ENZFELDER GmbH

Power transmission and lifting engineering

FREN Electric cylinder ELZ

History

1969 Mr. Enzfelder established a job shop in Vienna. Equipped with some machinery, the Enzfelder Company manufactured machine parts according to drawings.
Within one year the number of employees rose to 3. The Enzfelder company started manufacturing threaded spindles and nuts according to drawings. Then the range of manufacturing was enlarged by toothed wheels, screw wheels and endless screws according to drawings.

1974 The company including the complete manufacture was relocated to Enzesfeld.

1975 The manufacture of spindle gears was launched. The company's experience in the manufacture of trapezoid-threaded spindles, nuts, worm gear pairs and casings was a valuable basis for the construction. After many tests, the serial production of spindle gears was launched one year later. The result was a product characterized by a first-rate price-performance ratio. The product was distributed by dealers all over Europe.

1981 The planning and construction of small hydropower plants was launched to replace diesel generators. Environmental protection was not really a topic at that time, however, and the production was stopped in 1986.

1989 The Enzfelder GesmbH company replaced the Franz Enzfelder Company.

1990 Scissor-type lifting platforms and cable winches were added to the delivery program.

1991 Resilient spacer shafts were tested and added to the production range. At the same time, the telescopic spindle gear was developed. A patent for this principle was applied for and issued.

1993 The sale of spindle gears under their own name was launched and presented for the first time at the Hannover industrial fair. We have been approached with a variety of tasks and have provided solutions according to the customers' needs ever since.

1994 In cooperation with our customers we produced the first bevel gears to specification.

1995 Spindle bearing arrangements were designed and included in the standard program.

1996 The Enzfelder company produced planet gear to specification for the first time.

1998-1999 The standard programs were enlarged. Additionally, bevel gears are manufactured in a standard design.

2000 The development of electric cylinders in standard design for very high loads (5-1000kN) was started. At the same time the telescopic spindle gears were refined to save the customer the guiding and locking devices. Since that time we have been able to offer telescopic cylinders, too.

2001 The development of electric cylinders was completed, and these cylinders were added to the standard program.
At the same time the development and fabrication of cubic spindle gears for lifting loads between 2.5 and 150kN was started. These gears were added to the standard program as well.

2002 were extended and optimized the series of the electric cylinders. Further we provide an electronic 2D-3D product catalogue of the spindle gears, it makes it possible to integrate our products into your system.

2002-2003 We putted our new assembling and packaging hall, beside the manufacturing hall, in operation

2003 We increased our machinery by buying a CNC machine tool with 7 axes, brand AXA. That new CNC machine allows a precise machining of the screw jack housings in only two clamping.

2003-2004 The engineering started to use new 3-D CAD software, Solid Edge. That software enables our customers to integrate easily our drawings.

2004 We opened a sales office in France.

2004-2005 We started to design the high performance screw jacks HSG and we created a range of 10 different sizes.

2005 First participation to an exhibition in France: INDUSTRIE 2005 at Lyon.

2005-2006 We started to design a new range of telescopic screw jacks TSGLR. Today, these new telescopic screw jacks, with a more compact design, are used in the stage industry, in the aircraft industry, on train lifting equipments and in machine building.

2008 We replaced the tread grinding machine by a new CNC thread grinding machine, brand Mikromat.

In the past years we solved problems of motive power engineering and lifting for our customers. We searched and found the optimal solution for each case and manufactured at the best possible price/performance ratio.

Delivery 01-2009

Content of Catalog

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

Page

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

FREN Electric cylinders are an advancement of our standard program. By thought construction is an electrical cylinder in the situation also components out to be taken up. The lift link inside electrical cylinders is protected by the tubing system from any damage by environmental influences and is approximately to rotate secured.

In the FREN Electric cylinder there is a robust worm gear pair driving a trapezoid thread spindle. The gear box is made of nodular graphite cast iron 50 fit high loads and meeting high safty standards. The worm is hardened and ground and running on tapered roller bearings. The worm wheel is made of high-strength material which is particularly resistant to abrasion; it is mounted between deep groove ball thrust bearings. The thrust tube consists of steel and is outside polished and chromium plated. The spindle ends can be supplied after customer's request also stainless.

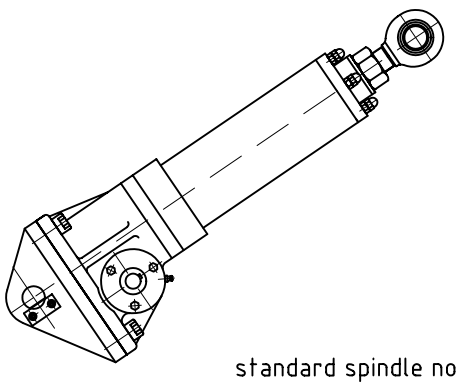
The ELZ5 to ELZ350 line ist the worm gear alternatively filled with grease or oil and the tubing system is lubricated with grease on delivery and fit for operating temperatures ranging between -30°C and +80°C. To be increased the trapezoid thread spindle is the life span additionally coated with lubricating varnish by better fail-safe characteristics to be achieved and thus.The operating factor at maximum load is 20% per hour 30% per 10 minutes.

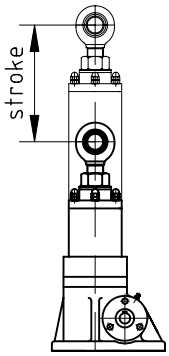
The trapezoid thread spindles are stand single-threas double-thread three-thread and four-thread execution. For higher demands with regard to lifting speed and operating factor we use ball screw spindles. FREN Electric cylinders are fitted with blue prime coat (RAL 5012)

Advantages opposite hydraulic cylinders
Exact synchronism of several lifting spindles also in case of eccentric stress
Automatic lock at standstill, consequently 100% prevention of sinking after customer's request
Synchronous actuation by motors or crank handle possible.
Precise adjustment and measuring possible
Operable in any position
Indifference to temperature over long periods
Many combinations possible thanks to standard piece parts
Large accessory assortment
High thrusts (up to 1000kN) and long strokes (up to 2500mm) feasible
No leakages

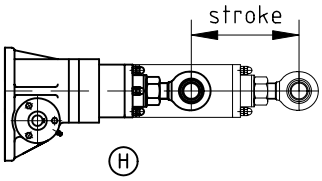
Survey of construction modes with example for ordering

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at



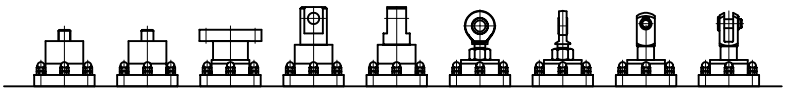


Ⓥ



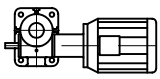
Ⓗ

standard spindle noses

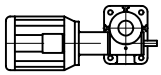


① ② ③ ④ ⑤ ⑥

motor on the right



motor on the left



no motor

standard reductions according to preselection table page 5

type designation according to preselection page 5

Electric cylinder = ELZ

ELZ 150 - 8 - 5 - 230 - H - MR-LK

type

reduction i

spindle nose = 1,2,3,4,5,6
special nose = So

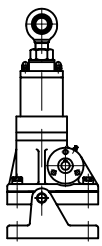
effective stroke in mm

fitting position horizontal = H
fitting position vertical = V

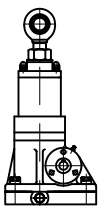
motor on the right = MR
motor on the left = ML
no motor= 00

swivelling console = SK
swivelling plate = SP
bearing console = LK
pivoting plate = GP

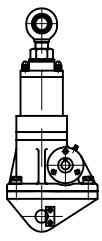
Ⓢⓚ



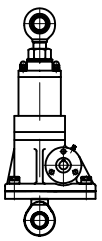
Ⓢⓟ



Ⓛⓚ



Ⓖⓟ



Above example for ordering:
Electric cylinder type 150, reduction 8:1, spindelnose 5, stroke 230, mountet horizontal, with motor mounted on the right and bearing console

additionally available options:

ball bearing spindel
limit stop
stainless execution
safty nut

three-phase A.C. motor with or without brake
d.c. motor
gear motor

impulse transmitter
overload clutch
oil lubrication

the required options must be added to the order ID or marked in the questionnaire.

Selection of Electric cylinder with trapezoid thread spindle

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

For the correct selection of spindle gears the following data are of decisive importance:

1.) load	[kN]	
2.) lifting speed	[m/min]	
3.) operating cycle	[%/10min] [%/hour]	
4.) spindle length (buckling)	[mm]	
5.) tensile- or pressure load	[kN]	
6.) ambient temperature	[°C]	
7.) fitting length (please indicate when ordering)	[mm]	If you use the questionnaire on page 33
8.) critical speed of the spindle	[min-1]	please provide the data available.

How to proceed in the selection: on the basis of the desired load data (in kN) a suitable type of gear is selected from the preselection table below.

Preselection Table

Single-thread spindle actuated Electric cylinders

Type	ELZ 5		ELZ 15		ELZ 30		ELZ 50		ELZ 100		ELZ 150		ELZ 200		ELZ 300		ELZ 350	
rated power kN	5		15		30		50		100		150		200		300		350	
size of spindle	Tr 20x6		Tr 24x6		Tr 30x6		Tr 40x9		Tr 55x12		Tr 60x12		Tr 65x12		Tr 90x16		Tr 100x16	
gear reduction	10:1	20:1	6:1	25:1	6:1	24:1	6:1	24:1	8:1	24:1	8:1	24:1	8:1	24:1	10⅔:1	32:1	10⅔:1	32:1
length of stroke per rotation in mm	0,6	0,3	1	0,24	1	0,25	1,5	0,375	1,5	0,5	1,5	0,5	1,5	0,5	1,5	0,5	1,5	0,5
torque at rated power Nm	1,65	1,14	7,7	3,18	17,68	7,96	39,8	17,05	88,42	44,21	143,24	77	199	22,6	311,3	170,5	397,8	214,3
efficiency in %	29	21	31	18	27	15	30	17,5	27	18	25	15,5	24	15	23	14	21	13
max. RPM	2800		2800		2800		1800		1800		1500		1500		1000		1000	
max. lifting speed m/min	1,68	0,84	2,8	0,67	2,8	0,7	2,7	0,67	2,25	0,75	2,25	0,75	2,25	0,75	1,5	0,5	1,5	0,5
max. driving power in kW at 20% duty cycle	0,18		0,35		0,6		1,2		2,1		2,8		3,9		5,2		6,2	
max. driving power in kW at 10% duty cycle	0,23		0,46		0,8		1,6		2,8		3,8		5,1		6,9		8,3	
weight, ELZ excl. lifting element in kg	--		--		--		--		--		--		--		--		--	
100mm spindle in kg	0,2		0,3		0,43		0,8		1,5		1,8		2,15		4,2		5,2	
kg of grease contained in spindle gear	0,05		0,1		0,2		0,35		0,6		0,8		1,2		1,7		2,2	
catalog page	7		8		10		11		12		13		14		16		17	

Double-thread spindle actuated Electric cylinders

(no longer self-locking - braking motor must be used!)

rated power kN	4		12		24		40		80		120		150		220		280	
size of spindle	Tr 20x12P6		Tr 24x12P6		Tr 30x12P6		Tr 40x18P9		Tr 55x24P12		Tr 60x24P12		Tr 65x24P12		Tr 90x32P16		Tr 100x32P16	
length of stroke per rotation in mm	1,2	0,6	2	0,48	2	0,5	3	0,75	3	1	3	1	3	1	3	1	3	1
max. lifting speed m/min	3,36	1,68	5,6	1,34	5,6	1,4	5,4	1,35	4,5	1,5	4,5	1,5	4,5	1,5	3	1	3	1
torque at rated power Nm	1,96	1,32	8,9	3,53	19,6	8,3	45,5	19,1	95,5	51	159,2	83	204,6	108,52	300	159,2	417,7	222,8
efficiency in %	39	29	43	26	39	23	42	25	40	25	36	23	35	22	35	22	32	20

Read off the dimensioned sketch and the performance table on the corresponding page of the catalog:

1.) whether the dimensions of gear and spindle fit into your system.
2.) which gear reduction must be selected for the desired lifting speed
(for higher lifting speeds the use of a double-thread spindle may be necessary).
3.) whether the power required for the desired lifting speed is admissible.
4.) whether under pressure load the critical buckling force is not exceeded.
5.) whether the critical revolutions/min of the spindle are not exceeded.
6.) If one of these requirements cannot be met the type next in size must be chosen.
7.) If point 6 is not sufficient, choose one of the types next in size or ask for special types (questionnaire see pages 33-34)!

Seletion of Electric cylinder with ball bearing spindle

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

For the correct selection of spindle gears the following data are of decisive importance:

1.) load	[kN]
2.) lifting speed	[m/min]
3.) operating cycle	[%/10min] [%/hour]
4.) spindle length (buckling)	[mm]
5.) tensile- or pressure load	[kN]
6.) ambient temperature	[°C]
7.) fitting length (please indicate when ordering)	[mm]
8.) critical speed of the spindle	[min-1]

If you use the questionnaire on page 33 please provide the data available.

How to proceed in the selection: on the basis of the desired load data (in kN) a suitable type of gear is selected from the preselection table below.

Preselection Table

Electric cylinder with ball bearing spindle

(no longer self-locking - braking motor must be used!)

Type	ELZ 5		ELZ 15		ELZ 30		ELZ 50		ELZ 100		ELZ 150		ELZ 200		ELZ 300		ELZ 350	
rated power kN	21,8		27		58		82,6		106,8		210,8		210,8		269		336	
size of spindle	KGT 2005		KGT 2505		KGT 3210		KGT 4010		KGT 5010		KGT 6310		KGT 6310		KGT 8010		KGT 10010	
gear reduction	10:1	20:1	6:1	25:1	6:1	24:1	6:1	24:1	8:1	24:1	8:1	24:1	8:1	24:1	10⅔:1	32:1	10⅔:1	32:1
length of stroke per rotation in mm	0,5	0,25	0,834	0,2	1,67	0,416	1,67	0,416	1,25	0,416	1,25	0,416	1,25	0,416	0,938	0,313	0,938	0,313
torque at rated power Nm	3,6	2,48	6,4	2,53	27,5	11,3	39,13	16,1	37,94	19,7	76,25	42,4	76,25	42,4	75,7	39,35	96,38	50,64
efficiency in %	48	35	56	34	56	34	56	34	56	36	55	33	55	35	53	34	52	33
max. RPM	3000		3000		3000		1800		1800		1500		1500		1000		1000	
max. lifting speed m/min	1,5	0,750	2,5	0,6	5	1,248	3	0,749	2,25	0,749	1,875	0,624	1,875	0,624	0,938	0,313	0,938	0,313
max. driving power in kW at 20% duty cycle	0,18		0,35		0,6		1,2		2,1		2,8		3,9		5,2		6,2	
max. driving power in kW at 10% duty cycle	0,23		0,46		0,8		1,6		2,8		3,8		5,1		6,9		8,3	
weight, ELZ excl. lifting element in kg	--		--		--		--		--		--		--		--		--	
100mm spindle in kg	0,2		0,34		0,56		0,815		1,325		2,17		2,17		3,6		4	
kg of grease contained in spindle gear	0,05		0,1		0,2		0,35		0,6		0,8		1,2		1,7		2,2	
catalog page	7		8		10		11		12		13		14		16		17	

Electric cylinder wit ball bearing spindle

(no longer self-locking - braking motor must be used!)

rated power kN	14,6		27		26,8		36,4		76		250		250		322		478	
size of spindle	KGT 2006		KGT 2510		KGT 3220		KGT 4020		KGT 5020		KGT 6320		KGT 6320		KGT 8020		KGT 10020	
length of stroke per rotation in mm	0,6	0,3	1,67	0,4	3,33	0,833	3,33	0,833	2,5	0,833	2,5	0,833	2,5	0,833	1,875	0,625	1,875	0,625
max. lifting speed m/min	1,8	0,9	5	1,2	10	2,5	6	1,5	4,5	1,5	3,75	1,25	3,75	1,25	1,875	0,625	1,875	0,625
torque at rated power Nm	2,9	2	12,8	5,1	25,4	10,45	34,5	14,2	54	28	180,86	100,48	180,86	100,48	181,25	94,2	274,23	144,08
efficiency in %	48	35	56	34	56	34	56	34	56	36	55	33	55	35	53	34	52	33

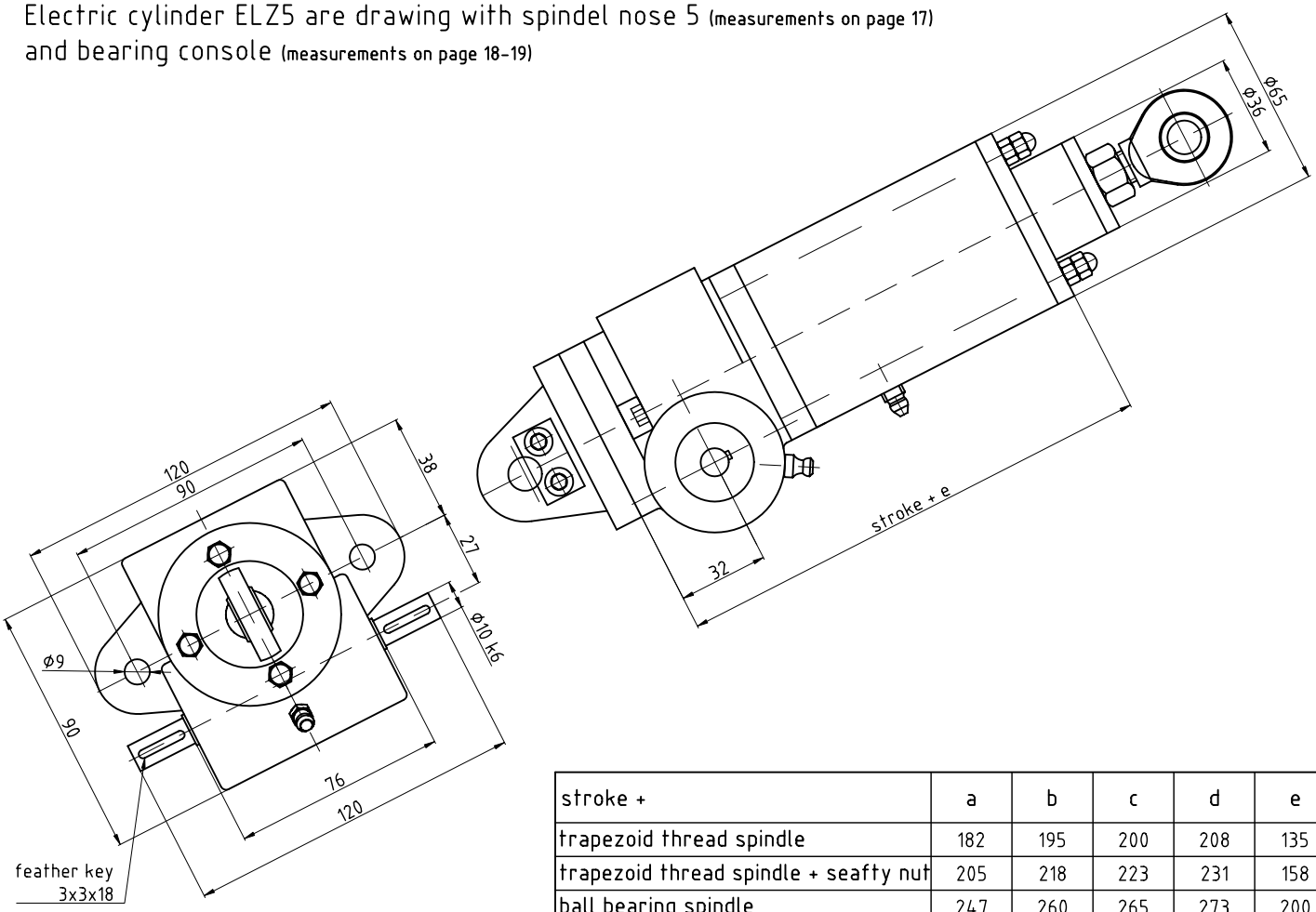
Read off the dimensioned sketch and the performance table on the corresponding page of the catalog:

1.) whether the dimensions of gear and spindle fit into your system.
2.) which gear reduction must be selected for the desired lifting speed
(for higher lifting speeds the use of a double-thread spindle may be necessary).
3.) whether the power required for the desired lifting speed is admissible.
4.) whether under pressure load the critical buckling force is not exceeded.
5.) whether the critical revolutions/min of the spindle are not exceeded.
6.) If one of these requirements cannot be met the type next in size must be chosen.
7.) If point 6 is not sufficient, choose one of the types next in size or ask for special types (questionnaire see pages 33-34)!

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

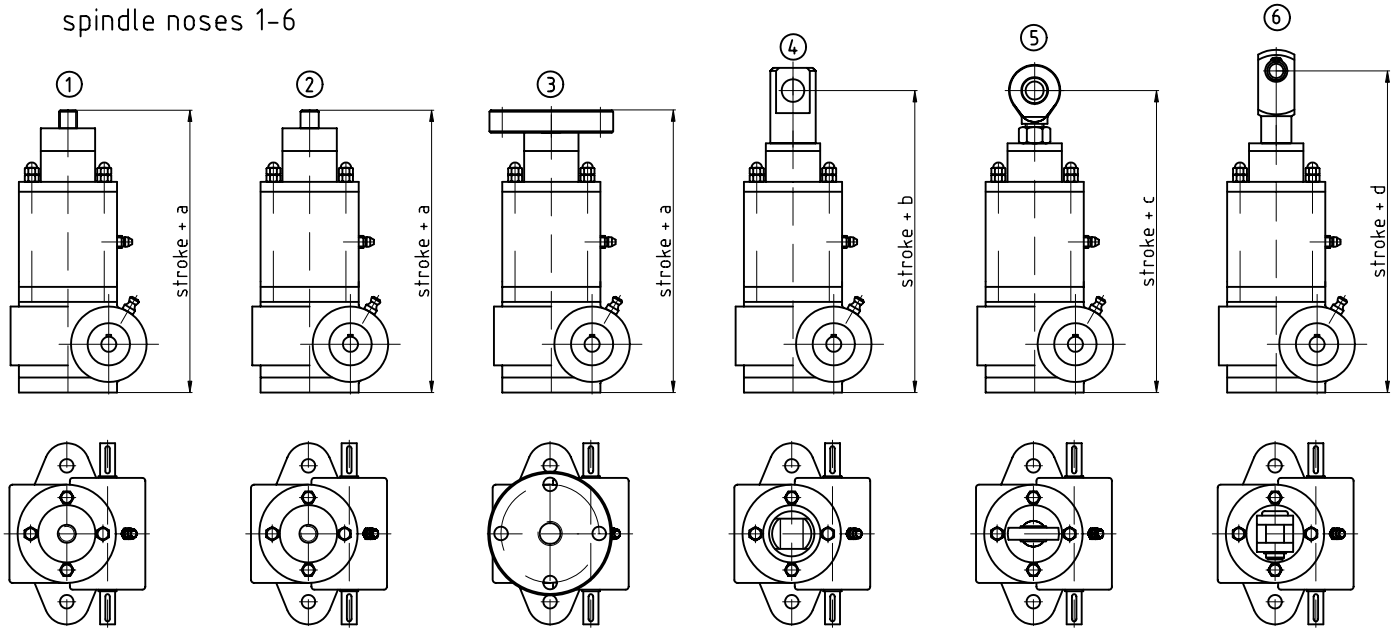
Electric cylinder ELZ 5

Electric cylinder ELZ5 are drawing with spindel nose 5 (measurements on page 17)
and bearing console (measurements on page 18-19)



stroke +	a	b	c	d	e
trapezoid thread spindle	182	195	200	208	135
trapezoid thread spindle + seafty nut	205	218	223	231	158
ball bearing spindle	247	260	265	273	200
ball bearing spindle + safety nut	270	283	288	296	223

spindle noses 1-6



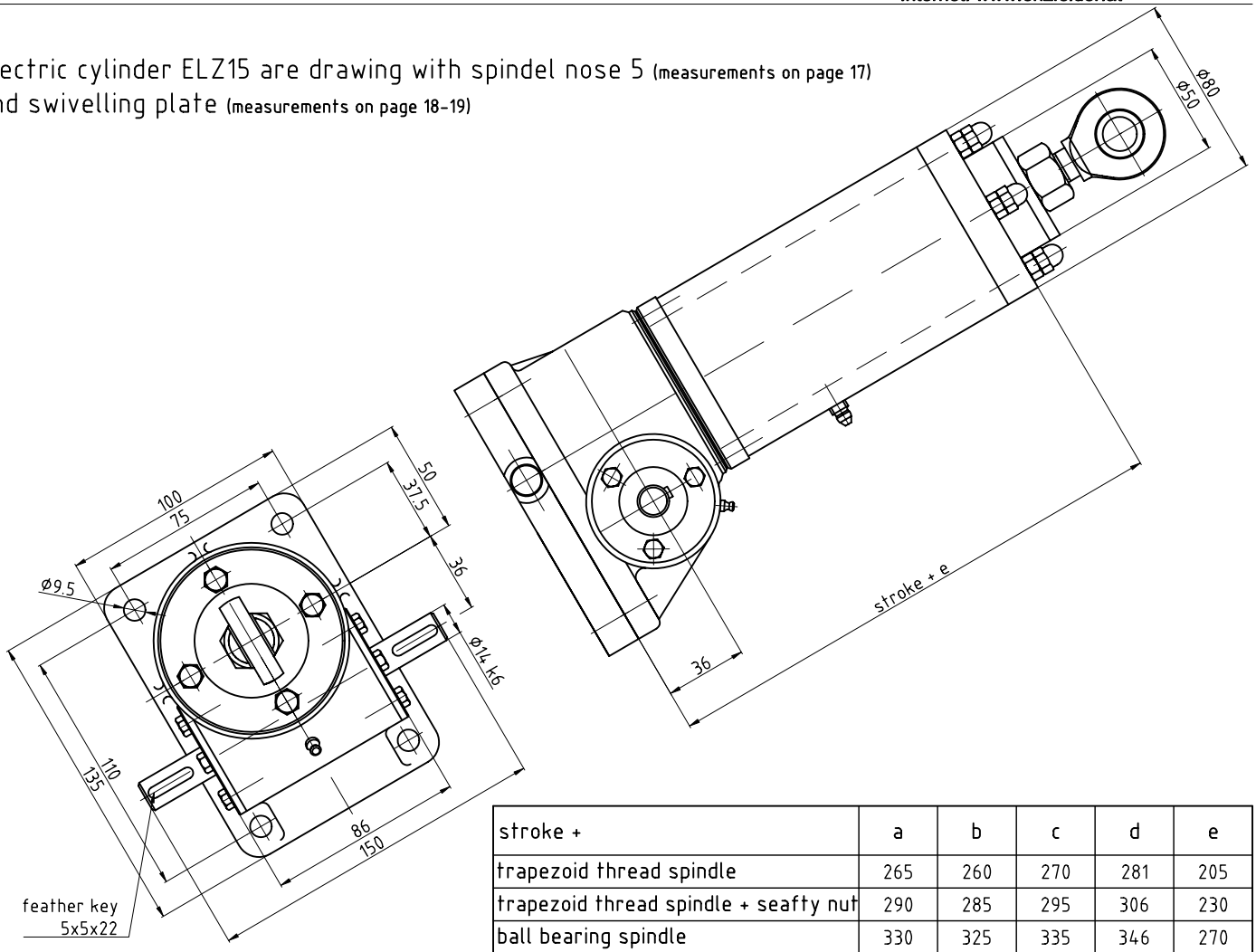
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

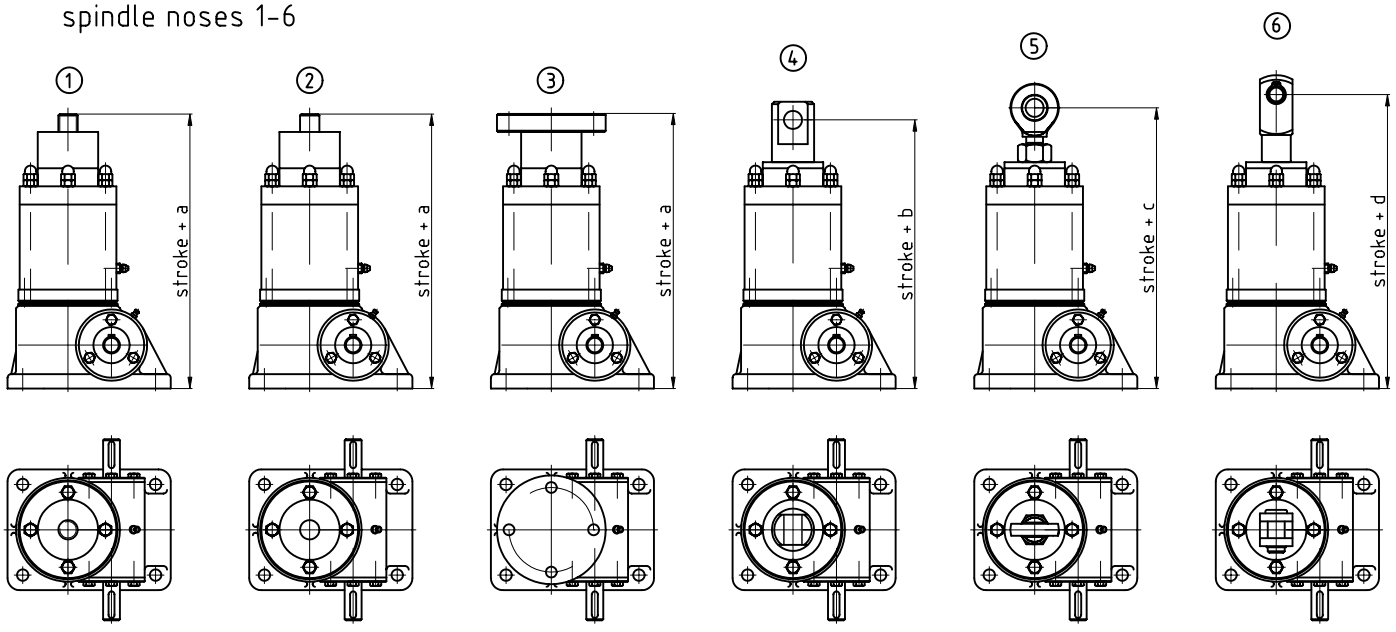
Electric cylinder ELZ 15

Electric cylinder ELZ15 are drawing with spindel nose 5 (measurements on page 17)
and swivelling plate (measurements on page 18-19)



stroke +	a	b	c	d	e
trapezoid thread spindle	265	260	270	281	205
trapezoid thread spindle + seafty nut	290	285	295	306	230
ball bearing spindle	330	325	335	346	270
ball bearing spindle + safety nut	355	350	360	371	295

spindle noses 1-6



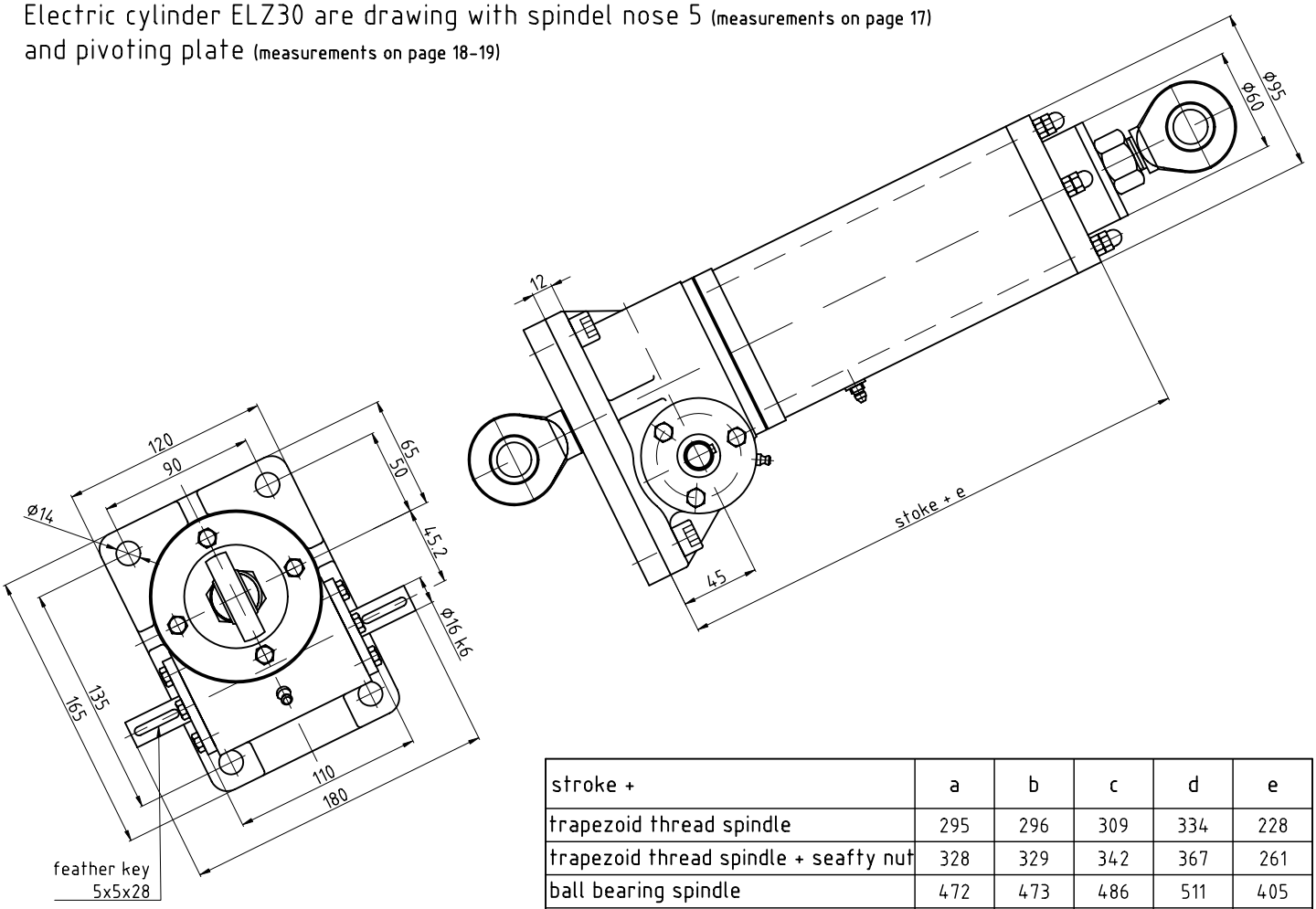
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

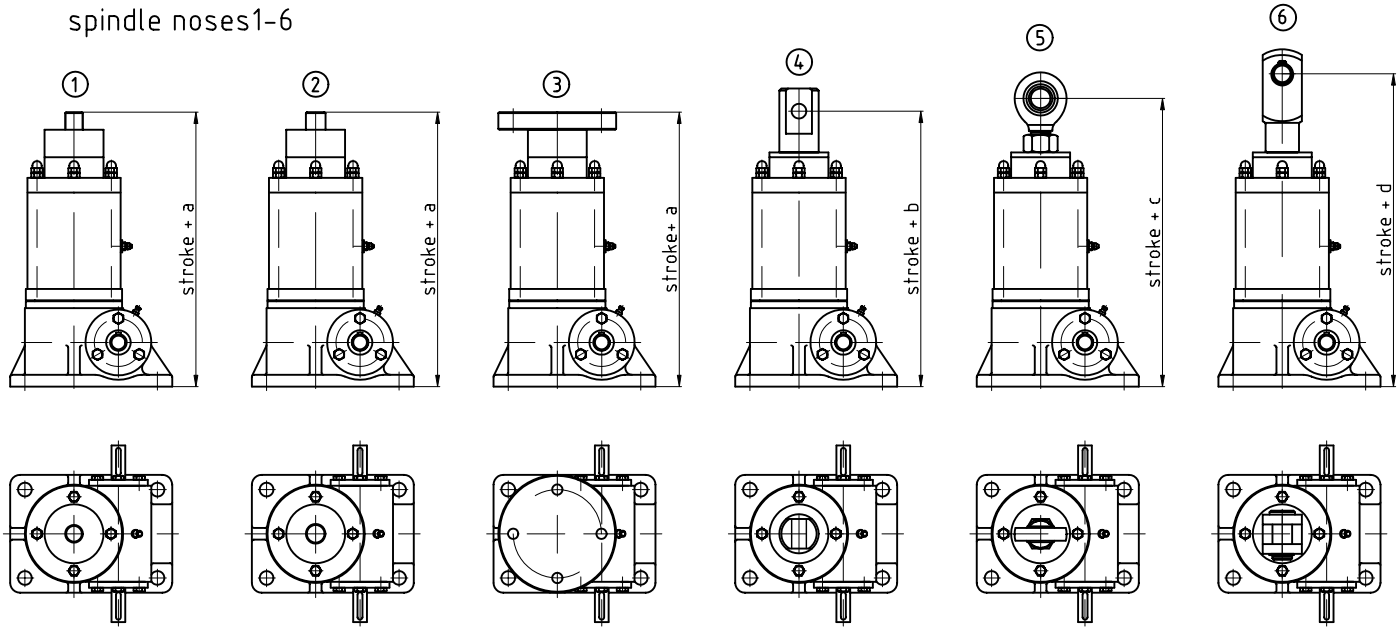
Electric cylinder ELZ 30

Electric cylinder ELZ30 are drawing with spindel nose 5 (measurements on page 17)
and pivoting plate (measurements on page 18-19)



stroke +	a	b	c	d	e
trapezoid thread spindle	295	296	309	334	228
trapezoid thread spindle + seafty nut	328	329	342	367	261
ball bearing spindle	472	473	486	511	405
ball bearing spindle + safety nut	521	522	535	460	438

spindle noses1-6



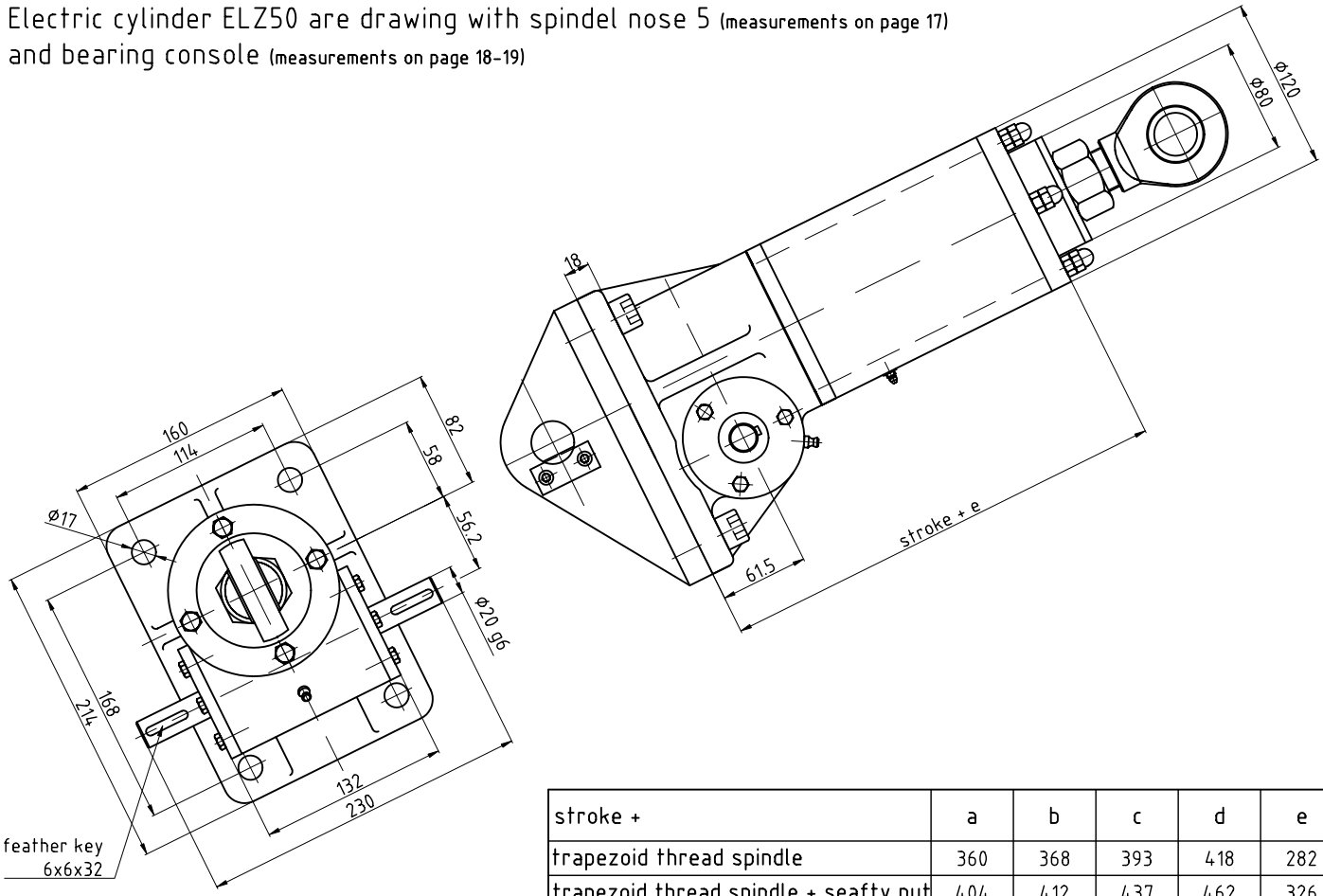
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

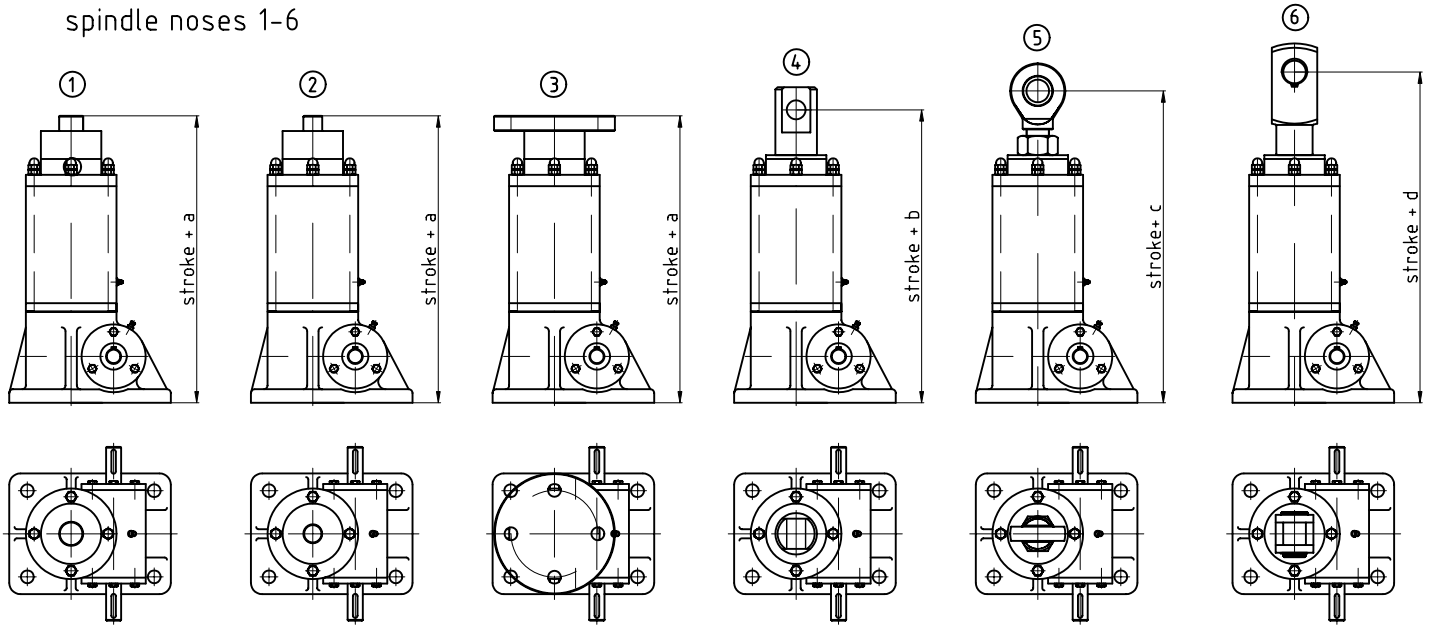
Electric cylinder ELZ 50

Electric cylinder ELZ50 are drawing with spindel nose 5 (measurements on page 17)
and bearing console (measurements on page 18-19)



stroke +	a	b	c	d	e
trapezoid thread spindle	360	368	393	418	282
trapezoid thread spindle + seafty nut	404	412	437	462	326
ball bearing spindle	447	455	480	505	369
ball bearing spindle + safety nut	491	499	524	549	413

spindle noses 1-6



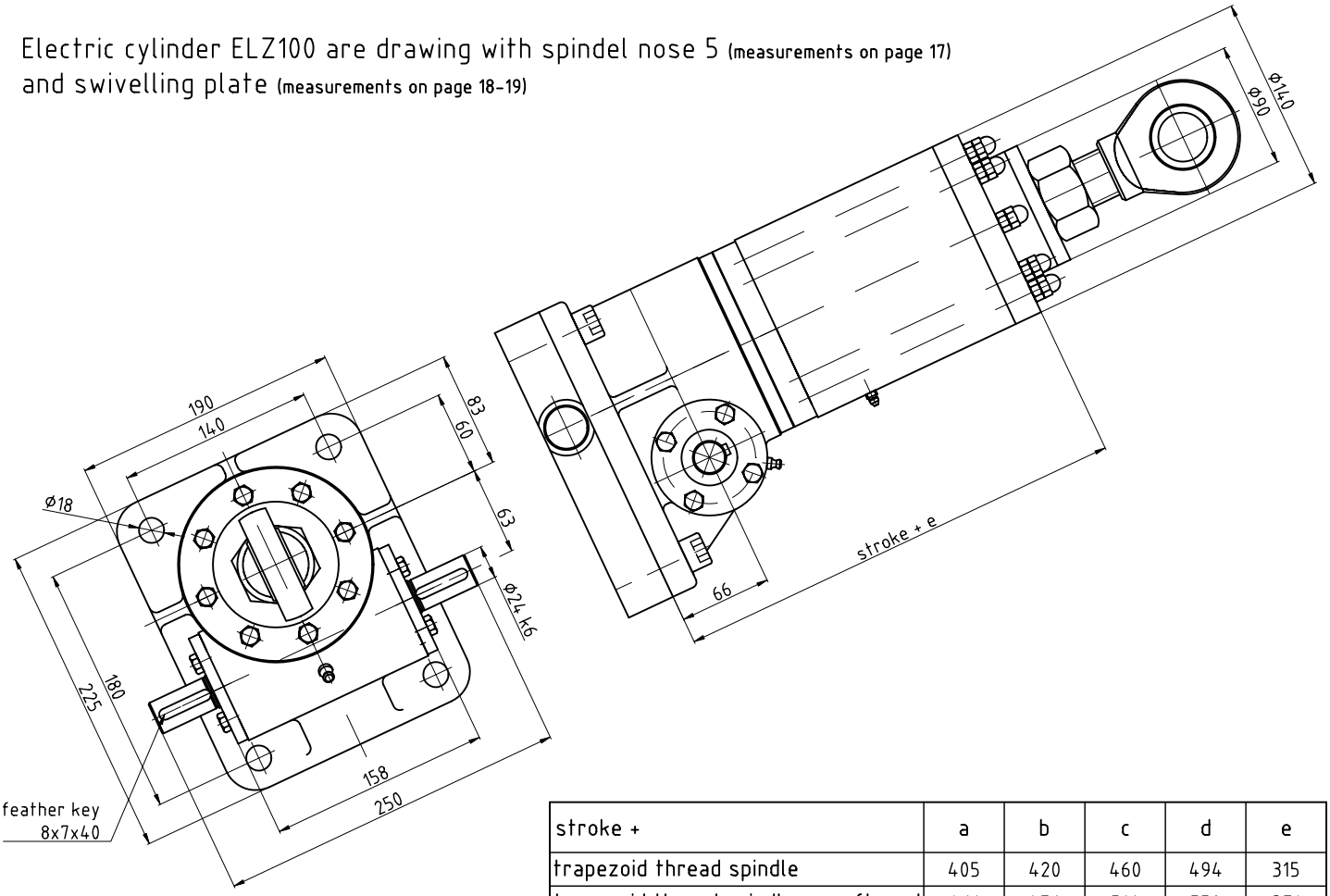
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

Electric cylinder
ELZ 100

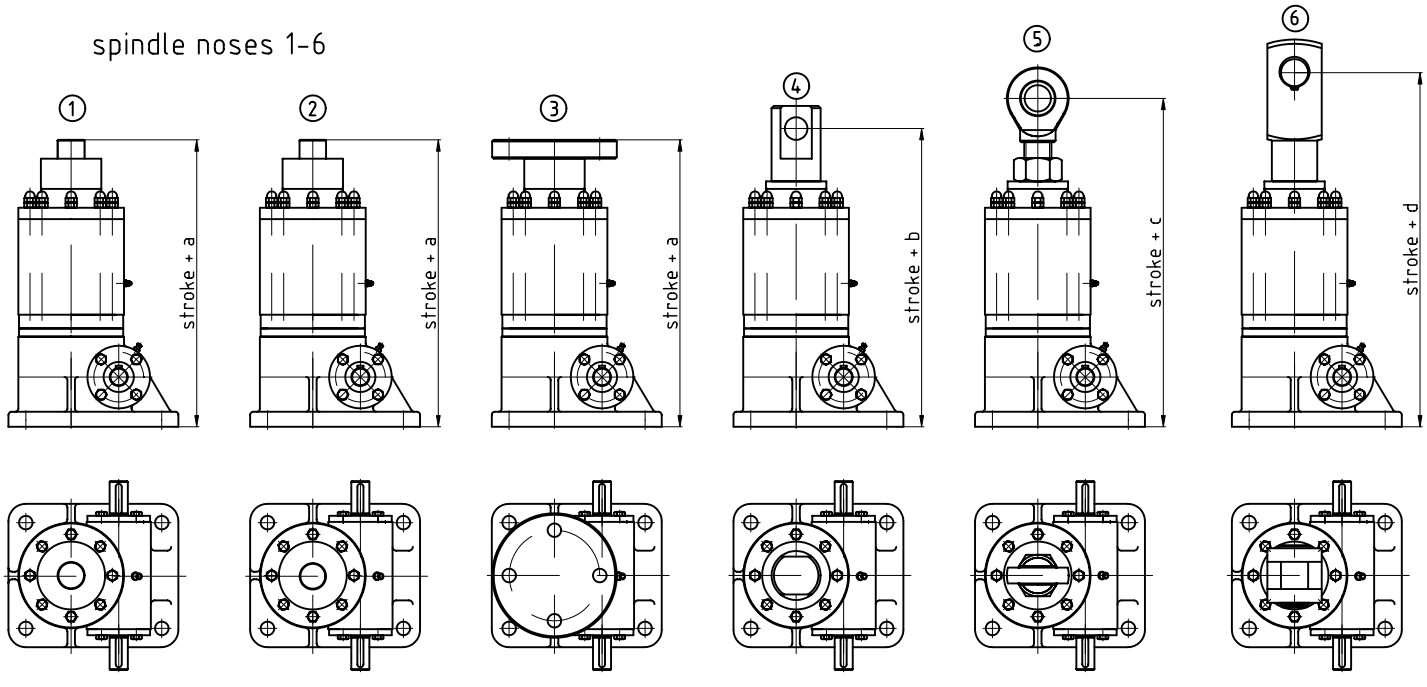
ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

Electric cylinder ELZ100 are drawing with spindel nose 5 (measurements on page 17) and swivelling plate (measurements on page 18-19)



stroke +	a	b	c	d	e
trapezoid thread spindle	405	420	460	494	315
trapezoid thread spindle + seafty nut	461	476	516	550	371
ball bearing spindle	520	535	575	609	430
ball bearing spindle + safety nut	576	591	631	665	486

spindle noses 1-6



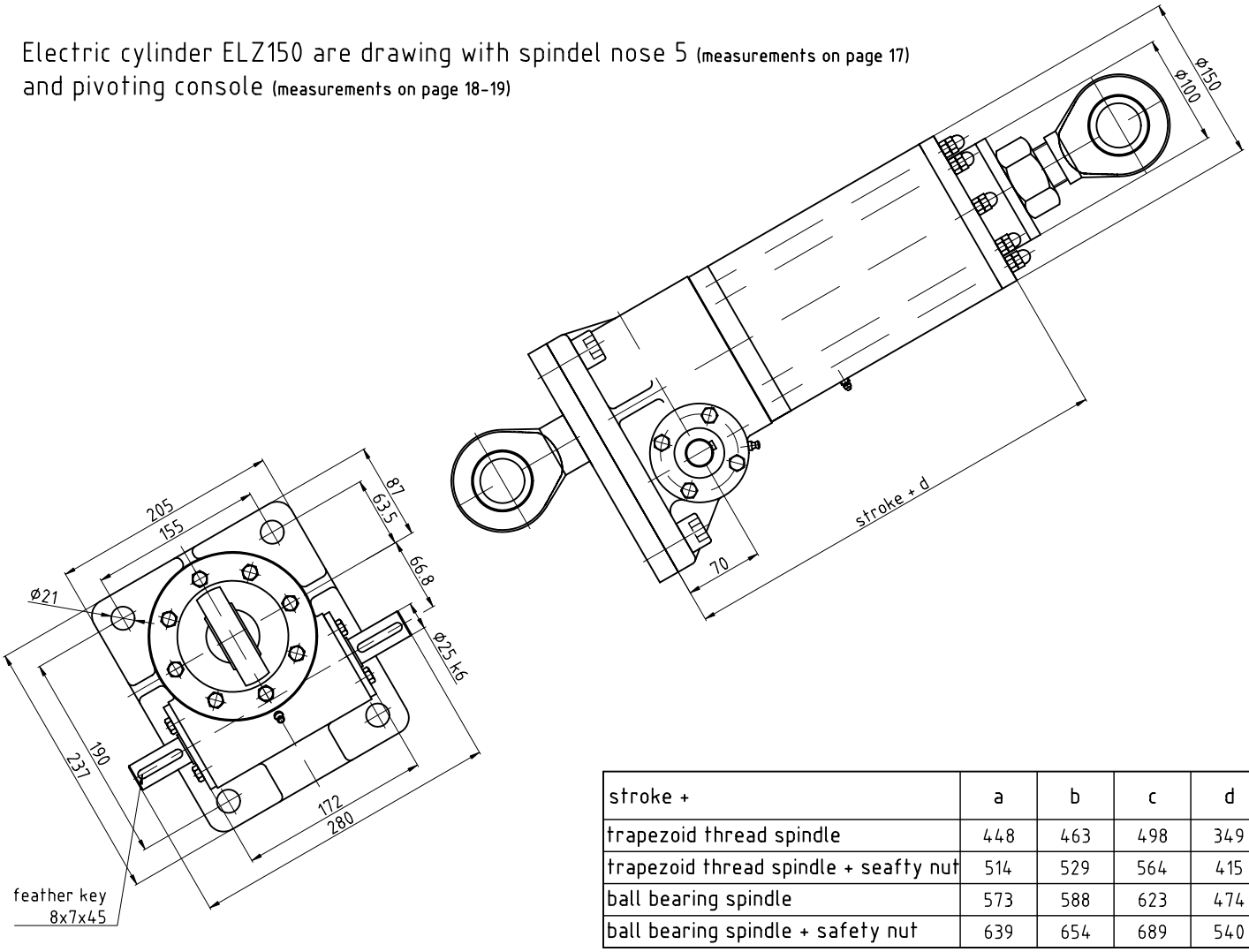
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

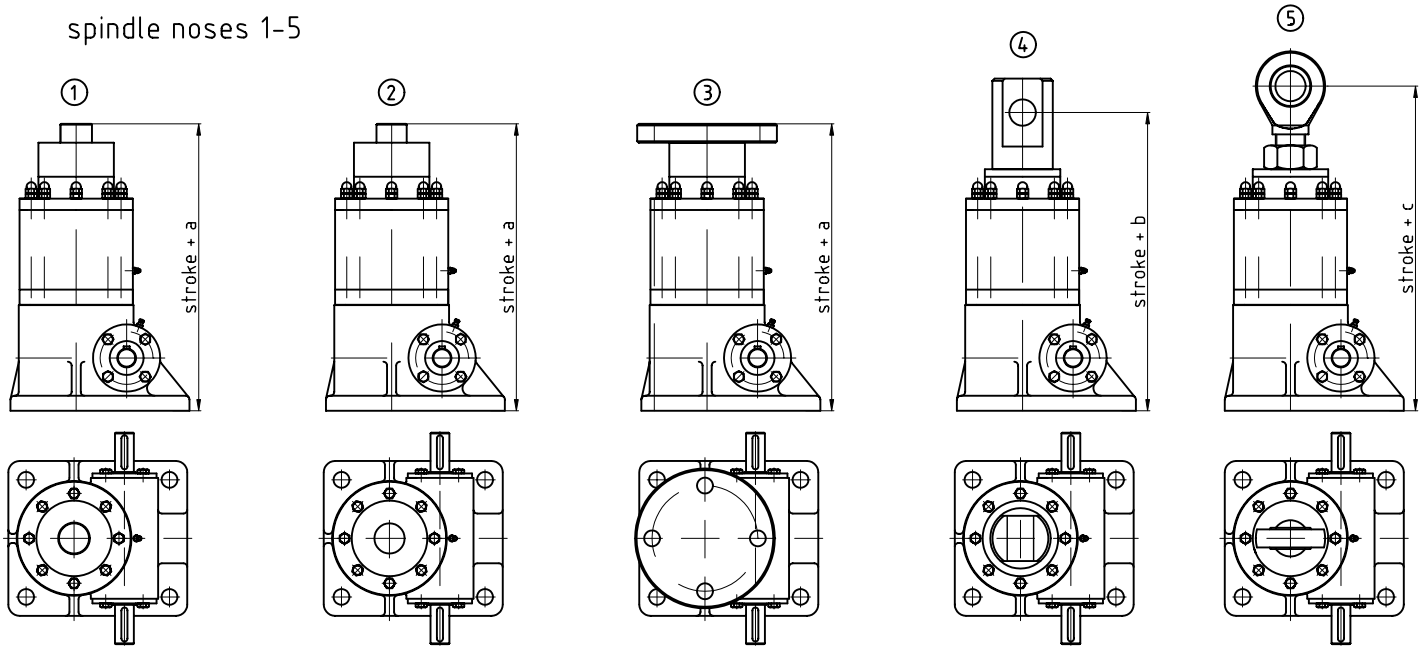
Electric cylinder ELZ 150

Electric cylinder ELZ150 are drawing with spindel nose 5 (measurements on page 17)
and pivoting console (measurements on page 18-19)



stroke +	a	b	c	d
trapezoid thread spindle	448	463	498	349
trapezoid thread spindle + seafty nut	514	529	564	415
ball bearing spindle	573	588	623	474
ball bearing spindle + safety nut	639	654	689	540

spindle noses 1-5



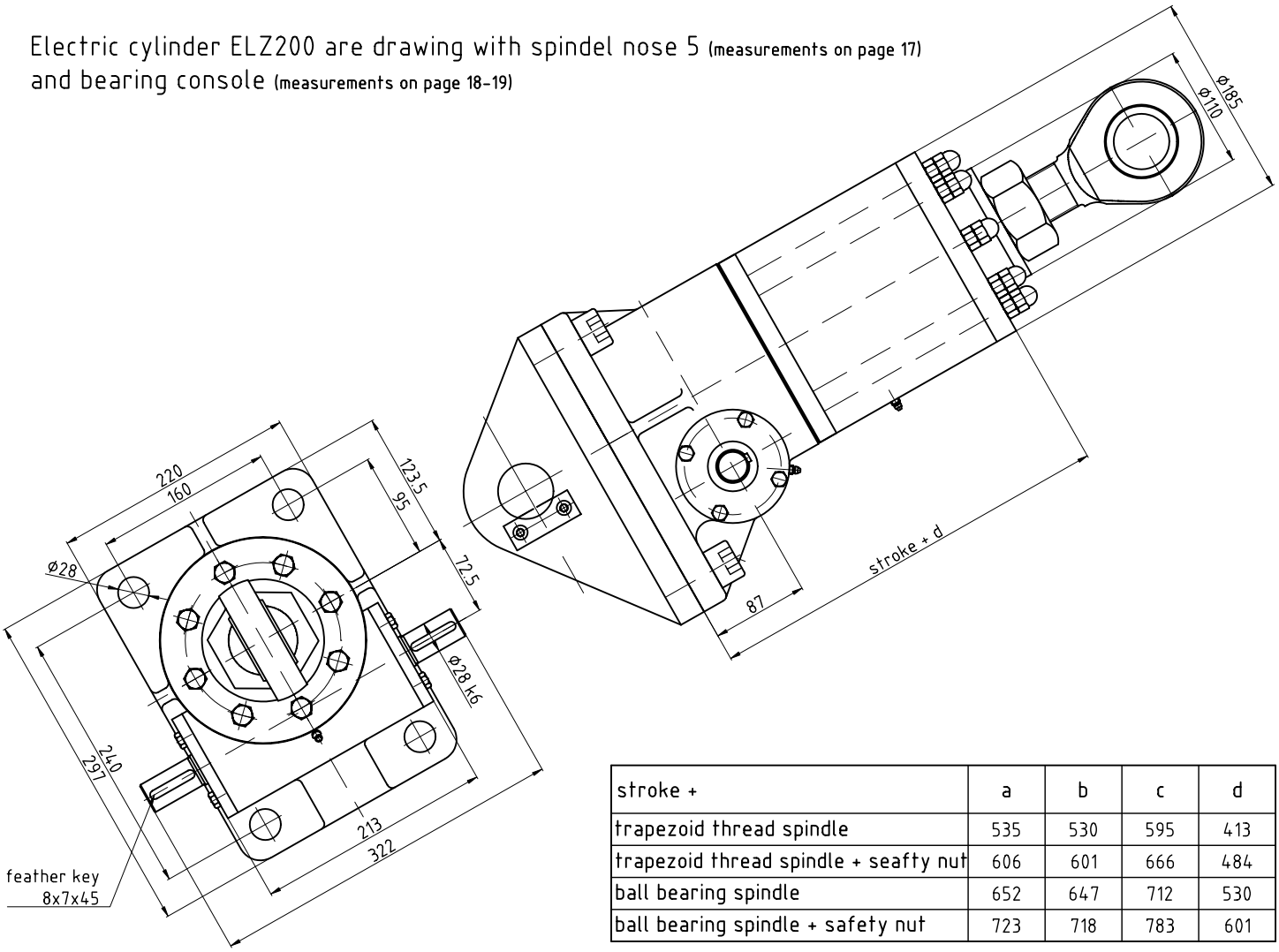
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

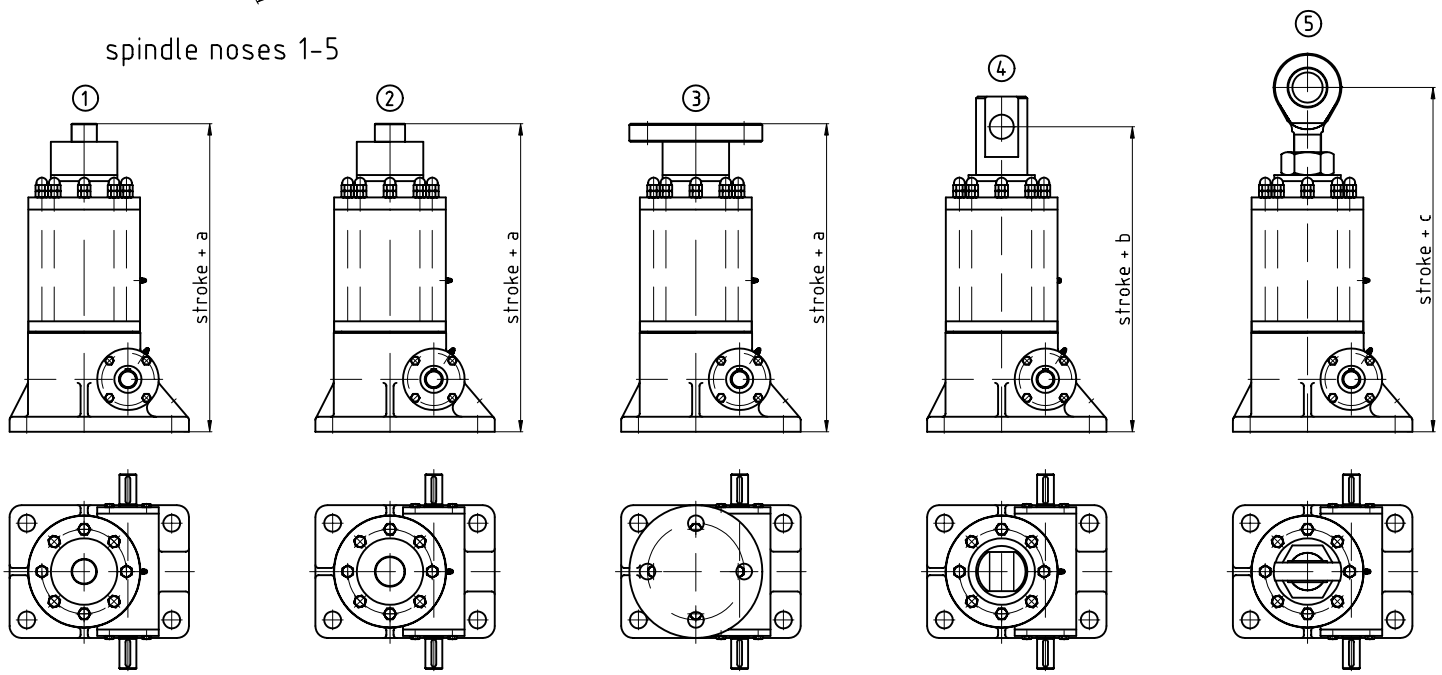
Electric cylinder ELZ 200

Electric cylinder ELZ200 are drawing with spindel nose 5 (measurements on page 17)
and bearing console (measurements on page 18-19)



stroke +	a	b	c	d
trapezoid thread spindle	535	530	595	413
trapezoid thread spindle + seafty nut	606	601	666	484
ball bearing spindle	652	647	712	530
ball bearing spindle + safety nut	723	718	783	601

spindle noses 1-5



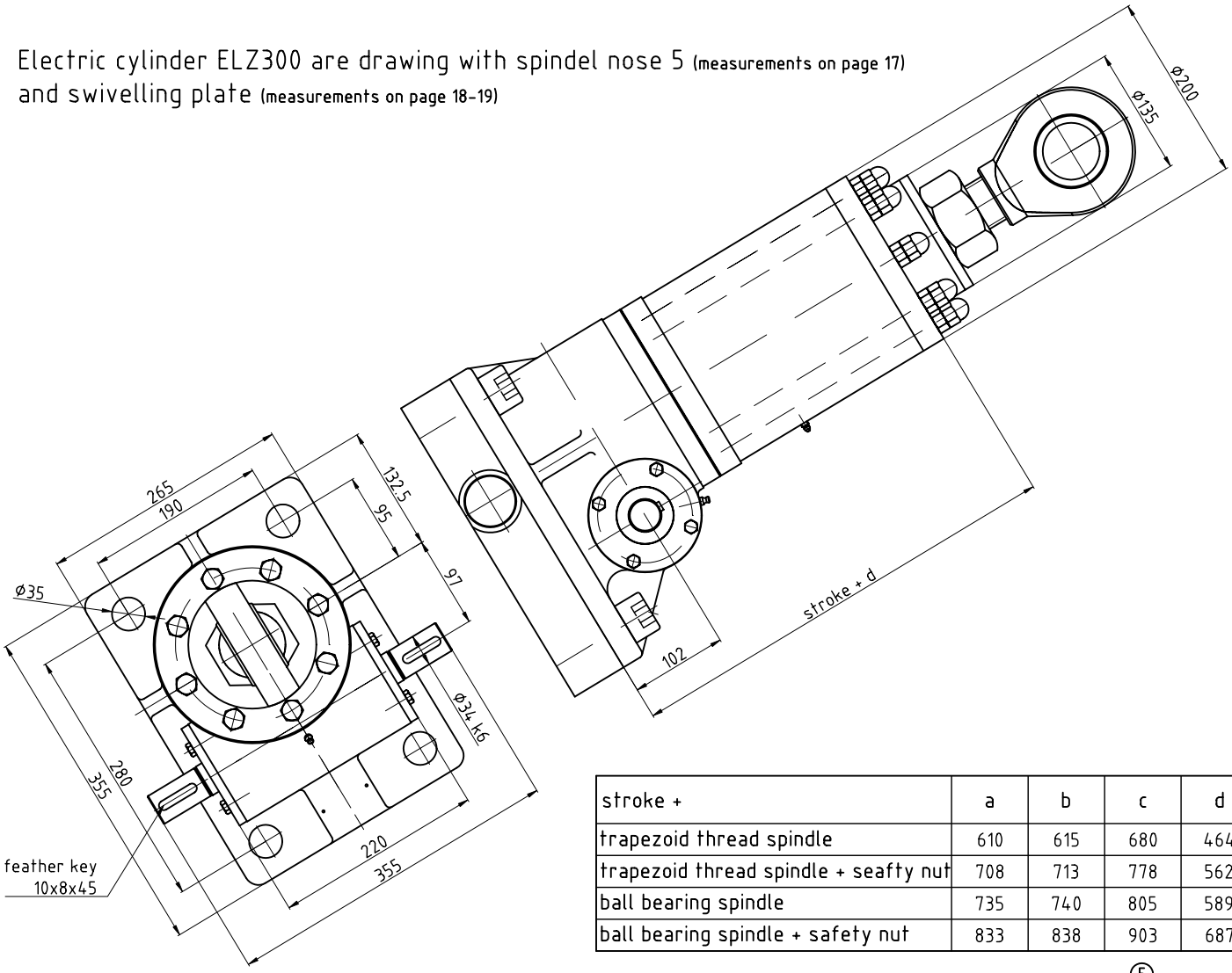
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

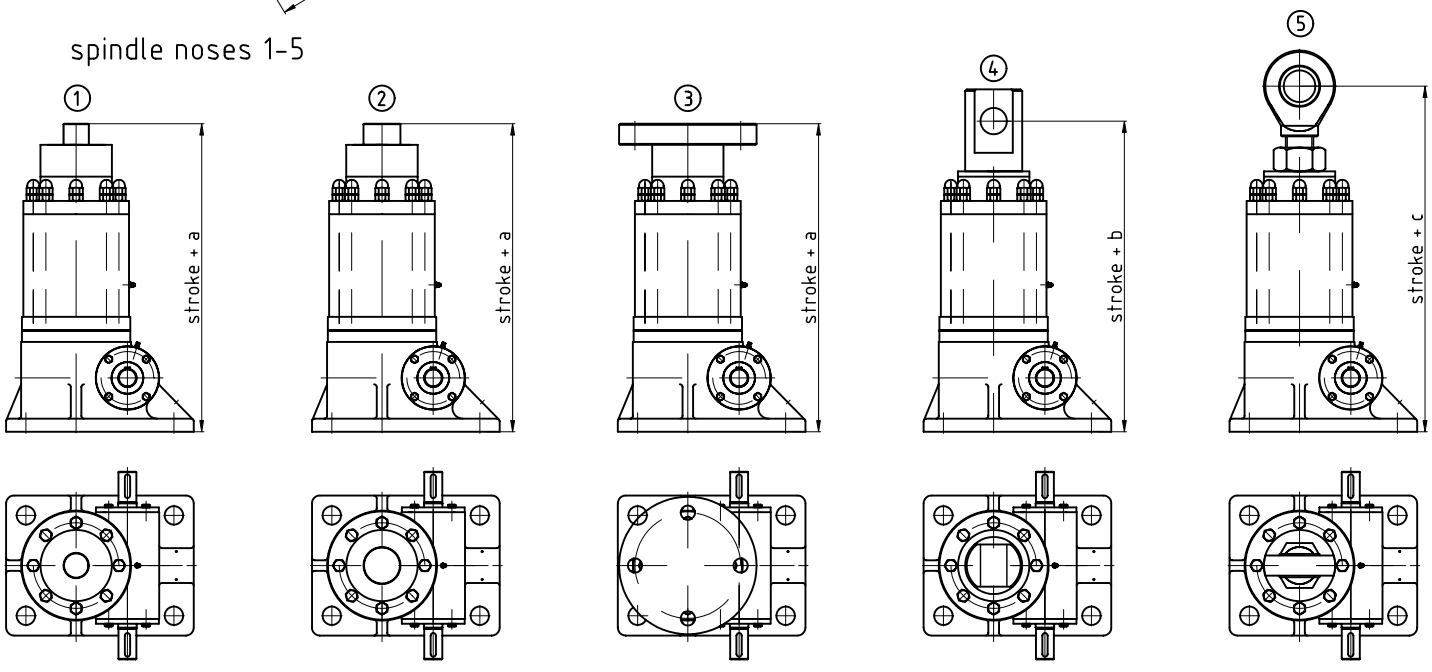
Electric cylinder ELZ 300

Electric cylinder ELZ300 are drawing with spindel nose 5 (measurements on page 17) and swivelling plate (measurements on page 18-19)



stroke +	a	b	c	d
trapezoid thread spindle	610	615	680	464
trapezoid thread spindle + seafty nut	708	713	778	562
ball bearing spindle	735	740	805	589
ball bearing spindle + safety nut	833	838	903	687

spindle noses 1-5



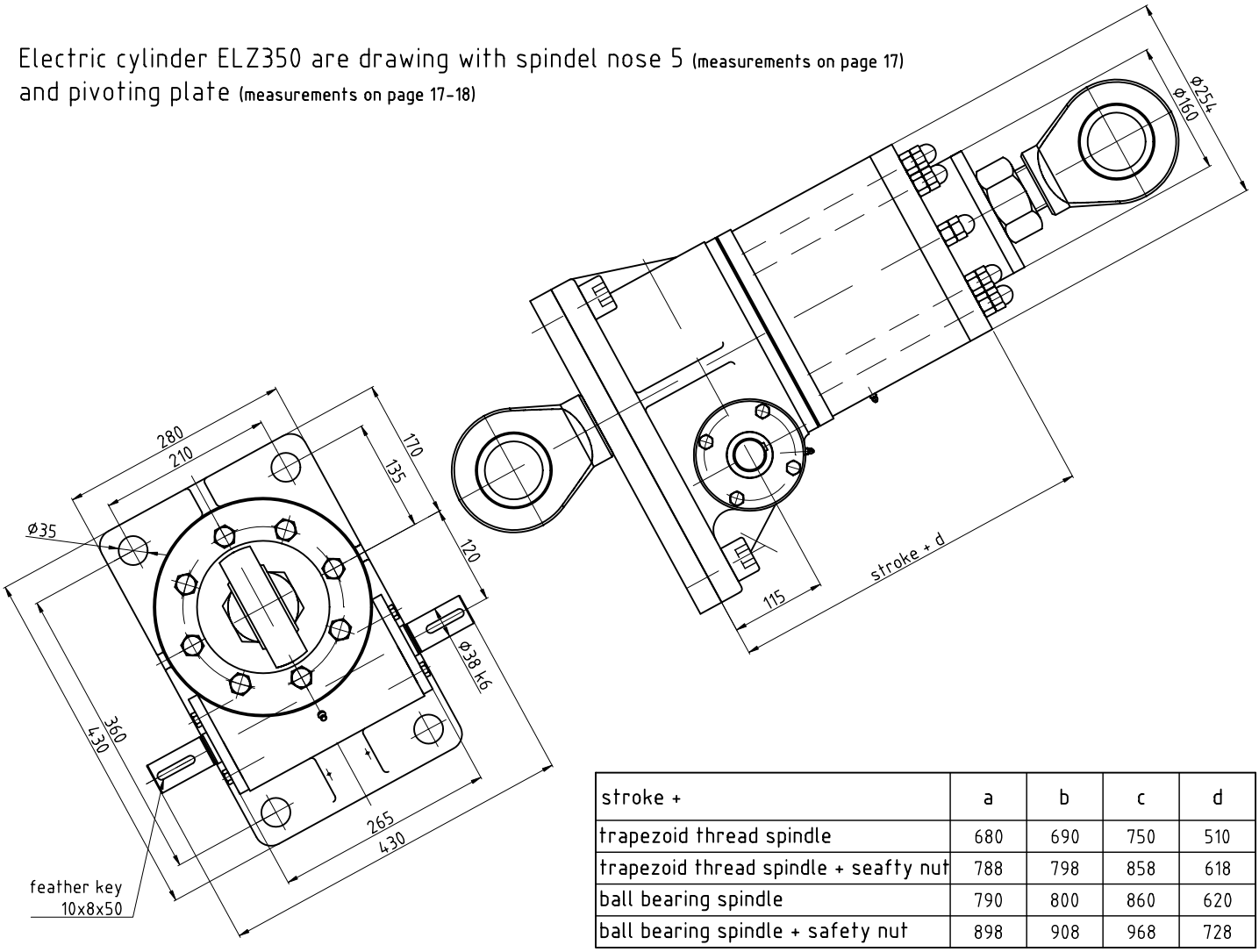
spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

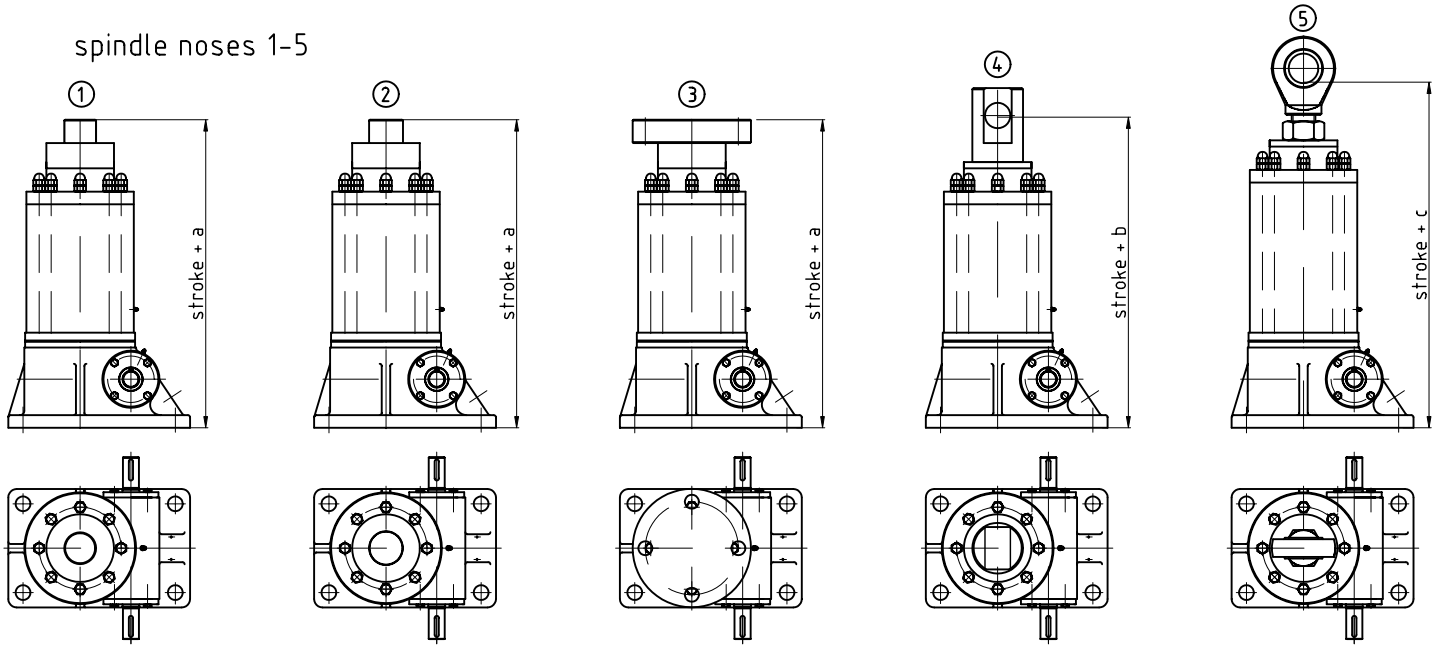
Electric cylinder ELZ 350

Electric cylinder ELZ350 are drawing with spindel nose 5 (measurements on page 17) and pivoting plate (measurements on page 17-18)



stroke +	a	b	c	d
trapezoid thread spindle	680	690	750	510
trapezoid thread spindle + seafty nut	788	798	858	618
ball bearing spindle	790	800	860	620
ball bearing spindle + safety nut	898	908	968	728

spindle noses 1-5

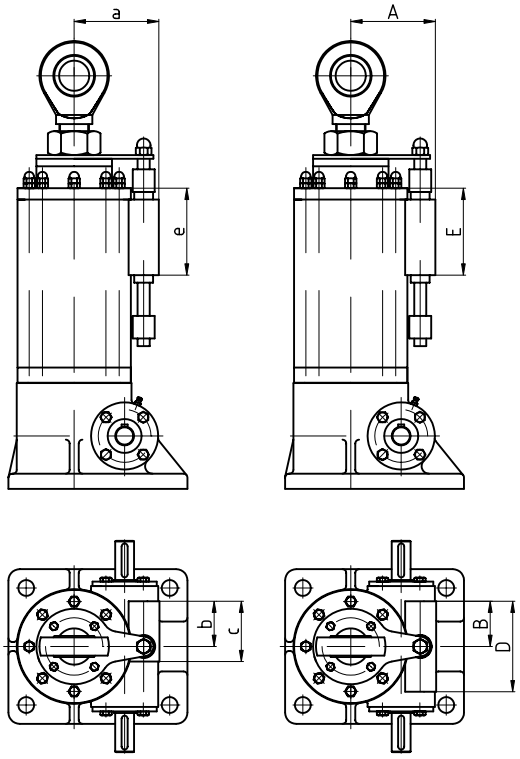


spindel noses 90° turned are possible

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

Limit stop with infinitely adjustable limit switches

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

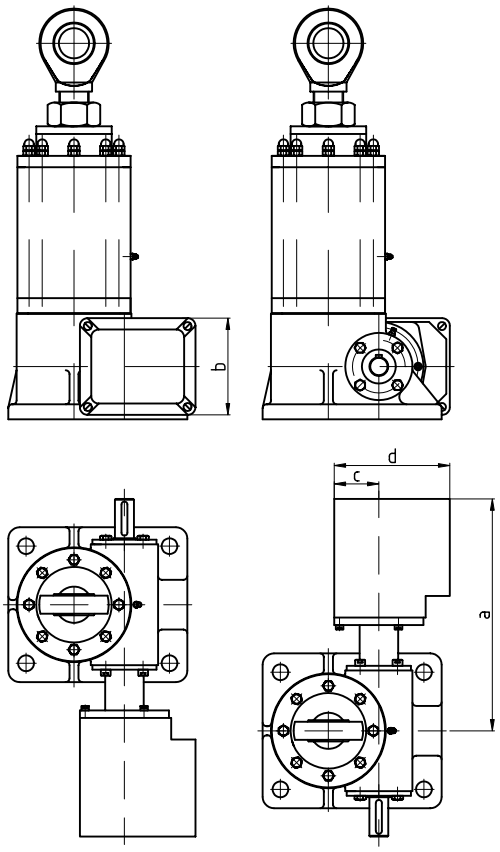


Limit stop with ever one operating limit switch above and down

ELZ	5	15	30	50	100	150	200	300	350
a	71	79	81,5	99	106	112	132,5	136	163
b	60	60	60	60	60	60	60	60	60
c	80	80	80	80	80	80	80	80	80
d	120	120	120	120	120	120	120	120	120
e	106,5	115	115	115	115	115	120	125	130
Special executions on request									

Limit stop with ever one operating and emergency limit switch above and down

ELZ	5	15	30	50	100	150	200	300	350
A	71	79	81,5	99	106	112	132,5	136	163
B	60	60	60	60	60	60	60	60	60
C	80	80	80	80	80	80	80	80	80
D	120	120	120	120	120	120	120	120	120
E	106,5	115	115	115	115	115	120	125	130
Special executions on request									



Limit stop with Geared com limit switch

with ever one operating limit switch above and down

ELZ	5	15	30	50	100	150	200	300	350
a×	221	241,5	251	260	273	282	298	303	322
b	128	128	128	128	128	128	128	128	128
c	59	59	59	59	59	59	59	59	59
d	153	153	153	153	153	153	153	153	153
Special executions on request									

× Measure a dependet from stroke

Limit stop with Geared com limit switch

with ever one operating and emergency limit switch above and down

ELZ	5	15	30	50	100	150	200	300	350
a×	246	266,5	276	285	298	307	323	328	347
b	128	128	128	128	128	128	128	128	128
c	59	59	59	59	59	59	59	59	59
d	153	153	153	153	153	153	153	153	153
Special executions on request									

× Measure a dependet from stroke

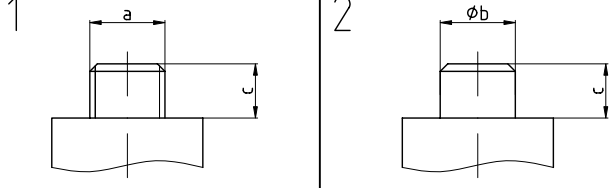
Limit switch housing made of glass fibre reinforced polycarbonate with the degree of protection IP66

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

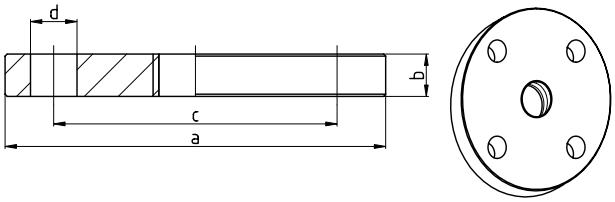
Spindle noses

Spindle nose 1 and 2



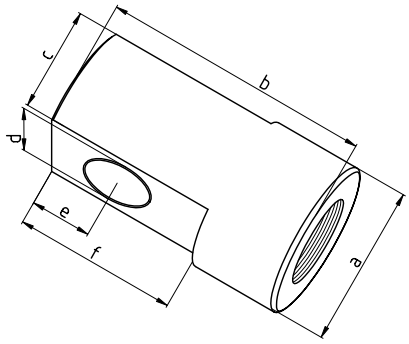
ELZ	5	15	30	50	100	150	200	300	350
a	M12	M16	M20x1,5	M30x1,5	M36x3	M42x1,5	M50x3	M70x3	M80x3
Øb	12	16	20	25	35	40	50	70	80
c	22	20	32	42	45	50	62	65	75
Special executions on request									

Spindle nose 3



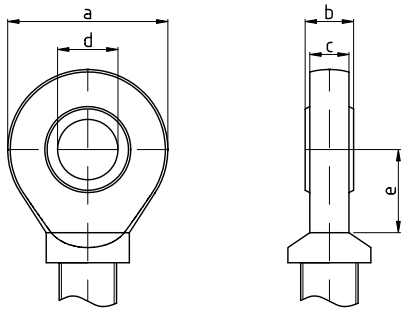
ELZ	5	15	30	50	100	150	200	300	350
a	82	90	120	160	165	150	220	260	280
b	15	15	18	20	25	25	30	40	55
c	65	70	90	115	120	140	160	200	220
Ød	7	9	10,5	17	18	21	26	27	33
Special executions on request									

Spindle nose 4



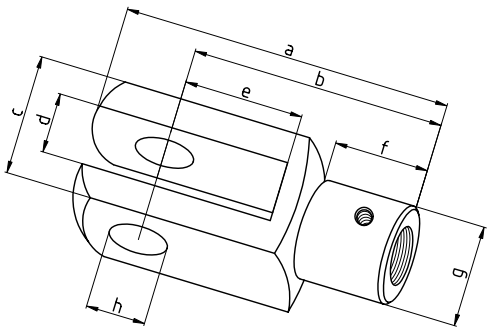
ELZ	5	15	30	50	100	150	200	300	350
a	30	35	40	55	65	80	85	108	120
b	50	50	65	90	100	120	130	155	175
c	20	25	30	40	50	60	65	80	100
Ød	15	15	15	25	30	35	40	50	60
e	15	15	23	30	30	45	50	60	100
f	30	35	46	60	70	90	100	120	130
Special executions on request									

Spindle nose 5



ELZ	5	15	30	50	100	150	200	300	350
a	34	40	53	73	82	92	112	135	160
b	10	12	16	22	25	28	35	44	49
c	8	10	13	19	21	23	30	38	42
Ød	12	15	20	30	35	40	50	60	70
e	19	20	27,5	37	43	48	60	75	87
Special executions on request									

Spindle nose 6



ELZ	5	15	30	50	100	150	200	300	350
a	62	72	105	148	188	-----	-----	-----	-----
b	48	56	80	110	144	-----	-----	-----	-----
c	24	27	40	60	72	-----	-----	-----	-----
d	12	14	20	30	36	-----	-----	-----	-----
e	24	28	40	60	72	-----	-----	-----	-----
f	18	22,5	30	40	54	-----	-----	-----	-----
g	20	24	34	48	60	-----	-----	-----	-----
Øh	12	14	20	30	36	-----	-----	-----	-----
Special executions on request									

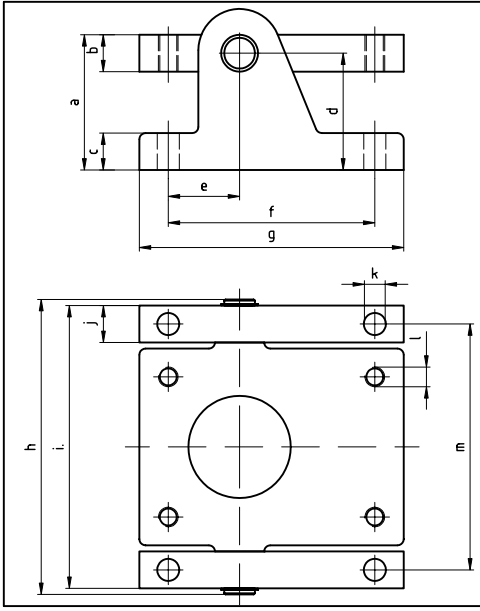
---- on request

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

Swivelling console, Swivelling plate, Bearing console and Pivoting plate

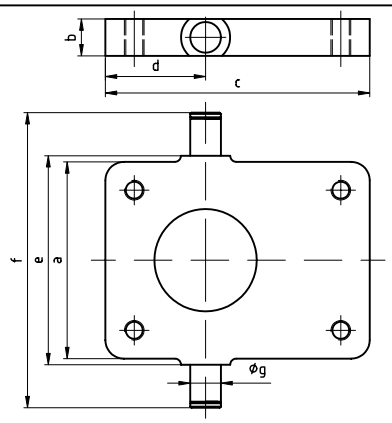
Swivelling console (SK)



ELZ	5	15	30	50	100	150	200	300	350
a	50	67,5	90	110	110	150	160	170	210
b	10	15	25	30	35	45	50	60	65
c	8	15	20	30	30	30	40	50	60
d	45	60	77,5	95	92,5	127,5	135	140	177,5
e	30	37,5	50	58	60	63,5	95	95	135
f	60	110	135	168	180	190	240	280	360
g	70	135	165	215	225	237	297	355	430
h	150	150	190	240	270	297	322	411	424
i	144	140	180	230	260	285	310	395	410
j	10	15	25	30	30	35	40	60	60
k	6	9	13	18	18	21	26	35	35
l	M8	M8	M12	M16	M16	M20	M24	M30	M30
m	134	125	155	200	230	250	270	335	350
Special executions on request									

Product as delivered: enclosed

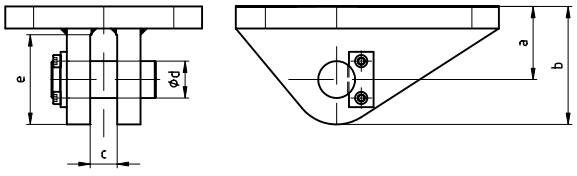
Swiveling plate (SP)



ELZ	5	15	30	50	100	150	200	300	350
a	120	100	120	160	190	205	220	265	280
b	10	15	25	30	35	45	50	60	65
c	65	135	165	215	225	237	297	355	430
d	32.5	50	65	81,5	82,5	87	123,5	133	170
e	124	110	130	170	200	215	230	275	290
f	150	150	190	240	270	297	322	411	424
g	8 f7	14 h7	20 h7	25 h7	32 h7	40 h7	45 h7	55 h7	60 h7
Special executions on request									

Product as delivered: enclosed

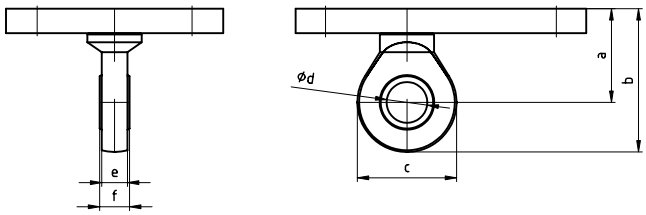
Bearing console (LK)



ELZ	5	15	30	50	100	150	200	300	350
a	30	40	46	59,5	65	71	86	101,5	115
b	47	61	72,5	96	106	117	142	169	195
c	10	12	16	22	26	28	35	44	49
d	12	15	20	30	35	40	50	60	70
e	34	42	54	73	82	92	112	135	162
Special executions on request									

Product as delivered: enclosed

Pivoting plate (GP)



ELZ	5	15	30	50	100	150	200	300	350
a	37	45	52	69	80	96	112	129	144
b	54	65	78,5	105,5	121	147	168	196,5	224
c	34	40	53	73	82	92	112	135	160
d	12	15	20	30	35	40	50	60	70
e	8	10	13	19	21	23	30	38	42
f	10	12	16	22	25	28	35	44	49
Special executions on request									

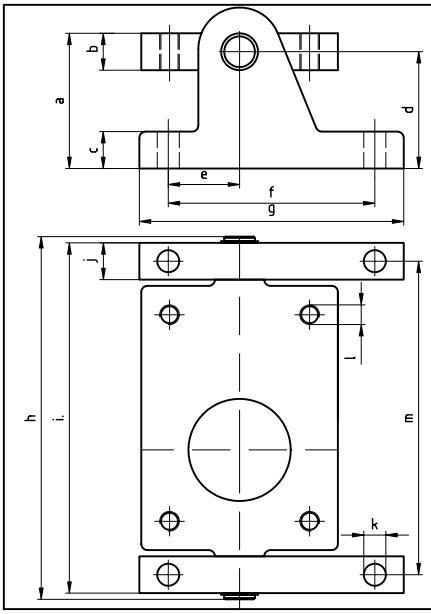
Product as delivered: enclosed

Special executions on request are possible
Subjects to measurements changes, representation not Obligatory

Swivelling console, Swivelling plate, Bearing console and Pivoting plate 90° turned

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

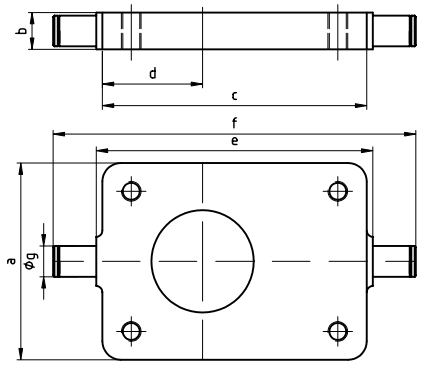
Swivelling console 90° turned (SK)



ELZ	5	15	30	50	100	150	200	300	350
a	50	67,5	90	110	110	150	160	170	210
b	10	15	25	30	35	45	50	60	65
c	8	15	20	30	30	30	40	50	60
d	45	60	77,5	95	92,5	127,5	135	140	177,5
e	30	37,5	50	58	60	63,5	95	95	135
f	60	110	135	168	180	190	240	280	360
g	70	135	165	215	225	237	297	355	430
h	106	185	235	295	305	329	399	501	574
i	100	175	225	285	295	317	387	485	560
j	10	15	25	30	30	35	40	60	60
k	6	9	13	18	18	21	26	35	35
l	M8	M8	M12	M16	M16	M20	M24	M30	M30
m	90	160	200	255	265	282	347	425	500
Special executions on request									

Product as delivered: enclosed

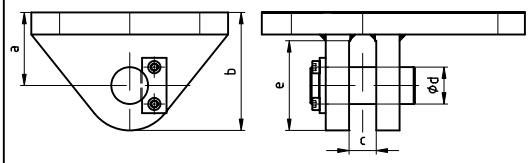
Swiveling plate 90° turned (SP)



ELZ	5	15	30	50	100	150	200	300	350
a	120	100	120	160	190	205	220	265	280
b	10	15	25	30	35	45	50	60	65
c	65	135	165	215	225	237	297	355	430
d	32.5	50	65	81,5	82,5	87	123,5	133	170
e	80	145	175	223,5	235	247	307	365	440
f	160	185	235	293,5	305	329	399	501	574
g	8 f7	14 h7	20 h7	25 h7	32 h7	40 h7	45 h7	55 h7	60 h7
Special executions on request									

Product as delivered: enclosed

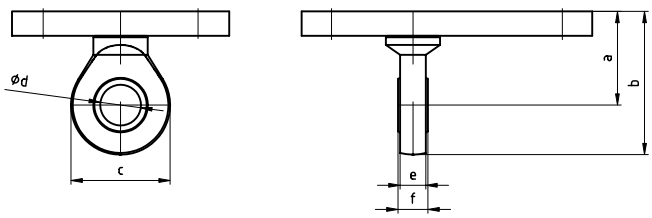
Bearing console turned (LK)



ELZ	5	15	30	50	100	150	200	300	350
a	30	40	46	59,5	65	71	86	101,5	115
b	47	61	72,5	96	106	117	142	169	195
c	10	12	16	22	26	28	35	44	49
d	12	15	20	30	35	40	50	60	70
e	34	42	54	73	82	92	112	135	162
Special executions on request									

Product as delivered: enclosed

Pivoting plate (GP)



ELZ	5	15	30	50	100	150	200	300	350
a	37	45	52	69	80	96	112	129	144
b	54	65	78,5	105,5	121	147	168	196,5	224
c	34	40	53	73	82	102	112	135	160
d	12	15	20	30	35	45	50	60	70
e	8	10	13	19	21	27	30	38	42
f	10	12	16	22	25	32	35	44	49
Special executions on request									

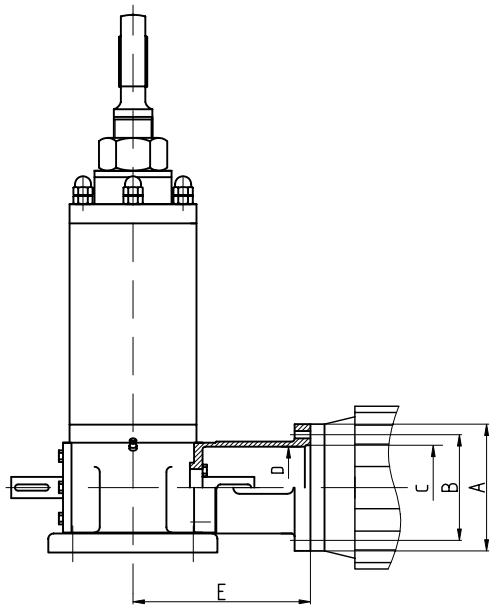
Product as delivered: enclosed

Special executions on request are possible
Subjects to measurements changes, representation not Obligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

Motor flanges
Crank handeles, Hand wheels

Motor flanges

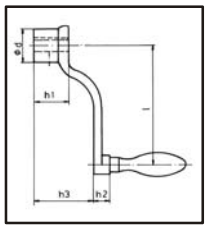


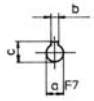
Important:

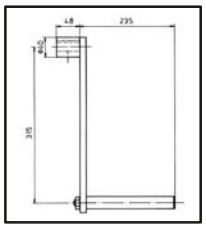
Unless otherwise requested by the customer, motor flanges are mounted on the right, as shown above!
Engines and fastening bolts are delivered non mounted.

	type of motor	flange ΦA	ΦB	ΦC	ΦD	E	shaft endsΦ SG	shaft endsΦ Motor	4 pces bolts DIN 912 f. motor
ELZ 5	56 B14	80	65	50	44	93	10	9	M5 x 16
	63 B14	90	75	60	44	96	10	11	M5 x 20
	71 B14	105	85	70	44	103	10	14	M6 x 25
ELZ15	63 B14	90	75	60	52	114	14	11	M5 x 20
	71 B14	105	85	70	52	121	14	14	M6 x 25
	80 B14	120	100	80	52	131	14	19	M6 x 25
ELZ 30	71 B14	105	85	70	59	136	16	14	M6 x 25
	80 B14	120	100	80	59	146	16	19	M6 x 25
	90 B14	140	115	95	59	156	16	24	M8 x 25
ELZ 50	90 B14	140	115	95	76	181	20	24	M8 x 25
	100 B14	160	130	110	76	193	20	28	M8 x 25
	112 B14	160	130	110	76	193	20	28	M8 x 25
ELZ 100	100 B14	160	130	110	80	203	24	28	M8 x 25
	112 B14	160	130	110	80	203	24	28	M8 x 25
	132 B14	200	215	180	80	225	24	38	M10 x 30
ELZ 150	100 B14	160	130	110	84	218	25	28	M8 x 25
	112 B14	160	130	110	84	218	25	28	M8 x 25
	132 B14	200	215	180	84	240	25	38	M10 x 30
ELZ 200	132 B14	200	215	180	100	263	28	38	M10 x 30
	160 B5	350	300	250	100	307	28	42	M16 x 60 + 4 nuts
ELZ 300	132 B14	200	215	180	114	278	34	38	M10 x 30
	160 B5	350	300	250	114	312	34	42	M16 x 60 + 4 nuts
ELZ 350	160 B5	350	300	250	130	349	38	42	M16 x 60 + 4 nuts
	180 B5	350	300	250	130	351	38	48	M16 x 60 + 4 nuts

Crank handles







Ch 1

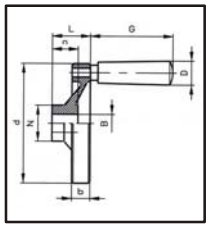
BG	5	10	25
a F 7	10	14	16
b P 9	3	5	5
c	11,4	16,3	18,3
d	28	38	38
h1	28	38	38
h2	13	14	14
h3	48	65	65
l	100	160	160

Ch 2

BG	50	100	150
a F 7	20	25	25
b P 9	6	8	8
c	22,8	27,3	28,3

Dimensional variations according to DIN 7168 medium.
Deviating dimensions on request.

Hand wheels

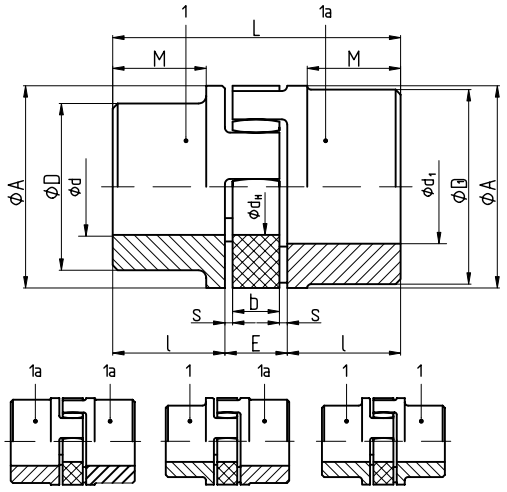


type	d	N	b	n	L	G	D	Pilot drill B H7	Weight [Kg]
BG 5	80	26	13,0	16	30	58,5	22	10	0,16
BG 10	125	31	15,0	18	34	67,5	23	14	1,3
BG 25	160	36	18,0	20	37	67,5	23	14	1,5
BG 50, 100	200	42	20,5	24	45	80,0	26	18	1,0
BG 100, 150	250	48	23,0	28	51	90,0	28	24	1,3

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

Elektric cylinder accessories

Elastic coupling (KU)



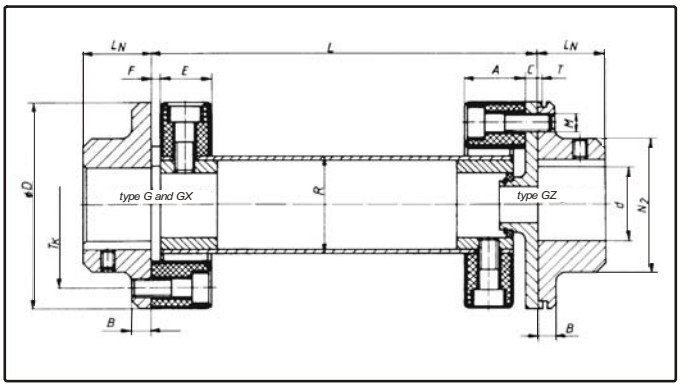
Type R	Mt nom. in Nm [1] at 80° Shore	Mt nom. in Nm [1] at 92° Shore	Mt nom. in Nm [1] at 98° Shore	holes hub 1 pilot drill	holes hub 1 finished Φd min	holes hub 1 finished Φd max	holes hub 1a pilot drill	holes hub 1a finished Φd1 min	holes hub 1a finished Φd1 max	ΦA	ΦD	ΦD1	L	l	E	s	b	M	ΦdH	material	weight [3] type 1 in kg	weight [3] type 1a in kg
14	4	7	12	-	4	14	-	-	-	30	30	-	35	11	13	1,5	10	-	10	Alu oder GG	0,14	0,14
19/24	5	10	17	4	6	19	-	6	24	40	32	40	66	25	16	2	12	-	18		0,32	0,36
24/28	17	35	60	6	8	24	6	8	28	55	40	48	78	30	18	2	14	24	27		0,60	0,72
28/38	46	95	160	8	10	28	8	10	38	65	48	65	90	35	20	2,5	15	28	30		0,97	1,33
38/45	93	190	325	10	12	38	36	38	45	80	66	77	114	45	24	3	18	37	38		2,08	2,46
42/55	130	265	450	12	14	42	40	42	55	95	75	94	126	50	26	3	20	40	46		3,21	3,93
48/60	150	310	525	13	15	48	46	48	60	105	85	102	140	56	28	3,5	21	45	51		4,41	5,19
55/70	180	375	625	18	20	55	52	55	70	120	98	120	160	65	30	4	22	52	60	GG	6,64	8,10
65/75 [2]	205	425	640	20	22	65	63	65	75	135	115	135	185	75	35	4,5	26	61	68		10,13	11,65
75/90 [2]	475	975	1465	28	30	75	73	75	90	160	135	160	210	85	40	5	30	69	80		16,03	19,43

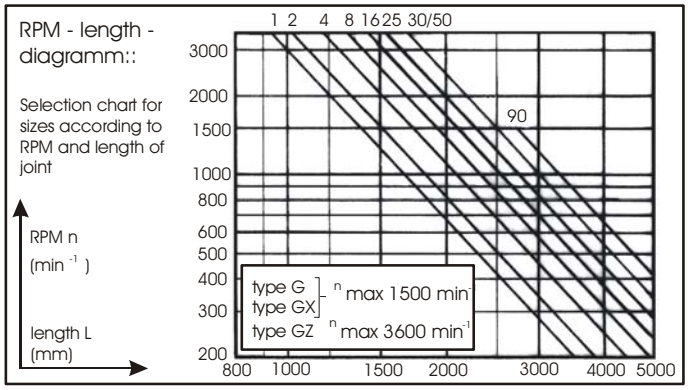
[1] The rated turning moments are valid for normal operation with slight jolts; due to the higher start-up moment of three-phase squirrel cage motors an impact factor of 2 must be taken into account.
[2] from size 65/75 95° Shore on
[3] weight for GG, aluminium approx. 60% less.

Product as delivered: enclosed

Finish-borings are made according, to the ISO system of tolerances H7. Feather key grooves are made according to DIN 6885/1. The max. angle shift is 1°30 , the twisting angle 3,2° at Mt nom. The operable temperature range lies between -40°C and +100°C.

Elastic propeller shafts G/GX/GZ





size	rated torque [Nm] type G	GX	GZ	weight [kg] for 2 hubs	for 1 m tube	max. shift of angle G+GZ	GX	A	B	C	ØD	pilot drill d	d max	E	F	L_N	ØN_2	R	T	T_K /M
1	10	10	10	1,0	1,1	3°	1°	24	7	5	56	8	25	22	2	24	36	30	1,5	Ø 44 / 2 x M6
2	20	30	20	2,2	1,4	3°	1°	24	8	5	85	12	38	20	4	28	55	40	1,5	Ø 68 / 2 x M8
4	40	60	40	3,4	1,6	3°	1°	28	8	5	100	15	45	24	4	30	65	45	1,5	Ø 80 / 3 x M8
8	80	120	80	7,3	2,2	3°	1°	32	10	5	120	18	55	28	4	42	80	60	1,5	Ø100 / 3 x M10
16	160	240	160	12,4	2,5	3°	1°	42	12	5	150	20	70	36	6	50	100	70	1,5	Ø125 / 3 x M12
25	250	370	250	19,1	3,1	3°	1°	46	14	5	170	20	85	40	6	55	115	85	1,5	Ø140 / 3 x M14
30	400	550	400	31,1	4,8	3°	1°	58	16	5	200	25	100	50	8	66	140	100	1,5	Ø165 / 3 x M16
50	600	-	600	32,1	4,8	3°	1°	58	16	5	200	25	100	50	8	66	140	100	1,5	Ø165 / 3 x M16
90	900	-	900	58,7	7,6	3°	1°	70	19	5	260	30	110	62	8	80	160	125	2,0	Ø215 / 3 x M20

Special executions on request are possible
Subjects to measurements changes, representation not abligatory

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

Symbols:

F (kN)	= dynamic load	P_{Elz} (kW)	= operating performance of the spindle gear
v (m/min)	= lifting speed	P_{ges} (kW)	= operating performance of all spindle gears
s (mm)	= spindle pitch	P_{Anl} (kW)	= operating performance of the system
n (R/min)	= revolutions/min at the worm	η_{ges}	= operating efficiency (preselection table page 5)
i	= worm gear reduction	η_{Anl}	= efficiency of the system
f_M	= factor for spindle load torque	M_{sp} (Nm)	= spindle load torque
		M (Nm)	= load torque at the worm

Driving power:

If the required driving power cannot be read sufficiently clear from the preselection and performance charts, it is computed as follows:

Driving power P_{Elz} per spindle gear:

$$P_{Elz} = \frac{F \times v}{61{,}2 \times \eta_{ges}}$$

Driving power P_{ges} all of multiple spindle systems:

After adding the individual performances P_{Elz} to reach the total performance P_{ges}, the losses of spacer shafts, bevel gears, couplings, pedestal bearings, alignment errors etc. must be allowed for.

Standard value in case of 2 spindle gears	η	0,95
3 spindle gears	η	0,90
4 spindle gears	η	0,85
6-8 spindle gears	η	0,80

$$P_{Anl} = \frac{P_{ges}}{\eta_{Anl}}$$

Starting capacity:

To compute the starting capacity the performance value P_{Elz} or P_{Anl} is multiplied by 1.3.

Ambient temperature:

At an ambient temerature higher than +20°C the operating factor must be reduced in correspondence with the following table.

Ambient temperature °C	50	60	70	80
max. permiss.OF in %/h	18	15	10	5
max. permiss.OF in %/10min	27	22	15	8

Load torque at the worm:

$$M = \frac{F \times s}{2 \times \pi \times i \times \eta_{ges}}$$

$$M = \frac{9550 \times P_{Elz}}{n}$$

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

Mounting

Spindle gears without swivelling equipment must be mounted in true alignment on a flat surface which must be so stiff that it can assume the maximal load without oscillations or deformations.
In lifting systems the spindle noses (in case of the basic type) or the traveling nuts (in case of the traveling nut type) must lie level with each other before the worms of the spindle gears are connected.
Before the driving gear is mounted the sense of rotation must be checked: in bevel gear driven lifting systems the sense of rotation can easily be confused; the result would be faulty mounting and possible damage of the installation.
Before putting it into service the electric cylinder or the lifting system should be turned by hand once. If this requires non uniform forces the electric cylinders are misaligned both to each other and to the installation. Adjustments are necessary; the fastening screws must be worked loose and the whole lifting gear must again be turned by hand.
Oil-lubricated worm gears: the upper screwed sealing plug must be replaced by the vent screw provided.
If our specifications and performances according to the technical instructions are nor observed and/or the components are not used as prescribed, any warranty claims will no longer be applicable.

Maintenance

By electric cylinder the worm gears are filled with the greasing AGIP GRS M2 and the tube systems are filled with the greasing Klüberplex GE11-680 in the factory.
Grease the worm gear and the tube system only in the driven out condition with the lubricating nipples at regular intervals (~ 30-50 operating hours). The intervals depend on the given operating conditions and the duty cycle of the spindle gears. In case of doubt please set up the lubrication plan together with us. After approx. 200-300 operating hours the wear of the tube system due to the backlash of threads should be checked. The maximal normal backlash of single trapezoid threads must not exceed 1/4 of the thread pitch. In the cases of multiple threads or special threads 1/4 of P is the maximum normal acceptable backlash.
When the maximum normal backlash is reached, the traveling nut in the tube system must be replaced. After a short run-in period all screws must be checked.
After approx. 500 operating hours we recommend cleaning gear and spindle to remove the grease, checking all parts as to wear, and recharging them with new grease.
Recommended lubricants: Shell Darina 2, Castrol Grease MS3, BP Energrease LS-EP2.
The lubricant recommended can be used both for gears and spindles. If a high-grade spindle lubricant has to be used, we recommend Klueberplex GE 11-680.
For special conditions (e.g. higher temperatures) we recommend the lubricants specified in the enclosed technical manual.
For oil-lubricated electric cylinders please ask for a special service manual.
If you order spare parts, the gear specifications, marked on the type plate must be provided.

ENZFELDER GMBH
Power transmission- and lifting engineering
Eichengasse 36
A-2551 Enzesfeld-Lindabrunn
Tel.: ++43 (0) 2256 81287-0
Fax: ++43 (0) 2256 81287-95
E-Mail: office@enzfelder.at
Internet: www.enzfelder.at

External dimensions

For connecting dimensions, the tolerances given in the corresponding drawings are valid. The values where no tolerance is indicated are untoeranced dimensions.

The axial backlash of the spindle

The axial backlash of the traveling nut in the tubing system is necessary for the building-up of an adequate lubricating film. Wear during operation will increase the axial backlash; please pay attention to our operating and maintenance instructions.

Spindle pitch P (mm)	6	7	8	10	12	16
max. axial backlash of the threaded spindle as manufactured (mm)	0,25	0,26	0,28	0,30	0,32	0,40
max. permissible axial backlash due to wear (mm)	1,5	1,7	2,0	2,5	3,0	4,0

Pitch errors of the spindle

Due to the work tolerances of the processing machines a pitch error of 0,05 to 0,075 mm per 300 mm threaded length results in whirl thread spindles. In the practice this error has hardly any effect on the precision of the lifting. In case of doubt please contact us.

Backlash of tooth flank

The backlash of the tooth profile between worm and wormwheel is 0,05 to 0,15 mm as manufactured. Due to the high speed-increasing ratios the effect on the lifting motion is practically imperdeptible.

Adjustment tolerance

An adjustment tolerance around 0,1 mm can easily be achieved with one-side load direction and manual operation. In the case of an alternation of load the above-mentioned points must be observed. For manual operation also fixed stop motion devices can be used.
In case of a motor drive a number of additional factors must be taken into account, e.g. speed of the driving motor, lifting load, flywheel effect, speed-reducing ratios in the piece parts, efficiency, load direction etc..
If suitable limit switches are used, which are adjusted in the process of assemblage, the stop point can be determined relatively exactly (prerequisite: constant operating conditions).
If in certain cases greater halting precision is required, braking motors or motor operators equipped with brakes must be used. Fixed stroke-arresting devices are not permissible. If in certain cases running against fixed devices is unavoidable, adequate steps must be taken to make sure that overstress is prevented (e. g. by slipping clutch, load-controlled motor cutoff, etc.).
For further information please contact us.

Questionnaire

COMPANY. . . . .
ADDRESS. . . . .
NAME. . . . . Dept . . Phone. . . . . Fax . . . .

To be able to prepare a proposal meeting your specific demands, please provide us with the following information:

In which systems are the lifting elements to be used?

. . . .
Number of systems . . . .
Number of lifting elements per system . . . .

AXIAL LOAD

per system	pressure	dynamic	. . . . kN	tension	dynamic	. . . . kN
		static	. . . . kN		static	. . . . kN
per spindle	pressure	dynamic	. . . . kN	tension	dynamic	. . . . kN
		static	. . . . kN		static	. . . . kN

OPERATING CONDITIONS

Effective stroke . . . . mm
Side forces acting . . . . kN
Lifting speed desired . . . . mm/min
Mounting of spindle . . . . vertically/horizontally
Ambient temperature . . . . °C
Duty cycle/load conditions per 10min . . . .
per hour . . . .
Distance per alternation of load . . . . mm

FOR WHICH PARTS DO YOU WISH TO RECEIVE OUR OFFER?

Electric cylinder with trapezoid thread spindle

Spindle nose 0/1/2/3/4/5/6/So
Separate spindle nose . . . .

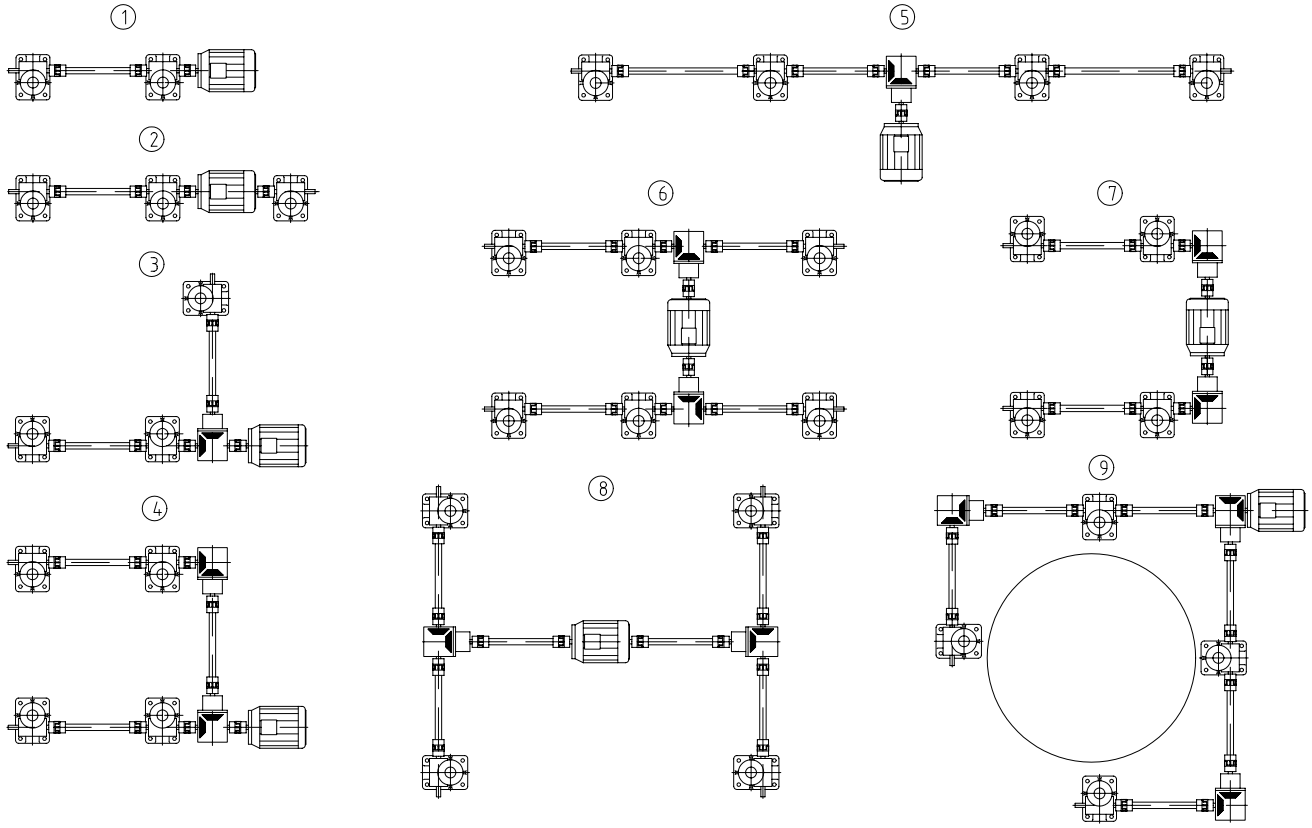
Electric cylinder with ball bearing spindle

Spindle nose 0/1/2/3/4/5/6/So
Separate spindle nose . . . .

bevel gear box . . . . yes/no
Elastic cardan shaft . . . . yes/no
Couplings . . . . yes/no
Pedestal bearing . . . . yes/no
Motor flanges . . . . yes/no
Motor; voltage . . . . frequency . . . . . . system of protection . . . .
Limit stop . . . . yes/no
Crank handle, handwheel . . . . yes/no
bearing console . . . . yes/no
Swivelling console . . . . yes/no
Swivelling plate . . . . yes/no
Other . . . .

Examples for arrangements

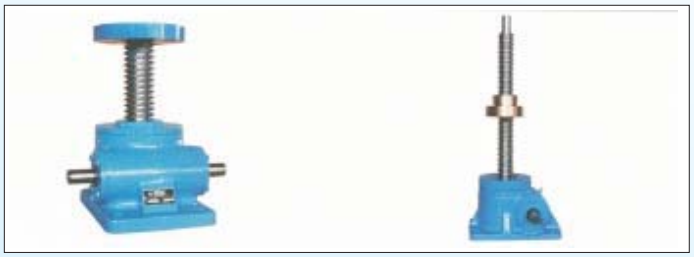
Anordnungsbeispiele



Please provide us with a sketch on the desired arrangement as shown above or according to your own ideas.
Please enter the distance from spindle to spindle and possibly lateral guidings into the sketch.
If you wish to receive an offer on spindle lifting elements actuated by multi-thread spindles or ball screw spindles, or if stainless material is desired, please let us know, too.

Sketch

Delivery programm



FREN Spindle gear for lifting, lowering, pulling,
pushing, sluing, or rotating
Forces up to 3000kN
Lifts up to 10000mm

FREN Electric cylinders for lifting, lowering, pulling,
pushing, sluing, or rotation
Forces up to 1000kN
Lifts up to 2500mm

FREN Bevel gears 'K' and Bevel gears cubic 'H'
for deflecting imput shafts
Speeds up to 6500U/min
Torques up to 5200Nm

FREN Resilient cardan shafts for transmitting
torques with assembling inaccuracies
Angles up to 3°
Torques up to 500Nm

FREN Telescopic gears and telescopic cylinders
for lifting, lowering, pulling, pushing
Forces up to 1000kN
Lifts up to 10000mm

FREN Planet gears in special designs for
reducing speeds and increasing torques
Gear reduction 1,5:1 up to 1500:1
Torques up to 1000Nm

FREN Scissor-type lifting platforms for lifting and lowering
including a wide range of accessories
Forces up to 500kN
Lifts up to 5000mm

FREN Cable winches for lifting, lowering, pulling
or sluing
Forces up to 300kN
Lifts up to 100000mm