.5
		0.09	4			1.6	12.5
CLA 28 CLA 28 T	AC 3-phase	0.06	2	230/400	50	0,7-0,4	-
	AC 1-phase	0.06		230		0.68	5
BSA 10 BSA 11	AC 3-phase	0.12	2	230/400	50	0,81-0,46	-
		0.09	4			0,8-0,45	-
	AC 1-phase	0.12	2	230		2.6	12.5
		0.09	4			1.6	12.5
BSA 12	AC 3-phase	0.25	2	230/400	50	1,3-0,75	-
		0.18	4			1,17-0,66	-
	AC 1-phase	0.25	2	230		2.1	20
		0.18	4			1.9	16
CLB 25 CLB 27	AC 3-phase	0.12	2	230/400	50	0,81-0,46	-
		0.09	4			0,8-0,45	-
	AC 1-phase	0.12	2	230		2.6	12.5
		0.09	4			1.6	12.5



12.4 AC MOTOR							
Insulation class (1)	Motor protection class (1)	Fan	Brake	Brake coil power supply (2) (3)	Brake rated current A	Braking torque Nm	Brake protection class
F	IP 55	Not available	Not available	-	-	-	-
F	IP 55	Standard	On request	DC powered by rectifier	0.05	1.7	IP 44
F	IP 55	Standard	On request	DC powered by rectifier	0.09	4	IP 44
F	IP 55	Not available	Not available	-	-	-	-
F	IP 55	Standard	On request	DC powered by rectifier	0.05	1.7	IP 44
F	IP 55	Standard	Not available	-	-	-	-
F	IP 55	Standard	On request	DC powered by rectifier	0.05	1.7	IP 44
F	IP 55	Standard	On request	DC powered by rectifier	0.09	4	IP 44
F	IP 55	Standard	On request	DC powered by rectifier	0.05	1.7	IP 44

(1) Higher insulation and protection classes available on request.

(2) Normally closed activated by DC electromagnet.  
The electromagnet is powered by a 1-phase rectifier fitted in the terminal box.

(3) Motors with separately powered brake available on request.  
This solution shall be used for applications with frequency inverter.

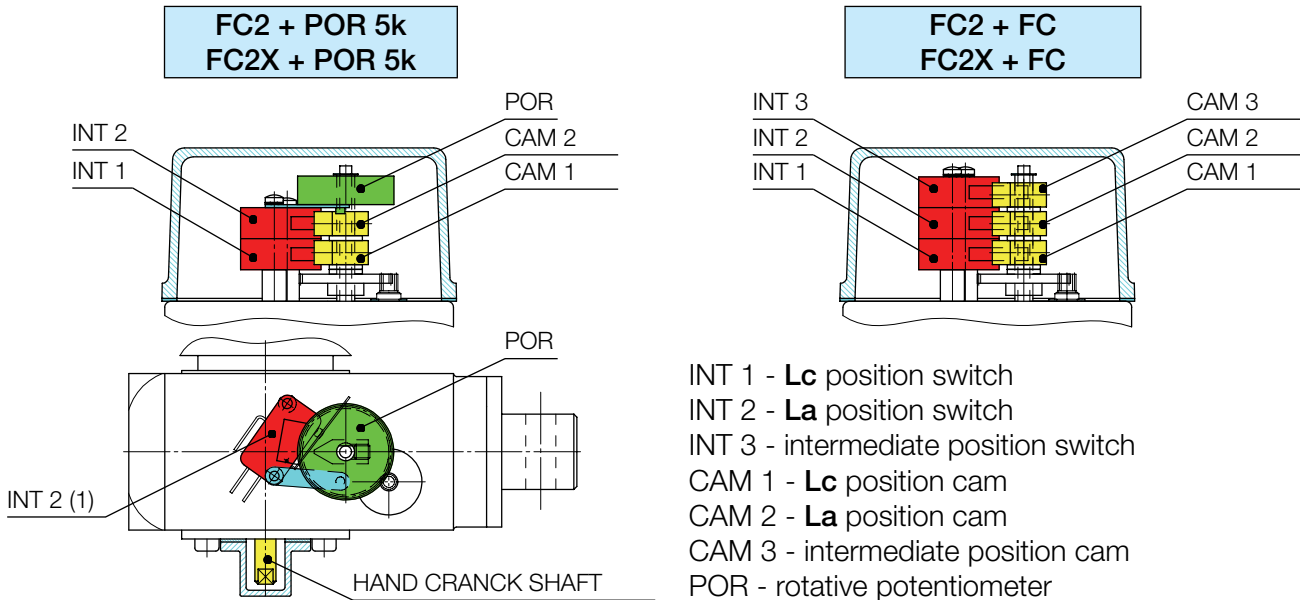
## 13.4 Electric cam-operated stroke end switches (linear actuators CLA and CLB Series)

Code **FC2**: two electric cam-operated switches, wired on contact NC (to be connected into the external control circuit). On request, the switches can be wired on the contact NO or on the switch-over contact CS. (For available configurations please contact our Technical Dpt).

Code **FC2X**: two electric cam-operated switches, internally wired between power supply and electric motor, in order to switch off the power supply directly, without relays. Available for actuators with Dc or AC 1-phase motor.

Code **FC2 + FC** or **FC2X + FC**: Stroke end switches FC2 or FC2X with a third switch for any intermediate position. The third switch can be wired on contact NC or NO on request. (For different configurations please contact our Technical Dpt).

SWITCH RATED VALUES		
Voltage	Max current	
	Resistive load	Inductive load
250 Vac	21 A	12 A
30 Vdc	14 A	12 A
125 Vdc	0.8 A	0.6 A



**Lc** = actuator retracted length, **La = Lc + Stroke** – actuator extended length

## 13.4 Rotative potentiometer for positioning control (linear actuators CLA and CLB Series)

Code **POR 5k**: rotative potentiometer, single turn (340°), 5 kOhm ± 20 %, linearity ± 2 %

The rotative potentiometer is an absolute transducer, whose output signal is proportional to the current position of the actuator push rod. Analogic output signal.

Standard cable: 4 x 0.25 mm<sup>2</sup> + shield, 1.5 m length (for different configurations please contact us).

POR 5k standard wiring diagram:

POR Power supply: 0 V dc

Reference signal: ZERO

Reference signal: RETURN

POR Power supply: + V cc

SHIELD

