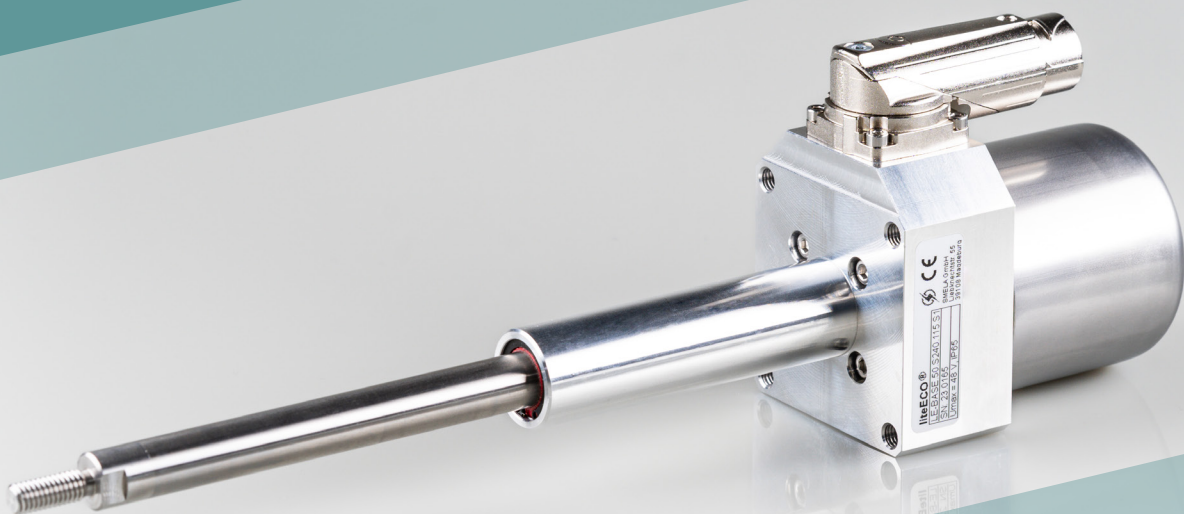


SMELA



liteECO® BASE series

Linear actuators for short stroke movements
up to 150 mm stroke and 750 N force
without integrated motion controller

liteECO® BASE linear actuators

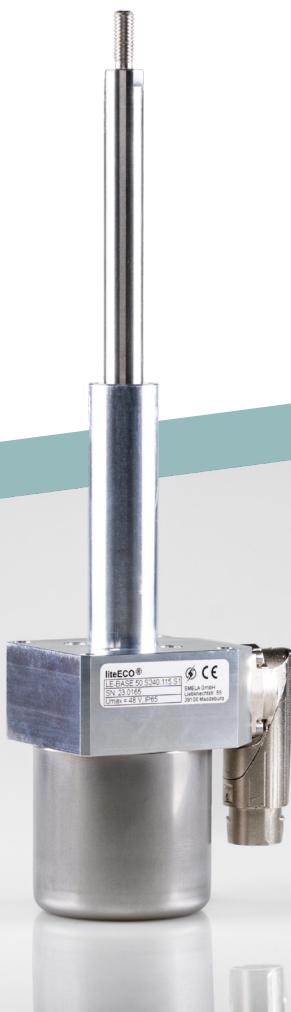
LINEAR TELESCOPABLE ELECTROMECHANICAL CONCEPT

Most compact pneumatic alternative for short stroke movements

SMELA liteECO® series are the most compact electromechanical alternative to pneumatic short-stroke cylinders due to their patented telescopic concept of motor and mechanics. This makes them ideal for linear movements often required in production lines, machine tools or packaging systems.

A servo motor incl. positioning sensor enables the movement of simple to complex profiles: for fixing, adjusting, locking and following any motion profile. The highly efficient motor not only saves up to 90 % of the energy compared to pneumatic systems. Together with the smart arrangement of the mechanics, it saves up to 80 % of installation space compared to existing electrical solutions. In addition, the liteECO® series offers the possibility of a simple refurbishment. Replacing worn mechanics is very easy and helps the drives to achieve several life cycles: sustainable, cost- and resource-saving.

The LE-BASE actuators integrate many of the advantages of electric actuators and complement them with essential features for demanding industrial requirements. In addition to sealing to protection class IP65, rotatable circular connectors of size M15 with a self-locking quick-release system are integrated. The maximum stroke is scalable in steps of 45, 85, 115 and 150 millimetres, whereby any positioning within the maximum stroke is possible.



Advantages

- High power and dynamics in a compact design
- High utilization of the installation length for the stroke
- Up to 90 % energy savings compared to pneumatics
- Up to 80 % installation space savings compared to electrical alternatives

Features

- Configurable stroke lengths
- Integrated, high-resolution encoder system
- Controllable with various motion controllers
- Robust rotatable hybrid connector for power and sensor signals
- Degree of protection IP65

Product configuration

Choose from 80 variants

LE-BASE.---.---.---.---.S-

Sensor configuration	
S1	Inkcemental + Hall signals (12 Bit)
S2	SSI (13 Bit)

Plunger configuration (connection)	
6B	M6 external thread
8N	M8 internal thread

Stroke length	
045	45 mm
085	85 mm
115	115 mm
150	150 mm

Lead screw type and pitch in mm/revolution			
Pitch	High helix	Trapezoidal	Max. force
2	-	T020	750
4	-	T040	650
10	S100	-	300
15	S150	-	200
24	S240	-	125
other thread configurations on request			

Size Flange width	
50	Load capacity up to 750 N (depending on lead screw type)
....	Further sizes to follow

liteECO® BASE series (without integrated motion controller)

Dimensions, Technical data

Size 50

Characteristics (depending on stroke length)	045	085	115	150
Stroke S [mm]	45	85	115	150
Length L [mm]	78	118,7	148,7	183,7
Width B [mm]	50			
Height H1 [mm]	58			
Height H2 [mm]	78			
Centering collar D2 [mm]	Ø 20g6			
Diameter plunger D1 [mm]	Ø 11			
Plunger configuration (connection) 6B 8N	M6x16 external thread - AF 9 mm M8x14 internal thread - AF 12 mm			
Weight [g]	540	590	640	690
My, Mz (Transverse forces on the plunger) [Nm]	< 1			
Coupling / Hole distance [mm] Mounting options (1) from the front into the flange (2) from behind through flange (3) Accessories (in the back of the flange) Tightening torque (strength class 8.8) M3 [Nm] M4 [Nm] M5 [Nm]	42 x 42 4 x M5 internal thread x deep 13 mm 4 x M3 (use as through-hole) 4 x M4 internal thread x deep 12 mm 1,3 3,0 6,0			
Hybrid connection (Power & Signal)	M15 Intercontec Itec 915, 15-pole, male angled (rotatable)			
Degree of protection	IP65*			
Materials (of the external components) Plunger Flange Cover Connector Screws Wiper ring Retaining ring	Stainless steel (1.4305) Aluminium Stainless steel (1.4301) Die-cast zinc – nickel-plated Stainless steel (1.4301) HPU (Hydrolysis resistant polyurethane) SAE 1060-1090			
Conformity (see Declaration of Conformity)	CE (Machinery Directive 2006/42/EC), RoHS (2011/65/EU and 2015/863/EU), REACH (Regulation (EC) No 1907/2006), EMC (2014/30/EU)			

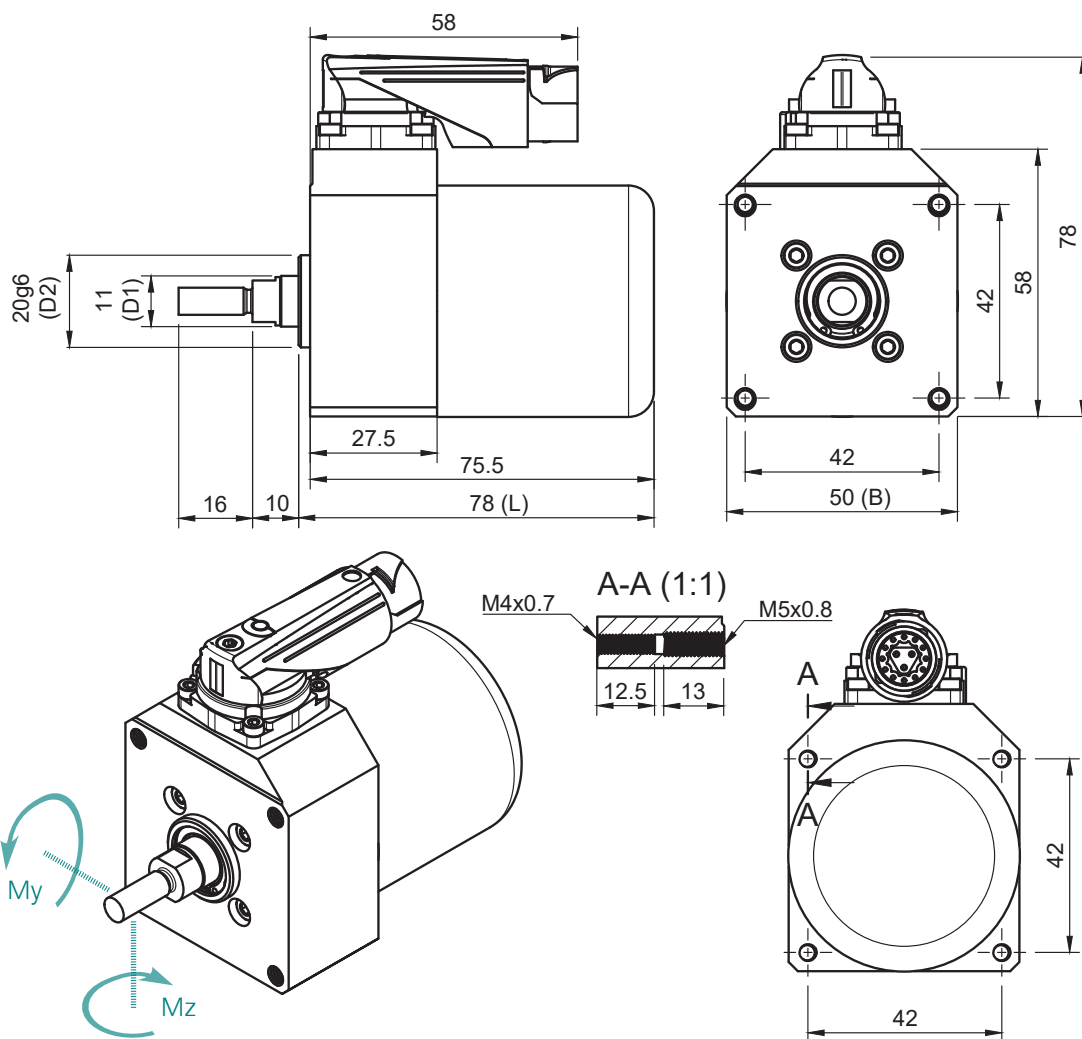
* The degree of protection is only guaranteed if all connectors are either plugged in or fitted with caps of the appropriate degree of protection.

SMELA GmbH reserves the right to make changes as a result of technical improvements or new findings.

Deviations from the standard configuration are available on request.

Dimensions, Mechanical connection

Size 50 | Stroke 45 mm | Plunger configuration 6B

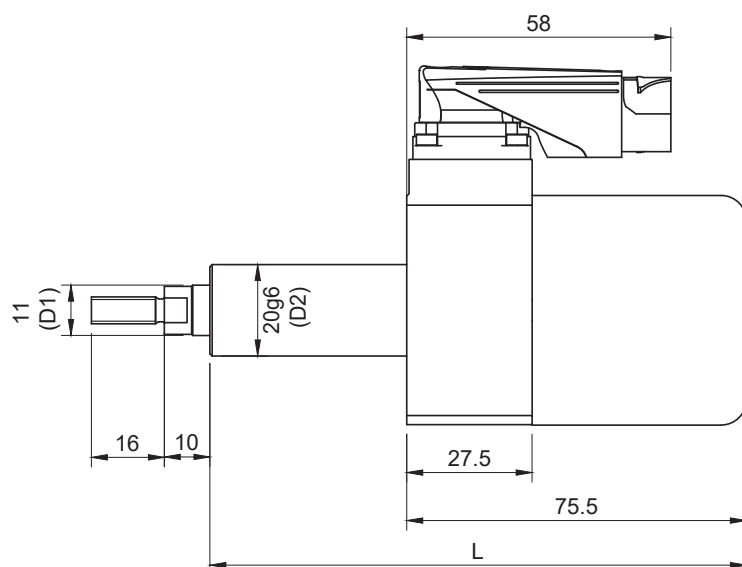


Integrate the CAD models of the actuators directly into your design!

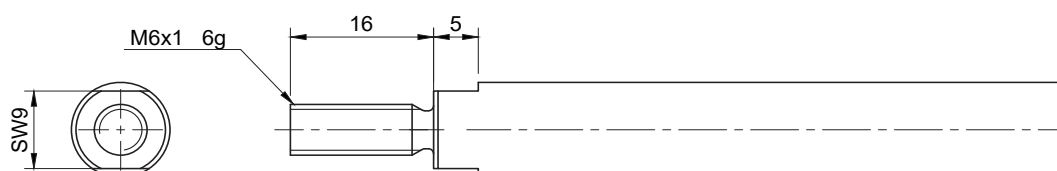
Latest data sheets and CAD models are available on request via sales@smela.com
or at: www.smela.com

Dimensions, Mechanical connection

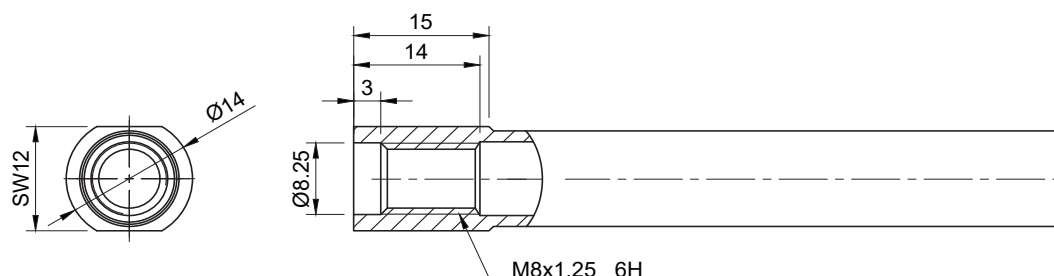
Size 50 | Stroke 85, 115, 150 mm | Plunger configuration 6B



Plunger configuration 6B: M6x16 external thread



Plunger configuration 8N: M8x14 internal thread



Mechanical performance data

Size 50

The following maximum achievable performance data are based on the permissible load capacity for the thread pairs used and the motor. Limiting parameters are, among others, the static load capacity of the nut configuration, the permissible sliding speed and the permissible peak and nominal currents of the integrated servomotor (see following page). In practice, due to the reciprocal effects of influences, it may not always be possible to reach the limit values, in particular peak force and maximum speed cannot occur simultaneously. Any increase in the load leads to a reduction in the permissible sliding speeds and vice versa. Please do not hesitate to ask us about the technical feasibility of your motion profiles.

Lead screw configuration	Limit load capacity ¹⁾	Backlash ²⁾	Peak force ³⁾ / Peak current ³⁾	Nom. force ⁴⁾ / Nom. current ⁴⁾	Max. speed ⁵⁾	Max. acceleration ⁶⁾	Positioning time ⁷⁾
	N	mm	N / A	N / A	mm/s	m/s ²	ms
High helix							
S100	370	0,1	300 / 12	125 / 5	500	25	120
S150	370	0,2	200 / 12	83 / 5	750	37,5	85
S240	315	0,25	125 / 12	52 / 5	1.200	60	65
Trapezoidal thread							
T020	750	0,1	750 / 6	625 / 5	50	2,5	900
T040	650	0,15	650 / 12	313 / 5	100	5	450

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Explanatory footnotes:

- 1) Limit load capacity: max. static force and axial load capacity of the internal mechanics; exceeding loads are not permissible and must be absorbed by external mechanics or brakes
- 2) Specification of the maximum backlash at the time of delivery. The backlash is subject to wear. Wear depends on the load and dynamic conditions, as well as the resulting temperature. The duty cycle and ambient temperature are further influencing factors.
- 3) Maximum permissible force and the corresponding proportional phase current must not be exceeded in order to protect the internal mechanics. The max. phase current of the rotary motor I_{max} may furthermore be applied for max. 20 seconds in order not to exceed the internal limit temperature starting from an initial temperature of the actuator of 20°C
- 4) Permissible permanent nom. force / permissible nom. phase current not to exceed the internal limit temperature at an ambient temperature of 20 °C. Determined by a slow and permanent movement under load (quasi-static method) for the normal case, i.e. the connection of the actuator to a metal body with a thermal contact resistance to air of 1.7 K/W. In case of a worse thermal coupling, limit to the nom. current of the worst case (3 A, see chart on page 8 and footnote 11)
- 5) The max. speed depends on voltage. The applied voltage (phase-phase) may be up to 48 V. The characteristics shown refer to a nom. voltage of 24 V (at the actuator);
- 6) During braking (negative acceleration), energy is generated and fed back into the DC link; if the DC link is not capable of regenerative braking, care must be taken to ensure that the DC link capacitance is adequately dimensioned and that an additional braking resistor is used
- 7) Over the stroke of 45 mm (shortest configuration) with a rated voltage of min. 24 V (at the actuator), without load

Integrate the CAD models of the actuators directly into your design!

Latest data sheets and CAD models are available on request via sales@smela.com or at: www.smela.com

Electrical performance data

Size 50

	Symbol	Unit	
General			
Nominal voltage ⁸⁾	U_N	V	24 to 48
Operating temperature ⁹⁾	T_{amb}	°C	+5 to +40
Internal temperature limit ⁹⁾	$T_{int,max}$	°C	+90
Motor feedback			Optical (rotative, singleturn, 5V logic)
Interface S1			Incremental: differentiell, 4.096 CPR Hall: Single ended
Interface S2			Clock rate 1.000 kHz Offset 1.072 (Sensor position 0 = motor phase 1) Single turn resolution: 13 bit Multi turn resolution: 12 bit
			Note: The multi-turn counter is reset when the sensor power is switched on or restarted
Motor parameters			
Max. permissible speed (equal to no-load speed at 24 V) ⁸⁾	$n_{max} = n_0$	min ⁻¹	3,025
Max. acceleration ⁶⁾	α_{max}	rad/s ²	16,610
Max. motor phase current ³⁾	I_{max}	A	12
Thermal time constant (winding) ¹⁰⁾	$\tau_{th,w}$	s	20
Nom. current ⁴⁾ poor thermal connection ¹¹⁾ good thermal connection ¹²⁾	$I_{N,wc}$ $I_{N,nc}$	A A	3 5
Max. torque (at I_{max})	M_{max}	mNm	750
Torque constant	k_M	mNm/A	62.5
Speed constant ¹³⁾	k_n	min ⁻¹ /V	126
Terminal resistance	R_s	mΩ	585
Terminal inductance ¹⁴⁾	L_s	μH	300
Electrical time constant ¹⁴⁾	τ_{el}	ms	0.512
Number of pole pairs	z_p	-	7
Rotor inertia ¹⁵⁾	J	g · cm ²	455

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Explanatory footnotes:

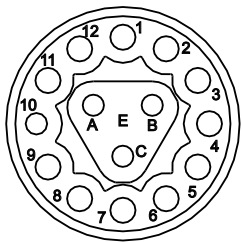
- 8) The applied voltage (phase-phase) can be up to 48 V. The characteristic data refer to a nominal voltage of 24 V (at the actuator);
The actual voltage at the actuator can deviate from the DC link voltage and depends, among other things, on the used inverter (voltage utilization) and the length of the connection cable
- 9) Max. permissible ambient temperature; The internal temperature limit must not be exceeded
- 10) The max. phase current I_{max} is to be applied for a duration of max. $\tau_{th,w}$ in order not to exceed the internal temperature limit of $T_{int,max}$ starting from an initial temperature of the actuator $T_{int} = T_{amb} = 20^\circ\text{C}$
- 11) With thermal insulation (actuator horizontal in static air at 20°C, 80% humidity, thermal contact resistance to air = 5 K/W)
- 12) When connected to a metal body with a thermal transfer resistance to air of 1.7 K/W
- 13) Related to measured peak voltage, no RMS value, phase to phase
- 14) Phase to phase; without taking into account connecting cables between actuator and drive controller; measured at 1 kHz, 1V rms
- 15) Calculated value without linear unit

Connection variants

Pin and wire assignment on the actuator and in the cable

Pin and wire assignment			
Pin	Sensor interface S1 (ABZ, Hall)	Sensor interface S2 (SSI)	Color code of SMELA LE-BASE cable
1	5 V (Sensor)	5 V (Sensor)	brown
2	GND (Sensor)	GND (Sensor)	white
3	Enc A	Clock+	green
4	Enc $\overline{A}$	Clock-	yellow
5	Enc B	-	grey
6	Enc $\overline{B}$	-	pink
7	Enc Z	Data-	blue
8	Enc $\overline{Z}$	Data+	red
9	Hall Sensor 1	-	white/green
10	Hall Sensor 2	-	white/yellow
11	Hall Sensor 3	-	brown/green
12	GND (Sensor)	GND (Sensor)	yellow/brown
A	Motor Phase 1	Motor Phase 1	brown (inner shield)
B	Motor Phase 2	Motor Phase 2	black (inner shield)
C	Motor Phase 3	Motor Phase 3	gray (inner shield)
Shield	inner & outer	inner & outer	both purple

Connector Itec 915
15-pole, male,
actuator side



Cables with drag chain capability

Configuration and order key

ITEC915.

Side 2 connection (controller side)

OPE Open end with single wires (ferrules)
..... Further assemblies on request

Cable length

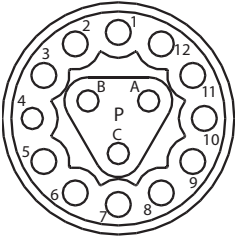
010	1 meter		100	10 meter
020	2 meter		120	12 meter
040	4 meter		140	14 meter
060	6 meter		160	16 meter
080	8 meter		Further assemblies on request	

Side 1 connection (actuator side)

Pin and wire assignment			
Pin	Sensor S1 (ABZ, Hall)	Sensor S2 (SSI)	Color code of SMELA LE-BASE cable
1	5 V (Sensor)	5 V (Sensor)	brown
2	GND (Sensor)	GND (Sensor)	white
3	Enc A	Clock+	green
4	Enc $\overline{A}$	Clock-	yellow
5	Enc B	-	grey
6	Enc $\overline{B}$	-	pink
7	Enc Z	Data-	blue
8	Enc $\overline{Z}$	Data+	red
9	Hall Sensor 1	-	white/green
10	Hall Sensor 2	-	white/yellow
11	Hall Sensor 3	-	brown/green
12	GND (Sensor)	GND (Sensor)	yellow/brown
A	Motor Phase 1	Motor Phase 1	brown (inner shield)
B	Motor Phase 2	Motor Phase 2	black (inner shield)
C	Motor Phase 3	Motor Phase 3	gray (inner shield)
Shield	inner & outer	inner & outer	both purple



Cable Itec 915
15-pole, female,
Further technical
specifications,
see back page



Cables with drag chain capability

Technical data, properties

Technical data

PUR Jacket
Drag chain capable
Diameter 10.60 ± 0.30 mm

Mechanical load capacity

Bending radius static 40 mm
Bending radius dynamic 80 mm
Recommended Speed ≤ 240 m/min
Acceleration ≤ 20 m/s²
Cycles $\geq 10,000,000$
Torsion ± 30 °/m
Pulling Force ≤ 20 N/mm²

Standard

UL	Subject 758 Style 20233 80 °C 300 V
CSA	C22.2 N° 210

APPROVALS

WEEE Compliance	Yes, in compliance with EU – Directive 2012/19/EU
RoHS Directive	Yes, in compliance with EU – Directive 2011/65/EU
Halogen Free	Yes, according to EN 60754-1
Silicon Free	Yes
CFC Free	Yes

Thermal load capacity (min/max)

Static -50 °C / +80 °C
Dynamic -40 °C / +80 °C

Chemical resistance

Oil resistant EN 50363-10-2

Security features

Flame retardant	IEC 60332-1-2
	UL/CSA FT1
	UL VW1

For further questions, please contact our sales department at
sales@smela.com or www.smela.com

