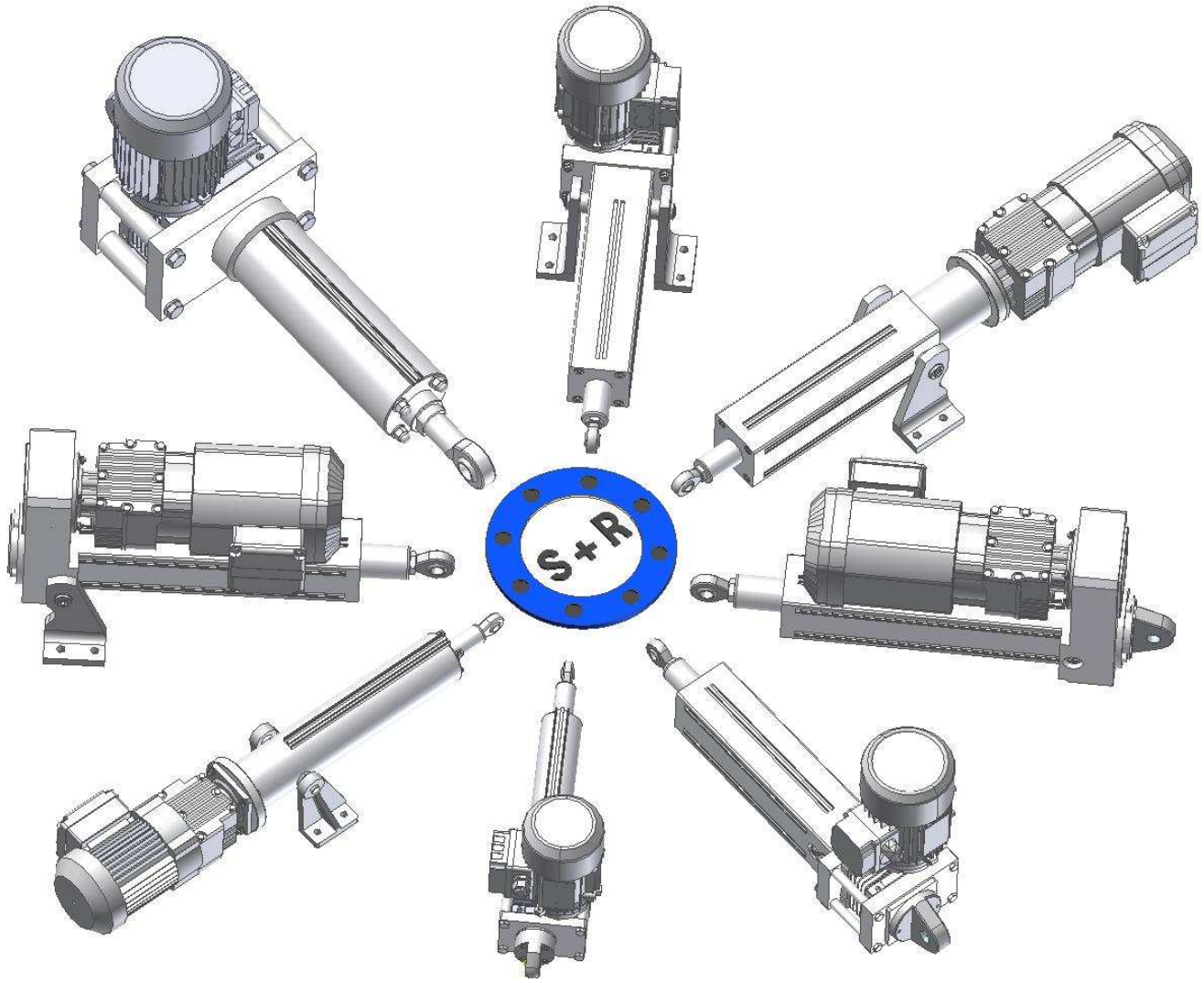
S+R automation systems GmbH

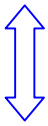
Electric Lifting Cylinder

Flexible in use - Powerful in its application

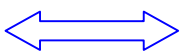
The drive element however **you** want it!



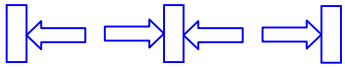
Lifting



Moving



Positioning



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Company profile

S+R automation systems GmbH is a company of the S+R Group with headquarters in Homberg/Ohm, Germany.
We manufacture electric lifting cylinders produced in small batches or according to our customer's needs. For this purpose, we have a standard product range that can be adapted according to the customer. The application areas of our electric lifting cylinders are versatile and include the entire field of mechanical engineering, traffic engineering, industrial applications, structural engineering (e.g. drives for gates and flaps) and many more.
The registered office is located centrally in the middle of Germany along the motorway A5 between Frankfurt and Kassel.

ISO 9001:2008 Certified

Factory building with main offices of S+R automation systems GmbH

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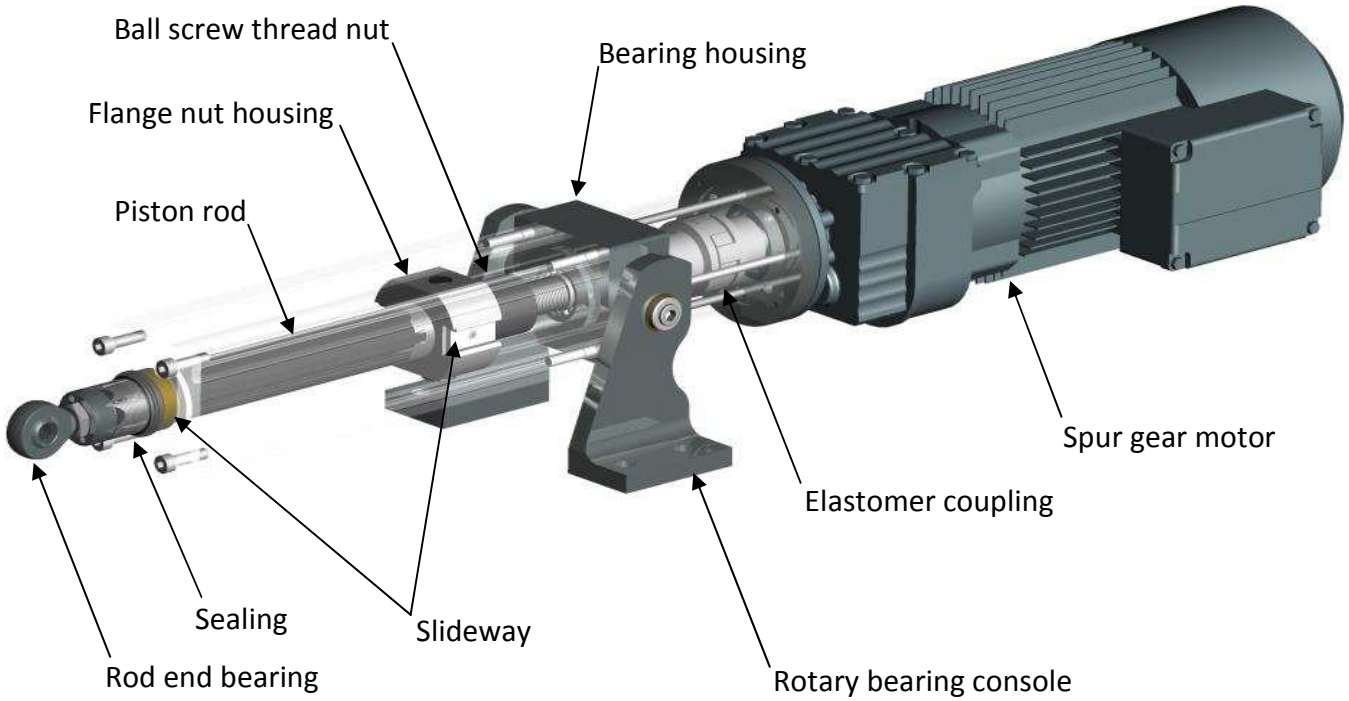
Design and function

An electric lifting cylinder is an electro-mechanical drive unit. A ball screw thread spindle or trapezoidal thread spindle are driven by an electric motor and produce a linear adjustment force. The electric lifting cylinders are offered in different designs and can be produced according to customer requirements. The difference betwen the designs is the connection between motor and threaded spindle. Spur gears, worm gears and toothed belt drives are used, for example.

Functional description using an electric lifting cylinder KV-20AP as an example

A spur gear motor drives the ball screw thread spindle via an elastomer coupling. This is fixed in the bearing house via ball bearings. The ball screw thread nut converts the rotational motion of the threaded spindle to a linear motion. The ball screw thread nut is connected to the piston rod via the nut housing. The piston rod is guided in a sealing ring and slideway. The nut housing has sliding bearings and is secured against twisting. Swivel bearing consoles on the bearing housing and a rod end bearing on the piston rod are used for fixing.



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Screw drive features

Ball screw threads or trapezoidal threads can be used depending on the application.

	Ball screw thread	Trapezoidal thread
Duty cycle > 50%	suitable	unsuitable
Adjustment velocity > 50 mm/s	suitable	partially suitable
hard impacts	unsuitable	partially suitable
Efficiency	> 85 %	< 40 %
Positioning accuracy	± 0.05 mm	± 0.3 mm
Operating temperature	-20 to +70 °C	-20 to +70 °C

When should ball screw threads be used:

- high adjustment velocities
- high duty cycles
- high required repetition accuracy
- high dynamic application
- high required affectivity

When should trapezoidal screw threads be used:

- low adjustment velocities
- low duty cycles
- applications with impacts
- cost-effective applications

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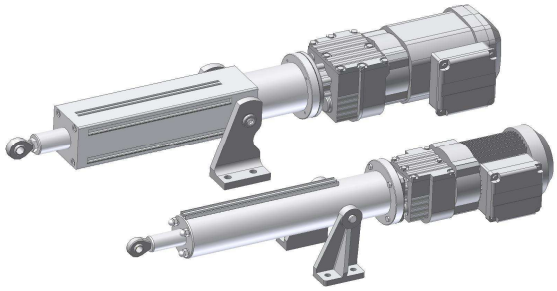
Type overview

Electric lifting cylinders are offered in three designs with different fixing possibilities. Depending on the requirements, these can be equipped with additional options.

Model A

Ball screw thread or trapezoidal thread
The motor is connected directly to the threaded spindle via a coupling

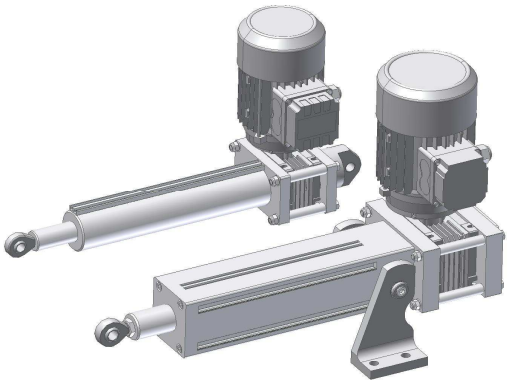
Fixing via the rod end bearing and rotary bearing console or according to customer requirements



Model S

Ball screw thread or trapezoidal thread
The motor is connected to the threaded spindle via a worm gear

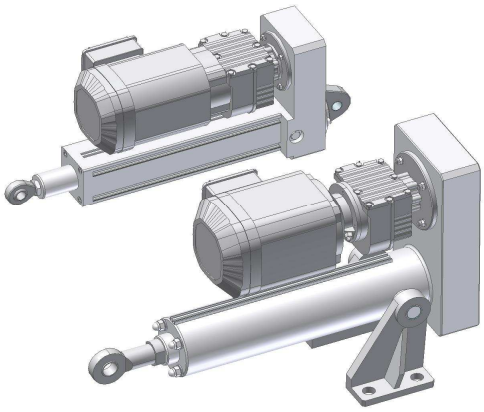
Depending on the type, fixing via the rod end bearing and rotary bearing console or rod end bearing and eye



Model X

Ball screw thread or trapezoidal thread
The motor is connected to the threaded spindle via a toothed belt drive

Depending on the type, fixing via the rod end bearing and rotary bearing console or rod end bearing and eye



S+R electric lifting cylinder can be supplied with ATEX certification.

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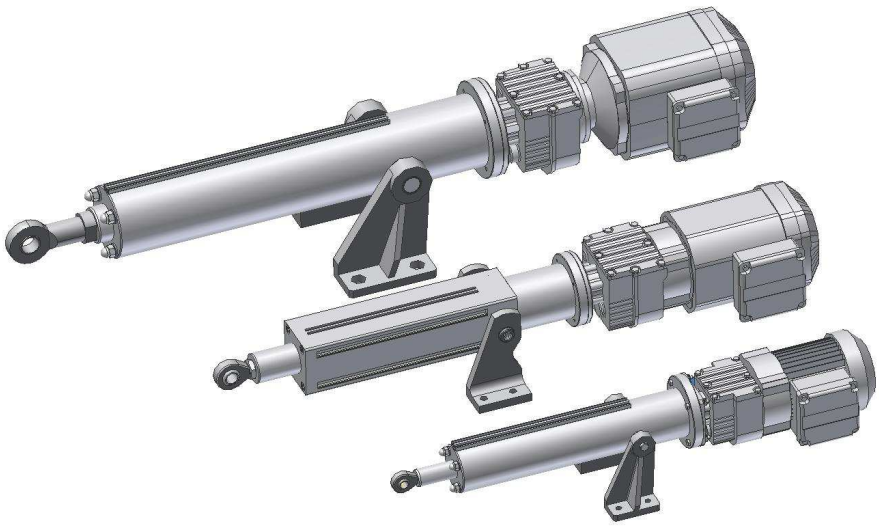
Series A



The main feature of the "A" series is the use of motors that, in the versions gear, servo or stepping motor drive, are mounted to the cylinder in an axial direction via the coupling.
Two design versions are available. A quadratic aluminium profile is used for the design sizes KV/TV – 20/30 AP, all other design sizes have a round housing.
Different mounting options can be supplied. By default, a rod end bearing on the piston rod and rotary bearing console are offered. Customer specific fixing points are also possible as an alternative.
This cylinder has been designed for the difficult operation and ambient conditions in the industry. The lifting cylinders are fully encapsulated and can be mounted in any installation position outdoors as well as in rooms with a high degree of soiling or in areas with potentially explosive atmosphere. The switching is generally carried out using an adjustable limit switch or, upon request, using an overload coupling. The attachment of a sender or potentiometer is also possible as well as the delivery with positioning or synchronizer control. The cylinders are practically maintenance-free.

Adjustment force	up to 500 kN
Velocity	up to 500 mm/s
Adjustment path	up to 3,000 mm
Duty cycle	up to 100%
Protection class	IP 65 or higher
Options	Limit switch
	Overload couplings
	Sender systems
	Controls
	Ex version
	Stainless steel version

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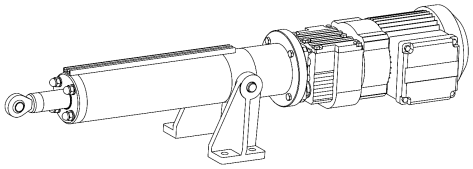
Type overview A Series

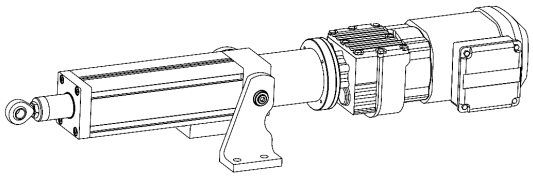
Standard product range

Fixing:
Rod end bearing - pivot bearing foot

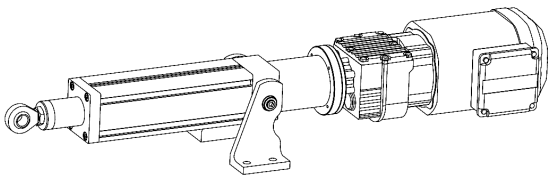
Type designation:	**KV-10 AE**	**TV-10 AE**
Spindle version:	**Ball screw thread**	**Trapezoidal thread**
Adjustment force:	3,000 N to 5,000 N	5,000 N to 7,000 N
Velocity:	15 mm/s to 56 mm/s	5 mm/s to 24 mm/s
Stroke length:	10 mm to 1,000 mm	10 mm to 1,000 mm
Duty cycle:	100 %	40 %
Protection class:	IP 65 or higher	IP 65 or higher



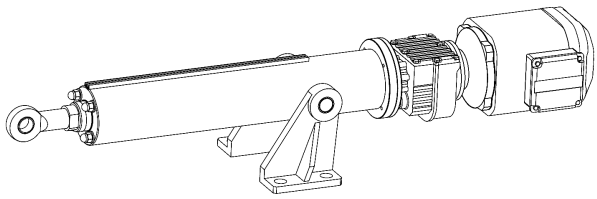
Type designation:	**KV-20 AP**	**TV-20 AP**
Spindle version:	**Ball screw thread**	**Trapezoidal thread**
Adjustment force:	5,000 N to 15,000 N	10,000 N to 15,000 N
Velocity:	15 mm/s to 93 mm/s	5 mm/s to 23 mm/s
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm
Duty cycle:	100 %	40 %
Protection class:	IP 65 or higher	IP 65 or higher



Type designation:	**KV-30 AP**	**TV-30 AP**
Spindle version:	**Ball screw thread**	**Trapezoidal thread**
Adjustment force:	15,000 N to 25,000 N	20,000 N to 25,000 N
Velocity:	15 mm/s to 334 mm/s	5 mm/s to 25 mm/s
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm
Duty cycle:	100 %	40 %
Protection class:	IP 65 or higher	IP 65 or higher



Type designation:	**KV-50 AE**	**TV-50 AE**
Spindle version:	**Ball screw thread**	**Trapezoidal thread**
Adjustment force:	22. 00 N to 50,000 N	30,000 N to 50,000 N
Velocity:	15 mm/s to 93 mm/s	12 mm/s to 25 mm/s
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm
Duty cycle:	100 %	40 %
Protection class:	IP 65 or higher	IP 65 or higher



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Data sheet A Series

with ball screw thread

Duty cycle 100 %, no self-locking
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed
KV-10 AE	K 20 x 5	3,000 N	56 mm / s	RF07 DR63M2 0.25 kW	674 rpm
		4,000 N	28 mm / s	RF07 DR63M4 0.18 kW	334 rpm
		5,000 N	15 mm / s	RF07 DT56L4 0.12 kW	174 rpm
KV-20 AP	K 25 x 25	5,000 N	274 mm / s	RF27DT90L2 2.2 kW	658 rpm
	K 25 x 10	10,000 N	93 mm / s	RF27DT90S2 1.5 kW	560 rpm
			52 mm / s	RF17DRS80S4 0.75 kW	313 rpm
	K 25 x 5	15,000 N	25 mm / s	RF17DRS71M4 0.55 kW	306 rpm
			15 mm / s	RF17DRS71S4 0.37 kW	183 rpm
KV- 30 AP	K32 x 40	5,000 N	334 mm / s	RF27DV100M2 3.0 kW	500 rpm
	K 32 x 10	15,000 N	94 mm / s	RF27DT90L2 2.2 kW	562 rpm
			47 mm / s	RF27DRS80M4 1.1 kW	282 rpm
		25,000 N	23 mm / s	RF17DRS80S4 0.75 kW	139 rpm
			15 mm / s	RF17DRS71M4 0.55 kW	87 rpm
	K 32 x 5	17,000 N	15 mm / s	RF17DRS71S4 0.37 kW	183 rpm

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Data sheet A Series

with ball screw thread

Duty cycle 100 %, no self-locking
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed
KV-50 AE	K 50 x 10	22,000 N	93 mm / s	RF27DV100M2 3.0 kW	560 rpm
		35,000 N	45 mm / s	RF27DT90L2 2.2 kW	277 rpm
		50,000 N	23 mm / s	RF27DRS90M4 1.5 kW	138 rpm
			15 mm / s	RF27DRS80M4 1.1 kW	90 rpm

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Data sheet A Series

with trapezoidal screw thread

Duty cycle < 40 %
A selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed
TV-10 AE	Tr 20 x 4	5,000 N	24 mm / s	RF17 DRS71S4 0.37 kW	360 rpm
		6,000 N	10 mm / s	RF07 DR63M4 0.18 kW	146 rpm
		7,000 N	5 mm / s	RF07 DT56L4 0.12 kW	78 rpm
TV-20 AP	Tr 26 x 5	10,000 N	23 mm / s	RF17DRS80S4 0.75 kW	277 rpm
		12,000 N	10 mm / s	RF17DRS71S4 0.37 kW	121 rpm
		15,000 N	5 mm / s	RF17DR63L4 0.25 kW	66 rpm
TV- 30 AP	Tr 36 x 6	20,000 N	25 mm / s	RF27DRS90M4 1.5 kW	250 rpm
		25,000 N	10 mm / s	RF17DRS80S4 0.75 kW	102 rpm
			5 mm / s	RF17DRS71M4 0.37 kW	49 rpm
TV-50 AE	Tr 40 x 7	30,000 N	25 mm / s	RF27DRS90L4 2.2 kW	212 rpm
		30,000 N	12 mm / s	RF27DRS80M4 1.1 kW	106 rpm
	Tr 48 x 8	30,000 N	40 mm / s	RF47DRS100L4 4.0 kW	300 rpm
		50,000 N	20 mm / s	RF37DRS100M4 3.0 kW	148 rpm
			12 mm / s	RF37DRS90L4 2.2 kW	90 rpm

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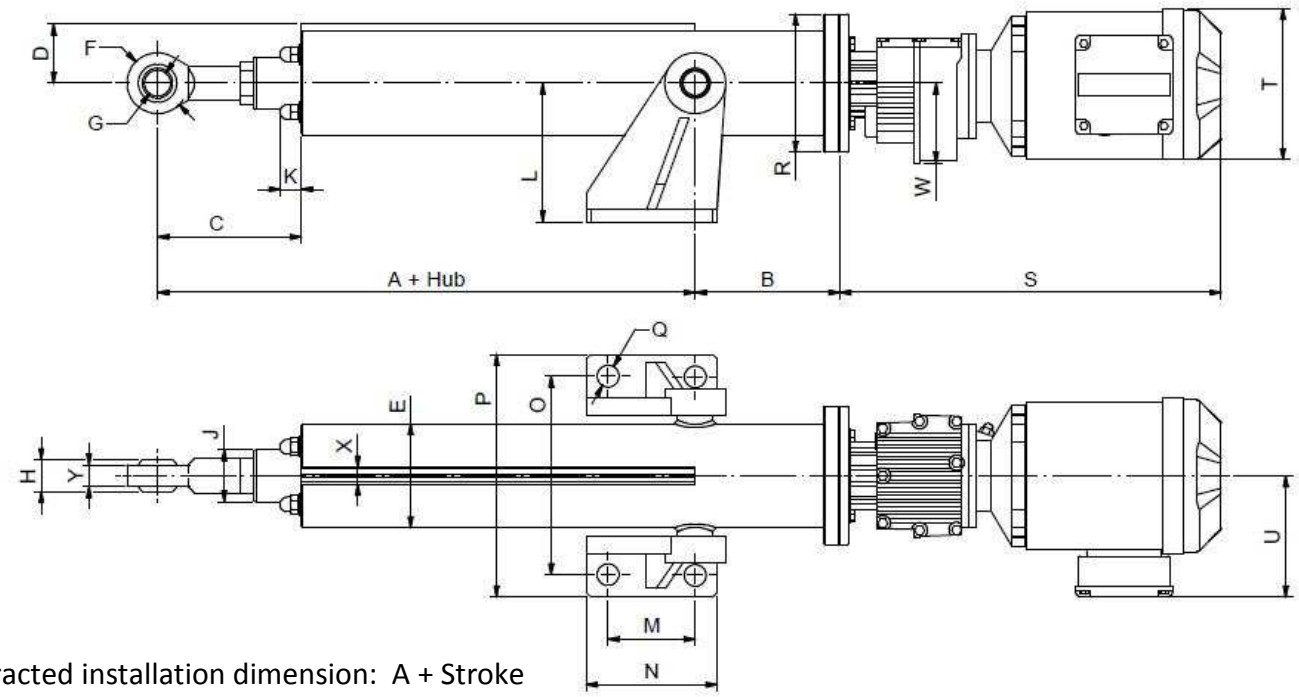
Dimensional sheet A Series

Version: rod end bearing - rotary bearing console
Standard product range



Retracted installation dimension: A + Stroke
Extracted installation dimension: A + 2xStroke, C + Stroke

Type	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	X	Y
TV-10AE	189	104	89	48	Ø80	36	Ø14	19	Ø30	17	110	50	80	149	184	11	Ø120	20	13.5
KV-10AE	238	104	86	48	Ø80	36	Ø14	19	Ø30	17	110	50	80	149	184	11	Ø120	20	13.5
TV-20AP	215	147	94	/	□90	42	Ø16	21	Ø40	/	110	50	90	193	228	13	Ø120	/	15
KV-20AP	265	147	78	/	□90	42	Ø16	21	Ø40	/	110	50	90	193	228	13	Ø120	/	15
TV-30AP	245	147	113	/	□90	50	Ø20	25	Ø50	/	110	50	90	193	228	13	Ø120	/	18
KV-30AP	294	147	86	/	□90	50	Ø20	25	Ø50	/	110	50	90	193	228	13	Ø120	/	18
TV-50AE	375	166*	135	68	Ø120	70	Ø30	37	Ø60	25	160	100	150	230	280	25	Ø160	20	25
KV-50AE	417	166*	135	68	Ø120	70	Ø30	37	Ø60	25	160	100	150	230	280	25	Ø160	20	25

Motor	S	T	U	W
RF07 DT56	269	Ø109	87	68
RF07 DT56 Brake	305			
RF07 DR63	300	□132	105	
RF07 DR63 Brake	355			
RF17 DR63	324	□132	105	76
RF17 DR63 Brake	379			
RF17 DRS71	360	□139	119	
RF17 DRS71 Brake	428		129	
RF17 DRS80	360	□156	128	
RF17 DRS80 Brake	428		139	

Motor	S	T	U	W
RF27DRS80	417	□156	128	92
RF27 DRS80 Brake	498		139	
RF27 DRS90	440	□179	140	
RF27 DRS90 Brake	534		150	
RF37 DRS90	448	□179	140	94
RF37 DRS90 Brake	542		150	
RF37 DRS100	478	□197	158	
RF37 DRS100 Brake	572			
RF47 DRS100	517			118
RF47 DRS100 Brake	611			

* Dimension B with gear RF47 is… = 176 mm

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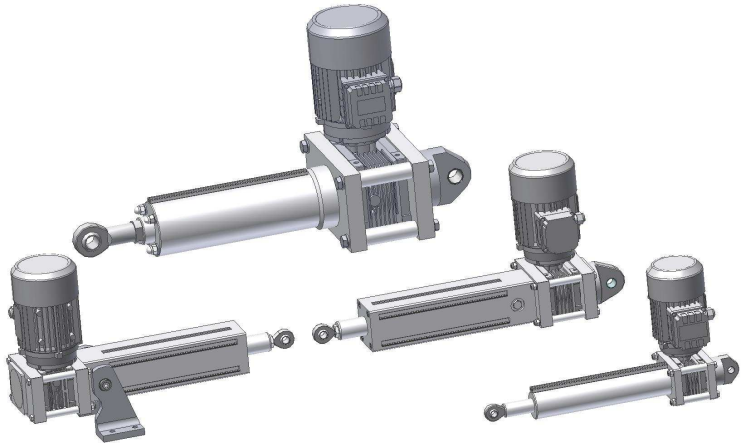
Series S



The main feature of the "S" series is the use of a worm gear that allows the mounting of a three-phase motor, DC motor, servo motor or stepping motor.
Two design versions are available. A quadratic aluminium profile is used for the design sizes KV/TV – 20/30 SP, all other design sizes have a round housing.
Different mounting options can be supplied. By default, the round housing design are offered with a rod end bearing on the piston rod and a flanged eye are offered. The types with a quadratic profile tube can be supplied with an eye or a rotary bearing console. Customer specific fixing points are also possible as an alternative.
This cylinder has been designed for the difficult operation and ambient conditions in the industry. The lifting cylinders are fully encapsulated and can be mounted in any installation position outdoors as well as in rooms with a high degree of soiling or in areas with potentially explosive atmosphere. The switching is generally carried out using an adjustable limit switch or, upon request, using an overload coupling. The attachment of a sender or potentiometer is also possible as well as the delivery with positioning or synchronizer control. The cylinders are practically maintenance-free.

Adjustment force	up to 500 kN
Velocity	up to 500 mm/s
Adjustment path	up to 3,000 mm
Duty cycle	up to 100%
Protection class	IP 65 or higher
Options	Limit switch
	Overload couplings
	Sender systems
	Controls
	Ex version
	Stainless steel version

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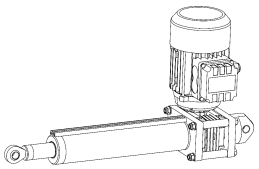
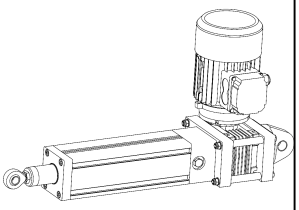
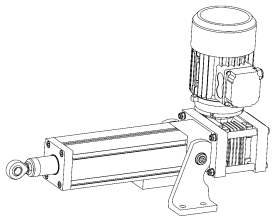
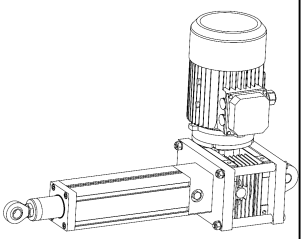
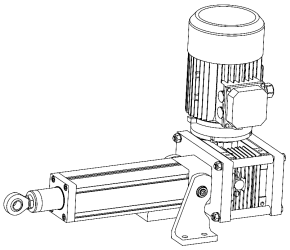
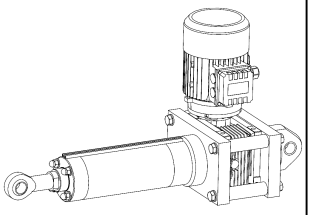
Type overview S Series

Standard product range

			Version: rod end bearing – bearing eye	Version: rod end bearing - bearing console
Type designation:	**KV-5 SE**	**TV-5 SE**		
Spindle version:	**Ball screw thread**	**Trapezoidal thread**		On request
Adjustment force:	Up to 5,000 N	2,500 N to 7,000 N		
Velocity:	11 mm/s to 45 mm/s	6 mm/s to 36 mm/s		
Stroke length:	10 mm to 1,000 mm	10 mm to 1,500 mm		
Duty cycle:	100 %	25 %		
Protection class:	IP 65 or higher	IP 65 or higher		
Type designation:	**KV-20 SP**	**TV-20 SP**		
Spindle version:	**Ball screw thread**	**Trapezoidal thread**		
Adjustment force:	5,000 N to 15,000 N	4,500 N to 15,000 N		
Velocity:	12 mm/s to 77 mm/s	8 mm/s to 47 mm/s		
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm		
Duty cycle:	100 %	25 %		
Protection class:	IP 65 or higher	IP 65 or higher		
Type designation:	**KV-30 SP**	**TV-30 SP**		
Spindle version:	**Ball screw thread**	**Trapezoidal thread**		
Adjustment force:	6,000 N to 17,000 N	15,000 N to 25,000 N		
Velocity:	12 mm/s to 120 mm/s	6 mm/s to 38 mm/s		
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm		
Duty cycle:	100 %	25 %		
Protection class:	IP 65 or higher	IP 65 or higher		
Type designation:	**KV-50 SE**	**TV-50 SE**		
Spindle version:	**Ball screw thread**	**Trapezoidal thread**		On request
Adjustment force:	22,000 N to 50,000 N	25,000 N to 50,000 N		
Velocity:	16 mm/s to 63 mm/s	9 mm/s to 22 mm/s		
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm		
Duty cycle:	100 %	25 %		
Protection class:	IP 65 or higher	IP 65 or higher		

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Data sheet S Series

with ball screw thread

Duty cycle 100 %, no self-locking
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed Gear reduction ratio
KV- 5 SE	K 20 x 5	5,000 N	45 mm / s	IEC 63-2 0.37 kW	550 rpm i=5
			23 mm / s	IEC 63-4 0.18 kW	270 rpm i=5
			11mm / s	IEC 63-4 0.12 kW	135 rpm i=10
KV-20 SP	K 25 x 25	5,000 N	77 mm / s	IEC 71-4 0.75 kW	185 rpm i=7.5
	K 25 x 10	10,000 N	46 mm / s	IEC 71-4 0.75 kW	280 rpm i=5
			23 mm / s	IEC 71-4 0.37 kW	140 rpm i=10
	K 25 x 5	15,000 N	23 mm / s	IEC 71-4 0.55 kW	280 rpm i=5
			12 mm / s	IEC 71-4 0.37 kW	140 rpm i=10
KV- 30 SP	K32 x 40	6,000 N	120 mm / s	IEC 90-4 1.1 kW	180 rpm i=7.5
	K 32 x 10	15,000 N	63 mm / s	IEC 80-2 1.5 kW	380 rpm i=7.5
			32 mm / s	IEC 80-4 0.75 kW	190 rpm i=7.5
		25,000 N	31 mm / s	IEC 90-4 1.5 kW	185 rpm i=7.5
			16 mm / s	IEC 80-4 0.75 kW	95 rpm i=15
	K 32 x 5	17,000 N	12 mm / s	IEC 71-4 0.37 kW	140 rpm i=10

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Data sheet S Series

with ball screw thread

Duty cycle 100 %, no self-locking
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed reduction ratio
KV-50 SE	K 50x10	22,000 N	63 mm / s	IEC 90-2 2.2 kW	380 rpm i=7.5
		40,000 N	31 mm / s	IEC 90-4 1.8 kW	185 rpm i=7.5
		50,000 N	23 mm / s	IEC 90-4 1.8 kW	140 rpm i=10
			16 mm / s	IEC 90-4 1.5 kW	95 rpm i=15

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Data sheet S Series

with trapezoidal screw thread

Duty cycle < 40 %
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed gear ratio
TV- 5 SE	Tr 20 x 4	2,500 N	36 mm / s	IEC 63-2 0.37 kW	546 rpm i=5
		3,000 N	18 mm / s	IEC 63-4 0.22 kW	274 rpm i=5
		5000 N	12 mm / s	IEC 63-4 0.22 kW	183 rpm i=7.5
		6,000 N	9 mm / s	IEC 63-4 0.22 kW	137 rpm i=10
		7,000 N	6 mm / s	IEC 63-4 0.18 kW	91 rpm i=15
TV-20 SP	Tr 26 x 5	4,500 N	47 mm / s	IEC 71-2 0.75 kW	568 rpm i=5
		6,500 N	23 mm / s	IEC 71-4 0.55 kW	278 rpm i=5
		9,500 N	15 mm / s	IEC 71-4 0.55 kW	185 rpm i=7.5
		12,000 N	12 mm / s	IEC 71-4 0.55 kW	139 rpm i=10
		15,000 N	8 mm / s	IEC 71-4 0.55 kW	93 rpm i=15

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Data sheet S Series

with trapezoidal screw thread

Duty cycle < 40 %
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed gear ratio
TV- 30 SP	Tr 36 x 6	15,000 N	38 mm / s	IEC 90-2 2.2 kW	379 rpm i=7.5
		21,000 N	19 mm / s	IEC 90-4 1.5 kW	187 rpm i=7.5
		25,000 N	14 mm / s	IEC 90-4 1.5 kW	140 rpm i=10
			10 mm / s	IEC 90-4 1.1 kW	92 rpm i=15
			6 mm / s	IEC 80-4 0.75 kW	57 rpm i=20
TV-50 SE	Tr 40 x 7	25,000 N	22 mm / s	IEC 100-4 2.2 kW	188 rpm i=7.5
		30,000 N	16 mm / s	IEC 100-4 2.2 kW	141 rpm i=10
			8 mm / s	IEC 90-4 1.1 kW	69 rpm i=20
	Tr 48 x 8	32,000 N	25 mm / s	IEC 100-4 3.0 kW	190 rpm i=7.5
		42,000 N	19 mm / s	IEC 100-4 3.0 kW	142 rpm i=10
		50,000 N	9 mm / s	IEC 100-4 2.2 kW	70 rpm i=20

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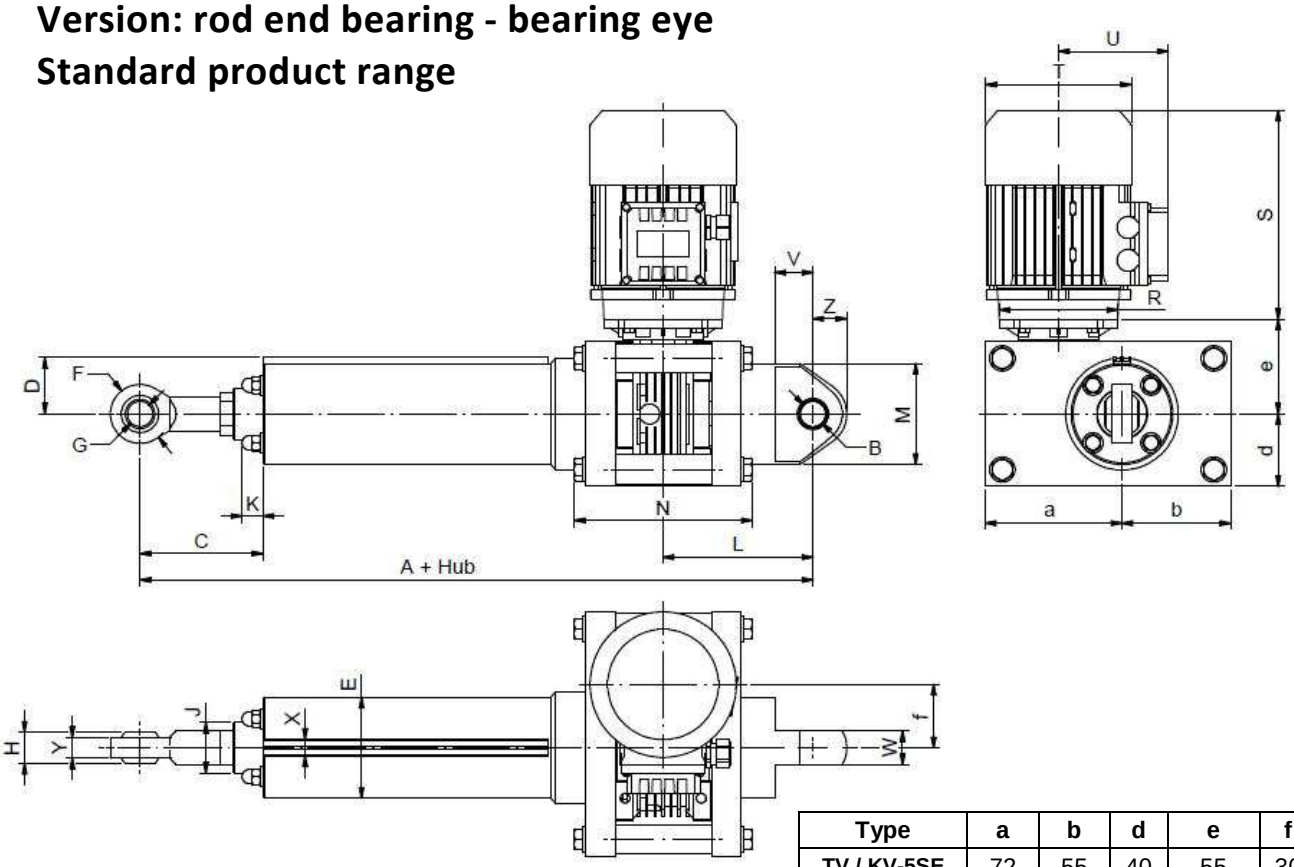
Dimensional sheet S Series

Version: rod end bearing - bearing eye
Standard product range



Type	a	b	d	e	f
TV / KV-5SE	72	55	40	55	30
TV / KV-20SP	90	70	50	70	40
TV / KV-30SP	134	98	72	109	63
TV / KV-50SE	166	129	89	126.5	75

Retracted installation dimension: A + Stroke
Extracted installation dimension: A + 2xStroke, C + Stroke

Type	A	B	C	D	E	F	G	H	J	K	L	M	N	V	W	X	Y	Z
TV-5SE	319	Ø14	87	38	Ø60	36	Ø14	19	Ø30	/	91	Ø60	116	20	20	20	13.5	20
KV-5SE	354	Ø14	87	38	Ø60	36	Ø14	19	Ø30	/	91	Ø60	116	20	20	20	13.5	20
TV-20SP	430	Ø20	94	/	□90	42	Ø16	21	Ø40	/	113	Ø90	150	30	25	/	15	15
KV-20SP	480	Ø20	78	/	□90	42	Ø16	21	Ø40	/	113	Ø90	150	30	25	/	15	15
TV-30SP	493	Ø20	113	/	□90	50	Ø20	25	Ø50	/	130	Ø90	190	30	25	/	18	15
KV-30SP	542	Ø20	86	/	□90	50	Ø20	25	Ø50	/	130	Ø90	190	30	25	/	18	15
TV-50SE	695	Ø30	135	68	Ø120	70	Ø30	37	Ø60	25	177	Ø120	210	45	40	20	25	40
KV-50SE	761	Ø30	135	68	Ø120	70	Ø30	37	Ø60	25	177	Ø120	210	45	40	20	25	40

Motor	S	T	U	R
IEC 63	188	Ø121	104	Ø90
IEC63 Brake	246			
IEC 71	209	Ø139	112	Ø105
IEC 71 Brake	273			
IEC 80	232	Ø158	122	Ø120
IEC 80 Brake	304			

Motor	S	T	U	R
IEC 90	273	Ø173	130	Ø140
IEC 90 Brake	350			
IEC 100	308	Ø191	139	Ø160
IEC 100 Brake	390			

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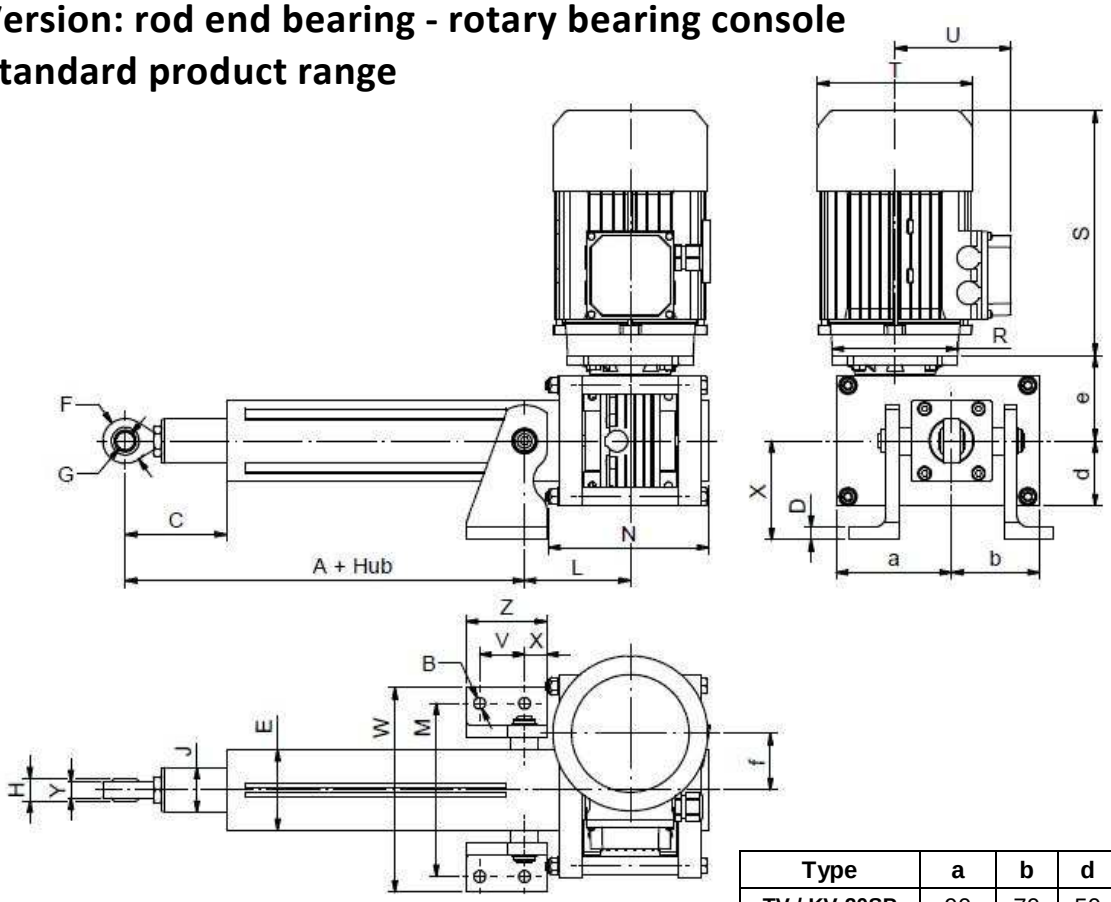
Dimensional sheet S Series

Version: rod end bearing - rotary bearing console

Standard product range



Type	a	b	d	e	f
TV / KV-20SP	90	70	50	70	40
TV / KV-30SP	134	98	72	109	63

Retracted installation dimension: A + Stroke
Extracted installation dimension: A + 2xStroke, C + Stroke

Type	A	B	C	D	E	F	G	H	J	L	M	N	V	W	X	Y	Z
TV-20SP	215	Ø13	94	14	□90	42	Ø16	21	Ø40	101	193	150	50	228	25	15	90
KV-20SP	265	Ø13	78	14	□90	42	Ø16	21	Ø40	101	193	150	50	228	25	15	90
TV-30SP	245	Ø13	113	14	□90	50	Ø20	25	Ø50	117	193	190	50	228	25	18	90
KV-30SP	294	Ø13	86	14	□90	50	Ø20	25	Ø50	117	193	190	50	228	25	18	90

Motor	S	T	U	R
IEC 63	188	Ø121	104	Ø90
IEC63 Brake	246			
IEC 71	209	Ø139	112	Ø105
IEC 71 Brake	273			
IEC 80	232	Ø158	122	Ø120
IEC 80 Brake	304			

Motor	S	T	U	R
IEC 90	273	Ø173	130	Ø140
IEC 90 Brake	350			
IEC 100	308	Ø191	139	Ø160
IEC 100 Brake	390			

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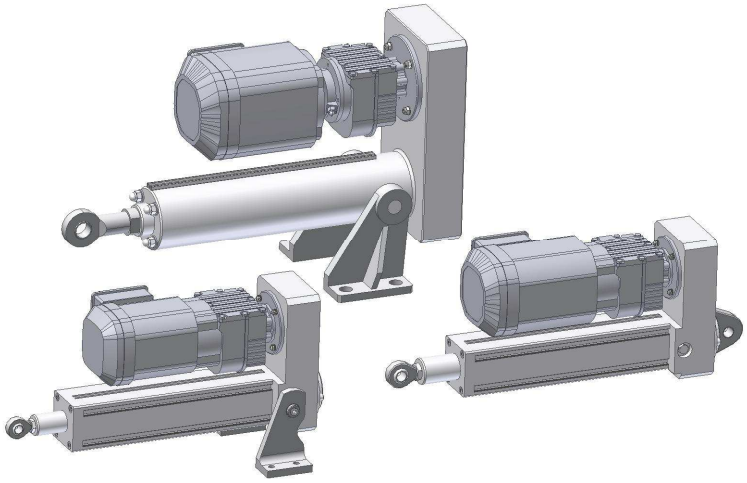
Series X



The main feature of the "X" series is the use of motors that, in the versions gear, servo or stepping motor, drive the spindle via a toothed belt or a chain. This arrangement allows a very compact installation dimension.
Two design versions are available. A quadratic aluminium profile is used for the design sizes KV/TV – 20/30 XP, all other design sizes have a round housing.
Different mounting options can be supplied. By default, the round housing design are offered with a rod end bearing on the piston rod and rotary bearing console. The types with a quadratic profile tube can be supplied with an eye or a rotary bearing console. Customer specific fixing points are also possible as an alternative.
This cylinder has been designed for the difficult operation and ambient conditions in the industry. The lifting cylinders are fully encapsulated and can be mounted in any installation position outdoors as well as in rooms with a high degree of soiling or in areas with potentially explosive atmosphere. The switching is generally carried out using an adjustable limit switch or, upon request, using an overload coupling. The attachment of a sender or potentiometer is also possible as well as the delivery with positioning or synchronizer control. The cylinders are practically maintenance-free.

Adjustment force	up to 100 kN
Velocity	up to 500 mm/s
Adjustment path	up to 3,000 mm
Duty cycle	up to 100%
Protection class	IP 65 or higher
Options	Limit switch
	Overload couplings
	Sender systems
	Controls
	Ex version
	Stainless steel version

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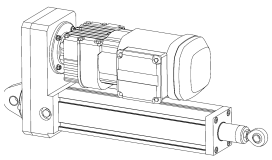
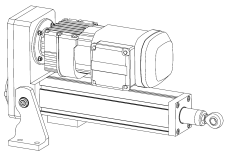
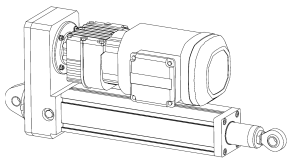
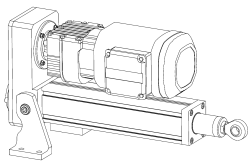
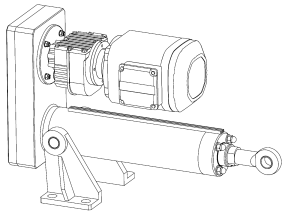
Type overview X Series

Standard product range

			Version: rod end bearing – bearing eye	Version: rod end bearing - bearing console
Type designation:	**KV-20 XP**	**TV-20 XP**		
Spindle version:	**Ball screw thread**	**Trapezoidal thread**		
Adjustment force:	5,000 N to 15,000 N	10,000 N to 15,000 N		
Velocity:	15 mm/s to 274 mm/s	5 mm/s to 23 mm/s		
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm		
Duty cycle:	100 %	25 %		
Protection class:	IP 65 or higher	IP 65 or higher		
Type designation:	**KV-30 XP**	**TV-30 XP**		
Spindle version:	**Ball screw thread**	**Trapezoidal thread**		
Adjustment force:	15,000 N to 25,000 N	20,000 N to 25,000 N		
Velocity:	15 mm/s to 334 mm/s	5 mm/s to 25 mm/s		
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm		
Duty cycle:	100 %	25 %		
Protection class:	IP 65 or higher	IP 65 or higher		
Type designation:	**KV-50 XP**	**TV-50 XP**	On request	
Spindle version:	**Ball screw thread**	**Trapezoidal thread**		
Adjustment force:	22,000 N to 50,000 N	30,000 N to 50,000 N		
Velocity:	15 mm/s to 93 mm/s	12 mm/s to 40 mm/s		
Stroke length:	10 mm to 1,500 mm	10 mm to 1,500 mm		
Duty cycle:	100 %	25 %		
Protection class:	IP 65 or higher	IP 65 or higher		

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Data sheet X Series

with ball screw thread

Duty cycle 100 %, no self-locking
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed
KV-20 XP	K 25 x 25	5,000 N	274 mm / s	RF27DT90L2 2.2 kW	658 rpm
	K 25 x 10	10,000 N	93 mm / s	RF27DT90S2 1.5 kW	560 rpm
			52 mm / s	RF17DRS80S4 0.75 kW	313 rpm
	K 25 x 5	15,000 N	25 mm / s	RF17DRS71M4 0.55 kW	306 rpm
			15 mm / s	RF17DRS71S4 0.37 kW	183 rpm
KV- 30 XP	K32 x 40	5,000 N	334 mm / s	RF27DV100M2 3.0 kW	500 rpm
	K 32 x 10	15,000 N	94 mm / s	RF27DT90L2 2.2 kW	562 rpm
			47 mm / s	RF27DRS80M4 1.1 kW	282 rpm
		25,000 N	23 mm / s	RF17DRS80S4 0.75 kW	139 rpm
			15 mm / s	RF17DRS71M4 0.55 kW	87 rpm
	K 32 x 5	17,000 N	15 mm / s	RF17DRS71S4 0.37 kW	183 rpm

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Data sheet X Series

with ball screw thread

Duty cycle 100 %, no self-locking
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed
KV-50 XE	K 50 x 10	22,000 N	93 mm / s	RF27DV100M2 3.0 kW	560 rpm
		35,000 N	45 mm / s	RF27DT90L2 2.2 kW	277 rpm
		50,000 N	23 mm / s	RF27DRS90M4 1.5 kW	138 rpm
			15 mm / s	RF27DRS80M4 1.1 kW	90 rpm

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Data sheet X Series

with trapezoidal screw thread

Duty cycle < 40 %
The selection of other forces and velocities can be supplied.

Type	Spindle	Adjustment force	Velocity	Motor Power	Speed
TV-20 XP	Tr 26 x 5	10,000 N	23 mm / s	RF17DRS80S4 0.75 kW	277 rpm
		12,000 N	10 mm / s	RF17DRS71S4 0.37 kW	121 rpm
		15,000 N	5 mm / s	RF17DR63L4 0.25 kW	66 rpm
TV- 30 XP	Tr 36 x 6	20,000 N	25 mm / s	RF27DRS90M4 1.5 kW	250 rpm
		25,000 N	10 mm / s	RF17DRS80S4 0.75 kW	102 rpm
			5 mm / s	RF17DRS71M4 0.37 kW	49 rpm
TV-50 XE	Tr 40 x 7	30,000 N	25 mm / s	RF27DRS90L4 2.2 kW	212 rpm
		30,000 N	12 mm / s	RF27DRS80M4 1.1 kW	106 rpm
	Tr 48 x 8	30,000 N	40 mm / s	RF47DRS100L4 4.0 kW	300 rpm
		50,000 N	20 mm / s	RF37DRS100M4 3.0 kW	148 rpm
			12 mm / s	RF37DRS90L4 2.2 kW	90 rpm

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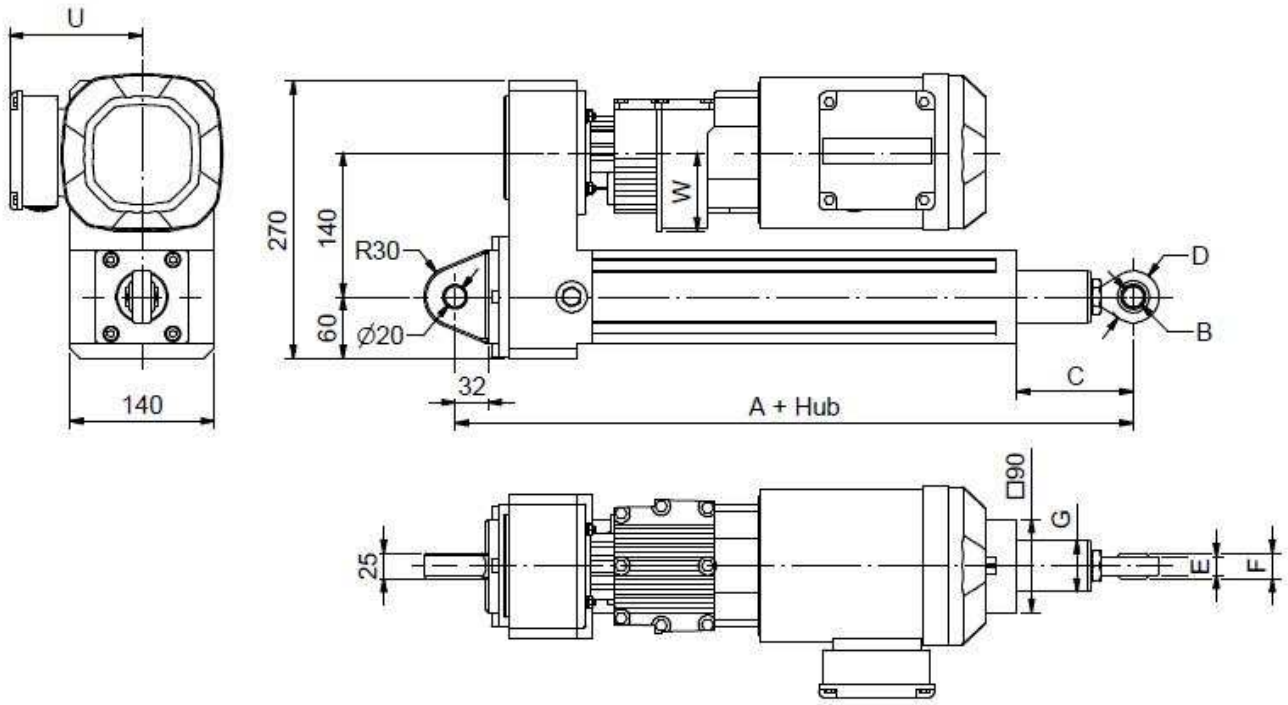
Dimensional sheet XP Series

Version: rod end bearing eye
Standard product range



Retracted installation dimension: A + Stroke
Extracted installation dimension: A + 2xStroke, C + Stroke

Type	A	B	C	D	E	F	G
TV-20XP	328	Ø16	94	42	15	21	Ø40
KV-20XP	378	Ø16	78	42	15	21	Ø40
TV-30XP	358	Ø20	113	50	18	25	Ø50
KV-30XP	410	Ø20	86	50	18	25	Ø50

Motor	S	T	U	W
RF07 DT56	269	Ø109	87	68
RF07 DT56 Brake	305			
RF07 DR63	300	□132	105	
RF07 DR63 Brake	355			
RF17 DR63	324	□132	105	76
RF17 DR63 Brake	379			
RF17 DRS71	360	□139	119	
RF17 DRS71 Brake	428		129	
RF17 DRS80	360	□156	128	
RF17 DRS80 Brake	428		139	

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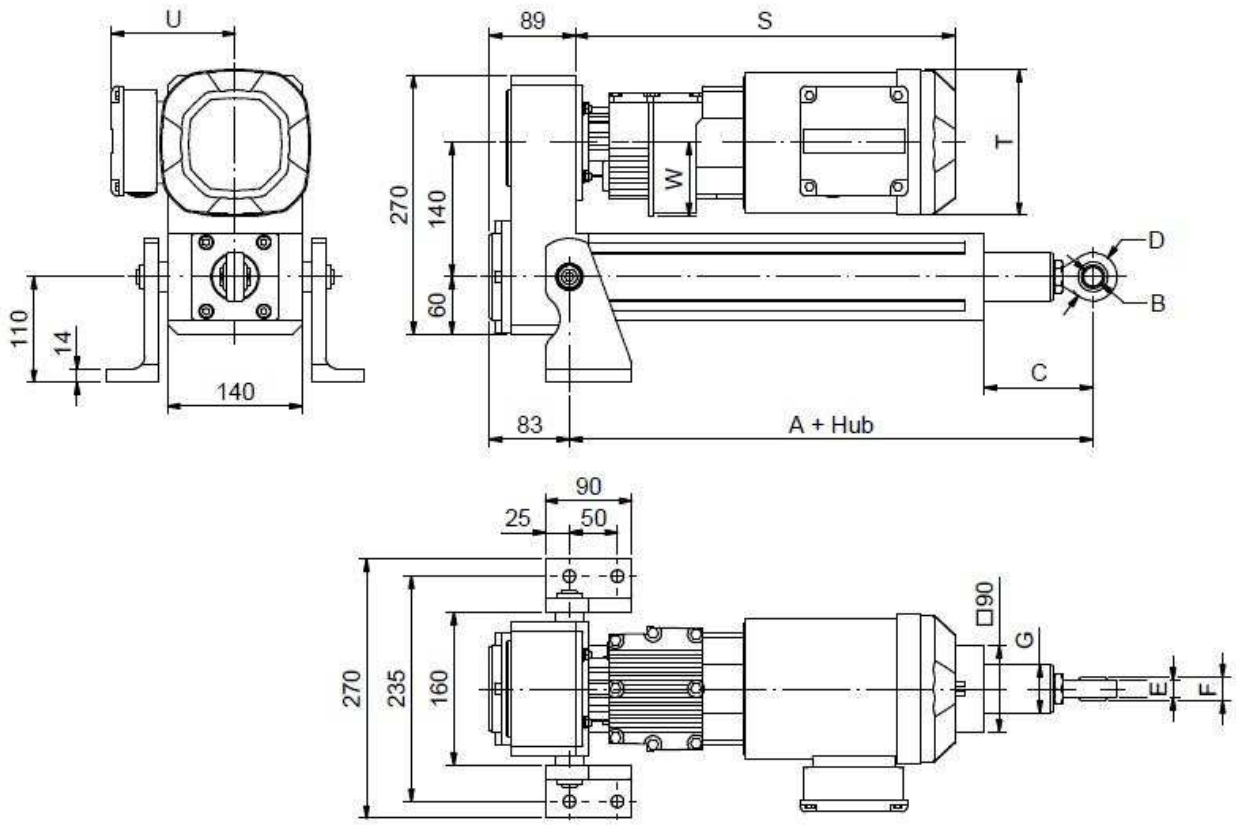
Dimensional sheet XP Series

Version: rod end bearing - rotary bearing console

Standard product range



Retracted installation dimension: A + Stroke
Extracted installation dimension: A + 2xStroke, C + Stroke

Type	A	B	C	D	E	F	G
TV-20XP	215	Ø16	94	42	15	21	Ø40
KV-20XP	265	Ø16	78	42	15	21	Ø40
TV-30XP	245	Ø20	113	50	18	25	Ø50
KV-30XP	294	Ø20	86	50	18	25	Ø50

Motor	S	T	U	W
RF07 DT56	269	Ø109	87	68
RF07 DT56 Brake	305			
RF07 DR63	300	□132	105	
RF07 DR63 Brake	355			
RF17 DR63	324	□132	105	76
RF17 DR63 Brake	379			
RF17 DRS71	360	□139	119	
RF17 DRS71 Brake	428		129	
RF17 DRS80	360	□156	128	
RF17 DRS80 Brake	428		139	

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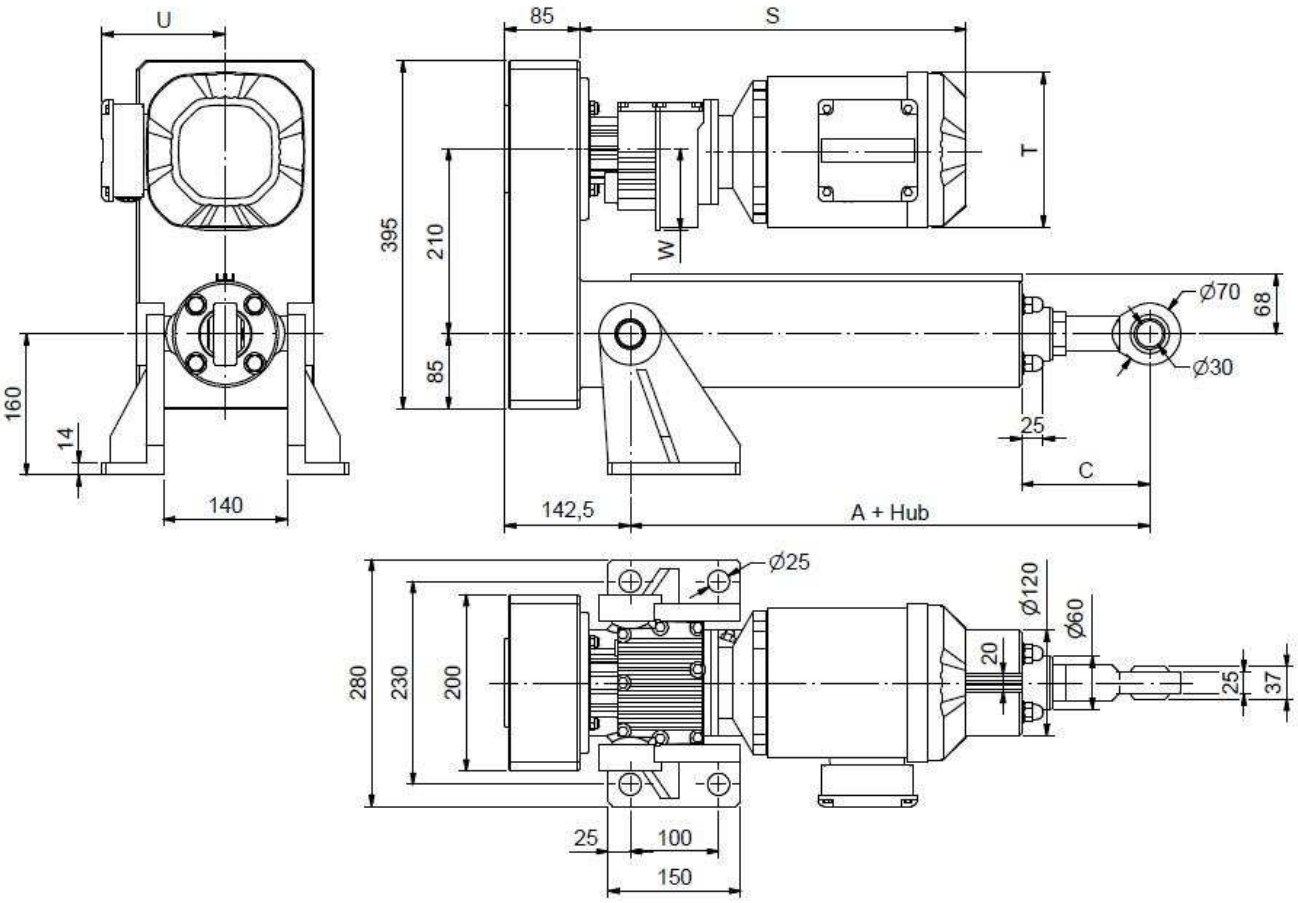
Dimensional sheet XE Series

Version: rod end bearing - rotary bearing console
Standard product range



Retracted installation dimension: A + Stroke
Extracted installation dimension: A + 2xStroke, C + Stroke

Type	A	C
TV-50XE	385	135
KV-50XE	417	135

Motor	S	T	U	W
RF27DRS80	417	□156	128	92
RF27 DRS80 Brake	498		139	
RF27 DRS90	440	□179	140	
RF27 DRS90 Brake	534		150	
RF37 DRS90	448	□179	140	94
RF37 DRS90 Brake	542		150	
RF37 DRS100	478	□197	158	
RF37 DRS100 Brake	572			
RF47 DRS100	517			118
RF47 DRS100 Brake	611			

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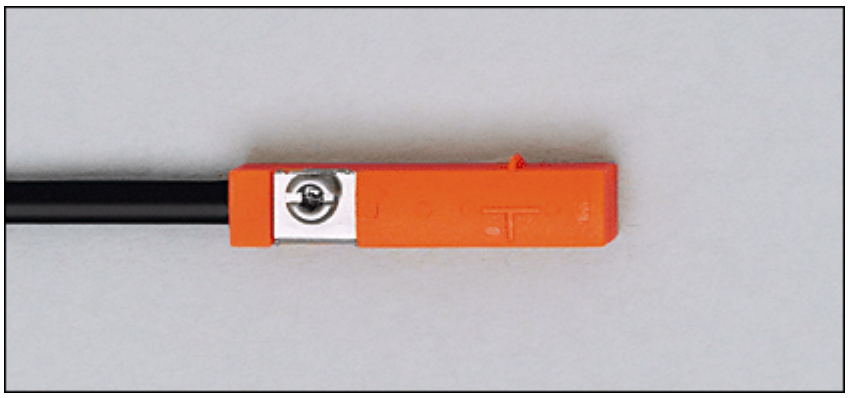
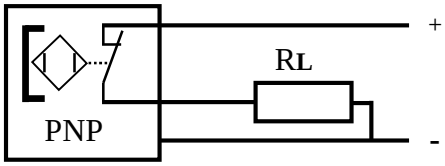
Accessories

A wide range of accessories can be provided for the electric lifting cylinders.
e.g.: Solenoid switch
Gear cam switch
Linear position sensors
Pulse generator
Frequency converter
Controls

Limit switch



All electric lifting cylinders can be equipped with a proximity sensor. These can be adjusted as required and inserted in two grooves on the profile tube. Additional sensors can also be installed for intermediate positions.
Electronic proximity switches with switching status display are used. The internal sensor element is activated magnetically and opens an electric circuit.
The sensor is used for requesting the piston rod position on the electric lifting cylinder.
The solenoid switches are set to the maximum stroke ex-factory and can be subsequently infinitely adjusted. Attention, this is not a safety switch!



10 ... 30V DC
Max. 100mA
Max. 3W

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Magnetic pulse generator

All models of the electric lifting cylinders can be equipped with a magnetic pulse generator. This magnetic pulse generator is carried out using a flange that is installed between the motor and the electric lifting cylinder. It can be used for recording the velocity or the position. The pulse generators work contact-free and are therefore wear and maintenance-free.
Corresponding controls with frequency converters and synchronous run controls can be supplied for the electric lifting cylinder.

Output signals

Both square wave signals A and B have been offset by 90° to each other for recognition of direction. Pulse / pause ration 1:1

The magnetic pulse generators are available with different pulse values. Respective data sheets can be provided.

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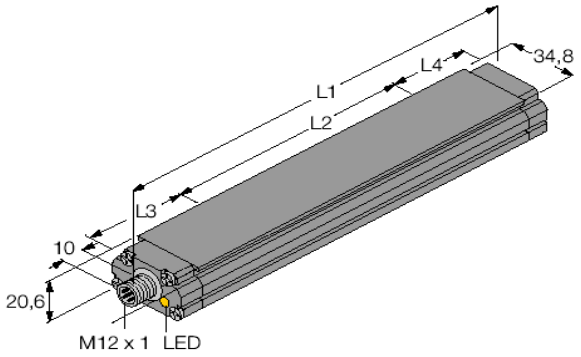
Linear position sensor

All models of the electric lifting cylinders can be equipped with a magnetostrictive linear position sensor. This is fixed in the specially-made groove on the profile tube of the electric lifting cylinder or using the respective brackets on the profile tube. The sensor is operated via a magnet installed in the electric lifting cylinder.



Magnetostrictive linear position sensors with analogue output provide a signal that is proportional to the traversing path. Simple control tasks are thus eliminated in a simple manner. The sensors have a high reproducibility, resolution and linearity.
Due to their extremely sturdy design, these sensors are especially suitable for industrial applications. They are distinguished by the high electro-magnetic compatibility and are stable over a broad temperature range. The sensors work contact-free and are therefore wear and maintenance-free.

The sensor supplies an output signal in the form of voltage variations 4 ... 20mA

- Metal / aluminium housing
- 4 wire, 10 ... 30 VDC
- Programmable measuring path
- Output signal can be inverted
- Current output 4 ... 20 mA
- Switching status display

Attention:
The use of a linear position sensor extends the installation length of the electric lifting cylinder. Please request the respective dimension sheets.

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Project planning

Important details for your request / order

If possible, have our technicians check your applications or make use of our offer to provide you with a comprehensive consultation. We would be more than pleased to take over the dimensioning of the required electric lifting cylinder if you provide us with the appropriate documents for your application.
It would be our pleasure to provide you with a non-binding offer!

Installation

Mechanical connection

The electric lifting cylinders must be fixed to a construction using the intended fixing points. In doing so, observe the maximum traversing path. Attention! Do not run into the end position of the electric lifting cylinder, observe the respective traversing paths according to the dimensional sheet!
Lateral forces or torsion may not act on the electric lifting cylinder.
The installation position of the cylinder must be specified when ordering.

Electric connection

S + R delivers the electric lifting cylinder with electric motor mounted according to the IEC standard. The customer must carry out the wiring of the motors. In doing so, the valid standards and guidelines must be observed.
Limit switches for limiting the stroke path must be used. These can be provided by S+R (they are not safety switches).
Upon request, the frequency converter, path measurement system and controls for the electric lifting cylinder can also be supplied.

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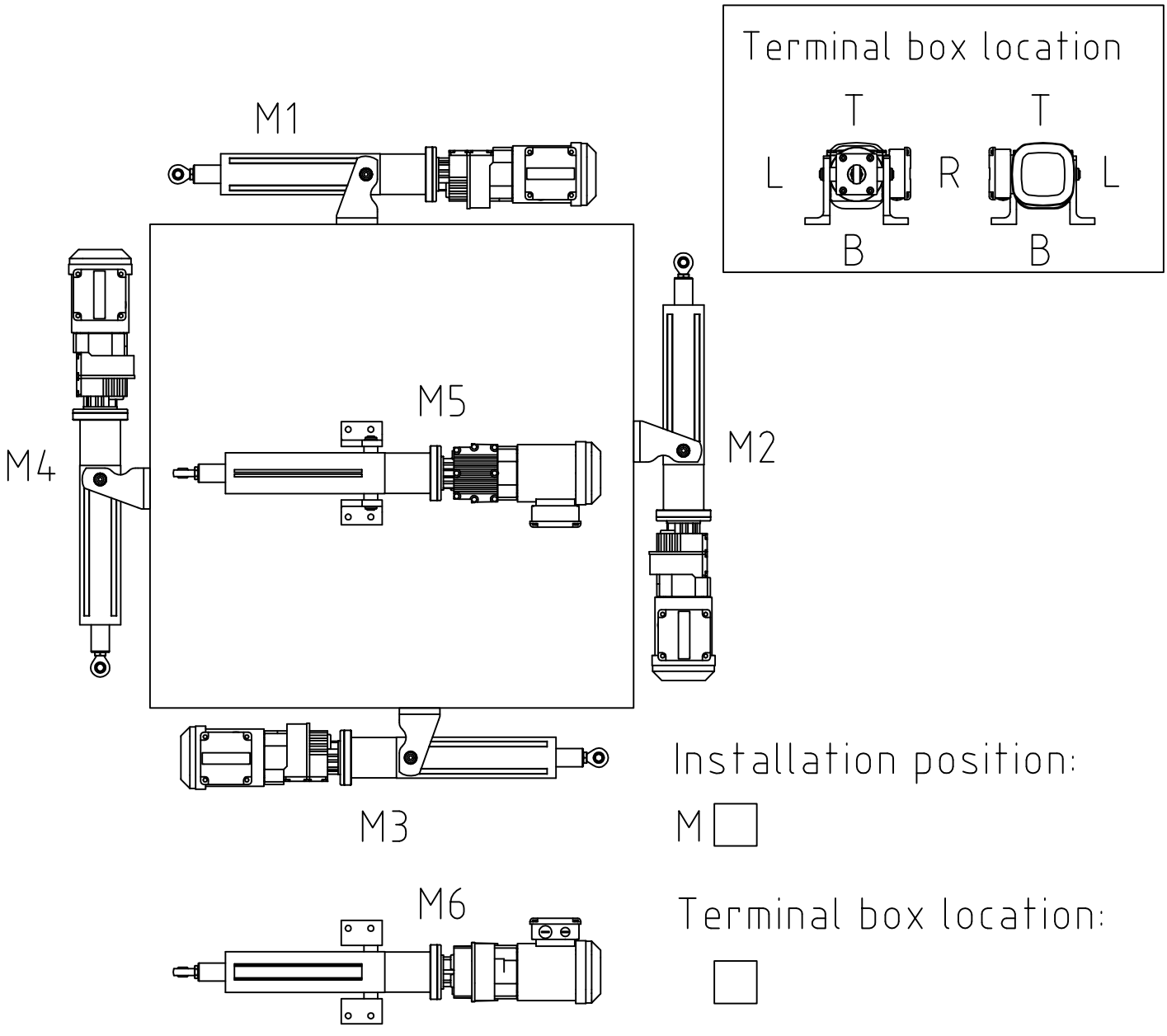
Installation position A - Series

The following figures show the standart mounting position of the motor.
Terminal box location according to customers' requirements.

All figures with terminal box location "R"



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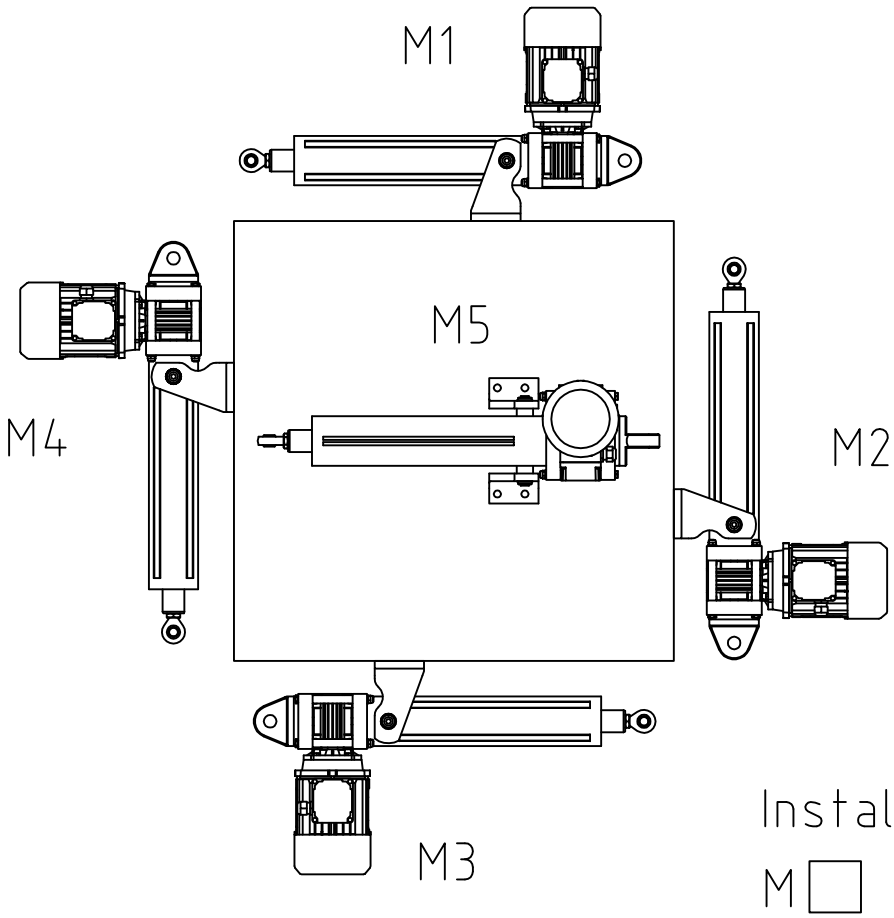
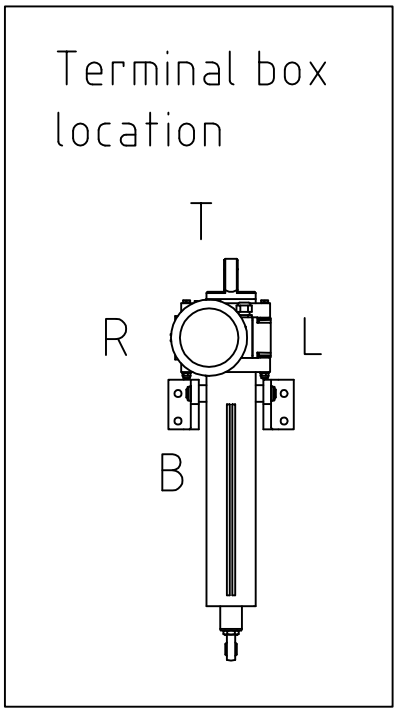
Installation position S - Series

The following figures show the standart mounting position of the motor.
Terminal box location according to customers' requirements.

All figures with terminal box location "R"





Installation position:
M ☐

Terminal box location:
☐

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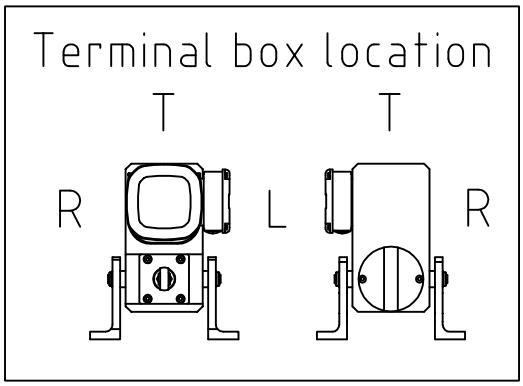
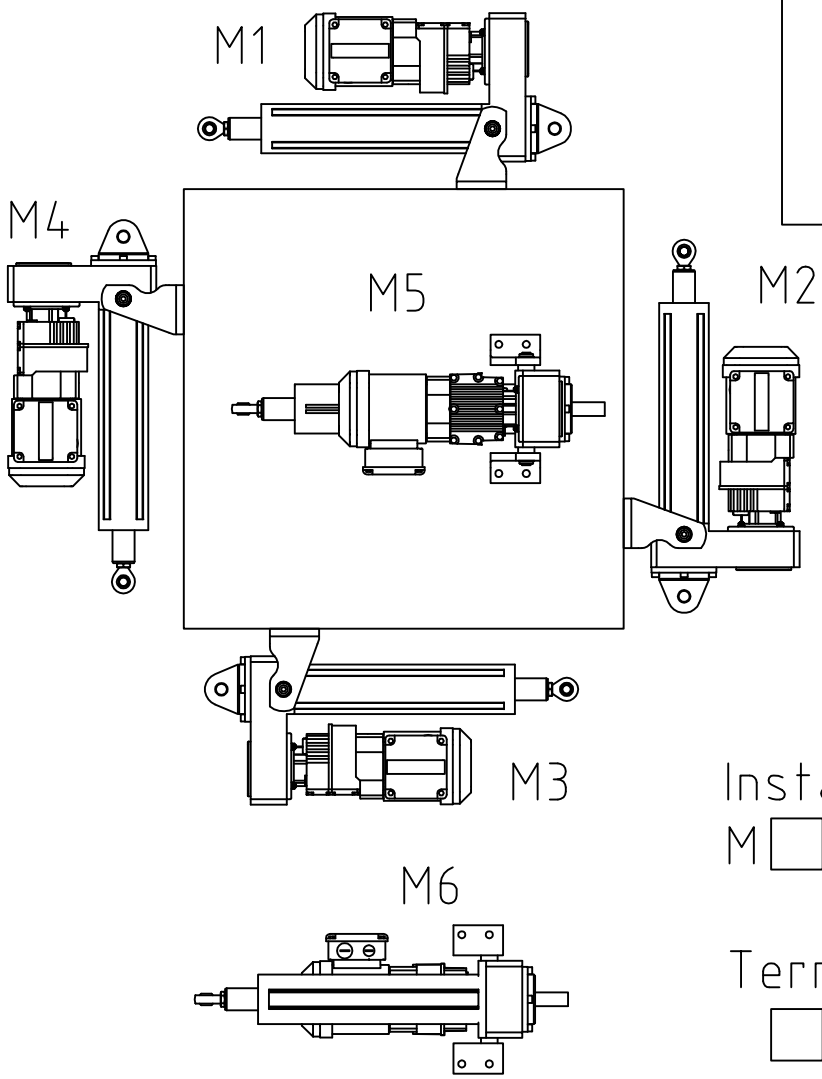
Installation position X - Series

The following figures show the standart mounting position of the motor.
Terminal box location according to customers' requirements.

All figures with terminal box location "R"





Installation position:
M☐

Terminal box location:
☐

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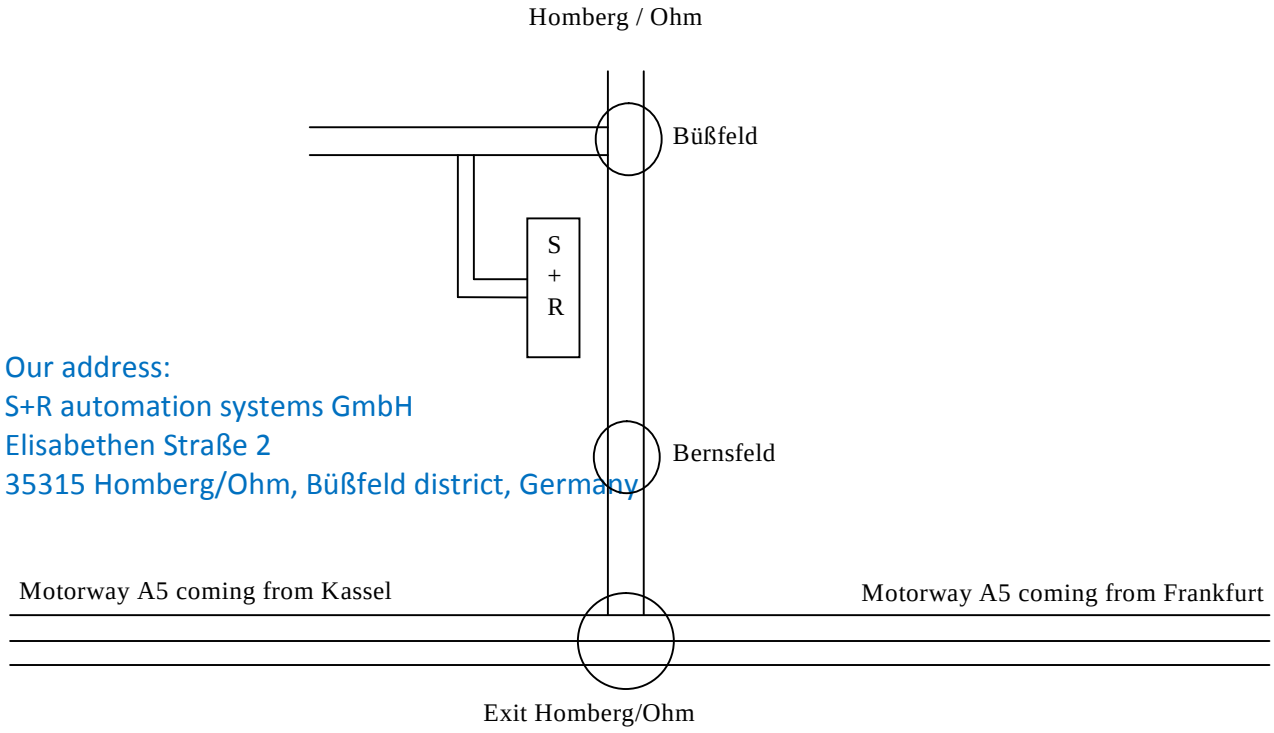
Directions

The way to us, very close to you.

Coming from Frankfurt:
Take the A5 motorway, leaving at Homberg, at the first roundabout take the second exit to the right and then in the second roundabout, the first exit towards Homberg / Ohm. Follow the road.

Coming from Kassel:
Take the A5 motorway, leaving at Homberg, at the roundabout take the second exit towards towards Homberg / Ohm.

From both directions:
Follow the road towards Homberg / Ohm. You pass through the town of Bernsfeld and reach Büßfeld. When entering Büßfeld, take the next left to enter the industrial area "am Lachenfeld" and then turn into the road "Elisabethenstraße". You have arrived.



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Representatives

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Electric lifting cylinder request form

Company: .....

Contact person: ..... Telephone: .....

Department: ..... Fax: .....

Street no.: ..... E-mail: .....

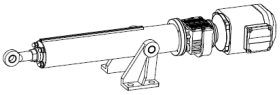
City / Postcode:

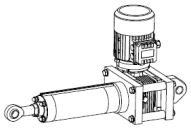
..... Appointment: .....

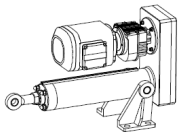
1. What should the electric lifting cylinder move?

.....

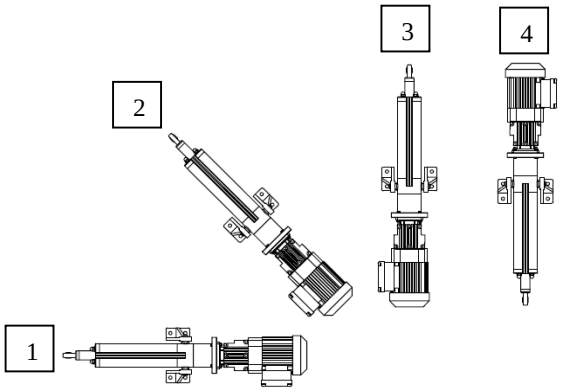
2. Which design is desired?

A 

S 

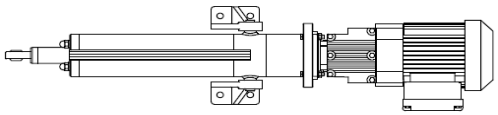
X 

3. Which installation position is required?

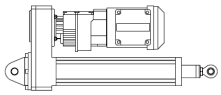


4. Please specify the direction of force.

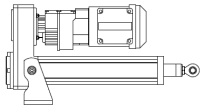
☐ ⇦ Pressing and / or pulling ⇨ ☐



5. Desired method of fixing?



☐ Rod end bearing -



☐ Rod end bearing - rotary

☐ Others: .....

6. Max. adjustment force [N]: ..... 7. Max. static loading [N]: .....

8. Adjustment velocity [mm/s]: ..... 9. Stroke length [mm]: .....

10. Ambient temperature [°C]: ..... 11. Operating voltage [v]: .....

12. Desired protection class: IP..... 13. Frequency converter operation planned?: ...

14. Switching frequency: Number of double strokes per hour: max.:.....average.: .....

Double strokes per day: max.:.....average.: .....

15. Lateral forces (must be avoided as far as possible) [N]: .....

16. Requirement [Items]: .....

17. Is there a risk to persons in event of malfunction? .....

18. Special guidelines / comments: ..... 19. Explosion protection required: .....

(If yes, please also fill in the request form "Explosion protection".)

Please fax to S+R automation systems GmbH +49 (0) 6633-9600-93

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Questionnaire Ex-protection

Company: .....

Mr / Mrs: .....

Project: .....

Information required for determining the device features / categories for use in areas where there are potentially explosive atmospheres.

		⇩ Please tick		
1	Potentially explosive mixture from air with		gas	continue with 2
			dust	continue with 7
2	With gas: operating location of the drive arranged in zone		1	continue with 3
			2	continue with 6
3	With zone 1, the customer specifies the ignition protection class of the motor as		pressure-resistant enclosure (EEX d)	continue with 4
			increased safety (EEx e)	continue with 6
4	Version of the terminal box (KK) with motors in pressure-resistant enclosure		KK in pressure-resistant enclosure (EEx d)	continue with 5
			KK in increased safety (EEx d)	
5	Details for the explosion group (only with pressure-resistant enclosure)		IIA	continue with 6
			IIB	
			IIC	
6	Temperature class (with gas-air mixtures)		T1	finished
			T2	
			T3	
			T4	
			T5 (only with EEX d)	
			T6 (only with EEX d)	
7	With dust: operating location of the drive arranged in zone		21	continue with 8
			22 (non-conductive)	
			22 (conductive)	
8	Maximum permissible surface temperature (with dust-air mixtures)		T120°C	finished
			T140°C	

Date: ..... Signature: .....

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Information on the individual positions

1) Assignment of the potentially explosive atmospheres in gas or dust

2) Zone assignment according to the operating location of the drive (the operator is responsible for the zone assignment complying with directive 99/92/EC. The TüV, BG and technical expert offices offer assistance here.
   - Zone 1: potentially explosive gas mixtures are to expected during normal operation.
   - Zone 2: potentially explosive gas mixtures are not to be expected during normal operation and when, then only temporarily.

3) Ignition protection types of the motor for use in zone 1:
   - pressure-resistant enclosure (EEX d):
     Potentially explosive mixtures can ingress into consumables, mixtures on the inside of the enclosure may be ignited → constructive measures prevent an ignition with the outer atmosphere.
   - increased safety (EEx e):
     Potentially explosive mixtures can ingress into consumables, no source of ignition in or on the consumables → no ignition of the gas mixture.

4) Version of the terminal box with pressure-resistant encapsulated motors in ignition protection
   - pressure-resistant enclosure (EEX d):
   - When selecting this terminal box version, it is imperative to note the approved cable throughways (Conduit-System, Cable Glands, ...). In addition, the thread type of the screw connection (ISO or NPT) must be specified.
   - increased safety (EEx e):
     When selecting this terminal box version, feeding the cables through is much easier, only an explosion protection approved screw connection must be used.

5) The explosion group depends on the material. (Details only necessary with pressure-resistant encapsulated motors) Observe appropriate tabulations, e.g. Nabert/Schön, Kennzahlen brennbarer Gase und Dämpfe, Deutscher Eichverlag GmbH, 38102 Braunschweig (Figures for flammable gases and vapours).

6) The temperature classes each represent the guaranteed maximum surface temperatures of the drive. (Info on the temperature classes of the hazardous materials, see:
   - T1: maximum permissible surface temperature: 450°C
   - T2: maximum permissible surface temperature: 300°C
   - T3: maximum permissible surface temperature: 200°C
   - T4: maximum permissible surface temperature: 135°C
   - T5: maximum permissible surface temperature: 100°C
   - T6: maximum permissible surface temperature: 85°C

7) Zone assignment according to the operating location of the drive (the operator is responsible for the zone assignment complying with directive 99/92/EC. The TüV, BG and technical expert offices offer assistance here.
   - Zone 21: potentially explosive dust-air mixtures are to expected during normal operation.
   - Zone 22: potentially explosive dust-air mixtures are not to be expected during normal operation and when, then only temporarily.
     (Exception: conductive dusts, see EN 61241-2-2).

8) The maximum surface temperature of a drive in dust-air mixtures. Details will be specified in the value °C.
   Info for this purpose, e.g. in the *BIA Report, Characteristic values of the combustion and explosion of dusts*, issued by the Hauptverband der gewerblichen Berufsgenossenschaften, 53757 St. Augustin