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**ELA –  
Electromechanical  
Linear Actuators**

# Electromechanical Linear Actuators ELA

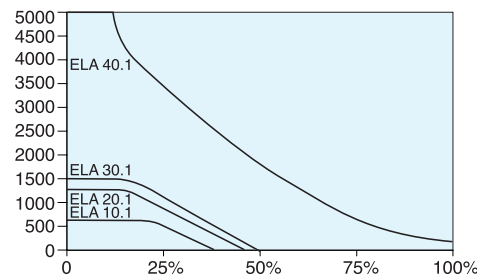
Electromechanical Linear Actuators (ELA) consist of a completely enclosed aluminium housing with worm gearing and axial bearing driven by a standard supplied electric motor as well as a thrust and shaft tube construction. Trapezoidal or ball screws. It is possible to install ELAs in any position and the thrust and guide mechanism is designed for both compressive and tensile loading. Other distinguishing features include robust construction and reliability giving ELAs a wide range of applications.



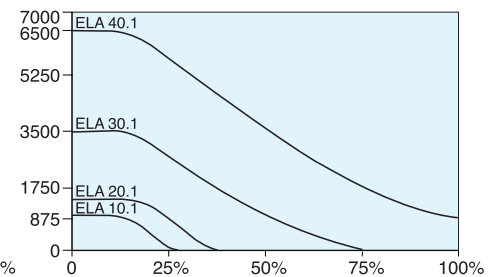
Use in accordance with European Directive 94/9/EC (ATEX) available on request

## Duty cycle diagrams, ELA with trapezoidal screw and three-phase motor:

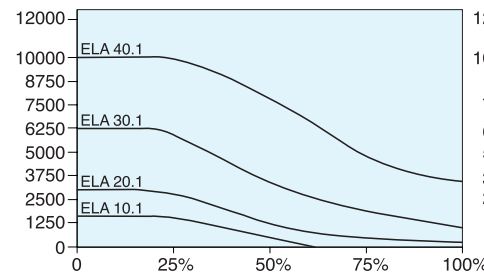
Ratio H Fdyn (N)/duty ratio in % per 10 minutes



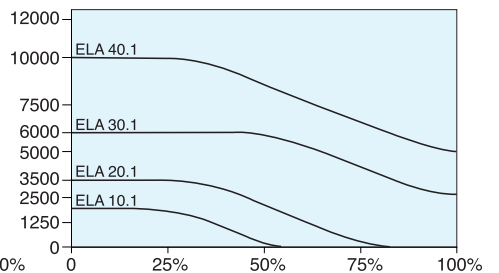
Ratio V Fdyn (N)/duty ratio in % per 10 minutes



Ratio N Fdyn (N)/duty ratio in % per 10 minutes



Ratio L Fdyn (N)/duty ratio in % per 10 minutes



## Selection table, series ELA, trapezoidal screw Tr:

Trapezoidal screw	Three-phase motor				Single-phase motor				D.C. motor				
	10.1	20.1	30.1	40.1	10.1	20.1	30.1	40.1	10.1	20.1	30.1	40.1	
Size													
Max. axial force	F [N] stat.	2500	4500	8000	13000	2500	4500	8000	13000	2500	4500	8000	13000
Screw		12x3	16x4	22x5	22x5	12x3	16x4	22x5	22x5	12x3	16x4	22x5	22x5
Approx. weight	[kg]	6	10	15	20	6	10	15	20	6	10	15	20
<b>Ratio H</b>		4:1	4:1	2,78:1	6,75:1	4:1	4:1	2,78:1	6,75:1	4:1	4:1	2,78:1	6,75:1
Max. tensile/compr. force	F [N] dyn.	550	1250	1500	5000	550	1200	1100	3500	700	1200	1100	3500
Lifting speed	v [mm/sec]	35	46,6	84	34,5	35	46,6	84	34,5	35	46,6	84	34,5
Motor power	P [Watt]	90	120	250 <sup>1)</sup>	550	90	120	250 <sup>1)</sup>	550	70	150	300 <sup>1)</sup>	500
<b>Ratio V</b>		6,5:1	6,5:1	5:1	10:1	6,5:1	6,5:1	5:1	10:1	6,5:1	6,5:1	5:1	10:1
Max. tensile/compr. force	F [N] dyn.	900	1650	3500	6500	900	1600	2500	5300	1100	1600	2500	5300
Lifting speed	v [mm/sec]	22	31	46,6	23,3	22	31	46,6	23,3	22	31	46,6	23,3
Motor power	P [Watt]	90	120	250	550	90	120	250	550	70	150	300	500
<b>Ratio N</b>		15:1	15:1	10:1	20:1	15:1	15:1	10:1	20:1	15:1	15:1	10:1	20:1
Max. tensile/compr. force	F [N] dyn.	1600	2750	6000	10000	1600	2300	4500	8500	1350	2300	4500	8500
Lifting speed	v [mm/sec]	9	13	23,3	11,5	9	13	23,3	11,5	10	13	23,3	11,5
Motor power	P [Watt]	90	120	250	550	90	120	250	550	70	150	300	500
<b>Ratio L</b>		25:1	25:1	20:1	25:1	25:1	25:1	20:1	25:1	25:1	25:1	20:1	25:1
Max. tensile/compr. force	F [N] dyn.	2000	3500	6000	10000	2000	3500	6000	10000	2000	3500	6000	10000
Lifting speed	v [mm/sec]	5,5	7,5	11,7	9	5,5	7,5	11,7	9	5,5	7,5	11,7	9
Motor power	P [Watt]	90	120	250	550	90	120	250	550	70	150	300	500

<sup>1)</sup> Brake motor



**Standard stroke lengths:**

- ELA 10.1: 100, 200, 300, 400 mm
- ELA 20.1: 200, 400, 600 mm
- ELA 30.1, 40.1: 200, 400, 600, 800 mm
- Special stroke lengths on request
- Wide range of accessories (see dimension diagrams)

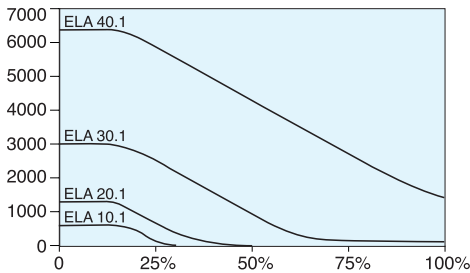
**The standard models have**

**the following design features:**

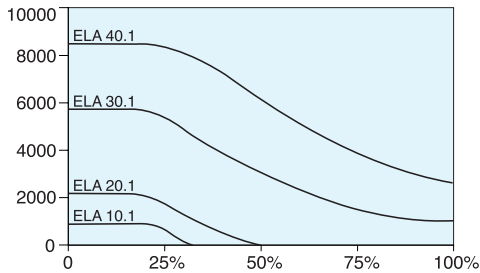
- Maximum dynamic axial loads from 55 to 1300 kg
- Lifting speeds from 6 to 84 mm/s (depending on load and duty ratio)
- Drive motors with IEC flange (B14), protection type IP 54, three-phase, single-phase or direct current.
- With brake (optional)
- Self-locking via trapezoidal screws
- Worm gear with various ratios
- Under normal operating conditions, long-term lubrication with high quality grease and enclosed design

**Duty cycle diagrams, ELA with ball screw and three-phase motor:**

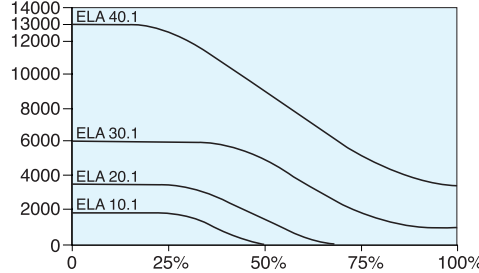
**Ratio H** Fdyn (N)/duty ratio in % per 10 minutes



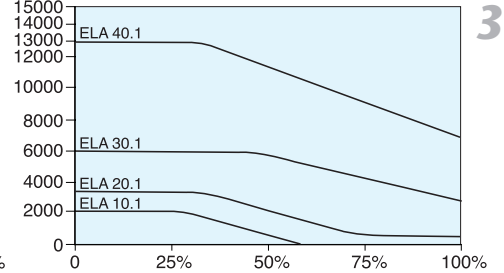
**Ratio V** Fdyn (N)/duty ratio in % per 10 minutes



**Ratio N** Fdyn (N)/duty ratio in % per 10 minutes



**Ratio L** Fdyn (N)/duty ratio in % per 10 minutes

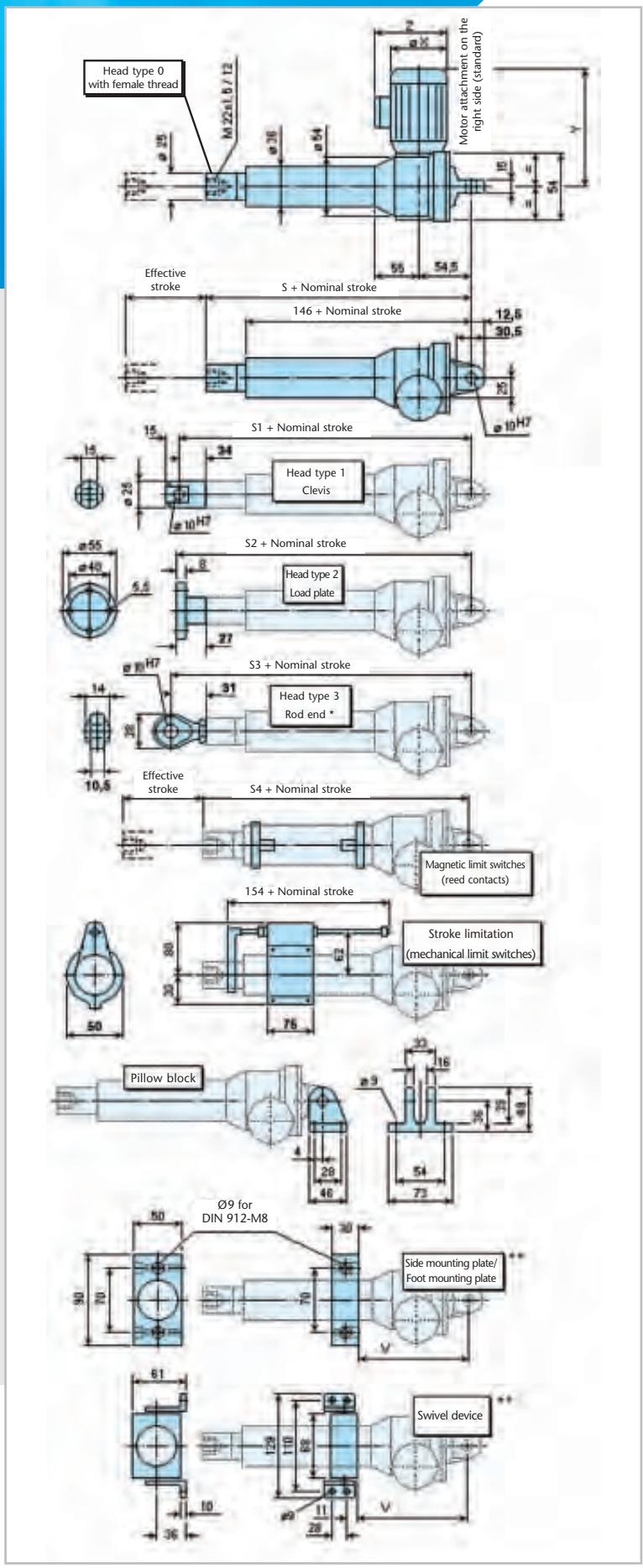


**Selection table, series ELA, ball screw Ku:**

Ball screw	Three-phase motor				Single-phase motor				D.C. motor				
	10.1	20.1	30.1	40.1	10.1	20.1	30.1	40.1	10.1	20.1	30.1	40.1	
Size	10.1	20.1	30.1	40.1	10.1	20.1	30.1	40.1	10.1	20.1	30.1	40.1	
Max. axial force	F [N] stat.	2500	4500	8000	13000	2500	4500	8000	13000	2500	4500	8000	13000
Screw		12x5	16x5	20x5	25x6	12x5	16x5	20x5	25x6	12x5	16x5	20x5	25x6
Approx. weight	[kg]	6	10	15	20	6	10	15	20	6	10	15	20
<b>Ratio H</b>		4:1	4:1	2,78:1	6,75:1	4:1	4:1	2,78:1	6,75:1	4:1	4:1	2,78:1	6,75:1
Max. tensile/compr. force	F [N] dyn.	600	1350	3000	6550	700	1250	2200	5500	750	1250	2200	5500
Lifting speed	v [mm/sec]	59	58	84	42	59	58	84	42	59	58	84	42
Motor power	P [Watt]	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	70 <sup>1)</sup>	150 <sup>1)</sup>	300 <sup>1)</sup>	500 <sup>1)</sup>
<b>Ratio V</b>		6,5:1	6,5:1	5:1	10:1	6,5:1	6,5:1	5:1	10:1	6,5:1	6,5:1	5:1	10:1
Max. tensile/compr. force	F [N] dyn.	950	2150	5800	8500	1000	2000	4200	7500	1150	2000	4200	7500
Lifting speed	v [mm/sec]	36	37	47	28	36	37	47	28	38	37	47	28
Motor power	P [Watt]	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	70 <sup>1)</sup>	150 <sup>1)</sup>	300 <sup>1)</sup>	500 <sup>1)</sup>
<b>Ratio N</b>		15:1	15:1	10:1	20:1	15:1	15:1	10:1	20:1	15:1	15:1	10:1	20:1
Max. tensile/compr. force	F [N] dyn.	1900	3500	6000	13000	2000	3500	4500	13000	1500	3500	4500	13000
Lifting speed	v [mm/sec]	16	15,6	23,3	14	16	15,6	23,3	14	15	15,6	23,3	14
Motor power	P [Watt]	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	70 <sup>1)</sup>	150 <sup>1)</sup>	300 <sup>1)</sup>	500 <sup>1)</sup>
<b>Ratio L</b>		25:1	25:1	20:1	25:1	25:1	25:1	20:1	25:1	25:1	25:1	20:1	25:1
Max. tensile/compr. force	F [N] dyn.	2500	3500	6000	13000	2500	3500	6000	13000	2500	3500	6000	13000
Lifting speed	v [mm/sec]	9	9	11,7	11	9	9	11,7	11	9	9	11,7	11
Motor power	P [Watt]	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	90 <sup>1)</sup>	120 <sup>1)</sup>	250 <sup>1)</sup>	550 <sup>1)</sup>	70 <sup>1)</sup>	150 <sup>1)</sup>	300 <sup>1)</sup>	500 <sup>1)</sup>

<sup>1)</sup> Brake motor

# Electromechanical Linear Actuator



## Dimensions ELA 10.1:

	Tr screw	Ku ball screw
<b>Size</b>	<b>12x3</b>	<b>12x5</b>
S	169	184
S 1	203	218
S 2	196	211
S 3	200	215
S 4	188	206

Nominal stroke	Effective stroke	
with mechanical limit switches		
100	100	85
200	200	185
300	300	285
400	400	385

Nominal stroke	Effective stroke	
with magnetic limit switches (reed contacts)		
100	78	60
200	178	160
300	278	260
400	378	360

Mechanical limit switches*	Magnetic limit switches** (reed contacts)
V	110
	175

\* Rod end not together with mechanical stroke limitation.  
 \*\* Combination of reed contact and side mounting plate/ foot mounting plate or swivel device only available for stroke 200 and above.

Three-phase motor 400 VAC, 90 W		
X	110	110
Y	195	-
Y (with brake)	220	220
Z	165	165

Single-phase motor 230 V~, 90 W		
X	110	110
Y	195	-
Y (with brake)	220	220
Z	165	165

D.C. motor 24 VDC, 70 W		
X	60	60
Y	165	-
Y (with brake)	210	210
Z	80	80

## Available upon request:

- Head type 1, 2 or 3
- Mechanical limit switches, connecting cables 5 x 0,75 mm<sup>2</sup>, 1 m long, 2 x NC contact
- Magnetic limit switches (reed contacts), connecting cables, each 2 x 0,25 mm<sup>2</sup>, 2 m long, NC contact
- Pillow block
- Side mounting plate/Foot mounting plate
- Swivel device
- Motor attachment on the left side
- Housing eye rotatable by 90°
- Anti-turn device is not available
- 2<sup>nd</sup> shaft end on the gear is not available

Only the most recent dimensional drawings are binding.



### Dimensions ELA 20.1:

	Tr screw	Ku ball screw
<b>Size</b>	<b>16x4</b>	<b>16x5</b>
S	190	211
S 1	215	236
S 2	210	231
S 3	230	251
S 4	204	211

Nominal stroke	Effective stroke	
with mechanical limit switches		
200	200	185
400	400	385
600	600	585

Nominal stroke	Effective stroke	
with magnetic limit switches (reed contacts)		
200	190	180
400	390	380
600	590	580

Mounting dimension of add-on items for	A	B	C
mechanical limit switches	175	171	192
magnetic limit switches (reed contacts)	259	255	277

\* Rod end only available with anti-turn device.

Three-phase motor 400 VAC, 120 W		
X	110	110
Y	225	-
Y (with brake)	285	285
Z	165	165

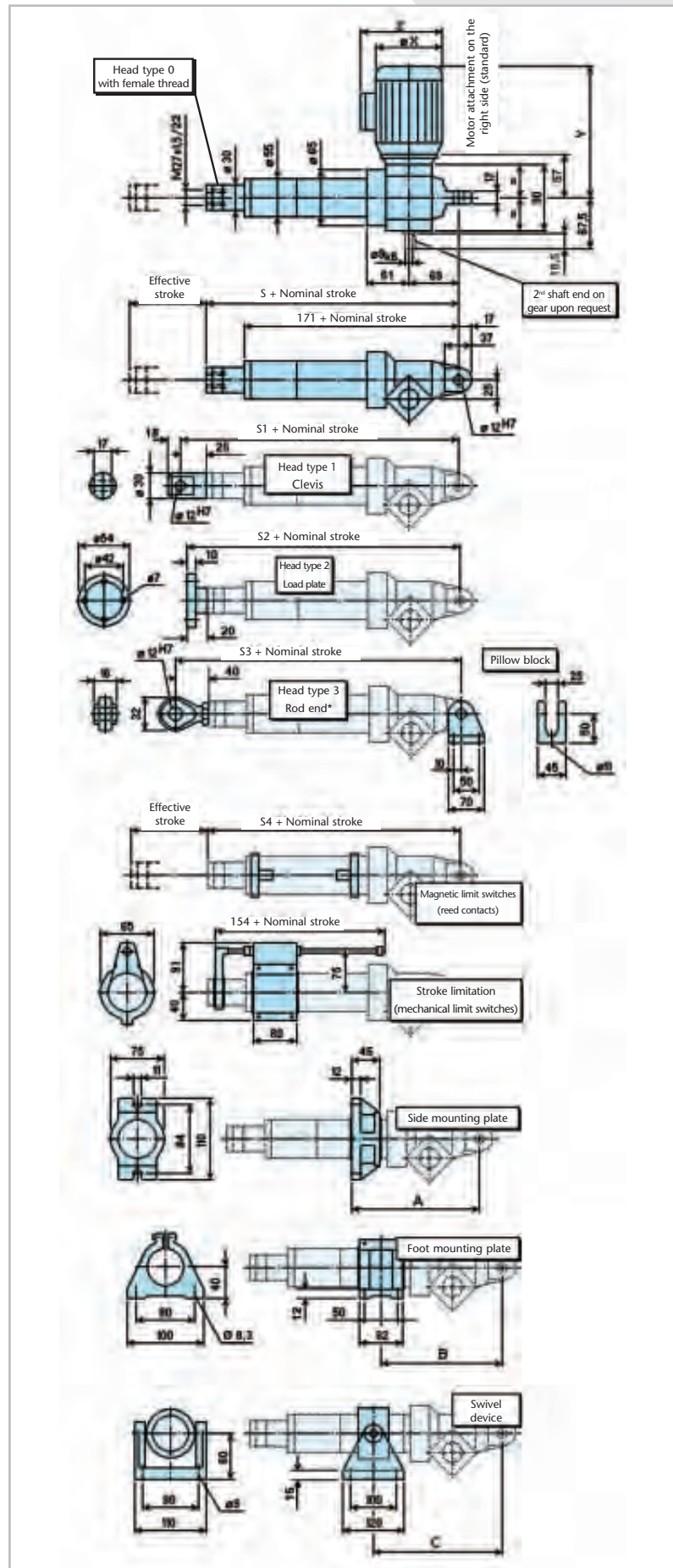
Single-phase motor 230 V~, 120 W		
X	115	115
Y	220	-
Y (with brake)	260	260
Z	165	165

D.C. motor 24 VDC, 150 W		
X	85	85
Y	225	-
Y (with brake)	270	270
Z	121	121

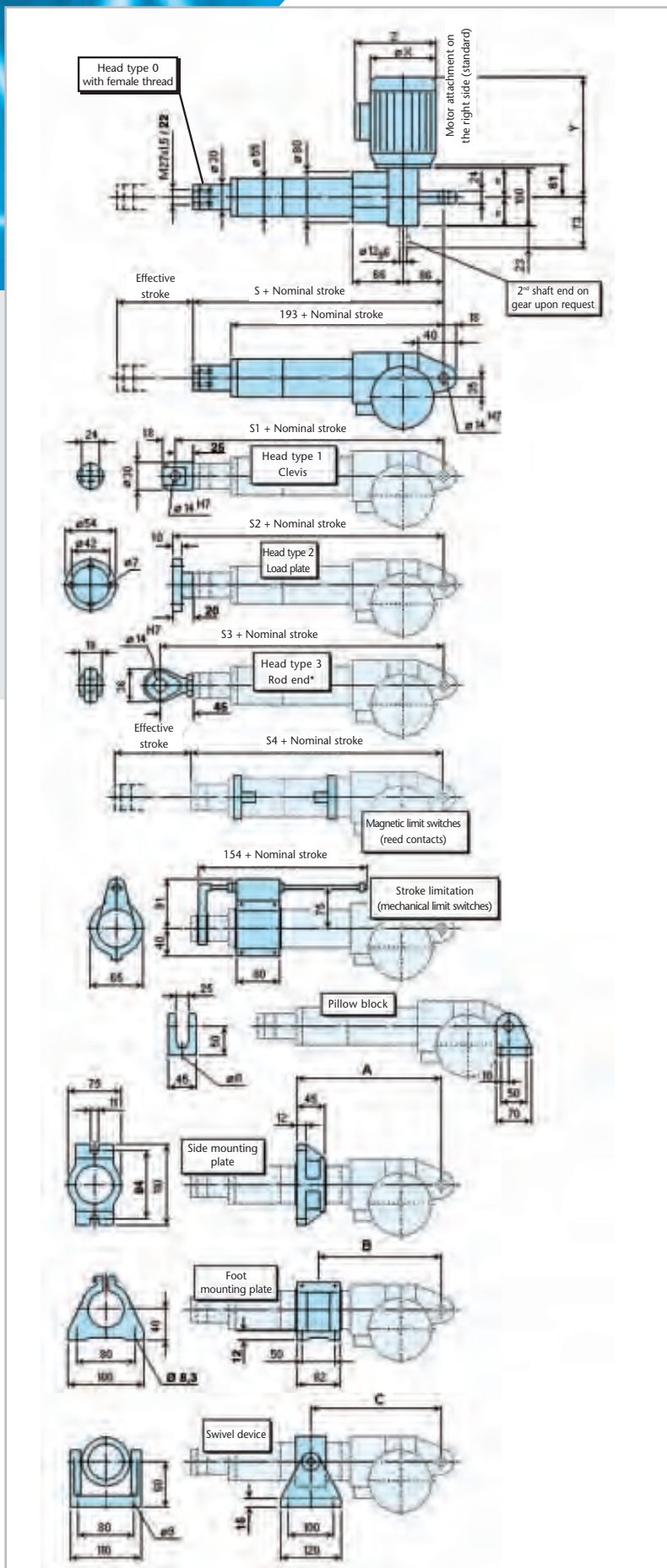
### Available upon request:

- Head type 1, 2 or 3
- Mechanical limit switches, connecting cables 5 x 0,75 mm<sup>2</sup>, 1 m long, 2 x NC contact
- Magnetic limit switches (reed contacts), connecting cables, each 2 x 0,25 mm<sup>2</sup>, 2 m long, NC contact
- Pillow block
- Side mounting plate
- Foot mounting plate
- Swivel device
- Motor attachment on the left side
- Housing eye rotatable by 90°
- Anti-turn device
- 2<sup>nd</sup> shaft end on the gear with feather key groove 3x3x14

Only the most recent dimensional drawings are binding.



# Electromechanical Linear Actuator



## Dimensions ELA 30.1:

	Tr srew	Ku ball screw
Size	22x5	20x5
S	220	230
S 1	245	255
S 2	240	250
S 3	265	275
S 4	226	240

Nominal stroke	Effective stroke	
with mechanical limit switches		
200	200	190
400	400	390
600	600	590
800	800	790

Nominal stroke	Effective stroke	
with magnetic limit switches (reed contacts)		
200	190	170
400	390	370
600	590	570
800	790	770

Mounting dimension of add-on items for	A	B	C
mechanical limit switches	197	193	214
magnetic limit switches (reed contacts)	281	277	299

\* Rod end only available with anti-turn device.

Three-phase motor 400 VAC, 250 W		
X	126	126
Y	255	-
Y (with brake)	315	315
Z	172	172

Single-phase motor 230 V~, 250 W		
X	126	126
Y	242	-
Y (with brake)	301	301
Z	172	172

D.C. motor 24 VDC, 300 W		
X	85	85
Y	290	-
Y (with brake)	331	331
Z	121	121

## Available upon request:

- Head type 1, 2 or 3
- Mechanical limit switches, connecting cables  
5 x 0,75 mm<sup>2</sup>, 1 m long, 2 x NC contact
- Magnetic limit switches (reed contacts), connecting cables, each 2 x 0,25 mm<sup>2</sup>, 2 m long, NC contact
- Pillow block
- Side mounting plate
- Foot mounting plate
- Swivel device
- Motor attachment on the left side
- Housing eye rotatable by 90°
- Anti-turn device
- 2<sup>nd</sup> shaft end on the gear with feather key groove 4x4x16

Only the most recent dimensional drawings are binding.



### Dimensions ELA 40.1:

	Tr srew	Ku ball-screw*
Size	22x5	25x6
S	275	285
S 1	305	315
S 2	297	307
S 3	328	338
S 4	285	285

Nominal stroke	Effective stroke	
with mechanical limit switches		
200	200	190
400	400	390
600	600	590
800	800	790

Nominal stroke	Effective stroke	
with magnetic limit switches (reed contacts)**		
200	190	190
400	390	390
600	590	590
800	790	790

\* Rod end only available with anti-turn device.  
 \*\* Ball screw not available in combination with anti-turn device and magnetic limit switches (reed contacts).

Three-phase motor 400 VAC, 550 W		
X	145	145
Y	295	-
Y (with brake)	350	350
Z	191	191

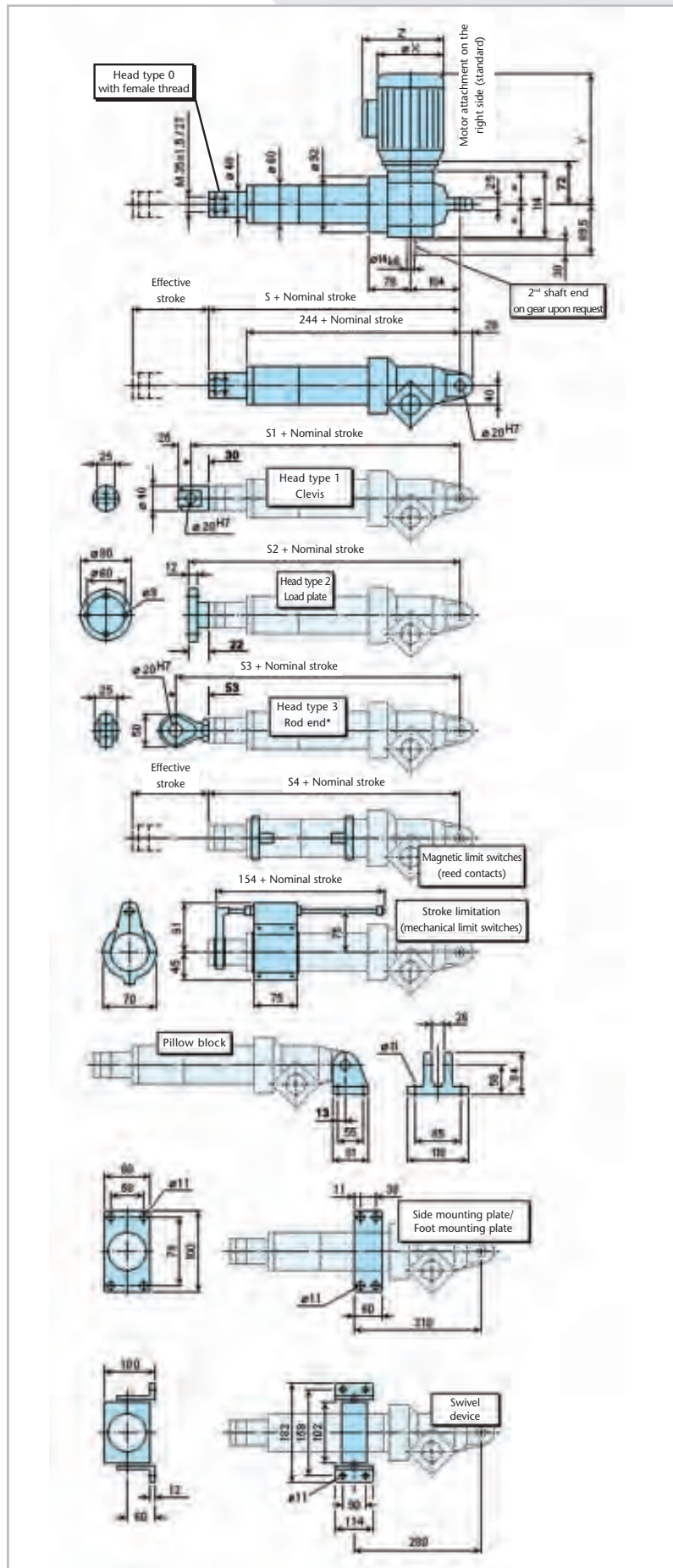
Single-phase motor 230 V~, 550 W		
X	140	140
Y	315	-
Y (with brake)	350	350
Z	191	191

D.C. motor 24 VDC, 500 W		
X	85	85
Y	395	-
Y (with brake)	435	435
Z	121	121

### Available upon request:

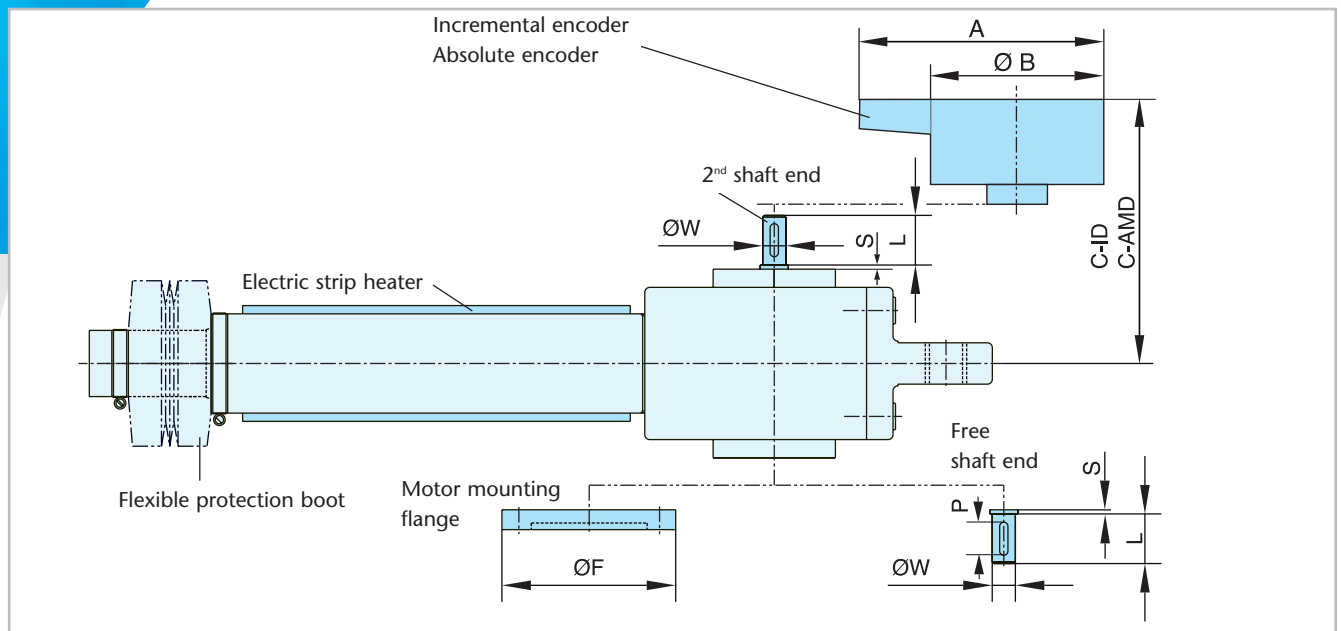
- Head type 1, 2 or 3
- Mechanical limit switches, connecting cables 5 x 0,75 mm<sup>2</sup>, 1 m long, 2 x NC contact
- Magnetic limit switches (reed contacts), connecting cables, each 2 x 0,25 mm<sup>2</sup>, 2 m long, NC contact\*\*
- Pillow block
- Side mounting plate/Foot mounting plate
- Swivel device
- Motor attachment on the left side
- Housing eye rotatable by 90°
- Anti-turn device\*
- 2<sup>nd</sup> shaft end on the gear with feather key groove 5x5x20

Only the most recent dimensional drawings are binding.



# Electromechanical Linear Actuator - Options

Option Incremental/absolute encoder/motor mounting flange/  
free or 2<sup>nd</sup> shaft end/electric strip heater (not possible for ELA 10.1)



The incremental encoder or absolute encoder is mounted on the 2<sup>nd</sup> shaft end. Only the most recent dimensional drawings are binding.

ELA size	IEC motor flange / ØF	ØW	S	L	P
20.1	56 B14 / Ø80	9	4	18,5	14
30.1	63 B14 / Ø90	12	-	23	16
40.1	71 B14 / Ø105	14	2,5	30	20

Feather key groove in accordance with DIN 6885/1

ELA size	A	Ø B	C-AMD	C-ID
20.1	approx. 155	approx. 65	approx. 165	approx. 115
30.1	approx. 155	approx. 65	approx. 170	approx. 120
40.1	approx. 155	approx. 65	approx. 175	approx. 125

Dimension A with mating plug or high-strength cable gland

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## Technical Data

### Incremental encoder:

Type:	ID
Pulses per rotation:	10 or 20
Supply voltage:	11 - 27 VDC
Power rating (without load):	< 4 Watt
Output:	5 V or 11-27 V
Incremental signal:	A/B/0 $\bar{A}$ / $\bar{B}$ / $\bar{0}$
Operating temperature:	0 °C to 60 °C
Protection rating:	IP 65
Type of connection:	Radial plug (12-pole, crimpable, included in delivery, recommendation CY PUR 3x2x0,14 + 2x0,5)



## Absolute multiturn encoder (pre-programmed)

### Technical Data

Type:	AMD
Overall resolution (encoder capacity):	max. 25 bit
Steps per rotation:	256 (max. 13 bit)
Number of revolutions:	4096 (max. 12 bit)
Supply voltage:	11...27 VDC
Power rating (without load):	< 3 Watt
Operating temperature:	0 °C to 60 °C
Protection rating:	IP 65

#### Rotary encoder

with data output: **RS 422 / SSI**

Output code:	programmable, pre-set, gray code
Type of connection:	Radial plug (12-pole, crimpable, included in delivery, recommendation CY PUR 3x2x0,14 + 2x0,5)

OR

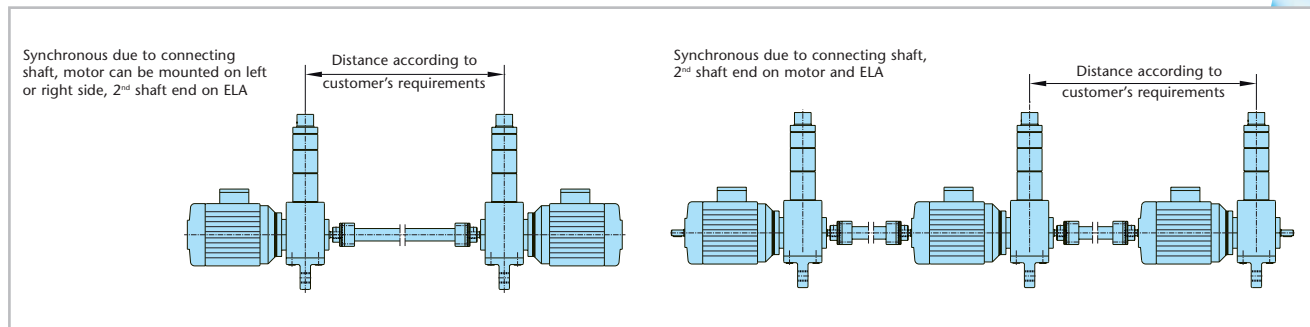
#### Rotary encoder

with data transfer: **Profibus DP**

Output code:	can be parameterized using Profibus DP according to PNO Class 2
Adress range:	3 to 99 adjustable via DIP-switch
Transfer rate:	9,6 kBaud to 12 MBaud
Type of connection:	Terminal screws, 3 x screwed radial cable gland

Other rotary encoders available upon request.

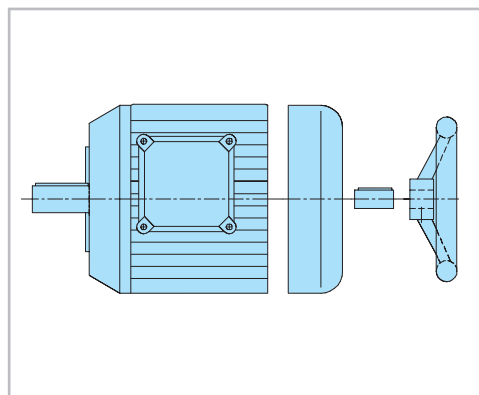
## Mechanical synchronization option (not possible for ELA 10.1)



## Motor option (not possible for ELA 10.1)

### Motor option:

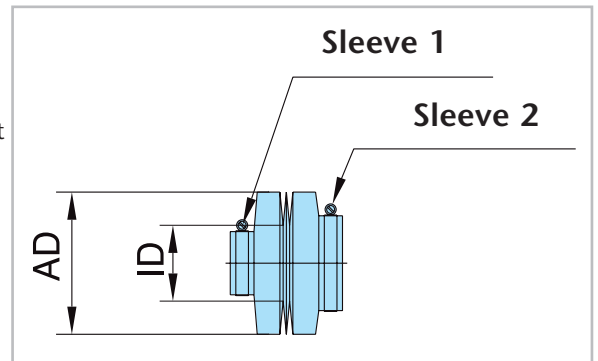
- Special voltages, frequencies and protection ratings
- 2<sup>nd</sup> shaft end with/without hand wheel
- Brake, rust-proof, with/without manually operated air ventilation
- Pole switchable to fast and creep speed
- Temperature monitor for frequency converters
- Incremental/absolute encoders
- Protection for tropical climates/against moisture
- Electric strip heater
- No fan
- UL, CSA, NEMA certification



# Electromechanical Linear Actuator - Options

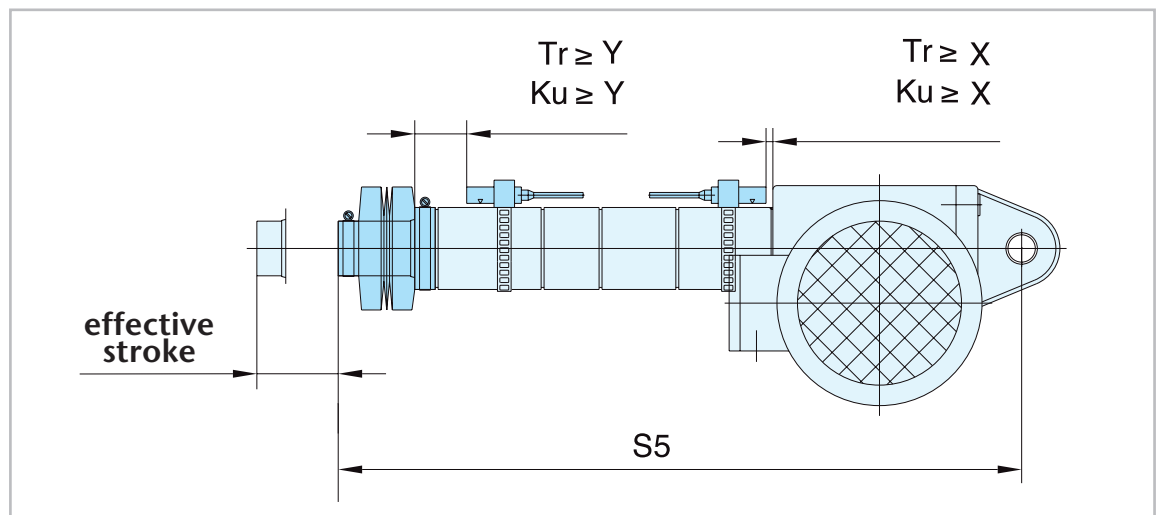
## Flexible protection boot option (not in combination with mechanical limit switches)

- Stainless steel clamps and air filters
- Material PN-XT
- Temperature range 0 °C to 40 °C
- Special versions available upon request



ELA size	ID <sup>1)</sup>	AD <sup>2)</sup>	Sleeve 1	Sleeve 2
10.1	Ø30	Ø72	Ø25x12	Ø36x12
20.1	Ø36	Ø78	Ø30x15	Ø55x15
30.1	Ø36	Ø78	Ø30x15	Ø55x15
40.1	Ø48	Ø90	Ø40x15	Ø60x15

<sup>1)</sup> Inner diameter <sup>2)</sup> Outer diameter



Only the most recent dimensional drawings are binding.

## Mounting dimensions for ELA with and without magnetic limit switches (reed contacts)

### ELA 10.1

Nominal stroke	Tr screw S5	Effective stroke	≥Y	≥X
100	288	78	32	0
200	398	168	32	10
300	508	258	32	20
400	618	348	32	30

Ball screw S5	Effective stroke	≥Y	≥X
306	60	50	0
406	160	50	0
506	260	50	0
616	350	50	10

### ELA 20.1

Nominal stroke	Tr screw S5	Effective stroke	≥Y	≥X
200	424	170	25	20
400	644	350	25	40
600	869	525	25	65

Ball screw S5	Effective stroke	≥Y	≥X
426	165	28	22
646	345	28	42
871	520	28	67

### ELA 30.1

Nominal stroke	Tr screw S5	Effective stroke	≥Y	≥X
200	446	170	25	20
400	666	350	25	40
600	891	525	25	65
800	1111	705	25	85

Ball screw S5	Effective stroke	≥Y	≥X
450	160	31	24
670	340	31	44
895	515	31	69
1115	695	31	89

### ELA 40.1

Nominal stroke	Tr screw S5	Effective stroke	≥Y	≥X
200	500	175	43	15
400	720	355	43	35
600	945	530	43	60
800	1165	710	43	80

Ball screw S5	Effective stroke	≥Y	≥X
500	175	38	20
720	355	38	40
945	530	38	65
1165	710	38	85

Pfaff-silberblau can supply both conventional contactor control units and, upon request, complete PLC controls.

## Contactor control system

For three-phase (~400 V) screw-drive units/linear actuators conforming to DIN EN 60204 Part 1, Part 32

### H1TM basic version

- Protection rating IP 54
- Housing made of plastic (270 x 220 x 108 mm)
- Operating voltage ~ 400 V 50 Hz
- Control system voltage ~ 42 V 50 Hz
- Motor protection relay
- „UP/DOWN“ push-button control
- Signals from the limit switches can be processed
- Built-in „EMERGENCY OFF“ master switch and reversal protection

### H1TM with external push-button controls and main contactor

- With wall-mounted „UP/DOWN“ and „EMERGENCY OFF“ push-buttons (supplied in separate package) or
- With „UP/DOWN“ and „EMERGENCY OFF“ pendant switches (incl. 5 m control cable)

### H1TM with electronic overload protection

(required for lifting devices for loads from 1000 kg)

- With main contactor
- Overload relay
- Key-operated „reset“ control
- Fault-warning light



Type H1TM	Motor power rating up to kW
Basic version	4,0
With external wall-mounted push-button	4,0
With external pendant switch	4,0
With electrical overload protection	4,0
With external wall-mounted push-button and electrical overload protection	4,0
With external pendant switch and electrical overload protection	4,0

The controls are also available in single-phase and D.C. design upon request

## Ordering details

**ELA -**  **1**  **.1**  **-**  **2**  **-**  **3**  **-**  **4**  **-**  **5**  **6**  **7**  **8**  **9**  **10** **Options**  **-**  **.....**

<p><b>1 Size</b> _____ 10/20/30/40</p> <p><b>2 Screw</b> _____ Tr (standard)/Ku</p> <p><b>3 Ratio</b> _____ H/V/N/L</p> <p><b>4 Nominal stroke</b> _____ stroke (mm)</p> <p><b>5 Motor</b> _____</p> <p>_____ 1 = Three-phase-400VAC</p> <p>_____ 2 = Three-phase-400VAC+brake</p> <p>_____ 3 = Single-phase-230VAC</p> <p>_____ 4 = Single-phase-230VAC+brake</p> <p>_____ 5 = D.C. 24VDC</p> <p>_____ 6 = D.C. 24VDC+brake</p> <p>_____ 0 = None (except of ELA 10.1)</p> <p><b>6 Motor attachment side</b> _____ 0 = Right side (standard)</p> <p>_____ 1 = Left side</p> <p><b>7 Head</b> _____ 1 = Clevis</p> <p>_____ 2 = Load plate</p> <p>_____ 3 = Rod end</p> <p>_____ 0 = None</p>	<p><b>8 Anti-turn device</b> _____ 0 = Yes</p> <p>_____ 1 = No</p> <p><b>9 Accessories 1</b> _____ 0 = None</p> <p>_____ 1 = Mechanical limit switches</p> <p>_____ 2 = Magnetic limit switches (reed contacts)</p> <p><b>10 Accessories 2</b> _____ 0 = None</p> <p>_____ 1 = 1 Pillow block</p> <p>_____ 2 = 2 Pillow blocks</p> <p>_____ 3 = Side mounting plate</p> <p>_____ 4 = Foot mounting plate</p> <p>_____ 5 = Swivel device</p> <p><b>Other options (as specified) = X</b></p> <p>For example _____ • 2<sup>nd</sup> shaft end on ELA</p> <p>_____ • Free shaft end (without motor)</p> <p>_____ • Flexible protection boot</p> <p>_____ • Shaft encoder</p> <p>_____ • Special motor.....</p> <p>_____ • Control unit H1TM or H1WTM (single-phase design)</p>
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**Please refer to the latest quotation drawings!**





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