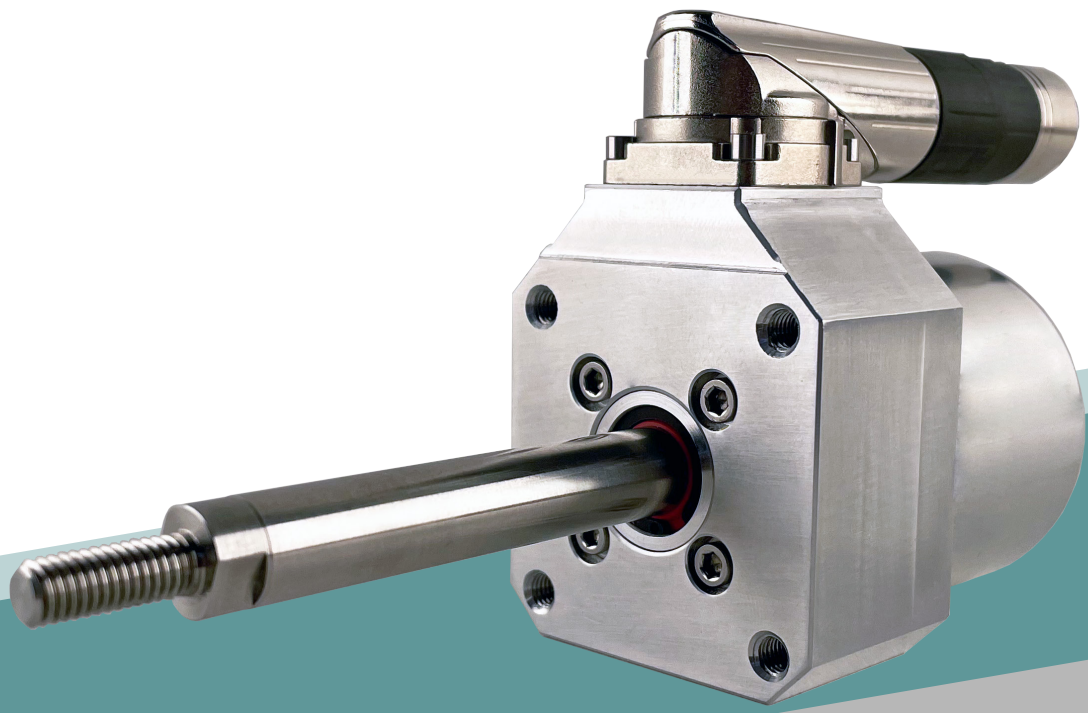
mela smart electric actuators



liteECO® LE-BASE Series

Linearactuators for short stroke movements
up to 115 mm stroke and 750 N force (static)
without integrated motion controller

liteECO® Linearactuators

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 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 more than **75 % energy** compared to pneumatic systems. Together with the smart arrangement of the mechanics, it ensures in particular an **installation space saving of up to 80 %** 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 new LE-BASE series integrates all the advantages of its predecessor LE48 and complements them with the essential features for high requirements in the industry, especially in the automotive and food industry. In addition to sealing to protection class IP65, circular connectors with a self-locking quick-connect system in size M15 have been added to the basic variant. Also new: the scaling of the stroke in three grades of 45, 85 and 115 millimeters, a centering collar on the flange and the option of mounting swivel and adapter flanges on the front as well as the back of the actuator.

Awards

HUGO JUNKERS PREIS FÜR FORSCHUNG UND INNOVATION AUS SACHSEN-ANHALT 2019

INNOVATIONSPREIS MAGDEBURG GEWINNER 2020

TOP 50 START-UPS 2020

* patent pending

Advantages

High power and dynamics in a compact design

High utilization of the installation lenght for the stroke

More than 75 % energy savings compared to pneumatics

Up to 80 % installation space savings compared to electrical alternatives

Features

Configurable stroke lengths

Integrated, high-resolution encoder system

Positionable and controllable with various motion controllers

Robust rotatable hybrid connector for power and sensor signals

Degree of protection IP65

Product configuration

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

Sensor configuration

S1	Incremental + Hall signals
S2*	SSI
S3*	BiSS

Stroke lenght

045	45 mm
085	85 mm
115*	115 mm

Lead screaw type and pitch (mm/rotation)

Pitch	High helix	Trapezoidal	Ball screw
2	-	T020	-
3	-	-	K030
4	-	T040	-
10	S100	-	-
15	S150	-	-
24	S240	-	-
40	S400	-	-

other thread configurations on request

Size | Flange width

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

liteECO® BASE Series (without integrated motion controller)

* on request/planned, details of the planned configurations will follow shortly

Technical Data, Dimensions

Size | Flange width 50

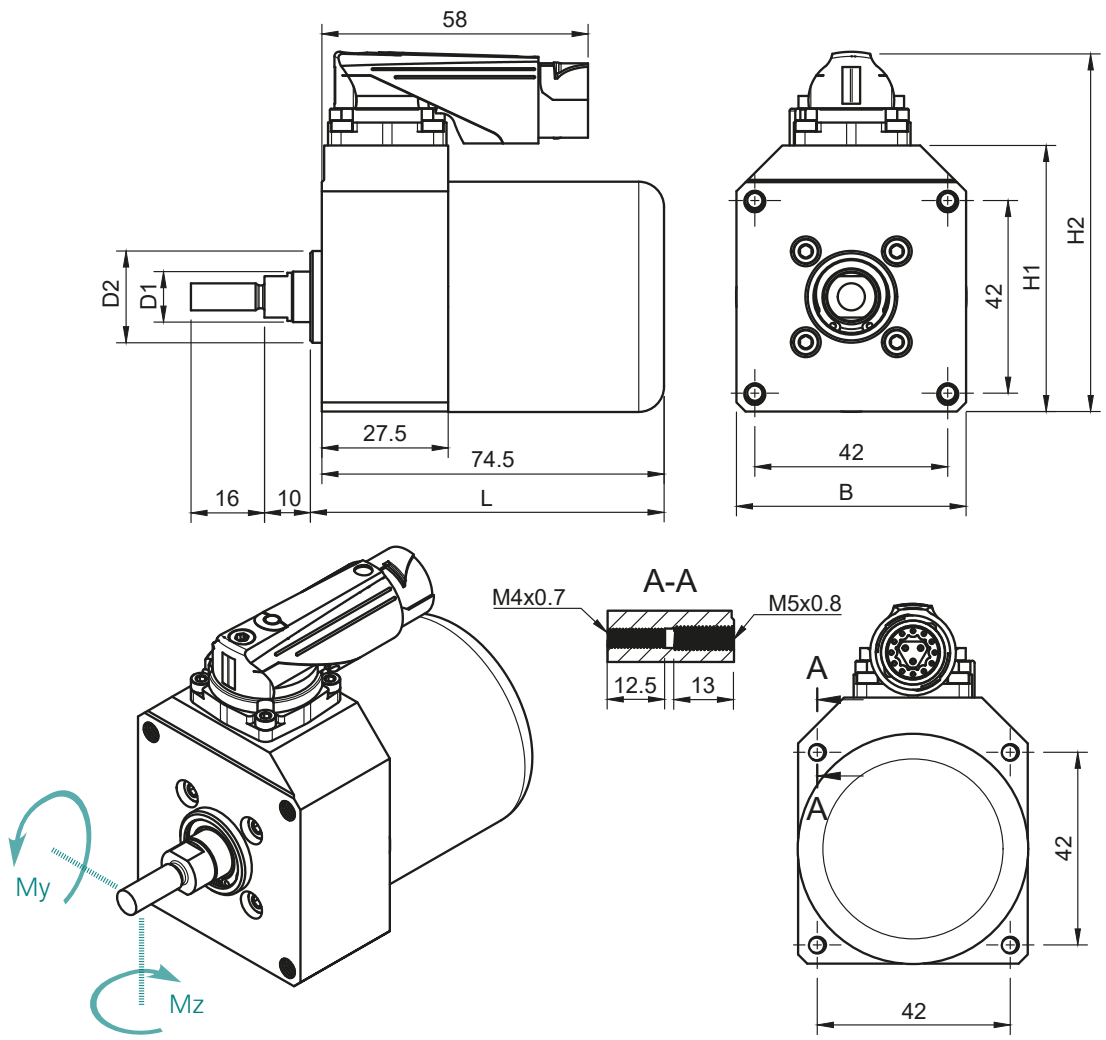
Characteristics (depending on stroke lenght)	045	085	115
Stroke S [mm]	45	85	115
Length L [mm]	77	117	147
Width B [mm]	50		
Height H1 [mm]	58		
Height H2 [mm]	78		
Centering collar D2 [mm]	Ø 20 x 2,5		
Diameter plunger D1 [mm]	Ø 11		
Thread on plunger	M6x16 (external thread)		
Width across flats for fixing the plunger [mm]	9		
Weight [g]	520	900	1.200
My, Mz (Transverse forces on the plunger) [Nm]	< 1		
Coupling / bolting on the flange 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) Tightenning torque (strength class 8.8) M3 [Nm] M4 [Nm] M5 [Nm]	42 x 42 4 x M5 Internal thread x Depth 13 mm 4 x M3 (as through hole) 4 x M4 Internal thread x Depth 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 Wiper ring (optional)	 Stainless steel (1.4305) Aluminium Aluminium HPU (Hydrolysis resistant polyurethane)		

Deviations from standard configuration are possible on request.
Plungers can be equipped with an integrated anti-rotation device, in which case the stroke is reduced by approx. 6 mm.
* in test phase

SMELA GmbH reserves the right to make changes in sense of technical improvements or new findings.

Dimensions, Mechanical connection

Size | Flange width 50 | Stroke 45 mm

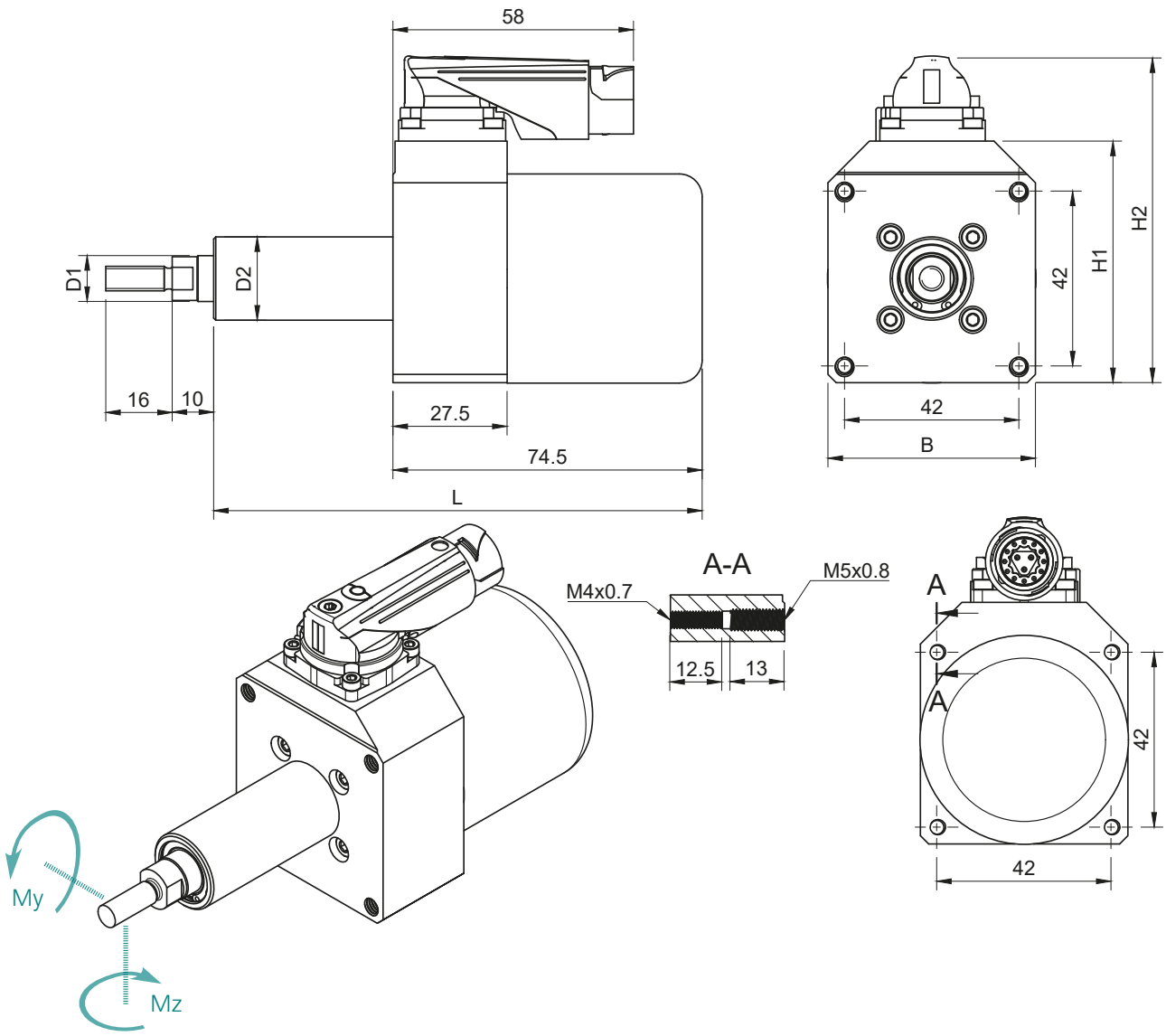


Plan the actuators directly into your design!

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

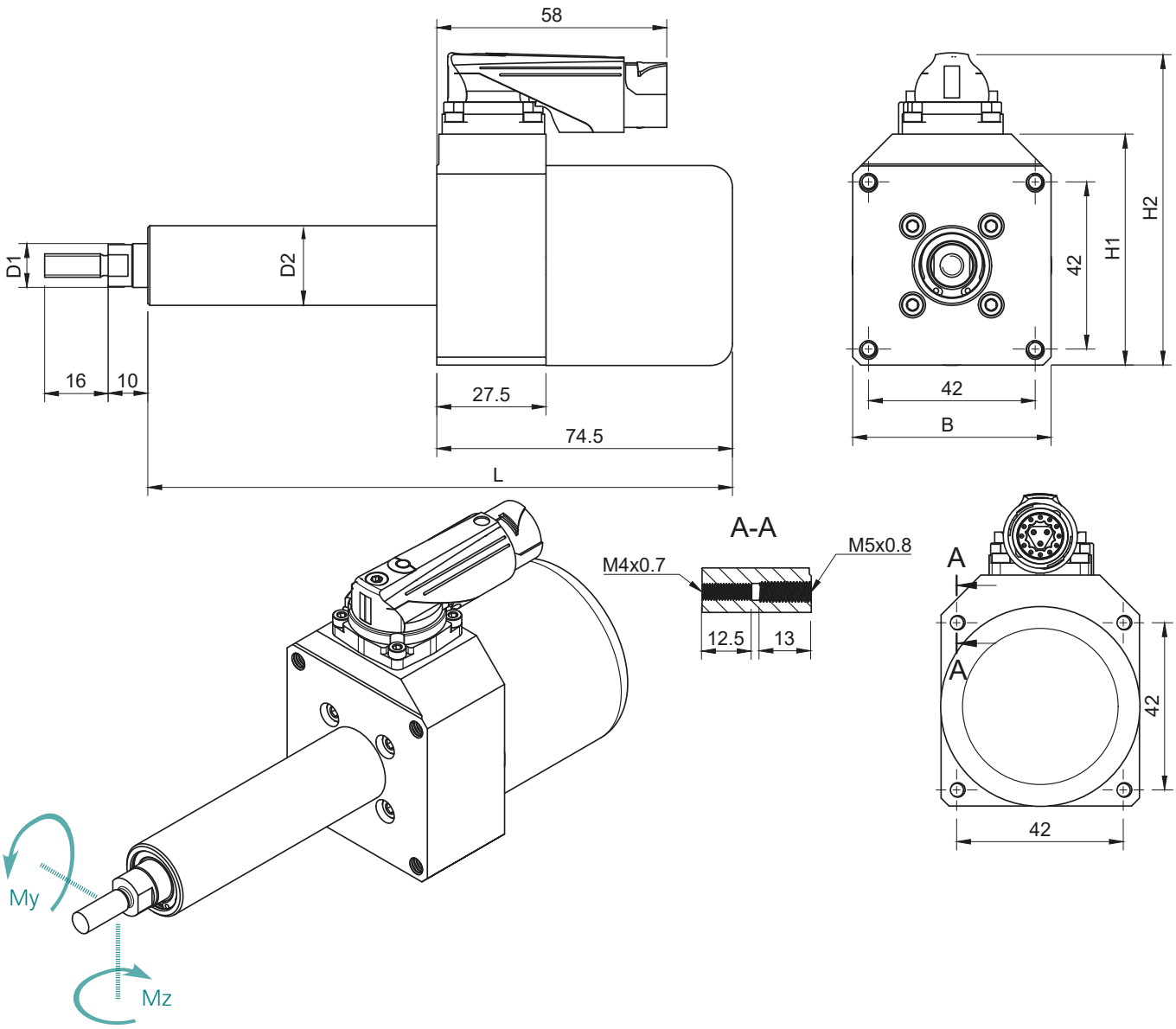
Dimensions, Mechanical connection

Size | Flange width 50 | Stroke 85 mm



Dimensions, Mechanical connection

Size | Flange width 50 | Stroke 115 mm



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Mechanical performance data
Size | Flange width 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 and never at the same time. 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/s²	ms
High helix							
S100	300	approx. ±0,1	300 / 12	125 / 5	500	25	120
S150	300		200 / 12	83 / 5	750	37,5	85
S240	260		125 / 12	52 / 5	1.200	60	65
S400	140		75 / 12	31 / 5	2.000	TBD	TBD
Trapezoidal thread							
T020	500	approx. ±0,1	500 / TBD	500 / TBD	50	TBD	TBD
T040	500		500 / TBD	313 / TBD	100	TBD	TBD
Ball screw							
K030	750	approx. ±0,05	417 / TBD	417 / TBD	135	TBD	TBD

SMELA GmbH reserves the right to make changes in sense of technical improvements or new findings.

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) The backlash is wear-dependent, the wear is dependent on load and dynamics
3) Maximum permissible force and the corresponding proportional phase power must not be exceed in order to protect the internal mechanics. The max. phase power 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 embient 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 (conductor-conductor) 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 or regenerative braking, care must be taken to ensure that the intermediate capacitance is adequately dimensioned and that an additional braking resitor is used
7) Over the stroke of 45 mm (shortest configuration) with a rated voltage of min. 24 V (at the actuator), without load

Electrical performance data
Size | Flange width 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 Measurement system Interface Resolution (increments | quadcounts)			 Optical (rotative, singleturn) Incremental, Hall, SSI*, BiSS* 1.024 | 4.096 higher resolutions*
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/s²	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 [14)]	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 · cm²	455

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Explanatory footnotes:

8) The applied voltage (conductor-conductor) 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 frequency converter used (voltage utilization) and the length of the connection cable
9) Max. permissible ambient temperature; The internal limit temperature 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 limit temperature of $T_{int,max}$ starting from an initial temperature of the actuator $T_{int} = T_{amb} = 20°C$
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

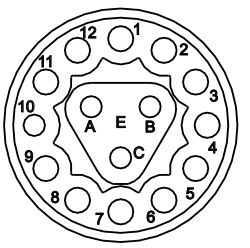
* Planned, on request

Connection variants

Actuator connection via Intercontec Itec 915

Pin assignment at actuator for sensor configuration S1	
Pin	Function
1	5 V (Sensor)
2	GND (Sensor)
3	Enc A
4	Enc $\overline{A}$
5	Enc B
6	Enc $\overline{B}$
7	Enc Z
8	Enc $\overline{Z}$
9	Hall Sensor 1
10	Hall Sensor 2
11	Hall Sensor 3
12	GND (Sensor)
A	Motor Phase 1
B	Motor Phase 2
C	Motor Phase 3

Intercontec Itec 915
15-pole, male - actuator side



Deviating assignments for other sensor configurations will follow.
Pre-assembled cables suitable for drag chains (see following page) are available on request by e-mail to sales@smela.com.

Preassembled cables
Configuration and order key

ITEC915.---.---

Confection 2. side (controller)

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

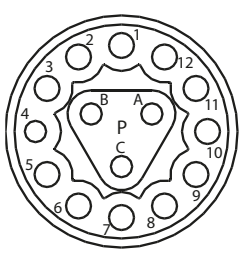
Cable length

010	1 meter
020	2 meter
040	4 meter
080	8 meter
	Further assemblies on request

Confection 1. side (actuator)

Pin and wire assignment for sensor configuration S1		
Pin	Function	Color code
1	5 V (Sensor)	brown
2	GND (Sensor)	white
3	Enc A	green
4	Enc $\overline{A}$	yellow
5	Enc B	grey
6	Enc $\overline{B}$	pink
7	Enc Z	blue
8	Enc $\overline{Z}$	red
9	Hall Sensor 1	white/green
10	Hall Sensor 2	white/yellow
11	Hall Sensor 3	brown/green
12	GND (Sensor)	yellow/brown
A	Motor Phase 1	brown (inner screen)
B	Motor Phase 2	black (inner screen)
C	Motor Phase 3	gray (inner screen)

Intercontec Itec 915
15-pole, female - cable side



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