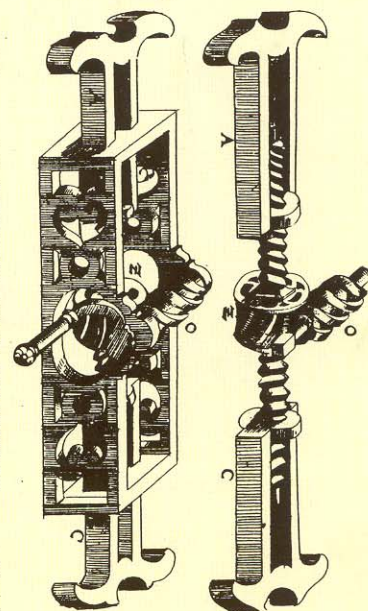
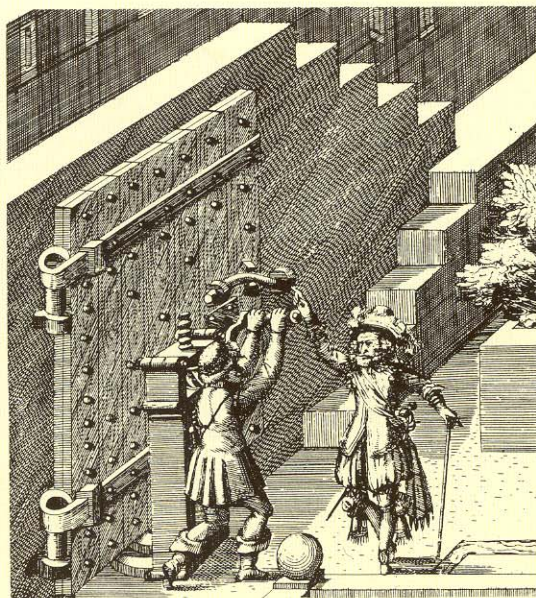
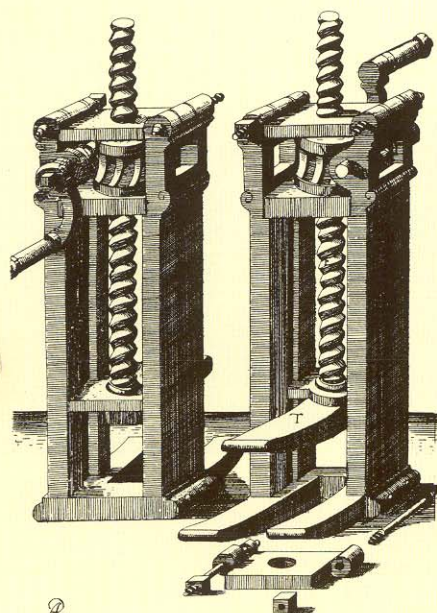




SPINDLE GEARS

the multipurpose alternative
with a history of over 400 years

Old Technology: individual construction made by hand



**New Technology: high-accuracy building blocks
for the constructing engineer**

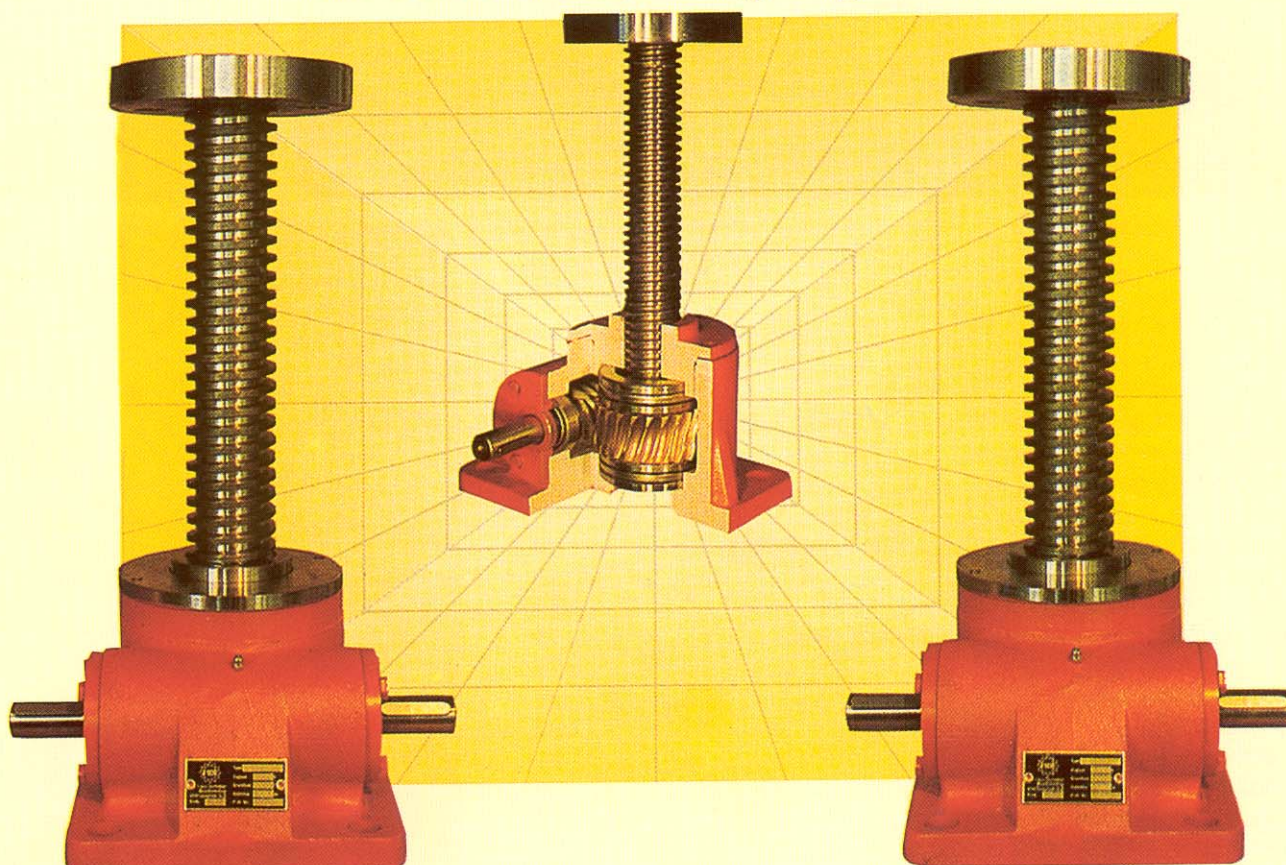


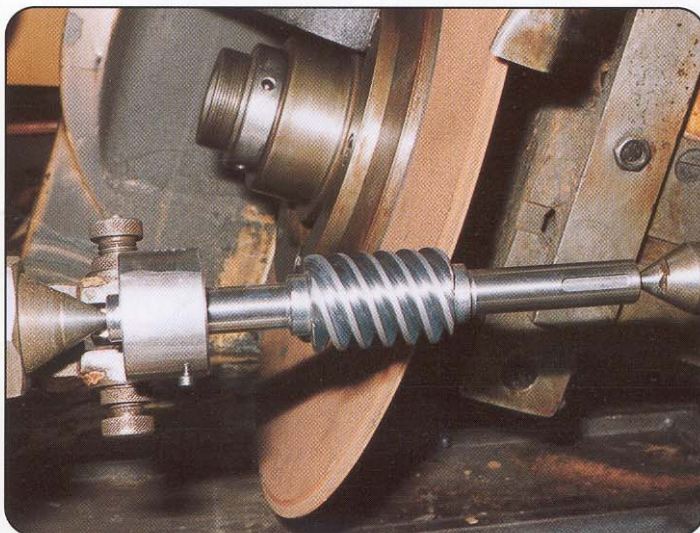
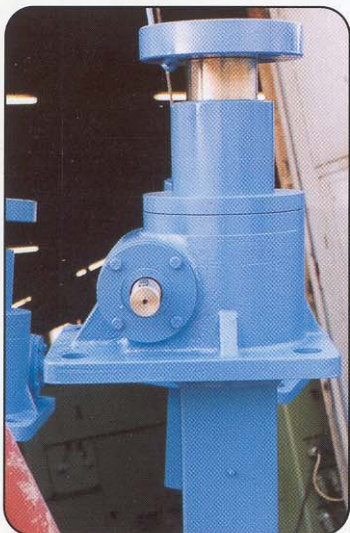
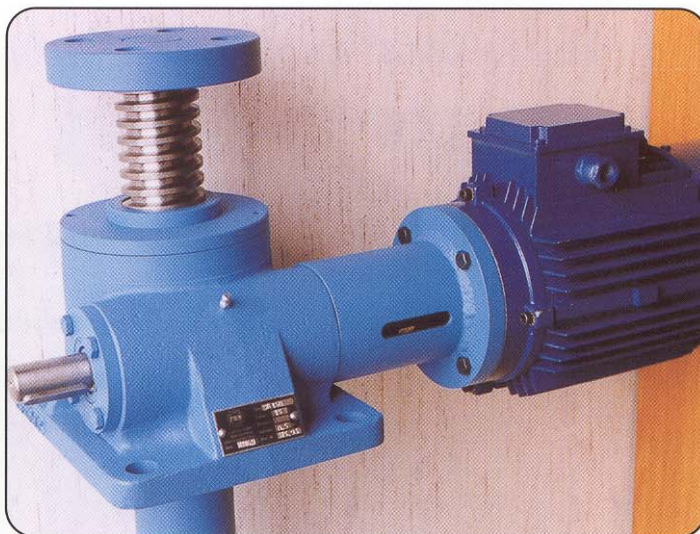
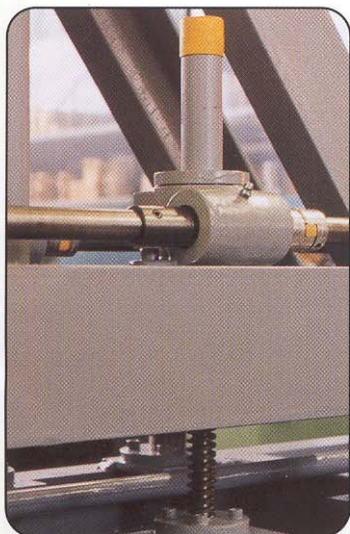


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Pictures from Production and Application



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Product information

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Cover illustration (historical feats)

Spindle winches used for unhooking a door, from the treasury of mechanical arts, dated 1620. The technology of spindle gears has been known for more than 400 years; spindle gears were used for the most diverse purposes already in the past and were the product of hard work done by hand—originally made of wood, later of steel. The screw-cutting lathe for threading was not invented until 1800, by Maudsley; without doubt the manufacturing of threaded spindle and worm gears was not an easy job before that: every single part had to be worked from the solid by hand and, of course, was not replaceable. Thanks to the enormous progress in the development of machine tools and metal working in the 18th and 19th centuries, spindle gears and their fabrication were continuously refined to reach today's high standard.

Product information

General:

FREN spindle gears are robust worm gear pairs driving a trapezoid thread spindle. The gearbox cases are made of nodular graphite cast iron 50 fit for high loads and meeting high safety 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 SG5 to SG500 line is fitted with grease on delivery and fit for operating temperatures ranging between -30°C and $+80^{\circ}\text{C}$. The operating factor at maximum load is 20% per hour or 30% per 10 minutes. The trapezoid thread spindles are standard single-thread and double-thread execution. For higher demands with regard to lifting speed and operating factor we use ball screw spindles. FREN spindle gears are fitted with a water-soluble blue prime coat (RAL 5012). The spindle is non-lubricated on delivery: it is not to be lubricated before mounting.

Types/Sizes:

In principle two types are to be differentiated: the basic type and the traveling nut type. The basic type is equipped with a non-rotating spindle which moves up and down. The traveling nut type is equipped with a rotating spindle on which a traveling nut moves up and down. Both types can be mounted to exit the gear either upwardly or downwardly (see page 6). FREN spindle gears are manufactured in 12 standard sizes ranging from 5kN to 500kN and equipped with single- or double- trapezoid thread spindles or ball screw spindles.

Lifting spindles in the basic type must be secured against torsion. If this is not possible on the part of the constructor we deliver a mounted securing device.

Applications:

Spindle gears are prefabricated parts used in engine construction and plant engineering; they are used in presses, elevating platforms, jack-up platforms, theater stages, working platforms, hoisting tackles, roll adjustments, feeding attachments, tipping devices, work benches, and loading platforms.

They are also used as driving mechanism for shutters, slides, landing stages, lock-gates, in airport technology etc. Expediently designed, precisely manufactured according to the latest standards, highly efficient and long-lasting, spindle gears are holding an irreplaceable position in the market and have become a fundamental building block for the constructing engineer of today.

Advantages:

Exact synchronism of several lifting spindles also in case of eccentric stress.

Automatic lock at standstill, consequently 100% prevention of sinking.

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.

High thrusts (up to 1000kN) and long spindles (up to 10 000mm) feasible.

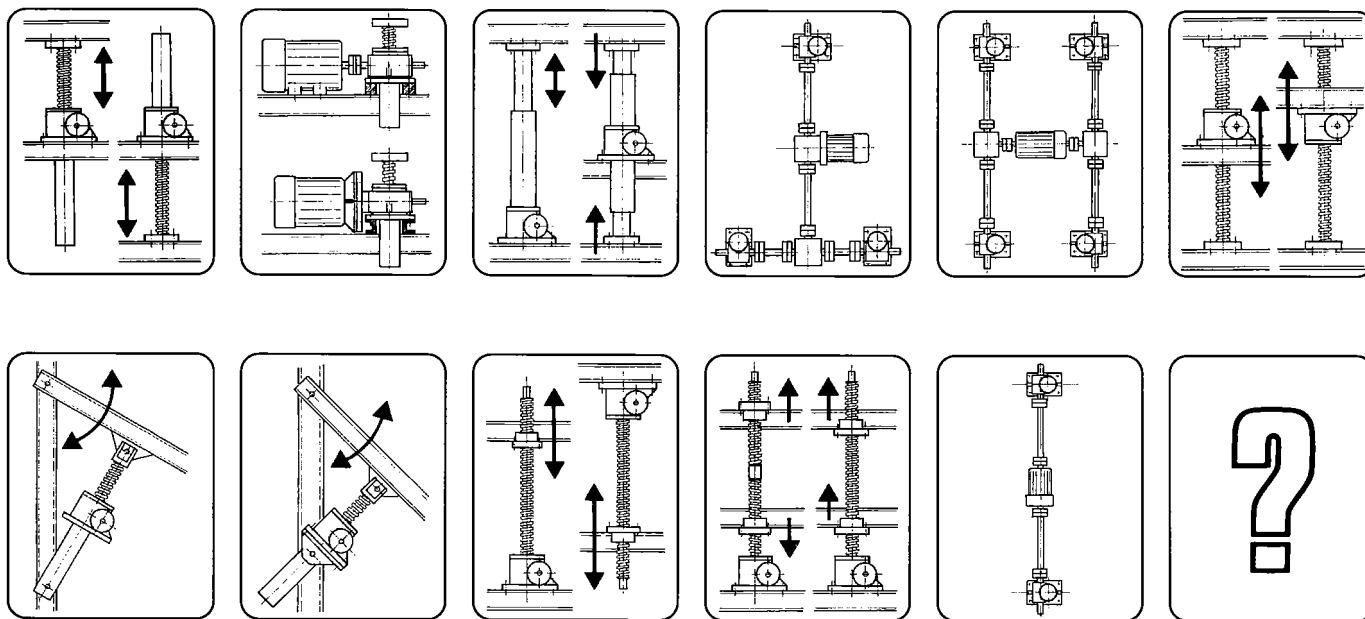


Examples for application

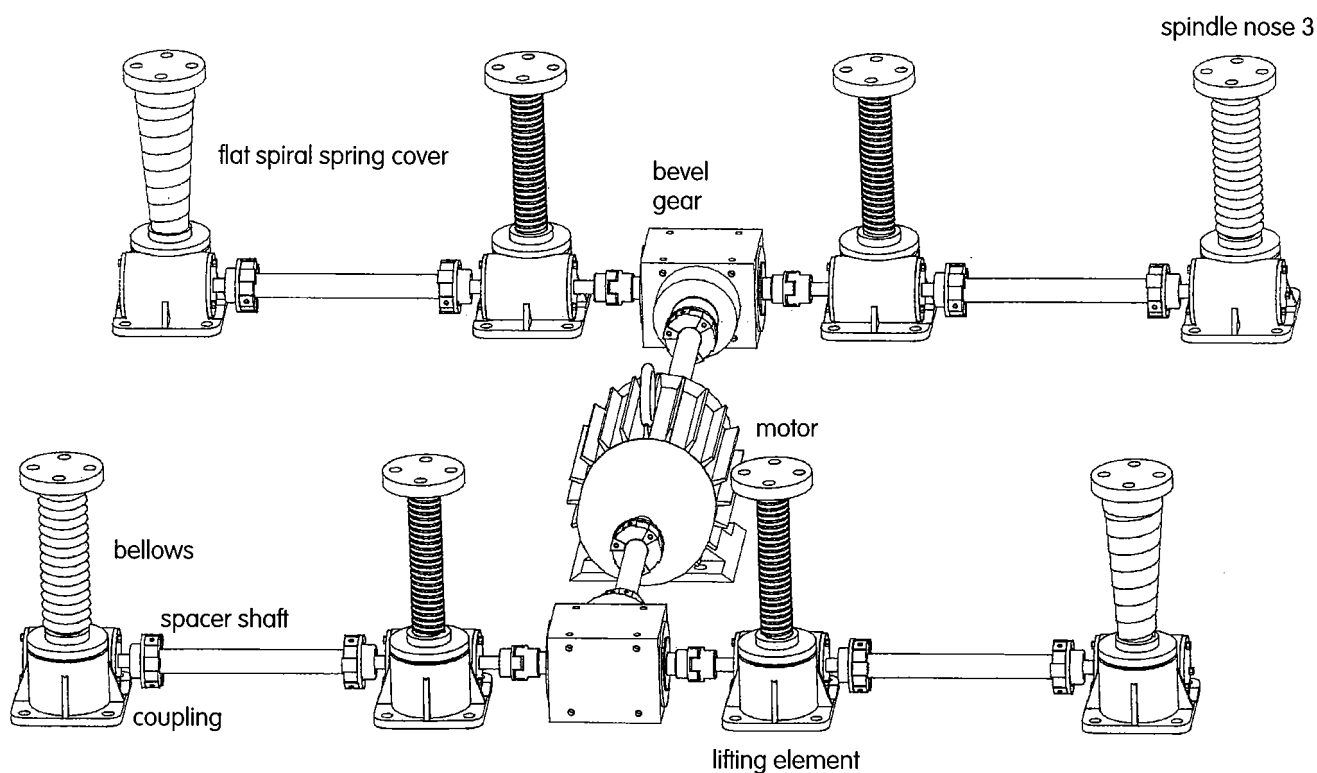
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Applications



Lifting system

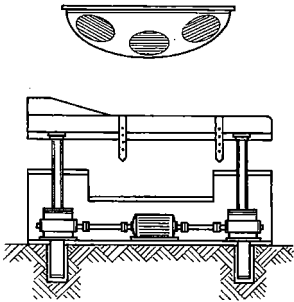




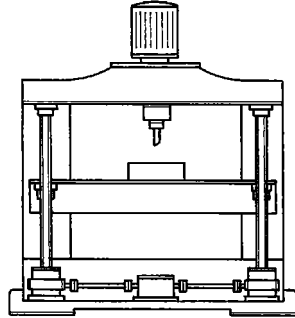
Examples for application

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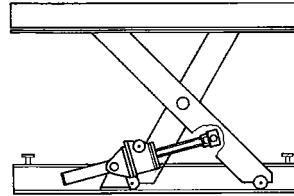
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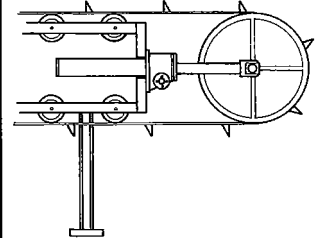
medical engineering



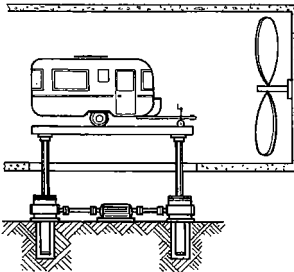
engine construction



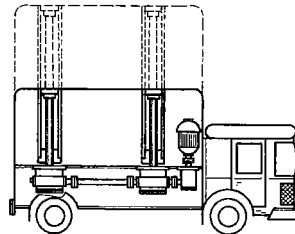
lifting technology



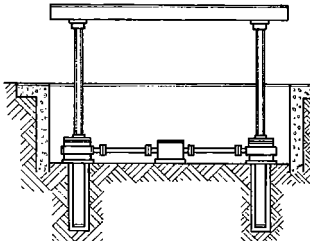
materials handling
technology
engine construction



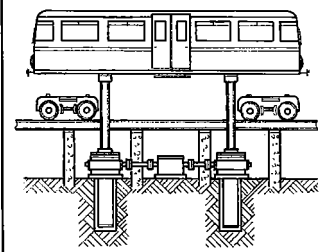
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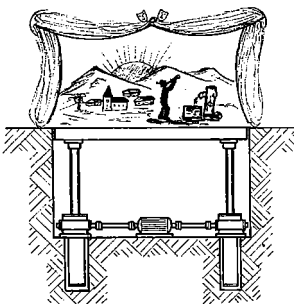
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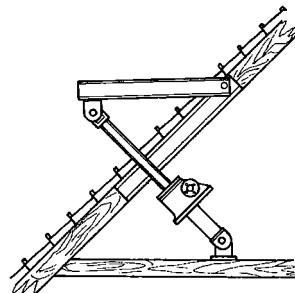
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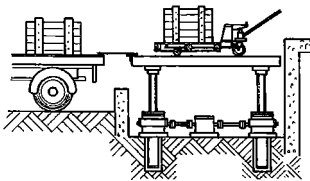
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plant engineering



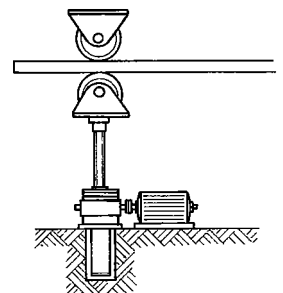
stage technology



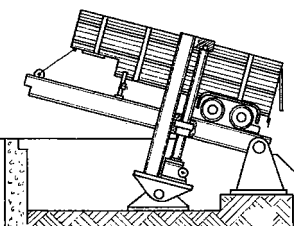
civil engineering and
building activities



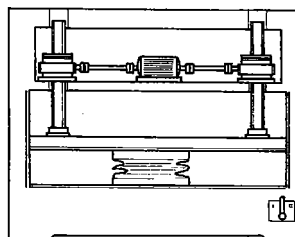
loading technology



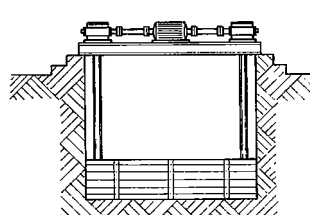
engine construction



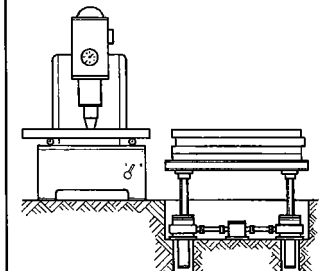
plant engineering



engine construction



plant engineering



engine construction



Selection of spindle gears

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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

Single-thread spindle actuated gears

Type	SG 5		SG 15		SG 20		SG 30		SG* 50		SG 100		SG 150		SG 200		SG 240		SG 300		SG 350		SG 500	
rated power kN	5		15		20		30		50		100		150		200		240		300		350		500	
size of spindle	Tr 20x6		Tr 24x6		Tr 26x6		Tr 30x6		Tr 40x9 (Tr 40x7)		Tr 55x12		Tr 60x12		Tr 65x12		Tr 75x14		Tr 90x16		Tr 100x16		Tr 120x16	
gear reduction	10:1	20:1	6:1	25:1	6:1	24:1	6:1	24:1	6:1	24:1	8:1	24:1	8:1	24:1	8:1	24:1	9½:1	28:1	10½:1	32:1	10½:1	32:1	10½:1	32:1
length of stroke per rotation in mm	0,6	0,3	1	0,24	1	0,25	1	0,25	1,5 (1,17)	0,375 (0,29)	1,5	0,5	1,5	0,5	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	1,54	1,04	7,23	2,86	9,8	4,1	16,5	7	37,3 (35,2)	15,3 (14,2)	81	39	133	68,2	184	93,6	221	112	286	149	363	186	586	300
efficiency in %	31	23	33	20	32	19	29	17	32 (26)	19,5 (16)	29	20	27	17,5	26	17	25	17	25	16	23	15	20	13
max. RPM	2800		2800		2800		2800		1800		1800		1500		1500		1500		1000		1000		1000	
max. lifting speed m/min	1,68	0,84	2,8	0,67	2,8	0,7	2,8	0,7	2,7	0,67	2,25	0,75	2,25	0,75	2,25	0,75	2,25	0,75	1,5	0,5	1,5	0,5	1,5	0,5
max. driving power in kW at 20% duty cycle	0,18		0,35		0,5		0,6		1,2		2,1		2,8		3,9		4,5		5,2		6,2		7,8	
max. driving power in kW at 10% duty cycle	0,23		0,46		0,7		0,8		1,6		2,8		3,8		5,1		5,9		6,9		8,3		10,8	
weight, basic type excl. lifting element in kg	1,5		3,2		7,8		8,2		18		23		28		40		58		75		90		180	
100mm spindle in kg	0,2		0,3		0,34		0,43		0,8		1,5		1,8		2,15		2,8		4,2		5,2		7,7	
kg of grease contained in spindle gear	0,05		0,1		0,15		0,2		0,35		0,6		0,8		1,2		1,5		1,7		2,2		3,3	
catalog page	7		8		9		10		11		12		13		14		15		16		17		18	

Double-thread spindle actuated gears

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

rated power kN	4		12		16		24		40		80		120		150		180		220		280		400	
size of spindle	Tr 20x12		Tr 24x12		Tr 26x12		Tr 30x12		Tr 40x18		Tr 55x24		Tr 60x24		Tr 65x24		Tr 75x28		Tr 90x32		Tr 100x32		Tr 120x32	
length of stroke per rotation in mm	1,2	0,6	2	0,48	2	0,5	2	0,5	3	0,75	3	1	3	1	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	5,6	1,4	5,4	1,35	4,5	1,5	4,5	1,5	4,5	1,5	4,5	1,5	3	1	3	1	3	1
torque at rated power Nm	1,86	1,23	8,48	3,27	12,1	4,89	18,2	7,64	43,4	17,7	91,2	47,2	151	77	194	100	232	120	284	146	393	203	637	318
efficiency in %	41	31	45	28	42	26	41	25	44	27	42	27	38	25	37	24	37	24	37	24	34	22	30	20

* SG50 is also available actuated by a lead screw Tr 40x7. Corresponding data in ().

For the standard gears SG750 and SG1000 please request the standard sheet!

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

- whether the dimensions of gear and spindle fit into your system.
- 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).
- whether the power required for the desired lifting speed is admissible.
- whether under pressure load the critical buckling force is not exceeded (see diagram on page 29).
- whether the critical revolutions/min of the spindle are not exceeded (see diagram on page 27).
- If one of these requirements cannot be met the type next in size must be chosen.
- If point 6 is not sufficient, choose one of the types next in size or ask for special types (questionnaire see pages 33-34)!



Survey of construction modes with example for ordering

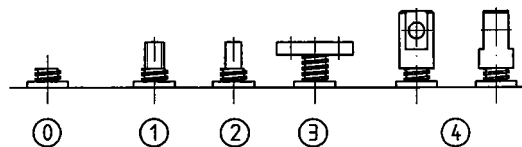
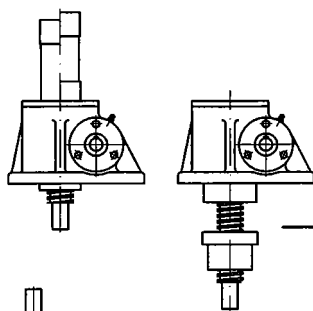
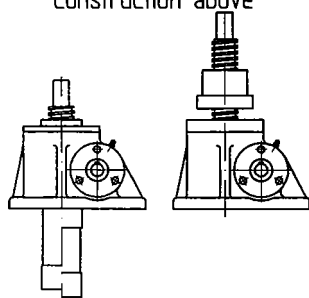
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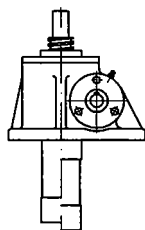
construction above

construction below

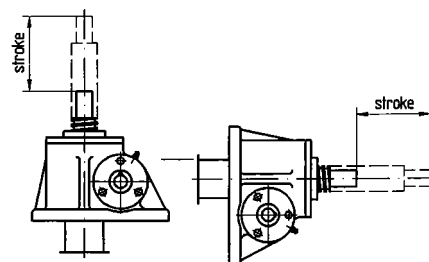
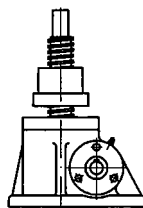
standard spindle noses



basic type



traveling nut type



standard reductions according
to preselection table
page 5

type designation according
to preselection table
page 5

swinging element = SE
spindle gear = SG
ball screw gear = KSG

type

reduction i

traveling nut type = L
basic type = G

construction above = 0
construction below = U

spindle nose = 0,1,2,3,4
special nose = S

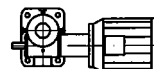
effective stroke in mm

fitting position horizontal = H
fitting position vertical = V

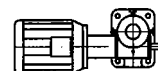
motor on the right = MR
motor on the left = ML
no motor = 00

SG 150 - 8 - G - 0 - 2 - 2300 H - MR

motor on the right



motor on the left



no motor



Above example for ordering:

Spindle gear type 150, reduction 8:1, basic type construction up, spindle nose 2,
stroke 2300mm, mounted horizontally, with motor mounted on the right.

Additionally available options:

rigid protection
2nd guide ring
safety nut
nut adjustable free from backlash
expansion bellows
spring steel spirals

square locking device to prevent twisting
three-phase A.C. motor with or without brake
d.c. motor
gear motor
stainless execution
limit stop

impulse transmitter
overload clutch
ball bearing spindle
telescopic execution
swivelling console
oil lubrication

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



Spindle gear SG 5

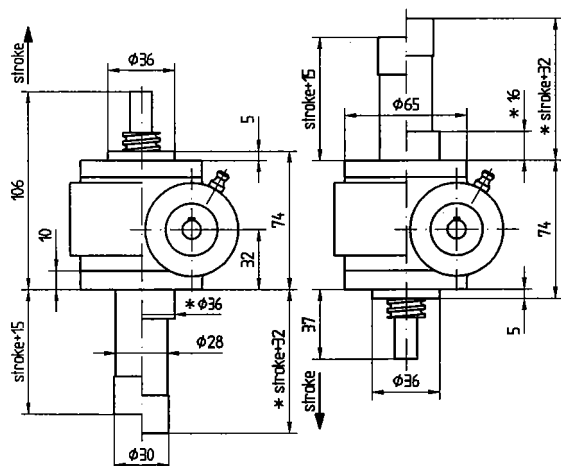
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Basic type (G)

above (O)

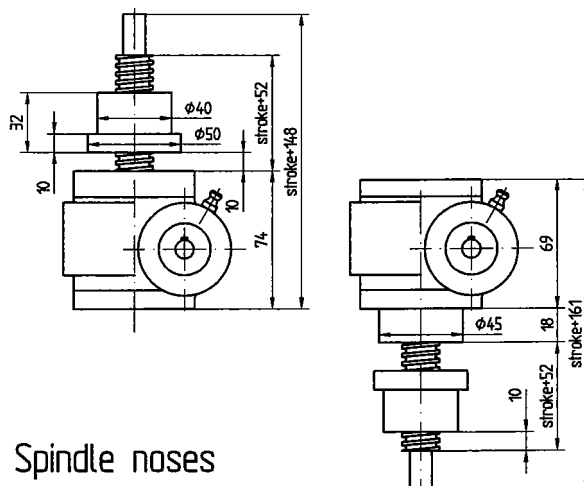
below (U)



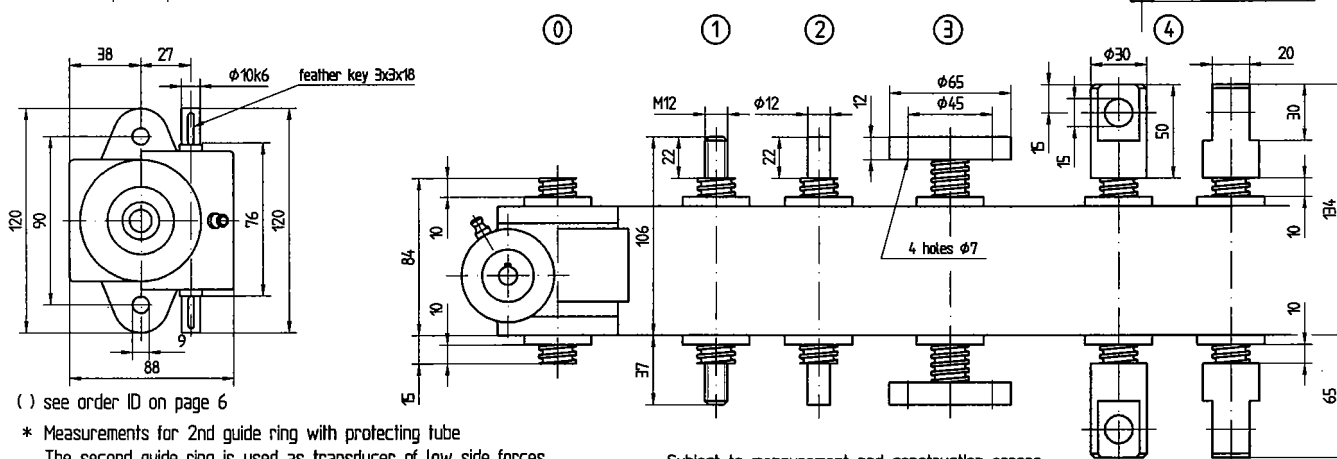
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube
The second guide ring is used as transducer of low side forces.

Subject to measurement and construction errors.

Tr 20x6 single-thread lifting power in kN

10:1 = 0,6mm/R
20:1 = 0,3mm/R

n ₁ min ⁻¹	lift. speed m/min		10:1		20:1		10:1		20:1		10:1		20:1		10:1		20:1		10:1		20:1		10:1		20:1	
	10:1	20:1	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
2800	1,68	0,84	154	0,44	104	0,3	123	0,36	0,83	0,24	0,92	0,27	0,62	0,18	0,61	0,18	0,41	0,12	0,46	0,14	0,31	0,09	0,3	0,1	0,21	0,06
1500	0,90	0,45	154	0,24	104	0,16	123	0,19	0,83	0,13	0,92	0,14	0,62	0,1	0,61	0,1	0,41	0,07	0,46	0,08	0,31	0,06	0,3	0,06	0,21	0,04
1000	0,60	0,30	154	0,16	104	0,11	123	0,13	0,83	0,09	0,92	0,10	0,62	0,07	0,61	0,07	0,41	0,05	0,46	0,06	0,31	0,04	0,3	0,05	0,21	0,04
750	0,45	0,22	154	0,12	104	0,08	123	0,10	0,83	0,07	0,92	0,08	0,62	0,06	0,61	0,06	0,41	0,04	0,46	0,05	0,31	0,04	0,3	0,04	0,21	0,04
500	0,30	0,15	154	0,08	104	0,06	123	0,07	0,83	0,05	0,92	0,06	0,62	0,04	0,61	0,04	0,41	0,04	0,46	0,04	0,31	0,04	0,3	0,04	0,21	0,04
200	0,12	0,06	154	0,04	104	0,05	123	0,04	0,83	0,04	0,92	0,04	0,62	0,04	0,61	0,04	0,41	0,04	0,46	0,04	0,31	0,04	0,3	0,04	0,21	0,04

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area. However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5). Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 20x12P6 double-thread lifting power in kN

10:1 = 1,2mm/R
20:1 = 0,6mm/R

n ₁ min ⁻¹	lift. speed m/min		10:1		20:1		10:1		20:1		10:1		20:1		10:1		20:1		10:1		20:1		10:1		20:1	
	10:1	20:1	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
2800	3,36	1,68	186	0,54	123	0,36	139	0,4	0,92	0,27	0,93	0,27	0,62	0,18	0,7	0,2	0,46	0,14	0,47	0,14	0,31	0,09	0,23	0,08	0,16	0,05
1500	1,80	0,90	186	0,29	123	0,19	139	0,22	0,92	0,15	0,93	0,15	0,62	0,1	0,7	0,11	0,46	0,08	0,47	0,07	0,31	0,06	0,23	0,04	0,16	0,04
100	1,20	0,60	186	0,19	123	0,13	139	0,14	0,92	0,10	0,93	0,10	0,62	0,07	0,7	0,07	0,46	0,06	0,47	0,05	0,31	0,04	0,23	0,04	0,16	0,04
750	0,90	0,45	186	0,15	123	0,1	139	0,11	0,92	0,08	0,93	0,08	0,62	0,05	0,7	0,06	0,46	0,04	0,47	0,04	0,31	0,04	0,23	0,04	0,16	0,04
500	0,60	0,30	186	0,1	123	0,07	139	0,08	0,92	0,05	0,93	0,06	0,62	0,04	0,7	0,05	0,46	0,04	0,47	0,04	0,31	0,04	0,23	0,04	0,16	0,04
200	0,24	0,12	186	0,05	123	0,04	139	0,04	0,92	0,04	0,93	0,04	0,62	0,04	0,7	0,04	0,46	0,04	0,47	0,04	0,31	0,04	0,23	0,04	0,16	0,04

Technical specifications

max. lifting power	5 kN
gear reduction	10:1 / 20:1
dimension of spindle	Tr20x6 / Tr20x12P6
start-up moment	table entry x 1,3
casing material	aluminium
weight without lifting (kg)	1,5
weight of spindle per 100mm lifting (kg)	0,2
lubricant	grease
quantity of lubricant (kg)	0,05
max. driving power (duty cycle 20%/h)	0,18 kW
max. driving power (duty cycle 10%/h)	0,23 kW



Spindle gear SG 15

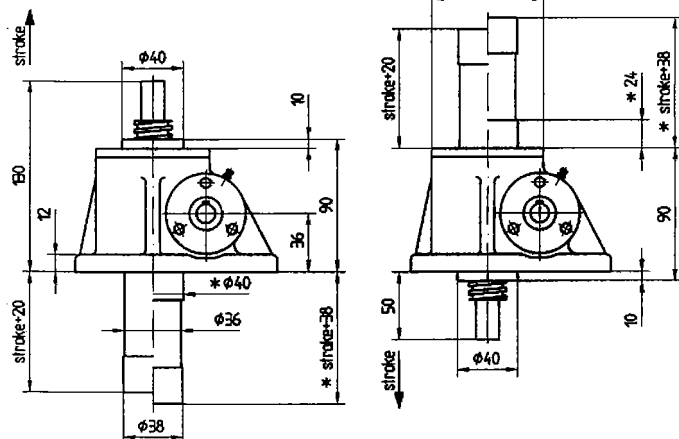
ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

above (O)

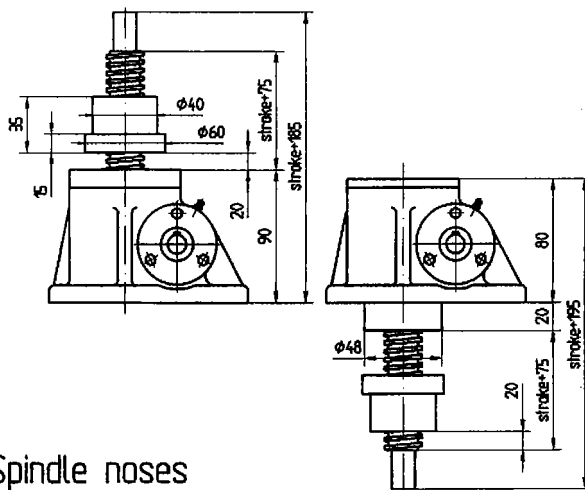
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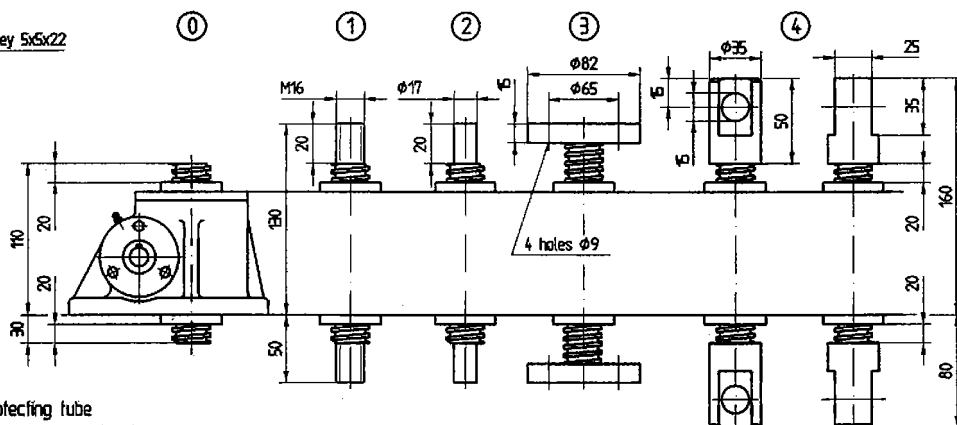
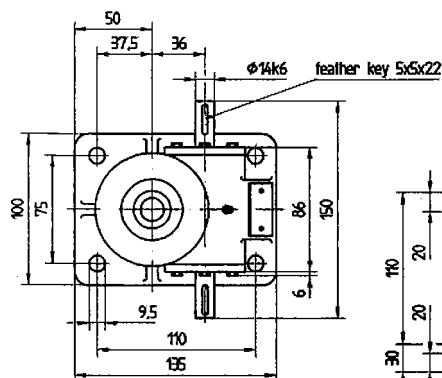
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube

The second guide ring is used as transducer of low side forces.

Subject to measurement and construction errors.

Tr 24x6 single-thread lifting power in kN

6:1 = 1.0mm/R
25:1 = 0.24mm/R

n ₁ min ⁻¹	Lift. speed m/min		15				12				8				5				3				2.5				1			
			6:1		25:1		6:1		25:1		6:1		25:1		6:1		25:1		6:1		25:1		6:1		25:1		6:1		25:1	
	6:1	25:1	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
2800	2.80	0.67	7.23	2.08	2.86	0.82	5.78	1.66	2.29	0.66	3.86	1.11	1.52	0.44	2.41	0.7	0.95	0.28	1.45	0.42	0.57	0.17	0.48	0.14	0.19	0.07	0.19	0.06	0.19	0.06
1500	1.50	0.36	7.23	1.11	2.86	0.45	5.78	0.9	2.29	0.36	3.86	0.6	1.52	0.23	2.41	0.37	0.95	0.16	1.45	0.23	0.57	0.11	0.48	0.09	0.19	0.06	0.19	0.06	0.19	0.06
1000	1.00	0.24	7.23	0.74	2.86	0.3	5.78	0.6	2.29	0.24	3.86	0.4	1.52	0.16	2.41	0.25	0.95	0.11	1.45	0.15	0.57	0.08	0.48	0.07	0.19	0.06	0.19	0.06	0.19	0.06
750	0.75	0.18	7.23	0.56	2.86	0.22	5.78	0.45	2.29	0.18	3.86	0.3	1.52	0.12	2.41	0.2	0.95	0.08	1.45	0.12	0.57	0.06	0.48	0.06	0.19	0.06	0.19	0.06	0.19	0.06
500	0.50	0.12	7.23	0.37	2.86	0.15	5.78	0.32	2.29	0.12	3.86	0.2	1.52	0.09	2.41	0.13	0.95	0.06	1.45	0.09	0.57	0.06	0.48	0.06	0.19	0.06	0.19	0.06	0.19	0.06
200	0.20	0.05	7.23	0.15	2.86	0.08	5.78	0.12	2.29	0.06	3.86	0.1	1.52	0.06	2.41	0.07	0.95	0.06	1.45	0.06	0.57	0.06	0.48	0.06	0.19	0.06	0.19	0.06	0.19	0.06

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5). Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 24x12P6 double-thread lifting power in kN

6:1 = 2.0mm/R
25:1 = 0.48mm/R

n ₁ min ⁻¹	lift. speed m/min		P = 0.46 kW																							
			12				10				8				5				3				1			
	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1	6:1	25:1				
min ⁻¹	6:1	25:1	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW		
2800	5.60	1.34	8.48	2.44	3.27	0.94	7.07	2.03	2.72	0.78	5.65	1.65	2.18	0.62	3.53	1.1	1.36	0.39	2.12	0.62	0.82	0.24	0.71	0.21	0.27	0.09
1500	3.00	0.72	8.48	1.31	3.27	0.51	7.07	1.09	2.72	0.42	5.65	0.87	2.18	0.34	3.53	0.55	1.36	0.21	2.12	0.33	0.82	0.13	0.71	0.11	0.27	0.06
1000	2.00	0.48	8.48	0.87	3.27	0.34	7.07	0.73	2.72	0.28	5.65	0.58	2.18	0.23	3.53	0.36	1.36	0.15	2.12	0.22	0.82	0.07	0.71	0.08	0.27	0.06
750	1.50	0.36	8.48	0.66	3.27	0.26	7.07	0.55	2.72	0.22	5.65	0.44	2.18	0.17	3.53	0.28	1.36	0.11	2.12	0.17	0.82	0.07	0.71	0.06	0.27	0.06
500	1.00	0.24	8.48	0.44	3.27	0.17	7.07	0.37	2.72	0.15	5.65	0.29	2.18	0.13	3.53	0.19	1.36	0.08	2.12	0.12	0.82	0.06	0.71	0.06	0.27	0.06
200	0.40	0.10	8.48	0.18	3.27	0.08	7.07	0.15	2.72	0.07	5.65	0.12	2.18	0.06	3.53	0.09	1.36	0.06	2.12	0.06	0.82	0.06	0.71	0.06	0.27	0.06

Technical specifications

max. lifting power	15 kN
gear reduction	6:1 / 25:1
dimension of spindle	Tr24x6 / Tr24x12P6
start-up moment	table entry x 1.3
casing material	GGG 50
weight without lifting (kg)	3.2
weight of spindle per 100mm lifting (kg)	0.3
lubricant	grease
quantity of lubricant (kg)	0.1
max. driving power (duty cycle 20%/h)	0.35 kW
max. driving power (duty cycle 10%/h)	0.46 kW



Spindle gear SG 20

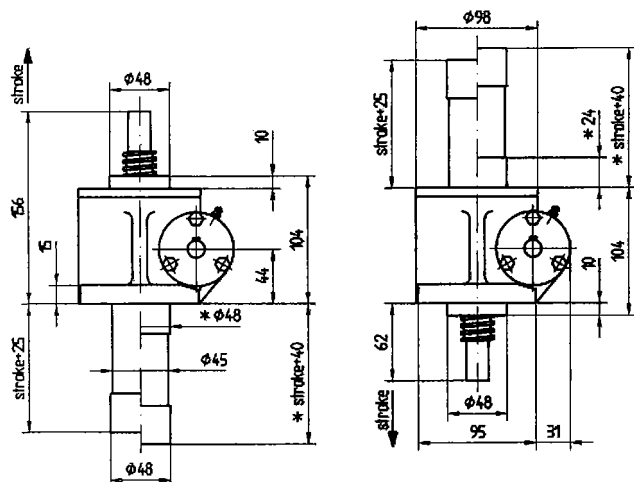
ENZFELDER GmbH.

WERK ENZSFELD:
EICHENGASSE 597
A-2551 ENZSFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

above (O)

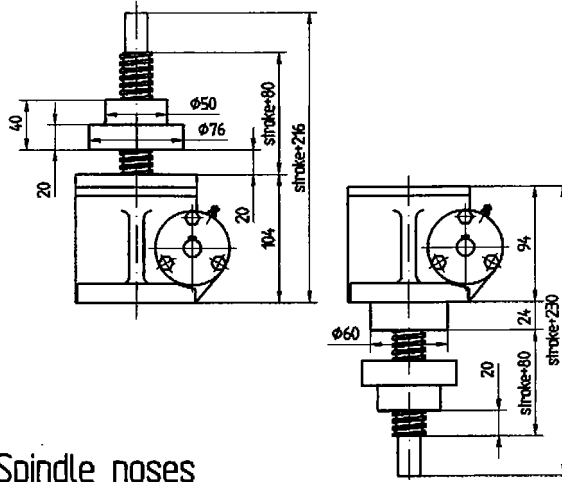
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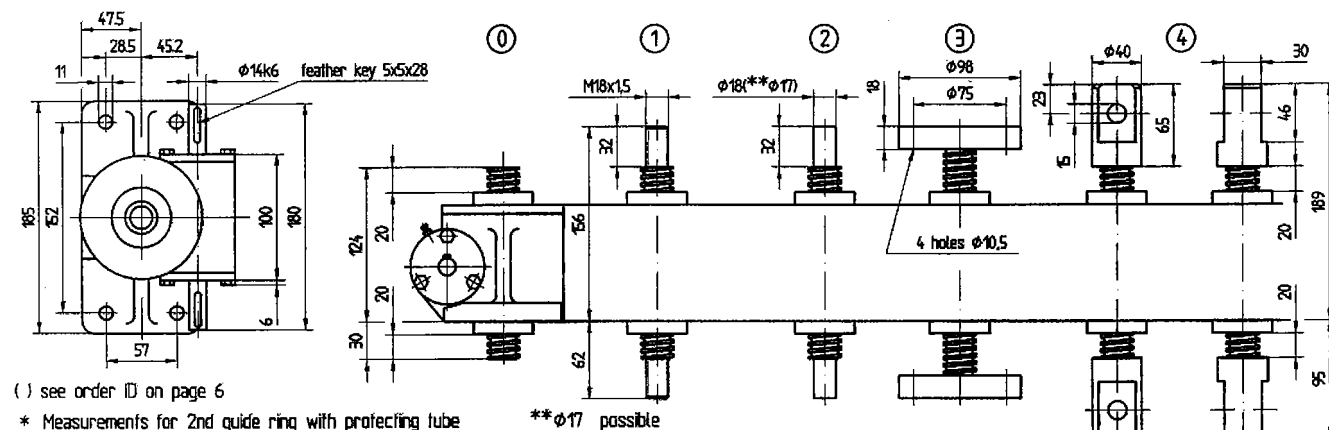
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube
The second guide ring is used as transducer of low side forces.

** $\phi 17$ possible

Subject to measurement and construction errors.

Tr 26x6 single-thread lifting power in kN

6:1 = 10mm/R
24:1 = 0.25mm/R

n ₁ min ⁻¹	lift. speed m/min	20				15				10				8				5				2				
		6:1		24:1		6:1		24:1		6:1		24:1		6:1		24:1		6:1		24:1		6:1		24:1		
		Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	
2800	2.80	0.70	9.8	2.86	4.1	1.2	7.35	2.15	2.14	0.9	4.9	1.44	1.43	0.6	3.92	1.15	1.14	0.48	2.45	0.72	0.71	0.3	0.98	0.29	0.28	0.12
1500	1.50	0.375	9.8	1.53	4.1	0.65	7.35	1.15	2.14	0.48	4.9	0.77	1.43	0.32	3.92	0.61	1.14	0.26	2.45	0.38	0.71	0.16	0.98	0.16	0.28	0.08
1000	1.00	0.25	9.8	1.02	4.1	0.43	7.35	0.77	2.14	0.32	4.9	0.51	1.43	0.22	3.92	0.41	1.14	0.18	2.45	0.26	0.71	0.12	0.98	0.11	0.28	0.06
750	0.75	0.19	9.8	0.77	4.1	0.33	7.35	0.58	2.14	0.25	4.9	0.38	1.43	0.16	3.92	0.31	1.14	0.13	2.45	0.19	0.71	0.09	0.98	0.09	0.28	0.06
500	0.50	0.125	9.8	0.51	4.1	0.22	7.35	0.39	2.14	0.16	4.9	0.26	1.43	0.12	3.92	0.22	1.14	0.12	2.45	0.13	0.71	0.07	0.98	0.07	0.28	0.06
200	0.20	0.05	9.8	0.21	4.1	0.17	7.35	0.16	2.14	0.08	4.9	0.11	1.43	0.06	3.92	0.09	1.14	0.06	2.45	0.06	0.71	0.06	0.98	0.06	0.28	0.06

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5). Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 26x12P6 double-thread lifting power in kN

6:1 = 2.0mm/R
24:1 = 0.5mm/R

n_1 min ⁻¹	lift. speed m/min	2.4.1. 0.3.0.0.1. 2																								
		16				12				8				6				4				2				
		6:1	24:1	Nm	kW	6:1	24:1	Nm	kW	6:1	24:1	Nm	kW	6:1	24:1	Nm	kW	6:1	24:1	Nm	kW	6:1	24:1	Nm	kW	
2800	5.60	1.40	12.1	3.48	4.9	1.4	9.09	2.67	3.68	1.06	6.06	1.8	2.45	0.7	4.55	1.3	1.83	0.53	3.03	0.9	1.23	0.35	1.51	0.45	0.62	0.18
1500	3.00	0.75	12.1	1.86	4.9	0.75	9.09	1.4	3.68	0.57	6.06	0.93	2.45	0.37	4.55	0.7	1.83	0.28	3.03	0.46	1.23	0.19	1.51	0.23	0.62	0.1
1000	2.00	0.50	12.1	1.25	4.9	0.5	9.09	0.93	3.68	0.38	6.06	0.62	2.45	0.25	4.55	0.47	1.83	0.19	3.03	0.31	1.23	0.13	1.51	0.16	0.62	0.08
750	1.50	0.375	12.1	0.93	4.9	0.38	9.09	0.7	3.68	0.28	6.06	0.47	2.45	0.19	4.55	0.35	1.83	0.15	3.03	0.23	1.23	0.1	1.51	0.13	0.62	0.06
500	1.00	0.25	12.1	0.62	4.9	0.25	9.09	0.46	3.68	0.19	6.06	0.31	2.45	0.13	4.55	0.23	1.83	0.1	3.03	0.16	1.23	0.08	1.51	0.09	0.62	0.06
200	0.40	0.10	12.1	0.25	4.9	0.11	9.09	0.19	3.68	0.09	6.06	0.13	2.45	0.07	4.55	0.1	1.83	0.06	3.03	0.07	1.23	0.06	1.51	0.06	0.62	0.06

Technical specifications

max. lifting power	20 kN
gear reduction	6:1 / 24:1
dimension of spindle	Tr26x6 / Tr26x12P6
start-up moment	table entry x 1,3
casing material	GGG50
weight without lifting (kg)	7.8
weight of spindle per 100mm lifting (kg)	0.34
lubricant	grease
quantity of lubricant (kg)	0.15
max. driving power (duty cycle 20%/h)	0.5 kW
max. driving power (duty cycle 10%/h)	0.7 kW



Spindle gear SG 30

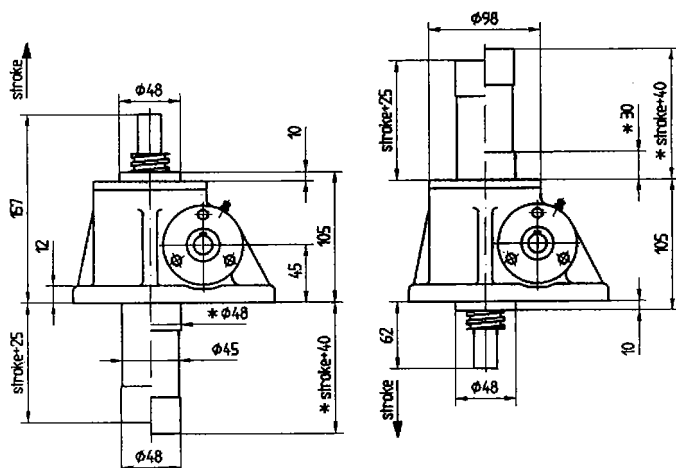
ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

above (O)

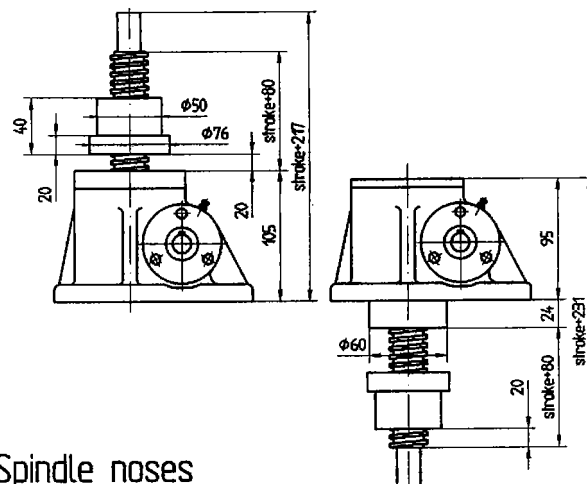
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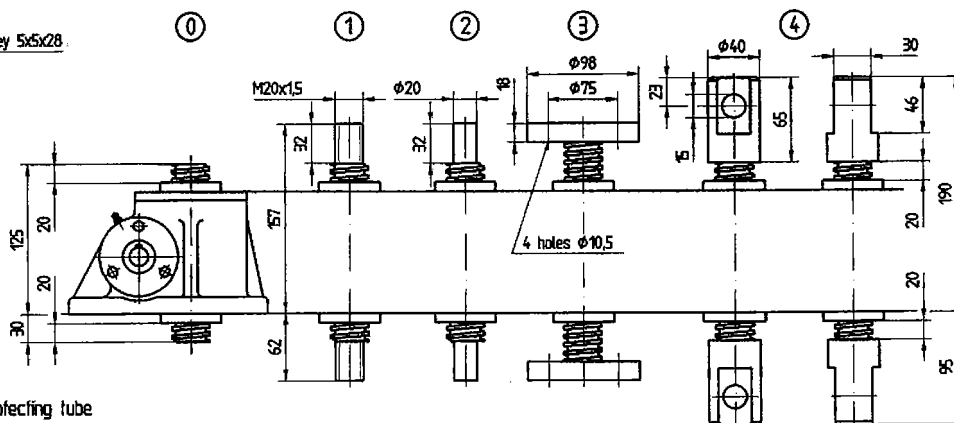
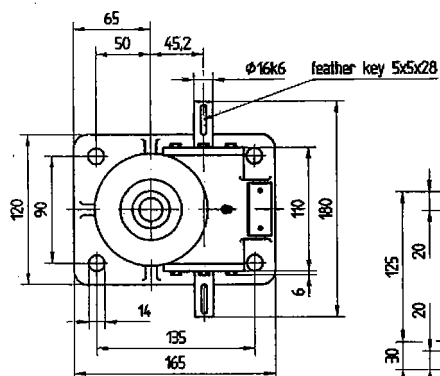
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube
The second guide ring is used as transducer of low side forces.

Subject to measurement and construction errors.

Tr 30x6		single-thread		lifting power in kN		6:1 = 1,0mm/R		24:1 = 0,25mm/R	
		30	24:1	20	15	10	5	2	1
n ₁	lift. speed	6:1	24:1	6:1	24:1	6:1	24:1	6:1	24:1
min ⁻¹	m/min	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW
2800	2,80	0,70	16,5 4,73	6,9 2,02	11 3,15	4,6 1,35	8,25 2,37	3,45 1	5,5 1,57
1500	1,50	0,375	16,5 2,53	6,9 1,08	11 1,69	4,6 0,72	8,25 1,27	3,45 0,54	5,5 0,85
1000	1,00	0,25	16,5 1,69	6,9 0,72	11 1,13	4,6 0,48	8,25 0,84	3,45 0,36	5,5 0,56
750	0,75	0,19	16,5 1,26	6,9 0,55	11 0,84	4,6 0,37	8,25 0,63	3,45 0,28	5,5 0,42
500	0,50	0,125	16,5 0,84	6,9 0,36	11 0,56	4,6 0,24	8,25 0,42	3,45 0,18	5,5 0,28
200	0,20	0,05	16,5 0,34	6,9 0,15	11 0,23	4,6 0,11	8,25 0,17	3,45 0,09	5,5 0,12

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5). Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 30x12P6		double-thread		lifting power in kN		6:1 = 2,0mm/R		24:1 = 0,5mm/R	
		24	18	12	8	5	2	1	0,5
n ₁	lift. speed	6:1	24:1	6:1	24:1	6:1	24:1	6:1	24:1
min ⁻¹	m/min	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW	Nm kW
2800	5,60	1,40	18,2 5,35	7,64 2,19	13,7 4	5,7 1,64	9,1 2,9	3,8 1,09	6,1 1,8
1500	3,00	0,75	18,2 2,87	7,64 1,18	13,7 2,5	5,7 0,88	9,1 1,43	3,8 0,59	6,1 0,96
1000	2,00	0,50	18,2 1,91	7,64 0,78	13,7 1,43	5,7 0,59	9,1 0,96	3,8 0,40	6,1 0,64
750	1,50	0,375	18,2 1,43	7,64 0,59	13,7 1,08	5,7 0,44	9,1 0,72	3,8 0,30	6,1 0,48
500	1,00	0,25	18,2 0,96	7,64 0,40	13,7 0,71	5,7 0,30	9,1 0,48	3,8 0,20	6,1 0,32
200	0,40	0,10	18,2 0,38	7,64 0,20	13,7 0,29	5,7 0,11	9,1 0,20	3,8 0,10	6,1 0,14

Technical specifications

max. lifting power	30 kN
gear reduction	6:1 / 24:1
dimension of spindle	Tr30x6 / Tr30x12P6
start-up moment	table entry x 1,3
casing material	GGG50
weight without lifting (kg)	8,2
weight of spindle per 100mm lifting (kg)	0,43
lubricant	grease
quantity of lubricant (kg)	0,2
max. driving power (duty cycle 20%/h)	0,6 kW
max. driving power (duty cycle 10%/h)	0,8 kW



Spindle gear SG 150

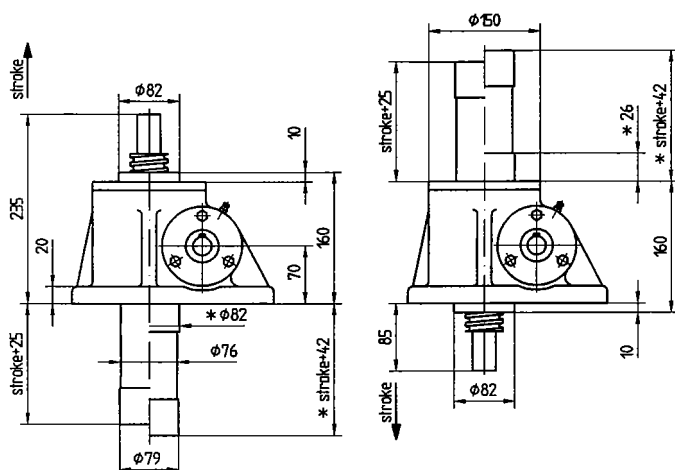
ENZFELDER GmbH.

WERK ENZFELD:
EICHENGASSE 597
A-2551 ENZFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

above (O)

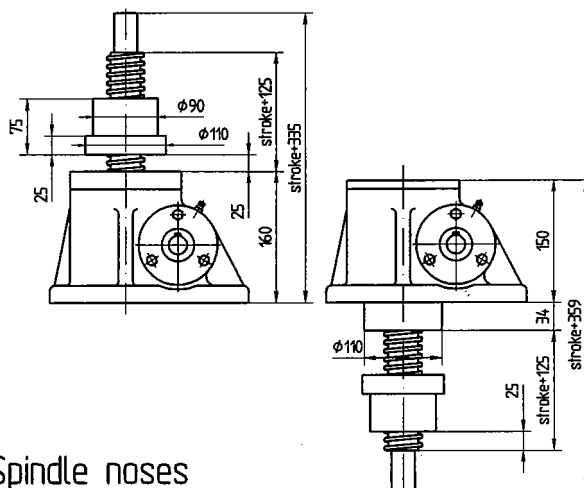
below (U)



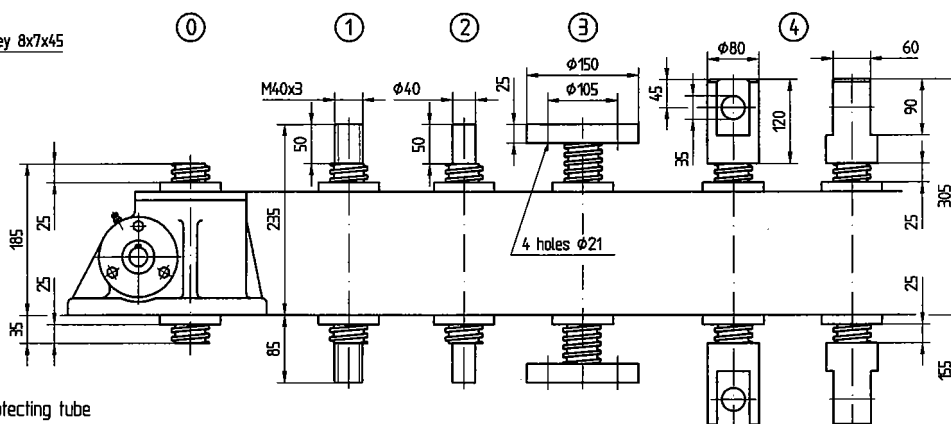
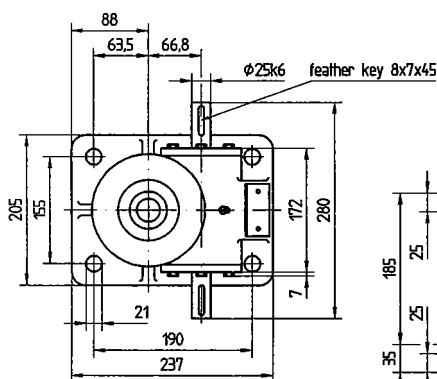
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube
The second guide ring is used as transducer of low side forces.

Subject to measurement and construction errors.

Tr 60x12 single-thread lifting power in kN

Tr 60x12 single-thread lifting power in kN																		8:1 = 1.5mm/R									
n ₁ min ⁻¹		lift. speed m/min		150				120				100				80				50				20			
				8:1		24:1		8:1		24:1		8:1		24:1		8:1		24:1		8:1		24:1		8:1		24:1	
8:1		24:1		Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
1500	2,25	0,75		133	20,4	68,2	10,5	106	16,3	54,6	8,4	89	13,6	45,5	7	71	10,9	36,4	5,6	44,3	6,8	22,7	3,5	17,7	2,7	9,1	1,4
1000	1,50	0,50		133	13,6	68,2	7,0	106	10,9	54,6	5,6	89	9,1	45,5	4,7	71	7,3	36,4	3,8	44,3	4,6	22,7	2,4	17,7	1,8	9,1	1,0
750	1,125	0,375		133	10,2	68,2	5,3	106	8,2	54,6	4,2	89	6,8	45,5	3,5	71	5,5	36,4	2,8	44,3	3,4	22,7	1,8	17,7	1,4	9,1	0,7
500	0,75	0,25		133	6,8	68,2	3,5	106	5,5	54,6	2,8	89	4,6	45,5	2,4	71	3,7	36,4	1,9	44,3	2,3	22,7	1,2	17,7	0,9	9,1	0,5
320	0,48	0,16		133	4,4	68,2	2,3	106	3,5	54,6	1,8	89	2,9	45,5	1,5	71	2,4	36,4	1,2	44,3	1,5	22,7	0,8	17,7	0,6	9,1	0,3
160	0,24	0,08		133	2,2	68,2	1,2	106	1,8	54,6	0,9	89	1,5	45,5	0,8	71	1,2	36,4	0,6	44,3	0,8	22,7	0,4	17,7	0,3	9,1	0,2

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5). Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 60x24P12 double-thread lifting power in kN

Tr 60x24P12 double-thread lifting power in kN																								8:1 = 3,0mm/R		
																								24:1 = 1,0mm/R		
n ₁ min ⁻¹	lift. speed m/min		120				100				80				50				20				10			
	8:1	24:1	8:1 Nm	8:1 kW	24:1 Nm	24:1 kW	8:1 Nm	8:1 kW	24:1 Nm	24:1 kW	8:1 Nm	8:1 kW	24:1 Nm	24:1 kW	8:1 Nm	8:1 kW	24:1 Nm	24:1 kW	8:1 Nm	8:1 kW	24:1 Nm	24:1 kW	8:1 Nm	8:1 kW	24:1 Nm	24:1 kW
1500	4,50	1,50	151	23,2	77	11,8	126	19,4	64,2	9,8	101	15,5	51,3	7,8	62,9	9,7	32,1	4,9	25,2	3,9	12,8	2,0	12,6	2,0	6,4	1,0
1000	3,00	1,00	151	15,5	77	7,9	126	12,9	64,2	6,6	101	10,3	51,3	5,3	62,9	6,5	32,1	3,3	25,2	2,6	12,8	1,3	12,6	1,3	6,4	0,7
750	2,25	0,75	151	11,6	77	5,9	126	9,7	64,2	4,9	101	7,7	51,3	4	62,9	4,8	32,1	2,5	25,2	2,0	12,8	1,0	12,6	1,0	6,4	0,5
500	1,50	0,50	151	7,7	77	3,9	126	6,5	64,2	3,3	101	5,2	51,3	2,6	62,9	3,2	32,1	1,6	25,2	1,3	12,8	0,7	12,6	0,7	6,4	0,4
320	0,96	0,32	151	5	77	2,5	126	4,2	64,2	2,1	101	3,3	51,3	1,7	62,9	2,1	32,1	1,1	25,2	0,8	12,8	0,5	12,6	0,4	6,4	0,3
160	0,48	0,16	151	2,5	77	1,3	126	2,1	64,2	1,1	101	1,7	51,3	0,9	62,9	1,1	32,1	0,6	25,2	0,4	12,8	0,3	12,6	0,2	6,4	0,2

Technical specifications

max. lifting power	150 kN
gear reduction	8:1 / 24:1
dimension of spindle	Tr60x12 / Tr60x24P12
start-up moment	table entry x 1,3
casing material	GGG50
weight without lifting (kg)	28
weight of spindle per 100mm lifting (kg)	1,8
lubricant	grease
quantity of lubricant (kg)	0,8
max. driving power (duty cycle 20%/h)	2,8 kW
max. driving power (duty cycle 10%/h)	3,8 kW



Spindle gear SG 240

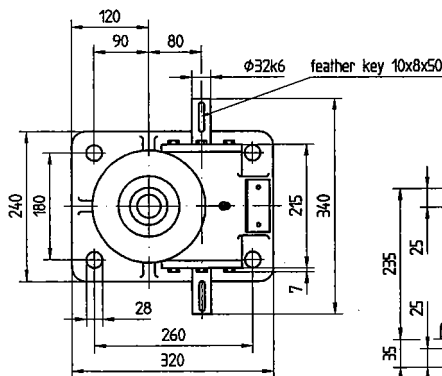
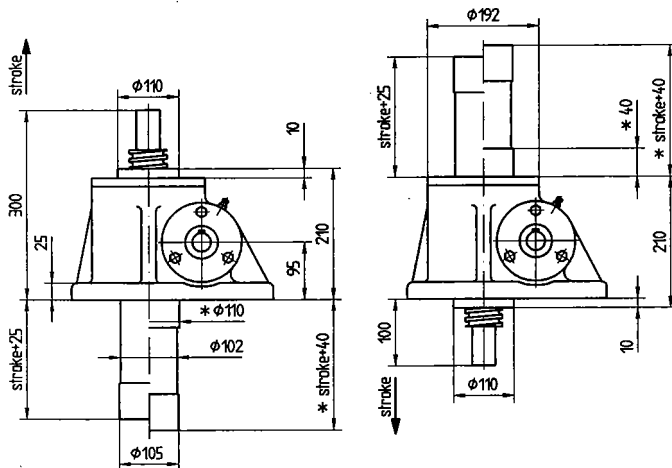
ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

above (O)

below (U)



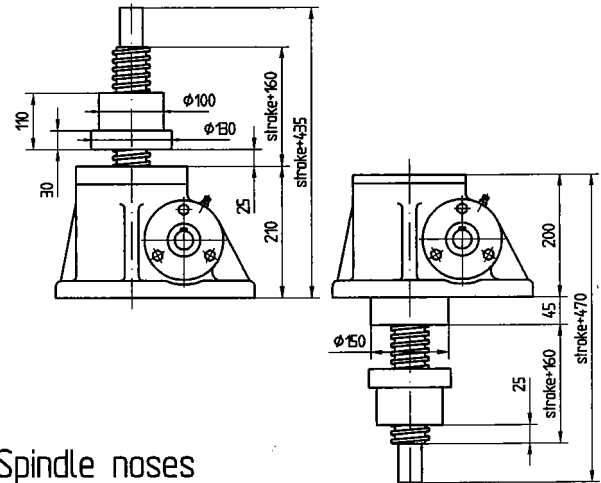
() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube
The second guide ring is used as transducer of low side forces.

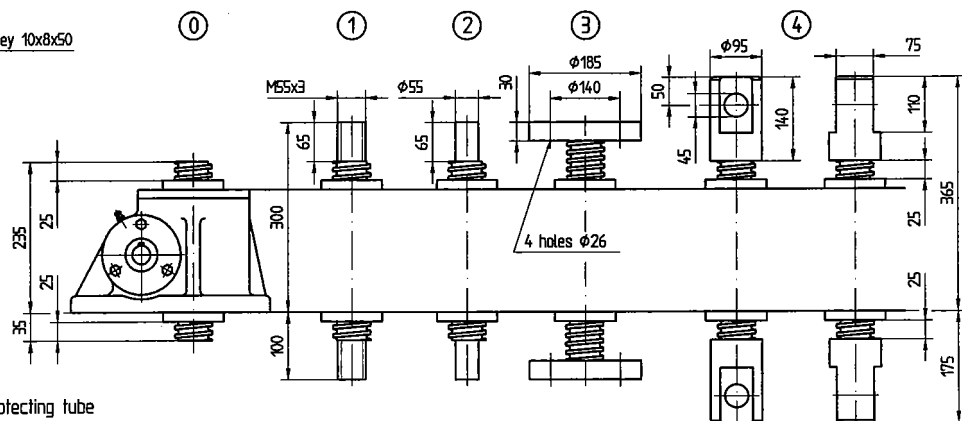
Traveling nut type (L)

above (O)

below (U)



Spindle noses



Subject to measurement and construction errors.

Tr 75x14		single-thread																lifting power in kN																9½:1 = 1,5mm/R				28:1 = 0,5mm/R			
n ₁ min ⁻¹	lift. speed m/min	240				160				120				80				60				40																			
		9½:1	28:1			9½:1	28:1			9½:1	28:1			9½:1	28:1			9½:1	28:1			9½:1	28:1			9½:1	28:1														
		Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW												
1500	2,25	0,75	221	35,3	112	17,3	14,7	23,5	74,7	11,6	110	17,7	56	8,7	73,7	11,8	37,3	5,8	55,3	8,8	28,0	4,4	36,8	5,9	18,7	2,9															
1000	1,50	0,50	221	23,6	112	11,6	14,7	15,7	74,7	7,7	110	11,8	56	5,8	73,7	7,9	37,3	3,8	55,3	5,9	28,0	2,9	36,8	4,0	18,7	1,9															
750	1,125	0,375	221	17,7	112	8,7	14,7	11,8	74,7	5,8	110	8,9	56	4,4	73,7	5,9	37,3	2,9	55,3	4,4	28,0	2,2	36,8	3,0	18,7	1,5															
500	0,75	0,25	221	11,8	112	5,8	14,7	7,9	74,7	3,8	110	5,9	56	2,9	73,7	4,0	37,3	1,9	55,3	3,0	28,0	1,5	36,8	2,0	18,7	0,9															
320	0,48	0,16	221	7,6	112	3,7	14,7	5,1	74,7	2,5	110	3,8	56	1,9	73,7	2,5	37,3	1,3	55,3	1,9	28,0	1,0	36,8	1,3	18,7	0,7															
160	0,24	0,08	221	3,8	112	1,9	14,7	2,6	74,7	1,3	110	1,9	56	1,0	73,7	1,3	37,3	0,7	55,3	1,0	28,0	0,6	36,8	0,7	18,7	0,5															

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

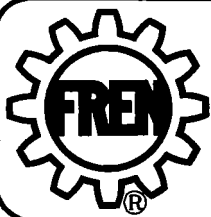
However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5).

Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 75x28P14 double-thread lifting power in kN																9½:1 = 3,0mm/R				28:1 = 1,0mm/R						
n ₁ min ⁻¹	lift. speed m/min		180				120				90				60				45				30			
	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1	9½:1	28:1		
	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
1500	4,50	1,50	232	35,8	120	18,4	155	23,8	80	12,2	116	17,9	60	9,2	77,3	11,9	40	6,1	58	9	30	4,6	38,7	6	40	3,2
1000	3,00	1,00	232	23,8	120	12,2	155	16	80	8,1	116	11,9	60	6,1	77,3	8	40	4	58	6	30	3,2	38,7	4	40	2
750	2,25	0,75	232	17,9	120	9,2	155	11,9	80	6,1	116	9	60	4,6	77,3	6	40	3,2	58	4,5	30	2,3	38,7	3	40	1,6
500	1,50	0,50	232	11,9	120	6,1	155	8	80	4	116	6	60	3,2	77,3	4	40	2	58	3	30	1,6	38,7	2	40	1
320	0,96	0,32	232	7,6	120	4	155	5,1	80	2	116	4	60	2	77,3	2,6	40	1	58	2	30	1	38,7	1,3	40	0,6
160	0,48	0,16	232	3,8	120	2	155	2,6	80	1	116	2	60	1	77,3	1,3	40	0,6	58	1	30	0,6	38,7	0,8	40	0,5

Technical specifications	
max. lifting power	240 kN
gear reduction	9 1/2:1 / 28:1
dimension of spindle	Tr75x14 / Tr75x28P14
start-up moment	table entry x 1,3
casing material	GGG50
weight without lifting (kg)	58
weight of spindle per 100mm lifting (kg)	2,8
lubricant	grease
quantity of lubricant (kg)	1,5
max. driving power (duty cycle 20%/h)	4,5 kW
max. driving power (duty cycle 10%/h)	5,9 kW



Spindle gear SG 300

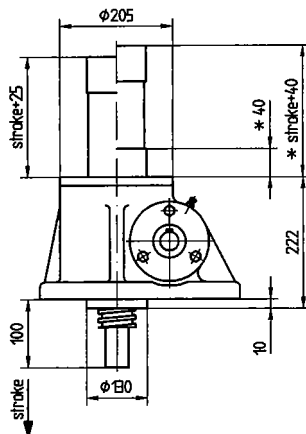
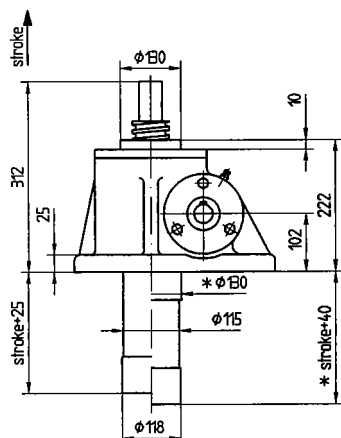
ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

above (O)

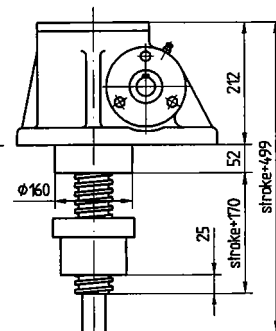
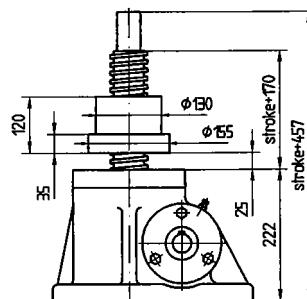
below (U)



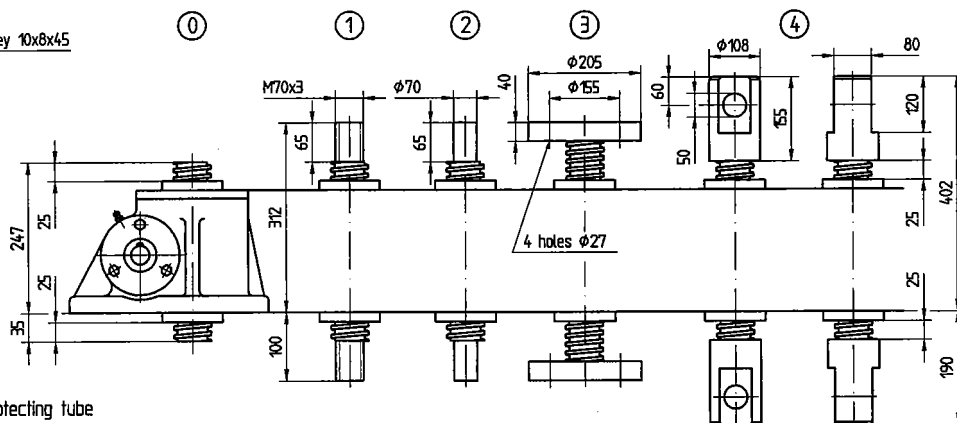
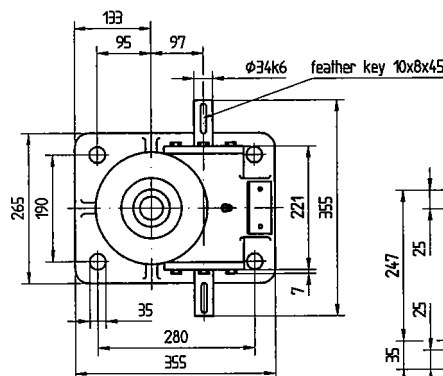
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube
The second guide ring is used as transducer of low side forces.

Subject to measurement and construction errors.

Tr 90x16 single-thread lifting power in kN

10%:1 = 1,5mm/R
32:1 = 0,5mm/R

n ₁	lift. speed	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1
min ⁻¹	m/min	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
1000	1,50	0,50	286	29,4	149	15,3	191	19,6	99,3	10,2	143	14,7	74,5	7,7	95	9,8	49,7
750	1,125	0,375	286	22,1	149	11,5	191	14,7	99,3	7,7	143	11,1	74,5	5,8	95	7,4	49,7
500	0,75	0,25	286	14,7	149	7,7	191	9,8	99,3	5,1	143	7,4	74,5	3,9	95	4,9	49,7
360	0,54	0,18	286	10,6	149	5,5	191	7,1	99,3	3,7	143	5,2	74,5	2,8	95	3,6	49,7
240	0,36	0,12	286	7,1	149	3,7	191	4,8	99,3	2,5	143	3,6	74,5	1,9	95	2,4	49,7
120	0,18	0,06	286	3,6	149	1,9	191	2,4	99,3	1,3	143	1,8	74,5	1	95	1,2	49,7

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5).

Please ask for further information in the works.
For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 90x32P16 double-thread lifting power in kN

10%:1 = 3,0mm/R
32:1 = 1,0mm/R

n ₁	lift. speed	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1
min ⁻¹	m/min	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW
1000	3,00	1,00	284	29,2	146	15	207	21,2	106	10,9	155	16	79,6	7,3	103	10,6	53,1
750	2,25	0,75	284	21,9	146	11,3	207	15,9	106	8,2	155	12	79,6	5,5	103	8	53,1
500	1,50	0,50	284	14,6	146	7,5	207	10,6	106	5,5	155	8	79,6	3,7	103	5,2	53,1
360	1,08	0,36	284	10,5	146	5,4	207	7,7	106	4	155	5,2	79,6	2,7	103	3,9	53,1
240	0,72	0,24	284	7	146	3,6	207	5,2	106	2,8	155	3,5	79,6	1,9	103	2,6	53,1
120	0,36	0,12	284	3,5	146	1,8	207	2,6	106	1,4	155	1,8	79,6	1	103	1,5	53,1

Technical specifications

max. lifting power	300 kN
gear reduction	10%:1 / 32:1
dimension of spindle	Tr90x16 / Tr90x32P16
start-up moment	table entry x 1,3
casing material	GGG50
weight without lifting (kg)	75
weight of spindle per 100mm lifting (kg)	4,2
lubricant	grease
quantity of lubricant (kg)	1,7
max. driving power (duty cycle 20%/h)	5,2 kW
max. driving power (duty cycle 10%/h)	6,9 kW



Spindle gear SG 350

ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

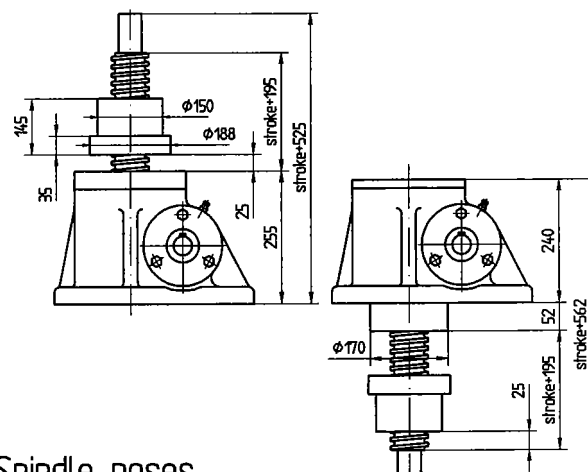
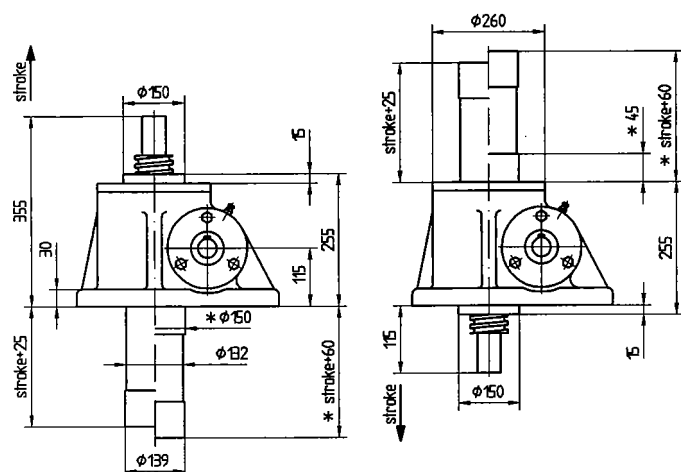
above (O)

below (U)

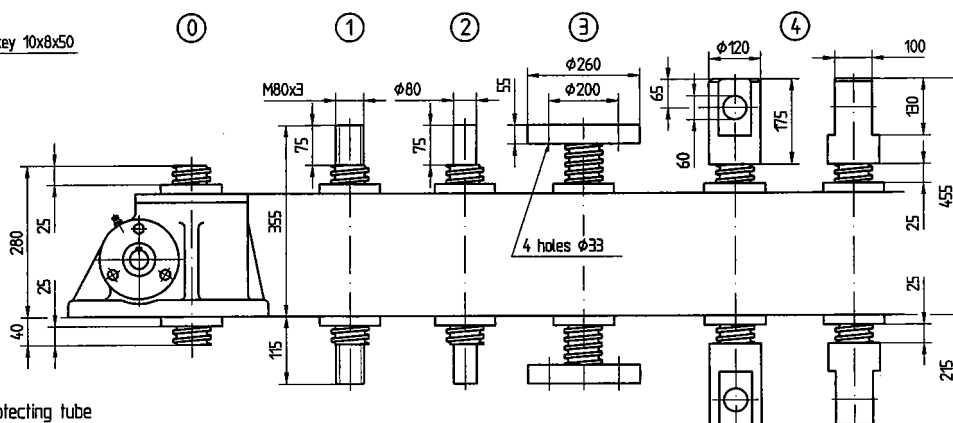
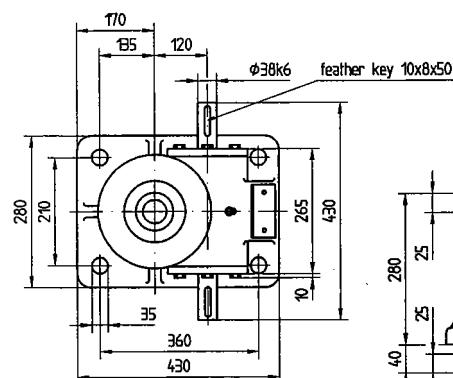
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

* Measurements for 2nd guide ring with protecting tube
The second guide ring is used as transducer of low side forces.

Subject to measurement and construction errors.

Tr 100x16		single-thread		lifting power in kN		10%:1 = 1,5mm/R		32:1 = 0,5mm/R	
		350	32:1	250	32:1	200	32:1	150	32:1
n_1	lift. speed	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1
min ⁻¹	m/min	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW
1000	1,50	0,50	363/37,3	186/19,1	260/26,6	133/13,7	208/21,3	106/10,9	156/16
750	1,125	0,375	363/28	186/14,3	260/20	133/10,2	208/16	106/8,2	156/12
500	0,75	0,25	363/18,7	186/9,6	260/13,3	133/6,8	208/10,7	106/5,5	156/8
360	0,54	0,18	363/13,4	186/6,9	260/9,6	133/5	208/7,7	106/4	156/5,8
240	0,36	0,12	363/9	186/4,6	260/6,4	133/3,3	208/5,2	106/2,6	156/4,7
120	0,18	0,06	363/4,5	186/2,4	260/3,2	133/1,8	208/2,6	106/1,4	156/2,7

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5).

Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 100x32P16		double-thread		lifting power in kN		10%:1 = 3,0mm/R		32:1 = 1,0mm/R	
		280	32:1	200	32:1	150	32:1	100	32:1
n_1	lift. speed	10%:1	32:1	10%:1	32:1	10%:1	32:1	10%:1	32:1
min ⁻¹	m/min	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW	Nm/kW
1000	3,00	1,00	393/40,4	203/21,2	281/28,8	145/15,1	211/21,6	109/11,3	141/14,4
750	2,25	0,75	393/30,3	203/15,9	281/21,6	145/11,4	211/16,2	109/8,6	141/10,8
500	1,50	0,50	393/20,2	203/10,6	281/14,4	145/7,6	211/10,8	109/7,7	141/7,2
360	1,08	0,36	393/14,6	203/7,6	281/10,4	145/5,6	211/7,8	109/4,2	141/5,2
240	0,72	0,24	393/9,7	203/5,2	281/7	145/3,8	211/5,2	109/2,9	141/3,5
120	0,36	0,12	393/4,9	203/2,6	281/3,5	145/2	211/2,6	109/1,5	141/1,9

Technical specifications

max. lifting power	350 kN
gear reduction	10%:1 / 32:1
dimension of spindle	Tr100x16 / Tr100x32P16
start-up moment	table entry x 1,3
casing material	GGG50
weight without lifting (kg)	90
weight of spindle per 100mm lifting (kg)	5,2
lubricant	grease
quantity of lubricant (kg)	2,2
max. driving power (duty cycle 20%/h)	6,2 kW
max. driving power (duty cycle 10%/h)	8,3 kW



Spindle gear SG 500

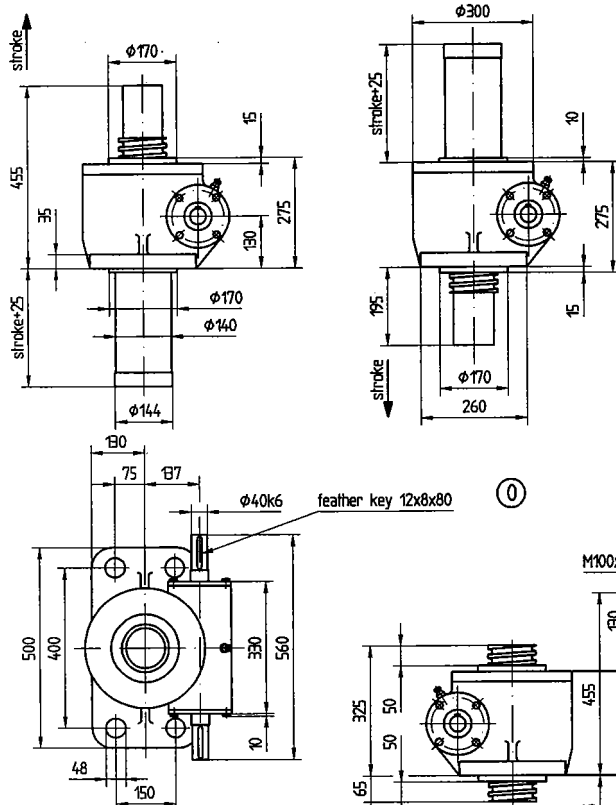
ENZFELDER GmbH.

WERK ENZESFELD:
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A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Basic type (G)

above (O)

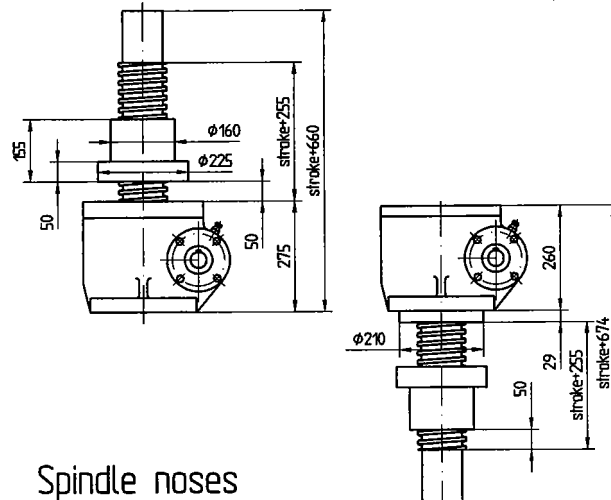
below (U)



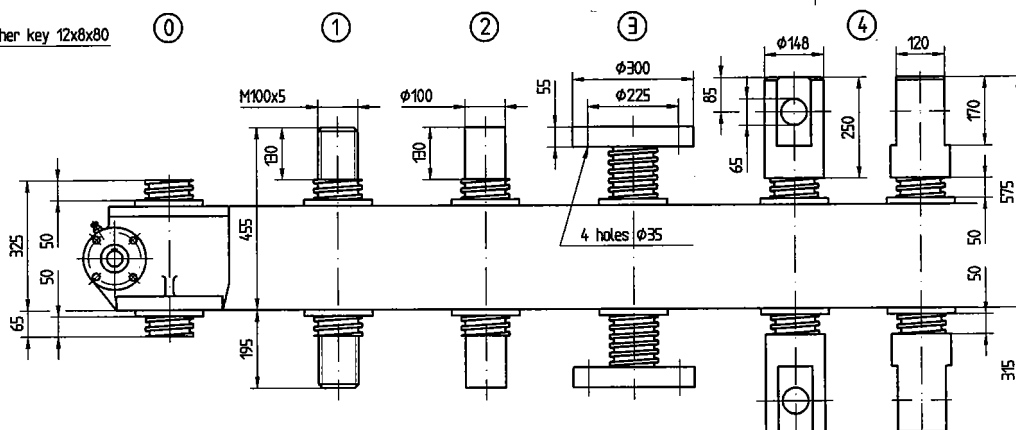
Traveling nut type (L)

above (O)

below (U)



Spindle noses



() see order ID on page 6

Subject to measurement and construction errors.

Tr 120x16 single-thread lifting power in kN

10%:1 = 1.5mm/R
32:1 = 0.5mm/R

n ₁ min ⁻¹	lift. speed m/min	500				400				250				200				100				50				
		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1		
		Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	
1000	1,50	0,50	586	61,3	300	31,4	487	49	240	25,2	293	30,7	150	15,7	235	24,5	120	12,6	117	12,3	60	6,3	58,6	6,2	30	3,2
750	1,125	0,375	586	46	300	23,6	487	36,8	240	18,9	293	23	150	11,8	235	18,4	120	9,5	117	9,2	60	4,8	58,6	4,6	30	2,5
500	0,75	0,25	586	30,6	300	15,7	487	24,5	240	12,6	293	15,3	150	7,9	235	12,3	120	6,3	117	6,2	60	3,2	58,6	3,1	30	1,7
360	0,54	0,18	586	22,1	300	11,3	487	17,7	240	9,1	293	11,1	150	5,7	235	8,9	120	4,6	117	4,5	60	2,4	58,6	2,3	30	1,3
240	0,36	0,12	586	14,7	300	7,6	487	11,8	240	6,1	293	7,4	150	3,8	235	6	120	3,1	117	3,1	60	1,6	58,6	1,6	30	0,9
120	0,18	0,06	586	7,4	300	3,8	487	6	240	3,1	293	3,8	150	2	235	3,1	120	1,6	117	1,6	60	0,9	58,6	0,9	30	0,6

RPM, power demand and admissible lifting speed at a reduction of 10:1 and 20:1 single-thread and double-thread spindle actuated, apply to the dynamic lifting power and a 20%/h or 30%/10min duty cycle at 20°C.

In the range of the spaces containing italics (above the lines) the spindle gears are overheated, the surface pressure in the thread being too high. We do not furnish a guarantee in this area.

However, it is feasible to transmit higher powers at a reduced duty cycle, or lower powers at a higher temperature (see preselection table, page 5). Please ask for further information in the works.

For lifting speeds higher than those given in the tables, also oil-lubricated ball bearing spindles or special reductions are available.

Tr 120x32P16 double-thread lifting power in kN

10%:1 = 3,0mm/R
32:1 = 1,0mm/R

n ₁ min ⁻¹	lift. speed m/min	400								300								200								150								75								50							
		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1		10%:1		32:1																	
		Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW	Nm	kW																
1000	3,00	1,00	637	65,4	318	32,7	478	49	239	24,5	319	32,7	159	16,4	239	24,5	120	12,3	120	12,3	60	6,2	80	8,2	40	4,1	40	4,1	20	2,1	20	2,1	10	1,1															
750	2,25	0,75	637	49	318	24,5	478	36,8	239	18,4	319	24,5	159	12,3	239	18,4	120	9,2	120	9,2	60	4,6	80	6,2	40	3,2	40	3,2	20	2,1	20	2,1	10	1,1															
500	1,50	0,50	637	32,7	318	16,4	478	24,5	239	12,3	319	16,4	159	8,2	239	12,3	120	6,2	120	6,2	60	3,2	80	4,1	40	2,1	40	2,1	20	2,1	20	2,1	10	1,1															
360	1,08	0,36	637	23,6	318	11,8	478	17,7	239	8,8	319	11,8	159	5,9	239	8,9	120	4,5	120	4,5	60	2,3	80	3	40	1,6	40	1,6	20	2,1	20	2,1	10	1,1															
240	0,72	0,24	637	15,7	318	7,8	478	11,8	239	6	319	7,9	159	4	239	5,6	120	3,1	120	3	60	1,6	80	2	40	1,1	40	1,1	20	2,1	20	2,1	10	1,1															
120	0,36	0,12	637	7,8	318	4	478	6	239	3	319	4	159	2,1	239	2,9	120	1,6	120	1,6	60	0,9	80	1,2	40	0,7	40	0,7	20	2,1	20	2,1	10	1,1															

Technical specifications

max. lifting power	500 kN
gear reduction	10%:1 / 32:1
dimension of spindle	Tr120x16 / Tr120x32P16
start-up moment	table entry x 1,3
casing material	GGG50
weight without lifting (kg)	180
weight of spindle per 100mm lifting (kg)	7,7
lubricant	grease
quantity of lubricant (kg)	3,3
max. driving power (duty cycle 20%/h)	7,8 kW
max. driving power (duty cycle 10%/h)	10,8 kW

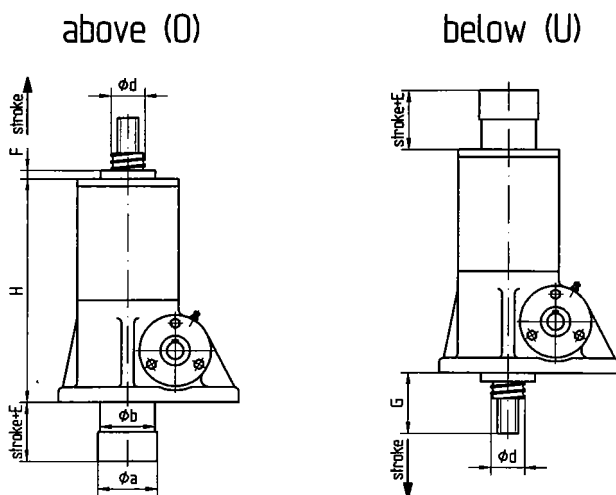


Ball screw gear Swinging elements

ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

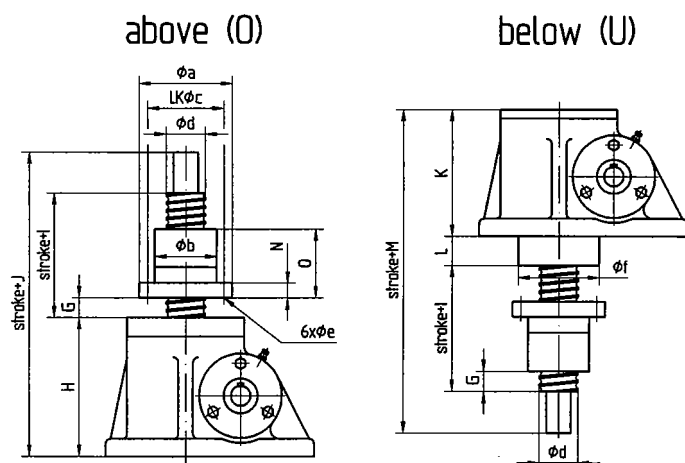
Basic type, ball-screw actuated (KSG)



KSG	30	50	150
ϕa	48	63	79
ϕb	45	60	76
ϕd	25x10	40x10	50x20
E	25	25	25
F	10	10	10
G	62	72	85
H	180	265	311

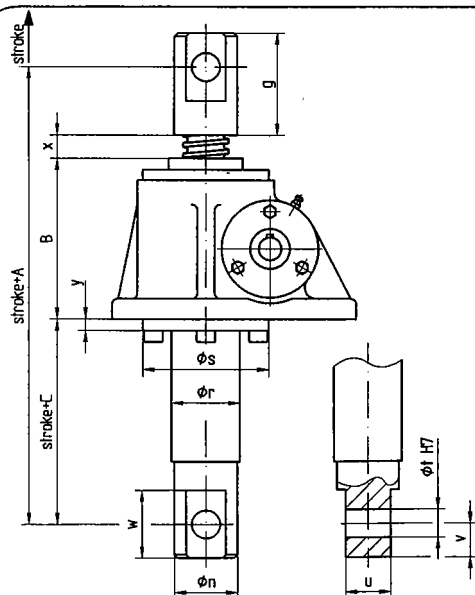
Measurements of spindle noses
see standard type!
Valid also for traveling nut type.

Traveling nut type, ball-screw actuated (KSG)



KSG	30	50	150
ϕa	63	95	125
ϕb g6	38	63	85
LKϕc	50	78	105
ϕd	25x10	40x10	50x20
ϕe	6,6	9	11
ϕf	60	83	110
G	20	20	25
H	105	140	160
I	80	100	125
J	218	282	335
K	95	130	150
L	24	30	34
M	232	302	359
N	12	15	22
O	64	70	92

Swinging element (SE)



SE	5	15	20	30	50	100	150	200	240	300	500
A	180	215	247	250	320	350	390	432	475	502	762
B	74	90	103	106	140	150	160	187	210	222	282
C	61	75	82	82	100	110	130	140	150	160	265
g	50	50	65	65	90	100	120	130	140	155	250
ϕn	30	35	40	40	55	65	80	85	95	108	148
ϕr	28	36	45	45	60	70	80	90	110	127	150
ϕs	59	65	80	80	110	120	140	160	180	190	240
$\phi t H7$	15	15	15	15	25	30	35	40	45	50	65
u	20	25	30	30	40	50	60	65	75	80	120
v	15	15	23	23	30	30	45	50	50	60	85
w	30	35	46	46	60	70	90	100	110	120	170
x	10	20	20	20	20	20	25	25	25	25	50
y	8	10	10	10	10	12	15	20	20	20	25

Special types available on request

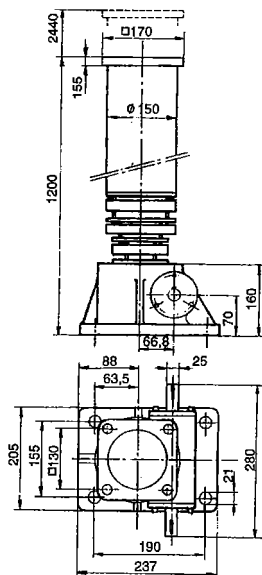


Telescopic Spindle Gears

(TSG)

ENZFELDER GmbH.

WERK ENZFELD:
EICHENGASSE 597
A-2551 ENZFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95



Examples from the practice

Innovation!
For constructing engineers

1st example:
fitting height
effective stroke
ultimate height
dynamic load
V
driving power
final stage

3-stage
1200 mm
2440 mm
3640 mm
60 kN
430 mm/min
2,5 kW

2nd example:
fitting height
effective stroke
ultimate height
dynamic load
V
driving power
final stage

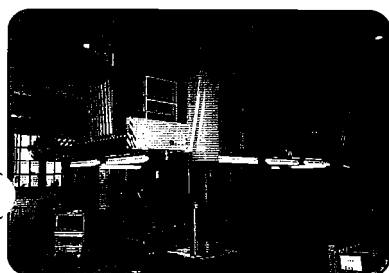
4-stage
1200 mm
3250 mm
4450 mm
60 kN
430 mm/min
2,9 kW

Features

- exact synchronism of several spindles
- self-locking mechanism at stoppage
- absolute safety from sinking over any period of time
- short fitting height, long stroke
- no expensive holes in the ground required for longer strokes
- all stages can be equipped with an intercepting nut (no gripping of the plane faces); patent application filed
- electric monitoring of safety nuts possible
- feasible up to 5 stages
- oil splash lubrication possible (reduces maintenance)
- position indication easily realizable

Telescopic spindles as building blocks in the construction of lifting gears.
You ask our advice, we recommend you the right thing to solve your problem!!!

In view of today's market requirements we developed the above telescopic spindles as an addition to our standard program of spindle gears. The telescopic spindles which were available before no longer fulfilled the present demands for higher speed, high weights (up to 200 kNdyn), and the use of safety locking nuts at any telescopic stage. Therefore, we developed a new system which meets the mentioned demands perfectly and reliably, without jamming of the telescopic plane faces or demolition of the intercepting nuts, and we applied for a patent for it. These telescopic spindles have already been used successfully in heavy lifting platforms and in engine construction, particularly where a small fitting height but a large effective stroke are required and the lifting gear must travel, or where for any other reason expensive holes for embedding spindles in the ground are to be avoided.



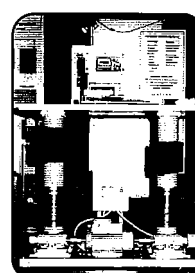
lifting stage 6.000x10.000mm
stroke 3.600



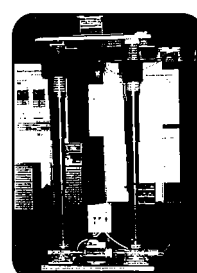
pivoted bogie lifter, fitting height 850 mm
effective stroke 1.450 mm



ultimate
height 6.000 mm



jacked-in table



telescoped table

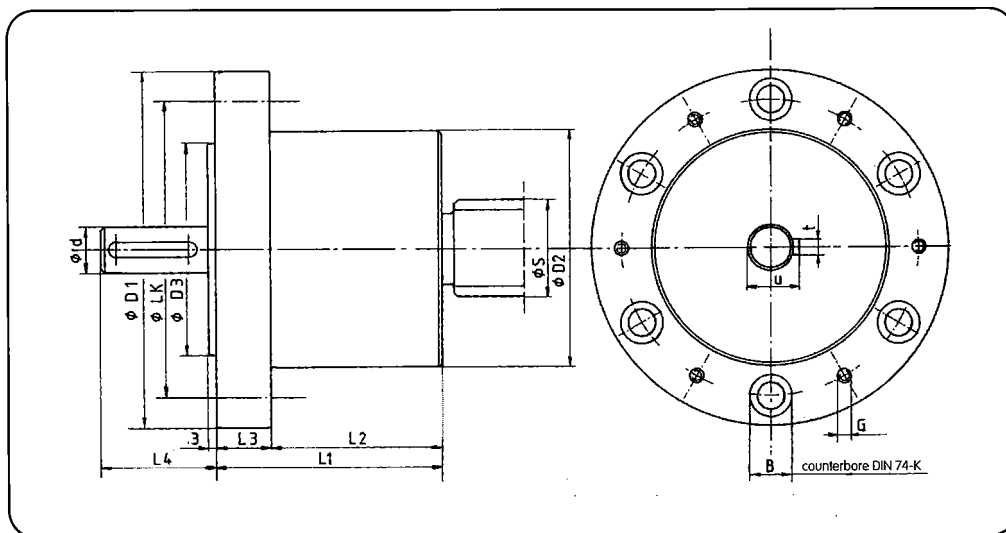




Spindle Bearing Arrangements

ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95



type	D1	D2	D3	d	LK	B	G	L1	L2	L3	L4	t	u	spindle Ø S	axial load kN C	Co	M power max Nm
SBA8	150	100	90	25	125	m10	M6	95	72	23	45	6	22,5	40 - 55	45,0	88,2	90
SBA12	170	120	110	35	145	m12	M8	120	90	30	70	10	38,0	55 - 70	61,9	126	280
SBA22	230	160	150	40	195	m16	M8	160	120	40	80	12	43,0	65 - 90	97,5	221	450

Advantages

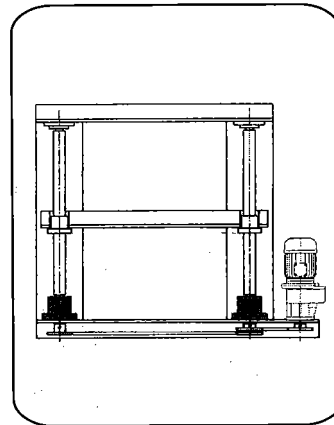
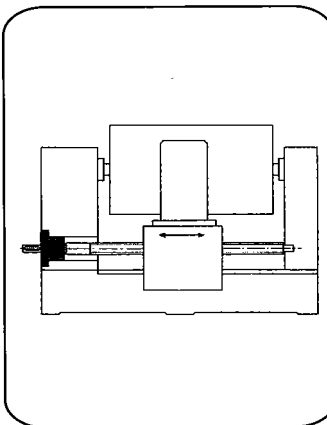
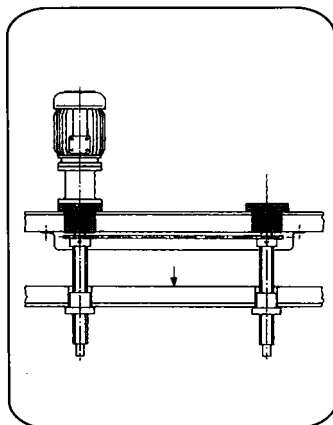
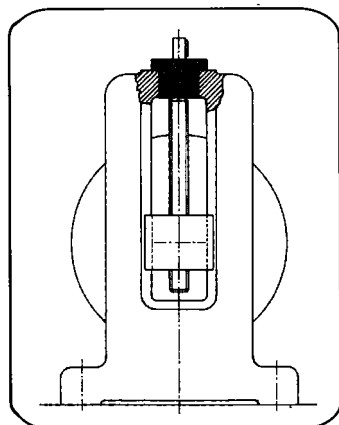
of a series fabrication type:

- no special bearing needs to be designed
- all that needs to be provided is one bore and 6 threads
- this means a considerable relief for your own fabrication (cost-effective!)
- high price/performance ratio thanks to series fabrication
- synchronism thanks to chain- or belt drive
- high statistic load carrying ability
- self-lockage if the spindles are selected accordingly
- motor lantern with coupling and swinging device possible
- can be equipped with spur wheel back-geared motor for many rotational speeds
- available with trapezoid thread, ball-headed spindle, or special thread

A product of your own construction is more expensive than that of a series fabrication! Send in your linear drive-related problem, and we shall make you a proposal.

Examples for the use of spindle bearing arrangements!

Synchronous traveling due to chain-belt drive for the purpose of lifting, sliding, exerting pressure, or pulling.



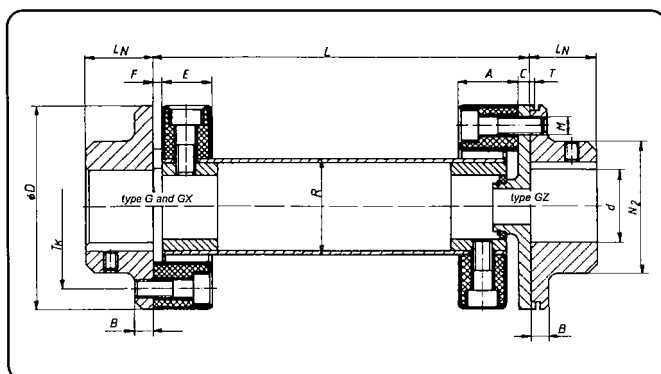


Elastic Cardan Shafts, Pedestal Bearings, Flange Bearings

ENZFELDER GmbH.

WERK ENZSFELD:
EICHENGASSE 597
A-2551 ENZSFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Elastic propeller shafts G/GX/GZ

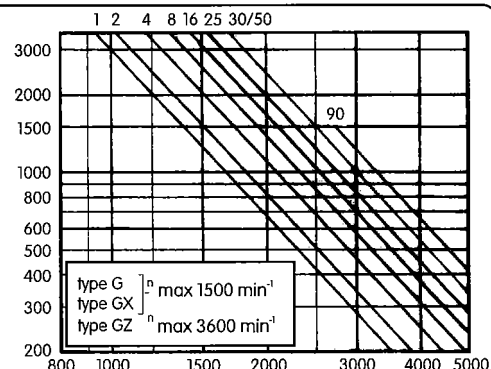


RPM - length -
diagram:

Selection chart for
sizes according to
RPM and length of
joint

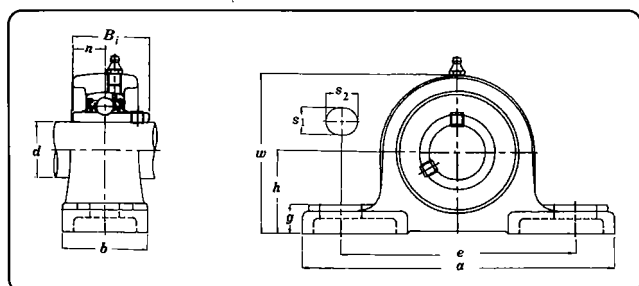
RPM n
(min⁻¹)

length L
(mm)



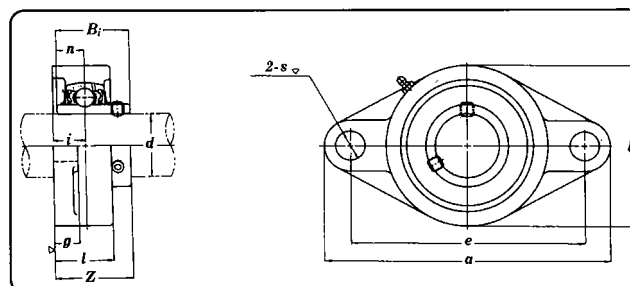
size	rated torque [Nm] type			weight [kg]		max. shift of angle					pilot drill	d	d max	E	F	L _w	Ø N ₂	R	T	T _k /M
	G	GX	GZ	for 2 hubs	for 1 m tube	G+GZ	GX	A	B	C										
1	10	10	10	1,0	1,1	3°	1°	24	7	5	56	8	25	22	2	24	36	30	1,5	Ø 44 / 2 x M6
2	20	30	20	2,2	1,4	3°	1°	24	8	5	85	12	38	20	4	28	55	40	1,5	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	Ø 100 / 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	Ø 125 / 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	Ø 140 / 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	Ø 165 / 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	Ø 165 / 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	Ø 215 / 3 x M20

Pedestal bearing



Typ	Ø d (mm)	Dimensions (mm)									Bolt Used (mm)	Weight (kg)
		h	a	e	b	s ₂	s ₁	g	w	n		
UCP 205	25	36,5	140	105	38	19	13	13	71	14,3	10	0,8
UCP 206	30	42,9	165	121	48	21	17	15	84	15,9	14	1,3
UCP 207	35	47,6	167	127	48	21	17	16	93	17,5	14	1,6
UCP 208	40	49,2	184	137	54	21	17	17	98	19,0	14	2,0
UCP 209	45	54,0	190	146	54	21	17	17	106	19,0	14	2,2
UCP 210	50	57,2	206	159	60	22	20	19	113	19,0	16	2,9
UCP 212	60	69,8	241	184	70	25	20	22	138	25,4	16	4,9
UCP 214	70	79,4	266	210	72	30	25	28	156	30,2	20	6,8
UCP 216	80	88,9	292	232	78	35	25	32	174	33,3	20	9,0
UCP 217	85	95,2	310	247	83	40	25	32	185	34,1	20	10,8

Flange bearing



Typ	Ø d (mm)	Dimensions (mm)										Weight (kg)
		a	e	i	g	l	s	b	Z	Bi	n	
UCFL 201	12	113	90	15	11	25,5	12	60	33,3	31,0	12,7	0,48
UCFL 203	17	113	90	15	11	25,5	12	60	33,3	31,0	12,7	0,48
UCFL 204	20	113	90	15	11	25,5	12	60	33,3	31,0	12,7	0,48
UCFL 205	25	130	99	16	13	27	16	68	35,7	34,0	14,3	0,64
UCFL 207	35	161	130	19	14	34	16	90	44,4	42,9	17,5	1,2
UCFL 208	40	175	144	21	14	36	16	100	51,2	49,2	19,0	1,6
UCFL 210	50	197	157	22	15	40	19	115	54,6	51,6	19,0	2,2
UCFL 212	60	250	202	29	18	48	23	140	68,7	65,1	25,4	4,2
UCFL 214	70	265	216	31	20	54	23	160	75,4	74,6	30,2	5,7
UCFL 216	80	290	233	34	20	58	25	180	83,3	82,6	33,3	7,8

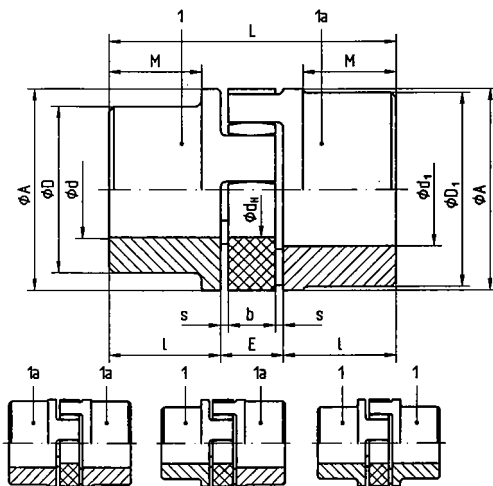


Couplings, expansion bellows

ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Elastic couplings (KU)



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 $1^{\circ}30'$, the twisting angle $3,2^{\circ}$ at Mt nom. The operable temperature range lies between -40°C and $+100^{\circ}\text{C}$.

Type R	Mt nom in Nm at 80° Shore ²	Mt nom in Nm at 92° Shore ²	Mt nom in Nm at 98° Shore ²	holes hub 1 finished ϕd_1 min max	holes hub 1a finished ϕd_1 min max	ϕA	ϕD	ϕD_1	L	E	s	b	M	ϕd_2	material	weight ³ type 1 in kg	weight ³ type 1a in kg
14	4	7	12	- 4 14	- - -	30	30	30	35	11	13	15	10	-	10	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	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

Expansion bellows (FA)

basic type

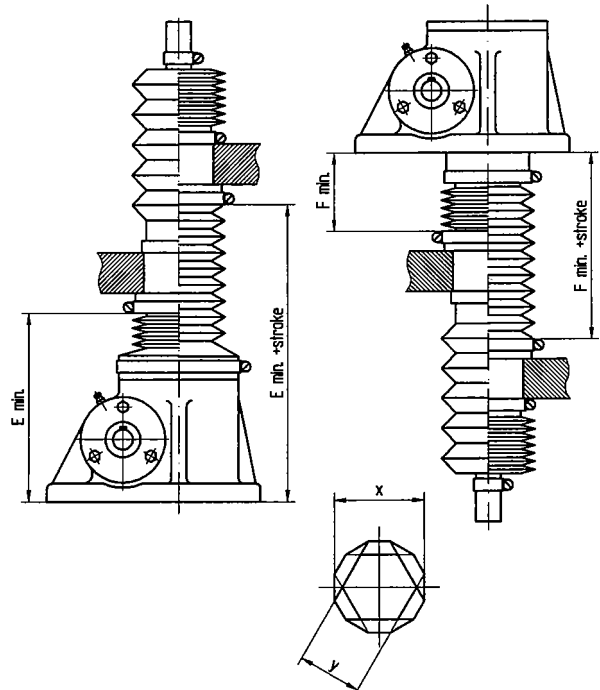
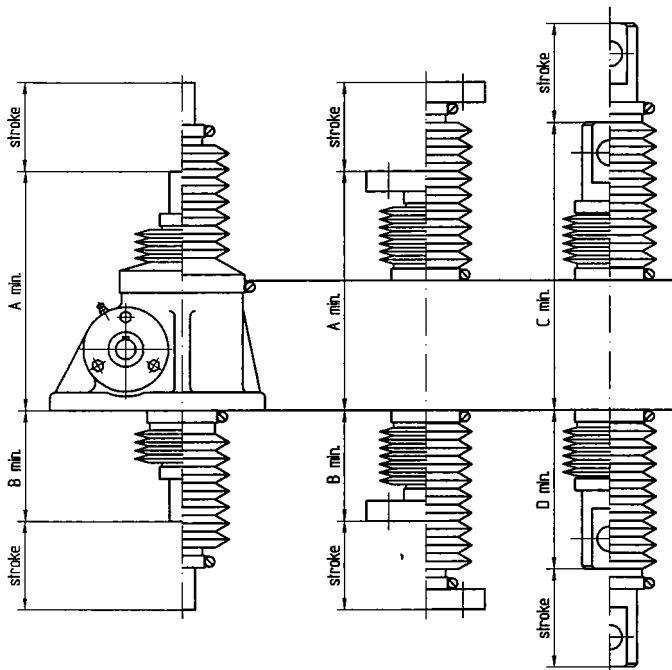
traveling nut type

spindle noses

①/②

③

④



SG	5	15	20	30	50	100	150	200	240	300	350	500
A min.	106+0,15xstroke	130+0,15xstroke	156+0,15xstroke	157+0,15xstroke	202+0,15xstroke	215+0,15xstroke	235+0,15xstroke	274+0,15xstroke	300+0,15xstroke	312+0,15xstroke	355+0,15xstroke	455+0,15xstroke
B min.	37+0,15xstroke	50+0,15xstroke	62+0,15xstroke	62+0,15xstroke	72+0,15xstroke	75+0,15xstroke	85+0,15xstroke	97+0,15xstroke	100+0,15xstroke	100+0,15xstroke	115+0,15xstroke	195+0,15xstroke
C min.	134+0,15xstroke	160+0,15xstroke	189+0,15xstroke	190+0,15xstroke	250+0,15xstroke	270+0,15xstroke	305+0,15xstroke	342+0,15xstroke	365+0,15xstroke	402+0,15xstroke	455+0,15xstroke	575+0,15xstroke
D min.	65+0,15xstroke	80+0,15xstroke	95+0,15xstroke	95+0,15xstroke	120+0,15xstroke	130+0,15xstroke	155+0,15xstroke	165+0,15xstroke	175+0,15xstroke	190+0,15xstroke	215+0,15xstroke	315+0,15xstroke
E min.	84+0,15xstroke	110+0,15xstroke	124+0,15xstroke	125+0,15xstroke	160+0,15xstroke	170+0,15xstroke	185+0,15xstroke	212+0,15xstroke	235+0,15xstroke	247+0,15xstroke	280+0,15xstroke	325+0,15xstroke
F min.	28+0,15xstroke	40+0,15xstroke	44+0,15xstroke	44+0,15xstroke	50+0,15xstroke	52+0,15xstroke	59+0,15xstroke	64+0,15xstroke	70+0,15xstroke	77+0,15xstroke	77+0,15xstroke	79+0,15xstroke
x	75	75	75	105	105	125	125	140	140	150	180	210
y	38	38	38	63	63	75	75	100	100	110	120	150

This chart is valid for closed rooms at a normal ambient temperature.
In case of deviations please inquire in the works.

Product as delivered: enclosed



Flat Spiral Spring Covers, Crank Handles, Handwheels

ENZFELDER GmbH.

WERK ENZFELD:
EICHENGASSE 597
A-2551 ENZFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Flat spiral spring covers

Flat spiral spring covers are made of high-grade, hardened, spiral rolled spring band steel; they are produced in the diameters and fitting lengths indicated below.

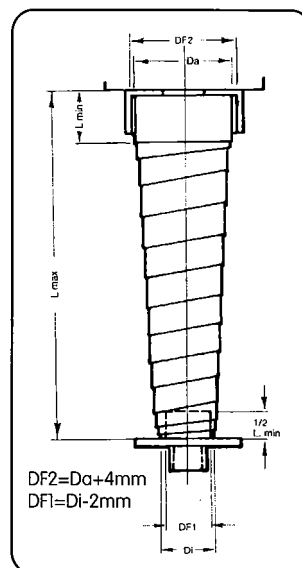
They protect spindles against dirt accumulation and damage and reduce the danger of accidents.

In addition to that they provide an excellent sealing between the individual threads.

Stainless execution available on request.

ATTENTION!

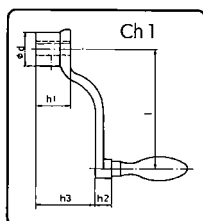
When ordering please indicate the fitting position: horizontal or vertical.



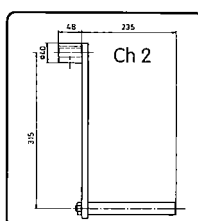
SG 5				SG 20/30				SG 50				SG 100				SG 150/200			
Di±1mm	Da±2mm	Lmax	Lmin	Di±1mm	Da±2mm	Lmax	Lmin	Di±1mm	Da±2mm	Lmax	Lmin	Di±1mm	Da±2mm	Lmax	Lmin	Di±1mm	Da±2mm	Lmax	Lmin
30	39	150	30	40	51	150	30	50	68	250	30	60	73	150	30	75	92	150	30
30	44	250	30	40	56	250	30	50	68	250	30	60	78	250	30	75	99	250	30
30	49	350	30	40	60	350	30	50	62	250	50	60	71	250	50	75	89	250	50
30	53	450	40	40	63	450	40	50	66	350	50	60	78	350	50	75	94	350	50
30	58	550	40	40	68	550	40	50	70	450	50	60	82	450	50	75	101	450	50
30	55	650	50	40	55	350	50	50	73	550	50	60	81	550	60	75	99	550	60
30	59	750	50	40	58	450	50	50	68	550	60	60	85	650	60	75	103	650	60
				40	61	550	50	50	72	650	60	60	89	750	60	75	108	750	60
				40	65	650	50	50	76	750	60	60	89	750	75	75	99	650	75
				40	69	750	50	50	78	750	75	60	95	900	75	75	104	750	75
				40	55	450	60	50	84	900	75	60	102	1100	75	75	111	900	75
				40	58	550	60	50	90	1100	75	60	90	1100	100	75	108	1100	100
				40	62	650	60	50	75	1100	100	60	94	1300	100	75	112	1300	100
				40	66	750	60	50	79	1300	100	60	101	1500	100	75	120	1500	100
				40	70	900	60	50	86	1500	100	60	109	1800	100	75	126	1700	100
				40	62	650	75	50	94	1800	10					75	115	1500	120
				40	66	750	75									75	122	1800	120
				40	72	900	75									75	127	2000	120
				40	78	1100	75									75	132	2200	120
				40	84	1300	75									75	135	2000	150
				40	90	1500	75									75	141	2400	150
				40	66	1000	100									75	145	2800	150
				40	70	1200	100									75	142	2800	180
																75	148	3000	180
																75	156	3250	180
																75	148	3250	200
																75	158	3500	200

SG 300			
Di±1mm	Da±2mm	Lmax	Lmin
110	131	250	60
110	135	350	60
110	139	450	60
110	130	350	75
110	135	450	75
110	140	600	75
110	129	650	100
110	133	750	100
110	138	900	100
110	139	1100	120
110	145	1300	120
110	155	1500	150
110	159	1800	150
110	165	2000	150
110	159	2000	180
110	165	2200	180
110	170	2400	180
110	162	2400	200
110	166	2600	200
110	172	2800	200

Different diameters and fitting lengths on request



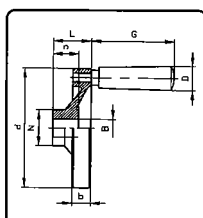
Crank handles



Ch 1			
SG	5	20	30
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				
SG	50	100	150	200
a F 7	20	24	25	28
b P 9	6	8	8	8
c	22,8	27,3	28,3	31,3

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



Hand wheels

type	d	N	b	n	L	G	D	pilot drill Ø H7	weight kg
SG 5	80	26	13,0	16	30	58,5	22	10	0,16
SG 20, 30	125	31	15,0	18	34	67,5	23	14	1,3
SG 30, 50	160	36	18,0	20	37	67,5	23	14	1,5
SG 50, 100	200	42	20,5	24	45	80,0	26	18	1,0
SG 100, 150	250	48	23,0	28	51	90,0	28	24	1,3

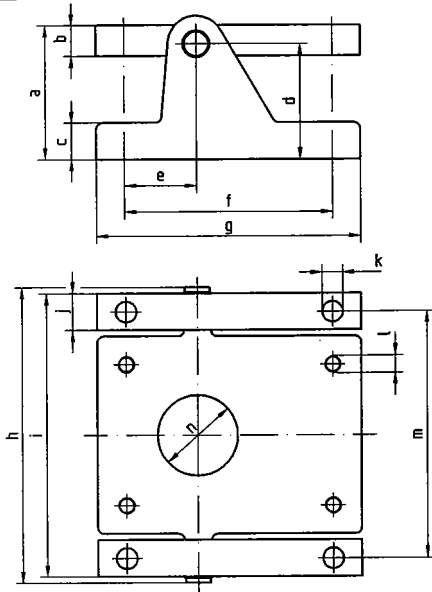


Swivelling console, Limit stop, Turn-lock device

ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Swivelling console (SK)

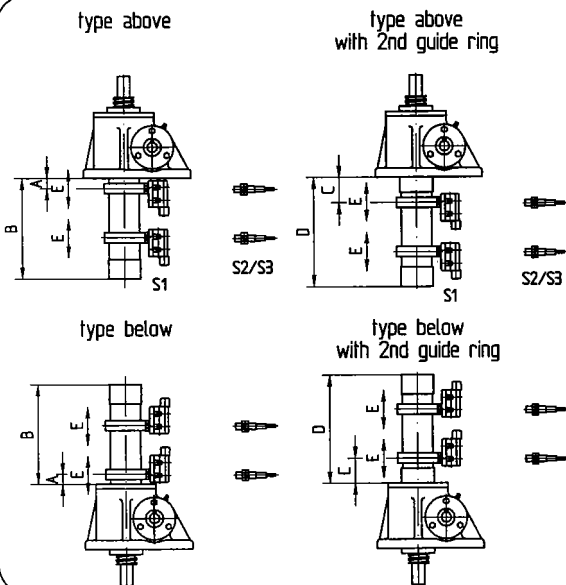


Product as delivered: enclosed

SG	30	50	100	150	200
a	90	110	110	150	160
b	20	30	30	40	40
c	20	30	30	30	40
d	80	95	95	130	140
e	50	58	60	63,5	95
f	135	168	180	190	240
g	165	215	225	237	297
h	190	240	270	295	320
i	180	230	260	285	310
j	25	30	30	35	40
k	13	18	18	21	26
l	M12	M16	M16	M18	M24
m	155	200	230	250	270
n	60,2	83,2	95,2	110,2	140,5

Special executions on request

Limit stop (EA)

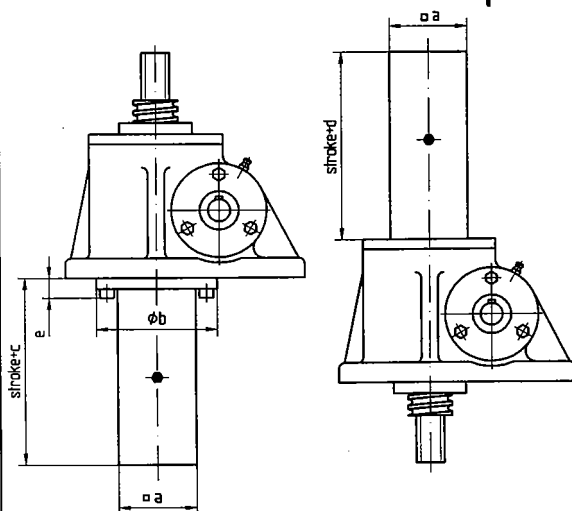


	A	B	C	D
SG 5	32	stroke+95	47	stroke+110
SG 15	32	stroke+105	57	stroke+130
SG 20	32	stroke+105	57	stroke+130
SG 30	32	stroke+105	62	stroke+135
SG 50	32	stroke+105	62	stroke+135
SG 100	32	stroke+105	62	stroke+135
SG 150	32	stroke+105	58	stroke+131
SG 200	32	stroke+105	67	stroke+140
SG 240	32	stroke+105	72	stroke+145
SG 300	32	stroke+105	72	stroke+145
SG 350	32	stroke+105	77	stroke+150
SG 500	-	-	45	stroke+120

Limit switches must be adjusted in situ!
Product as delivered: enclosed

Limit switch type	S1	S2	S3
current max. at 250V	0,25A	220mA	-
voltage 120V	0,5A	500mA	-
24V	7A	1A	1A
type of connection	binding posts	cable 3x0,5mm ² 1m length	plug
setting range E	±15	the entire range	the entire range
temperature min/max	-10°C +80°C	-5°C +70°C	-25°C +70°C
system of protection	IP 65	IP 67	IP 65
type of switch	mech.	magnet	magnet

Square turn-lock device (VV)



SG	5	15	20 30	50	100	150	200	240 300	350	500
ca	30	40	40	70	80	90	110	120	140	180
φb	59	70	70	108	116	129	148	177	197	235
c	67	92	92	106	112	115	121	132	137	158
d	60	77	77	85	90	100	110	110	115	158
e	11	14	14	18	20	22	22	26	26	26

A turn-lock device comprised of a grooved spindle and feather key is also available on request.

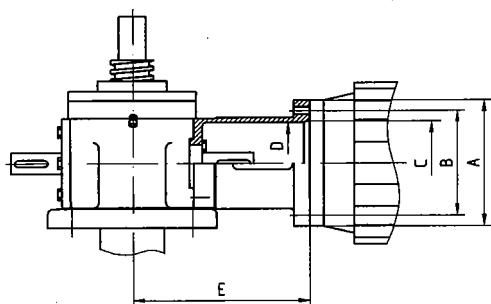


Motor flanges, Safety nuts

ENZFELDER GmbH.

WERK ENZESFELD:
EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Motor flanges

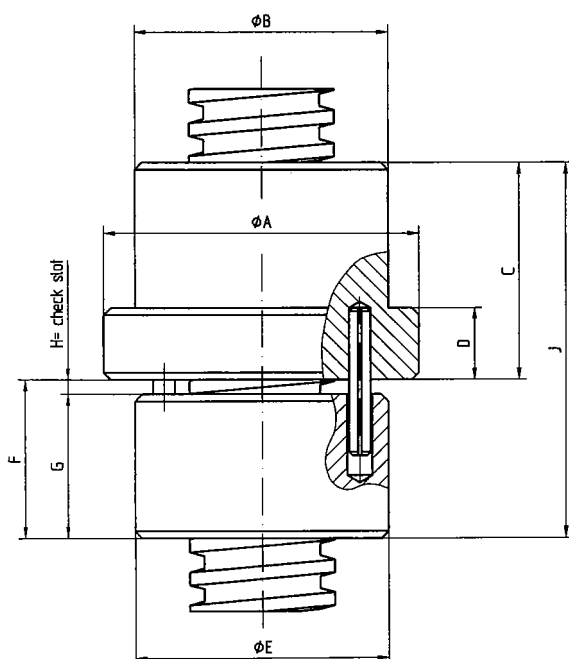


Important:

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 ends ϕ SG	motor	4 pcs bolts DIN 912 for motor
SG 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
SG 15	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
SG 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
SG 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
SG 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
SG 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
SG 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
	132 B14	200	215	180	108	270	32	38	M10 x 30
SG 240	160 B5	350	300	250	108	304	32	42	M16 x 60 + 4 nuts
	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
SG 300	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
	160 B5	350	300	250	150	414	40	42	M16 x 60 + 4 nuts
SG 500	180 B5	350	300	250	150	416	40	48	M16 x 60 + 4 nuts

Safety nuts



SG	5	15	20 30	50	100	150	200	240	300	350	500
ϕA	50	60	76	87	98	110	120	130	155	188	225
ϕB	40	40	50	70	75	90	90	100	130	150	160
C	32	35	40	60	70	75	100	110	120	145	155
D	10	15	20	20	25	25	30	30	35	35	50
ϕE	40	38	50	70	73	85	90	98	120	145	160
F	23	25	33	44	56	66	71	80	98	108	128
G	20	22	30	40	50	60	65	73	90	100	120
H	3	3	3	4	6	6	6	7	8	8	8
J	55	60	73	104	126	141	171	190	218	253	283

Connected with the loaded traveling nut via driving pins, the locking nut runs at idle. As the threads in the traveling nut wear it approaches the idling, unloaded and therefore unworn safety nut. The wear is ascertained by checking the slot H. When the table entry H has declined by half the traveling nut must be replaced!

The visual check of the slot H can be automated by integrating an automatic disconnecting limit switch which is actuated when the traveling nut sinks.

Also available for the basic type.
Standard sheet on request.

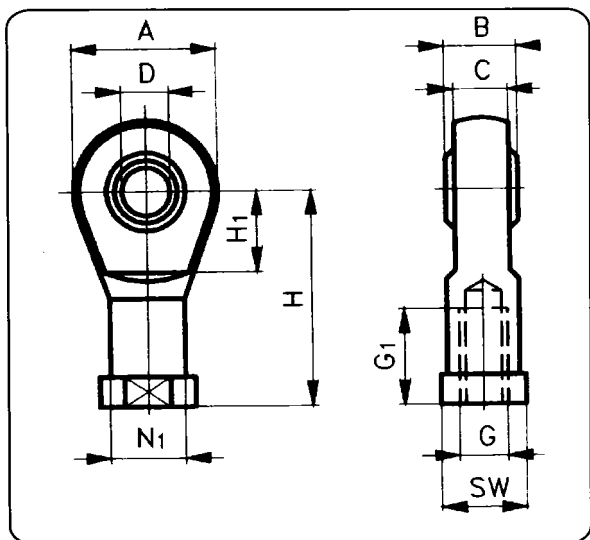
Product as delivered: enclosed



Pivoting Heads, Axial Pivoting Bearings, Critical Speed

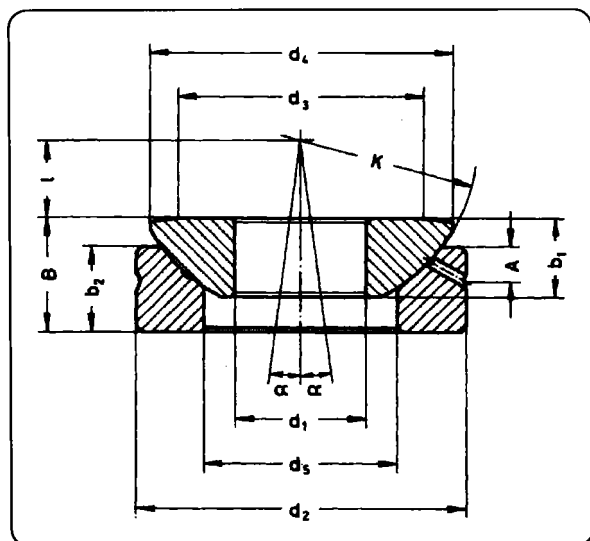
ENZFELDER GmbH.

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EICHENGASSE 597
A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95



Pivoting heads

Type	A	B	C	D	G	G1	H	H1	SW	N1
SG 5	34	10	8	12	M 12 x 1,75	18	50	17,5	17	19
SG 20	40	12	10	15	M 14 x 2	21	61	20	19	22
SG 30	53	16	13	20	M 20 x 1,5	30	77	25	24	28
SG 50	73	22	19	30	M 30 x 2	45	110	35	36	42
SG 100	82	25	21	35	M 36 x 3	60	125	42	50	47
SG 150	132	63	52	63	M 48 x 2	64	140	62	114	70



Axial pivoting gears

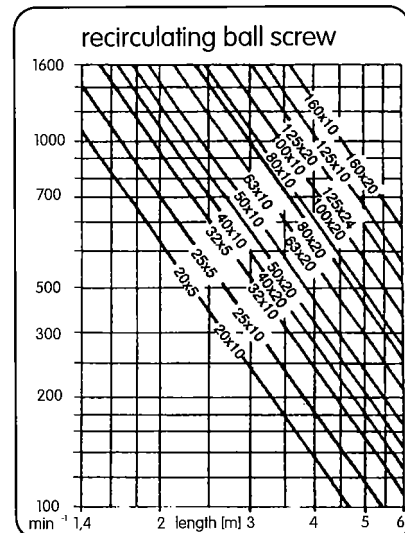
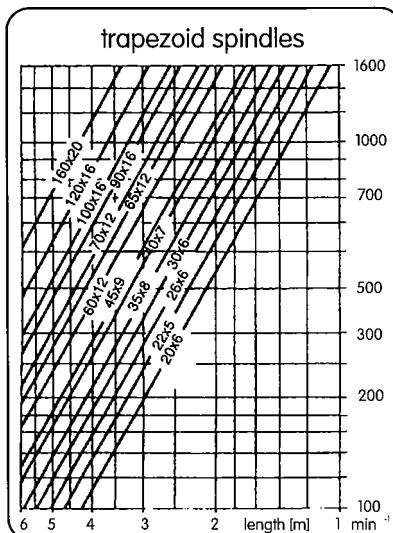
Type	d ₁	d ₂	b ₁	b ₂	B	K	d ₃	d ₄	d ₅	A	l	tilt angle α
GE 25 AX	25	62	16	17	22,5	66	45	57,5	34,5	6	14	7°
GE 35 AX	35	90	22	20	28	98	66	84	52	8	22	6°
GE 40 AX	40	105	27	22	32	114	78	98	59	9	24,5	6°
GE 45 AX	45	120	31	25	36,5	130	89	112	68	11	27,5	6°
GE 50 AX	50	130	33,5	32	42,5	140	98	122,5	69	10	30	5°
GE 60 AX	60	150	37	33	45	160	108	140	86	12,5	35	7°
GE 70 AX	70	160	40	36	50	170	121,5	149,5	95	13,5	35	6°
GE 80 AX	80	180	42	36	50	194	130	168	108	14,5	42,5	6°
GE 100 AX	100	210	50	42	59	220	155,5	195,5	133	15	45	7°
GE 120 AX	120	230	52	45	64	245	170	214	154	16,5	52,5	8°
GE 140 AX	140	260	61	50	72	272	198	244	176	23	52,5	6°
GE 160 AX	160	290	65	52	77	310	213	272	199	23	65	7°

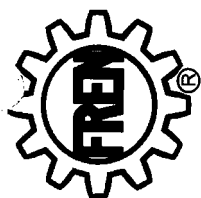
For lining the traveling nut to compensate for alignment errors.

Critical speed

In the L execution the critical speed depends on diameter and length of the spindle and on the spindle bearing arrangement.

The basis is a fixed bearing arrangement in the transmission case of the spindle gears and a single-row movalbe bearing arrangement at the spindle nose. If no movable bearing arrangement is available the admissible RPMs of the spindle are reduced to: TPM = table entry x 0,2.





Spiral Bevel Gear Box

ENZFELDER GmbH.

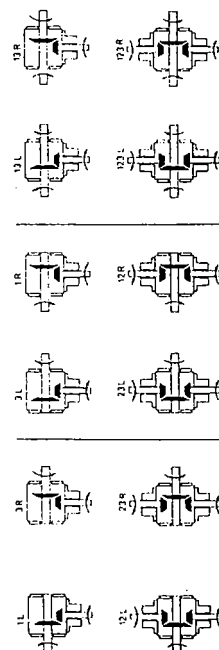
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EICHENGASSE 597

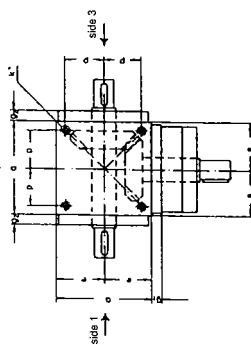
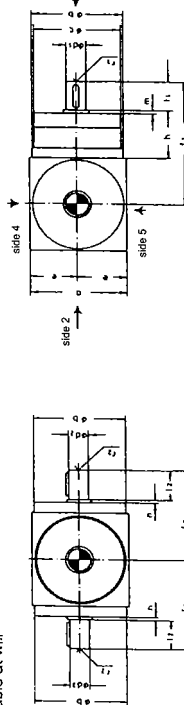
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Tel.: 0 22 56/81 287

Fax: 0 22 56/81 0 95



direction of rotation
adjustable at will



$r_1/r_2 = \text{Form D DIN 332}$

$i = 1:1, 1.5:1, 2:1$

Size	ϕ	ϕ_{b1}	ϕ_{c1}	ϕ_{d1}	ϕ_{e1}	ϕ_{f1}	ϕ_{g1}	ϕ_{h1}	ϕ_{i1}	ϕ_{j1}	ϕ_{k1}	ϕ_{l1}	ϕ_{m1}	ϕ_{n1}	ϕ_{o1}	ϕ_{p1}	ϕ_{q1}	ϕ_{r1}	ϕ_{s1}	ϕ_{t1}	ϕ_{u1}	ϕ_{v1}	ϕ_{w1}	ϕ_{x1}	ϕ_{y1}	ϕ_{z1}	
K 600	75	73	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9	72.9
K 700	90	88	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
K 1000	110	108	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107
K 1500	140	135	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134
K 2000	170	165	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163
K 3000	210	205	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203
K 3500	210	205	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203	203

$i = 3:1$

Size	ϕ ϕ_{b1}	ϕ_c	ϕ_{d14}	ϕ_{d26}	ϕ_e	ϕ_f	ϕ_g	ϕ_h	ϕ_i	ϕ_j	ϕ_k	ϕ_l	ϕ_m	ϕ_n	ϕ_o	ϕ_p	ϕ_q	ϕ_r	ϕ_s	ϕ_t	ϕ_u	ϕ_v	ϕ_w	ϕ_x	ϕ_y	ϕ_z	
K 600	75	73	72.8	14	25	20	35	37.5	110	85	11	10.5	47.5	2	2	6	30	M 5	M 6	5.4×5×25	8 × 6 × 32	8 × 6 × 32	8 × 6 × 32	8 × 6 × 32	8 × 6 × 32	8 × 6 × 32	8 × 6 × 32
K 700	90	88	72	16	30	24	45	45	125	102	10	50	2	2	2	6	36	M 6	M 8	5.4×5×25	8 × 7 × 40	8 × 7 × 40	8 × 7 × 40	8 × 7 × 40	8 × 7 × 40	8 × 7 × 40	8 × 7 × 40
K 1000	110	108	81	20	35	32	50	55	145	117	10	55	2	2	2	8	44	M 8	M 12	8.6×6×32	10 × 8 × 45	10 × 8 × 45	10 × 8 × 45	10 × 8 × 45	10 × 8 × 45	10 × 8 × 45	10 × 8 × 45
K 1500	140	135	98	26	45	40	60	70	175	140	10	60	2	2	2	10	55	M 8	M 16	8.6×7×40	12 × 8 × 50	12 × 8 × 50	12 × 8 × 50	12 × 8 × 50	12 × 8 × 50	12 × 8 × 50	12 × 8 × 50
K 2000	170	165	118	32	50	50	80	95	205	182	12	70	2	2	2	12	67	M 12	M 18	10.8×8×45	14 × 9 × 70	14 × 9 × 70	14 × 9 × 70	14 × 9 × 70	14 × 9 × 70	14 × 9 × 70	14 × 9 × 70
K 3000	210	205	128	38	55	60	110	105	245	232	15	85	2	2	2	16	85	M 12	M 20	10.8×8×50	18 × 11 × 100	18 × 11 × 100	18 × 11 × 100	18 × 11 × 100	18 × 11 × 100	18 × 11 × 100	18 × 11 × 100

Subject to design modifications

for high moments of momentum

transmission $i = 1:1, 1.5:1, 2:1$, and 3:1

8 sizes K 600, K 700, K 1000, K 1500, K 2000, K 3000, K 3500

Case-hardened spiral bevel gear sets

Taper roller bearing arrangement, double, both for driving gear

and power take-off gear

Attachment - thread all over

Shaft seal: double-acting radial packing rings

Gearbox case, flange and cap made of high-grade, oil-tight

gray cast iron

High efficiency (0.98)

Maintenance-free

Attachment - thread all over

Fitting position: any

Rated capacity and rated load torque $i = 1:1$

n_1 min ⁻¹	n_2 min ⁻¹	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)
10	10	-	75	0.13	125	0.27	260	0.57	540	0.94	900	1.90	1800	3.80	3600
50	50	0.39	75	0.66	125	1.30	260	2.85	540	4.65	900	9.20	1800	18.40	3600
100	100	0.77	74	1.30	122	2.70	257	5.60	535	9.90	815	17.60	1685	35.20	3370
200	200	1.45	70	2.50	120	5.25	250	10.90	517	17.10	815	32.00	1550	64.00	1220
500	500	3.55	67.5	5.80	111	12.30	235	24.40	478	38.40	735	74.30	1420	148.60	2840
750	750	4.95	63	8.40	107	16.80	215	35.20	445	54.00	685	104.00	1320	208.00	2640
1000	1000	6.40	61	10.70	102	21.50	205	45.20	430	68.00	650	128.00	1220	256.00	2440
1500	1500	9.30	59	14.90	95	30.00	190	63.00	400	86.00	590	171.00	1090	342.00	2180
2000	2000	11.90	57	18.80	90	37.70	180	78.50	375	116.00	555	212.00	1015	424.00	2030

Rated capacity and rated load torque $i = 1.5:1$

n_1 min ⁻¹	n_2 min ⁻¹	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)
10	6.7	-	61.5	-	103	0.15	215	0.32	455	0.50	730	1.05	1490	2.10	2260
50	33	0.21	61.5	0.36	103	0.75	215	1.60	455	2.55	730	5.20	1490	10.40	2260
100	67	0.43	61.5	0.72	103	1.50	215	3.15	455	5.10	730	10.40	1490	20.80	2260
200	133	0.83	61.0	1.40	102	3.00	213	6.30	450	10.00	720	20.50	1470	41.00	2240
500	333	2.10	60.0	3.50	100	7.35	210	15.50	445	24.80	710	50.50	1450	101.00	2200
750	500	3.05	58.5	5.15	98	10.30	208	23.00	440	36.80	700	74.80	1430	149.60	2180
1000	667	4.00	57.0	6.70	96	14.30	205	30.40	435	48.80	670	95.60	1370	191.20	2160
1500	1000	5.85	56.0	9.85	94	20.60	197	44.00	420	68.00	650	138.00	1320	276.00	2120
2000	1333	7.70	55.0	12.80	92	26.80	192	57.00	410	86.50	620	177.00	1270	354.00	2080

Rated capacity and rated load torque $i = 2:1$

n_1 min ⁻¹	n_2 min ⁻¹	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)
10	5	-	50.0	-	83	0.47	180	0.20	375	0.33	640	0.66	1270	1.32	2540
50	25	0.13	50.0	0.22	83	0.94	180	0.98	375	1.65	640	3.30	1270	6.60	2540
100	50	0.26	50.0	0.43	83	1.85	178	1.95	375	3.35	640	6.60	1270	13.20	2540
200	100	0.52	49.5	0.86	82	3.65	176	3.85	370	6.60	630	13.20	1260	26.40	2520
500	250	1.80	48.0	2.10	81	14.60	176	15.50	365	24.80	620	49.60	1240	99.20	2480
750	375	2.45	47.5	3.10	79	20.60	174	21.60	360	34.80	610	69.60	1220	139.20	2460
1000	500	3.05	46.5	4.05	77	26.80	171	27.80	355	44.80	600	89.60	1200	179.20	2440
1500	750	4.55	45.5	5.90	75.5	40.00	165	41.00	345	64.00	590	128.00	1180	256.00	2420
2000	1000	6.05	44.5	7.75	74	53.30	161	54.30	340	85.50	580	171.00	1160	342.00	2400

Rated capacity and rated load torque $i = 3:1$

n_1 min ⁻¹	n_2 min ⁻¹	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)	P (kW)	M_2 (Nm)
10	3.3	-	40	-	60.0	0.23	130	0.16	275	0.23	465	0.46	930	0.92	1860
50	17	0.14	40	0.21	60.0	0.45	130	0.48	275	0.81	465	1.62	930	3.24	1860
100	33	0.28	39.5	0.41	59.5	0.90	129	0.96	272	1.60	460	3.20	920	6.40	1840
200	67	0.56	39	0.82	59	1.80	127	1.92	268	3.20	455	6.40	910	12.80	1820
500	167	2.28	38.5	3.65	57.0	7.20	126	7.36	265	11.60	445	23.20	890	46.40	1780
750	250	3.00	38.5	4.85	56.0	9.60	123	9.60	260	15.00	430	30.00	870	60.00	1760
1000	333	3.75	37.5	6.00	54.5	12.00	119	12.00	250	18.00	410	36.00	840	72.00	1740
1500	500	5.25	36.5	8.40	53.5	17.00	116	17.00	245	25.50	395	51.00	800	102.00	1720
2000	667	6.75	35.5	10.10	52.5	20.40	111	20.40	240	27.60	385	55.20	780	110.40	1700

Pay attention to maximum permissible temperatures

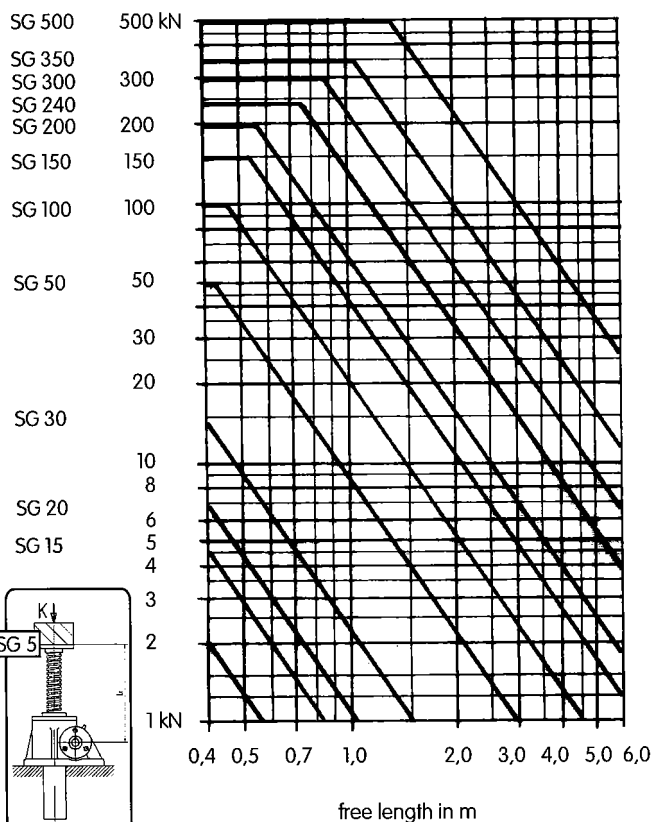


Critical Buckling Force

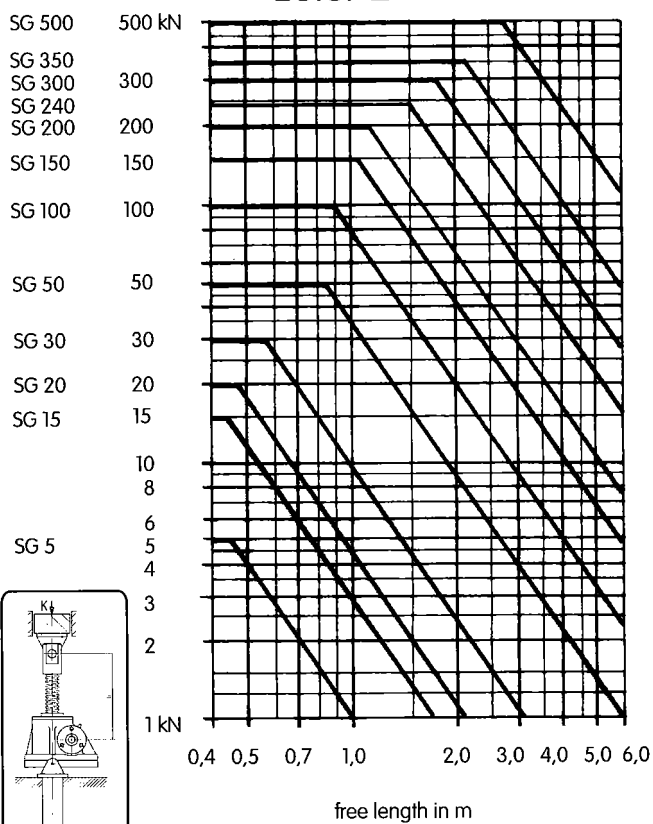
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Tel.: 0 22 56/81 287
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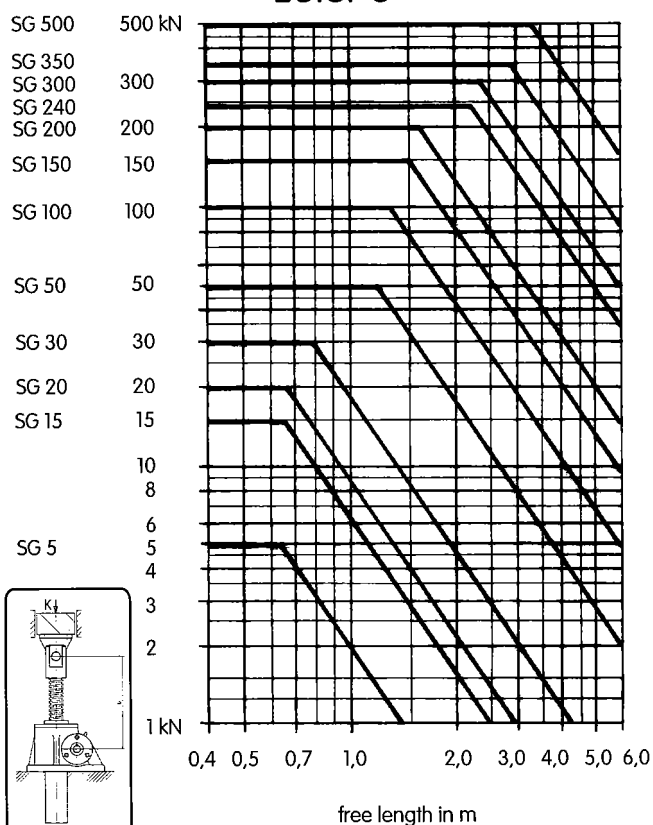
Euler 1



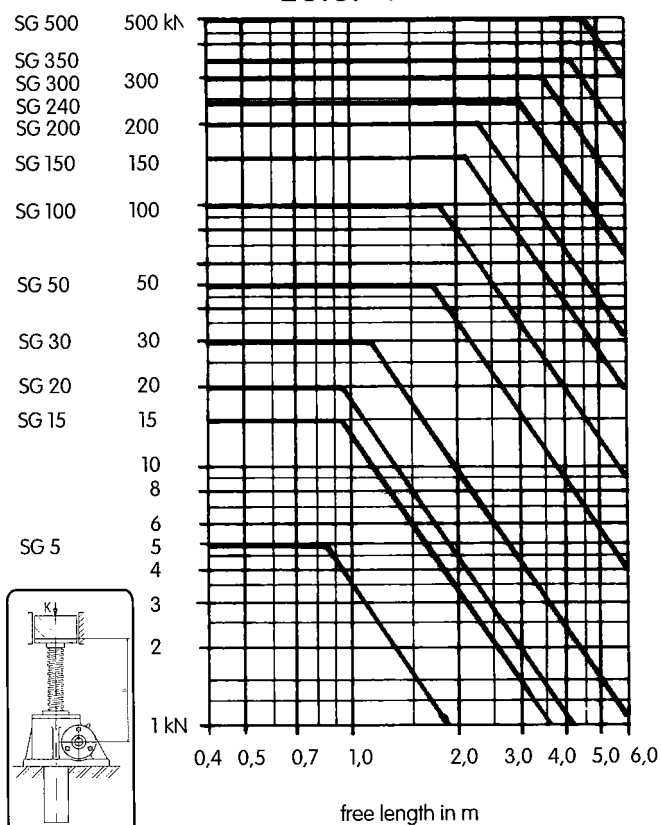
Euler 2



Euler 3



Euler 4





Calculations

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Symbols:

F (kN) = dynamic load
v (m/min) = lifting speed
s (mm) = spindle pitch
n (R/min) = revolutions/min at the worm
i = worm gear reduction
f_M = factor for spindle load torque

P_{SG} (kW) = operating performance of the spindle gear
P_{ges} (kW) = operating performance of all spindle gears
P_{Ant} (kW) = operating performance of the system
η_{ges} = operating efficiency (preselection table page 5)
η_{Ant} = efficiency of the system
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_{SG} per spindle gear:

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

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

After adding the individual performances P_{SG} 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

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

Starting capacity:

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

Ambient temperature:

At an ambient temperature 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:

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

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

Spindle load torque:

The spindle load torque M_{sp} is the load torque acting on the various parts of the system via the spindle noses 3,4 or the traveling nut. The spindle load torque can be computed with the help of the f_M factor in the table below.

$$F \times f_M = M_{sp}$$

SG	5	15	20	30	50	100	150	200	240	300	350	500
f _M SG single-thread	1,87	2,07	2,17	2,42	3,29	4,5	4,84	5,0	5,8	6,98	7,5	8,5
f _M SG double-thread	2,85	3,06	3,16	3,35	4,77	6,47	6,7	6,95	8,1	9,43	10,0	11,1
f _M KSG				1,67	1,67		3,35					



Operating and Mounting Instructions for Spindle Gears SG 5 - SG 500 Grease Lubricated

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A-2551 ENZESFELD-LINDABRUNN
Tel.: 0 22 56/81 287
Fax: 0 22 56/81 0 95

Mounting

Spindle gears 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. The alignment and correct positioning of the spindle gear must be done very carefully as no side forces should act on spindle and guide rings.

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 spindle gear or the lifting system should be turned by hand once. If this requires non uniform forces the spindles 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.

Spindles must be lubricated before being put into service; they are delivered non-greased!

Oil-lubricated worm gears: the upper screwed sealing plug must be replaced by the vent screw provided.

Attention! Misalignment and faulty gripping lead to increased power consumption, which is converted into friction and noise. The consequence is quick wear.

Additional add-on pieces: check under "Options".

If our specifications and performances according to the technical instructions are not observed and/or the components are not used as prescribed, any warranty claims will no longer be applicable.

Maintenance

Spindle gears are filled with the greasing AGIP GRS M2 in the factory.

Grease the spindle and all 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 doubt please set up the lubrication plan together with us. After approx. 200-300 operating hours the wear of the traveling nut or the worm wheel 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 or the worm wheel 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 piece parts as to wear, and recharging them with new grease.

Recommended lubricants: Shell Darina 2, Castrol Grease MS3, BP Energ grease LS-EP2.

The lubricant recommended can be used both for gears and spindles. If a high-grade spindle lubricant is 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.

In case of possible dirt accumulation in or damage of the spindle, expansion bellows or spring steel spirals must be used to protect the spindle. For oil-lubricated gears please ask for a special service manual.

If you order spare parts the gear specifications marked on the type plate must be provided.



Tolerances

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1.) External dimensions

For connecting dimensions the tolerances given in the corresponding drawings are valid. The values where not tolerance is indicated are untoeranced dimensions.

2.) The lateral backlash of the spindle

In the basic type (the spindle travels in and out) the lateral backlash of the spindle is the result of the difference between outside diameter of the spindle and inside diameter of the guide rings. Depending on the type of lifting element it is 0,1 to 0,3 mm. The result of these values is a lateral backlash at the end of the spindle, depending on the stroke (or how far the spindle is actually extended) if 2 guide rings are used. The approximate values of this lateral backlash "S" are listed in the table below. This lateral backlash can be reduced if required.

Backlash "S" (mm) with second guide ring									
stroke in mm	SG 5	SG 15 / 20	SG 30	SG 50	SG 100 / 150	SG 200	SG 300	SG 350	SG 500
0	0,6	0,7	0,7	0,9	1,0	1,0	1,0	1,1	1,1
75	0,9	1,0	1,0	1,2	1,3	1,2	1,3	1,3	1,3
150	1,3	1,3	1,3	1,5	1,6	1,5	1,4	1,5	1,5
300	2,0	1,9	1,9	2,1	2,2	2,0	2,0	1,9	1,9
500	3,0	2,7	2,7	2,9	3,0	2,6	2,6	2,5	2,4
750		3,7	3,7	4,0	4,0	3,5	3,4	3,2	3,0
1000		4,7	4,7	5,0	5,0	4,3	4,2	3,9	3,6
1500			6,7	7,1	7,0	6,0	5,8	5,3	4,8
2000			8,6	9,1	9,0	7,7	7,4	6,7	6,1
2500				11,2	11,0	9,3	9,0	8,2	7,3

3.) The axial backlash of the spindle

The axial backlash of the spindle (basic type) and of the traveling nut (traveling nut type) 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. If desired the axial backlash can be limited accordingly through low-backlash or adjustable backlash executions.

spindle pitch (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

4.) 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.

5.) Straightness of the spindle

The threaded spindles are made of material in tension and deviate from straightness max. by 0,5 mm per 1 m spindle length.

6.) Backlash of tooth flank

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

7.) 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 halt 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.

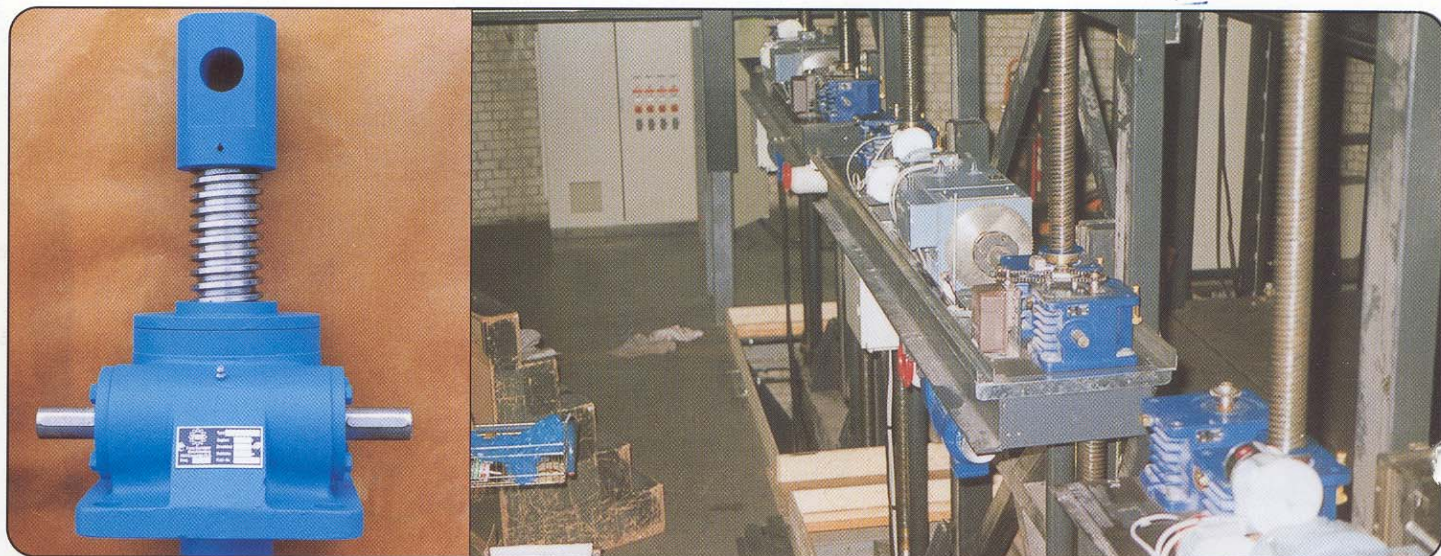


Program of Delivery

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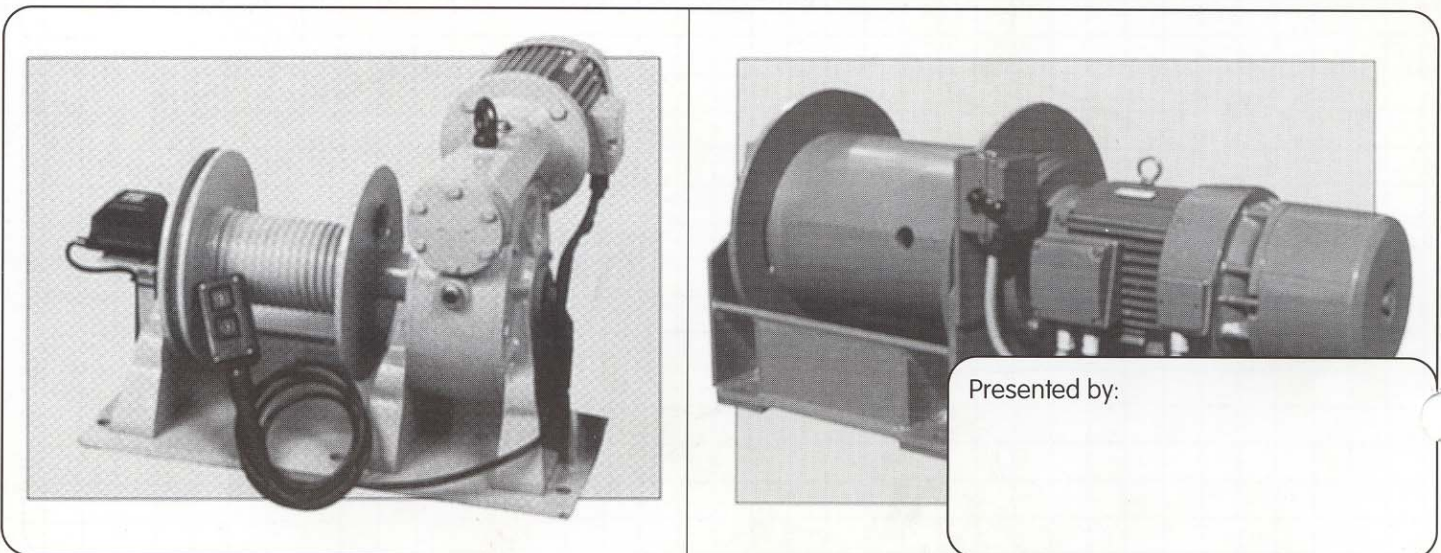
Spindle Gears from 1 kN - 1000 kN, Spindle Actuated Lifting Systems



Hydraulic Elevating Platforms, 5 kN - 100 kN



Cable winches from 1 kN - 300 kN



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