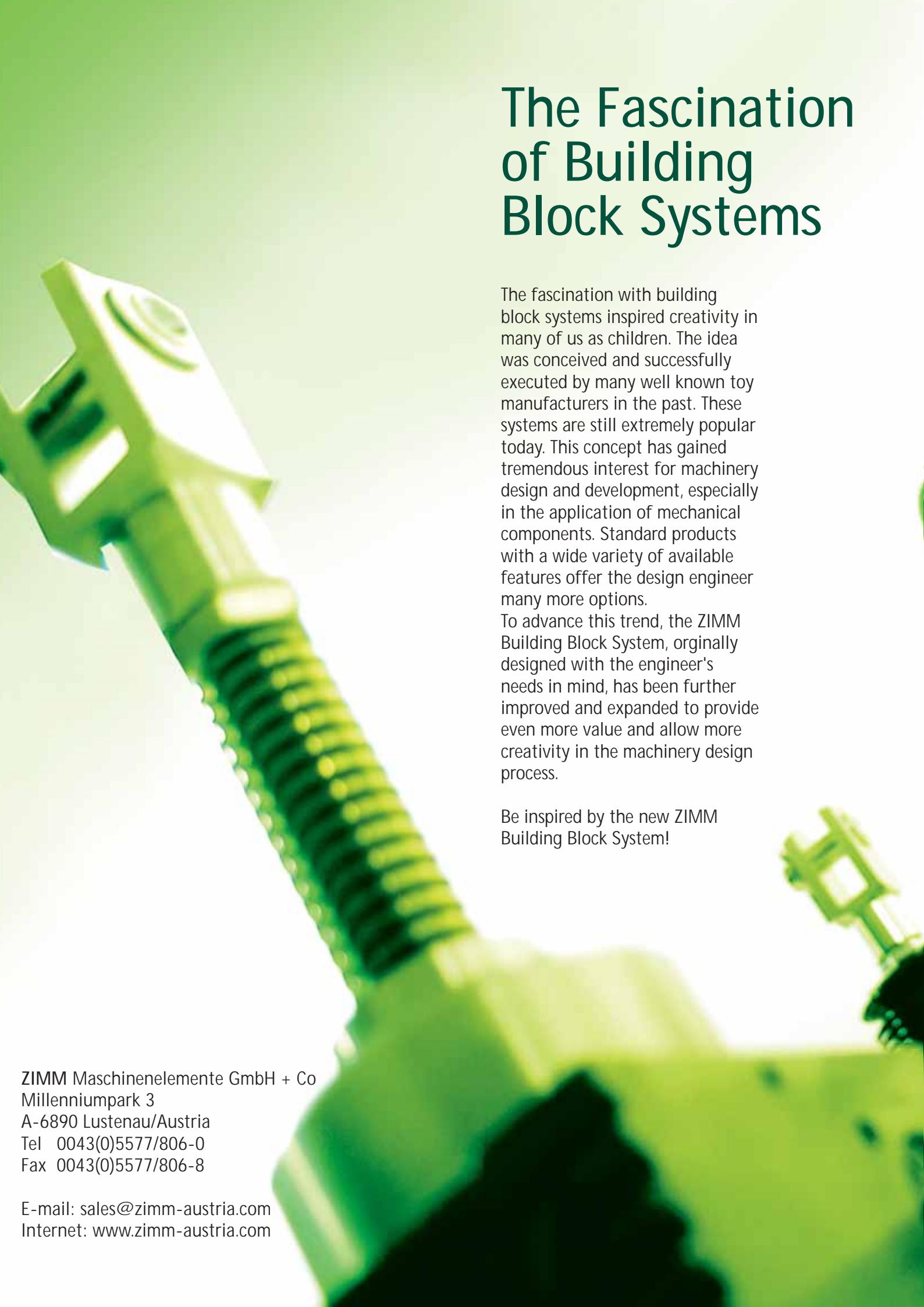




ZIMM®
Screw Jack Systems

Engineering Catalogue 2004
www.zimm-austria.com

The Fascination of Building Block Systems



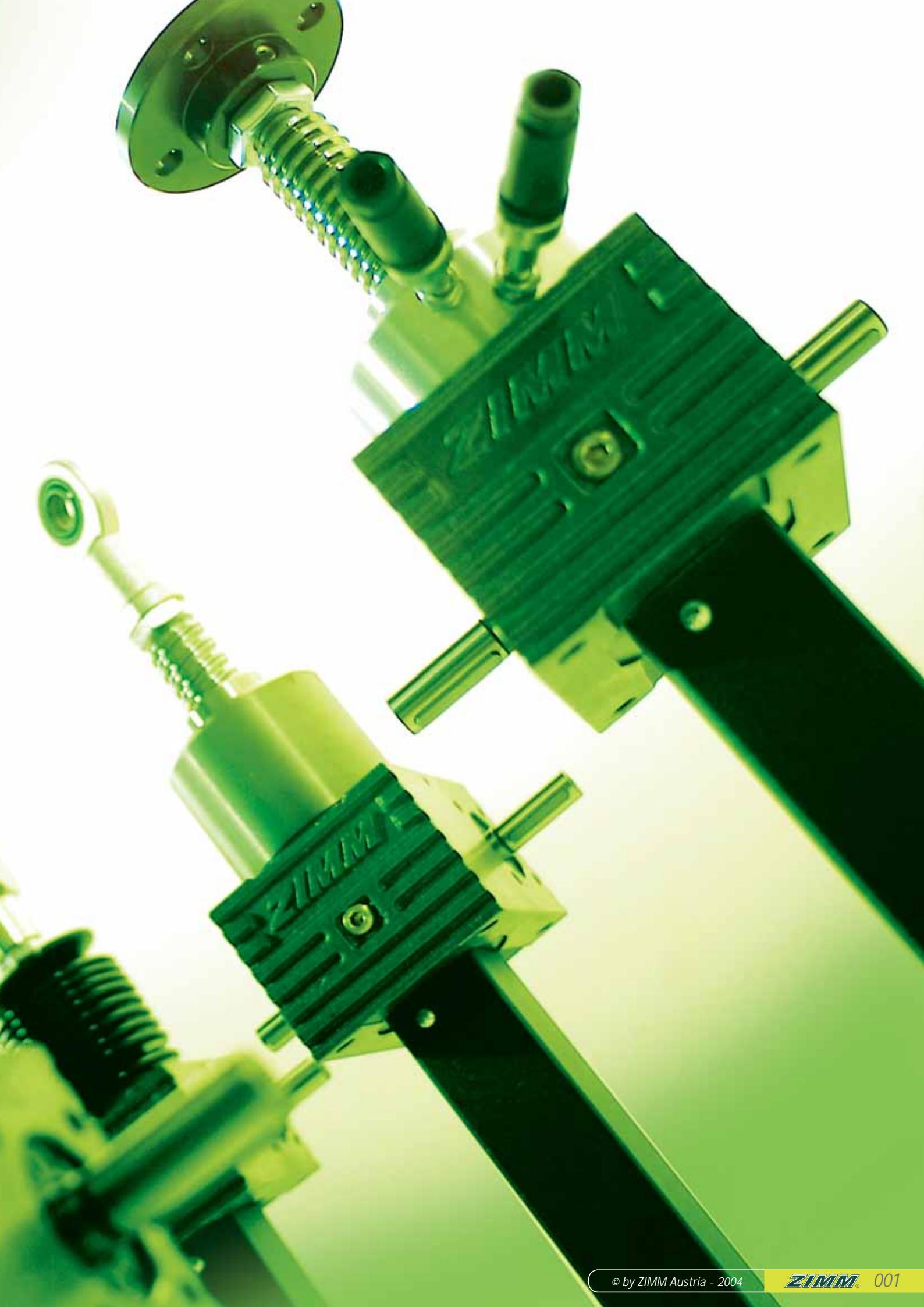
The fascination with building block systems inspired creativity in many of us as children. The idea was conceived and successfully executed by many well known toy manufacturers in the past. These systems are still extremely popular today. This concept has gained tremendous interest for machinery design and development, especially in the application of mechanical components. Standard products with a wide variety of available features offer the design engineer many more options.

To advance this trend, the ZIMM Building Block System, originally designed with the engineer's needs in mind, has been further improved and expanded to provide even more value and allow more creativity in the machinery design process.

Be inspired by the new ZIMM Building Block System!

ZIMM Maschinenelemente GmbH + Co
Millenniumpark 3
A-6890 Lustenau/Austria
Tel 0043(0)5577/806-0
Fax 0043(0)5577/806-8

E-mail: sales@zimm-austria.com
Internet: www.zimm-austria.com



Our History

ZIMM Maschinenelemente GmbH + Co

We have been involved in drive technology for over 25 years. We have carried out a wide range of projects during this time and strengthened our competence.

We started out as toothed gear element suppliers for machine manufacturers - we delivered standard parts from our catalogue as well as special parts to meet customers demands.

Our emphasis has moved to electro-magnetic options for linear movement. Our ZIMM modular system for spindle lifting gear units provides a wide product range to meet and satisfy customer demands and wishes.

The application range is so wide that we will just mention some classical applications such as theatre and stage technology, height adjustment for tables, platforms, conveyor belts, shaft and roller adjustment or exact load positioning in assembly and handling technology.

Our modular system lets you choose from many standardized components - with the advantage of short delivery times. Many additional component and solution options complement these standard components, so that we can deliver "from one source", partially or fully assembled.



Gunther and Jürgen Zimmermann
CEO





ZIMM sales team

CAD-Files

To support your construction tasks, our components are available as **CAD files** on our **CD-ROM** or you download the latest data from our homepage www.zimm-austria.com.

We are certified according to EN ISO 9001,
17.12.1996, Reg. No. 953/0

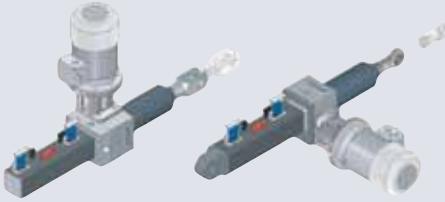
Our Engineering Catalogue
is available in:

- > German
- > English
- > French
- > Italian
- > Spanish



Con

Page Chapter

004	1. ZIMM Screw Jack Building Block System – Content	
006	2. Practical Application of Screw Jacks	
016	3. System Overview - Selection Support	
022	4. Selection Calculation Checklists	
042	5. Screw Jacks "Heavy Duty" MSZ kN 5, 10, 25, 50, 100	
052	6. kN 150, 250, 350, 500, 650, 750	
064	7. Screw Jacks MSZ – Alu with aluminium housings kN 5, 10, 25	
070	8. Screw Jacks "Heavy Duty" MSZ with safety nut with rotation control and fail safe wear control	
072	9. Screw Jacks "Heavy Duty" MSZ with integrated ball screws KGT optional pitches	
074	10. Screw Jacks "Heavy Duty" MSZ Anti Backlash AB, with adjustable thread play	
075	11. Screw Jack Actuators - hinged bearing plate design - support tube design	

tent

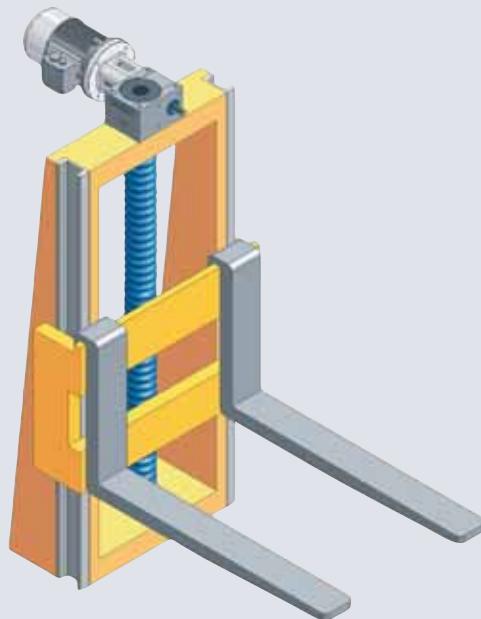
Page

Chapter

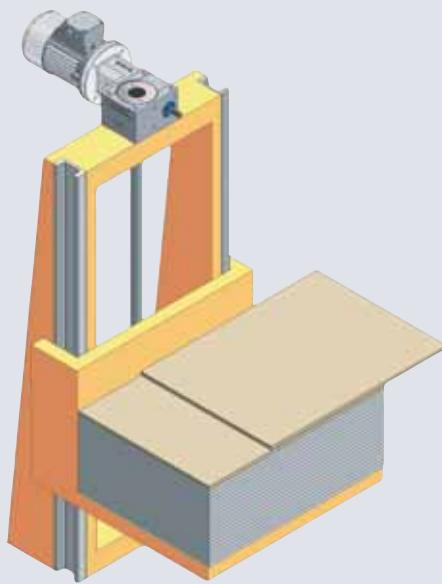
079	12. Bevel gearboxes with straight bevel gears KLM and KGZ, with spiral bevel gears KSZ Heavy duty design KST	
087	13. Worm Gears MSG	
089	14. System Components for Screw Jacks MSZ	
133	15. Miniature Screw Jack Building Block System SHZ 02	
140	16. Mounting, Operation and Maintenance Instruction for MSZ Spare Parts	
158	17. General Terms and Conditions of Sale and Delivery, Sales Partners Worldwide	
160		
162	18. Copyright by ZIMM 2004 Location + Direction	
163		



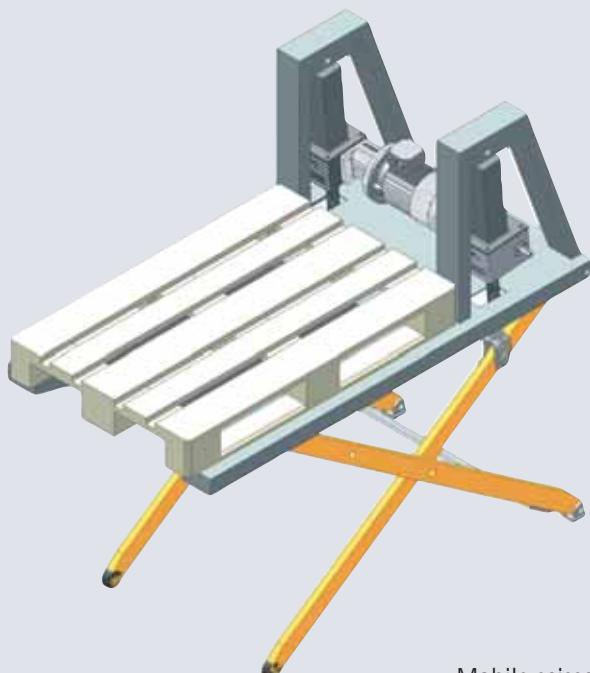
Application Examples of Screw Jacks



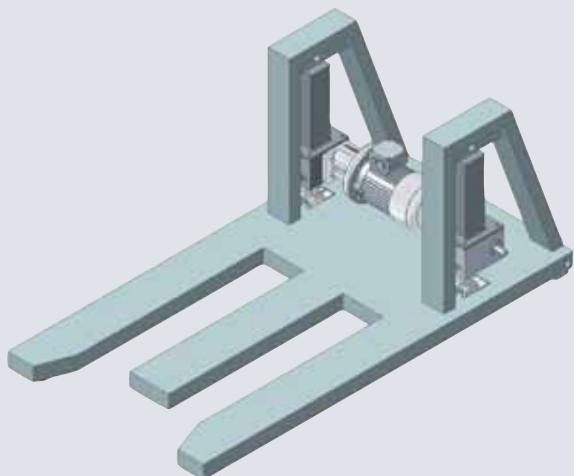
Destacking unit



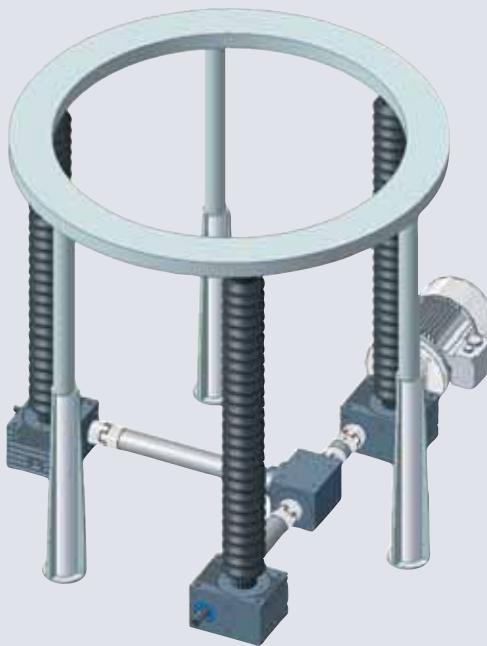
Destacking unit for plates



Mobile scissor table for pallet transfer with a hand lift



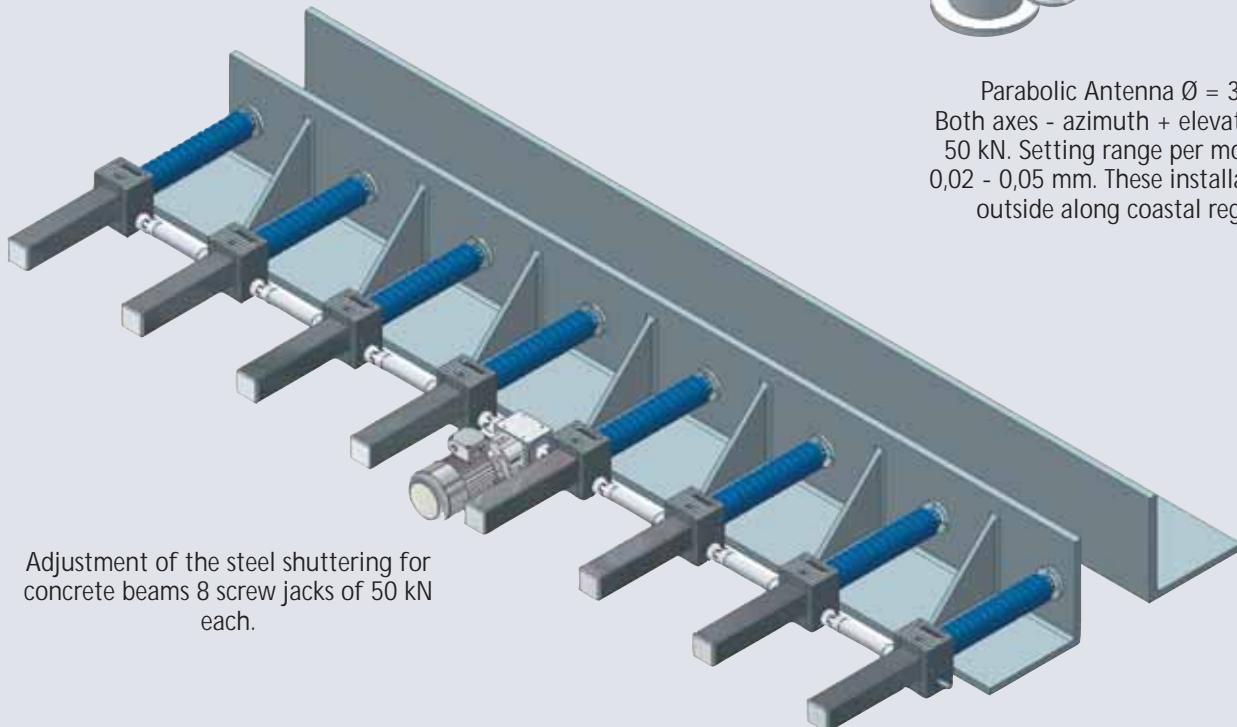
Application Examples of Screw Jacks



Three-point system of a lapping and polishing apparatus, diameter 7.000 mm.
Compensation is made for different component sizes by the screw jack.

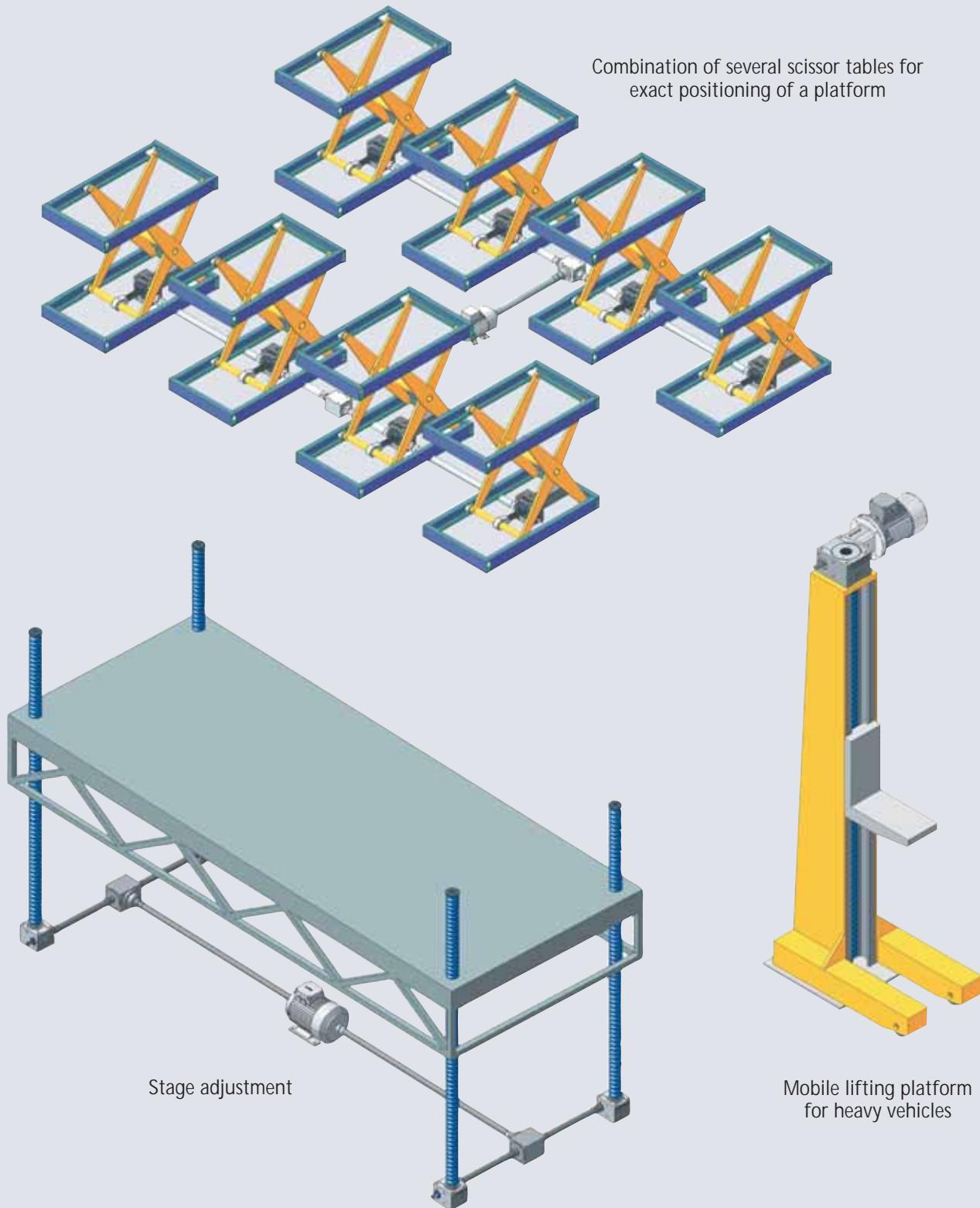


Parabolic Antenna $\varnothing = 3,3$ m
Both axes - azimuth + elevation each
50 kN. Setting range per movement
0,02 - 0,05 mm. These installations are
outside along coastal regions.

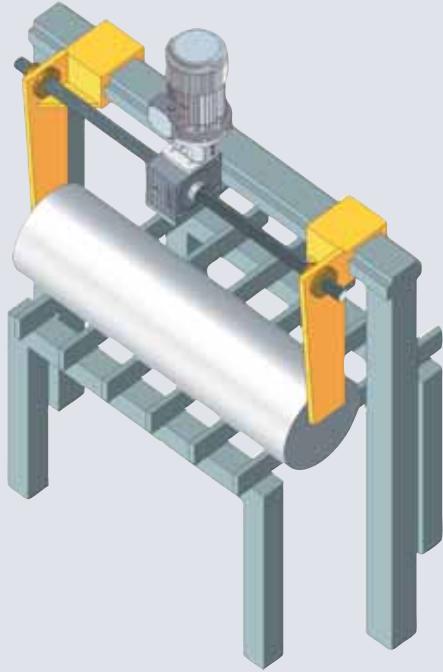


Adjustment of the steel shuttering for
concrete beams 8 screw jacks of 50 kN
each.

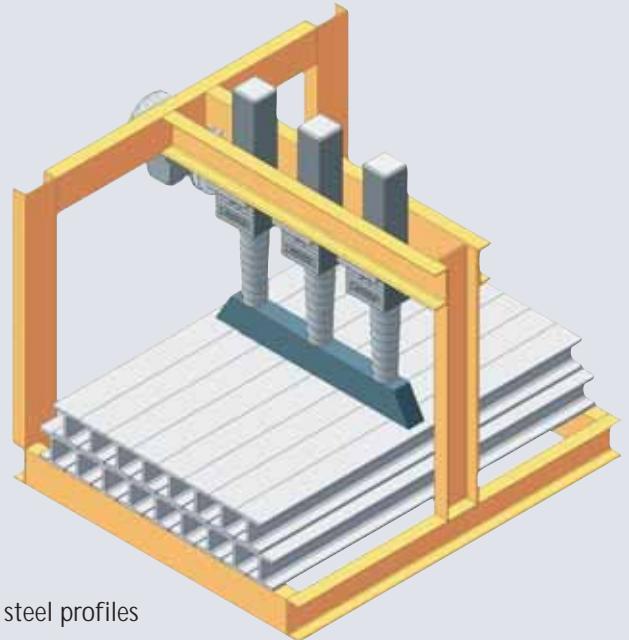
Application Examples of Screw Jacks



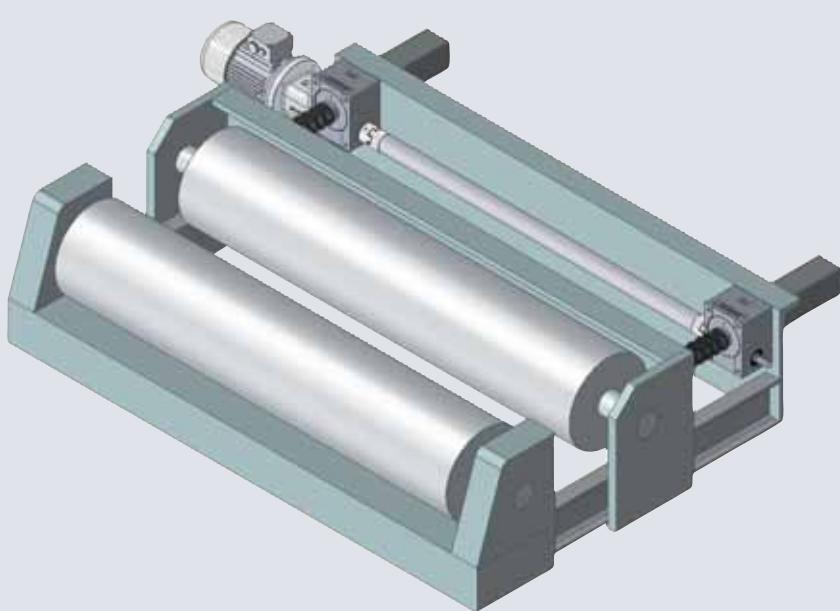
Application Examples of Screw Jacks



Centering mechanism with right and left threaded spindles



Alignment of steel profiles

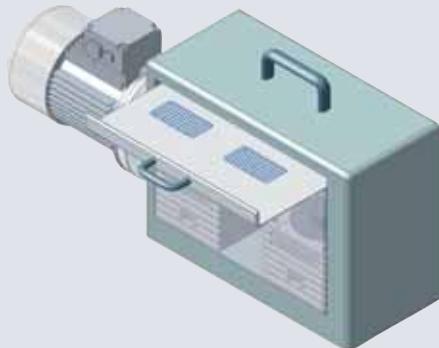


Adjustment of a roller system in the textile industry

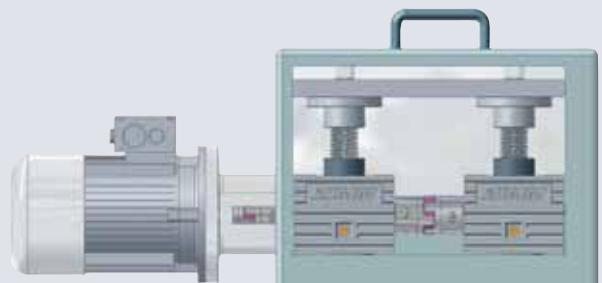


Motor gripper for steel profile

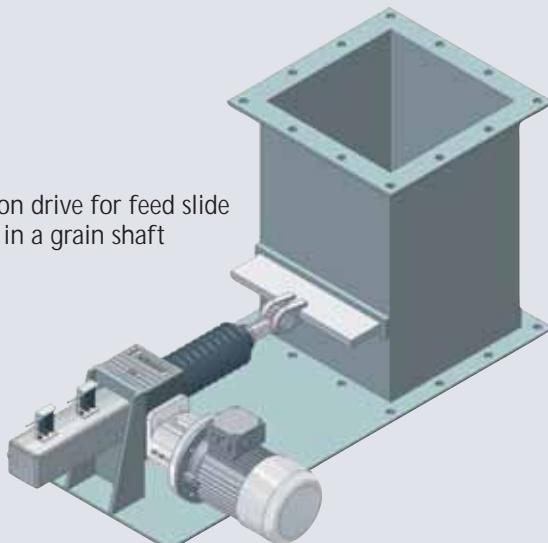
Application Examples of Screw Jacks



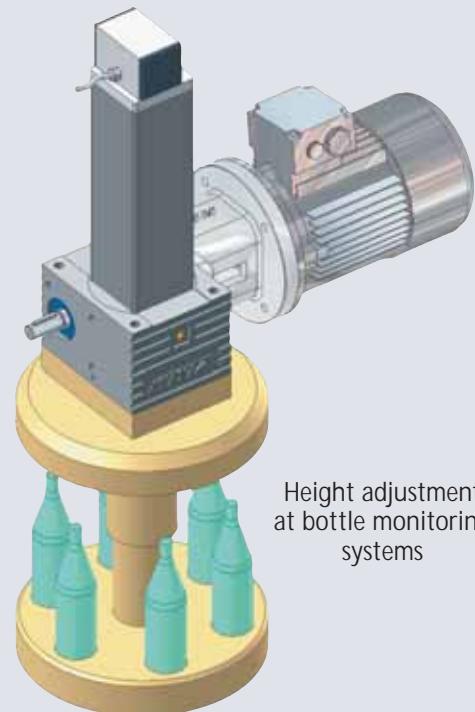
Compact press



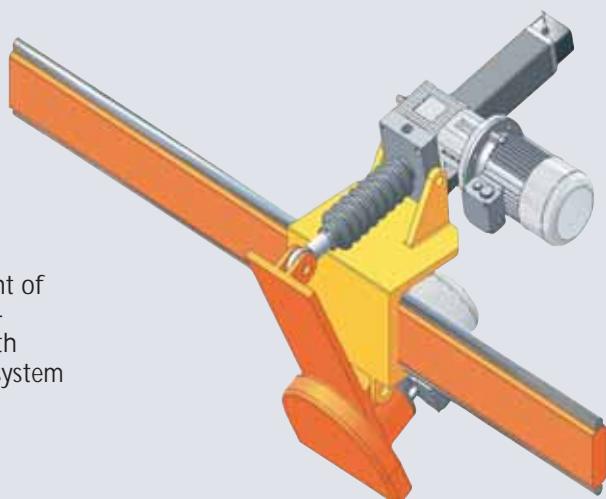
Position drive for feed slide
in a grain shaft



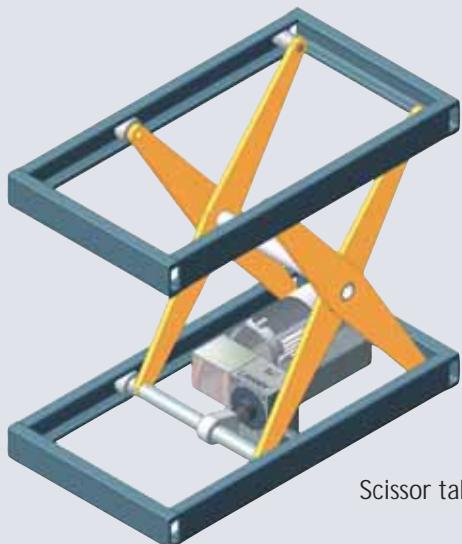
Height adjustment
at bottle monitoring
systems



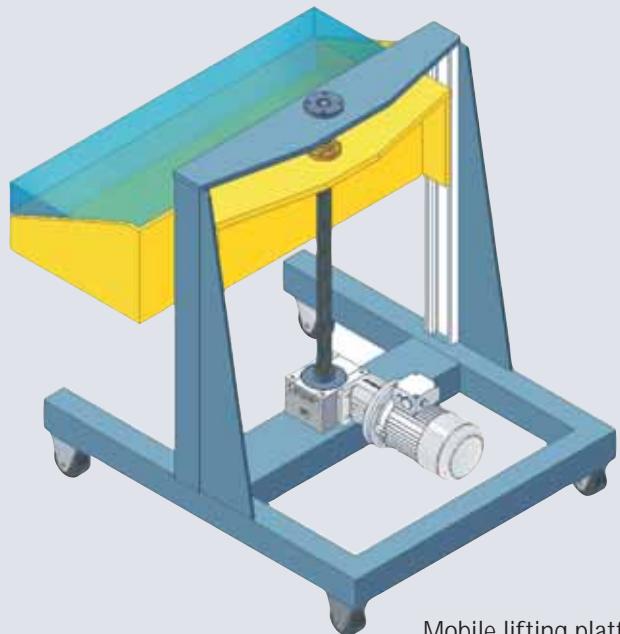
Angle adjustment of
a plate saw -
screw jack with
linear measuring system



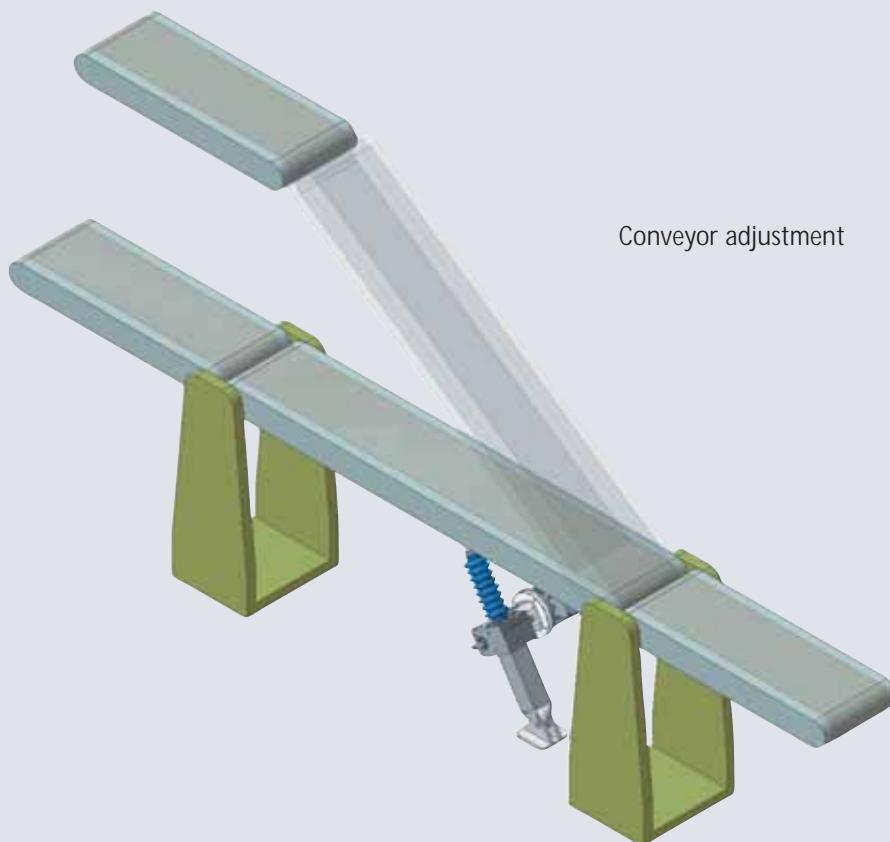
Application Examples of Screw Jacks



Scissor table

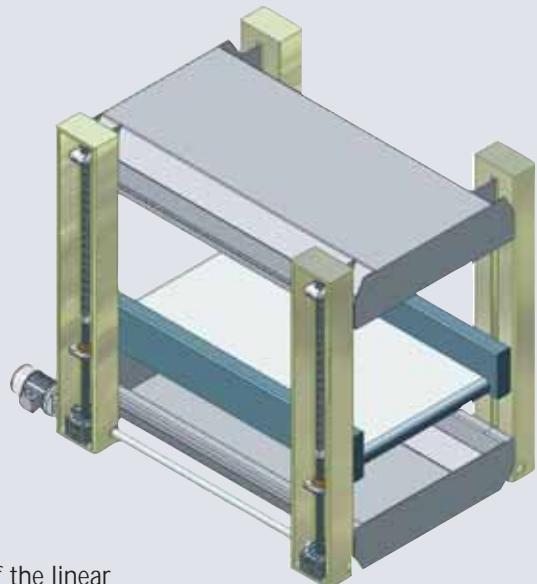
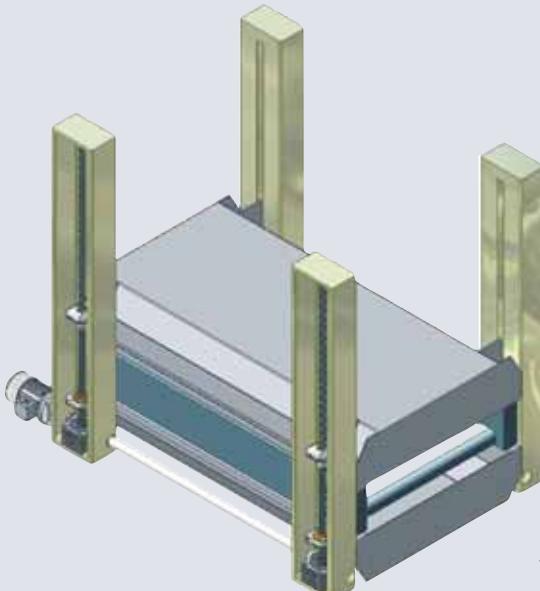


Mobile lifting platform

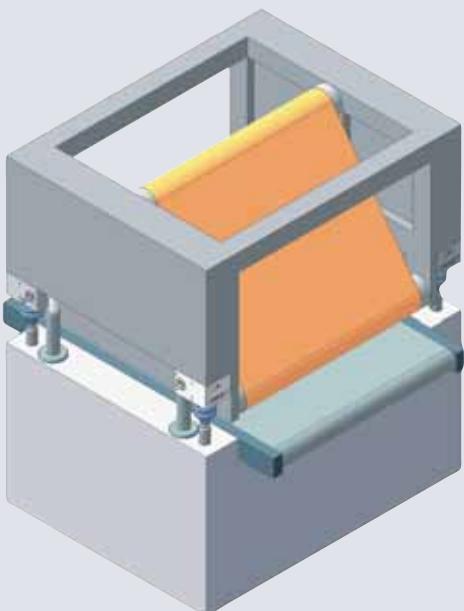


Conveyor adjustment

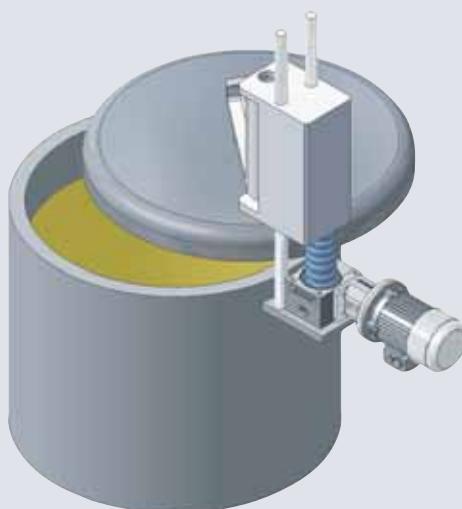
Application Examples of Screw Jacks



The lower and upper part of the linear freeze-dryer system is opened electro-mechanically with screw jacks for cleaning.

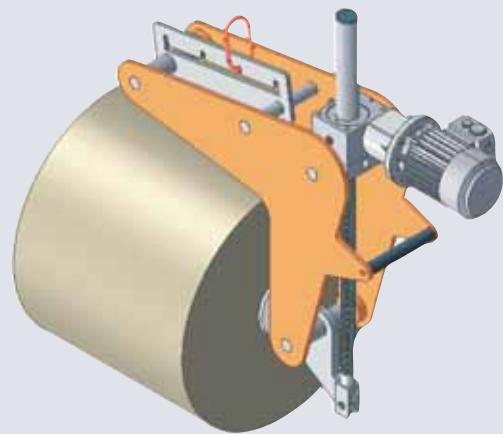
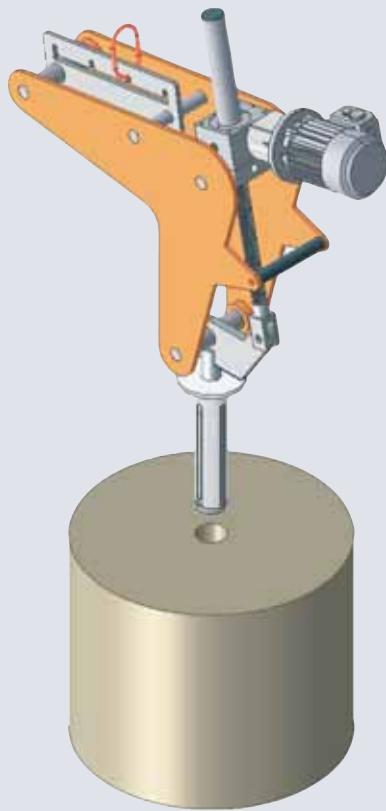


Wide belt grinding machine -
precise adjustable stop
with 4 screw jacks

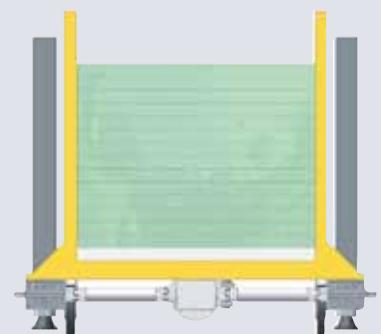


Opening and closing of a
sealed pressure tank

Application Examples of Screw Jacks



Turning over of foil coils
(horizontal + vertical take up)



Permanent discharge level regulation
by means of lifting gears in a mobile
container for panel production.



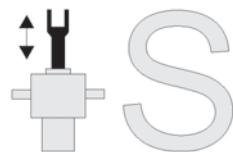
Innovation in Design



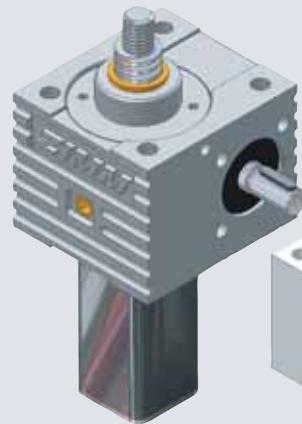


Advanced Screw Jack Building Block System

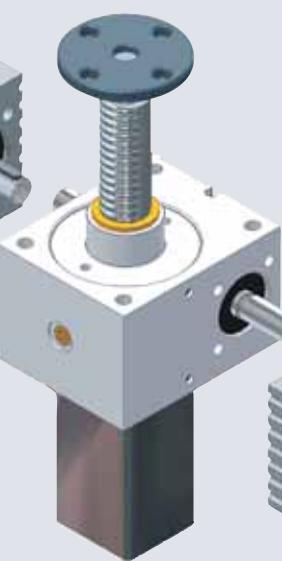




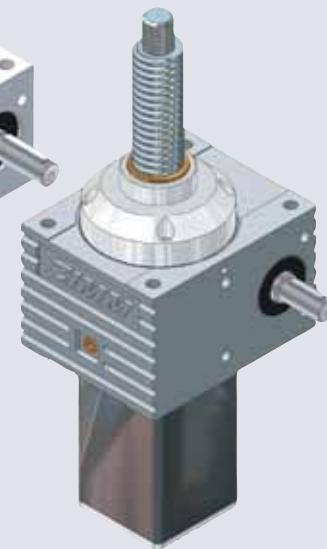
3.1 Standard Version with Standing Spindle S



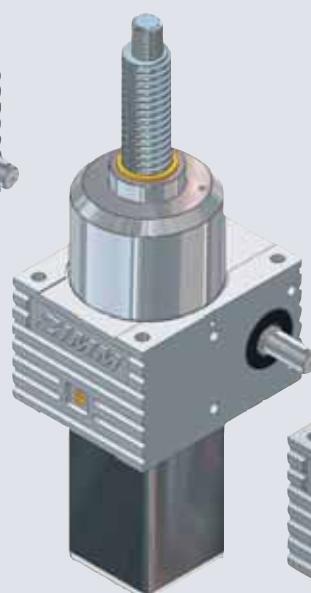
Cast iron housing -
version S



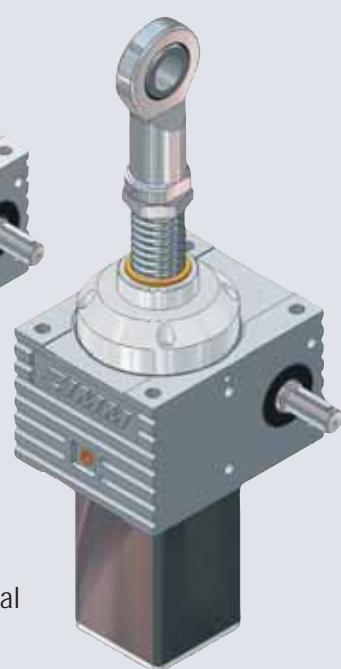
Aluminium housing -
version S



Safety nut SIFA
for fail safe wear control

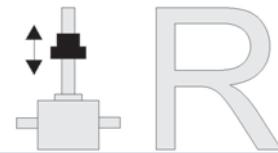


Ball Screws with optional
pitches - version KGT

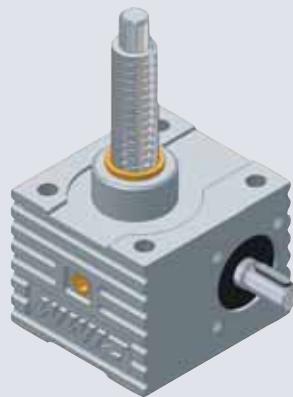


Anti Backlash AB
with adjustable
thread play

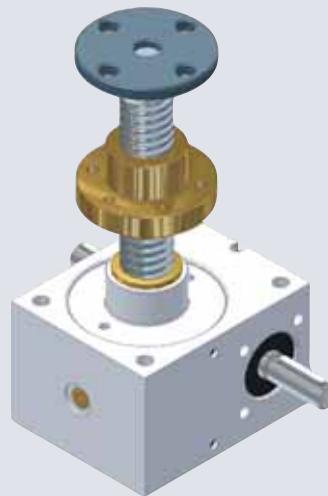




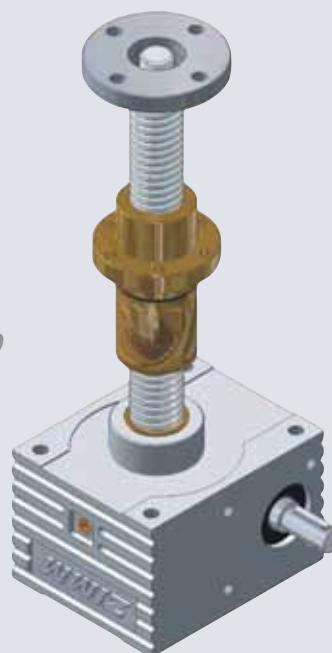
3.2 Standard Version with Rotating Spindle R



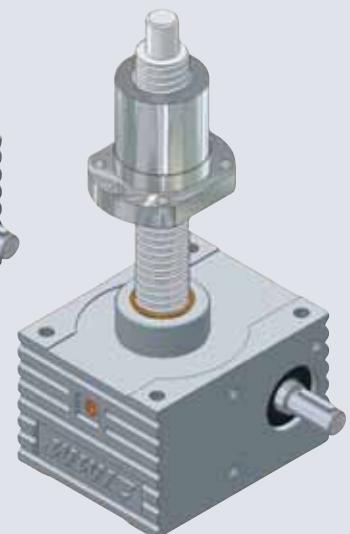
Cast iron housing
- version R



Aluminium housing -
version R

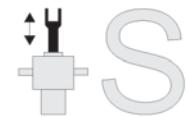


Safety nut SIFA
for fail safe wear control

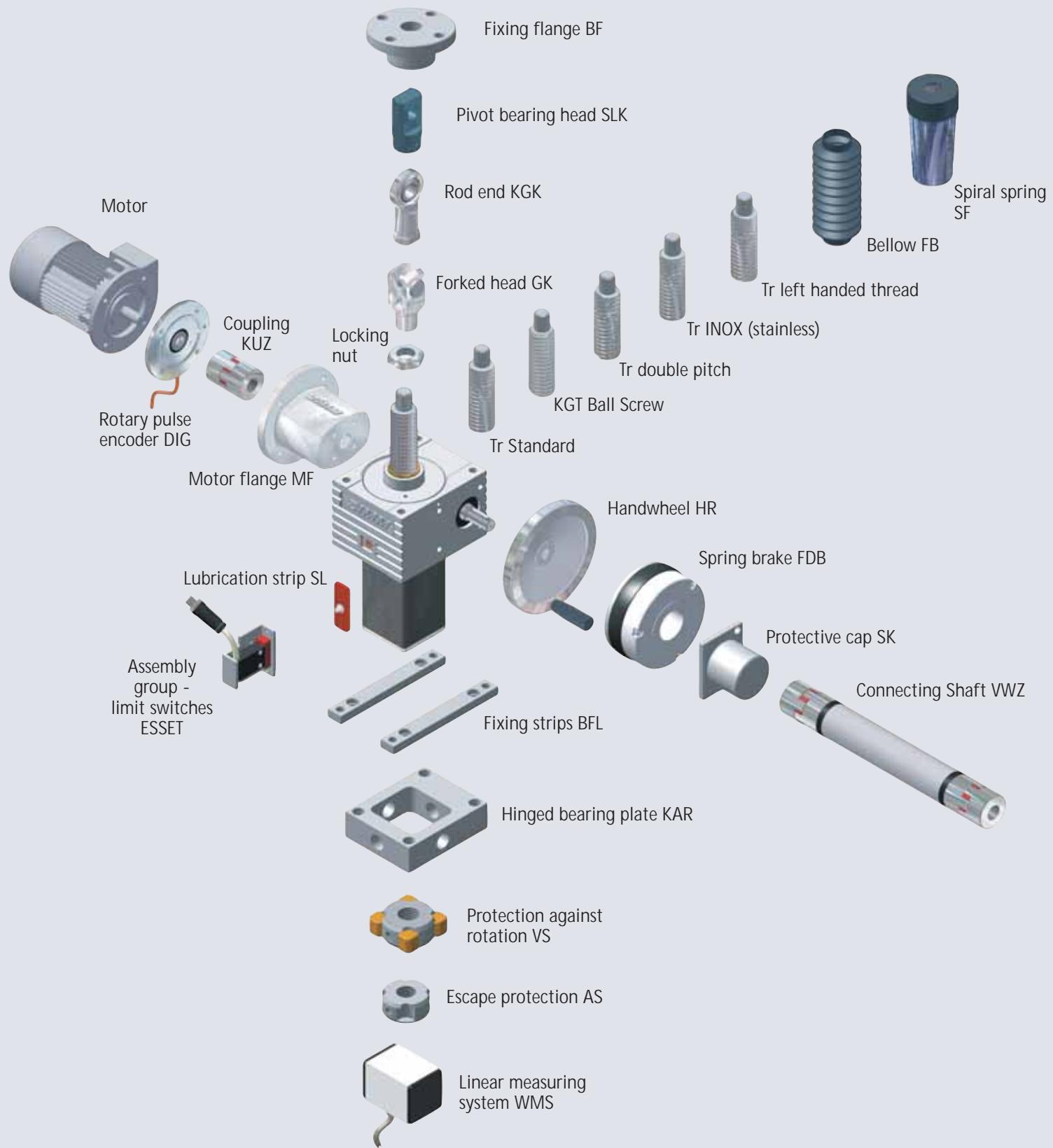


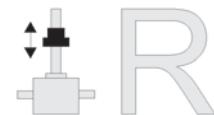
Ball Screws with optional
pitches - version KGT



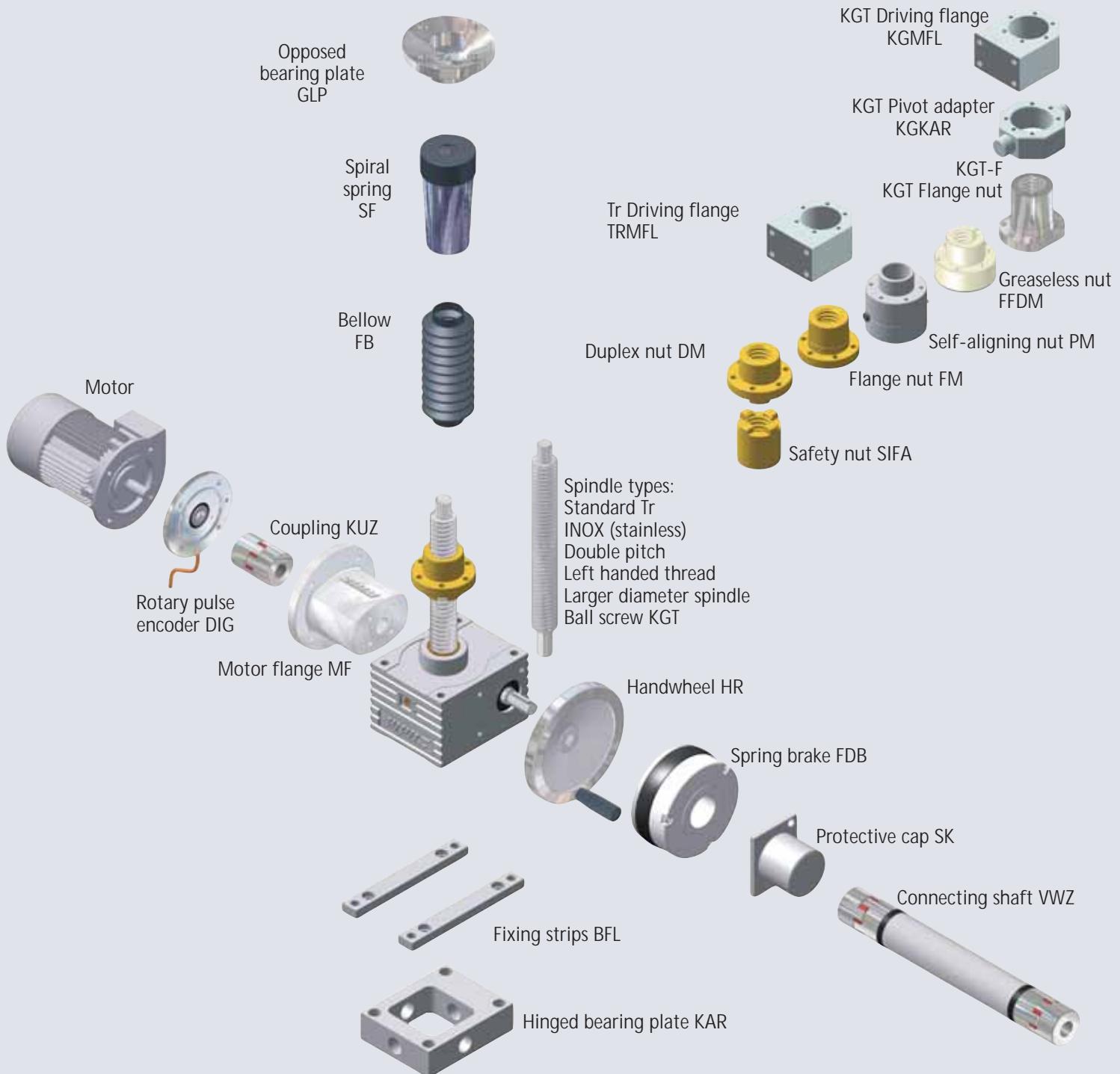


3.3 System Components, Standing Spindle S

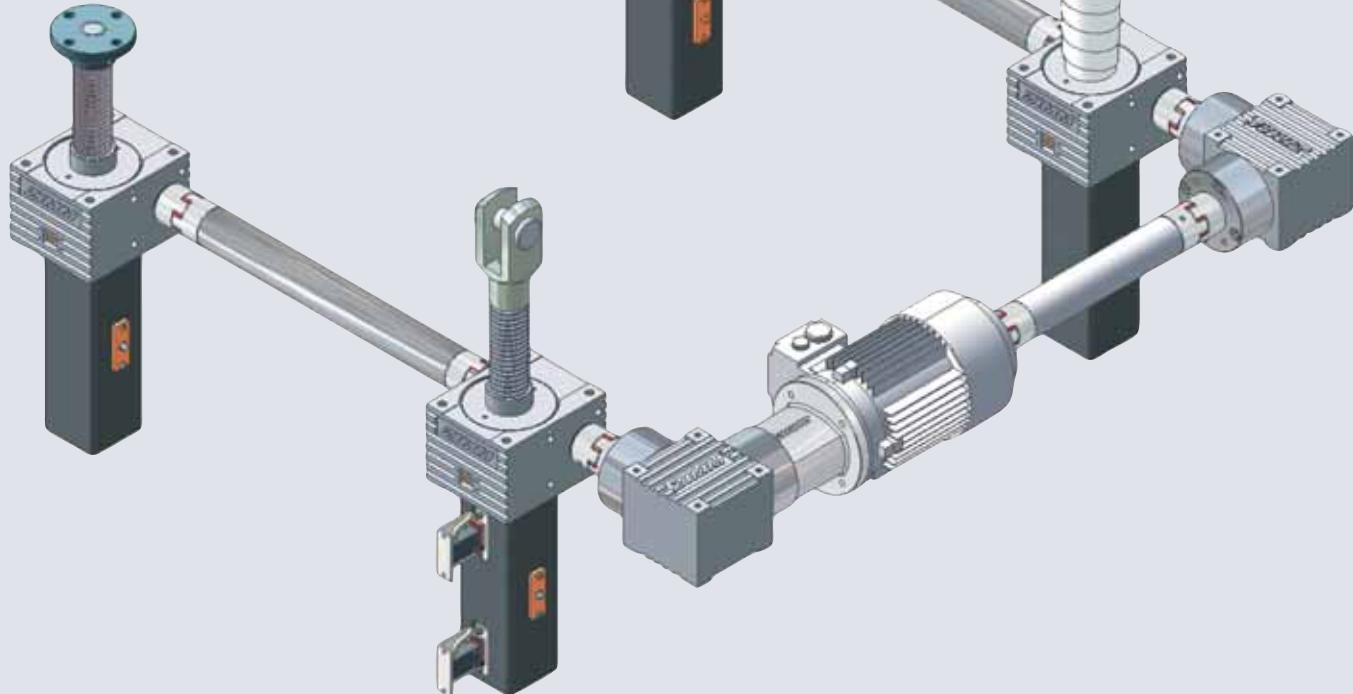




3.4 System Components, Rotating Spindle R



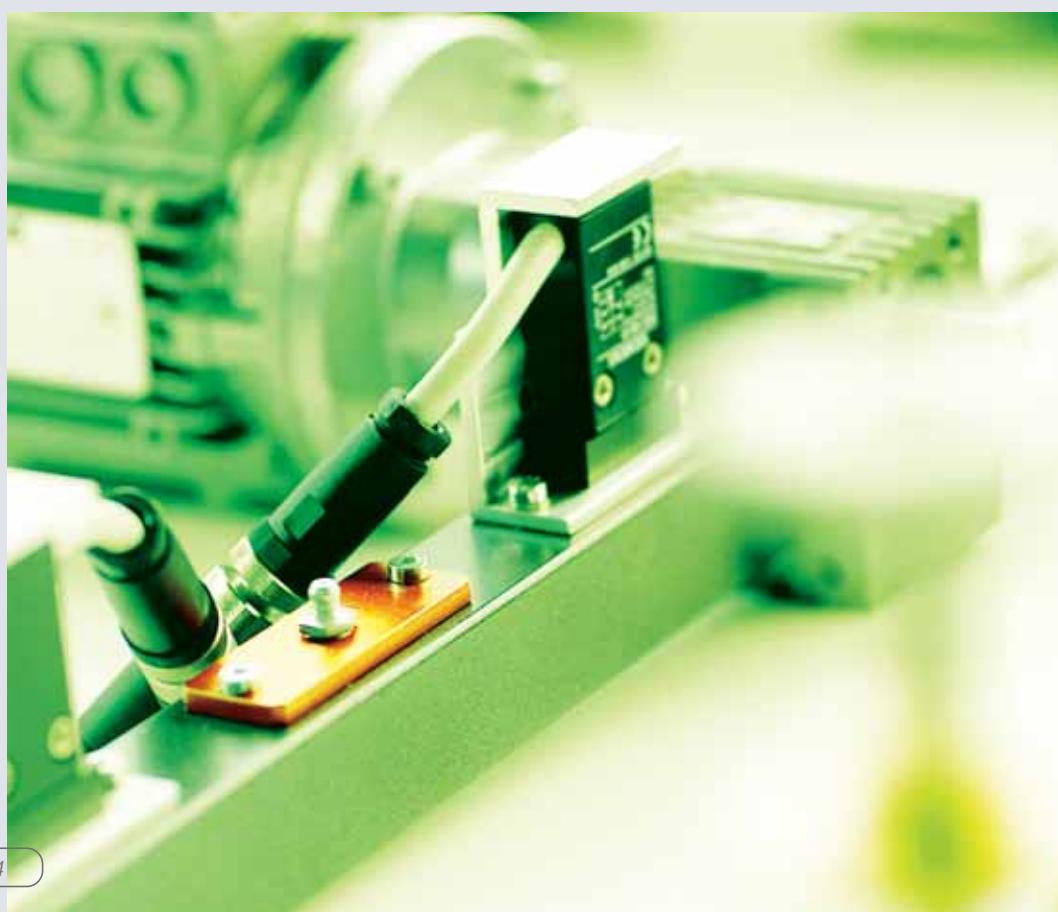
3.5 Complete Solutions



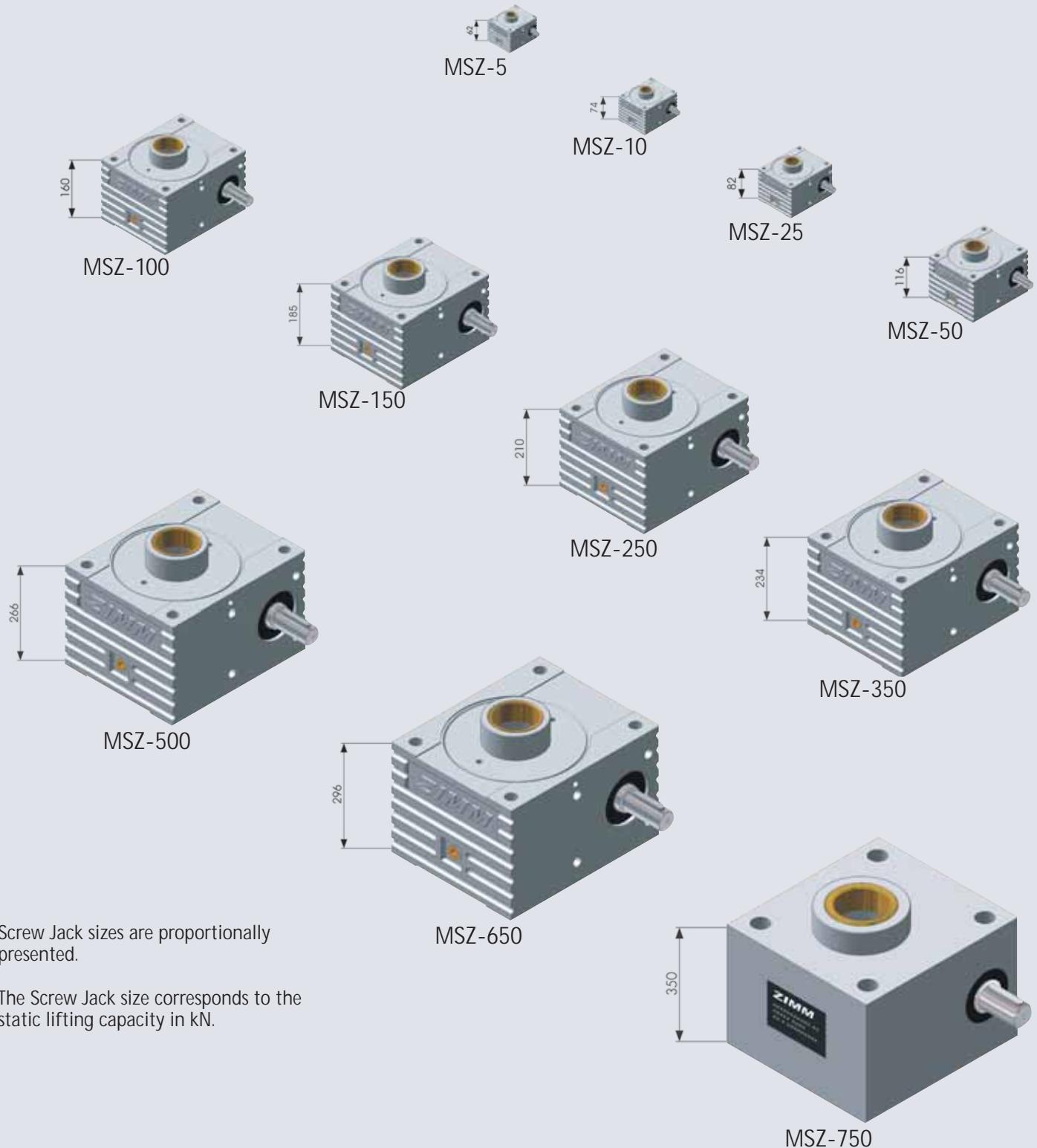
ZIMM – Screw Jack Building Block System

We lift, lower, push and pull loads from 5 to 1000 kN.

- Efficient construction due to our Screw Jack Building Block System – all components compatible
- All components from one supplier saves purchase costs.
- Delivery of pre-mounted units and assembly groups, motors included
- Short delivery times
- Capable of bearing tension and compression loads
- Attractive design
- Stainless spindles and components on request
- Custom components for specialist applications on request.



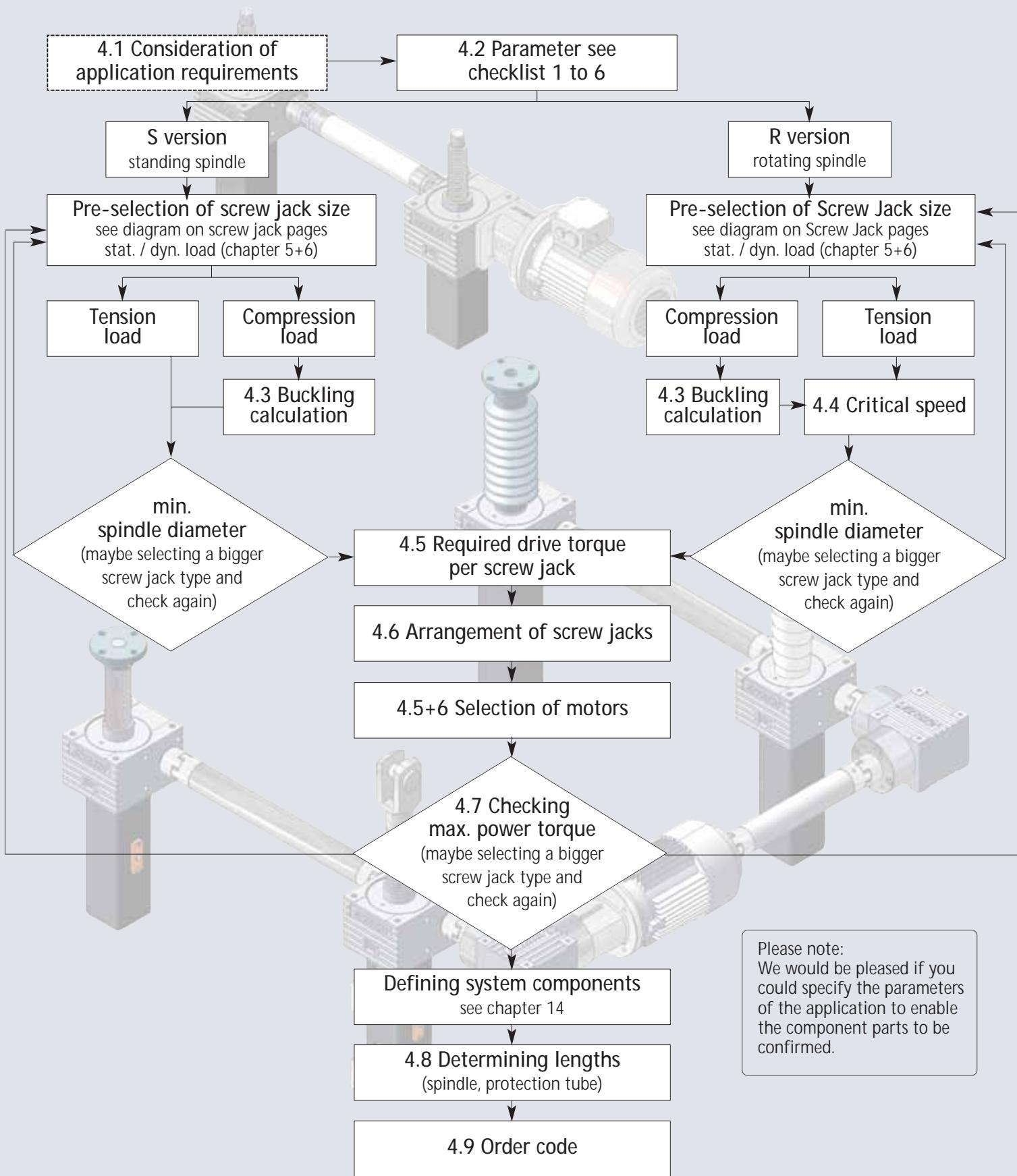
3.6 Sizes



Screw Jack sizes are proportionally presented.

The Screw Jack size corresponds to the static lifting capacity in kN.

Selection of Screw Jack System and Arrangement



4.1 Construction Advice

Design & Specification

The customer, based on the application criteria can determine the selection and dimensioning of the system from the information contained in this catalogue. On request we can provide design advice and calculations to determine the correct components and compile a full quotation based on your application criteria.

ZIMM guarantee the quality of all of the components shown in the catalogue. The screw jacks are designed for industrial use and for loads & operational duty as stated in the catalogue. For further information please contact our sales department.

Our deliveries are subject to the General Terms of Sale and Delivery according to our catalogue (chapter 21).

Lifting Speed

Normal version N: 1 mm stroke per movement of drive shaft (MSZ-150 and bigger sizes - higher speed acc. to table) at 1500 min⁻¹:

→ 1,5 m/min

Slow version L: 0,25 mm stroke per movement of drive (MSZ-150 and bigger sizes - higher speed acc. to table) at 1500 min⁻¹:

→ 0,375 m/min

In order to increase the speed of the system the following options can be considered:

- Double pitch screw (Attention: max. input torque, system is not self-locking, system brake required)
- Larger diameter spindle with R version (spindle of the next larger size): depending on the screw jack size faster pitch, higher torque requirement
- Ball screw: various pitch options
- Rotary pulse encoder: Enables an increase in motor speed of more than 1500. This system is only designed for

light loads and low duty operation.

To reduce system speed

- Use a motor with more poles / lower speed (6, 8, 10 or 12 poles)
- Rotary pulse encoder (for slower speed operation below 25 Hz an adequate method of cooling the motor is required)
- Geared motor (Attention to max input torque is required)
- Bevel gearbox with gear reduction (only for certain applications)

Temperature and Operating time

Screw jacks are generally not designed for continuous operation.

Max operational time is stated as ED in chapter 5 & 6. These values are for reference only and must be checked against the individual application criteria. In borderline cases the next biggest gearbox may require selection or contact our technical dept. Operating temperatures should not exceed 80 degrees.

Parallelism and Angularity

Care must be exercised to ensure that the systems are parallel to each other as well as level and aligned with the mounting surfaces. Connecting shafts, pillow blocks etc. must be axially aligned with each other.

Guidance

The guide bushes incorporated in the screw jack gearbox can only tolerate a play of between 0.2 & 0.6mm are not designed to take high side forces on the system. For most applications a suitable additional guidance system should be designed into the application to counteract any side forces.

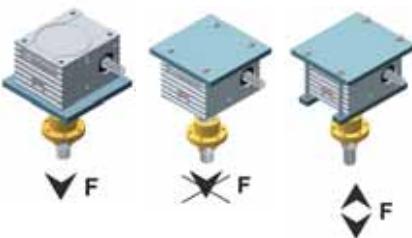
Protection Against Rotation

With the standing screw version S the spindle is free running within the gearbox (worm wheel). It is therefore necessary to protect the spindle from rotating due to the friction in the worm wheel. This can be achieved by incorporating an additional external guidance system or by using the protection against rotation (mounted internally within the protective tube).



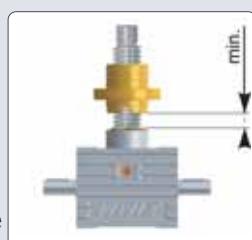
4.1 Construction Advice

Design & Specification

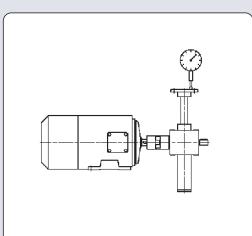


A flat-machined surface is necessary. The four attachment bolts are designed for the rated static loads of the gearbox in tension and compression. Additional impact loads and vibration must be taken into account (Grey cast iron housing GG25). The length of the mounting screws must be observed. Tension loads on the mounting bolts should be avoided. With unknown factors like shock and vibration we recommend additional protection of the screw jack by using guide rails and threaded rods. This will ensure loads in tension and compression are secured.

Safety Distances
Safety distances must be observed between moving and stationary components otherwise there is the risk of damage to the system.

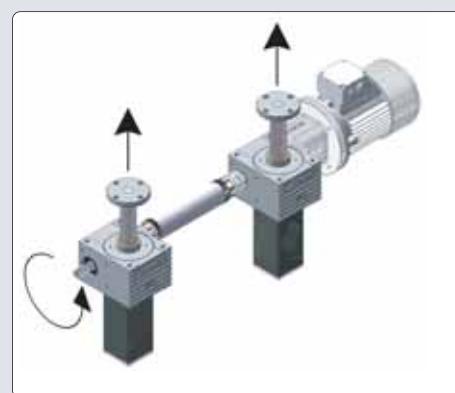


Accuracy
The repeat accuracy of the gearbox can be up to 0.05mm if the load is constant and in the same direction. This requires also suitable control of the drive system e.g. using a rotary voltage braked motor in connection with a frequency converter, a rotary pulse encoder or a servo motor with encoder, etc.



The pitch precision of the trapezoid screw is 0.2mm per 300mm of spindle length. With ballscrews it is 0.05mm per 300mm of spindle length. Under alternating load, tension & compression the axial play can be up to 0.4mm with the trapezoid spindle and 0.08mm with the ballscrew. For systems which require zero clearance we recommend the use of the gearbox version incorporating Anti-Backlash AB with adjustment (chapter 10).

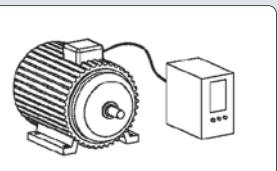
Direction of Rotation and Movement



Check the direction of the required rotation and detail this in your design drawing or select one of the standard system layouts (chapter 4). With T bevel gearbox the direction of rotation can be changed by rotating the gearbox around.

Self-locking / Overrun
Screw jacks with a single pitch trapezoid thread have a limited self-locking capability. Where shock or vibration is evident a brake should be incorporated into the system. The potential overrun after having stopped the motor differs from application to application. In order to minimise the overrun to a minimum we recommend to use a brake motor or a spring pressure brake FDB. A braked motor is essential where a double pitch trapezoid screw or ballscrew is used as they are not self locking.

Drive
In order to achieve soft start for acceleration and deceleration we recommend the use of a frequency inverter. The lifetime of the system will be increased and the noise of the system will be reduced.



Trial Run

A trial run under normal operating condition including load is necessary to ensure correct operation. On-site trial runs are necessary to ensure precise alignment of the system and make any necessary adjustments.

Spare Parts

It is recommended that a range of spare parts gearboxes, spindles etc. are held by your customer. This is especially relevant where high duty application are involved.

Stage Engineering

ZIMM systems are specified to meet the regulation of the Stage Lifting industry.

Vehicles for Land, Air or Water

For applications, which are mobile either on land, sea or air are generally excluded from our normal warranty terms. Special conditions will apply. Please contact our sales department.

Environmental Conditions

For special applications outside of normal environmental conditions please contact our technical department.

4.1 Construction Advice

Lubrication

Sufficient lubrication is essential for the lifetime of the system. The spindle, gearbox & protection against rotation must be suitably lubricated. The red lubrication strip for the protection against rotation can be mounted in optional positions to meet your requirements. Please also see the automatic lubrication system (14.3.7) and maintenance instructions (chapter 16).



Mounting, Operation and Maintenance Instruction

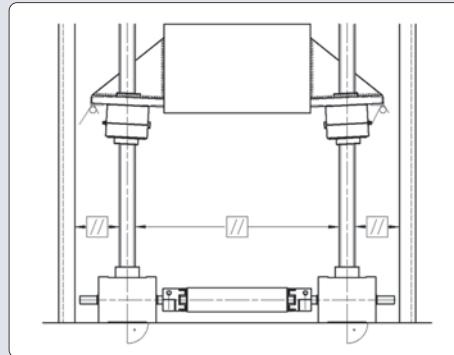
The installation instructions (chapter 16) must be adhered to.

Construction Advice for Plant Engineers:

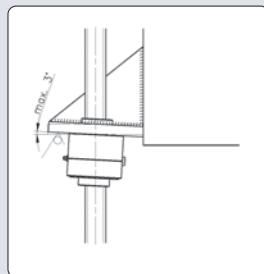
Where machined surfaces are used few assembly problems should be encountered. However geometric errors can occur in welded frames despite accurate assembly and it is therefore important to consider the following:

Parallelism / Angularity:

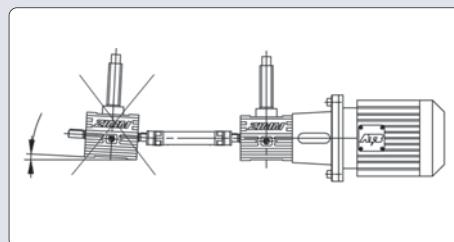
Screws and linear guides must be parallel otherwise the whole system could seize up during operation. All mounting surfaces for the gearboxes must be at right angles to the linear guides otherwise wear or damage to the components could occur.



The mounting surfaces for the nuts should also be at right angles. The option of the self aligning nut should be considered for certain applications (chapter 14).



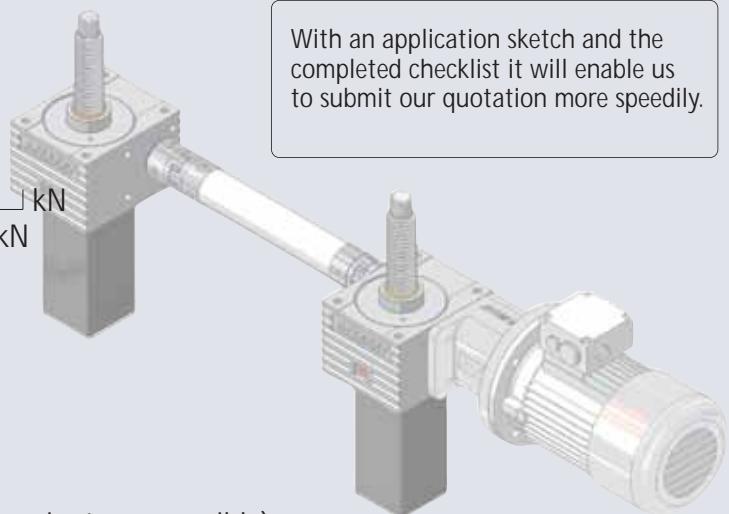
Alternatively the use of the hinged bearing plate KAR could be considered (chapter 14).



Printing errors, mistakes regarding dimensions, etc., as well as technical changes and improvements are excepted. Valid are the drawings which have been checked and approved by both partners in accordance with the order acknowledgement.

4.2 Checklist - Page 1 - Parameters

Company: _____ Date: _____
 Address: _____ Phone.: _____
 Contact: _____ Fax: _____
 Departement: _____ Number of pages: _____



1 Axial capacity in kN, max.

- per gearbox _____ kN per system _____ kN
- in tension _____ kN in compression _____ kN
- load: static _____ kN dynamic _____ kN
- installation position: vertical horizontal
- idle impact load vibration

2 Lift / Travel _____ mm

3 Lifting speed

- Type N = 1.5 m/min. Type L = 0.375 m/min.
(MSZ-150 and bigger: slightly different speeds)
- Customer's requirements _____ m/min (many variants are possible)

4a Operating time, operating cycle

_____ lifts per day _____ lifts per hour hours per day: 8 16 24

_____ % operating time (ED) related to a 10 min period,
for permanent operating see checklist page 2 (4b).

5 Gear type: S standing spindle R rotating spindle

6 Standard arrangement no. _____ Dimension X1 _____ X2 _____ X3 _____ Y _____
see standard arrangements, checklist pages 5 and 6!

7 Accessories YES NO see checklist page 3 or 4!

8 Motor: AC motor brake motor _____ manual operation
 spring pressure brake incremental encoder linear measuring system limit switches (S version)

9 Application objective / Function description

Description:

Operating conditions: Dry Humid Dusty Chips _____

Ambient operating temperature: min. _____ °C max. _____ °C

10 Quantity: _____ piece prototype first

11 Date: Offer: _____ Delivery: _____

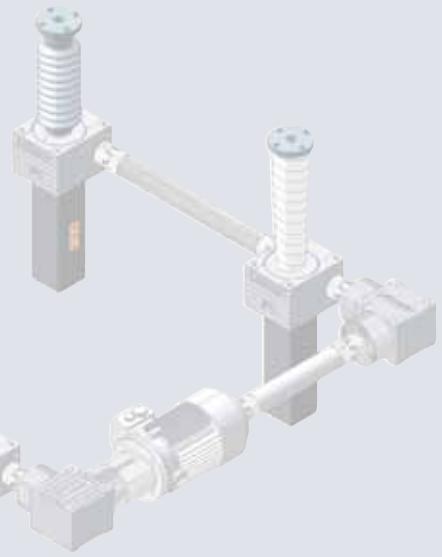
4.2 Checklist - Page 2 - Operating Times

Only required for extended operating times and high duty cycles.

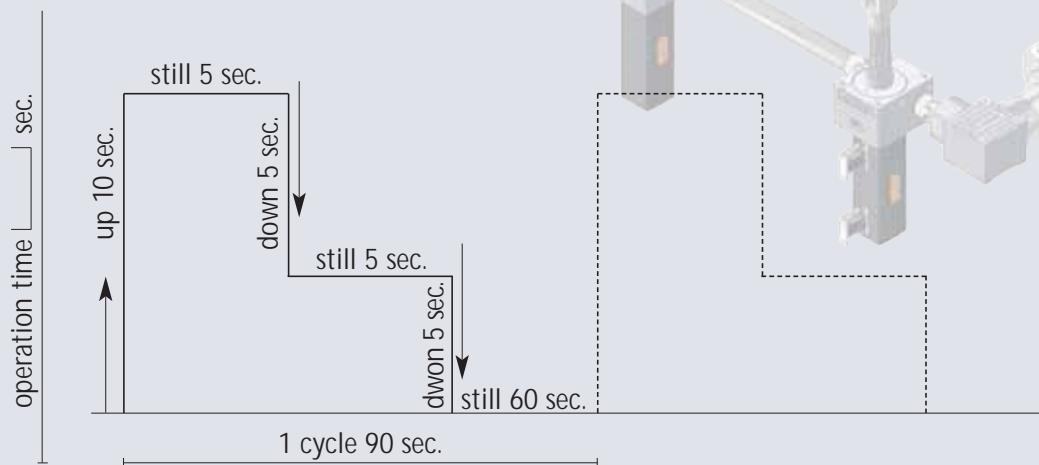
4b Operating cycle for permanent operations / operation times

Diagrams with times in seconds or minutes,
resulting operating period in percent %,
with calculation

8 16 or 24 hours - operation / day



Example:



Idle time in sec. min. hours

Formula for calculating the relative operating period ED:

$$ED = \frac{te}{\Sigma(te+tp)} \times 100 \quad ED \text{ in \%}$$

ED = operating period
te = operating time (in sec.)
tp = idle time (in sec.)

$$ED = \frac{10 \text{ sec.} + 5 \text{ sec.} + 5 \text{ sec.}}{\Sigma(10 \text{ sec.} + 5 \text{ sec.} + 5 \text{ sec.} + 5 \text{ sec.} + 5 \text{ sec.} + 60 \text{ sec.})} \times 100 = 22,2\% \text{ per hour}$$

when operated 8hr/day



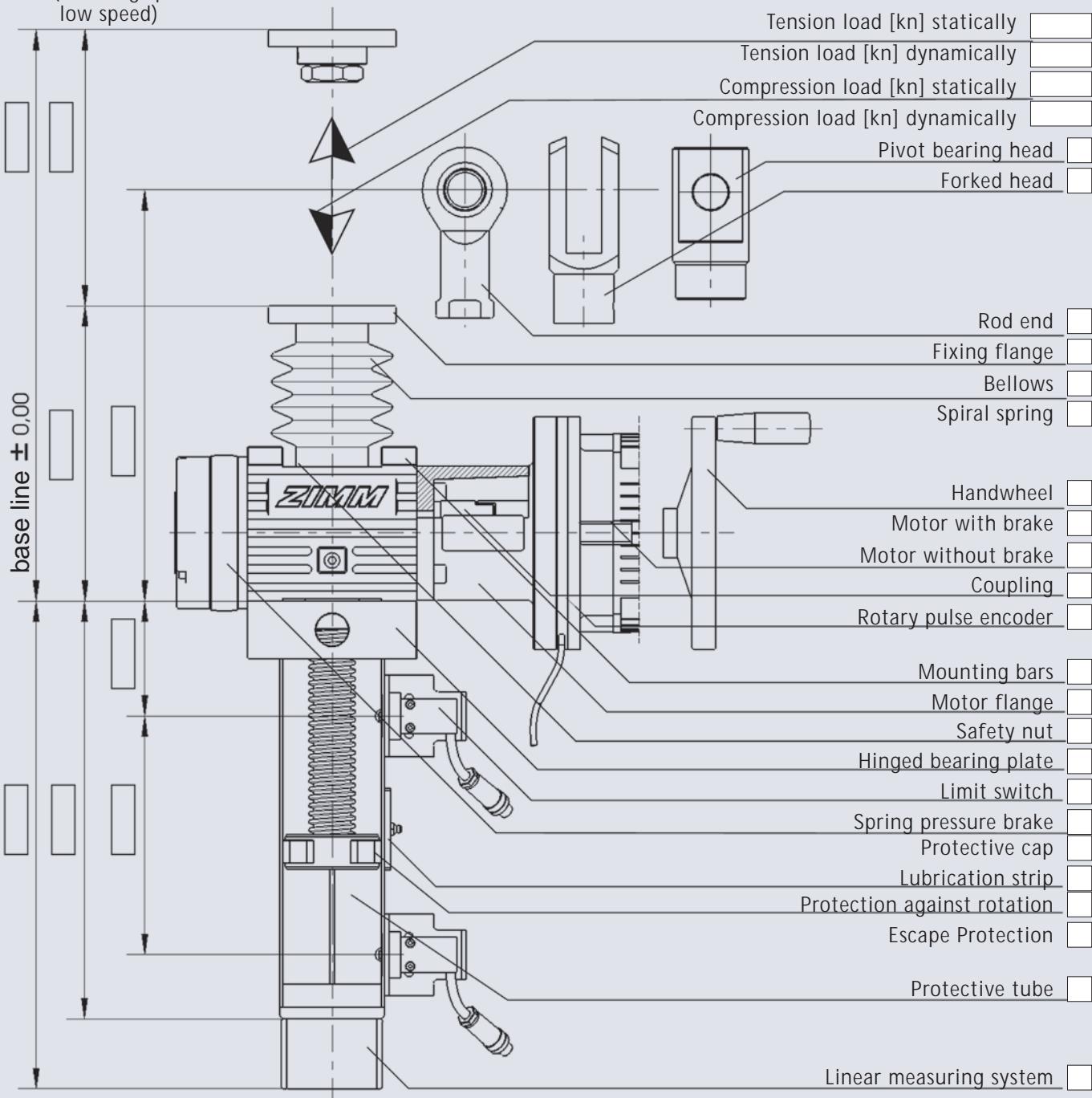
4.2 Checklist - Page 3 - Accessories S

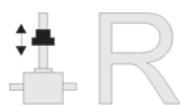
(also see overview chapter 3.3)

Execution:

SN (standing spindle,
normal speed)

SL (standing spindle,
low speed)





4.2 Checklist - Page 4 - Accessories R

(also see overview chapter 3.4)

Execution:

- RN (rotating spindle, normal speed)
- RL (rotating spindle, low speed)



Tension load [kn] statically

Tension load [kn] dynamically

Compression load [kn] statically

Compression load [kn] dynamically

Opposed bearing plate

BelloWS

Flat spiral spring covering

on top

on bottom

Duplex nut DM-1

Flange nut FM (trapezoid)

Flange nut KGT-F

Self-aligning nut PM-1

Greaseless nut FFDM

Driving flange TRMFL

Safety nut

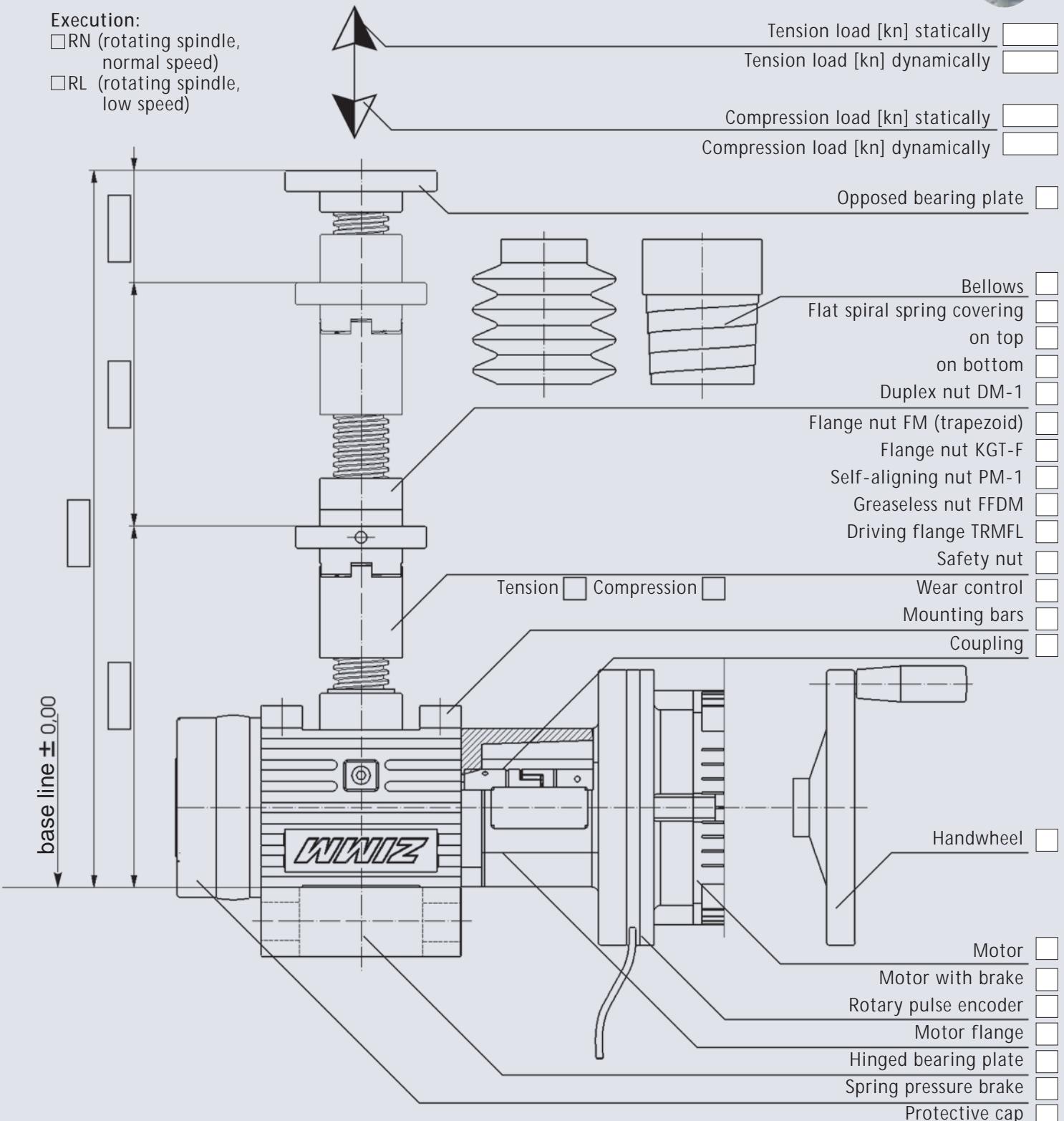
Wear control

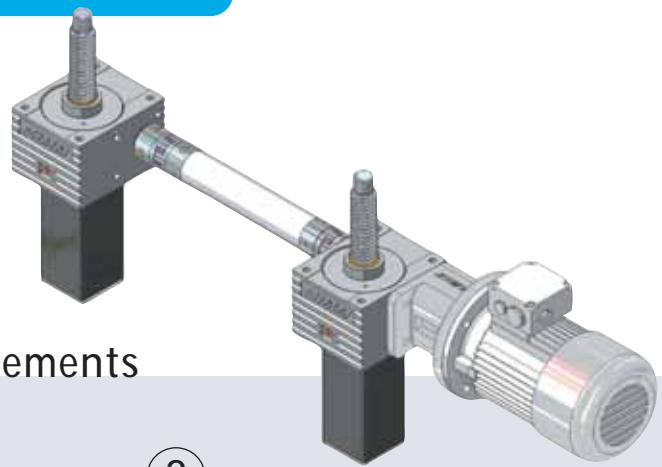
Mounting bars

Coupling

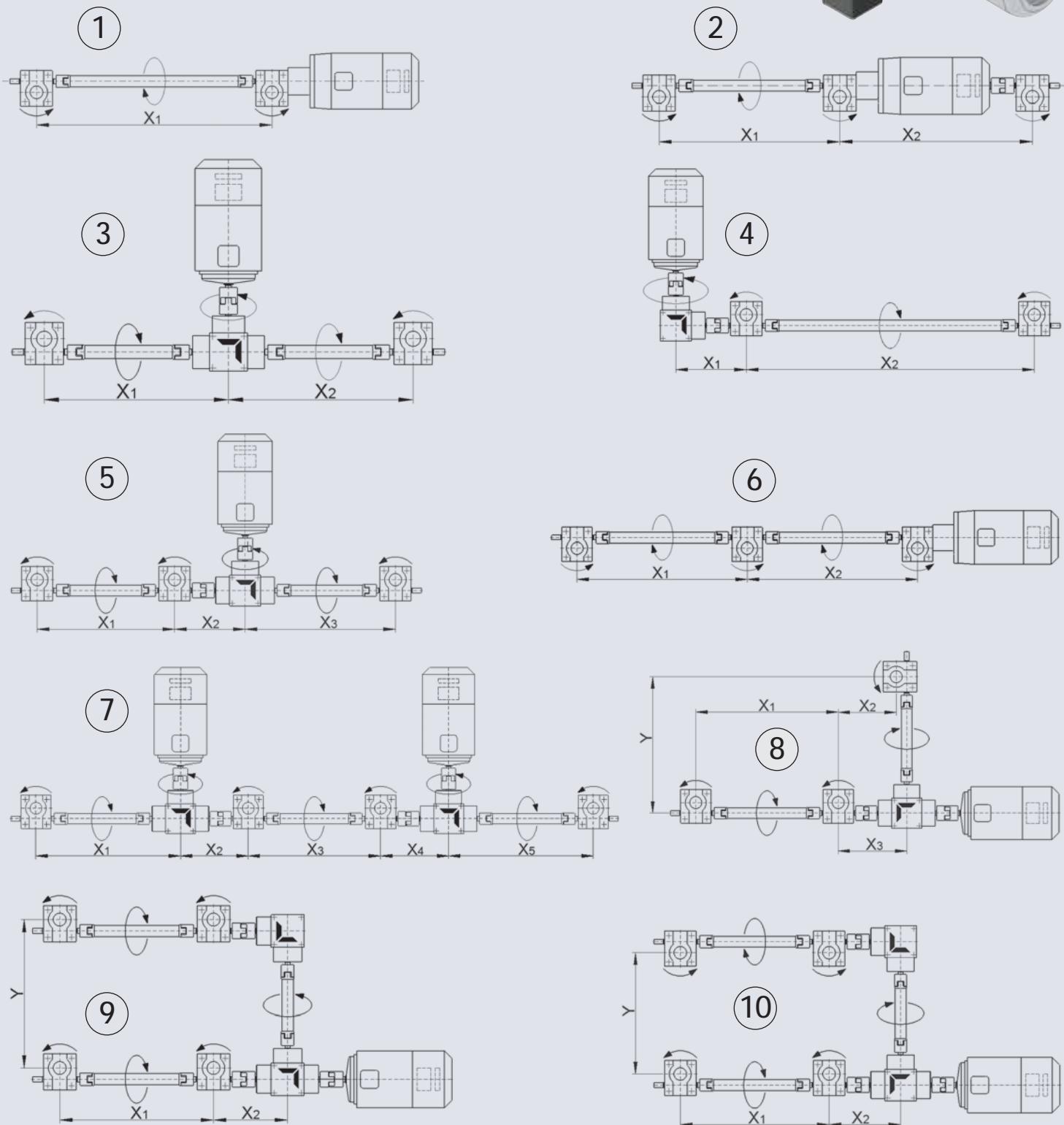
Tension Compression

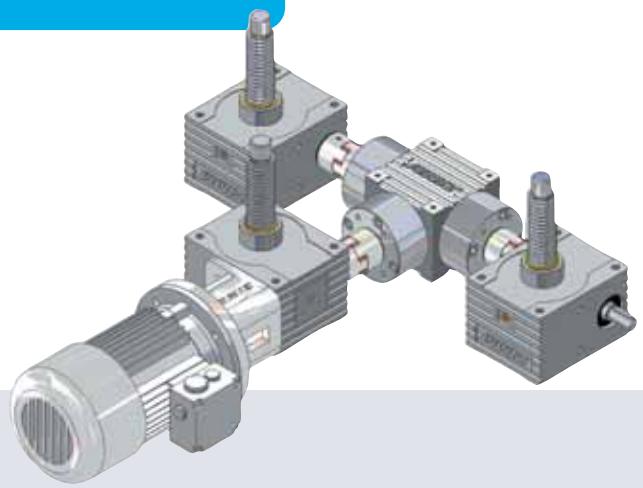
base line ± 0,00



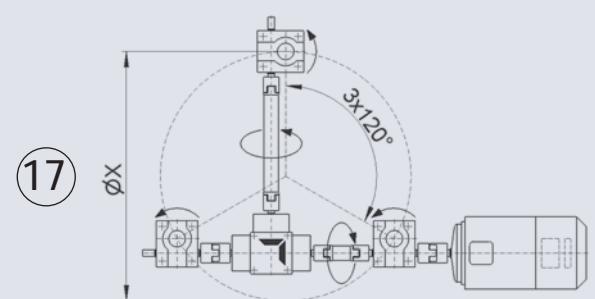
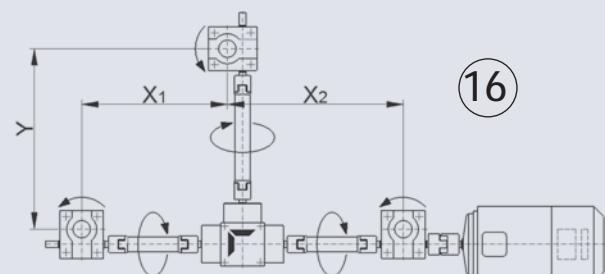
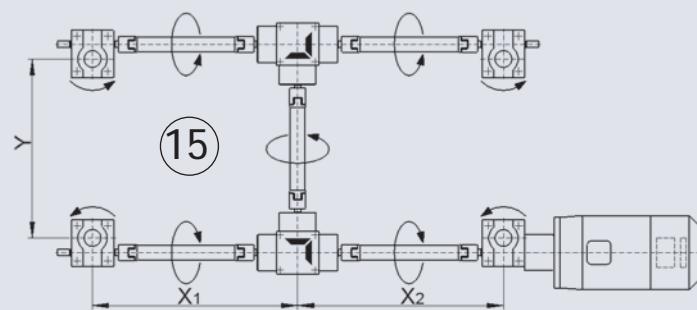
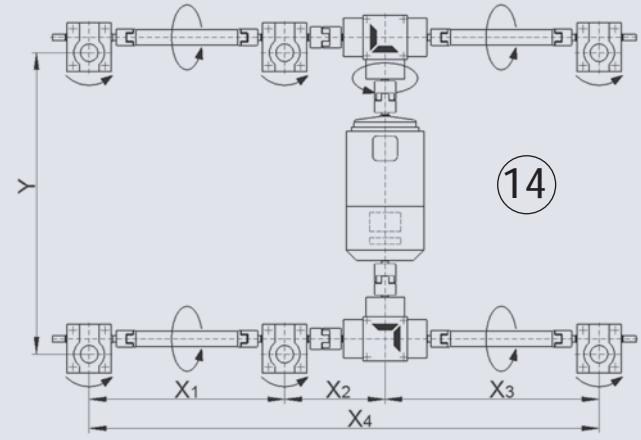
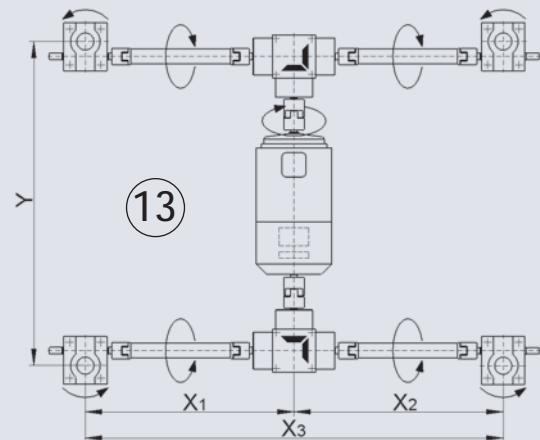
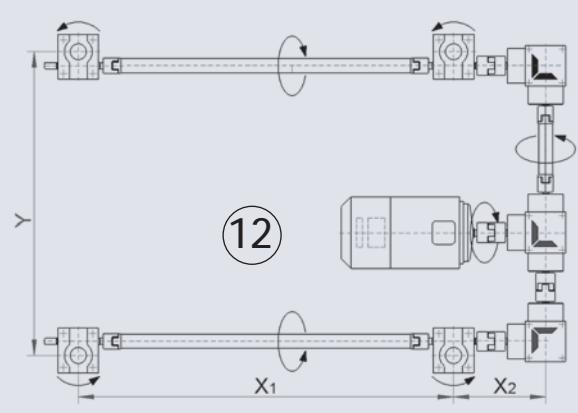
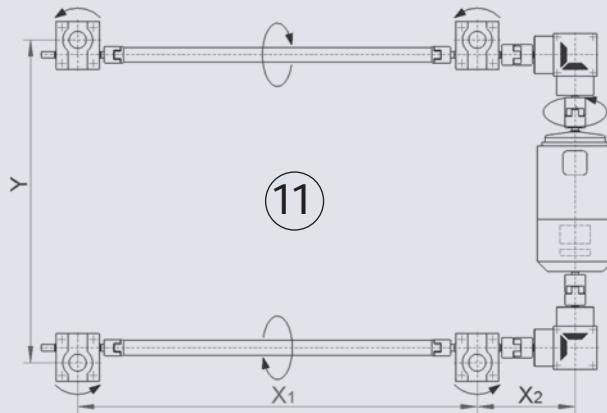


4.2 Checklist - Page 5 - Standard Arrangements

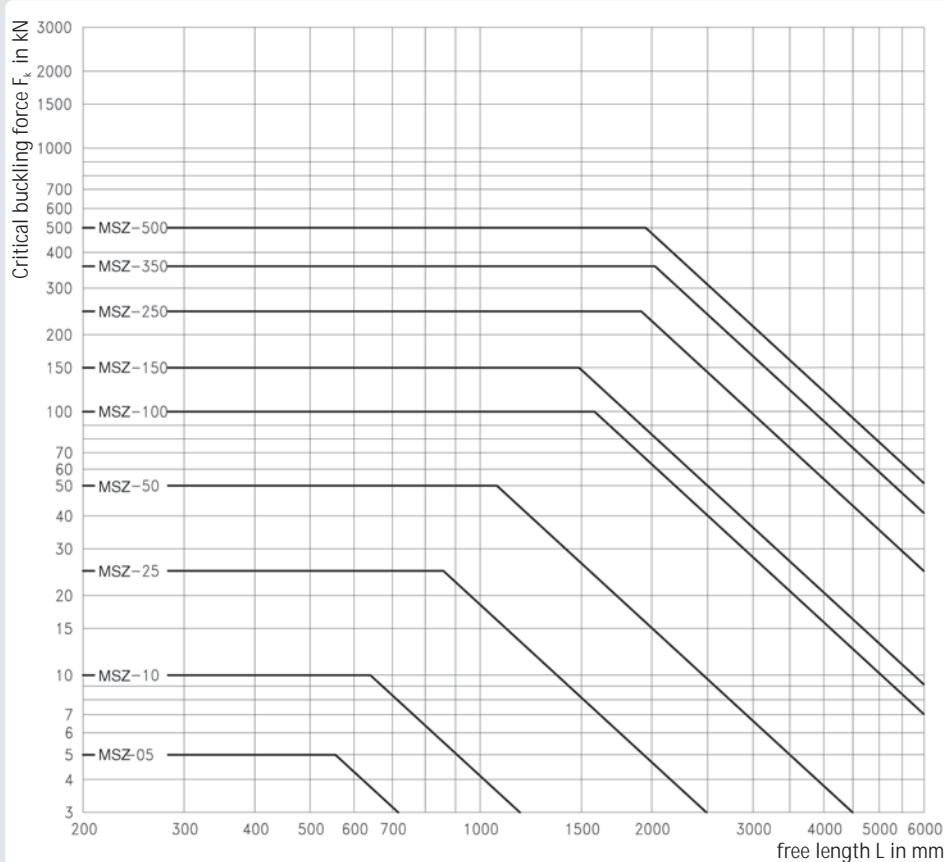
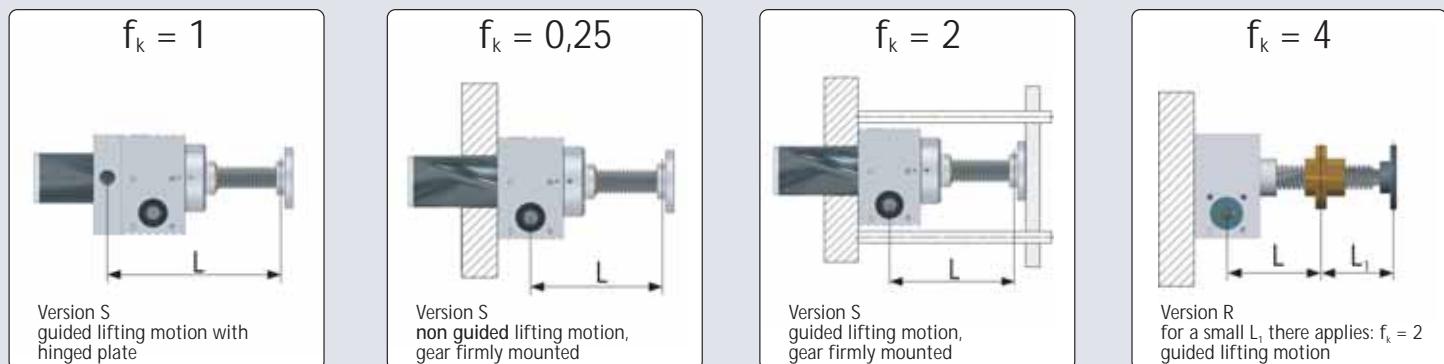




4.2 Checklist - Page 6 - Standard Arrangements



4.3 Critical Buckling Force of the Lifting Screw



If the max calculated load is lower than required a larger spindle diameter could be selected. The calculations must then be reworked.
With the rotating screw version a larger diameter screw can be selected (from the next bigger gearbox size).
Any increase in pitch/ lifting speed must

be taken into account.

The safety factors for the type of system specified must be used, as shown above, to calculate the max allowable axial load for the system.

There is a buckling risk especially with gearboxes with long, thin spindles in combination with compression load. With the following calculation you can find the max. allowed axial load acc. to Euler.

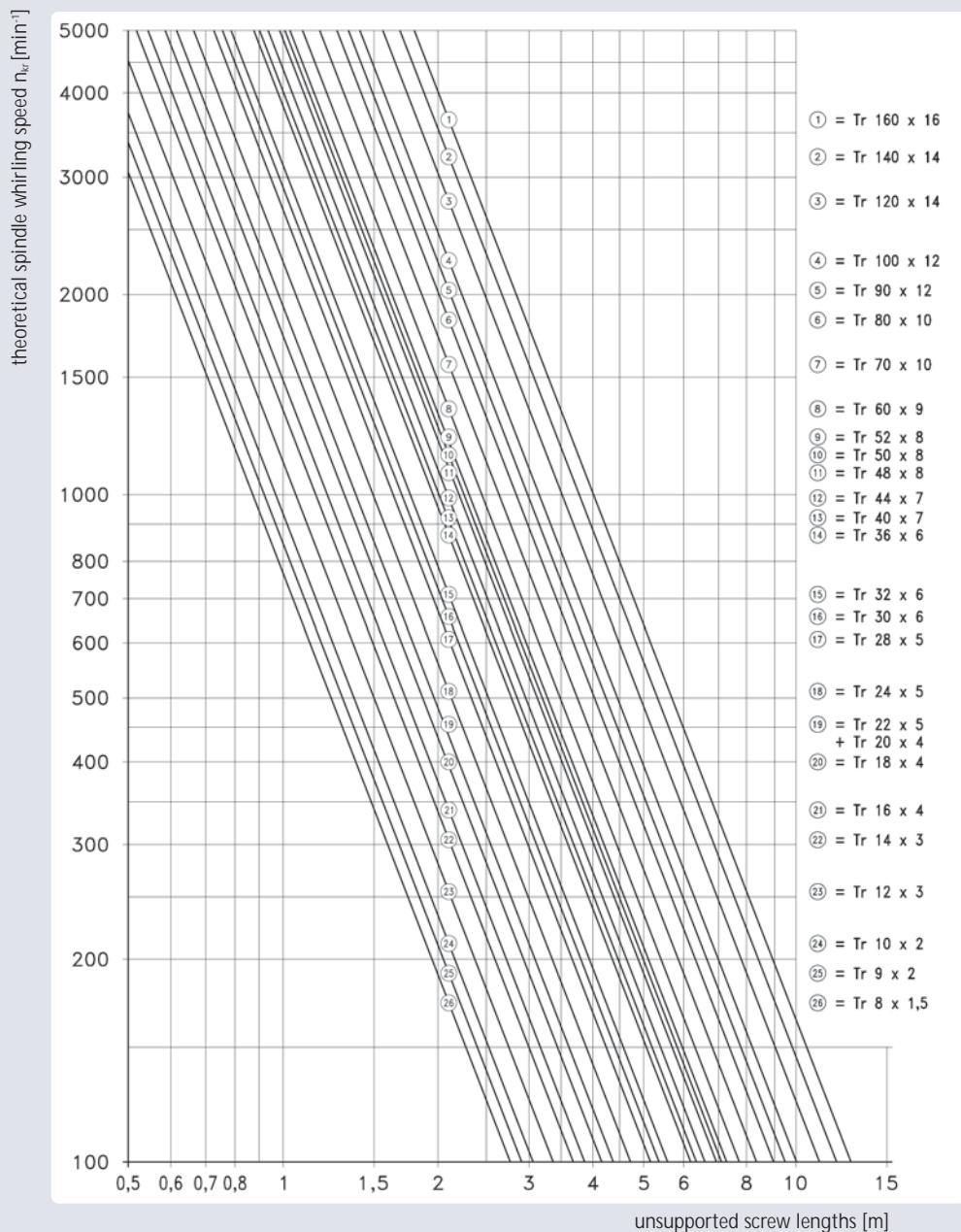
Maximum allowed axial load

$$F_{\text{all}} = 0,8 \times F_k \times f_k$$

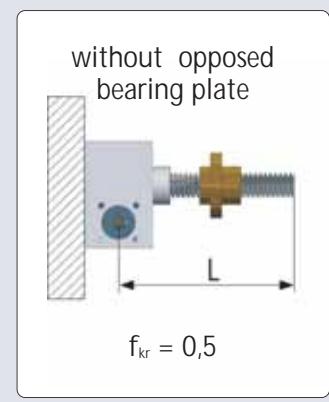
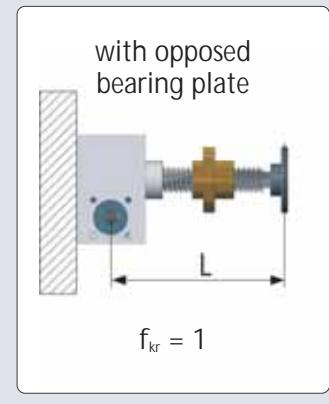
F_{all} maximum allowable axial load (kN)
 F_k theoretical critical buckling force (kN) acc. to diagram
 f_k correction value (considers kind of bearing support, respectively guidance of lifting load)
 see pictograms above



4.4 Critical Whirling Speed of Spindle - R Version



- ① = Tr 160 x 16
- ② = Tr 140 x 14
- ③ = Tr 120 x 14
- ④ = Tr 100 x 12
- ⑤ = Tr 90 x 12
- ⑥ = Tr 80 x 10
- ⑦ = Tr 70 x 10
- ⑧ = Tr 60 x 9
- ⑨ = Tr 52 x 8
- ⑩ = Tr 50 x 8
- ⑪ = Tr 48 x 8
- ⑫ = Tr 44 x 7
- ⑬ = Tr 40 x 7
- ⑭ = Tr 36 x 6
- ⑯ = Tr 32 x 6
- ⑯ = Tr 30 x 6
- ⑰ = Tr 28 x 5
- ⑱ = Tr 24 x 5
- ⑲ = Tr 22 x 5 + Tr 20 x 4
- ⑳ = Tr 18 x 4
- ㉑ = Tr 16 x 4
- ㉒ = Tr 14 x 3
- ㉓ = Tr 12 x 3
- ㉔ = Tr 10 x 2
- ㉕ = Tr 9 x 2
- ㉖ = Tr 8 x 1,5



Maximum allowable spindle speed
 $n_{all} = 0,8 \times n_{kr} \times f_{kr}$

$$\text{spindle speed} = \frac{\text{input speed}}{i_{\text{gearbox}}}$$

For R version gearboxes (with rotating spindle) with long, thin spindles it is necessary to calculate the max. allowable spindle speed. Please take the theoretical critical speed n_{kr} from the diagram. Also consider the additional lengths for spindle covers, etc. when calculating the unsupported screw lengths. Together with the correction factor for the bearing layout the max. allowable

spindle speed can be calculated.

If the calculated max spindle speed is lower than that required, a larger spindle should be selected. The calculations must then be reworked.

If a larger diameter spindle is used in the R version the potential for higher drive torque's must be considered.

The safety factors for the type of system specified must be used, as shown above, to calculate the max allowable axial load for the system.

4.5 Determining the Drive Torque [M_G] of a Lifting Gear

With the formula shown below it is possible to calculate the necessary drive torque.

In order to facilitate the calculation of the drive torque we have determined multiplication factors out of this formula and have stated them in the technical data for the single gearbox version.

Formula¹⁾:

$$\text{Drive torque: } M_G = \frac{F [\text{kN}] \cdot P [\text{mm}]}{2 \cdot \pi \cdot \eta_{\text{Gearbox}} \cdot \eta_{\text{Spindle}}} + M_L [\text{Nm}]$$

$$\text{Power of motor: } P_M [\text{kW}] = \frac{M_G [\text{Nm}] \cdot n [\text{min}^{-1}]}{9550}$$

Safety factor (start torque) = calculated drive torque x 1.3 to 1.5 (for smaller systems use up to x 2).

M_G	Required drive torque [Nm] of a lifting gear
F	Lifting load (dynamic) [kN]
η_{Gearbox}	Efficiency of the lifting gear (without spindle)
η_{Spindle}	Efficiency of the spindle
P	Spindle pitch [mm]
i	Transmission of the lifting gear
M_L	Idling torque [Nm]
P_M	Power of motor



Example:

MSZ-25-SN	
$F = 12 \text{ kN}$ (lifting load dynamic)	
$\eta_{\text{Gearbox}} = 0,87$	$\eta_{\text{Spindle}} = 0,375$
$P = 6$	$i = 6$

$$M_G = \frac{12 \text{ kN} \cdot 6 \text{ mm}}{2 \cdot \pi \cdot 0,87 \cdot 0,375 \cdot 6} + 0,36 \text{ Nm} = 6,21 \text{ Nm}$$

$$P_M = \frac{6,21 \text{ Nm} \cdot 1500 \text{ min}^{-1}}{9550} = 0,975 \text{ kW}$$

$$\text{Example: } 0,975 \text{ kW} \cdot 1,4 = 1,365 \text{ kW} \rightarrow \text{motor } 1,5 \text{ kW}$$

¹⁾ For gearboxes with one-pitch trapezoidal spindles it is also possible to multiply the factor which is stated on the corresponding gearbox page with the load.

Tr spindle η_{Spindle} Efficiency single pitch		
Tr	P	η lubricated
12	3	0,427
18	4	0,399
20	4	0,375
30	6	0,375
40	7	0,344
50	8	0,314
60	12	0,368
80	16	0,368
100	16	0,314
120	16	0,273
140	20	0,288

Tr spindle η_{Spindle} Efficiency double pitch		
Tr	P	η lubricated
12	6	0,592
18	8	0,565
20	8	0,540
30	12	0,540
40	14	0,509
50	16	0,474
60	24	0,532
80	32	0,532
100	32	0,474
120	32	0,426
140	40	0,444

The efficiency of a trapezoid screw is substantially lower than that of ball screws due to friction.

However, the trapezoid screw is technically more simple and more favourable. A safety device (e.g. a brake) is rarely required for trapezoid screws due to their self-locking

capability.
With a ballscrew system an efficiency factor of $\eta=0,9$ can be used.
It is essential to incorporate a break into a ballscrew system.

Efficiency of gearboxes η_{Gearbox} (without spindle) at $n = 1,500$

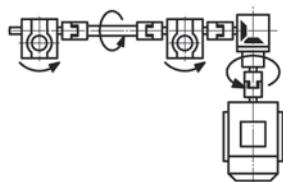
MSZ	2	5	10	25	50	100	150	250	350	500	650
N	0,82	0,84	0,86	0,87	0,89	0,85	0,84	0,86	0,87	0,84	0,85
L	0,77	0,62	0,69	0,69	0,74	0,65	0,67	0,72	0,70	0,62	0,65

Idling torques M_L of gearboxes [Nm]

MSZ	2	5	10	25	50	100	150	250	350	500	650
N	0,06	0,10	0,26	0,36	0,76	1,68	1,90	2,64	3,24	3,96	5,60
L	0,04	0,08	0,16	0,26	0,54	1,02	1,20	1,94	2,20	2,84	3,40

With ball screws you basically can calculate with an efficiency factor of $\eta=0,9$.

4.6 Drive Torque for Gearboxes



$$M_R = M_G \times 2,25$$

Calculation

The required drive torque of a lifting gear results from the sum of the moments of the individual lifting units. This is increased due to frictional losses of transmission components like couplings, connecting shafts, bevel gears, etc.

To simplify the calculation, some factors for determining the drive torque in the most common applications are provided below.



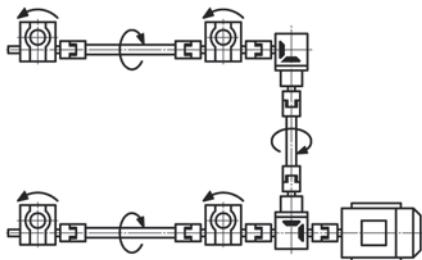
$$M_R = M_G \times 2,1$$



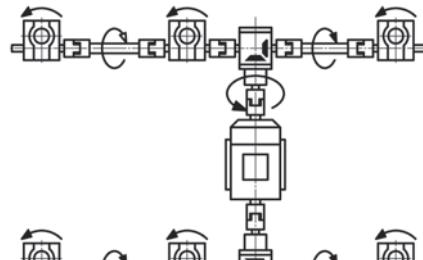
$$M_R = M_G \times 3,1$$



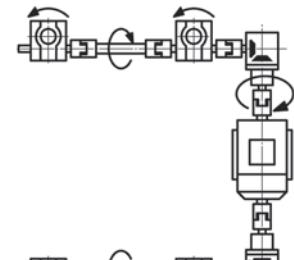
$$M_R = M_G \times 3,35$$



$$M_R = M_G \times 4,6$$



$$M_R = M_G \times 6,8$$

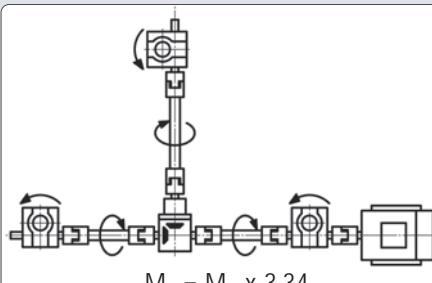


$$M_R = M_G \times 4,4$$

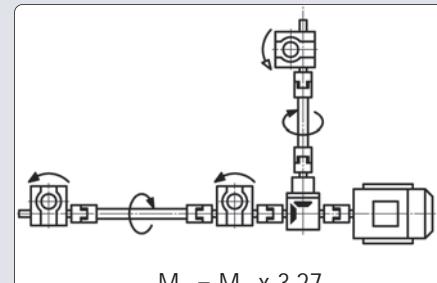
M_R – Total drive torque for the whole system

M_G - Input torque of a single gearbox

M_A – Starting torque max. $1,5 \times M_R$

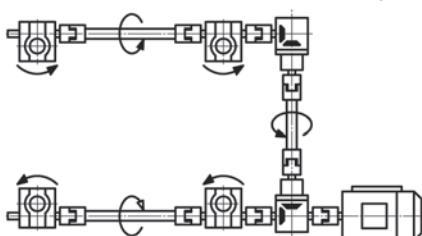


$$M_R = M_G \times 3,34$$



$$M_R = M_G \times 3,27$$

Example (example from the left page, 12 kN per gearbox)



$$M_R = M_G \times 4,6 = 6,21 \text{ Nm} \times 4,6 = \underline{\underline{28,57 \text{ Nm}}} \\ \longrightarrow \times \text{safety factor } 1,3 = \underline{\underline{37,14 \text{ Nm}}}$$

Attention:

It is recommended to multiply the calculated value with a safety factor of 1.3 to 1.5 (for smaller systems factor up to 2). The indicated values are applicable in cases of uniform distribution of the lifting gear load onto all gears!

4.7 Maximum Power / Moments

Load definitions

F - Lifting load tension and/or compression

F_S - Side forces on the spindle

V_H - Lifting speed of the spindle
(or nut of the R version)

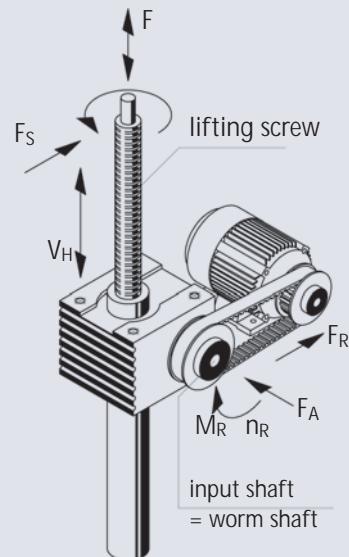
F_A - Axial load of the input shaft

F_R - Radial load of the input shaft

M_R - Drive torque

n_R - Drive speed

Please examine the information on the following pages before making your choice of the lifting gear suited for your application. Various influences and assumptions can only be estimated on the basis of information gained by experience. In case of doubt please contact our sales engineers.



Side forces on the spindle

Please refer to the adjoining table for the maximum permissible side force. Side forces should be supported by a guidance system whenever possible. The bronze bushings in the gearbox are a secondary support only and should not be relied upon as adequate guidance. The maximum side force at a given screw extension must not exceed that stated in the adjoining table.

Attention: only statically allowed!

maximum side force F_S [N] (static)

MSZ	100	200	300	400	500	600	700	800	900	1000	1200	1500	2000	2500	3000
5	360	160	100	70	55	45	38	32	28	25	20	18	12	-	-
10	600	280	180	130	100	80	70	60	50	47	40	30	20	15	-
25	900	470	300	240	180	150	130	110	100	90	70	60	45	35	30
50	3000	2000	1300	900	700	600	500	420	380	330	280	230	160	130	100
100	5000	4000	3000	2300	1800	1500	1300	1100	950	850	700	600	400	350	250
150	5500	5000	3900	2800	2300	1800	1500	1300	1200	1000	850	750	500	400	350
250	9000	9000	6500	4900	3800	3000	2500	2200	2000	1900	1450	1250	900	760	660
350	15000	13000	12000	10000	8800	7000	6000	5500	4800	4300	3500	3000	2000	1600	1400
500	29000	29000	29000	29000	24000	20000	17000	15000	14000	12000	9000	7000	5600	4900	
650	34800	34800	34800	34800	34800	28800	24000	20400	18000	16800	14400	10800	8400	6720	5880
750	46000	46000	39000	36000	32000	30000	25000	29000	25000	23500	20000	17000	12000	10000	8000

Max. drive torque

The stated values of the table on the right should not be exceeded. If gearboxes are arranged in tandem or in larger arrangements the maximum drive torque may be higher. If there are more than 5 gearboxes in an arrangement please contact our sales engineers.

maximum drive torque M_R [Nm]

Type	min^{-1}	SHZ-02	MSZ-5	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650	MSZ-750
M_R SN/RN	1500	0,7	6,4	12,6	21,7	44,7	72,0	67,3	118,4	187,0	204,3	268,3	415,0
M_R SN/RN	500	1,0	10,4	20,5	34,2	70,3	114,9	107,0	185,1	295,7	325,6	427,9	663,0
M_R SL/RL	1500	0,5	2,6	5,3	7,8	15,5	17,0	17,3	23,5	40,2	42,8	62,8	83,0
M_R SL/RL	500	0,7	4,3	8,4	12,5	24,5	27,8	27,7	36,6	63,9	71,2	102,6	132,0

- Consider that the starting torque is factor 1.5 of the operation torque

- Limit values are mechanical - consider thermal factors depending on operating time

maximum radial load acting on the input shaft F_R [N]

	SHZ-02	MSZ-5	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650
F_R max.	18	110	215	300	520	800	810	1420	2100	3780	4536

Radial load on the input shaft

The radial forces of the table on the right should not be exceeded if you use chain drives or belt drives.

4.8 Calculating Spindle and Protective Tube Lengths

The following tables will allow calculation of the required spindle and protective tube length for the screw jack system selected.

Basic

Depending on gearbox version and system components the spindle (and protective tube for S version) have to be extended.

These lengths are important. For non standard layouts please provide a drawing or contact the technical department.

Stroke + basic length (+ extensions for variants/system components)

Example S:

MSZ-25-SN, stroke: 250 mm
 bellow MSZ-25-FB-300 (compression ZD=70mm)
 fixing flange BF (therefore bellow without retainer)
 protection against rotation VS
 limit switch ESSET

Spindle length Tr:

$$\begin{array}{rcl} 250 & + & 180 \\ \text{stroke} & & \text{basic length} \end{array} + \begin{array}{rcl} 43 & + & 44 \\ \text{bellow} & & \text{limit switch} \end{array} = \begin{array}{l} 517 \text{ mm} \\ \text{spindle length} \end{array}$$

(70-27=43) + protection against rotation

protective tube length SRO:

$$\begin{array}{rcl} 250 & + & 55 \\ \text{stroke} & & \text{basic length} \end{array} + \begin{array}{rcl} 71 & = & 376 \\ \text{limit switch} & & \text{protective tube length} \end{array}$$

+ protection against rotation

Example R:

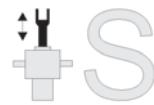
MSZ-25-RN, stroke 250 mm
 spindle with pilot (opposed bearing plate GLP)
 bellow MSZ-25-FB-300 (compression ZD=70mm) below and above
 duplex nut DM

Spindle length Tr:

$$\begin{array}{rcl} 250 & + & 145 \\ \text{stroke} & & \text{basic length} \end{array} + \begin{array}{rcl} 60 & + & 55 \\ \text{bellow gearbox-sided} & & \text{2. bellow} \end{array} + \begin{array}{rcl} 50 & = & 560 \text{ mm} \\ \text{(70-10=60)} & & \text{(70-15=55)} \\ & & \text{duplex nut} \end{array} \text{spindle length}$$

Length calculation for connecting shafts can be found in chapter 14.4.

4.8 Length Calculation, Standing Version S - Spindle



spindle extension S version below gearbox (tube side)

	MSZ-5	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650
Tr basic length	139	161	180	240	325	338	386	434	524	573
Tr basic length with safety nut	-	192	216	276	362	384	467	522	626	676
Tr basic length Anti-Backlash										
KGT basic length	16x05 203	25x05 238	32x05 263	40x05 326	50x10 430	63x10 427	-	-	-	-
	16x10 223	25x10 258	32x10 273	40x10 326	50x20 470	-	-	-	-	-
	25x25 328	32x20 303	40x20 356			-	-	-	-	-
	25x50 458	32x40 373	40x40 416			-	-	-	-	-
Escape prot./prot. against rot. (evtl. WMS)	15	20	20	30	30	30	35	40	40	40
Limit switch ₃₎ (+evtl. linear measuring syst.)	41	45	44	55	55	48	48	53	58	59
ES ₃₎ and hinged bearing plate (evtl. WMS)	63	63	69	80	90	95	107	119	154	154

spindle extension S version above gearbox

	MSZ-05	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650 _z
Bellows with bushing (GK / KGK) ₁₎	ZD -2	ZD +1	ZD +5	ZD +10	ZD +8	ZD +2				
Bellows without bushing (BF / SLK) ₁₎	ZD -22	ZD -24	ZD -27	ZD -36	ZD -40	ZD -18				
Bellows and KAR with FBR (GK / KGK) ₁₎	ZD +32	ZD +34	ZD +53	ZD +67	ZD +81	ZD +71	ZD +93	ZD +114	ZD +136	ZD +128
Bellows and KAR without FBR (BF / SLK) ₁₎	ZD +12	ZD +9	ZD +22	ZD +21	ZD +33	ZD +51	ZD +73	ZD +94	ZD +116	ZD +108

Safety distances are already included in basic lengths!

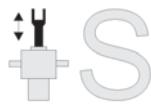
(Tr spindle: 10mm up to MSZ-100, 16mm from MSZ-150, for KGT see chapter 9.1, dimension L3)

- 1) The value will be added or subtracted to the ZD dimension of the bellow - the result will then be added to the spindle length.
(e.g. ZD = 70 => "ZD-22" = 48 mm => spindle extension for bellow is 48 mm)
- 2) Bellow, bellow ring and bellow adapter are similar to MSZ-500
- 3) Limit switches ES are always in combination with protection against rotation VS (VS is in the extension included)

Spindle extension for spiral spring covering SF:

As the extension of the spiral spring covering differs depending on the attachment,
this variant has to be calculated graphically.
If necessary we would be pleased to generate this drawing.

Abbreviations:	AS	Escape protection	KAR	Hinged bearing plate
	BF	Fixing flange	KGK	Rod end
	ES	Limit switch	SLK	Pivot bearing head
	FBR	Bellows connecting ring	WMS	Linear measuring system
	GK	Forked head	ZD	Compression



4.8 Length Calculation, Standing Version S – Protective Tube SRO

protective tube extension S version

	MSZ-5	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650
Tr basic length ¹⁾	48	50	55	64	75	87	92	102	112	112
KGT basic length ¹⁾	16x05 60	25x05 60	32x05 65	40x05 74	50x10 95	63x10 95	-	-	-	-
	16x10 80	25x10 80	32x10 75	40x10 74	50x20 135	-	-	-	-	-
	25x25 150	32x20 105	40x20 104			-	-	-	-	-
	25x50 280	32x40 175	40x40 164			-	-	-	-	-
Escape prot./prot. ag. rotat. AS/V/S	15	20	20	30	30	30	30	35	40	40
Limit switch ES ₃) (+ evtl. WMS) + VS	69	72	71	82	82	69	69	74	79	79
ES ₃) and hinged bearing plate KAR	91	90	96	107	117	116	128	140	175	174
VS + Linear measuring system WMS	31	36	36	46	46	46	51	51	56	56

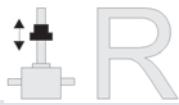
1) Basic length of protective tube without cap - to achieve the whole protective tube length add another 5mm for the cap

Attention: minimum stroke with limit switch ES:

min.stroke with limit switch ES ₃ 2)	48	46	47	37	37	37	32	27	27
min.stroke with ES ₃ + lubric. strip 2)	118	116	117	107	107	107	102	97	97

2) Is a lower stroke required as stated above, the limit switches and the lubrication strips have to be mounted on two different sides (assembly position)!

3) Limit switches ES are always in combination with protection against rotation VS (VS is in the extension included)



4.8 Length Calculation, Rotating Version R - Spindle

Spindle extension R version

	Spindle extension R version					
	MSZ-05	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150
Tr basic length without machined end	93	106	120	163	212	251
Tr basic length with machined end (= standard for opposed bearing plate GLP)	108	126	145	193	257	306
Tr basic length larger diameter with machined end ¹⁾	113	131	150	208	267	326
KGT basic length larger diameter with machined end ²⁾	145	25x05	158	32x05	185	50x10
16x10	178	25x10	191	32x10	209	40x10
25x25	228	32x20	236	40x20	250	40x20
25x50	381	32x40	271	40x40	285	40x40
16x05	160	25x05	178	32x05	210	40x05
16x10	193	25x10	211	32x10	234	40x10
25x25	261	32x20	275	40x20	313	40x20
25x50	414	32x40	310	40x40	378	40x40
25x05	165	32x05	196	40x05	217	50x05
25x10	198	32x10	220	40x10	231	50x10
25x25	248	32x20	261	40x20	270	50x20
25x50	401	32x40	296	40x40	335	50x40
Flange nut FM	35	44	46	66	90	-
Duplex nut DM	45	45	50	70	90	115
Self-aligning nut PM	78	83	95	129	190	210
Greaseless nut FFDM	53	53	59	85	-	224
DM + Safety nut SIFA	70	84	95	133	173	211
PM + Safety nut SIFA	123	128	158	212	300	330
1. FB gearbox-nut ⁵⁾	ZD-12	ZD-12	ZD-10	ZD-12	ZD-12	ZD-18
2. FB nut-opposite bearing plate ³⁾	ZD-10	ZD-14	ZD-15	ZD-15	ZD-10	ZD-26
KAR ⁶⁾ spindle-sided and 1. bellow ⁵⁾	ZD+18	ZD+18	ZD+32	ZD+32	ZD+46	ZD+65

Safety distances are already included in basic lengths!
(Tr spindle: 10mm up to MSZ-100, 16mm from MSZ-150, for KGT see chapter 9.1, dimension L3)

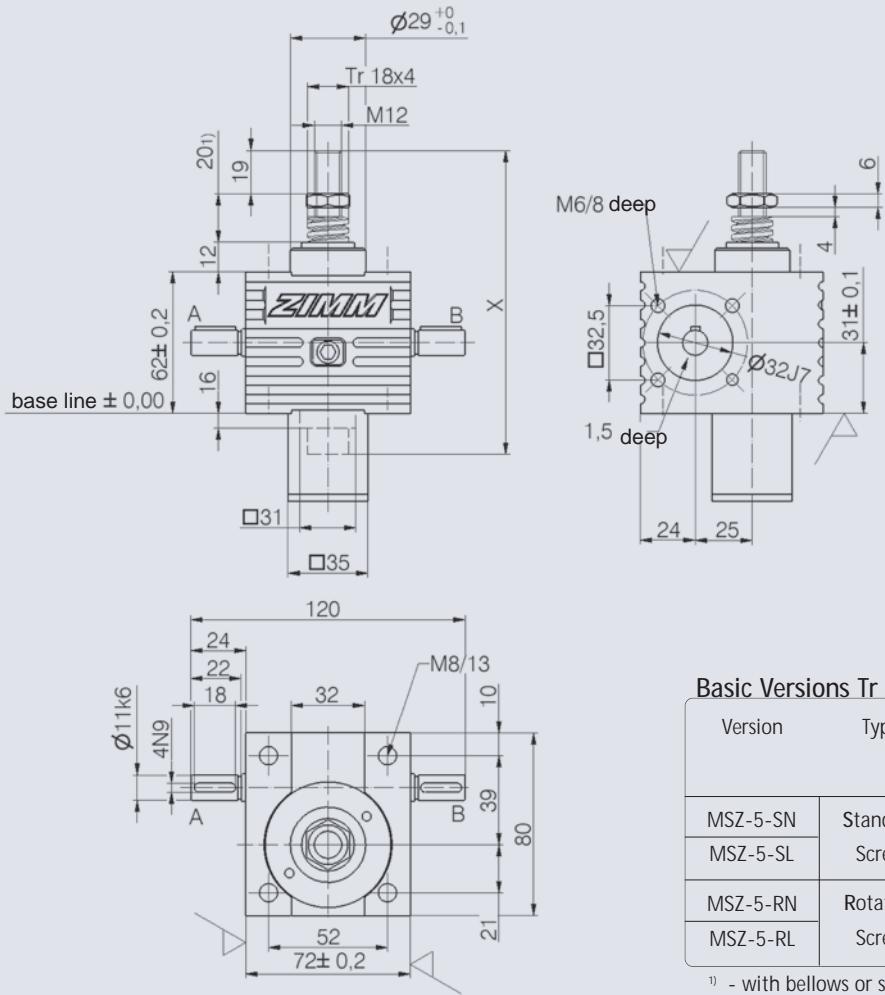
- When using a larger diameter spindle also select the system components of the next bigger gearbox.
(MSZ-10 with larger diameter spindle has spindle Tr30x6, system components of MSZ-25 - therefore also calculational spindle extension of gearbox size 25).
- The basic length of KGT spindles includes the length of the KGT nut and the safety distance according to ZIMM catalogue (see chapter 9.2, size L₃).
- KGT nut with dynamic load rating 135kN and static load rating 322kN (80x20-4EP).
- KGT nut with dynamic load 167,5kN and static load rating 398kN (80x20-5EP).
- The value will be - depending on the algebraic sign - added or subtracted of the ZD (compression) dimension of the bellow
- the result will then be added to the spindle length.
- KAR is the hinged bearing plate

Spindle extension for spiral spring covering SF:
As the extension of the spiral spring covering differs depending on the attachment,
this variant has to be calculated graphically.
If necessary we would be pleased to generate this drawing.

4.9 Order - Code MSZ

5kN

MSZ-5 Standing Screw S 5kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-5-SN	Standing Screw	Normal	Tr 18x4	4:1	1,00 mm
MSZ-5-SL		Low		16:1	0,25 mm
MSZ-5-RN	Rotating Screw	Normal	Tr 18x4	4:1	1,00 mm
MSZ-5-RL		Low		16:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard types S

Basic model S Heavy duty screw jack grey cast housing	Ball screw KGT
Aluminium housing	KGT 16 x 5 KGT 16 x 10

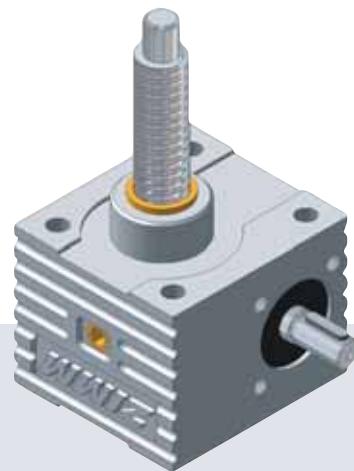
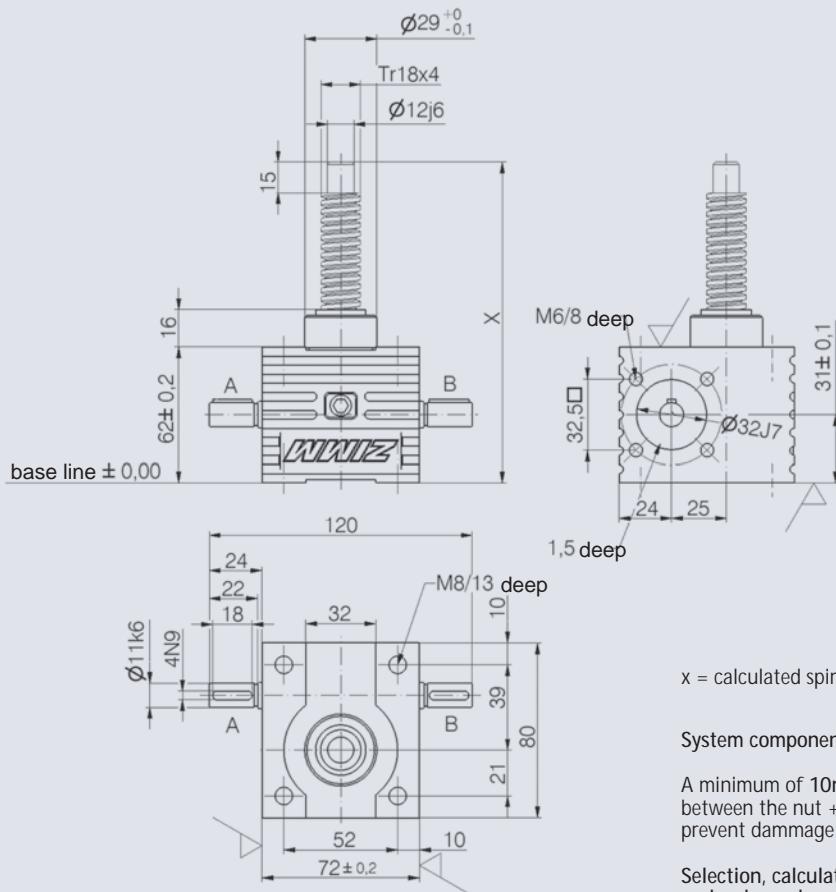
Standard types R

Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball Screw KGT
Aluminium housing	wear control of the nut	KGT 16 x 5 KGT 16 x 10



5kN

MSZ-5 Rotating Screw R 5kN



$x = \text{calculated spindle length (chapter 4.8)} + 5 \text{ mm}$

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

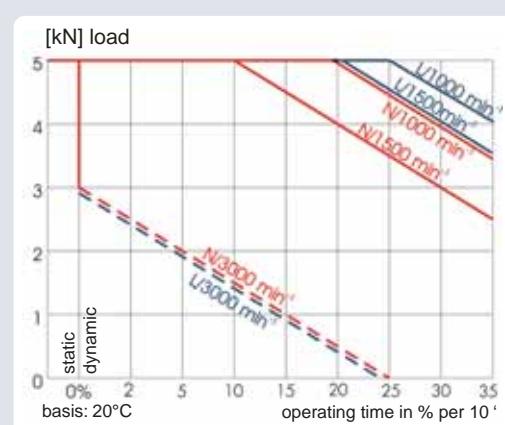
Technical data S and R

Max. pressure/tensile force static	- 5 kN (0,5 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 18x4 ²⁾
Gear reduction	- 4:1 (N) / 16:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 1,70 kg
Weight of spindle/m	- 1,58 kg
Drive torque M _G [Nm]	- F [kN] x 0,62 ³⁾⁽⁵ + M _L (N-Normal) - F [kN] x 0,21 ³⁾⁽⁵ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 0,10 (N-Normal) - 0,08 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr18x4 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr20x4 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 4mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

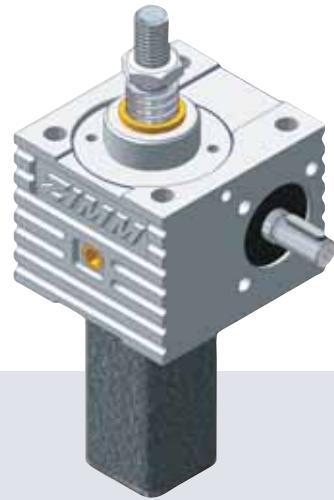
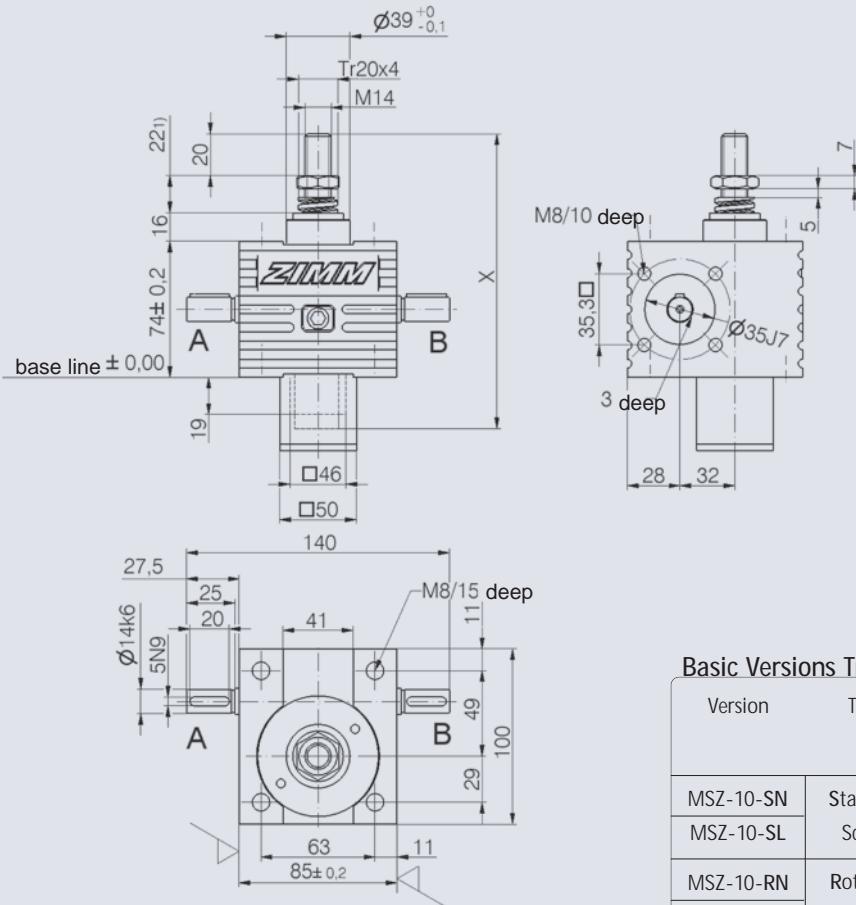
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



10kN

MSZ-10 Standing Screw S 10kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-10-SN	Standing Screw	Normal	Tr 20x4	4:1	1,00 mm
MSZ-10-SL		Low		16:1	0,25 mm
MSZ-10-RN	Rotating Screw	Normal	Tr 20x4	4:1	1,00 mm
MSZ-10-RL		Low		16:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

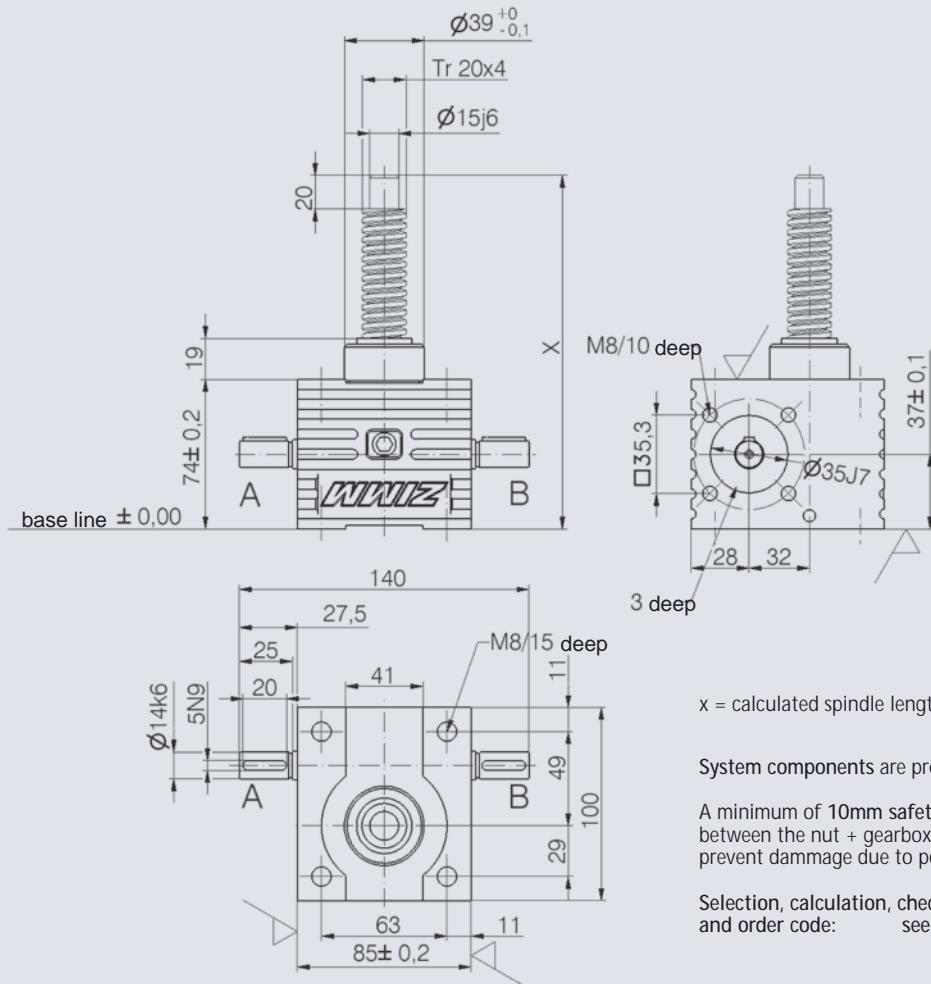
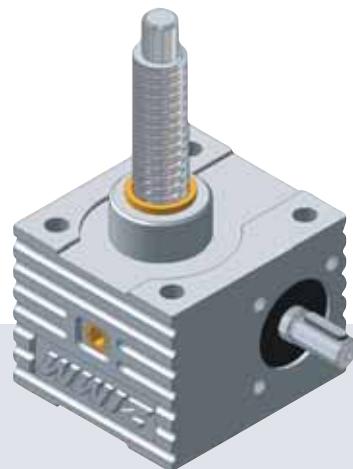
Standard Types S

Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT	Anti-Backlash AB	Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT



10kN

MSZ-10 Rotating Screw R 10kN



$x = \text{calculated spindle length (chapter 4.8)} + 8 \text{ mm}$

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

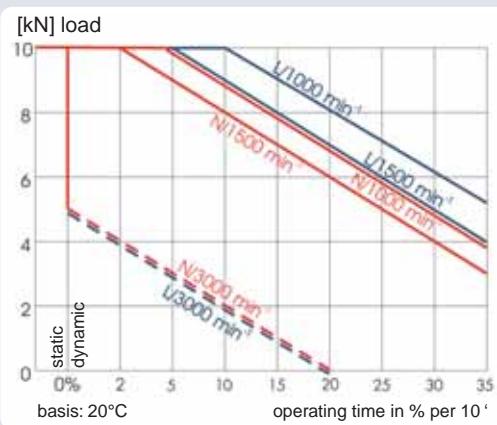
Technical data S and R

Max. pressure/tensile force static	- 10 kN (1 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 20x4 ²⁾
Gear reduction	- 4:1 (N) / 16:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 3 kg
Weight of spindle/m	- 2 kg
Drive torque M _G [Nm]	- F [kN] x 0,64 ³⁾⁽⁵ + M _L (N-Normal) - F [kN] x 0,20 ³⁾⁽⁵ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 0,26 (N-Normal) - 0,16 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr20x4 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr30x6 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 4mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

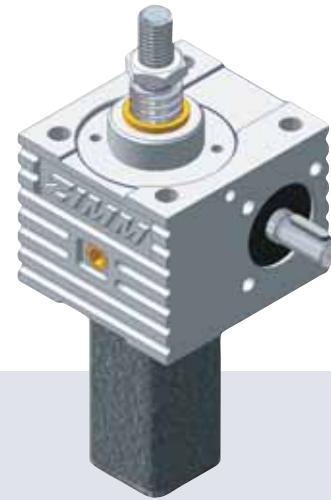
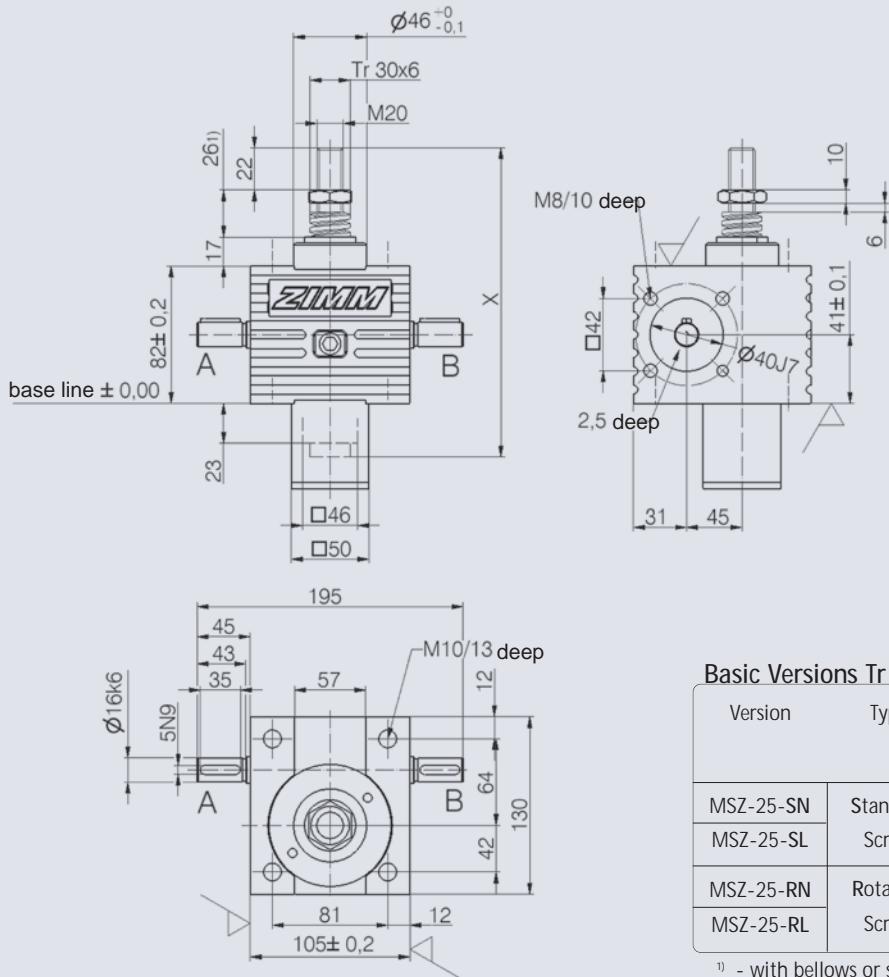
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



25kN

MSZ-25 Standing Screw S 25kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-25-SN	Standing Screw	Normal	Tr 30x6	6:1	1,00 mm
MSZ-25-SL		Low		24:1	0,25 mm
MSZ-25-RN	Rotating Screw	Normal	Tr 30x6	6:1	1,00 mm
MSZ-25-RL		Low		24:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

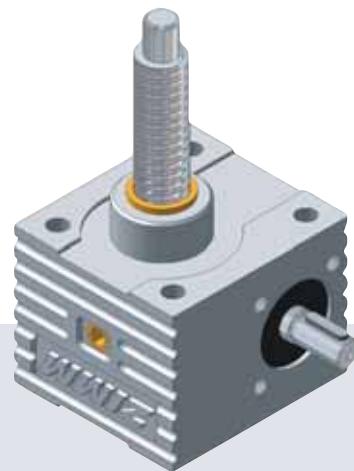
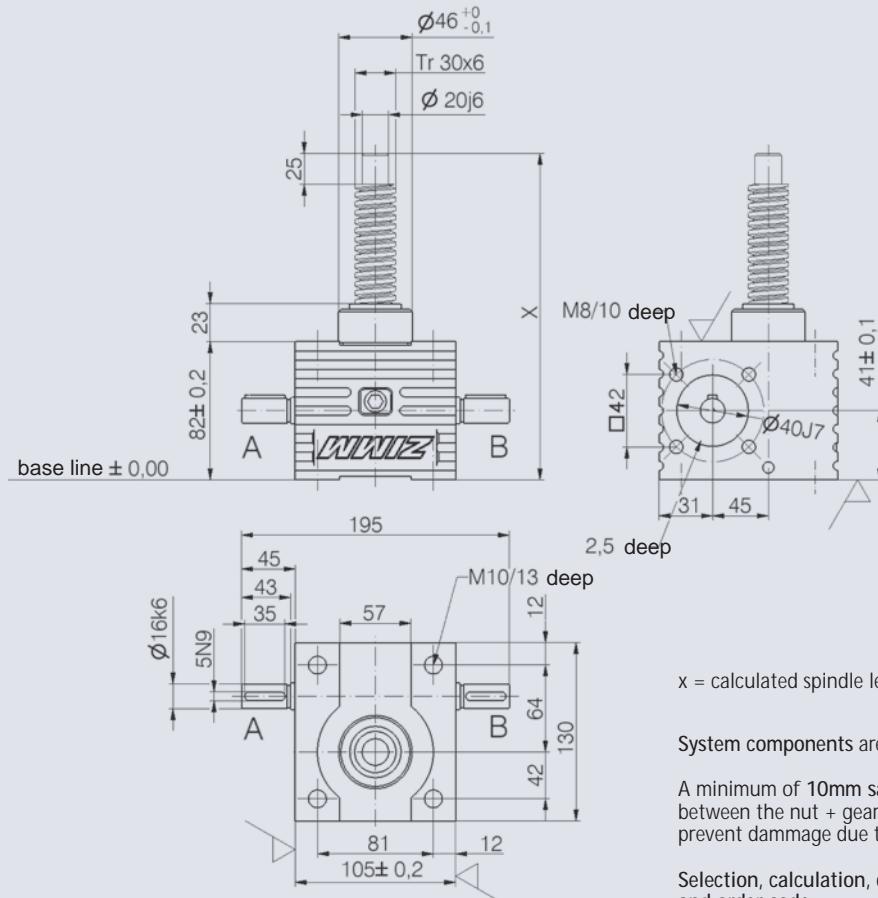
Standard Types S

Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT	Anti-Backlash AB	Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT



25kN

MSZ-25 Rotating Screw R 25kN



x = calculated spindle length (chapter 4.8) + 5 mm

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

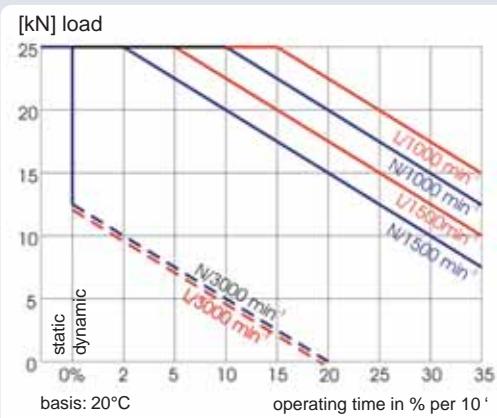
Technical data S and R

Max. pressure/tensile force static	- 25 kN (2,5 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 30x6 ²⁾
Gear reduction	- 6:1 (N) / 24:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 6,5 kg
Weight of spindle/m	- 4,5 kg
Drive torque M _G [Nm]	- F [kN] x 0,63 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,20 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 0,36 (N-Normal) - 0,26 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr30x6 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr40x7 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 6mm

Capacity diagram stat./dyn. S and R



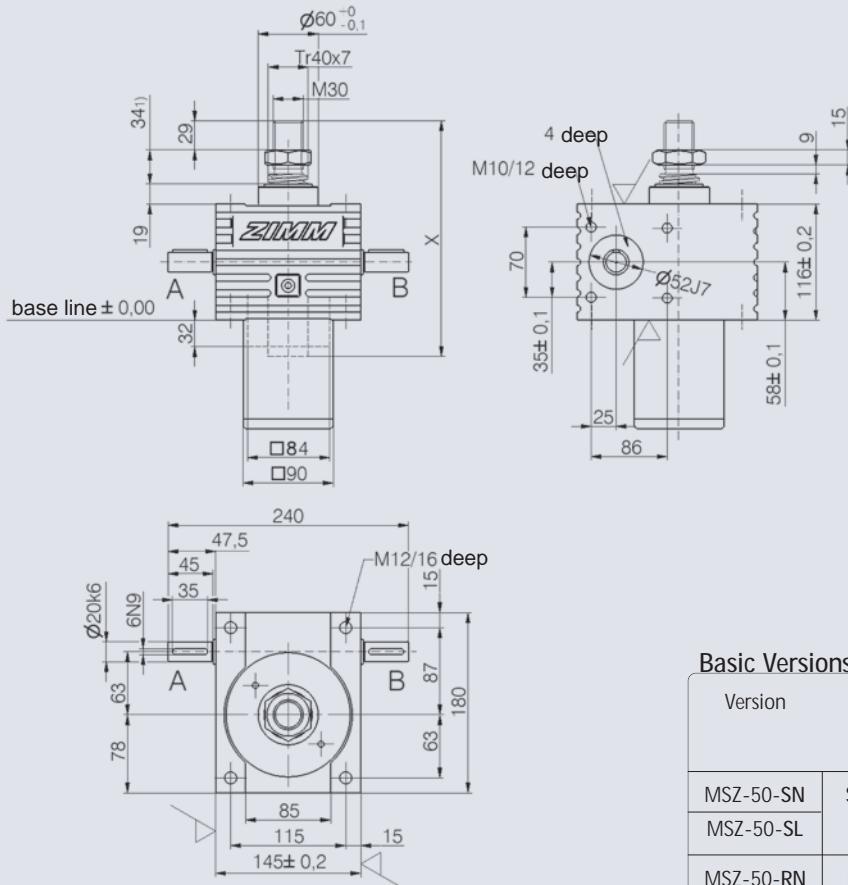
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



50kN

MSZ-50 Standing Screw S 50kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-50-SN	Standing Screw	Normal	Tr 40x7	7:1	1,00 mm
MSZ-50-SL		Low		28:1	0,25 mm
MSZ-50-RN	Rotating Screw	Normal	Tr 40x7	7:1	1,00 mm
MSZ-50-RL		Low		28:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

Basic model S
Heavy duty screw jack
grey cast housing



Safety nut SIFA



Ball screw KGT



Anti-Backlash AB



rotation control and
wear control
of the nut

KGT 40 x 5
KGT 40 x 10
KGT 40 x 20
KGT 40 x 40

adjustable
anti-backlash

Standard Types R

Basic model R
Heavy duty screw jack
grey cast housing



Safety nut SIFA



Ball screw KGT



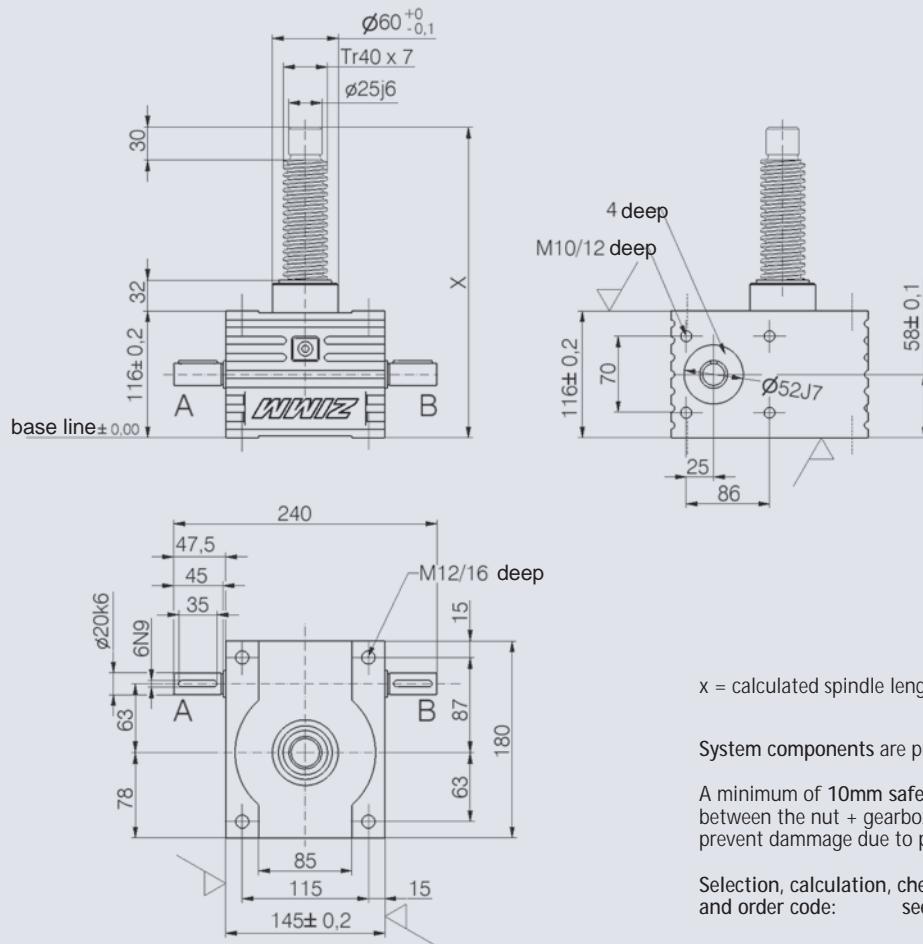
wear control
of the nut

KGT 40 x 5
KGT 40 x 10
KGT 40 x 20
KGT 40 x 40



50kN

MSZ-50 Rotating Screw R 50kN



$x = \text{calculated spindle length (chapter 4.8)} + 6 \text{ mm}$

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

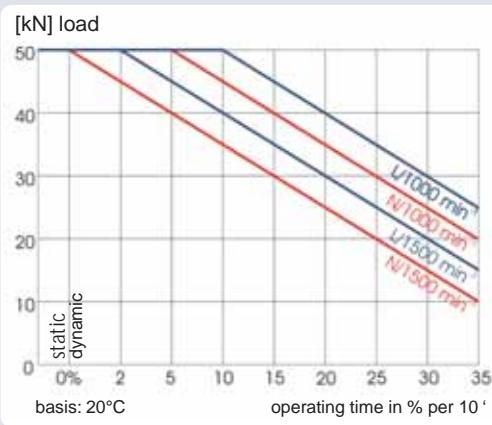
Technical data S and R

Max. pressure/tensile force static	- 50 kN (5 t)
Max. drive shaft speed	- 1800 min^{-1} (higher on request)
Screw dimension	- $Tr\ 40x7^2$
Gear reduction	- 7:1 (N) / 28:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 15 kg
Weight of spindle/m	- 8 kg
Drive torque M_G [Nm]	- $F [\text{kN}] \times 0.68^{3(5)} + M_L$ (N-Normal) - $F [\text{kN}] \times 0.20^{3(5)} + M_L$ (L-Low)
Starting torque	- drive torque $M_G \times 1.5$
Idle torque ⁴⁾ M_I [Nm]	- 0.76 (N-Normal) - 0.54 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - $Tr40x7$ is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle $Tr50x8$ (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 7mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

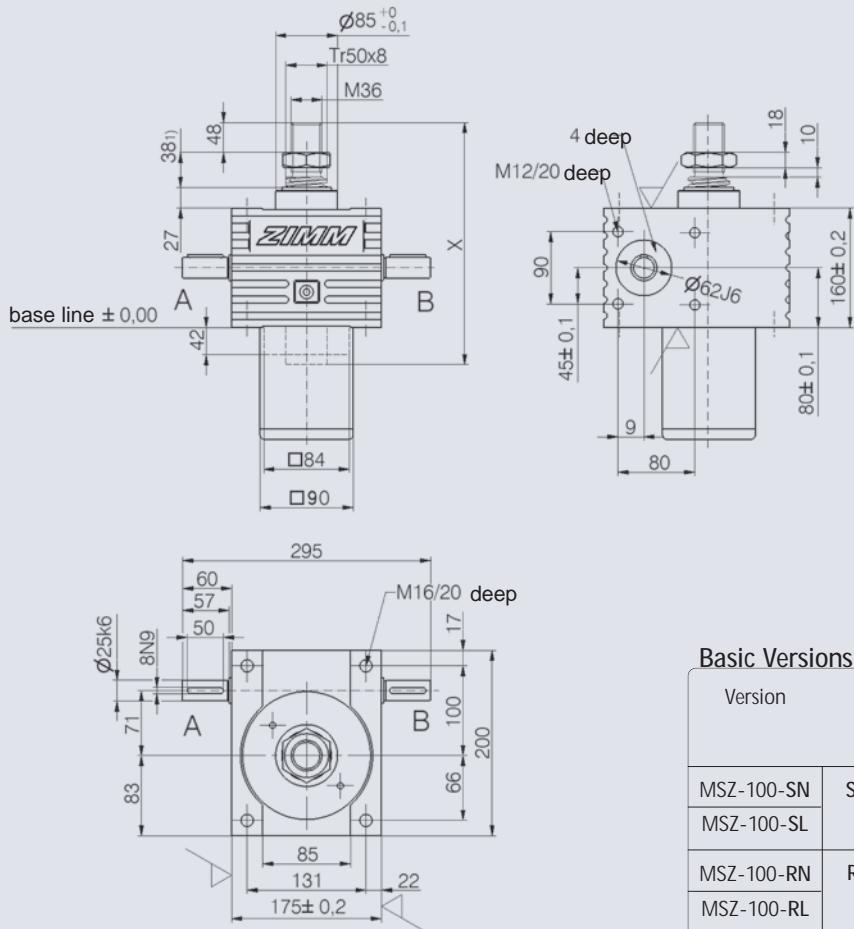
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



100kN

MSZ-100 Standing Screw S 100kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-100-SN	Standing Screw	Normal	Tr 50x8	8:1	1,00 mm
MSZ-100-SL		Low		32:1	0,25 mm
MSZ-100-RN	Rotating Screw	Normal	Tr 50x8	8:1	1,00 mm
MSZ-100-RL		Low		32:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

Basic model S
Heavy duty screw jack
grey cast housing



Safety nut SIFA



Ball screw KGT



Anti-Backlash AB



rotation control and
wear control
of the nut

KGT 50 x 10
KGT 50 x 20

adjustable
anti-backlash

Standard Types R

Basic model R
Heavy duty screw jack
grey cast housing



Safety nut SIFA



Ball screw KGT



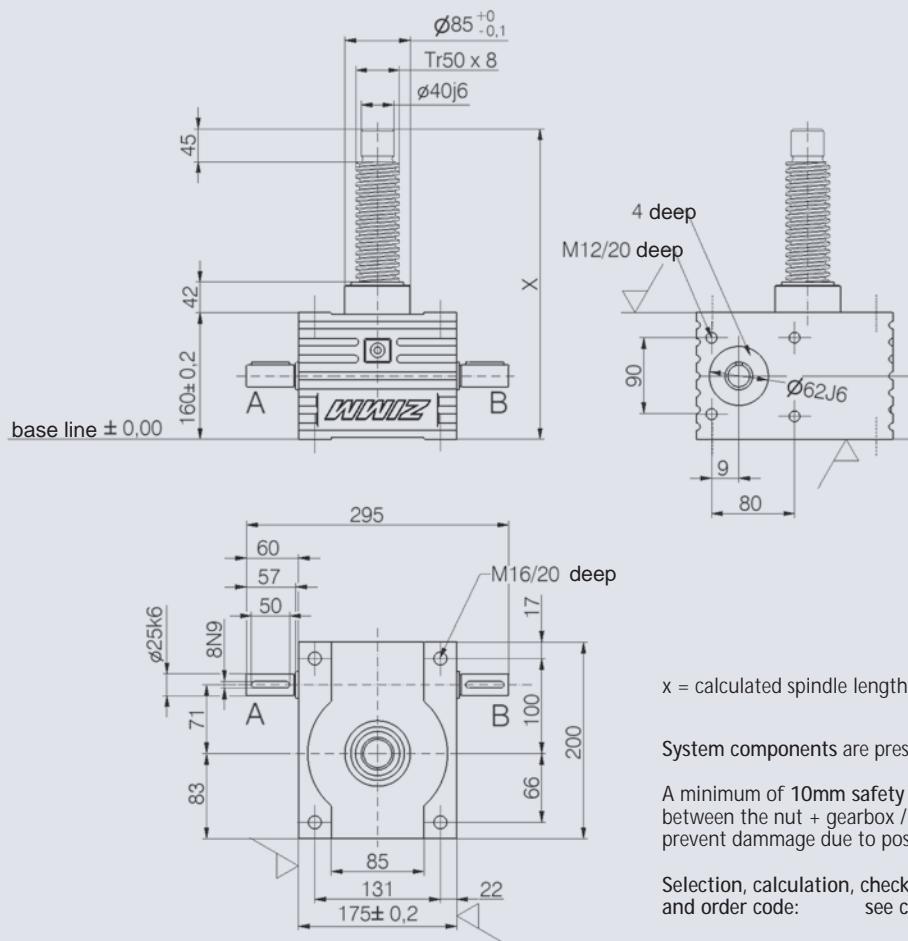
wear control
of the nut

KGT 50 x 10
KGT 50 x 20



100kN

MSZ-100 Rotating Screw R 100kN



$x = \text{calculated spindle length (chapter 4.8)} + 10 \text{ mm}$

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

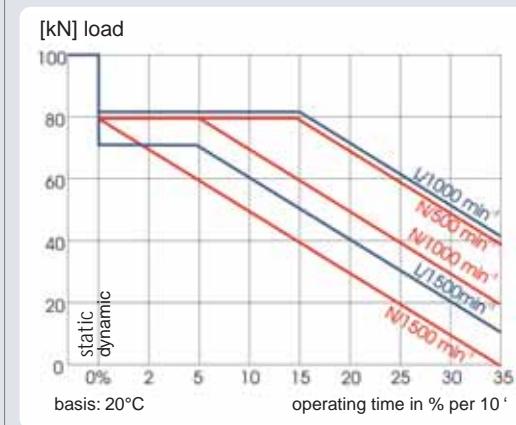
Technical data S and R

Max. pressure/tensile force static	- 100 kN (10 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 50x8 ²⁾
Gear reduction	- 8:1 (N) / 32:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 33 kg
Weight of spindle/m	- 13 kg
Drive torque M _G [Nm]	- F [kN] x 0,78 ³⁾⁽⁵ + M _L (N-Normal) - F [kN] x 0,25 ³⁾⁽⁵ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 1,68 (N-Normal) - 1,02 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr50x8 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr60x12 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 8mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

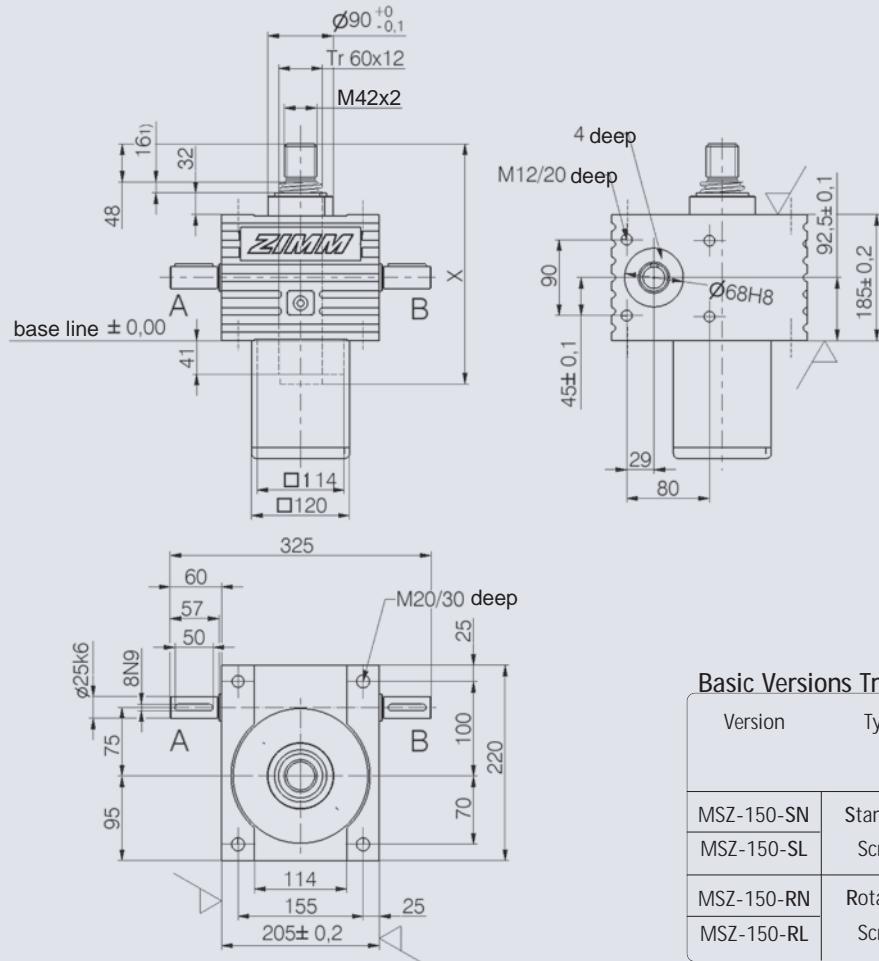
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



150kN

MSZ-150 Standing Screw S 150kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-150-SN	Standing Screw	Normal	Tr 60x12	9:1	1,33 mm
MSZ-150-SL		Low		36:1	0,33 mm
MSZ-150-RN	Rotating Screw	Normal	Tr 60x12	9:1	1,33 mm
MSZ-150-RL		Low		36:1	0,33 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT	Anti-Backlash AB

rotation control and wear control of the nut KGT 63x10 adjustable anti-backlash

Standard Types R

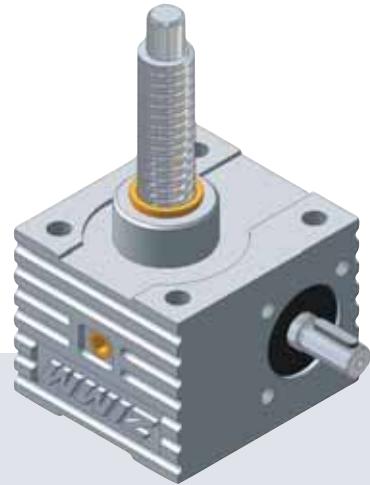
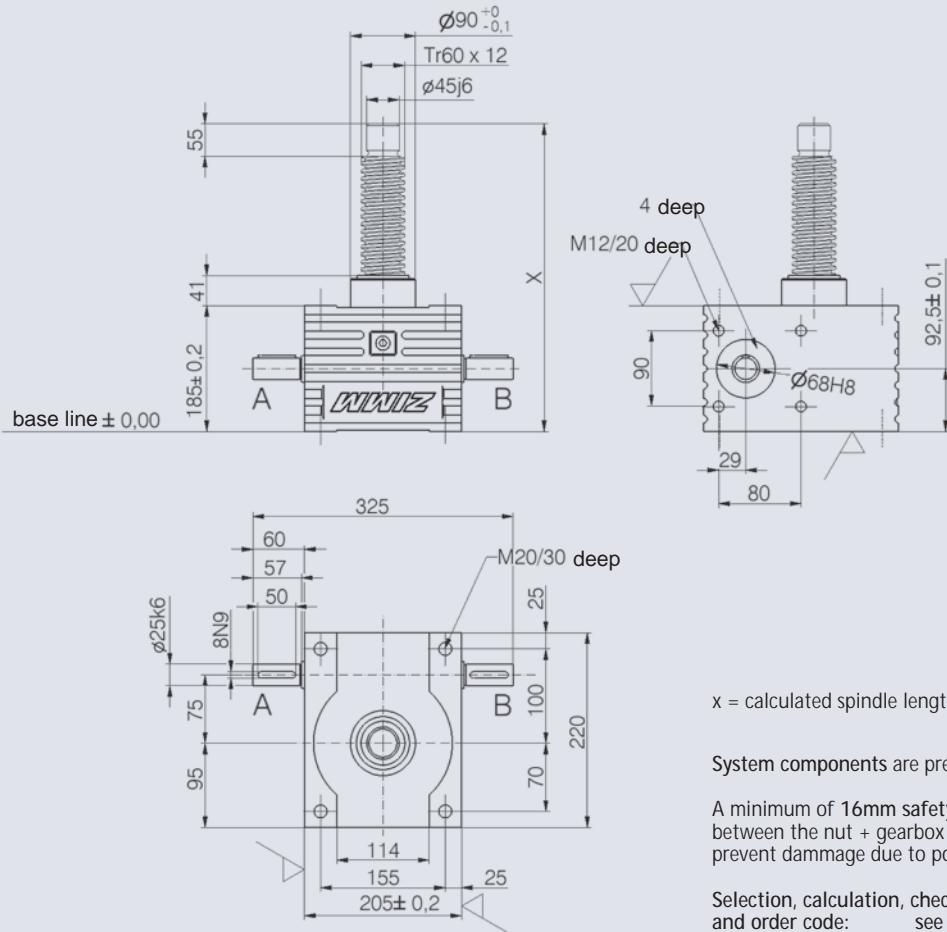
Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT

wear control of the nut KGT 63 x 10 KGT 63 x 20



150kN

MSZ-150 Rotating Screw R 150kN



$X = \text{calculated spindle length (chapter 4.8)} + 8 \text{ mm}$

System components are presented in chapter 14

A minimum of 16mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

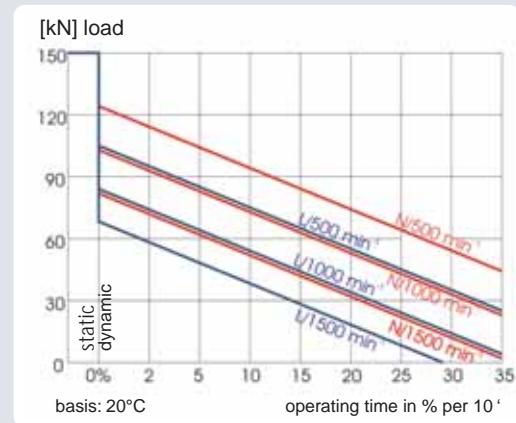
Technical data S and R

Max. pressure/tensile force static	- 150 kN (15 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 60x12 ²⁾
Gear reduction	- 9:1 (N) / 36:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 42 kg
Weight of spindle/m	- 18 kg
Drive torque M _G [Nm]	- F [kN] x 0,89 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,28 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 1,90 (N-Normal) - 1,20 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr60x12 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr80x16 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 12mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

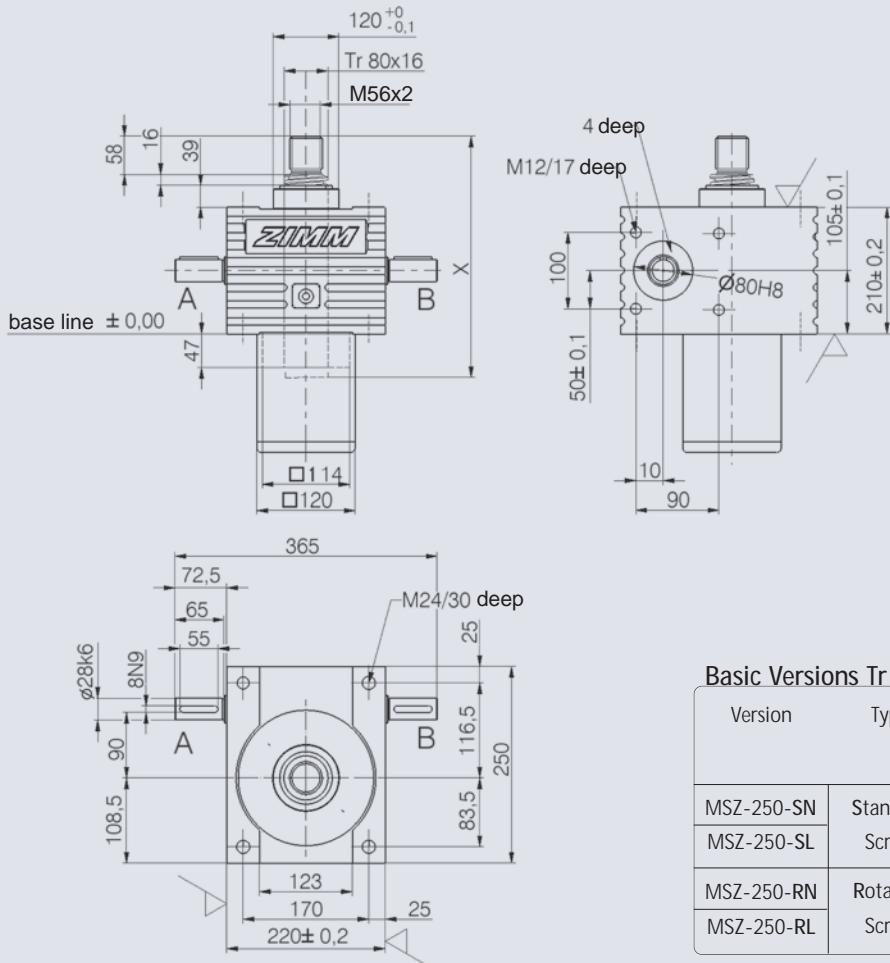
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



250kN

MSZ-250 Standing Screw S 250kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-250-SN	Standing Screw	Normal	Tr 80x16	10:1	1,60 mm
		Low		40:1	0,40 mm
MSZ-250-RN	Rotating Screw	Normal	Tr 80x16	10:1	1,60 mm
		Low		40:1	0,40 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Anti-Backlash AB

rotation control and wear control of the nut adjustable anti-backlash

Standard Types R

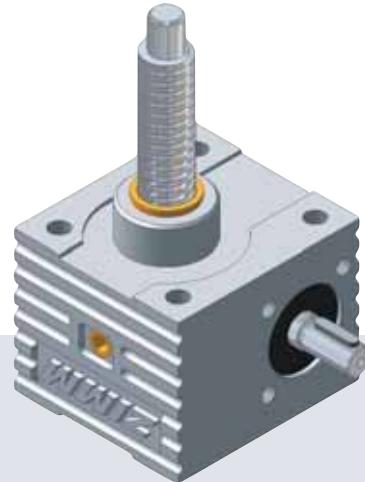
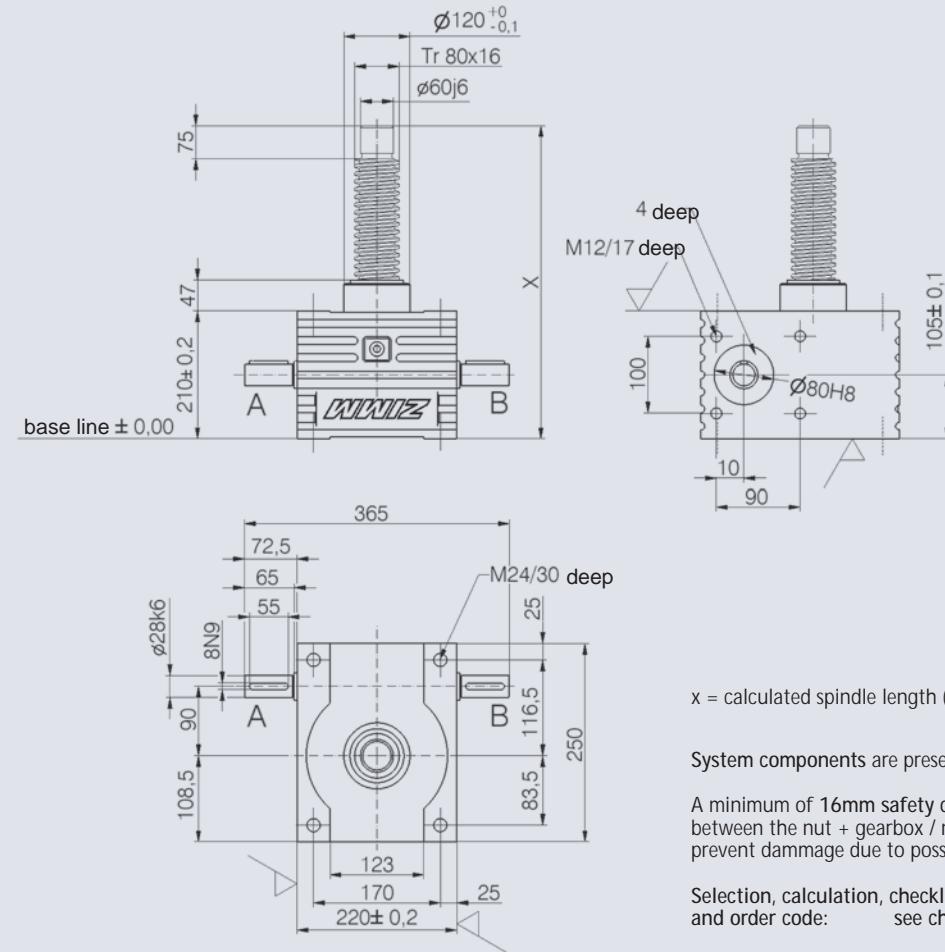
Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT

wear control of the nut KGT 80 x 10
KGT 80 x 20



250kN

MSZ-250 Rotating Screw R 250kN



$x = \text{calculated spindle length (chapter 4.8)} + 10 \text{ mm}$

System components are presented in chapter 14

A minimum of 16mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

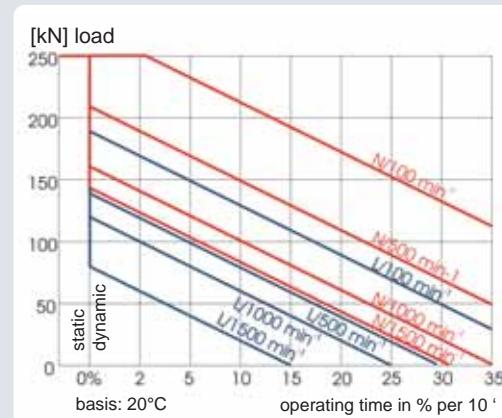
Technical data S and R

Max. pressure/tensile force static	- 250 kN (25 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 80x16 ²⁾
Gear reduction	- 10:1 (N) / 40:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 57 kg
Weight of spindle/m	- 42 kg
Drive torque M _G [Nm]	- F [kN] x 1,05 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,31 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 2,64 (N-Normal) - 1,94 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr80x16 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr100x16 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 16mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

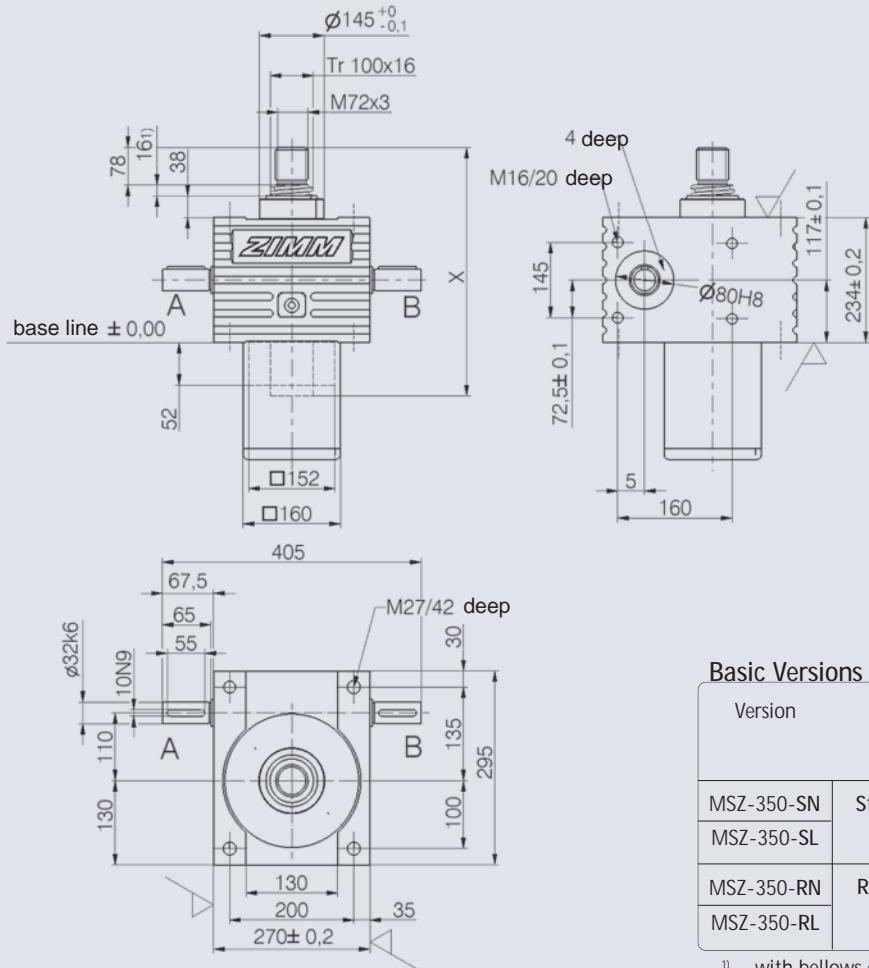
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



350kN

MSZ-350 Standing Screw S 350kN

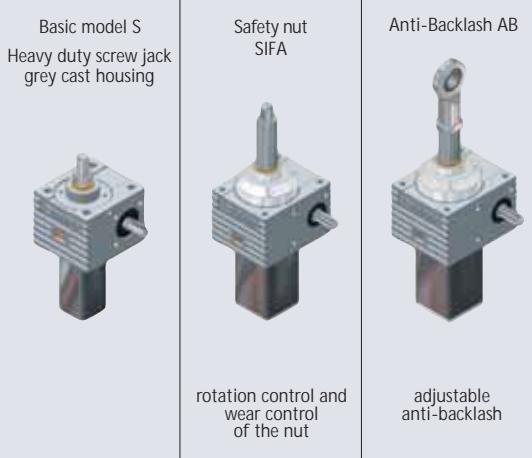


Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-350-SN	Standing Screw	Normal	Tr 100x16	10:1	1,60 mm
		Low		40:1	0,40 mm
MSZ-350-RN	Rotating Screw	Normal	Tr 100x16	10:1	1,60 mm
		Low		40:1	0,40 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

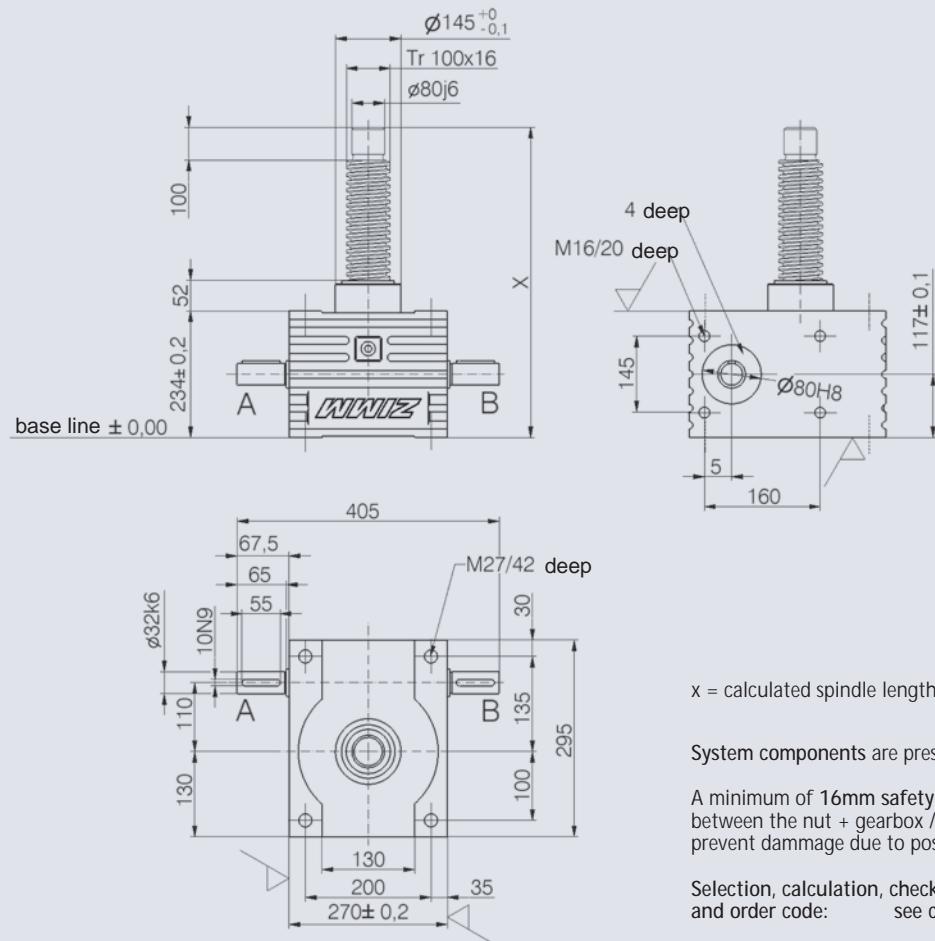


Standard Types R



350kN

MSZ-350 Rotating Screw R 350kN



$X = \text{calculated spindle length (chapter 4.8)} + 7 \text{ mm}$

System components are presented in chapter 14

A minimum of 16mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

Technical data S and R

Max. pressure/tensile force static	- 350 kN (35 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 100x16 ²⁾
Gear reduction	- 10:1 (N) / 40:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 87 kg
Weight of spindle/m	- 66 kg
Drive torque M _G [Nm]	- F [kN] x 1,21 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,38 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 3,24 (N-Normal) - 2,20 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr100x16 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr120x16 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 16mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

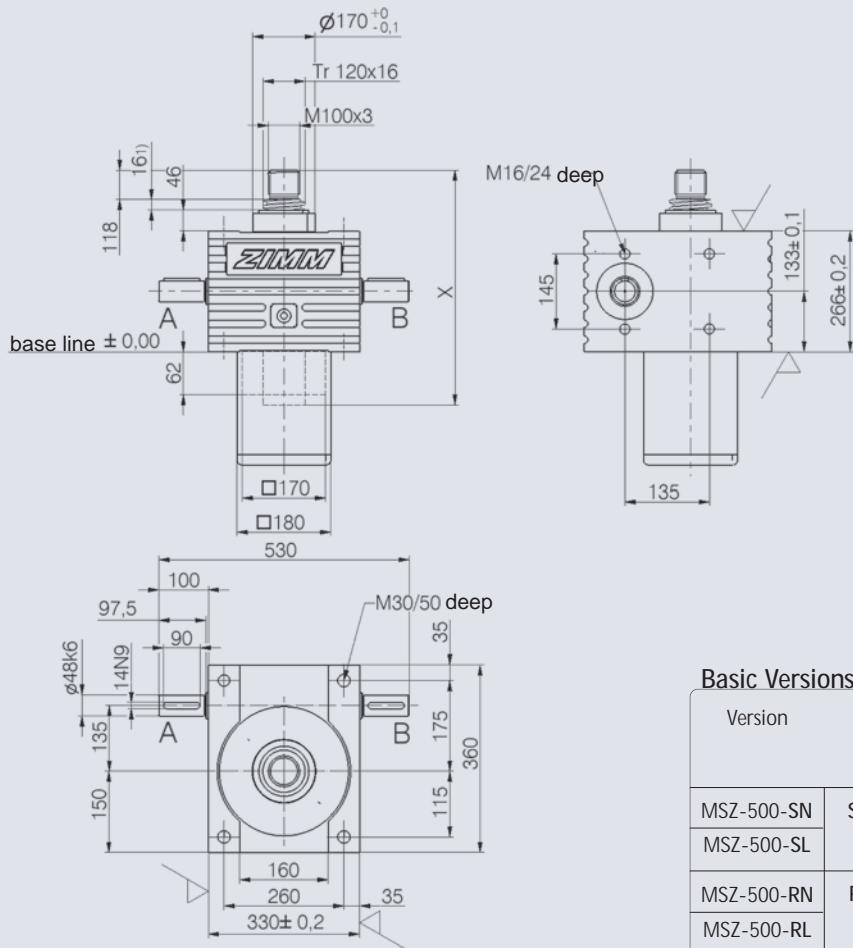
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



500kN

MSZ-500 Standing Screw S 500kN



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-500-SN	Standing Screw	Normal	Tr 120x16	14:1	1,143 mm
		Low		56:1	0,286 mm
MSZ-500-RN	Rotating Screw	Normal	Tr 120x16	14:1	1,143 mm
		Low		56:1	0,286 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

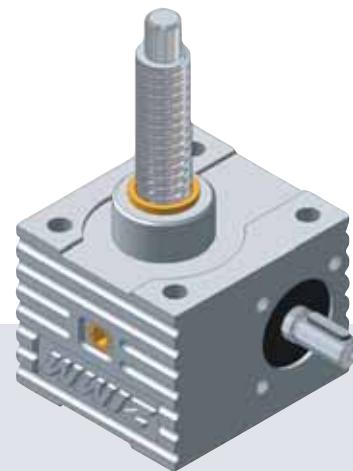
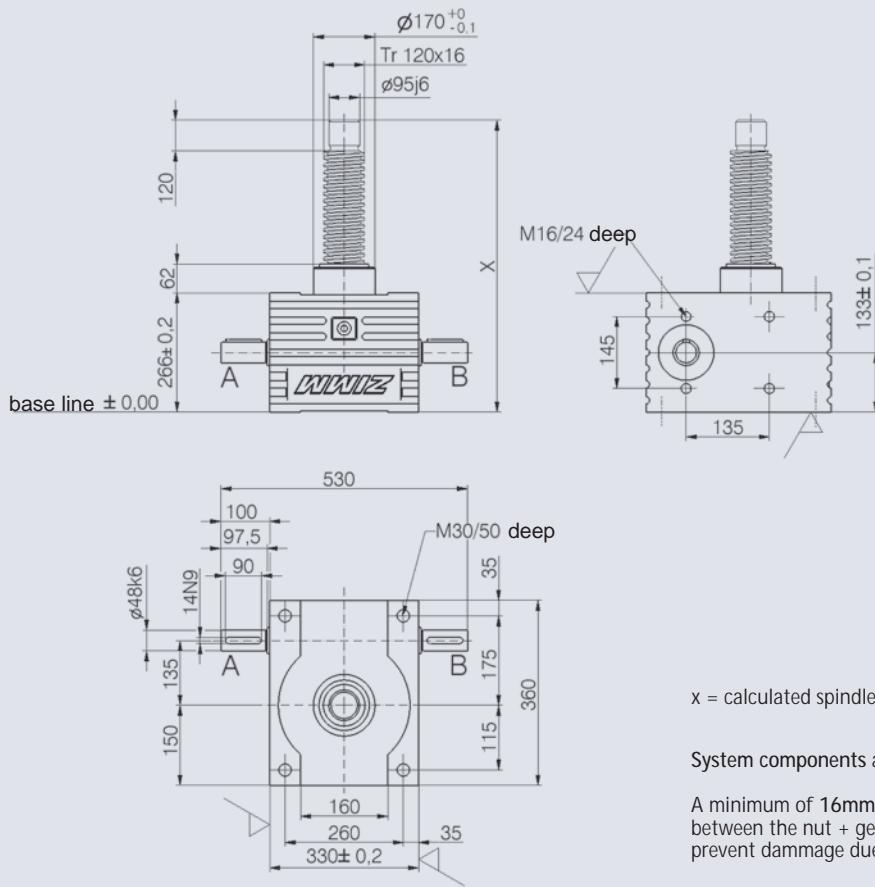


Standard Types R



500kN

MSZ-500 Rotating Screw R 500 kN



$X = \text{calculated spindle length (chapter 4.8)} + 8 \text{ mm}$

System components are presented in chapter 14

A minimum of 16mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

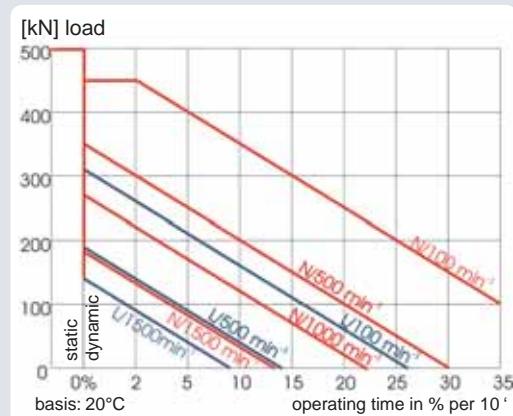
Technical data S and R

Max. pressure/tensile force static	- 500 kN (50 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 120x16 ²⁾
Gear reduction	- 14:1 (N) / 56:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 165 kg
Weight of spindle/m	- 78 kg
Drive torque M _G [Nm]	- F [kN] x 1,03 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,35 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 3,96 (N-Normal) - 2,84 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr120x16 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr140x20 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 16mm

Capacity diagram stat./dyn. S and R



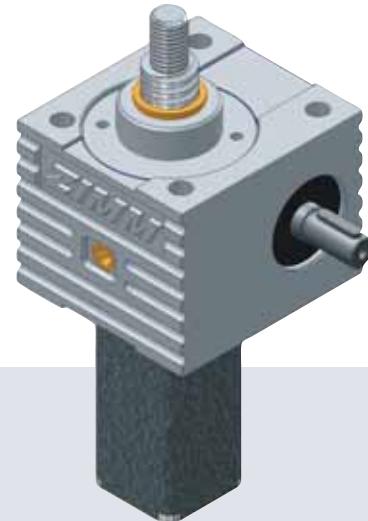
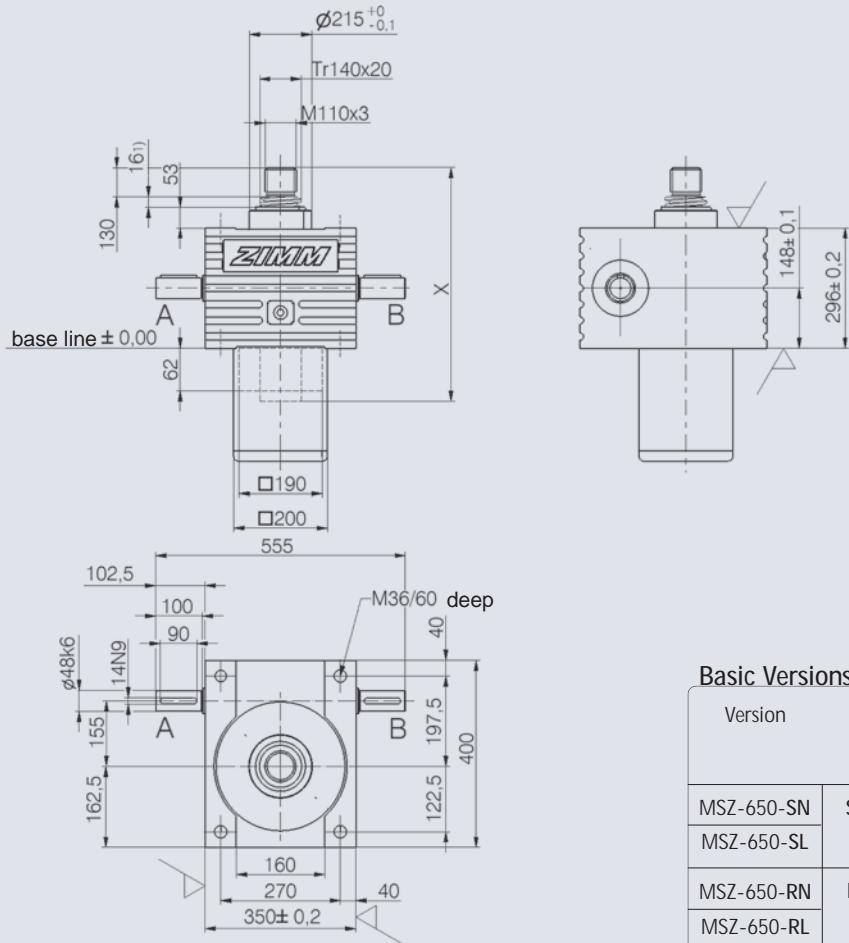
N = Normal speed
L = Low speed

This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



MSZ-650 Standing Screw S 650kN



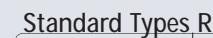
Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-650-SN	Standing Screw	Normal	Tr 140x20	14:1	1,429 mm
MSZ-650-SL		Low		56:1	0,357 mm
MSZ-650-RN	Rotating Screw	Normal	Tr 140x20	14:1	1,429 mm
MSZ-650-RL		Low		56:1	0,357 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

<p>Basic model S Heavy duty screw jack grey cast housing</p> 	<p>Safety nut SIFA</p> 	<p>Anti-Backlash AB</p> 
<p>rotation control and wear control of the nut</p>	<p>adjustable anti-backlash</p>	

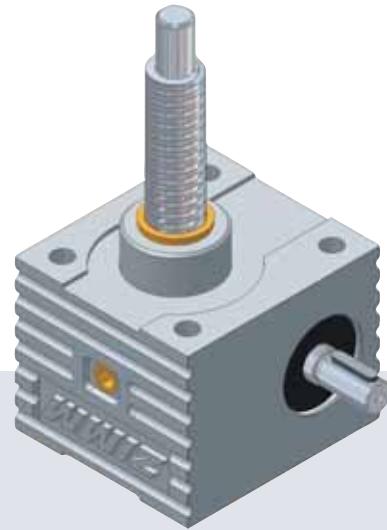
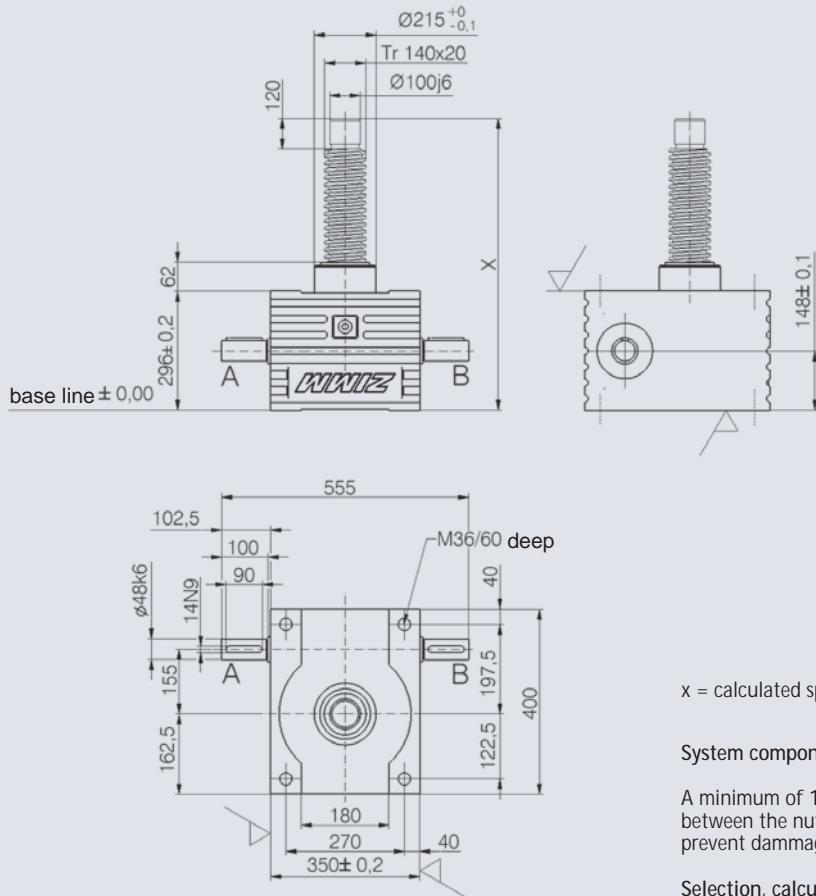


<p>Basic model R</p> <p>Heavy duty screw jack grey cast housing</p> 	<p>Safety nut SIFA</p> 
	<p>wear control of the nut</p>



650kN

MSZ-650 Rotating Screw R 650kN



$X = \text{calculated spindle length (chapter 4.8)} + 3 \text{ mm}$

System components are presented in chapter 14

A minimum of 16mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

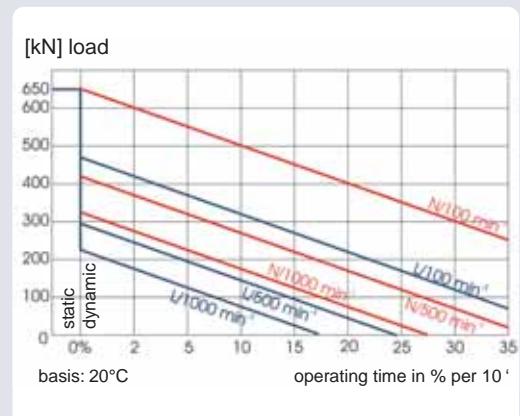
Technical data S and R

Max. pressure/tensile force static	- 650 kN (65 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 140x20 ²⁾
Gear reduction	- 14:1 (N) / 56:1 (L)
Material of box	- GG grey cast
Lubrication	- grease
Weight of lifting gear	- 202 kg
Weight of spindle/m	- 105 kg
Drive torque M _G [Nm]	- F [kN] x 1,21 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,39 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 5,60 (N-Normal) - 3,40 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr140x20 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr160x20 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 20mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

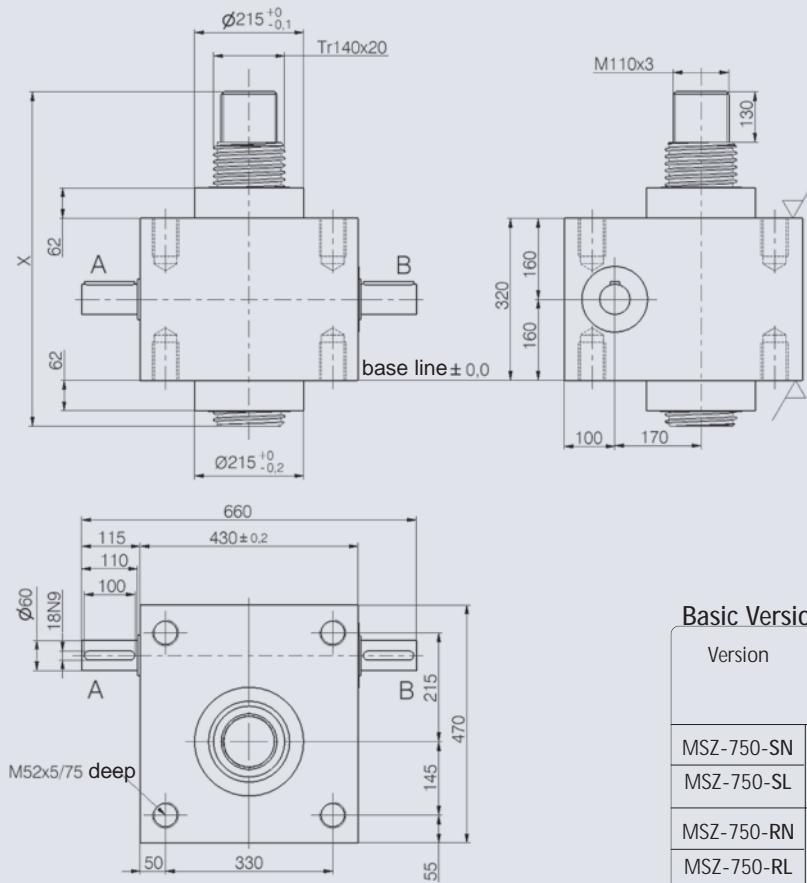
The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



750kN

MSZ-750 Standing Screw S 750kN

1000 kN on request



Basic Versions Tr

Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-750-SN	Standing Screw	Normal	Tr 140x20	14:1	1,429 mm
		Low		56:1	0,357 mm
MSZ-750-RN	Rotating Screw	Normal	Tr 140x20	14:1	1,429 mm
		Low		56:1	0,357 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

Standard Types S

Basic model S
Heavy duty screw jack
steel version



Standard Types R

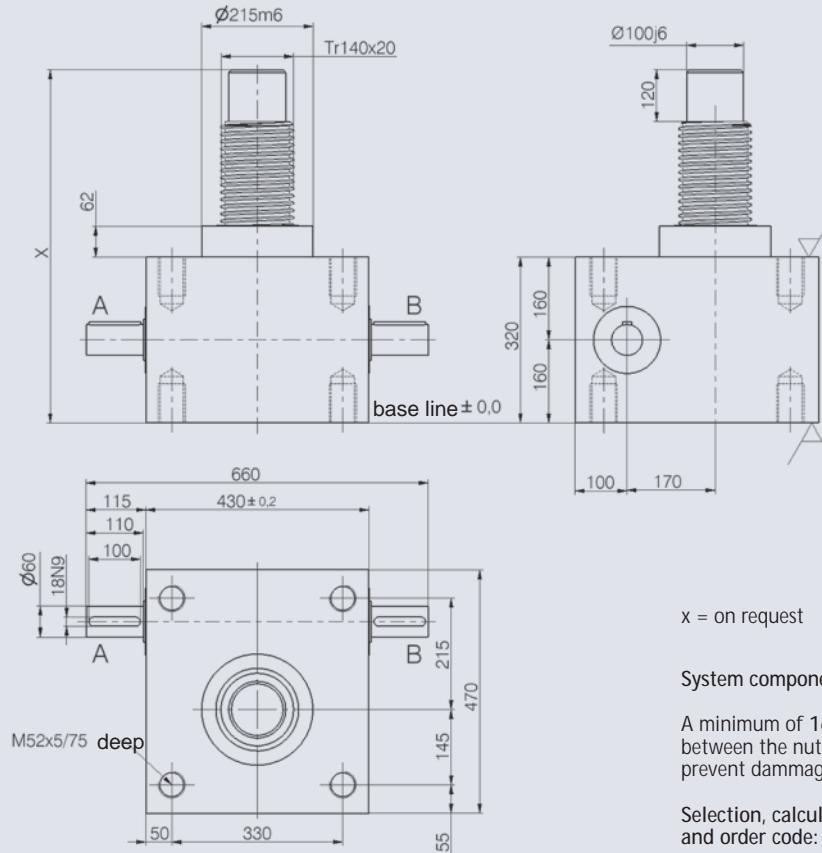
Basic model R
Heavy duty screw jack
steel version



750kN

MSZ-750 Rotating Screw R 750kN

1000 kN on request



x = on request

System components are presented in chapter 14

A minimum of 16mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

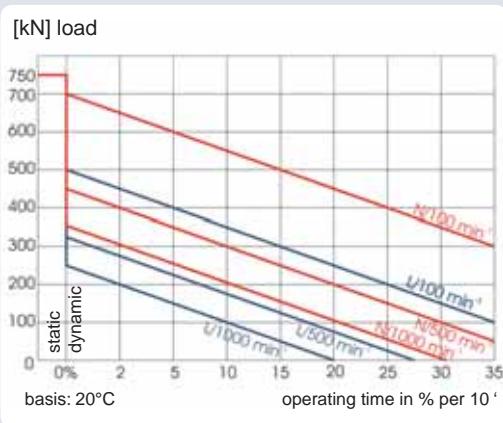
Technical data S and R

Max. pressure/tensile force static	- 750 kN (75 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 140x20 ²⁾
Gear reduction	- 14:1 (N) / 56:1 (L)
Material of box	- steel
Lubrication	- grease
Weight of lifting gear	- 270 kg
Weight of spindle/m	- 105 kg
Drive torque M _G [Nm]	- F [kN] x 1,17 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,35 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 7,28 (N-Normal) - 4,42 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr140x20 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr160x20 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 20mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

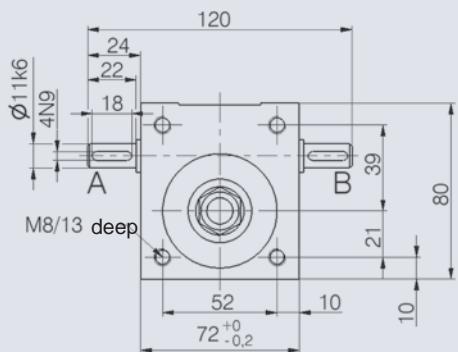
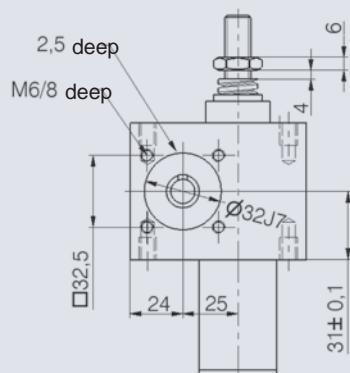
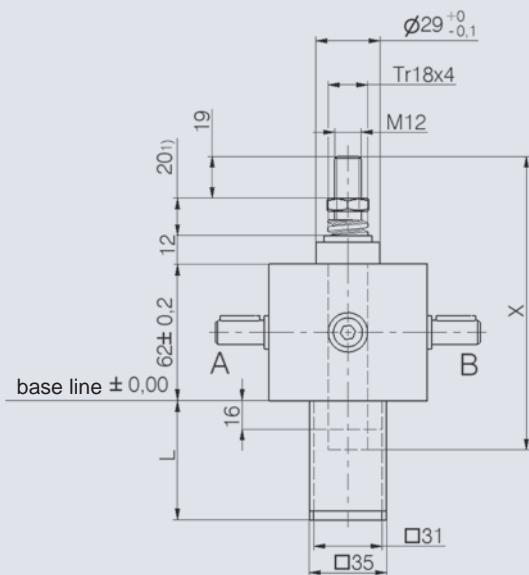
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



5kN

MSZ-5-A Standing Screw S 5kN



Basic Versions Tr

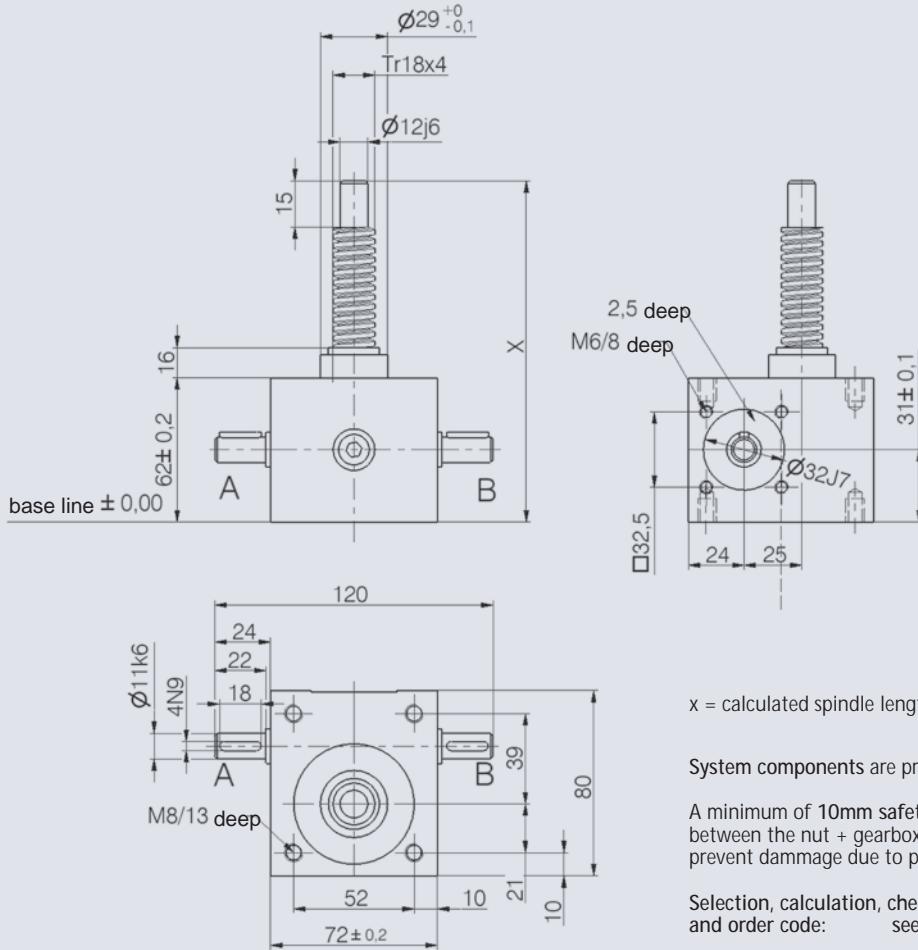
Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-5-A-SN	Standing Screw	Normal	Tr 18x4	4:1	1,00 mm
MSZ-5-A-SL		Low		16:1	0,25 mm
MSZ-5-A-RN	Rotating Screw	Normal	Tr 18x4	4:1	1,00 mm
MSZ-5-A-RL		Low		16:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4



5kN

MSZ-5-A Rotating Screw R 5kN



$X = \text{calculated spindle length (chapter 4.8)} + 5 \text{ mm}$

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

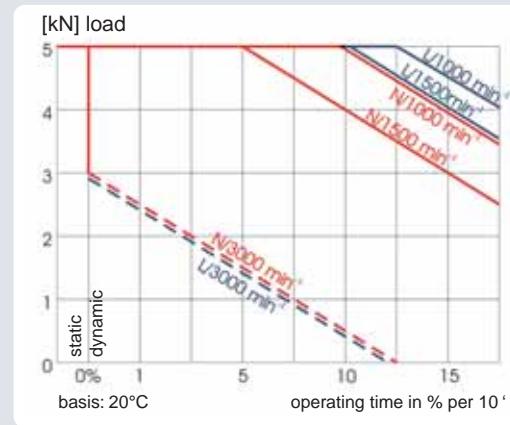
Technical data S and R

Max. pressure/tensile force static	- 5 kN (0,5 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 18x4 ²⁾
Gear reduction	- 4:1 (N) / 16:1 (L)
Material of box	- Aluminium
Lubrication	- grease
Weight of lifting gear	- 1,04 kg
Weight of spindle/m	- 1,58 kg
Drive torque M _G [Nm]	- F [kN] x 0,62 ³⁾⁽⁵ + M _L (N-Normal) - F [kN] x 0,21 ³⁾⁽⁵ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 0,10 (N-Normal) - 0,08 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr18x4 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr20x4 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 4mm

Capacity diagram stat./dyn. S and R



N = Normal speed
L = Low speed

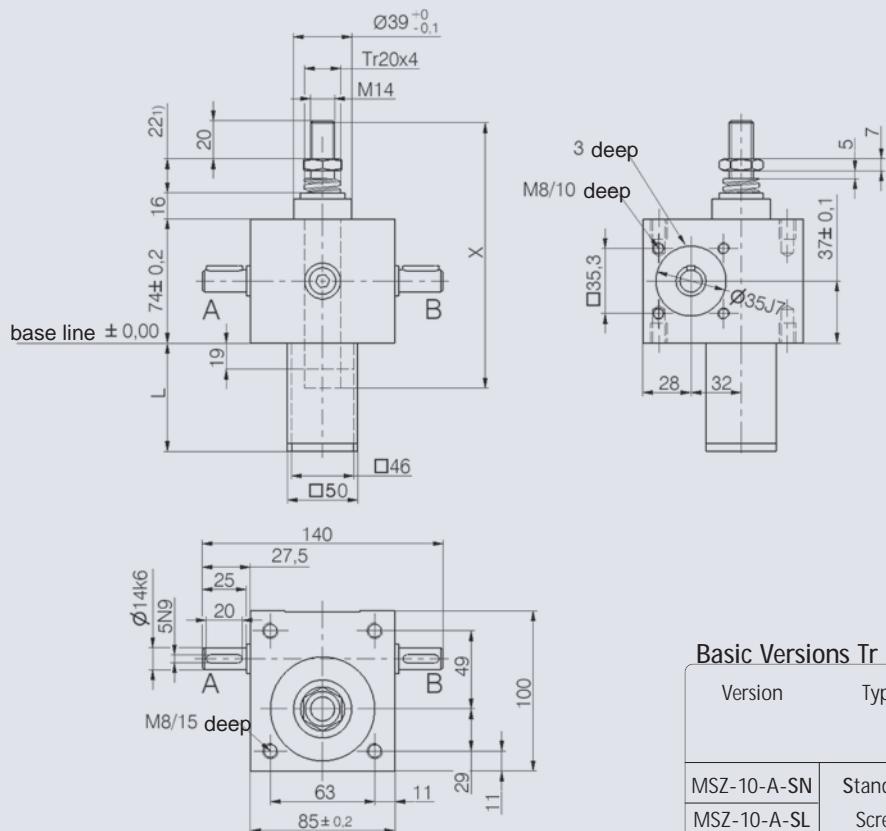
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



10kN

MSZ-10-A Standing Screw S 10kN



Basic Versions Tr

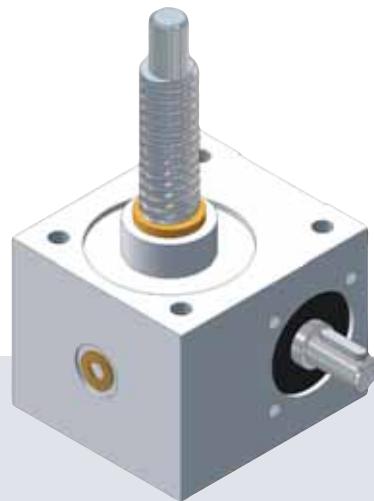
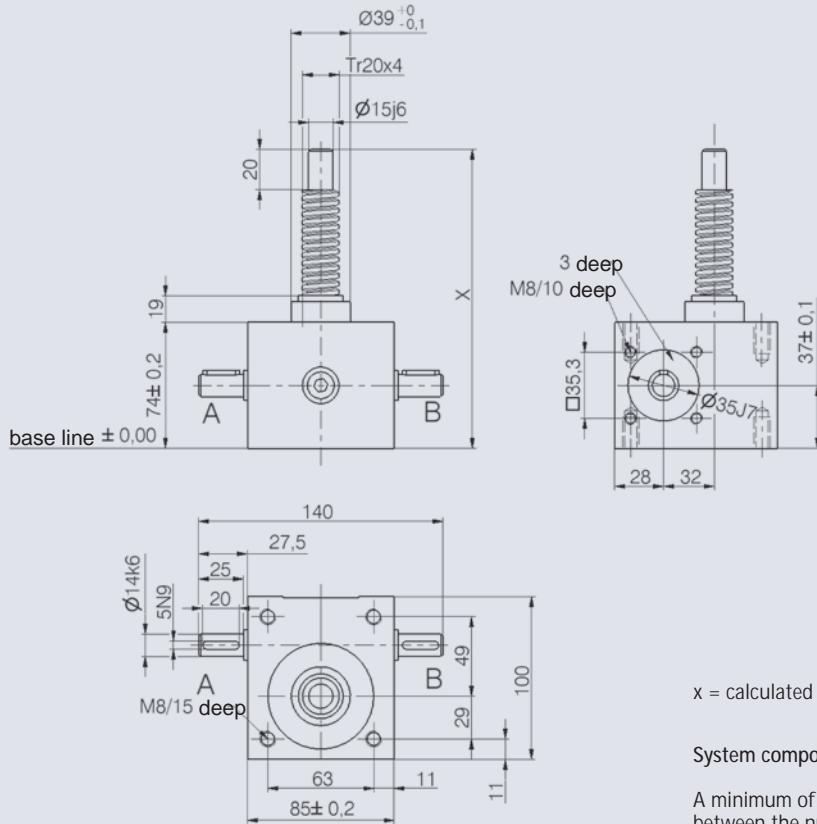
Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-10-A-SN	Standing Screw	Normal	Tr 20x4	4:1	1,00 mm
MSZ-10-A-SL		Low		16:1	0,25 mm
MSZ-10-A-RN	Rotating Screw	Normal	Tr 20x4	4:1	1,00 mm
MSZ-10-A-RL		Low		16:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4



10kN

MSZ-10-A Rotating Screw R 10kN



$X = \text{calculated spindle length (chapter 4.8)} + 8 \text{ mm}$

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

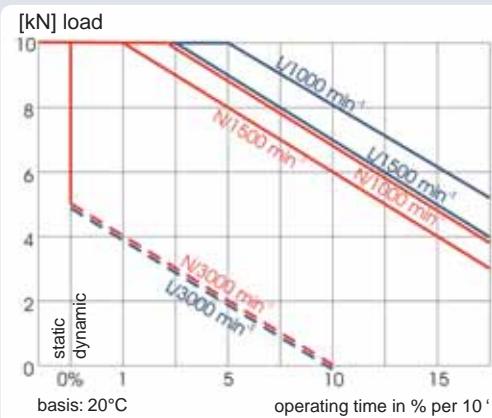
Technical data S and R

Max. pressure/tensile force static	- 10 kN (1 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 20x4 ²⁾
Gear reduction	- 4:1 (N) / 16:1 (L)
Material of box	- Aluminium
Lubrication	- grease
Weight of lifting gear	- 2 kg
Weight of spindle/m	- 2 kg
Drive torque M _G [Nm]	- F [kN] x 0,64 ³⁾⁽⁵ + M _L (N-Normal) - F [kN] x 0,20 ³⁾⁽⁵ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _I [Nm]	- 0,26 (N-Normal) - 0,16 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr20x4 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr30x6 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 4mm

Capacity diagram stat./dyn. S and R



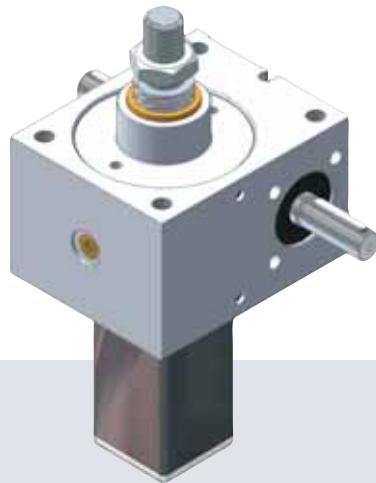
N = Normal speed
L = Low speed

This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

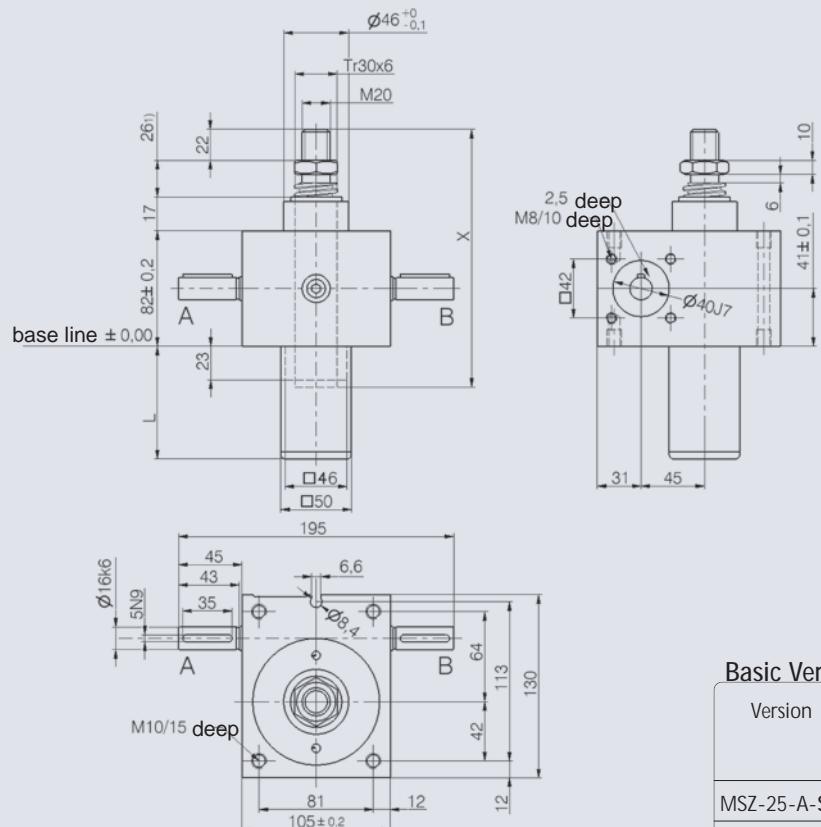
The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.



25kN



MSZ-25-A Standing Screw S 25kN

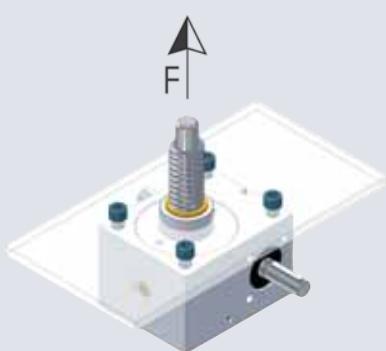


Basic Versions Tr

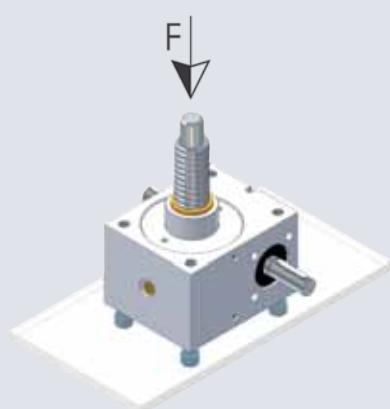
Version	Type	Speed	Standard Screw ²⁾	i	Stroke per revolution ⁵⁾
MSZ-25-A-SN	Standing Screw	Normal	Tr 30x6	6:1	1,00 mm
		Low		24:1	0,25 mm
MSZ-25-A-RN	Rotating Screw	Normal	Tr 30x6	6:1	1,00 mm
		Low		24:1	0,25 mm

¹⁾ - with bellows or spiral spring extension: see chapter 4

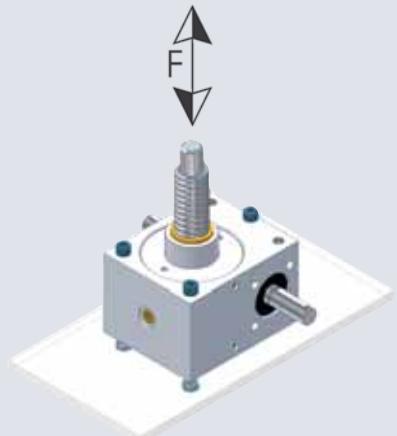
3 Fixing options (only MSZ-25-A)



4 blind hole threads M10



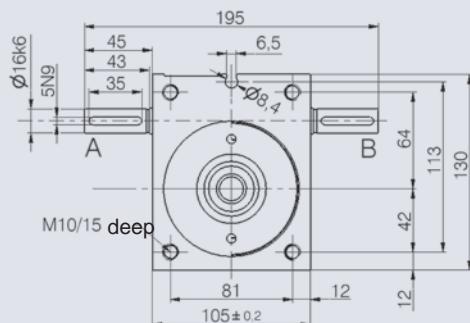
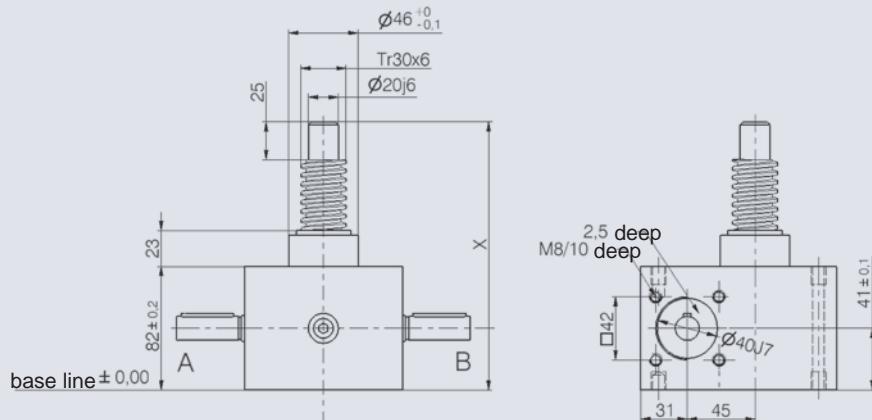
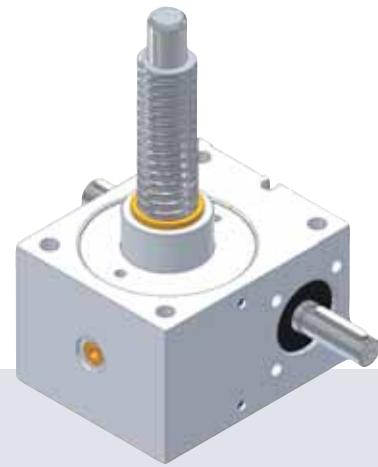
4 blind hole threads M10



3 through borings ø8,4
(only MSZ-25-A)

25kN

MSZ-25-A Rotating Screw R 25kN



$$x = \text{calculated spindle length (chapter 4.8)} + 5 \text{ mm}$$

System components are presented in chapter 14

A minimum of 10mm safety clearance is required between the nut + gearbox / nut + end mounting to prevent damage due to possible overrun.

Selection, calculation, checklists
and order code: see chapter 4

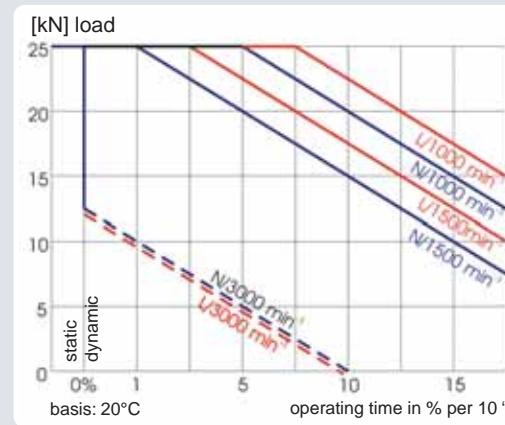
Technical data S and R

Max. pressure/tensile force static	- 25 kN (2,5 t)
Max. drive shaft speed	- 1800 min ⁻¹ (higher on request)
Screw dimension	- Tr 30x6 ²⁾
Gear reduction	- 6:1 (N) / 24:1 (L)
Material of box	- Aluminium
Lubrication	- grease
Weight of lifting gear	- 3,8 kg
Weight of spindle/m	- 4,5 kg
Drive torque M _G [Nm]	- F [kN] x 0,63 ³⁾⁽⁵⁾ + M _L (N-Normal) - F [kN] x 0,20 ³⁾⁽⁵⁾ + M _L (L-Low)
Starting torque	- drive torque M _G x 1,5
Idle torque ⁴⁾ M _L [Nm]	- 0,36 (N-Normal) - 0,26 (L-Low)

Important notes

- ¹⁾ - For bellows or spiral spring extensions: see chapter 4
- ²⁾ - Tr30x6 is standard, also available: 2-pitch, INOX, left-handed, larger diameter spindle Tr40x7 (only for R version)
- ³⁾ - Factor includes efficiency, ratio and 30% safety
- ⁴⁾ - May be higher in new condition
- ⁵⁾ - At spindle pitch of 6mm

Capacity diagram stat./dyn. S and R

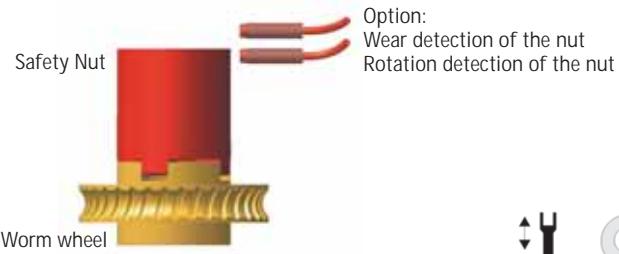


N = Normal speed
L = Low speed

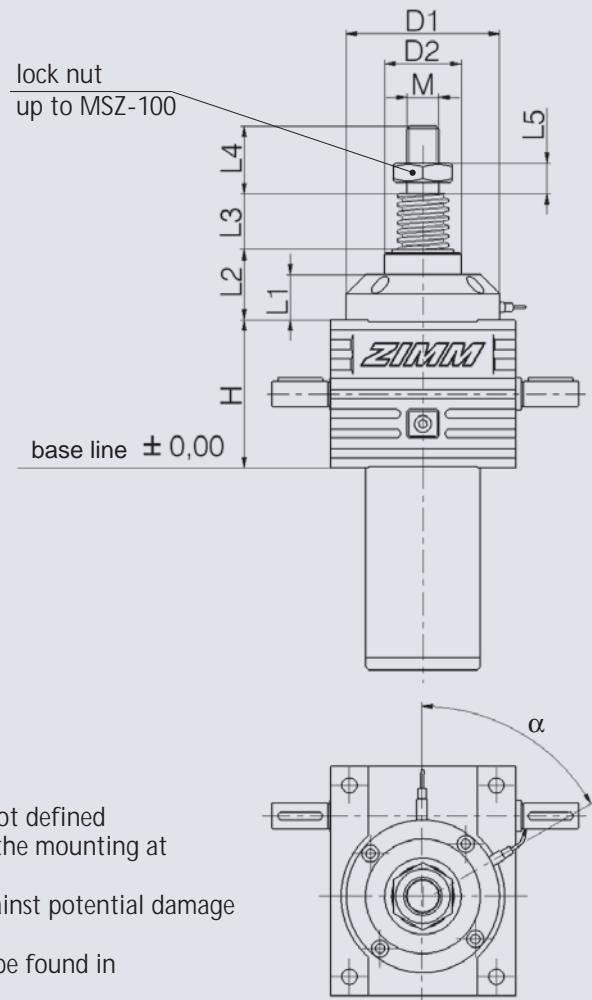
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

The maximum duty cycle is affected by many factors: e.g.: lubrication, environmental temperature, bellow, etc.





Safety Nut SIFA-S



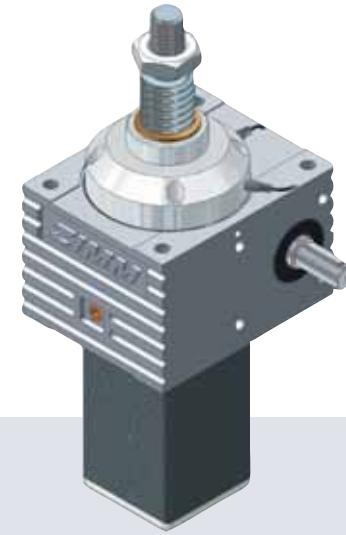
- Position of sensors is not defined
- It is possible to rotate the mounting at 90° intervals
- Protect the sensors against potential damage

Further dimensions can be found in chapters 5 and 6

System components in chapter 14

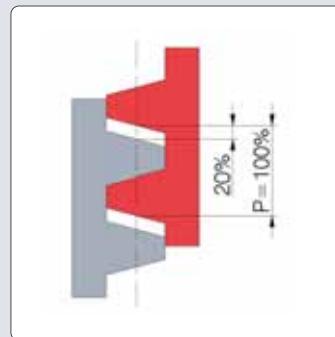
Gearbox	Tr thread	H	D1	D2	L1	L2	L3 ¹⁾	L4	L5	M
MSZ-10	20x4	74	65	39	31	47	10	32	12	M14
MSZ-25	30x6	82	88	46	36	53	10	38	16	M20
MSZ-50	40x7	116	122	60	36	55	10	53	24	M30
MSZ-100	50x8	160	125	85	37	64	10	76	28	M36
MSZ-150	60x12	185	165	90	46	78	16	48	-	M42x2
MSZ-250	80x16	210	195	120	88	120	16	58	-	M56x2
MSZ-350	100x16	234	230	145	88	126	16	78	-	M72x3
MSZ-500	120x16	266	260	170	101	148	16	118	-	M100x3
MSZ-650	140x20	296	295	215	104	156	16	130	-	M110x3

¹⁾ Extension for bellows or spiral springs see chapter 4



Function

The safety nut protects the load in one direction only. If the main nut should fail the safety nut will carry the full load.



As soon as the thread of the worm wheel has worn more than 20% of the thread pitch (= 40% of tooth dimension), the worm wheel (or the whole gearbox >> most cost effective for gearbox sizes up to MSZ-100) should be replaced.

Carefully check the direction of load (tension or compression)!

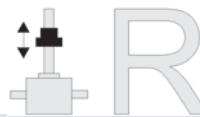
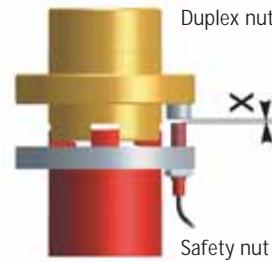
A drawing with an application view is necessary to ensure correct specification. For a combination of SIFA in tension with protection against rotation VS please contact our technical department.

Wear sensor

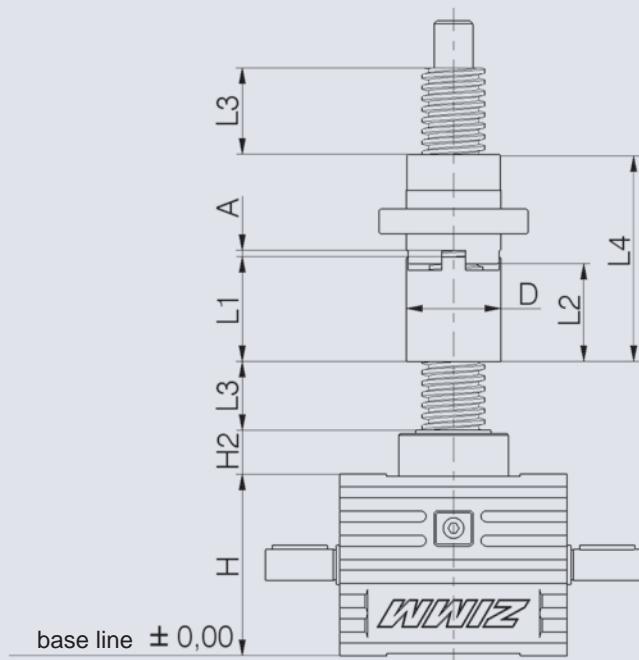
The sensor is positioned so that the system will be stopped (by the customers control) when the sensor detects wear in the thread in excess of 20% of the screw pitch.

Rotation sensor

The rotation sensor is mounted on the last gearbox of each drive chain and detects possible failure of all the transmission components (coupling, ...).

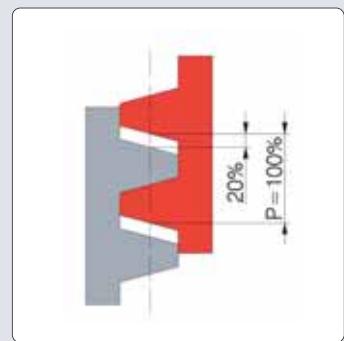


Safety Nut SIFA-R



Function

The safety nut protects the load in one direction only. If the main nut should fail the safety nut will carry the full load.



By distance "A" it is possible to check wear. As soon as the measurement "A" reduces more than 20% of thread pitch (= 40% of tooth dimension) the rotating nut should be replaced.

Carefully check the direction of load (tension or compression)!

A drawing with an application view is necessary to ensure correct specification.

Electronic wear detection available on request.

Further dimensions can be found in chapters 5 and 6
System components in chapter 14
SIFA combined with self-aligning nut PM on request.

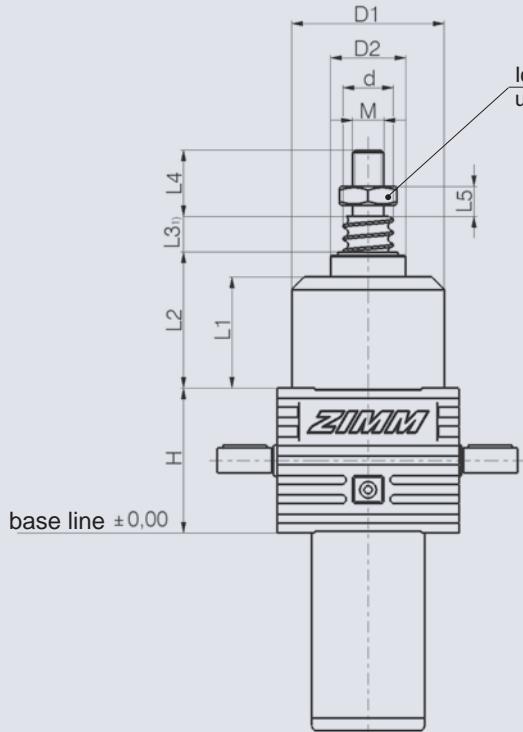
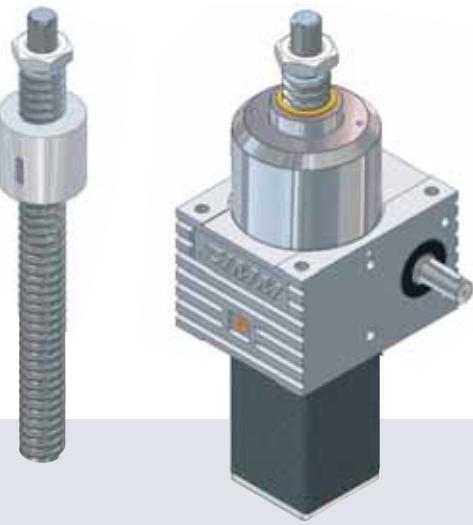
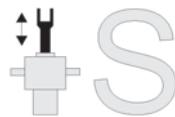
Gearbox	Tr thread	H	H2	D	L1	L2	L3 ¹⁾	L4	A ²⁾
MSZ-10	20x4	74	19	28	42	39	10	84	3
MSZ-25	30x6	82	23	38	48	45	10	95	4
MSZ-50	40x7	116	32	50	67	63	10	133	4
MSZ-100	50x8	160	42	65	88	83	10	173	5
MSZ-150	60x12	185	41	70	101	96	16	211	5
MSZ-250	80x16	210	47	100	115	111	16	251	6
MSZ-350	100x16	234	52	120	115	106	16	266	6
MSZ-500	120x16	266	62	135	135	123	16	303	8
MSZ-650	140x20	296	62	160	160	143	16	363	8
MSZ-750	140x20	320	62	160	160	143	16	363	8

¹⁾ Extension for bellows or spiral springs see chapter 4

²⁾ ca. basic setting, must be documented by customer and consulted for inspection.



Standing Version S

Technical data KGT

Accuracy of pitch
0,05mm / 300mm

Self-locking

None! Therefore a parking brake is required:
Brake motor (14.6.2) or spring pressure brake FDB (14.6.3)

Temperatures

Operating temperature: -25°C to +80°C

Contamination

Nuts are generally equipped with scrapers. For contaminated applications where fine dust or chippings are present we recommend the use of bellows or flat spiral springs (see chapter 14.3).

Lubrication

Adequate lubrication is an important factor to insure the life of the system, reducing friction and ensuring smooth running. For KGT we use the same lubricants as for ball bearings.

Escape protection

The spindle nut must not be removed from the spindle. Escape protection should be used with the S version.

System starting and braking

Especially with high pitches and large gearboxes we recommend the use of a frequency inverter or a soft start for acceleration and deceleration. This provides protection for the whole system. Subject to a suitable control system being used the L3 dimension may be reduced. Please contact the technical department for more information.

Gearbox	Spindle (ØxP)	mm stroke per revolution		Dimension [mm]									Axial play max ⁵⁾ [mm]	Load rating [kN] dyn. stat.		
		SN	SL	H	d	D ₁	D ₂	L ₁	L ₂	L ₃ ¹⁾	L ₄	L ₅	M			
MSZ-5	16x05	1,25	0,31	62	15,5	55	29	53	66	15	29	10	M12	0,08	9,3	13,1
	16x10	2,50	0,63	62	15,4	55	29	53	66	25	29	10	M12	0,08	15,4	26,5
MSZ-10	25x05	1,25	0,31	74	24,5	65	39	67	83	15	32	12	M14	0,08	12,3	22,5
	25x10	2,50	0,63	74	24,5	65	39	67	83	25	32	12	M14	0,08	13,2	25,3
	25x25	6,25	1,56	74	24,5	65	39	67	83	60	32	12	M14	0,08	16,7	32,2
	25x50	12,50	3,13	74	24,1	65	39	67	83	125	32	12	M14	0,15	15,4	31,7
MSZ-25	32x05	0,83	0,21	82	31,5	88	46	73	90	15	38	16	M20	0,08	21,5	49,3
	32x10	1,67	0,42	82	32,7	88	46	73	90	20	38	16	M20	0,08	33,4	54,5
	32x20	3,33	0,83	82	31,7	88	46	73	90	35	38	16	M20	0,08	29,7	59,8
	32x40	6,67	1,67	82	30,9	88	46	73	90	70	38	16	M20	0,08	14,9	32,4
MSZ-50	40x05	0,71	0,18	116	39,5	122	60	76	95	15	53	24	M30	0,08	23,8	63,1
	40x10	1,43	0,36	116	39,5	122	60	76	95	15	53	24	M30	0,08	38,0	69,1
	40x20	2,86	0,72	116	39,7	122	60	76	95	30	53	24	M30	0,08	33,3	76,1
	40x40	5,71	1,43	116	38,9	122	60	76	95	60	53	24	M30	0,08	35,0	101,9
MSZ-100	50x10	1,25	0,31	160	49,5	125	85	85	112	20	76	28	M36	0,08	68,7	155,8
	50x20	2,50	0,63	160	49,5	125	85	85	112	40	76	28	M36	0,08	60,0	136,3
MSZ-150	63x10	1,11	0,28	185	62,5	160	90	81	113	20	48	-	M42x2	0,08	76,0	197,0

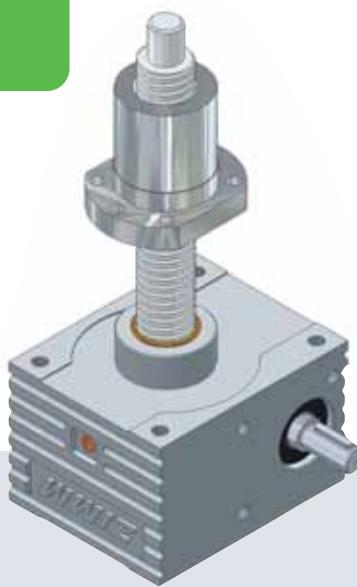
1) Extension for bellow or spiral spring see chapter 4

2) Dynamic load rating acc. DIN 69051 part 4 draft 1989

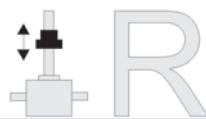
5) Restricted play 0,02mm available on request

Order code: see chapter 4

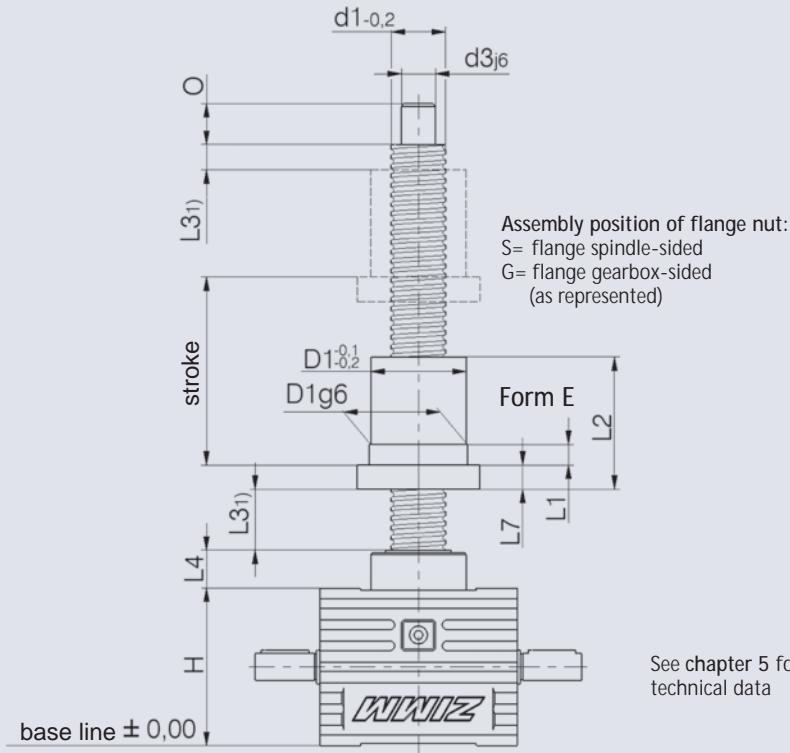




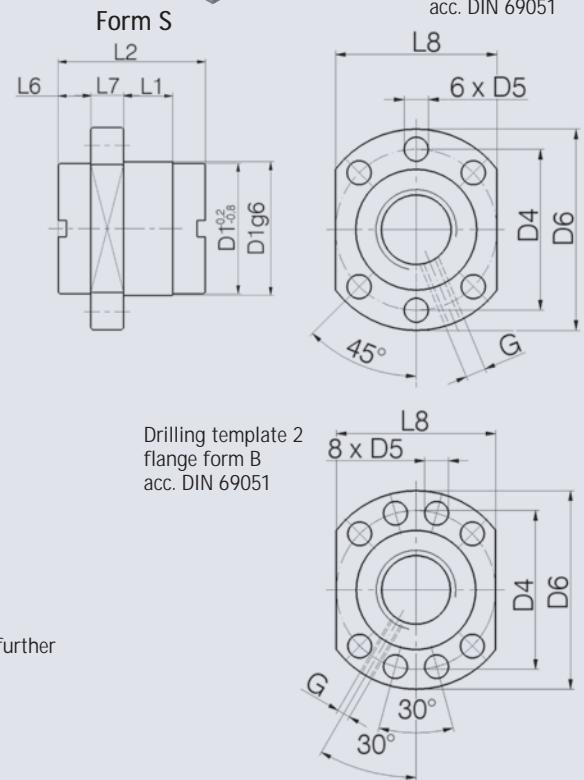
Rotating Version R



Images and component dimensions are subject to modification



See chapter 5 for further technical data



With the rotating version it is also possible to use a larger diameter spindle (e.g.: MSZ-10-RN with spindle 32x10)

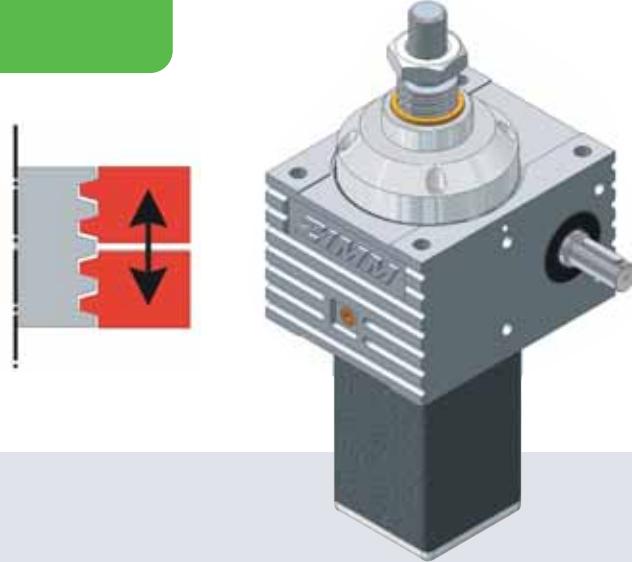
Gearbox	Spindle (ØxP)	mm stroke per revolution RN RL	Form	Drilling template	Measurements [mm]												Lubrication boring G	Axial play max ⁵⁾ [mm]	Load rating [kN] dyn. stat. KGT			
					d ₁	d ₃	O	H	D ₁	D ₄	D ₅	D ₆	L ₁	L ₂	L ₃ ¹⁾	L ₄						
MSZ-5	16x05	1,25	0,31	E 1	15,5	12	15	62	28	38	5,5	48	10	42	15	16	-	10	40	M 6	0,08	9,3 13,1
	16x10	2,50	0,63	E 1	15,4	12	15	62	28	38	5,5	48	10	55	25	16	-	10	40	M 6	0,08	15,4 26,5
MSZ-10	25x05	1,25	0,31	E 1	24,5	15	20	74	40	51	6,6	62	10	42	15	19	-	10	48	M 6	0,08	12,3 22,5
	25x10	2,50	0,63	E 1	24,5	15	20	74	40	51	6,6	62	16	55	25	19	-	10	48	M 6	0,08	13,2 25,3
MSZ-25	25x25	6,25	1,56	S 1	24,5	15	20	74	40	51	6,6	62	9	35	60	19	8	10	- ³⁾	M 6	0,08	16,7 32,2
	25x50	12,50	3,13	S 1	24,1	15	20	74	40	51	6,6	62	10	58	125	19	10	10	48	M 6	0,15	15,4 31,7
MSZ-25	32x05	0,83	0,21	E 1	31,5	20	25	82	50	65	9	80	10	55	15	23	-	12	62	M 6	0,08	21,5 49,3
	32x10	1,67	0,42	E 1	32,7	20	25	82	53 ⁶⁾	65	9	80	16	69	20	23	-	12	62	M 8x1	0,08	33,4 54,5
MSZ-25	32x20	3,33	0,83	E 1	31,7	20	25	82	53 ⁶⁾	65	9	80	16	80	35	23	-	12	62	M 6	0,08	29,7 59,8
	32x40	6,67	1,67	S N ⁴⁾	30,9	20	25	82	53 ⁶⁾	68 ⁶⁾	7 ⁶⁾	80	14	45	70	23	7,5	16	- ³⁾	M 6	0,08	14,9 32,4
MSZ-50	40x05	0,71	0,18	E 2	39,5	25	30	116	63	78	9	93	10	57	15	32	-	14	70	M 6	0,08	23,8 63,1
	40x10	1,43	0,36	E 2	39,5	25	30	116	63	78	9	93	16	71	15	32	-	14	70	M 8x1	0,08	38,0 69,1
MSZ-50	40x20	2,86	0,72	E 2	39,7	25	30	116	63	78	9	93	16	80	30	32	-	14	70	M 8x1	0,08	33,3 76,1
	40x40	5,71	1,43	S 2	38,9	25	30	116	63	78	9	93	16	85	60	32	7,5	14	- ³⁾	M 8x1	0,08	35,0 101,9
MSZ-100	50x10	1,25	0,31	E 2	49,5	40	45	160	75	93	11	110	16	95	20	42	-	16	85	M 8x1	0,08	68,7 155,8
	50x20	2,50	0,63	E 2	49,5	40	45	160	85 ⁶⁾	103 ⁶⁾	11	125	22	95	40	42	-	18	95	M 8x1	0,08	60,0 136,3
MSZ-150	63x10	1,11	0,28	E 2	63	45	55	185	90	108	11	125	16	120	20	41	-	18	95	M 8x1	0,05	84,7 210,8
	63x20	2,22	0,56	E 2	63	45	55	185	95	115	13,5	135	25	150	40	41	-	20	100	M 8x1	0,05	120,0 250,0
MSZ-250	80x10	1,00	0,25	E 2	80	60	75	210	105	125	13,5	145	16	120	20	47	-	20	110	M 8x1	0,05	93,4 269,2
	80x20-4EP	2,00	0,50	E 2	80	60	75	210	125	145	13,5	165	25	175	40	47	-	25	130	M 8x1	0,05	135,0 322,0
MSZ-250	80x20-5EP	2,00	0,50	E 2	80	60	75	210	125	145	13,5	165	25	175	40	47	-	25	130	M 8x1	0,05	161,5 398,0

1) Extension for bellow or spiral spring see chapter 4
2) Dynamic load rating acc. DIN 69051 part 4 draft 1989

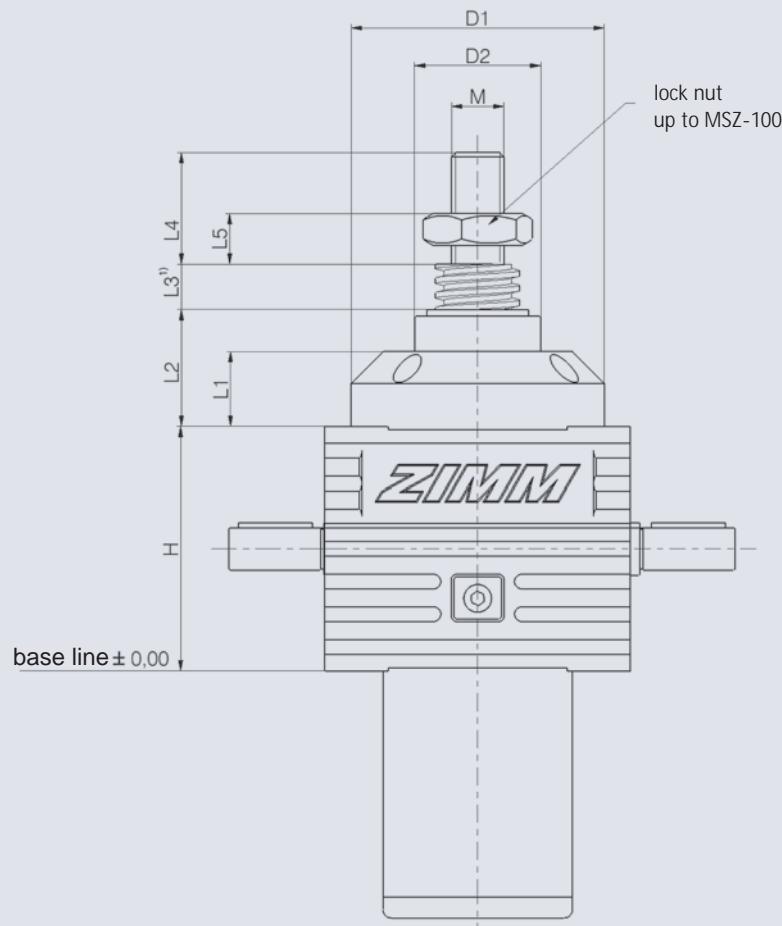
3) Round flange
4) Drilling template on request

5) Restricted play 0,02mm available on request
6) not acc. DIN 69051

Order code: see chapter 4



MSZ with Adjustable Thread Play



Trapezoidal thread / play

Trapezoidal threads have a certain amount of axial play. For most applications where the load is in one direction only this does not matter (e.g. lifting platforms).

If necessary the backlash between the spindle and the nut can be adjusted for greater accuracy (e.g.: roller adjustment) with the Anti Backlash AB option. Please note that there will still be some remaining play in the worm gear.

Adjustment

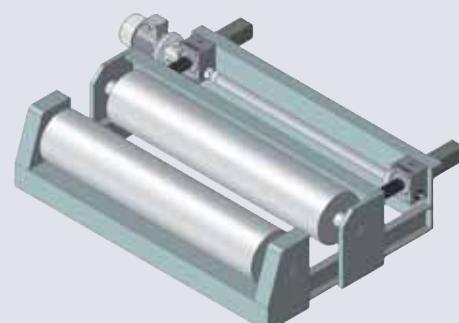
It is very simple to adjust or re-adjust the required play: Remove the aluminium cap and rotate the adjustment nut. (Do not over tighten) Refit the cap.

Applications

The Anti Backlash option is only designed for low duty applications, i.e. roller adjustments, etc. For applications with higher duty where minimum backlash is required please contact the technical department.

Saving time and costs by

- cost effective solution
- reduced design and production time
- reduced system assembly
- a more simple system and less components



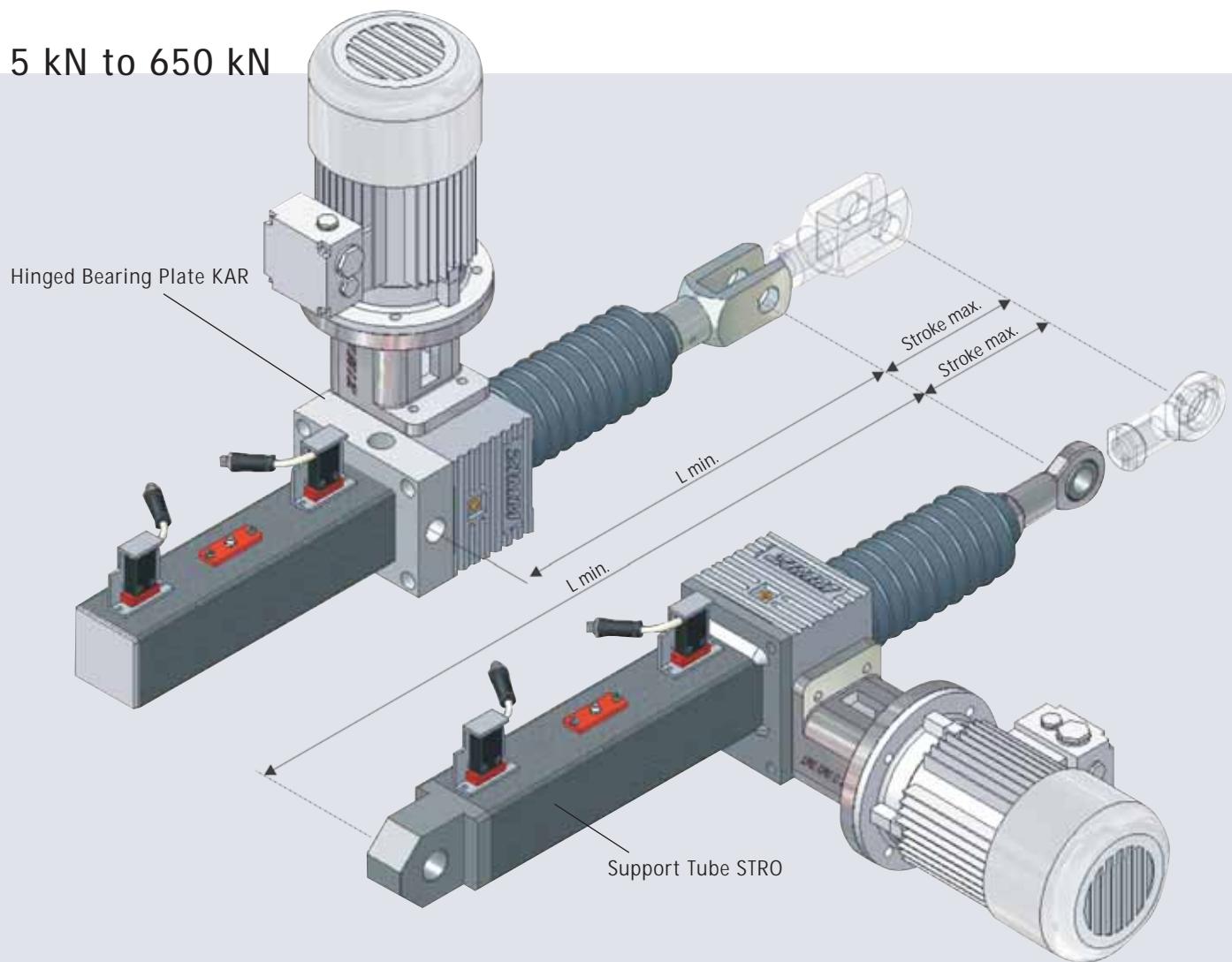
Application:
roller adjustment

	Tr thread	H	D1	D2	L1	L2	L3 ¹⁾	L4	L5	M
MSZ-10	20x4	74	65	39	31	47	10	32	12	M14
MSZ-25	30x6	82	88	46	36	53	10	38	16	M20
MSZ-50	40x7	116	122	60	36	55	10	53	24	M30
MSZ-100	50x8	160	125	85	37	64	10	76	28	M36
MSZ-150	60x12	185	165	90	46	78	16	48	-	M42x2
MSZ-250	80x16	210	195	120	88	120	16	58	-	M56x2
MSZ-350	100x16	234	230	145	88	126	16	78	-	M72x3
MSZ-500	120x16	266	260	170	101	148	16	118	-	M100x3
MSZ-650	140x20	296	295	215	104	156	16	130	-	M110x3

1) Extension for bellow or spiral spring see chapter 4



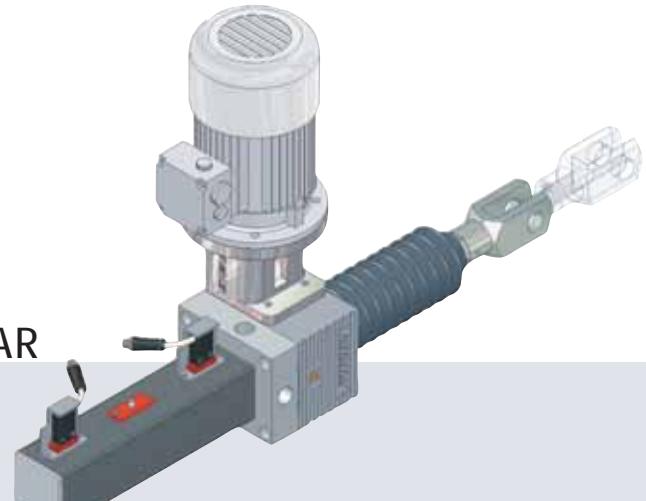
5 kN to 650 kN



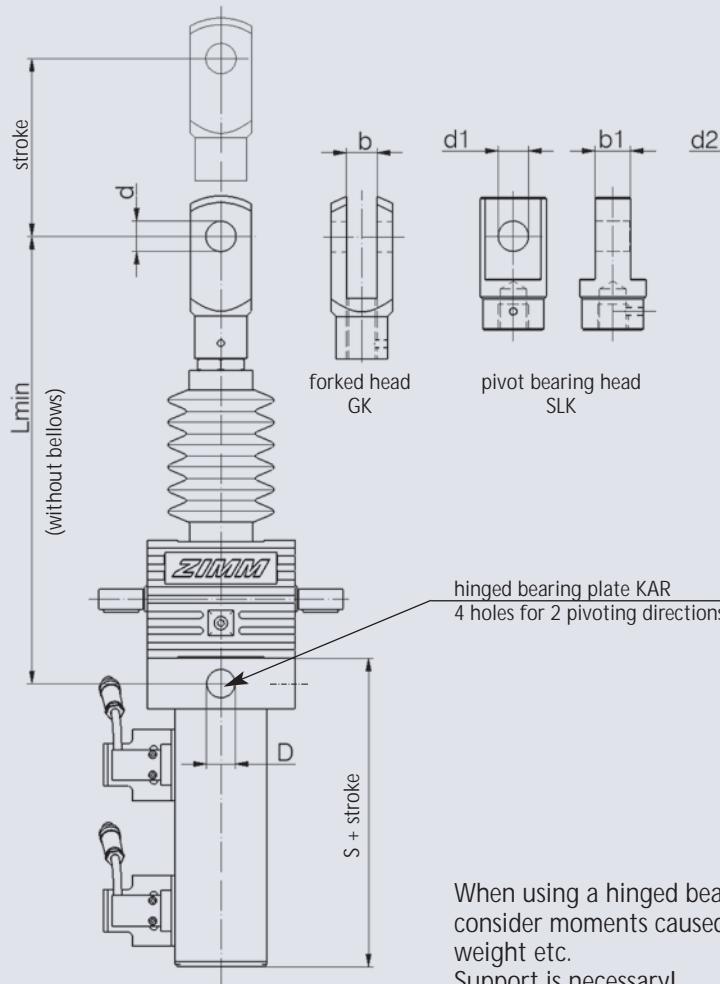
ZIMM actuators are designed for compression loads with eye-eye function. Where the heavy load of a mounted motor would be directly supported by the eye mounting it is recommended to use

the hinged bearing plate KAR option instead.
Twin actuators with connecting shaft on request.

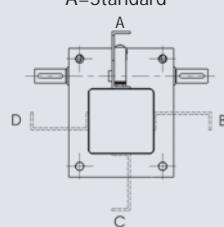




11.1 Actuators with Hinged Bearing Plate KAR



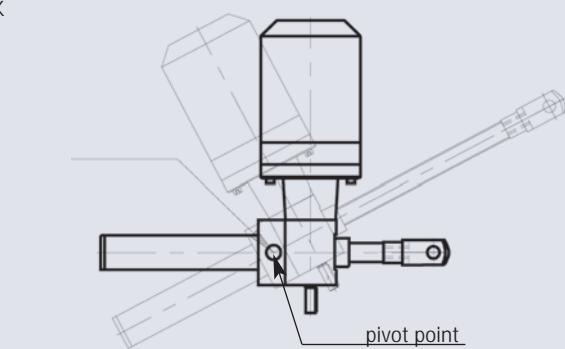
position of limit switches
A=Standard



"A" is the standard position of limit switch and lubrication strip (with protection against rotation VS). Please specify if another position is required!

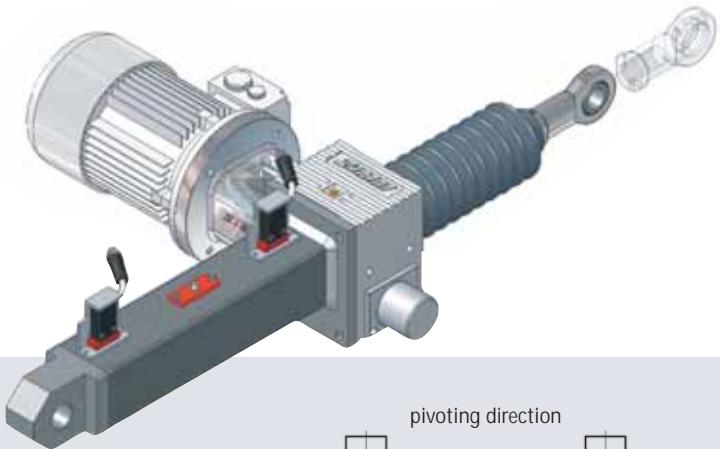
When using a hinged bearing plate please consider moments caused by motor weight etc.
Support is necessary!
If the main load direction is in tension it is recommended to mount the hinged bearing plate on the spindle side to avoid tension forces on the mounting screws.

Order code:
Component details in chapter 5, 6 and 14
- or fill out the checklists in chapter 4 and contact our technical department for further information.

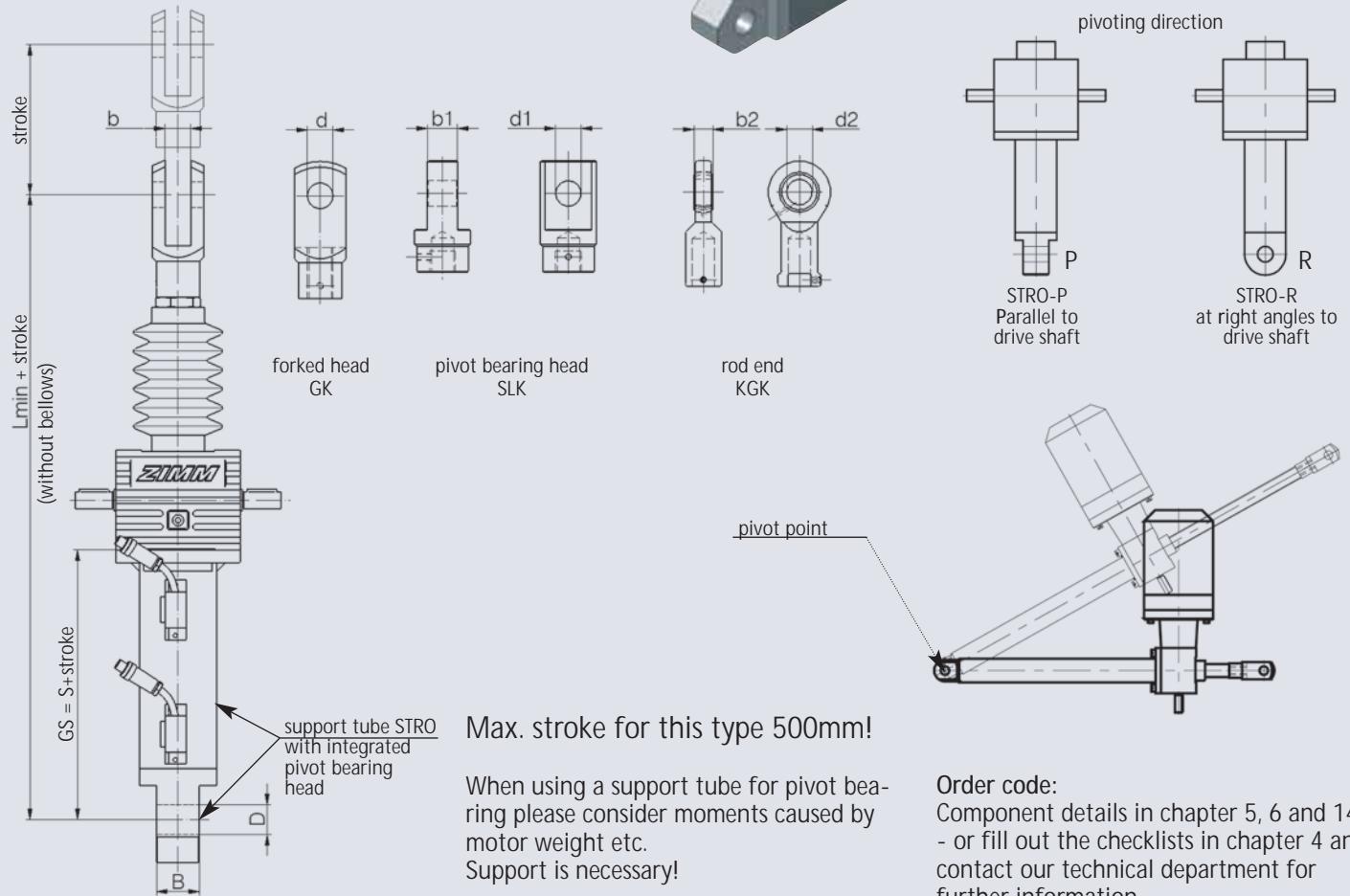


Size	S Standard	S with AS/VS	S with ESSET	L min. GK	L min. SLK	L min. KGK	d	b	d1	b1	d2	b2	D
MSZ-5	52	67	143	157	157	159	12	12	12	18	12	10	16
MSZ-10	54	74	144	183	183	188	14	14	14	24	15	12	16
MSZ-25	58	78	154	225	225	222	20	20	20	30	20	16	20
MSZ-50	67	97	174	314	286	304	30	30	30	35	30	22	30
MSZ-100	77	107	194	404	368	385	35	36	35	40	35	25	40
MSZ-150	88	118	204	441	428	433	42	42	50	57	50	35	50
MSZ-250	94	124	222	-	494	448			80	80			50
MSZ-350	104	139	244	-	538	573			95	100			60
MSZ-500	114	154	289	-	647	-			110	120			80
MSZ-650	114	154	288	-	-	-							90

- Extension for bellows you will find in chapter 4 - length determination
- System components and gears are presented in chapter 14



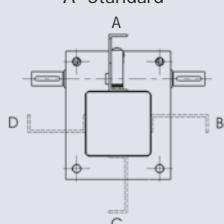
11.2 Actuator with Support Tube for Pivot Bearing STRO



Order code:
Component details in chapter 5, 6 and 14
- or fill out the checklists in chapter 4 and contact our technical department for further information.

Order example
(support tube): MSZ-25-STRO-P, GS=150mm

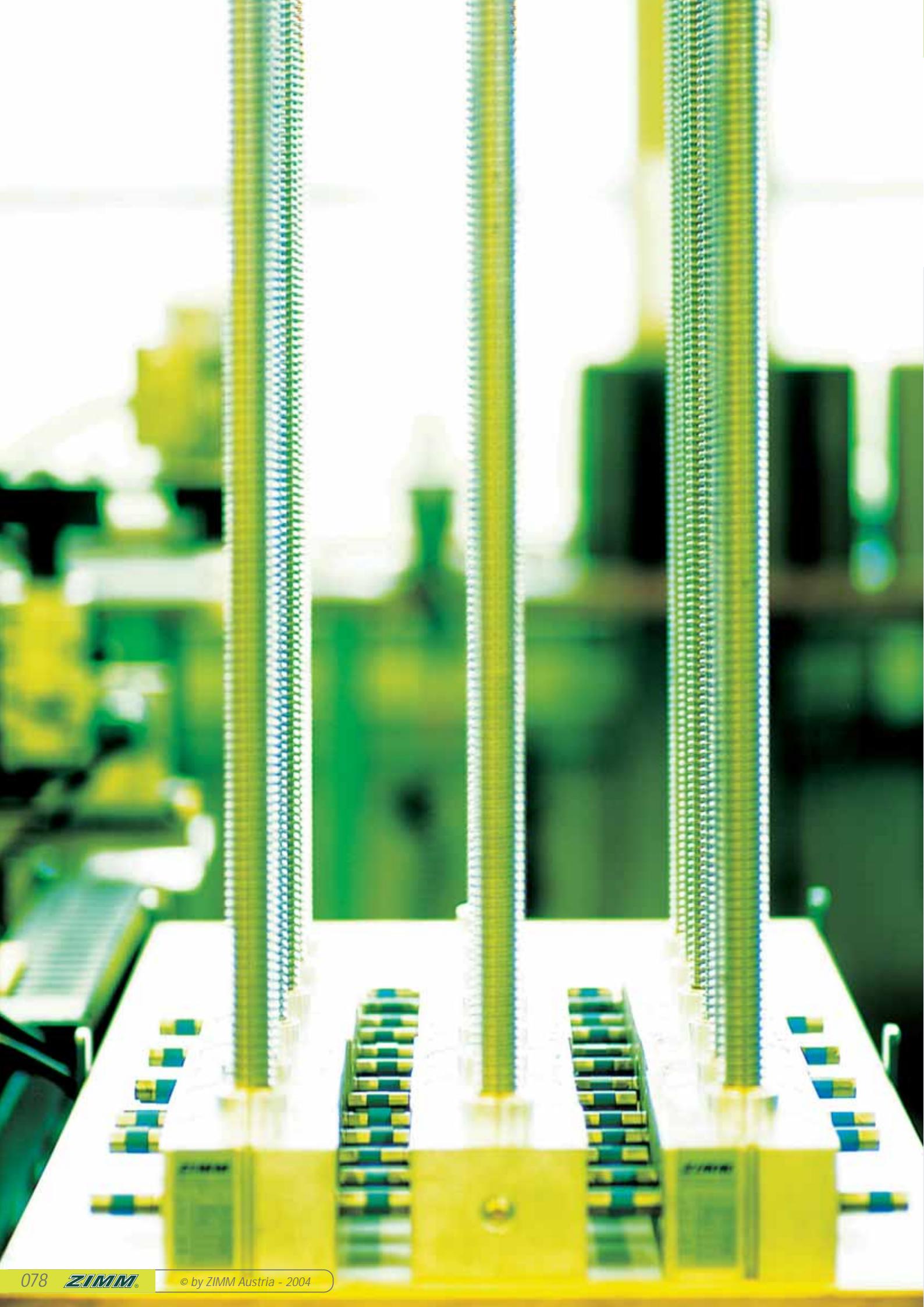
position of limit switch
A=Standard



"A" is the standard position of limit switch and lubrication strip (with protection against rotation VS). Please specify if another position is required!

Size	Attachment	S	L min. GK	L min. SLK	L min. KGK	d	b	d1	b1	d2	b2	D	B
MSZ-5	standard	82	224	224	226	12	12	12	18	12	10	12	20
	with AS/VS	97	239	239	241	12	12	12	18	12	10	12	20
	with ESSET	152	294	294	296	12	12	12	18	12	10	12	20
MSZ-10	standard	94	262	262	267	14	14	14	24	15	12	20	30
	with AS/VS	114	282	282	287	14	14	14	24	15	12	20	30
	with ESSET	166	334	334	339	14	14	14	24	15	12	20	30
MSZ-25	standard	98	303	303	300	20	20	20	30	20	16	20	30
	with AS/VS	118	323	323	320	20	20	20	30	20	16	20	30
	with ESSET	169	374	374	371	20	20	20	30	20	16	20	30
MSZ-50	standard	137	426	398	416	30	30	30	35	30	22	40	50
	with AS/VS	167	456	428	446	30	30	30	35	30	22	40	50
	with ESSET	219	508	480	498	30	30	30	35	30	22	40	50
MSZ-100	standard	147	516	480	497	35	36	35	40	35	25	40	50
	with AS/VS	177	546	510	527	35	36	35	40	35	25	40	50
	with ESSET	229	598	562	579	35	36	35	40	35	25	40	50

- Extension for bellows you will find in chapter 4 - length determination
- System components and gears are presented in chapter 14



Overview

12.1 KLM-Alu
straight-toothed



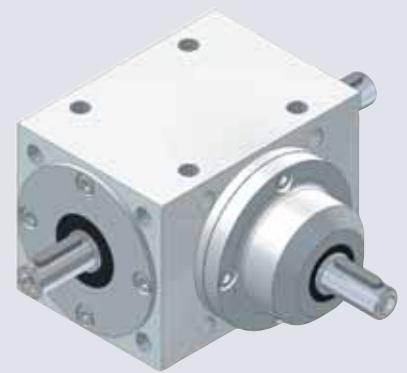
12.2 KGZ
straight-toothed



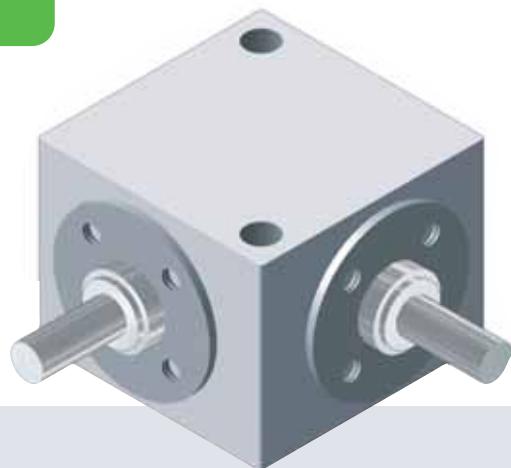
12.3 KSZ
spiral-toothed



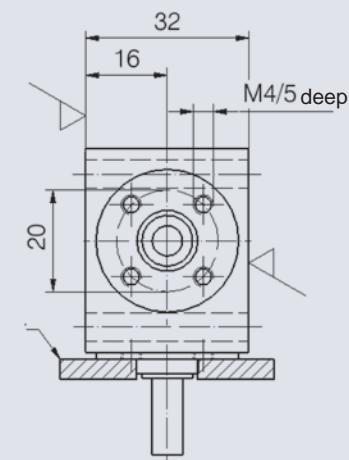
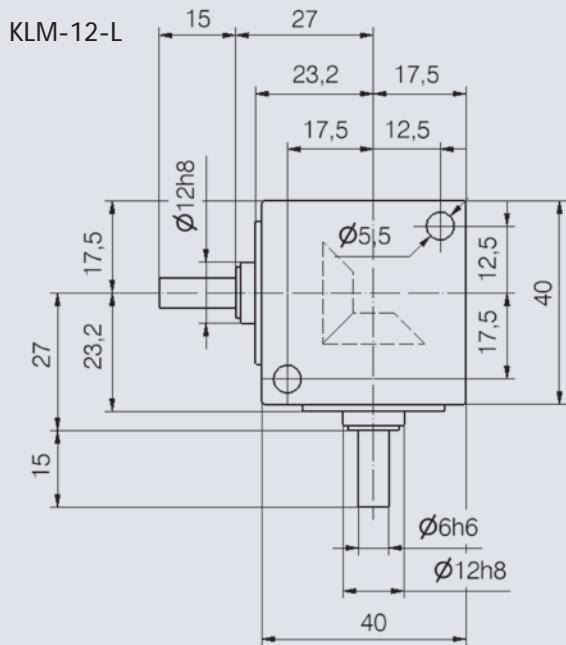
12.4 KST
heavy-duty gearbox
spiral-toothed



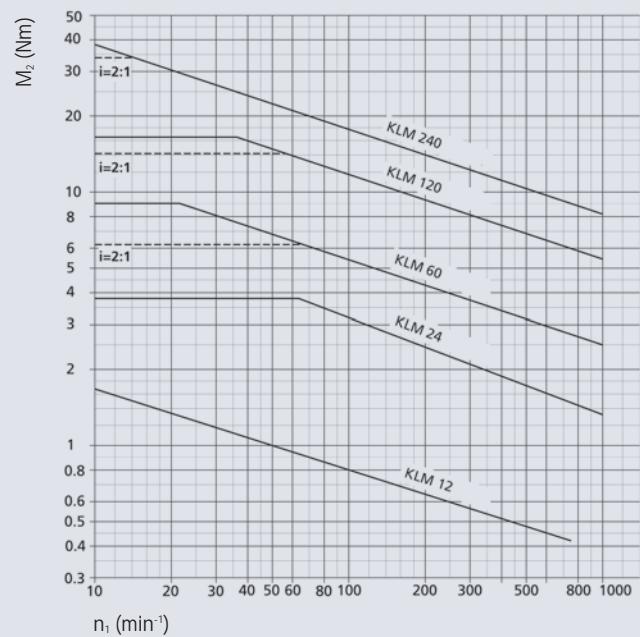
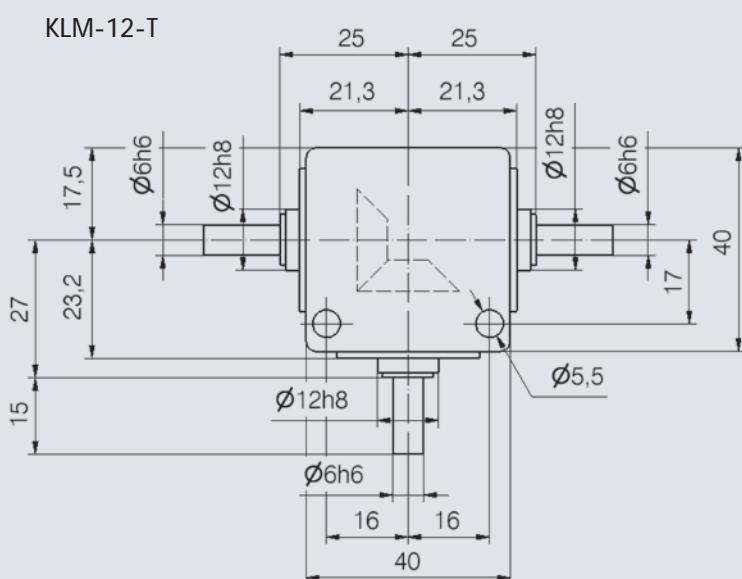
KSZ and KGZ are preferred models
which we define as standard.



12.1 KLM, Straight Toothing, Aluminium



Mounting possibility
L and T

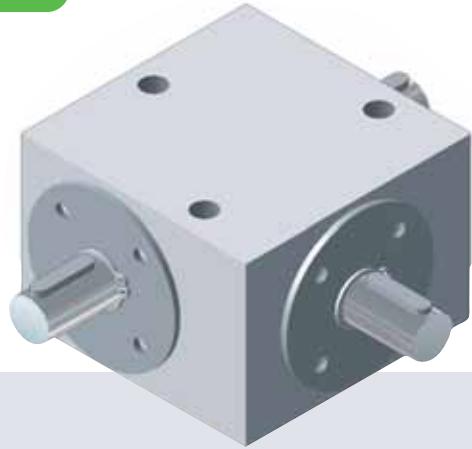


Material: Aluminium
Lubrication: low-viscosity grease (lifetime lubrication)
Rotational speed: max. 750 min⁻¹

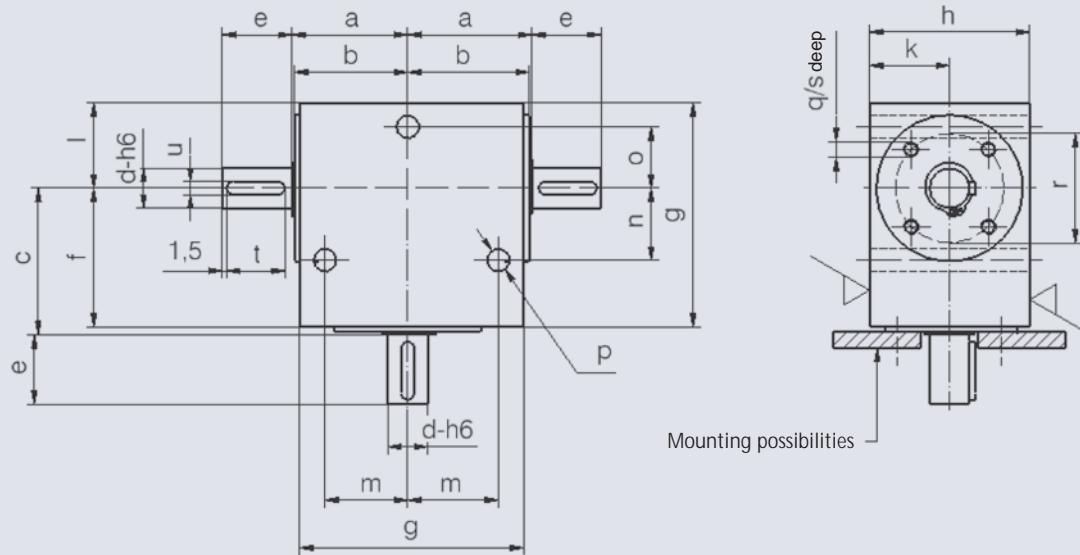
Basics for values in the diagram:
Life time: 6000 hrs. (LM12:2500 hrs.)
Continuous operation

Type	i	Weight (kg)
KLM-12-T	1:1	0,21
KLM-12-L	1:1	0,20

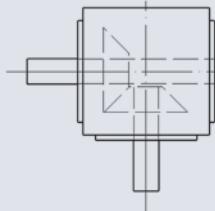
n_1 = input speed (min^{-1})
 M_2 = drive torque (Nm)



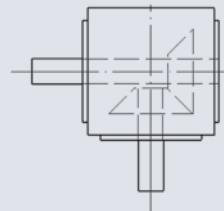
12.1 KLM, Straight Toothing, Aluminium



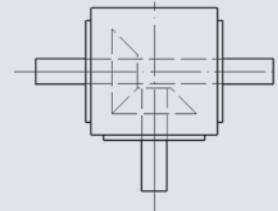
Name: KLM-60-L-RA I



KLM-60-L-RA II



KLM-60-T



Order example: KLM-60-L-RA I-2:1

Material: Aluminium

Lubrication: low-viscosity grease (lifetime lubrication)

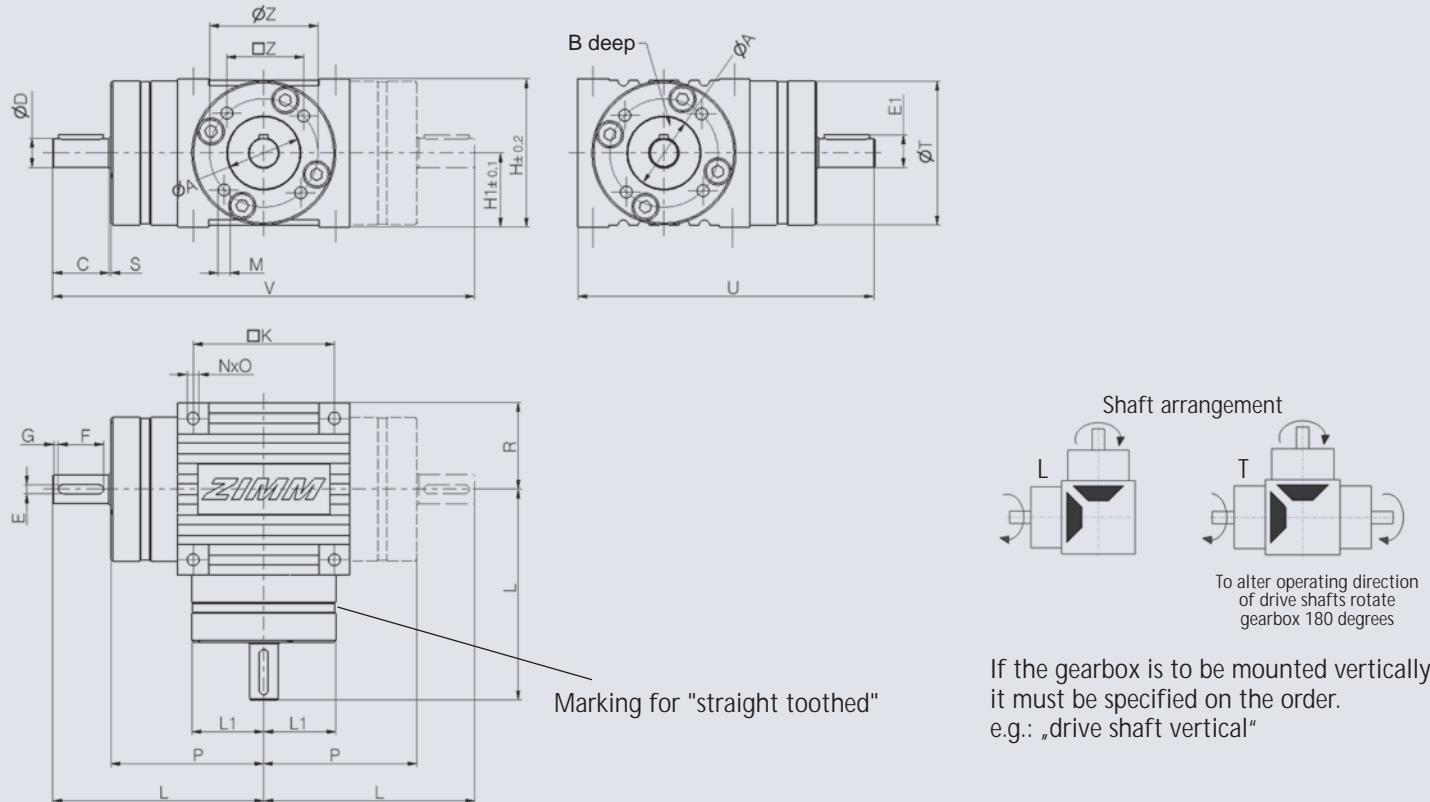
Rotational speed: max. 1000 min⁻¹

Dimensions in mm

	i	a	b	c	d-h6	e	f	g	h	k	l	m	n	o	p	q	r	s	t	u	Weight kg
KLM-24-	1:1	31	30	38,0	8	15	37,0	58	42	21	22,0	23,0	20	-	7,0	M4	29	8	12	2	0,48
KLM-60-	1:1 2:1	38	37	44,5	10	18	43,5	70	50	25	27,5	27,5	23	-	8,5	M5	34	9	14	3	0,94
KLM-120-	1:1 2:1	45	44	54,0	15	26	53,0	84	60	30	32,0	32,5	27	23	8,5	M6	41	9	22	5	1,70
KLM-240-	1:1 2:1	53	52	65,0	17	28	64,0	100	70	35	37,5	40,0	32	28	10,5	M6	48	10	22	5	2,80



12.2 KGZ Straight Toothing



Order no.	$\emptyset A_{H_7}$	B	C	D_{j_6}	E_{h_9}	F	G	H	H_1	$\square K$	L	L_1	M	N	O	P	R	S	$\emptyset T$	U	V	$\emptyset Z$	$\square Z$	
KGZ- 5-L/T-1	32	2	21	11	4	11,5	16	3	62	31	60	90	30	M 6	M 6	13	69	36,0	1,0	61,5	126,0	180	46,1	32,5
KGZ-25-L/T-1	40	3	31	16	5	18,0	25	3	82	41	78	117	39	M 8	M 8	15	86	47,5	1,5	80,0	164,5	234	60,0	42,0

Technical data for type L-1 and T-1

Size	Allowable torque [Nm] at 1500 min ⁻¹		Allowable radial load F_R [N] at shaft extension at n_1 [min ⁻¹]				
	L version	T version	500	750	1000	1500	2000
KGZ- 5	6,5	7,5	250	210	180	150	100
KGZ-25	14,0	16,0	600	500	450	360	200

Criteria of production and quality for L-1 and T-1:

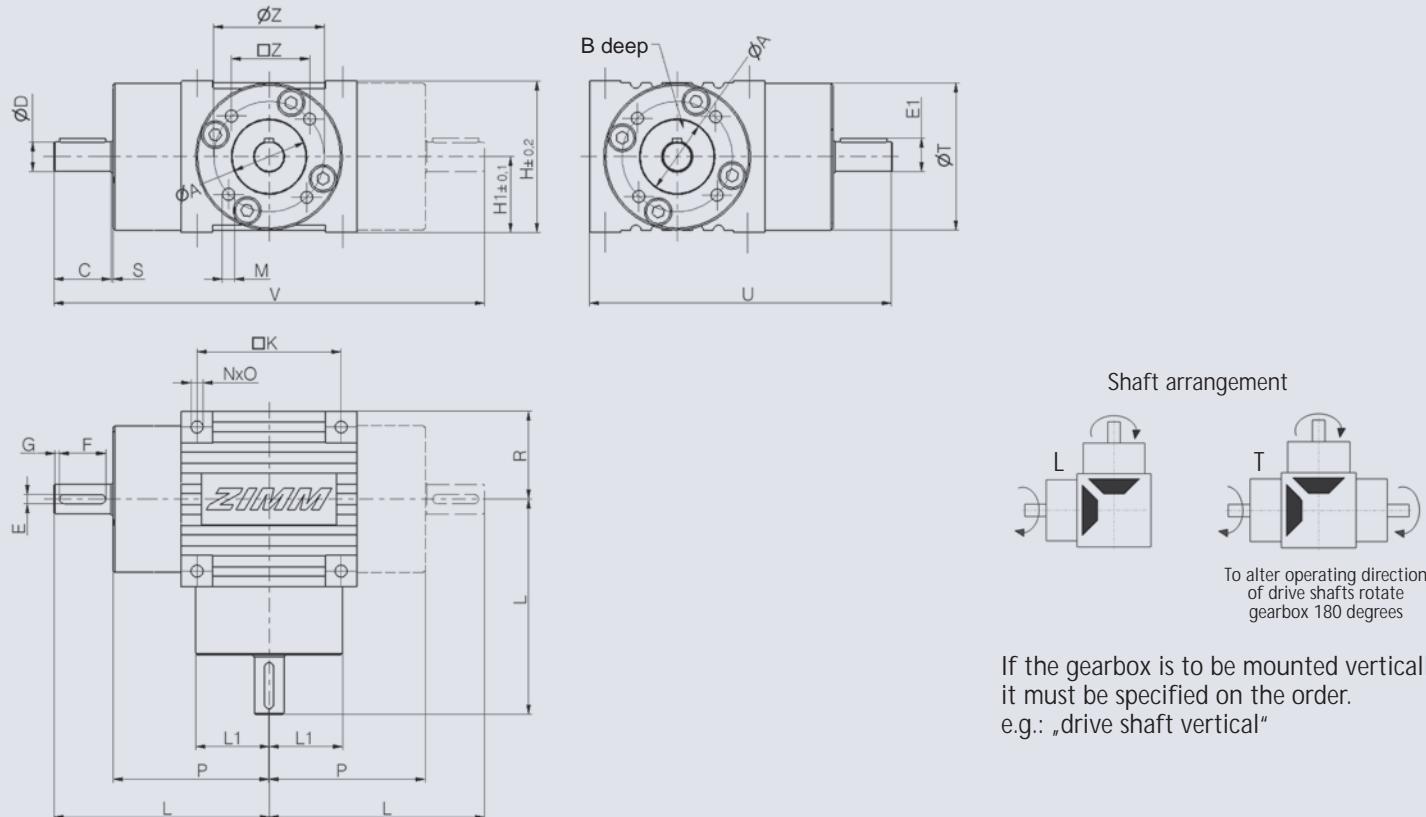
- Housing material: GGL 20
- Bevel gears: straight-toothed, gas nitrated
- Rolling bearing
- Lifetime lubrication with synthetic oil
- Temperature range -10°C to +90°C
- Ratio $i = 1:1$
- Max. speed max. 1500 U/min
- Operating period max. 20 %
- Repairs: exchange of complete bevel gearbox
- In the higher range, revolution values from 90 to 100 dBA are possible.

Straight-toothed bevel gearboxes KGZ-1 are especially designed for infrequent manual or motor-driven operation. The operation noises are higher than those of the spiral-toothed bevel gearbox KSZ. KGZ-1 is manufactured with exactly the same construction KSZ.

Order example:
Bevel gearbox
straight-toothed
Size
KGZ - 25 - T-1
Shaft arrangement



12.3 KSZ Spiral Toothing



If the gearbox is to be mounted vertically it must be specified on the order.
e.g.: „drive shaft vertical“

Order no.	$\varnothing A_{H7}$	B	C	D_{i6}	E_{h9}	F	G	H	H_1	K	L	L_1	M	N	O	P	R	S	$\varnothing T$	U	V	$\varnothing Z$	$\square Z$	
KSZ- 5-L/T	32	2	21	11	4	12,5	16	3	62	31	60	90	30	M 6	M 6	13	69	36,0	1,0	61,5	126,0	180	46,1	32,6
KSZ-10-L/T	35	3	26	14	5	16,0	16	5	74	37	70	105	35	M 8	M 8	15	79	42,5	1,5	73,5	147,5	210	49,5	35,0
KSZ-25-L/T	40	3	31	16	5	18,0	25	3	82	41	78	117	39	M 8	M 8	15	86	47,5	1,5	80,0	164,5	234	60,0	42,4
KSZ-50-L/T	52	4	39	20	6	22,5	25	5	116	58	110	165	55	M10	M10	15	126	67,5	2,0	115,0	232,5	330	86,0	50x70

Bevel gearbox	Torque in [min^{-1}]	0	10	100	750	1500	3000
KSZ- 5-L/T		29,5	13,9	13,9	13,8	13,5	13,3
KSZ-10-L/T	transferable	58,4	25,4	25,2	25,1	23,1	19,1
KSZ-25-L/T	torque [Nm]	82,4	32,9	32,9	32,7	30,1	24,1
KSZ-50-L/T		343,0	143,3	143,1	119,3	95,8	75,3

Bevel gearbox	$F_{\text{radial}} [\text{N}]$
KSZ- 5-L/T	140
KSZ-10-L/T	200
KSZ-25-L/T	300
KSZ-50-L/T	1100

Criteria of production and quality for L and T:

- Housing material: GGL 20
- Minimal backlash
- Quiet operation
- High torque transmission with small size
- Spiral-toothed bevel gears
- Prestressed bevel gear bearings
- Ratio $i = 1:1$
- Lifetime lubrication with synthetic oil, Oil change only after very high load.
- Sealing using rotary shaft or O-ring seals
- Max. 40 % operating period with 1500 min^{-1}
- Compatible with screw jack building block system
- All installation dimensions are symmetric
- Shaft extension is identical to same size screw jacks

Order example:

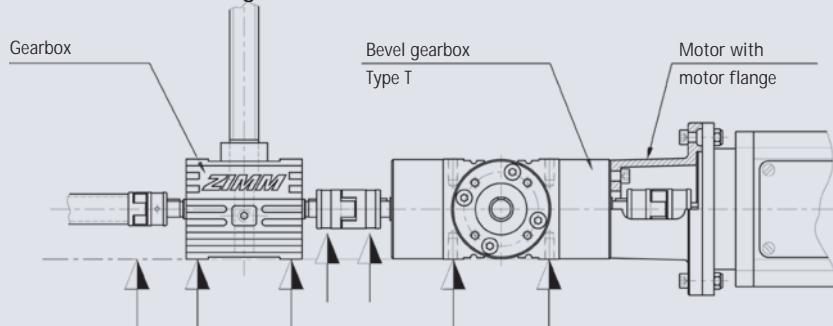
Bevel gearbox
spiral-toothed
Size

KSZ - 25 - T

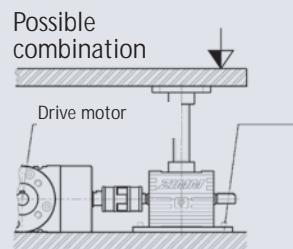
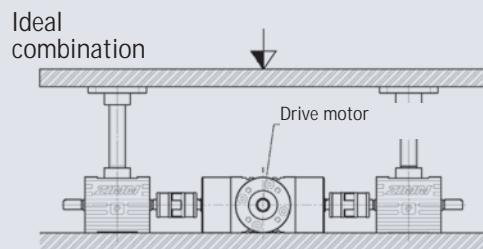
Shaft arrangement

Advantages of KSZ and KGZ

Same installation height



Example - dimensioning of a lifting unit



Our KSZ bevel gearboxes (spiral-toothed) are distinguished by the fact that their centre line dimension corresponds to the same size in the screw jack building block system. This means that there is no height difference for the drive shafts. The drive shafts of the screw jack and bevel gearboxes have the same diameter. The drive shafts are arranged symmetrically. Consequently, the direction of rotation can be changed by simply turning the bevel gearbox around (only T version).

KSZ and KGZ are preferred models which we define as standard and deliver from stock.

Size MSZ-5 – KSZ-5

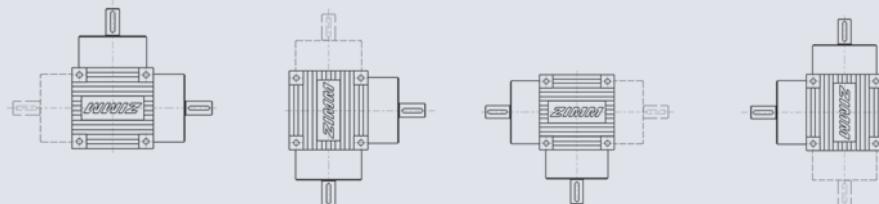
It is possible to use the same gearbox size up to a max. calculated drive torque of 13.5 Nm (example MSZ-5 with 1500 min⁻¹).

There is no special sub-construction required as screw jacks and bevel gearboxes have the same construction height.

Size MSZ-5 – KSZ-10

If it is necessary to transmit a higher drive torque (e.g. for multiple systems), the next larger bevel gearbox can be used. Pay attention to the max. torque! Compensation must be made for the differences in height by the use of fixing strips.

Symmetry, Direction of Rotation



Changing the direction of rotation with the same arrangement of mounting holes with T version

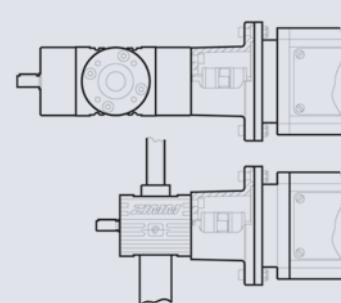


All-round rotatable bevel gearbox

Our bevel gearboxes can be rotated and mounted in all directions around their center line. To change the direction of rotation, the bevel gearbox can be turned around 180°.

Advantage

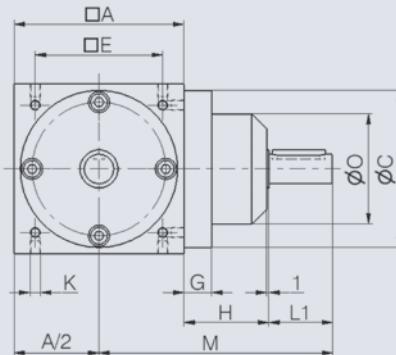
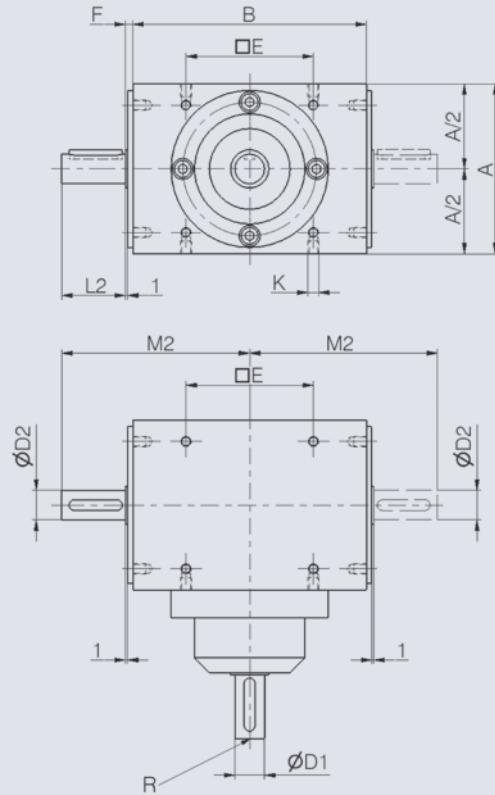
Type T and L have the same arrangement of mounting holes and shaft positions which allow mounting in any direction. KGZ (straight-toothed) and KSZ (spiral-toothed) gearboxes also have the same dimensions.



The screw jack and bevel gearbox have the same arrangement of mounting holes for mounting of the motor flange.



12.4 KST Bevel Gearboxes



Gearbox size	$\square A$	B	C_{j7}	D_{1j6} D_{2j6}	$\square E$	M	M_2	L_1	L_2	F	G	H	K	R	O	Feather key DIN 6885
KST-00	80	110	74	14	60	110	88,5	30	3,5	13	40	M6	M6	52	5x5	
KST-01	110	145	102	22	82	135	111,0	35	3,5	14	45	M8	M8	70	6x6	
KST-A1	140	175	130	32	105	165	137,0	45	4,5	14	50	M10	M10	90	10x8	
KST-B1	170	215	160	42	130	210	172,0	60	4,5	18	65	M12	M12	110	12x8	
KST-C1	210	260	195	55	160	275	220,0	85	5,0	18	85	M16	M16	135	16x10	
KST-D1	260	330	245	65	200	340	270,0	100	5,0	23	110	M16	M16	150	18x11	
KST-E1	330	430	310	75	260	435	340,0	120	5,0	29	150	M20	M20	230	20x12	

$$K_{\text{deep}} = K \cdot 1,5$$

For higher demands of efficiency, we use spiral-toothed heavy-duty gears that were designed specifically for our screw jack building block system.

Quality features

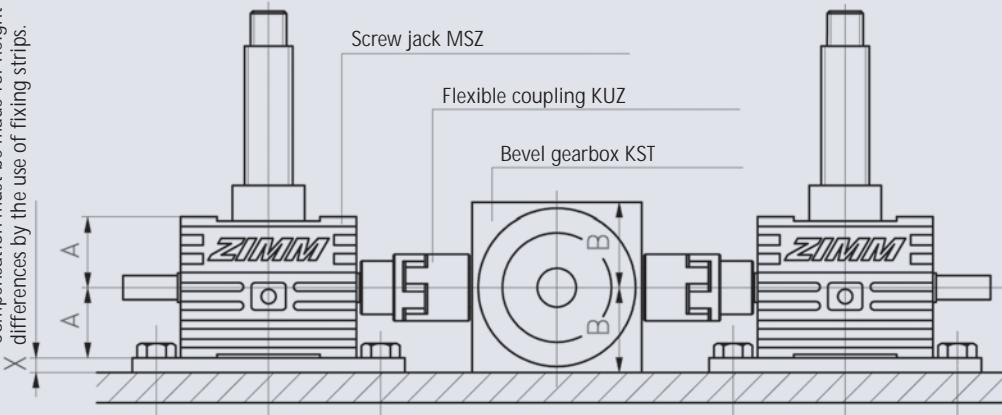
- Quiet operation
- Maintenance-free, with minimum backlash
- High torques
- High operating period i.e. continuous operation
- High precision components
- Suited for highest duties

Manufacturing features

- Spiral bevel gears, case hardened, extrafine lapped in pairs
- Tooth contact adjusted to $+/- 15\mu$ due to precise mounting
- Rolling bearing acc. to special standard SV7 = appr. quality P5 in noise-controlled execution.
- Case made of cast GD250 (Meehanite); low extension and high stiffness
- Radial packing rings, generally with seals
- Oil filled: Synthetik HT68, lifetime lubrication
- Standard ratio: $i = 1:1$, additional ratios on request

12.4 KST Bevel Gearboxes

Compensation must be made for height differences by the use of fixing strips.

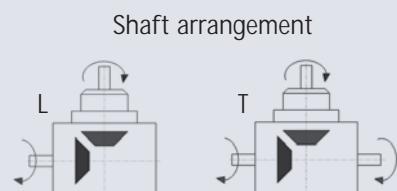


Size	max. M_d	Perm. torque [Nm]		Perm. radial load F_R [N] at shaft end		Weight [Kg]
		1500min ⁻¹	3000min ⁻¹	d_1	d_2	
KST-00	80	28	20	300	300	5
KST-01	200	65	50	1100	1100	11
KST-A1	380	130	95	1500	2700	21
KST-B1	620	230	160	2000	3700	36
KST-C1	1200	390	-	3250	5000	64
KST-D1	2000	740	-	3800	7500	124
KST-E1	3500	1300	-	4500	9200	250

Specific features:

For operating periods of more than 20 %, speed 3000 min⁻¹, lubricating oil and oil inspection glass must be specified with the order.

Screw Jack	Bevel Gearbox	A	B	X
MSZ- 5	KST-00	31 ^{+0.1} _{0.1}	40 ^{+0.1} _{0.1}	9
MSZ- 10	KST-00	37 ^{+0.1} _{0.1}	40 ^{+0.1} _{0.1}	3
MSZ- 25	KST-01	41 ^{+0.1} _{0.1}	55 ^{+0.1} _{0.1}	14
MSZ- 50	KST-A1	58 ^{+0.1} _{0.1}	70 ^{+0.1} _{0.1}	12
MSZ-100	KST-C1	80 ^{+0.1} _{0.1}	105 ^{+0.2} _{0.2}	25
MSZ-150	KST-D1	93 ^{+0.1} _{0.1}	130 ^{+0.2} _{0.2}	37
MSZ-350	KST-E1	110 ^{+0.1} _{0.1}	165 ^{+0.2} _{0.2}	55

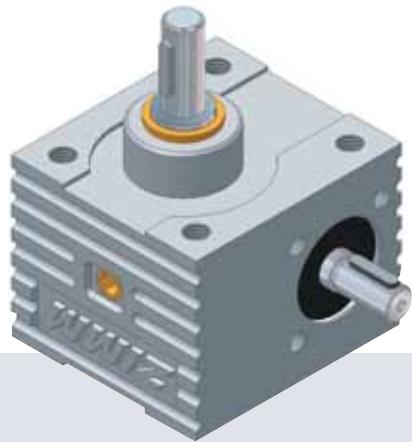


To alter operating direction of drive shafts rotate gearbox 180 degrees

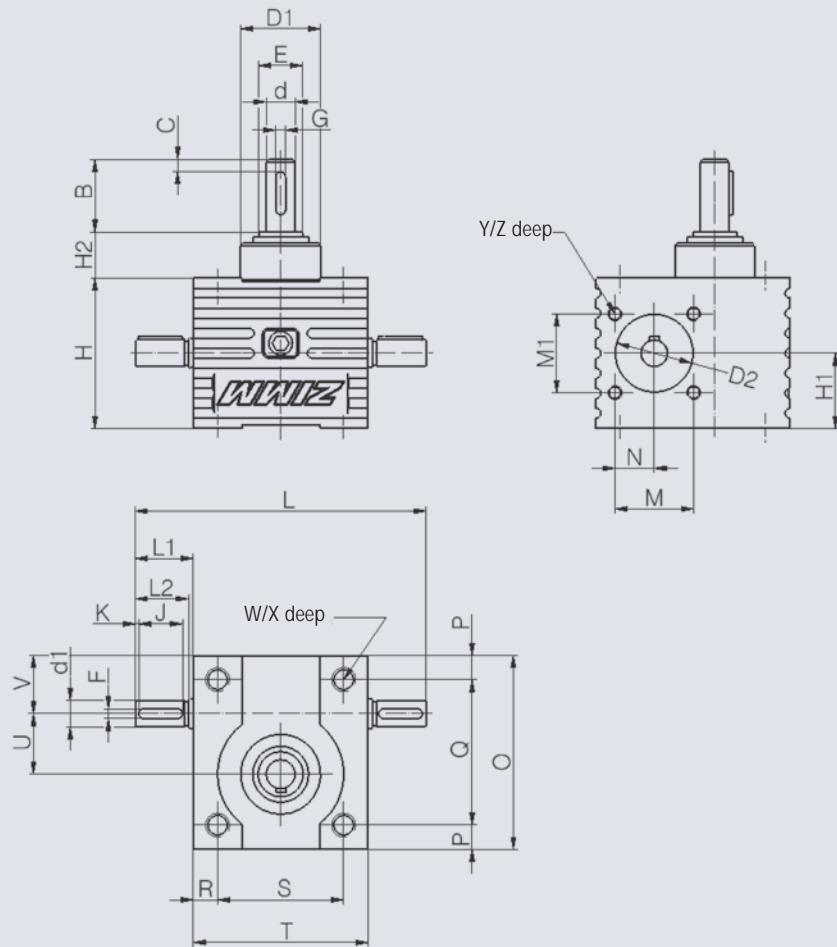
Ordering example:

Bevel gearbox spiral-toothed	Shaft arrangement
Size	Ratio 1:1 (others on request)
KST - 01	- L - 1:1

On request we also deliver bevel gearboxes KST with ratios from 1:2 (to accelerate) to 6:1 (to slow down), as well as flange gearboxes which can be directly mounted on the motor or servo motor.



Dimensions MSG



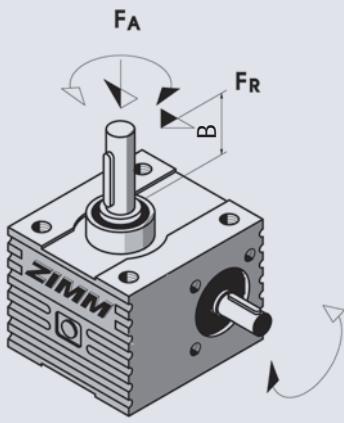
The ZIMM – worm gearbox MSG features especially by its high axial load capacity.

Please turn over!

	B	C	D1	D2	E	F	G	H	H1	H2	J	K	L	L1	L2	M
MSG-5	30	5	29	32	18	4	4	62	31	19	18	1,5	120	24	22	32,5
MSG-10	30	5	39	35	20	5	5	74	37	22	20	2,5	140	27,5	25	35
MSG-25	50	5	46	40	30	5	8	82	41	27	35	3	195	45	43	42
MSG-50	60	10	60	52	40	6	8	116	58	33	35	4,5	240	47,5	45	86
MSG-100	80	10	85	62	50	8	12	160	80	51	50	3,5	295	60	57	80
MSG-150	100	10	90	68	60	8	14	185	92,5	53	50	3,5	325	60	57	80
MSG-250	100	10	120	80	80	8	18	210	105	62	60	2,5	365	72,5	65	90
MSG-350	160	20	145	80	100	10	22	234	117	72	55	5	405	67,5	65	160
MSG-500	200	20	170	-	120	14	28	266	133	92	90	3,5	530	100	97,5	135

	M1	N	O	P	Q	R	S	T	U	V	W	X	d	d1	Y	Z
MSG-5	32,5	16,2	80	10	60	10	52	72	25	24	M8	13	12	11	M6	8
MSG-10	35	17,5	100	11	78	11	63	85	32	28	M8	13	14	14	M8	10
MSG-25	42	21	130	12	106	12	81	105	45	31	M10	13	23	16	M8	10
MSG-50	70	25	180	15	150	15	115	145	63	39	M12	16	30	20	M10	12
MSG-100	90	9	200	17	166	22	131	175	71	46	M16	20	40	25	M12	20
MSG-150	90	29	220	25	170	25	155	205	75	50	M20	30	45	25	M12	20
MSG-250	100	10	250	25	200	25	170	220	90	51,5	M24	30	60	28	M12	17
MSG-350	145	5	295	30	235	35	200	270	110	55	M27	42	80	32	M16	20
MSG-500	145	0	360	35	290	35	260	330	135	75	M30	50	100	48	M16	24

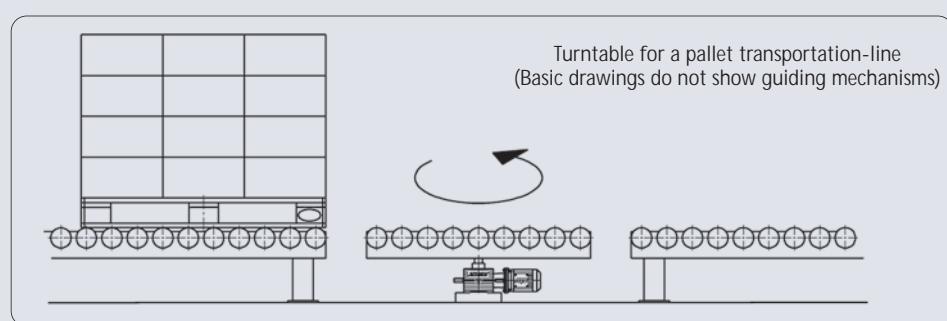
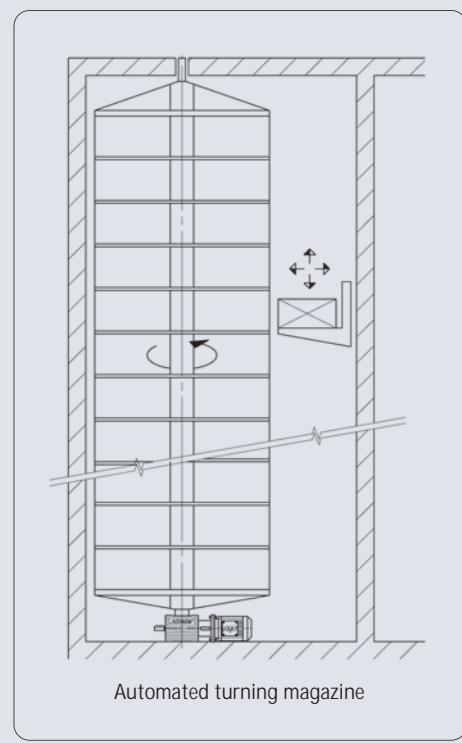
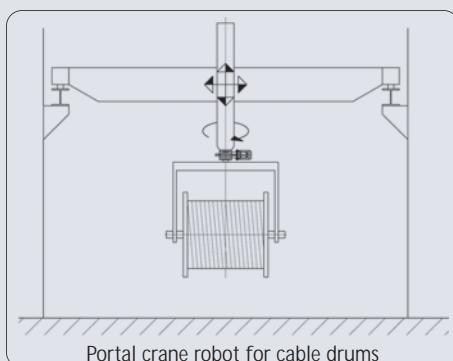
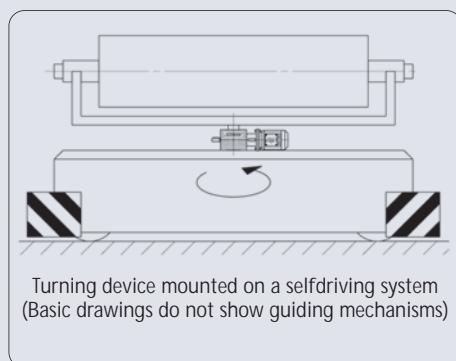
Technical Data



The ZIMM – worm gearbox MSG features high axial load capacity.

Type	F_A [kN] max. axial load	Input speed 500 U/min		Input speed 1500 U/min		Reduc- tion	F_R [N] max. radial load	B [mm]
		M_1 [Nm] max. input torque	M_2 [Nm] max. output torque	M_1 [Nm] max. input torque	M_2 [Nm] max. output torque			
MSG-5-L	5	4,3	43,7	2,6	30,4	16:1	360	30
MSG-5-N	5	10,4	35,8	6,4	23,0	4:1	360	30
MSG-10-L	10	8,4	94,2	5,3	65,4	16:1	600	30
MSG-10-N	10	20,5	71,9	12,6	46,0	4:1	600	30
MSG-25-L	25	12,5	200,6	7,8	140,6	24:1	900	50
MSG-25-N	25	34,2	178,8	21,7	118,7	6:1	900	50
MSG-50-L	50	24,5	480,8	15,5	338,4	28:1	3000	60
MSG-50-N	50	70,3	431,9	44,7	286,8	7:1	3000	60
MSG-100-L	100	27,8	574,1	17,0	403,2	32:1	5000	80
MSG-100-N	100	114,9	777,0	72,0	517,6	8:1	5000	80
MSG-150-L	150	27,7	661,4	17,3	467,7	36:1	5500	100
MSG-150-N	150	107,0	802,8	67,3	538,9	9:1	5500	100
MSG-250-L	250	36,6	1034	23,5	738,2	40:1	10000	100
MSG-250-N	250	185,1	1599	118,4	1077	10:1	10000	100
MSG-350-L	350	63,9	1789	40,2	1263	40:1	13000	160
MSG-350-N	350	295,7	2554	187,0	1705	10:1	13000	160
MSG-500-L	500	71,2	2396	42,8	1707	56:1	15000	200
MSG-500-N	500	325,6	3829	204,3	2554	14:1	15000	200
MSG-650-L	650	102,6	3678	62,8	2618	56:1	on request	
MSG-650-N	650	427,9	5044	268,3	3347	14:1	on request	

Applications



Content-chapter 14

Page Chapter

14.1 System components for standing spindle S

- 90 1.1 Overview assembly group S
- 91 1.2 Protective tube with cap SRO
- 91 1.3 Protection against rotation VS
- 91 1.4 Escape protection AS
- 91 1.5 Lubrication strip SL
- 92 1.6 Assembly group "limit switch" ESSET
- 93 1.7 Linear measuring system WMS
- 94 1.8 Trapezoid threaded screw S-Tr
- 94 1.9 Fixing flange BF
- 94 1.10 Forked head GK
- 94 1.11 Rod end KGK
- 94 1.12 Pivot bearing head SLK
- 70 1.13 Safety nut SIFA (see chapter 8)
- 72 1.14 Ball screw version KGT (see chapter 9)



14.2 System components for rotating spindle R

- 95 2.1 Trapezoid threaded screw R-Tr
- 95 2.2 Opposed bearing plate GLP
- 95 2.3 Driving flange TRMFL
- 96 2.4 Nuts (FM, DM, SIFA, PM, FFDM)
- 71 2.5 Safety nut SIFA (see chapter 8)
- 73 2.6 Ball screw version KGT (see chapter 9)



14.3 System components: S + R

- 99 3.1 Hinged bearing plate KAR
- 99 3.2 Fixing strips BFL
- 99 3.3 Protective cap SK
- 99 3.4 Handwheel HR
- 100 3.5 Bellows FB, bushing FBR, adapter FBA
- 102 3.6 Spiral springs SF, centering bushings
- 104 3.7 Automatic lubricator



14.4 Connecting shafts

- 106 4.1 Connecting shaft VWZ
- 108 4.2 Pedestal bearing STL, shaft extension WZ
- 112 4.3 Precision shaft joints extendable KGW
- 113 4.4 Connecting shaft GX



14.5 Couplings

- 116 5.1 Friction coupling KUZ-KK
- 117 5.2 Standard coupling KUZ

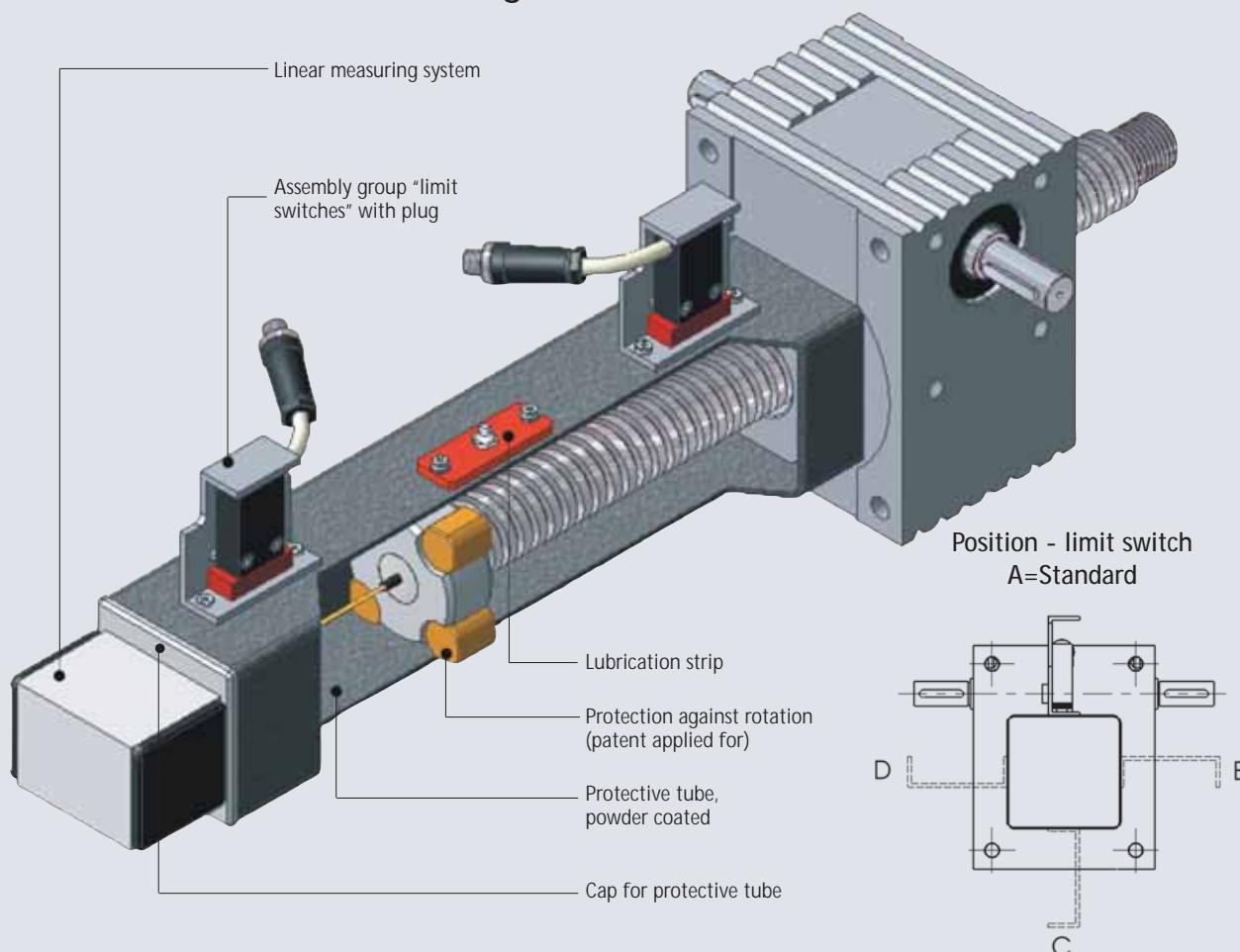
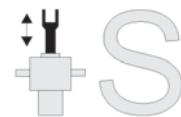


14.6 Motors, motor flanges

- 120 6.1 Motor flanges MF
- 123 6.2 AC 3ph motors, AC 3ph brake motors
- 124 6.3 Spring pressure brake FDB
- 130 6.4 Rotary pulse encoder plate DIG



14.1.1 System Drawing: Assembly Group "Protective Tube" Standing Version S



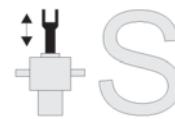
Safety cutoff

Tip: Choose a screw jack with a 30 mm longer stroke: Use the outer limit switch for safety cutoff and place on each side another limit switch 15mm inwards for stroke limitation.

Example: Required stroke 100 mm, effective stroke until safety cutoff 130mm. The limit switches are mounted

staggered (pos. A, B, C or D). The limit switch actuator can be passed over in our limit switch version.





14.1 For Standing Version S

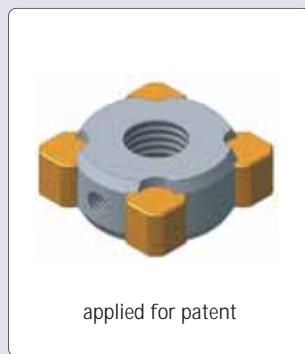


14.1.2 Protective tube SRO with cap

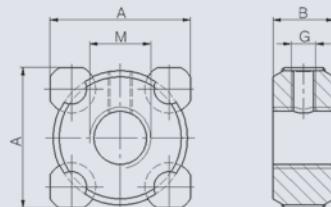


Material: steel, powder coated/cap: aluminium

Order no.	A	I	L1	L2
MSZ-5-SRO	35	31	10	5
MSZ-10-SRO	50	46	10	5
MSZ-25-SRO	50	46	10	5
MSZ-50-SRO	90	84	10	5
MSZ-100-SRO	90	84	10	5
MSZ-150-SRO	120	114	10	5
MSZ-250-SRO	120	114	10	5
MSZ-350-SRO	160	152	15	5
MSZ-500-SRO	180	170	15	5
MSZ-650-SRO	200	190	15	5



14.1.3 Protection against rotation VS



Protection against rotation is required to prevent the screw from rotating or when used in combination with limit switches or rod end KKG.

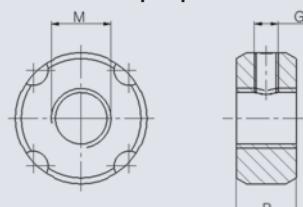
Material: steel, bronze

Order no..	A	B	G	M
MSZ-5-VS*	31	15	M6	M12
MSZ-10-VS	46	20	M8	M14
MSZ-25-VS	46	20	M8	M20
MSZ-50-VS	84	30	M10	M30
MSZ-100-VS	84	30	M10	M36
MSZ-150-VS	114	30	M12	M48x2
MSZ-250-VS	114	30	M12	M64x3
MSZ-350-VS	152	35	M16	M72x3
MSZ-500-VS	170	40	M16	M85x3
MSZ-650-VS	190	40	M16	M100x3

* VS for MSZ-5 is completely made of bronze



14.1.4 Escape protection AS



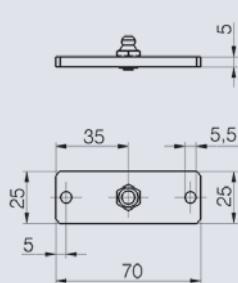
Material: steel

The escape protection prevents the screw from being unwound from the gearbox. Especially recommended for ball screws! Do not use the escape protection as end of stroke stop!

Order no.	B	G	M
MSZ-5-AS	15	M6	M12
MSZ-10-AS	20	M8	M14
MSZ-25-AS	20	M8	M20
MSZ-50-AS	30	M10	M30
MSZ-100-AS	30	M10	M36
MSZ-150-AS	30	M12	M48x2
MSZ-250-AS	30	M12	M64x3
MSZ-350-AS	35	M16	M72x3
MSZ-500-AS	40	M16	M85x3
MSZ-650-AS	40	M16	M100x3



14.1.5 Lubrication strip MSZ-SL



Thread: G 1/8"

The lubrication strip is designed for lubrication of the protection against rotation. Please grease it regularly depending on operation duty or connect it to a centralized lubrication.

Order no.: MSZ-SL

For lubrication please use KLÜBER Unigear LA02 or

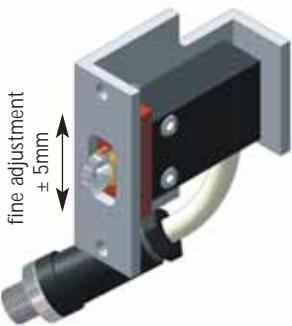
equivalent grease. At ZIMM available in 1kg cans.

Order no.: MSZ-LA02-Dose

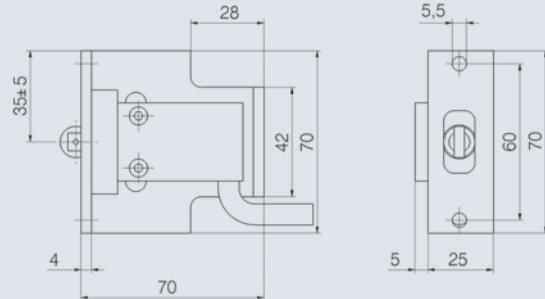
If you require more than one lubrication strip please advise. The following mounting positions can be specified: A (= standard), B, C or D



14.1.6 Limit Switch



Assembly group "limit switch" ESSET

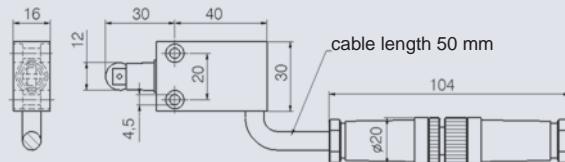


Assembly group consist of:
1 limit switch with 5-pole plug and
bushing for cable Ø 6 to 8 mm
1 fixing angle (aluminium)
1 distance piece (plastic)
2 screws M4
1 strip with thread 2xM4 (steel)
2 screws M5x8
2 spring washers for M5

Ordering example:
2 pcs MSZ-25-ESSET
(2 assembly groups per screw jack)
Attention: limit switches are only possible in
combination with protection against rotation (= switch cam).



Limit switch ES

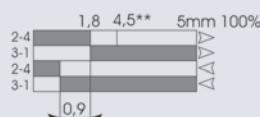


Control element
Switch diagram
Connection designation
acc. EN50 013

Skip switching elements
1 S + 1 O

Nominal shifting travels
0 line reference line acc. EN 50 041
** coercive opening acc.
IEC 60 947-5-1-3

■ switching element closed
□ switching element opened



Incl. 5-pole plug and bushing
for cable Ø 6 to 8 mm.

Order no.:
MSZ-ES

Technical data:
Type: Siemens 3SE3180 – 1D
Coercive opening acc. EN947-5-1
Equipped with skip switching contacts
Housing and roller tappet: metal
Type of protection: IP 67
Environmental temperature: -30 to +85°C

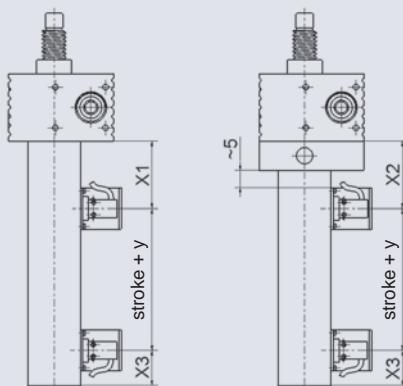
Switch frequency: 30/min
Rated insulation voltage Ui: 500V
Pollution degree: class 3
Conventional th. current Ith: 10A
Mechanical lifetime: 10⁷ switch cycles
Electric lifetime: 500 000 switch cycles
Connecting cable: PVC-5x0.75mm²
Contact opening: 2 x 1,25mm

CNL = Canadian National Standards - Listed
USL = United States Standards - Listed

Plug combination

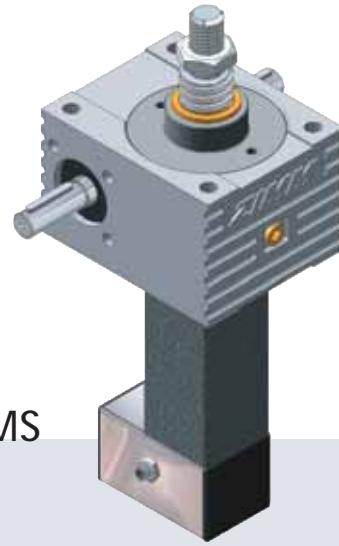


Mounting positions of limit switches

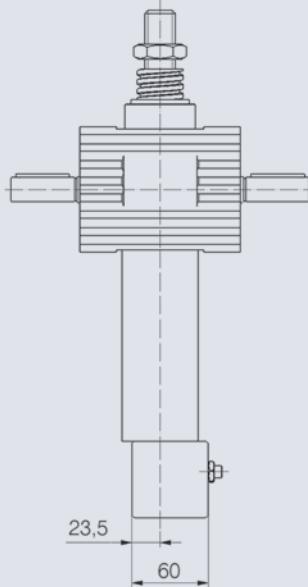
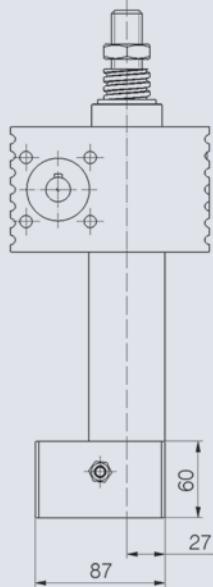


Size	X1	X2	X3	Y
MSZ-5	48	70	45	22
MSZ-10	52	70	45	24
MSZ-25	55	79	45	23
MSZ-50	65	89	45	33
MSZ-100	75	110	45	33
MSZ-150	73	120	45	33
MSZ-250	79	138	45	33
MSZ-350	84	150	50	38
MSZ-500	94	190	50	43
MSZ-650	95	190	50	43

The values X1, X2 and X3 change with MSZ with ball screw KGT, stroke + Y remain.



14.1.7 Analog, Absolute Linear Measuring System WMS



Technical data
Output type
Resolution
Measuring range
Connection

Input voltage
Divider resistance
Work range

Potentiometer $1\text{ k}\Omega$
Infinite
250, 500, 1000
plug M8x1, 3-pole,
female plug with 2m cable

max. 32 V DC at $1\text{ k}\Omega$
(max. performance 1 W)
 $1\text{ k}\Omega \pm 10\%$,
-15 to +60°C, max. 95% rel. humidity,
non-condensing

Order code WMS

WMS 250 R1K L35

Model
WMS

Measuring range (up to mm)
250 / 500 / 1000

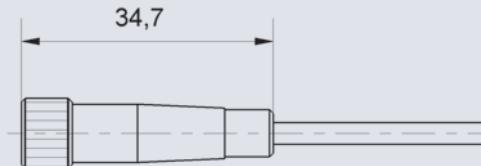
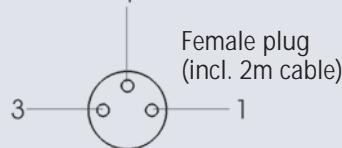
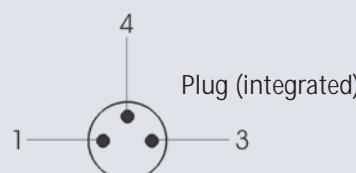
Output type
R1K = Potentiometer $1\text{ k}\Omega$
(other values on request, e.g. $10\text{ k}\Omega$)

Linearity
L35 = $\pm 0,35\%$

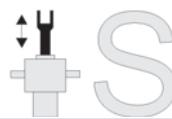
Accuracy of the linear measuring system WMS
Linearity $\pm 0,35\%$ referring to measuring range
Positioning accuracy $\pm 0,35\%$ referring to measuring range
e.g.: Type up to 250mm $\rightarrow \pm 0,875\text{mm}$
Repeat accuracy $\pm 0,035\%$ referring to measuring range
e.g.: Type up to 250mm $\rightarrow \pm 0,0875\text{mm}$



Please also note our
incremental rotary pulse
encoder DIG
(chapter 14.6.4)

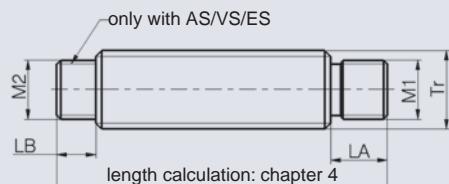


Pin assignment of female plug
1 brown Poti +
3 blue GND
4 black slider



14.1 For Standing Screw S

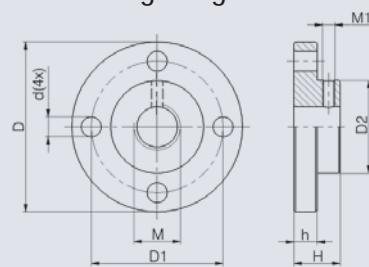
14.1.8 Trapezoid threaded screw MSZ-..S-Tr



Material: St 60, C35, C45 (INOX, double-pitch, left-handed on request, quality 7e DIN 103, pitch precision 0,2mm/300mm)

Order no.	Tr	M1	LA	M2	LB
MSZ- 5-S-Tr	Tr 18x4	M 12	29	M12	15
MSZ- 10-S-Tr	Tr 20x4	M 14	32	M14	20
MSZ- 25-S-Tr	Tr 30x6	M 20	38	M20	20
MSZ- 50-S-Tr	Tr 40x7	M 30	53	M30	30
MSZ-100-S-Tr	Tr 50x8	M 36	76	M36	30
MSZ-150-S-Tr	Tr 60x12	M 42x2	48	M48x2	30
MSZ-250-S-Tr	Tr 80x16	M 56x2	58	M64x3	30
MSZ-350-S-Tr	Tr 100x16	M 72x3	78	M72x3	35
MSZ-500-S-Tr	Tr 120x16	M100x3	118	M85x3	40
MSZ-650-S-Tr	Tr 140x20	M110x3	130	M100x3	40
MSZ-750-S-Tr	Tr 140x20	M110x3	130	M100x3	40

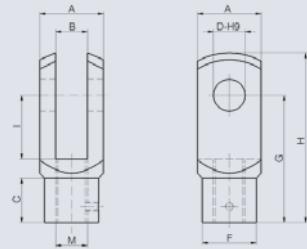
14.1.9 Fixing flange BF



Order no.	ØD	ØD1	ØD2	M	Ød	h	H	M1
MSZ- 5-BF	65	48	29	M 12	9	7	20	5
MSZ- 10-BF	80	60	38	M 14	11	8	21	6
MSZ- 25-BF	90	67	46	M 20	11	10	23	8
MSZ- 50-BF	110	85	60	M 30	13	15	30	8
MSZ-100-BF	150	117	85	M 36	17	20	50	10
MSZ-150-BF	170	130	90	M 42x2	21	25	50	10
MSZ-250-BF	210	165	120	M 56x2	26	30	60	12
MSZ-350-BF	260	205	145	M 72x3	32	40	80	12
MSZ-500-BF	310	240	170	M100x3	38	40	120	12

Material: steel, short-time nitrided
identical to previous SHZ type

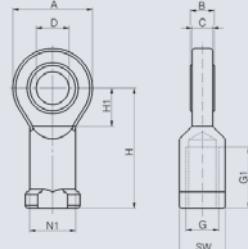
14.1.10 Forked head GK



Order no.	A	B	C	D	M	F	G	H	I
MSZ- 5-GK	24	12	18	12	M12(x1,75)	20	48	62	24
MSZ- 10-GK	27	14	22	14	M14(x2)	24	56	72	28
MSZ- 25-GK	40	20	30	20	M20(x2,5)	34	80	105	40
MSZ- 50-GK	60	30	42	30	M30(x3,5)	52	120	160	60
MSZ-100-GK	70	36	54	35	M36(x4)	60	144	188	72
MSZ-150-GK	85	42	63	42	M42x2	70	168	232	84

Material: 1.0718 (9 SMnPb 28K)
galvanized, with bolt and key
identical to previous SHZ type

14.1.11 Rod end KKG

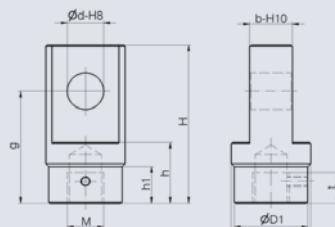


Order no.	A	B	C	D	G	G1	H	H1	SW	N1
MSZ- 5-KKG	34	10	8	12	M12(x1,75)	23	50	17,5	18	17
MSZ- 10-KKG	40	12	10	15	M14(x2)	30	61	20	21	20
MSZ- 25-KKG	53	16	13	20	M20(x2,5)	40	77	27,5	32	27,5
MSZ- 50-KKG	73	22	19	30	M30(x3,5)	56	110	37	41	40
MSZ-100-KKG	82	25	21	35	M36(x4)	60	125	42	50	47
MSZ-150-KKG	112	35	31	50	M42x2	68	160	56	70	62

Attention: Use only in combination with protection against rotation!
From size MSZ-250 on request

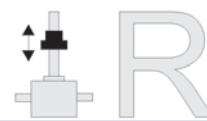
Material: steel/steel, galvanized
identical to previous SHZ type

14.1.12 Pivot bearing head SLK



Order no.	H	D	D1	d	g	b	h	h1	t	M
MSZ- 5-SLK	65	30	29	12	48	18	25	20	22	M12
MSZ- 10-SLK	80	40	39	14	56	24	25	20	25	M14
MSZ- 25-SLK	110	50	46	20	80	30	45	25	25	M20
MSZ- 50-SLK	130	60	60	30	92	35	50	-	33	M30
MSZ-100-SLK	144	85	85	35	108	40	65	-	55	M36
MSZ-150-SLK	210	100	90	50	155	57	90	50	70	M42x2
MSZ-250-SLK	260	125	120	80	180	80	85	40	63	M56x2
MSZ-350-SLK	280	145	145	95	195	100	105	-	83	M72x3
MSZ-500-SLK	335	170	160	110	245	120	155	80	120	M100x3

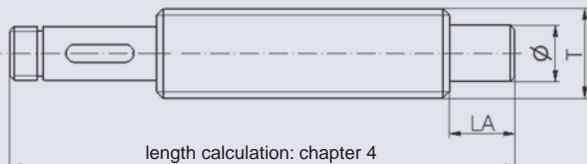
Material: steel, short-time nitrided
identical to previous SHZ type



14.2 For Rotating Screw R



14.2.1 Trapezoid threaded screw MSZ-..-R-Tr



Material: C35 or Ck15

Quality: DIN 103, 7e

Pitch precision: 0,2mm / 300mm

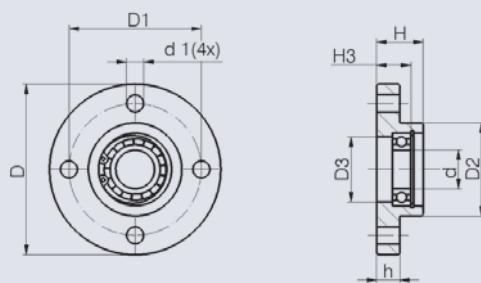
right-handed (double-pitch, INOX, left-handed on request)

Screw length calculation: see chapter 4

Order no.	T	Ø	LA
MSZ- 5-R-Tr	Tr 18x4	12j6	15
MSZ- 10-R-Tr	Tr 20x4	15j6	20
MSZ- 25-R-Tr	Tr 30x6	20j6	25
MSZ- 50-R-Tr	Tr 40x7	25j6	30
MSZ-100-R-Tr	Tr 50x8	40j6	45
MSZ-150-R-Tr	Tr 60x12	45j6	55
MSZ-250-R-Tr	Tr 80x16	60j6	75
MSZ-350-R-Tr	Tr 100x16	80j6	100
MSZ-500-R-Tr	Tr 120x16	95j6	120
MSZ-650-R-Tr	Tr 140x20	100j6	120
MSZ-750-R-Tr	Tr 140x20	100j6	120



14.2.2 Opposed bearing plate GLP



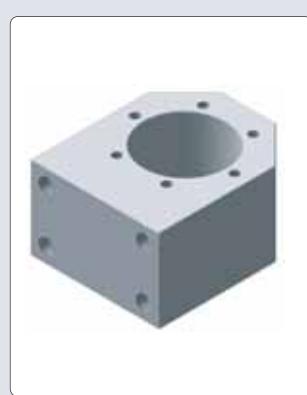
Material: steel, short-time nitrided

The ball bearing is already pre-assembled.

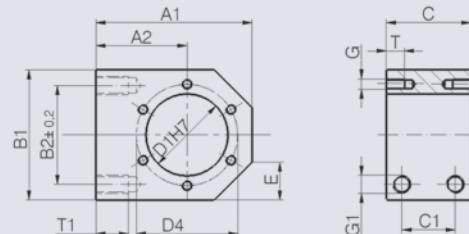
Identical to previous SHZ type

The opposed bearing plate improves the quiet running and the buckling resistance of the lifting gear.

Order no.	ØD	ØD1	ØD2	ØD3	Ød	Ød1
MSZ- 5-GLP	65	48	29	20	12	9
MSZ- 10-GLP	80	60	39	28	15	11
MSZ- 25-GLP	90	67	46	32	20	11
MSZ- 50-GLP	110	85	60	42	25	13
MSZ-100-GLP	150	117	85	60	40	17
MSZ-150-GLP	170	130	90	68	45	21
MSZ-250-GLP	210	165	120	85	60	26
MSZ-350-GLP	265	205	145	95	80	26
	h	H	H3	Bearing	Si Ring	
MSZ- 5-GLP	7	20	13	61901.2RS	J 24	
MSZ- 10-GLP	8	21	17	6002.2RS	J 32	
MSZ- 25-GLP	10	23	19	61904.2RS	J 37	
MSZ- 50-GLP	15	30	22	6005.2RS	J 47	
MSZ-100-GLP	20	50	35	6008-2RS	J 68	
MSZ-150-GLP	25	50	31	6009.2RS	J 75	
MSZ-250-GLP	30	60	50	2x6012.2RS	J 95	
MSZ-350-GLP	32	65	54	2x6016.2RS	J125	



14.2.3 Driving flange TRMFL for flange nut MSZ-..-FM



Order no.	for gearbox	A1	A2max*	A2min*	Weight
TRMFL-18x4	MSZ- 5	60	35,0	25,0	0,7 Kg
TRMFL-20x4	MSZ- 10	68	37,5	29,0	0,9 Kg
TRMFL-30x6	MSZ- 25	75	42,5	32,5	1,1 Kg
TRMFL-40x7	MSZ- 50	120	70,0	50,0	4,5 Kg

Order no.	B1	B2	C	C1	G1	D1	D4	GxT
TRMFL-18x4	50	34	40	24	M 8x15	28	38	M 5x10
TRMFL-20x4	58	39	40	24	M 8x15	32	45	M 6x12
TRMFL-30x6	65	49	40	24	M10x15	38	50	M 6x12
TRMFL-40x7	100	76	65	41	M14x25	63	78	M 8x14

* Supplied ex works with size A2max!

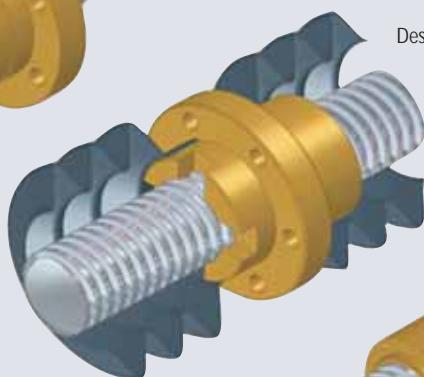
Material: steel, short-time nitrided



14.2.4 Nuts



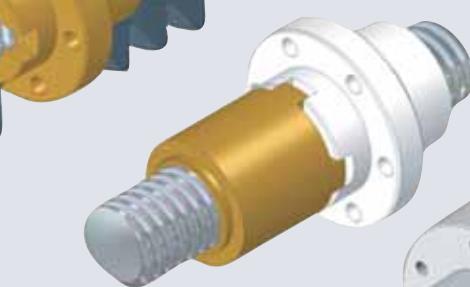
Flange Nut FM
Standard nut for simple designs



Design patent

Duplex Nut DM

- 2 flanges for bellows connection,
- Uniform flange diameter on gearbox neck,
- nut and opposed bearing plate
- Grease nipple or connection for centralised lubrication or automatic lubricator (14.3.7)



Safety Nut SIFA
In combination with Duplex Nut or Self-Aligning Nut. Function and use see chapter 8

Registered patent



Self-Aligning Nut PM

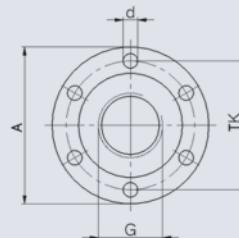
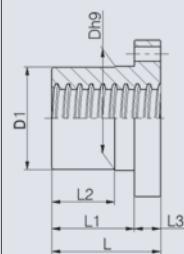
- Max. 3° angular compensation in all directions
- Possibility to fix 2 flanges
- Uniform flange diameter on gearbox neck, nut and opposed bearing plate
- Grease nipple or connection for centralised lubrication or automatic lubricator (14.3.7)

Greaseless Nut FFDM

- Specially designed for non-lubricated operation (e.g. textiles, foodstuffs, chemicals,...)
- Possibility to fix 2 flanges
- Reinforced with stainless steel disk



Flange Nut MSZ..-FM

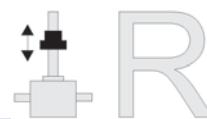


Order no.	G	Dh9	TK	A	d (6x)	L	L1	L2	L3
MSZ- 5-FM ²⁾	Tr 18x4	28	38	48	6	35	23	15	12
MSZ- 10-FM ²⁾	Tr 20x4	32	45	55	7	44	32	24	12
MSZ- 25-FM ²⁾	Tr 30x6	38	50	62	7	46	32	24	14
MSZ- 50-FM ²⁾	Tr 40x7	63	78	95	9	66	50	38	16
MSZ-100-FM	Tr 50x8	72	90	110	11	75	57	43	18

²⁾ identical to previous SHZ type
Material: 2.1090.01 (RG7 red brass alloy)
Quality: 7H DIN 103

D1=D-0,2 mm

right-handed (left-handed, double-pitch on request)

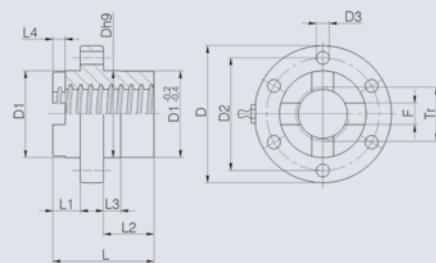


14.2.4 Nuts



Design patent

Duplex Nut MSZ-...-DM



Order no.	Tr	D	D1	D2	D3	L	L1	L2	L3	L4	F
MSZ- 5-DM ²⁾	Tr 18x4	52	29	40	6	45	13	20	12	6	6
MSZ- 10-DM ²⁾	Tr 20x4	68	39	54	7	45	13	20	12	6	8
MSZ- 25-DM ²⁾	Tr 30x6	79	46	61	7	50	13	23	14	7	12
MSZ- 50-DM ²⁾	Tr 40x7	95	60	78	9	70	18	36	16	8,5	15
MSZ-100-DM	Tr 50x8	130	85	108	11	90	18	54	18	10	20
MSZ-150-DM	Tr 60x12	140	90	116	13	115	20	75	20	10	20
MSZ-250-DM	Tr 80x16	185	120	153	17	140	25	85	30	10	25
MSZ-350-DM	Tr 100x16	230	145	189	23	160	25	100	35	15	24
MSZ-500-DM	Tr 120x16	255	170	214	23	180	30	110	40	20	30
MSZ-650-DM	Tr 140x20	289	215	252	23	220	30	140	50	25	30
MSZ-750-DM	Tr 140x20	289	215	252	23	220	30	140	50	25	30

²⁾ compatible with previous SHZ type

Material: 2.1090.01 (RG7 red brass alloy)

Quality: 7H DIN 103

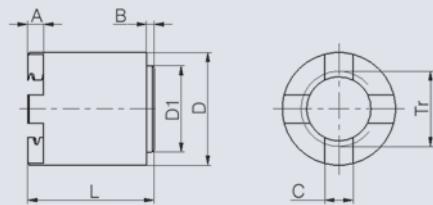
right-handed (left-handed, double-pitch on request)

Grease nipple screwed, up to MSZ-50 G1/8", from MSZ-100 on G1/4"



Safety Nut MSZ-...-SIFA

see chapter 8

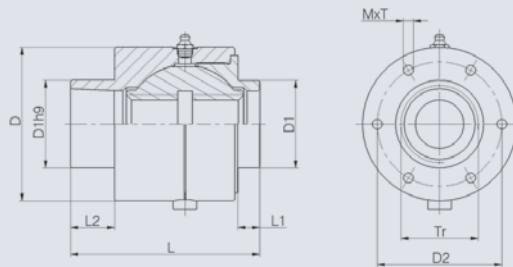


Order no.	Tr	A	B	C	D	D1	L
MSZ- 5-SIFA ²⁾	Tr 18x4	6	3	6	24	20	28
MSZ- 10-SIFA ²⁾	Tr 20x4	6	3	8	28	23	42
MSZ- 25-SIFA ²⁾	Tr 30x6	7	4	12	38	33	47,5
MSZ- 50-SIFA ²⁾	Tr 40x7	8,5	4	15	50	46	67
MSZ-100-SIFA	Tr 50x8	10	5	20	65	59	88
MSZ-150-SIFA	Tr 60x12	10	5	20	70	64	101
MSZ-250-SIFA	Tr 80x16	10	6	25	100	90	115
MSZ-350-SIFA	Tr 100x16	15	6	24	120	110	115
MSZ-500-SIFA	Tr 120x16	20	6	30	135	125	135
MSZ-650-SIFA	Tr 140x20	25	6	30	160	150	160
MSZ-750-SIFA	Tr 140x20	25	6	30	160	150	160

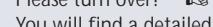
²⁾ identical to previous SHZ type

Registered patent

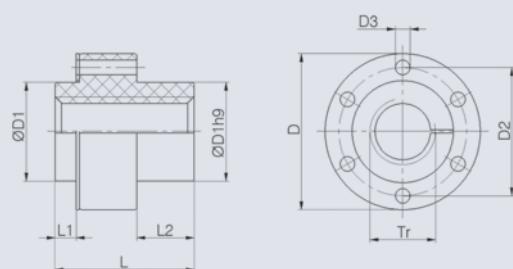
Self-Aligning Nut MSZ-...-PM



Please turn over!

You will find a detailed description
on the next page.

Greaseless Nut MSZ-...-FFDM



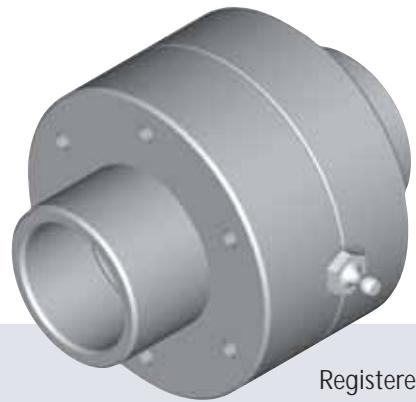
Order no.	Tr	D	D1	D2	D3	L	L1	L2	kN max. limit load ¹⁾
MSZ- 5-FFDM ²⁾	Tr 18x4	52	29	40	6	53	13	20	1
MSZ-10-FFDM ²⁾	Tr 20x4	68	39	54	7	53	13	20	2
MSZ-25-FFDM ²⁾	Tr 30x6	79	46	61	7	59	13	23	5
MSZ-50-FFDM ²⁾	Tr 40x7	95	60	78	9	85	15	35	7

Material nut: plastic, super PTFE-Compound
Material steel ring: stainless steel

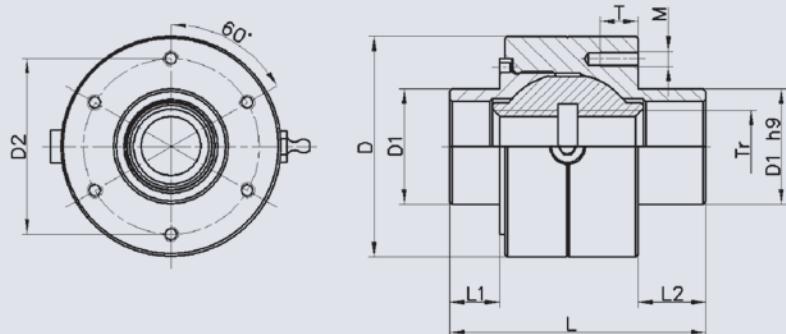
Quality: 7H DIN 103, right-handed

¹⁾ as guide value, depending on lifting speed and environmental temperature²⁾ identical to previous SHZ type SHZ-...-FFDM

14.2.4 Nuts / Self-Aligning Nut PM



Registered patent

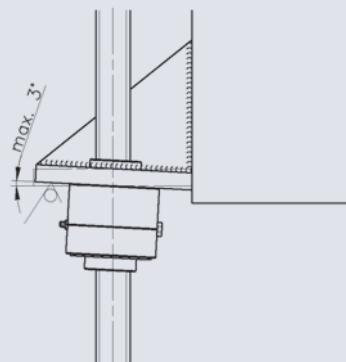


What it can do

Errors can occur in the welded construction, which can lead to rapid wear of the trapezoid nuts. The self-aligning nut is able to compensate for angular errors up to a max. of 3° on the mounting faces. Due to a large grease reservoir extended life and service intervals are possible.

What it cannot do

The self-aligning nut is not able to compensate parallelism errors of the screws and the guides. Care must be taken to ensure exact alignment of nuts and spindles. In addition the mounting faces for the gearbox must be exactly at right angles to the guides.



Advantage

- 2 options to fix the bellows
- Grease nipple or connecting thread for centralised lubrication
- Max. 3° angular compensation

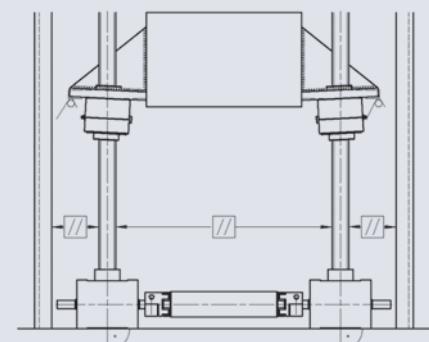
Trapezoid thread

DIN 103, quality 7H
right-handed

Grease nipple screwed
Thread 1/8" / 1/4" from Tr 50x8 on

Material

Housing: GG 25 (grey cast iron)
Nut insert: Rg7 (bronze)



Higher quality and service life

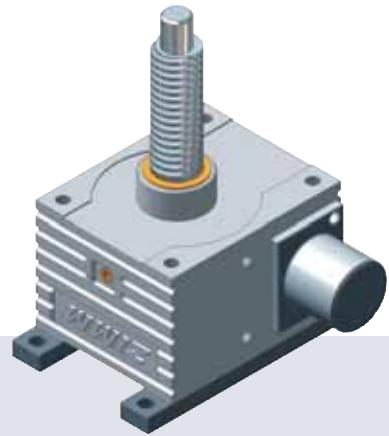
- +/- 3° angular compensation
- large grease reservoir

Saving of time and costs by

- simplified customer construction
- simplified production
- simplified mounting
- no additional components required
- long service intervals

Order no.	Thread Tr d x P	D	D1	D2	M x T	L	L1	L2
MSZ- 5-PM ²⁾	18x4	52	29	40	5x12	78	13	21
MSZ- 10-PM ²⁾	20x4	74	39	60	6x12	83	13	24
MSZ- 25-PM ²⁾	30x6	88	46	70	6x12	95	13	27
MSZ- 50-PM ²⁾	40x7	105	60	85	8x16	129	15	30
MSZ-100-PM new	50x8	148	85	120	10x20	190	15	45
MSZ-150-PM new	60x12	165	90	125	12x24	210	15	45

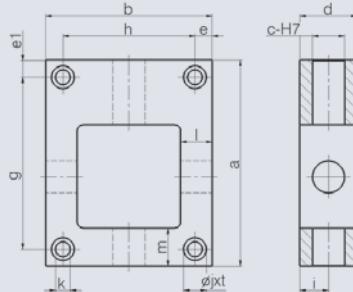
²⁾ identical to previous SHZ type SHZ-..-PM1



14.3 For S and R Version



14.3.1 Hinged bearing plate KAR



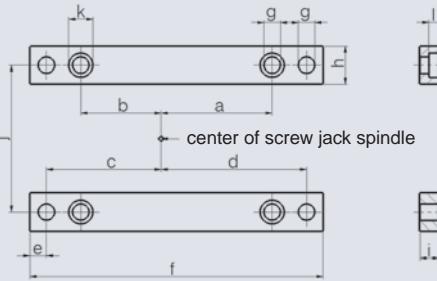
Order no.	a	b	c	d	e	e1	g	h	i	j	k	l	m	t
MSZ- 5-KAR ²⁾	80	72	16	30	10	60	52	15	15	9	18	10	9	
MSZ- 10-KAR ²⁾	100	85	16	30	11	11	78	63	15	15	9	16	11	9
MSZ- 25-KAR ²⁾	130	105	20	40	12	12	106	81	20	18	11	25	25	11
MSZ- 50-KAR ²⁾	180	145	30	50	15	15	150	115	25	20	13	24	30	13
MSZ-100-KAR	200	175	40	70	22	17	166	131	35	26	17	40	30	18
MSZ-150-KAR	220	205	50	80	25	25	170	155	40	33	22	40	28	22
MSZ-250-KAR	250	220	50	98	25	25	200	170	49	40	26	47	42	26
MSZ-350-KAR	295	270	60	110	35	30	235	200	55	46	30	52	40	30
MSZ-500-KAR	360	330	80	150	35	35	290	260	75	50	33	70	50	33
MSZ-650-KAR	400	350	90	150	40	40	320	270	75	58	39	70	52	39

Material: steel, short-time nitrided

²⁾compatible with previous SHZ type



14.3.2 Fixing strips MSZ-..-BFL



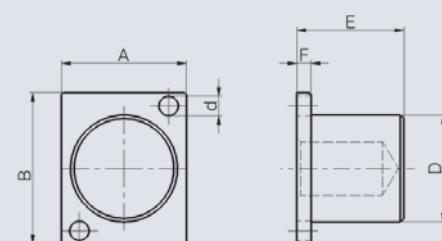
Order no.	a	b	c	d	e	f	g	h	i	j	k	l
MSZ- 5-BFL ²⁾	39	21	41	59	10	120	9	20	10	52	14	6
MSZ- 10-BFL	49	29	50	70	10	140	9	20	14	63	14	6
MSZ- 25-BFL ²⁾	64	42	64	86	10	170	11	25	12	81	17	7,5
MSZ- 50-BFL	87	63	90	114	13	230	13	30	20	115	19	7
MSZ-100-BFL	100	66	101	135	17	270	18	40	25	131	26	11
MSZ-150-BFL	100	70	115	145	20	300	22	50	35	155	33	13

Material: steel, short-time nitrided

²⁾compatible with previous SHZ type



14.3.3 Protective cap MSZ-..-SK



Order no.	D	d	A	B	E	F	Screws DIN 912
MSZ- 5-SK	30	7	50	50	34	8	M 6x16
MSZ-10-SK	30	9	50	50	37	8	M 8x16
MSZ-25-SK	40	9	60	60	55	8	M 8x16
MSZ-50-SK	60	11	70	85	60	8	M 10x16

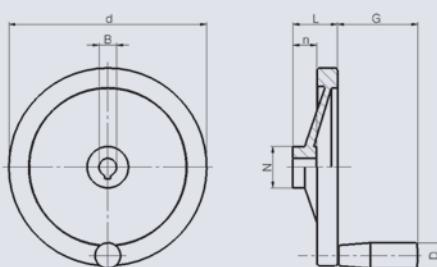
for sizes bigger than MSZ-100 on request

Material: plastic, POM

Compatible with MSZ and bevel gearboxes (KGZ, KSZ) identical to previous SHZ type



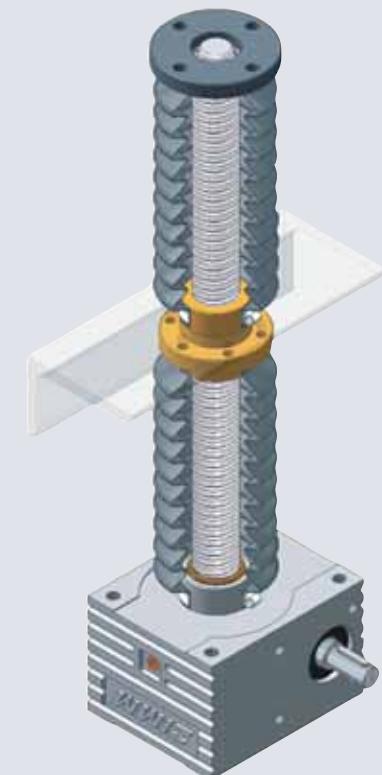
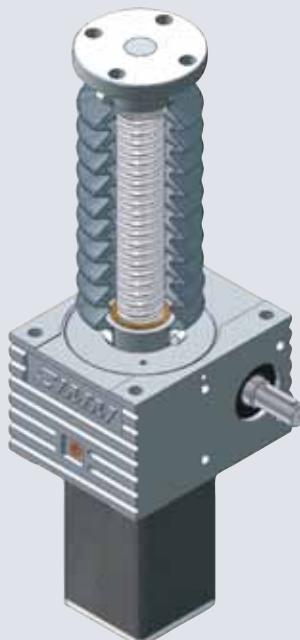
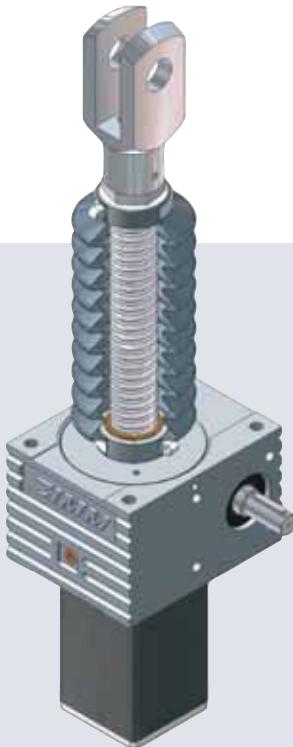
14.3.4 Handwheel HR



Order no.	d	N	b	n	L	G	D	B H7 rough hole	B H7 with keyway	Weight
HR- 80	80	26	13,0	16	26	42,5	18	8	11	0,16
HR-125	125	31	15,0	18	33	67,5	23	10	11 / 14	0,30
HR-160	160	36	18,0	20	39	82,5	26	14	14 / 16	0,50
HR-200	200	42	20,5	24	45	82,5	26	16	16 / 20	1,00
HR-250	250	48	23,0	28	51	92,5	28	20	20 / 25	1,30

Material: Aluminium, plastic (handle)

Ordering example: HR-125-11-N (N = with keyway, V = rough hole)



Bellows protect the screw against contamination and humidity.

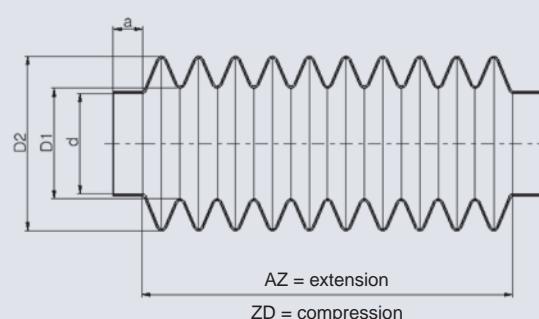
Attention:

The bellows must not be compressed below the ZD dimension or extended beyond the AZ dimension. For strokes greater than 1000 mm, use the bellow with the extension block. Take into consideration that, for horizontal installation of the bellows, it must not come into contact with screw: Serious wear will occur! This can be avoided by the use of support rings.

Especially for installation at construction sites, protect the screws from:
Construction dust, grinding dust of angle grinders, welding splatter, etc. Also protect the bellows against direct sun light. Take into consideration that the max. operating time of the gearboxes will be reduced due to the insulating effect of the bellows.



**Bellows MSZ-...-FB
round**



Order no.	a	d	ZD	AZ	Stroke	D1	D2
MSZ- 5-FB-265	10	29	35	300	265	40	76
MSZ- 10-FB-340	10	39	80	420	340	40	80
MSZ- 25-FB-300	15	46	70	370	300	50	83
MSZ- 50-FB-390	15	60	85	475	390	66	102
MSZ-100-FB-285	15	85	75	360	285	85	118
MSZ-150-FB-350	15	90	50	400	350	92	141
MSZ-250-FB-390	15	120	90	480	390	125	166
MSZ-350-FB-600	15	145	100	700	600	172	236

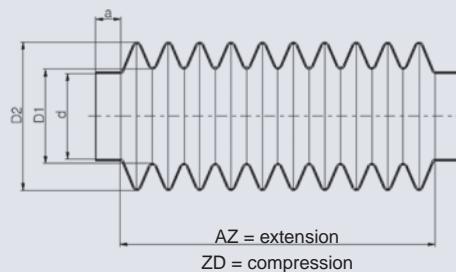
Material: Molerit-TH59 black, service temperature +70°C to max. +85°C, cold-crack temperature -32°C, incl. 2 pcs. galvanized hose connectors.

Attention: Screw extension see chapter 4 identical to previous SHZ type

14.3.5 Bellows FB



Bellow MSZ- . . -FB
square

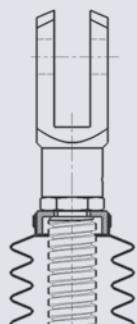


Material: polyurethane-coated polyester fabric type OZ-23, temperature resistance -15°C to +70°C, incl. 2 pcs. galvanized hose connectors.
Attention: Screw extension see chapter 4
Important! Please indicate in your order:
If mounted horizontally, the bellows must be provided with corresponding supporting rings in order to avoid abrasion by friction from the trapezoid screw. For strokes greater than 1000 mm, use the bellows with the extension block.
Compatible with previous SHZ types.

Order no.	a	d	ZD	AZ	Stroke	D1	D2
MSZ- 5-FB-500	10	29	100	600	500	38	68
MSZ- 5-FB-800	10	29	120	920	800	38	68
MSZ- 10-FB-700	10	39	100	800	700	38	75
MSZ- 10-FB-1000	10	39	150	1150	1000	38	75
MSZ- 25-FB-700	15	46	100	800	700	63	105
MSZ- 25-FB-1000	15	46	120	1120	1000	63	105
MSZ- 50-FB-600	15	60	72	672	600	63	105
MSZ- 50-FB-1000	15	60	130	1130	1000	63	105
MSZ- 50-FB-1200	15	60	125	1325	1200	63	105
MSZ- 50-FB-1500	15	60	180	1680	1500	63	105
MSZ-100-FB-600	15	85	72	672	600	63	105
MSZ-100-FB-1000	15	85	130	1130	1000	63	105
MSZ-100-FB-1500	15	85	180	1680	1500	63	105
MSZ-150-FB-600	15	90	72	672	600	110	150
MSZ-150-FB-1000	15	90	130	1130	1000	110	150
MSZ-150-FB-1500	15	90	180	1680	1500	110	150
MSZ-250-FB-600	15	120	72	672	600	110	150
MSZ-250-FB-1000	15	120	130	1130	1000	110	150
MSZ-250-FB-1500	15	120	180	1680	1500	110	150
MSZ-350-FB-900	15	145	108	1008	900	150	200
MSZ-350-FB-1500	15	145	180	1680	1500	150	200



Bushing MSZ-..-FBR



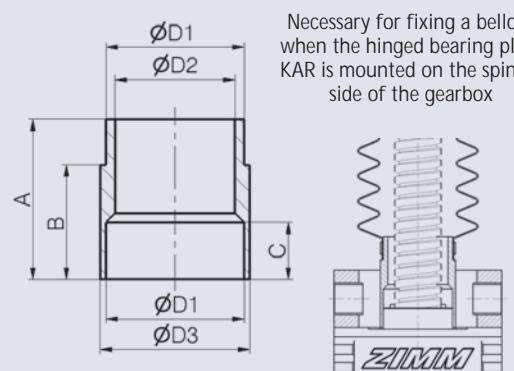
The bushing FBR is used with forked head GK or rod end KGK in order to fix the bellow FB.
Identical with previous SHZ type.
Material: POM (plastic)

Ordering example: MSZ-25-FBR

If you order a forked head GK or rod end KGK, the bushing will be automatically provided with the delivery.
If you do not order a forked head or rod end, please order the bushing separately.

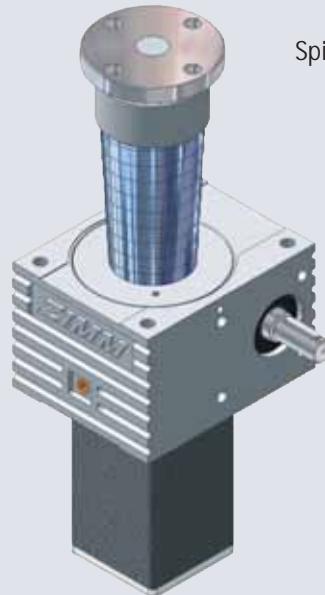
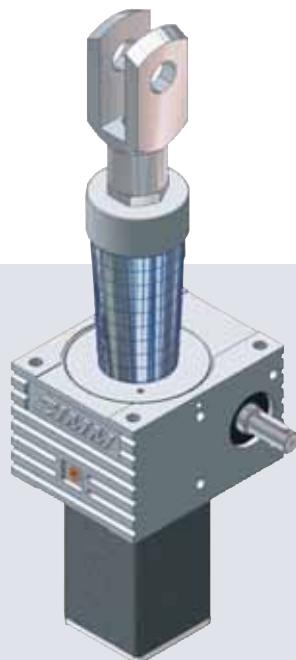


Bellow adapter MSZ-..-FBA

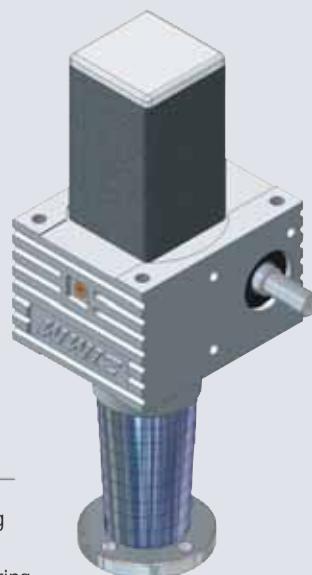


Order no.	D1	D2	D3	A	B	C
MSZ-5-FBA	29	25	32	44	32	20
MSZ-10-FBA	39	30	42	42	32	22
MSZ-25-FBA	46	40	50	57	42	26
MSZ-50-FBA	60	52	65	70	52	40
MSZ-100-FBA	85	80	90	90	72	50
MSZ-150-FBA	90	85	95	100	82	50
MSZ-250-FBA	120	115	125	118	100	60
MSZ-350-FBA	145	140	150	130	112	60
MSZ-500-FBA	170	150	180	172	152	70

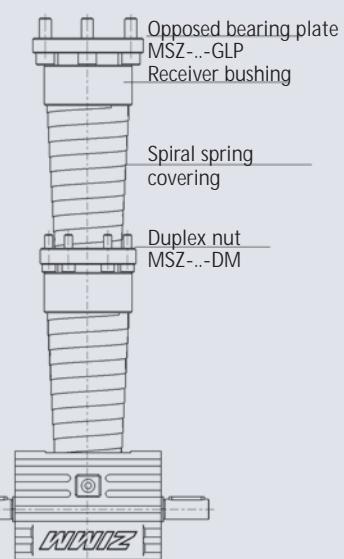
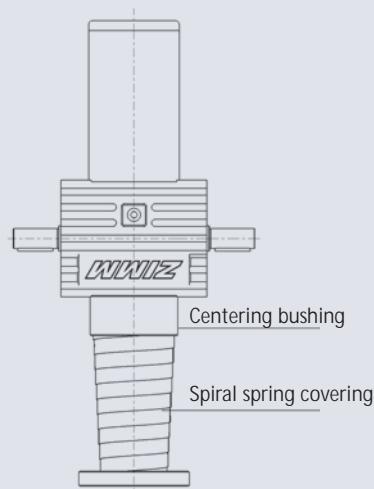
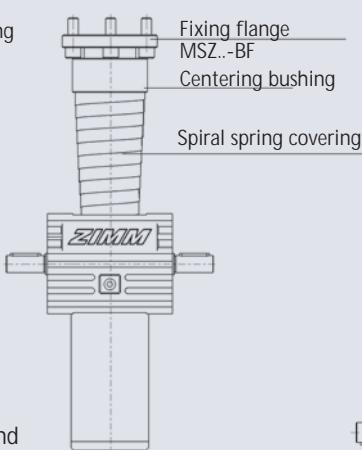
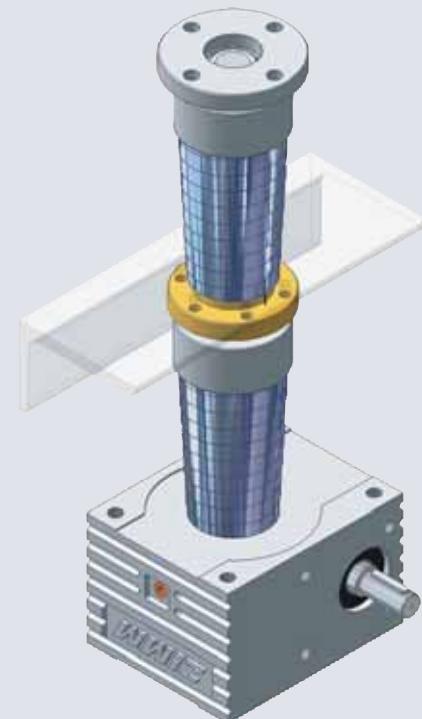
Material: Aluminium or steel



Spiral spring covering
for SN/SL



Spiral spring covering
for RN/RL



Mounting advice:

Spiral springs can be used for cutting and non-cutting applications. An overview is provided of the standard spiral spring and screw jack assemblies. If you want to combine different add-on components, centering bushings are required, which can be included in our quotation.

Important:

The spiral spring must not be allowed to uncoil. Please specify if the spiral spring SF is to be installed vertically or horizontally. We recommend placing the large diameter facing up for vertical installation, and for horizontal installation the large diameter in the direction of the waste material. A thin layer of oil film improves operation and increases the operating life.

14.3.6 Spiral Springs

14.3.6 Spiral Springs SF

Material: Band steel for springs (blued)

Also available in corrosion resistant material.

Ordering example:

Spiral spring	smallest diameter	longest length AZ*	smallest length ZD	horizontal mounting
D1				vertical mounting
SF - 030 - 0250 - 030 - H (V)				

***ATTENTION:**

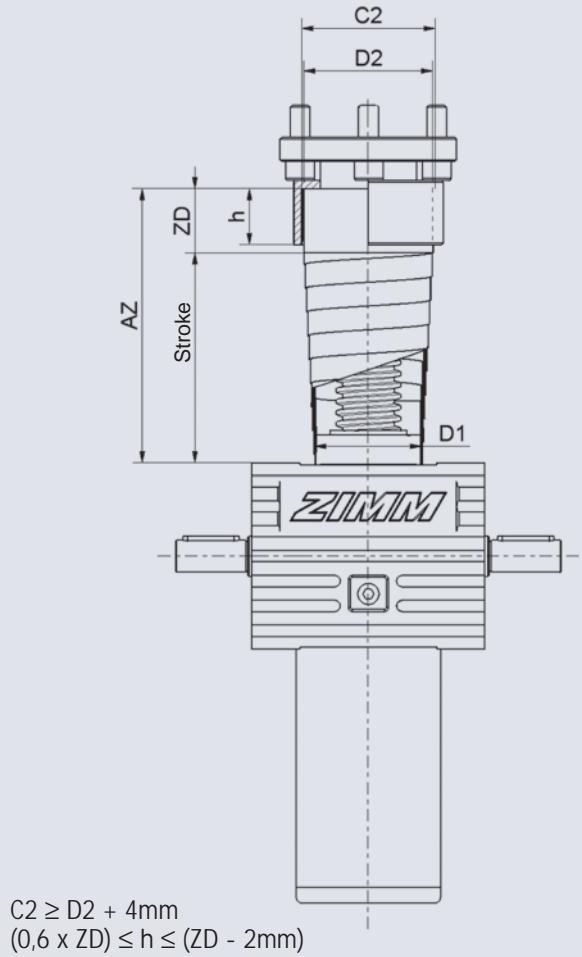
In case of horizontal mounting, the max. extension is reduced by 1/3. The exact dimension will be given in our offer.

Part numbers in bold text are preferred sizes.

- Horizontal mounting not available.

Screw jack MSZ-5			
Type SF	D1	D2	ZD
030-0150-030	30	39	30
030-0250-030	30	44	30
030-0350-030	30	49	30
030-0450-030	30	57	30
030-0550-040	30	59	40
030-0650-050	30	55	50
030-0750-050	30	59	50

Centering bushing			
Type SF	for SF with D2		
100-ZENTR.SET	< 100		
120-ZENTR.SET	< 120		
121-ZENTR.SET	>120		
100-ZENTR.OBEN	<100		
120-ZENTR.OBEN	<120		
121-ZENTR.OBEN	>120		
ZG-ZENTR.OBEN	drawing		
ZG-ZENTR.UNTEN	drawing		



Screw jack MSZ-10			
Type SF	D1	D2	ZD
040-0150-030	40	51	30
040-0250-030	40	56	30
040-0350-030	40	60	30
040-0450-040	40	63	40
040-0550-040	40	68	40
040-0450-050	40	58	50
040-0550-050	40	61	50
040-0650-050	40	65	50
040-0750-050	40	69	50
040-0650-060	40	62	60
040-0750-060	40	66	60
040-0900-060	40	70	60
040-0900-075	40	72	75
040-1100-075	40	78	75
040-1300-075	40	90	75
040-1500-075	40	90	75
040-1200-100	40	70	100
040-1500-100	40	78	100
040-1800-100	40	82	100

Screw jack MSZ-25			
Type SF	D1	D2	ZD
050-0250-030	50	68	30
050-0250-050	50	62	50
050-0350-050	50	66	50
050-0450-050	50	70	50
050-0550-050	50	73	50
050-0650-050	50	78	50
050-0750-060	50	76	60
050-0750-075	50	78	75
050-0900-075	50	83	75
050-1100-075	50	90	75
050-1200-075	50	94	75
050-1100-100	50	75	100
050-1200-100	50	79	100
050-1350-100	50	82	100
050-1500-100	50	86	100
050-1800-100	50	94	100
050-1700-120	50	91	120
050-2100-120	50	100	120
050-2500-120	50	111	120

Screw jack MSZ-50			
Type SF	D1	D2	ZD
065-0150-030	65	78	30
065-0250-030	65	85	30
065-0350-050	65	83	50
065-0450-050	65	88	50
065-0550-060	65	88	60
065-0650-060	65	92	60
065-0750-060	65	95	60
065-0900-060	65	98	60
065-0750-075	65	93	75
065-0900-075	65	99	75
065-1100-075	65	107	75
065-1000-100	65	91	100
065-1100-100	65	95	100
065-1300-100	65	99	100
065-1500-100	65	109	100
065-1800-100	65	117	100
065-1700-120	65	106	120
065-2200-120	65	118	120
065-2400-120	65	125	120
065-2600-120	65	128	120

Screw jack MSZ-100			
Type SF	D1	D2	ZD
090-0250-050	90	116	50
090-0350-050	90	121	50
090-0450-060	90	114	60
090-0650-075	90	124	75
090-0600-100	90	115	100
090-0900-100	90	123	100
090-1300-100	90	132	100

Screw jack MSZ-150			
Type SF	D1	D2	ZD
100-0250-060	100	119	60
100-0350-060	100	125	60
100-0600-075	100	129	75
100-0800-075	100	138	75
100-0900-100	100	131	100
100-1500-100	100	148	100
100-3000-200	100	170	200

14.3.7 Automatic Lubricator SG

The automatic lubricator SG continuously provides the screw with grease. The dispenser is activated by a chemical reaction which produces a positive pressure inside of the canister.

Advantages

- Cost effective solution due to automatic lubrication
- Longer lifetime, operation and reliability due to permanent lubrication

Technical data

- Activation by electrochemical reaction
- Temperature range: 0°C to +40°C
- Maximum pressure build-up of 4 bar
- Volume: 120 cm³

Time of dispense

Average temperature	Type 1 time of dispense (months)	start time (days)	Type 3 time of dispense (months)	start time (days)	Type 6 time of dispense (months)	start time (days)	Type 12 time of dispense (months)	start time (days)
0°C	4	5	8	12	15	16	<18	25
+10°C	2	3	5	4	8	8	18	10
+20°C	1	1	3	3	6	4	12	6
+30°C	0,8	<1	2	2	3	2	6	3
+40°C	0,6	<1	1	<1	2	1	3	1

The values stated in the table are only guide values, which have been calculated under test conditions. Lubricant, temperature and add-on-components (e.g. hose line) can have significant effects on the real time of dispense.



yellow = 1 month



green = 3 months

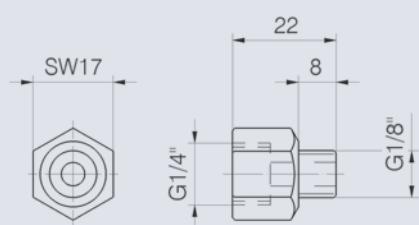


red = 6 months



grey = 12 months

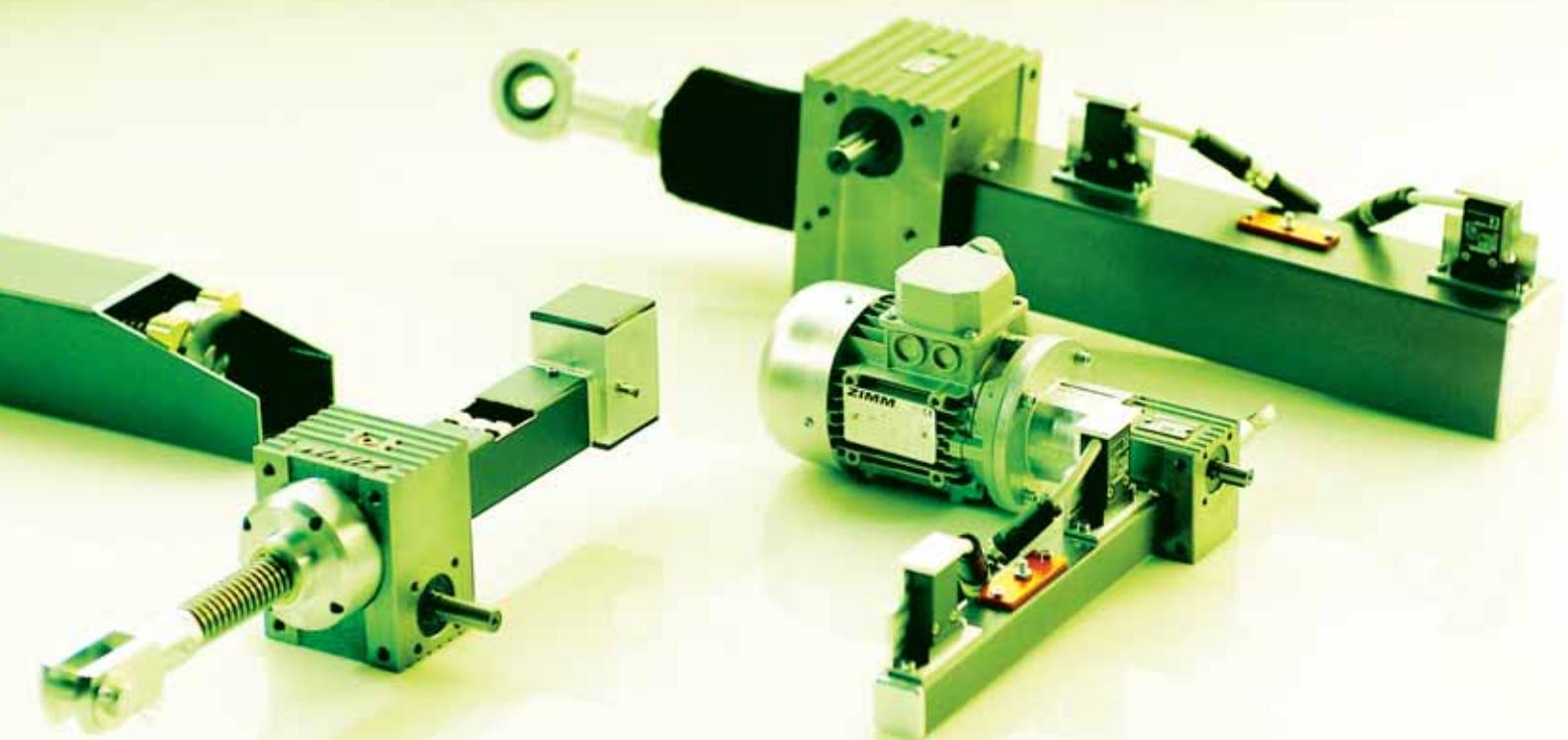
Ordering example: MSZ-SG-3M (automatic lubricator, incl. screw for 3 months of dispense)
 MSZ-SG (automatic lubricator separately)
 MSZ-SG-3M-S (screw separately, for 3 months of dispense)

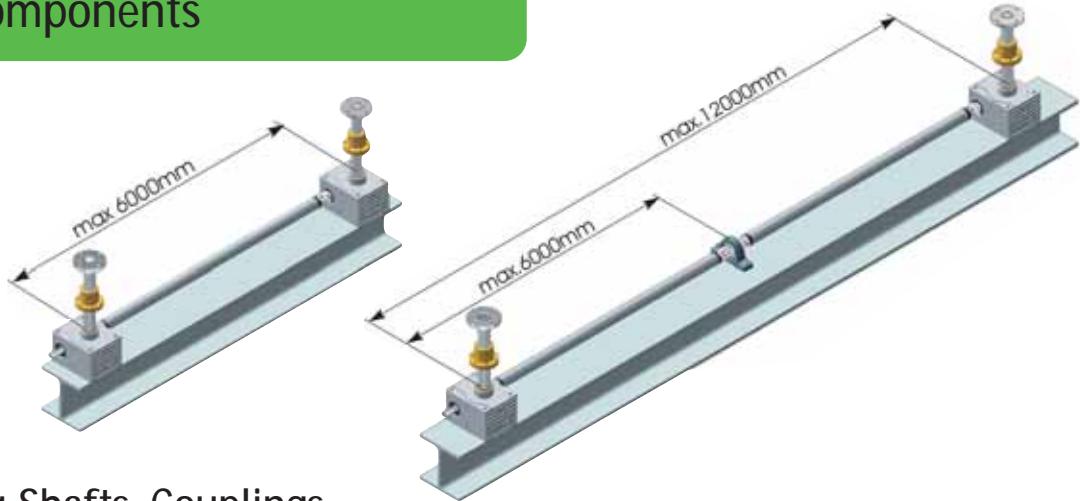


Reducer RS

In order to fix the automatic lubricator on the duplex nut DM or self-aligning nut PM up to size 50 a reducer of G1/4" to G1/8" is required.

Order no.: MSZ-SG-RS





14.4 + 14.5 Connecting Shafts, Couplings

The new performance characteristics of connecting shafts VWZ

- Lengths up to 6.000 mm
Depending on speed large centre distances are possible due to increased section diameter.
Additional pedestal bearings and supports are not necessary.

- 5 sizes
Shaft diameter 28, 40, 60, 80 and 100

- High concentric precision

- Shafts can be removed without disassembling the gearboxes saving time and cost.

- For speeds up to 3.000 U/min

- Infinitely variable height adjustment with clamping collar couplings

- Clamping hub couplings Available separately with optional standard drillings.

- Top design



14.4.1 New connecting shaft VWZ made of high-tensile alu alloy



14.4.2 Pedestal bearing STL



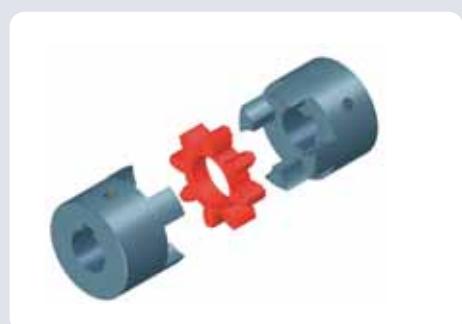
14.4.3 Precision shaft joints extendable KGW



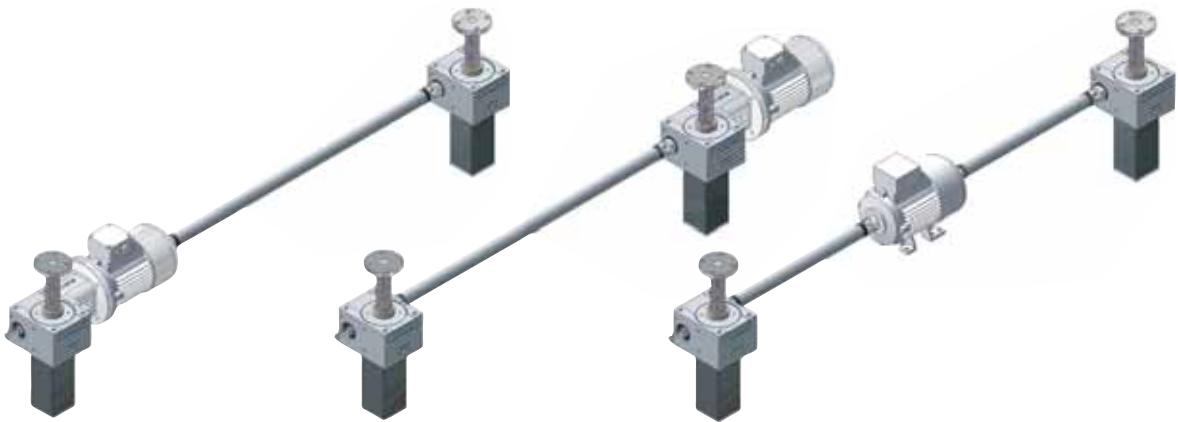
14.4.4 Connecting shaft GX

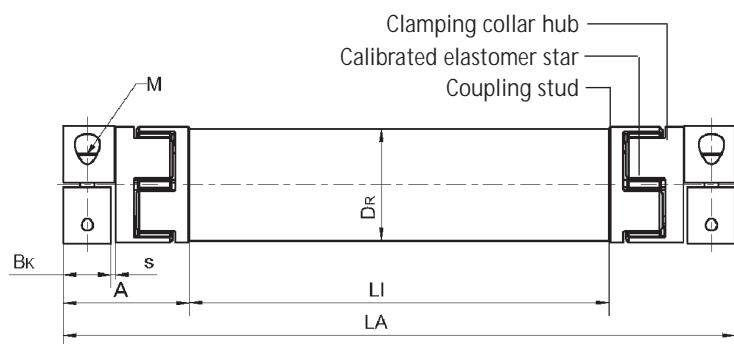
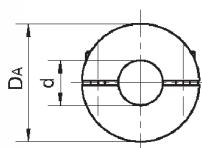


14.5.1 Clamping collar coupling KUZ-KK



14.5.2 Standard coupling KUZ





14.4.1 Connecting Shaft VWZ

Advantages of clamping hubs in half-shell design

- High concentric precision
- Easy radial assembly and disassembly of shaft with fixed mounted gearboxes.
- High clamping strength
- Quick assembly
- No backlash
- Additional connection securing with pin and keyway not necessary.
- No problems in disassembly even after long operating period.

Advantages of calibrated elastomer stars

- Heat treatment preempts ageing.
- Permanently free of play and vibration absorption, even during continuous operation because the star cannot "sit tight".
- Electrical insulating properties
- High positional accuracy

Dimension VWZ - connecting shaft - Standard

Size	DA	DR	BK	s	LA min	A
VWZ- 28	32	28	15	2	99	34
VWZ- 40	42	40	17	2	133	46
VWZ- 60	56	60	30	2	177	63
VWZ- 80	82	80	40	2	249	84
VWZ-100	102	100	50	2	283	97

On request also available in stainless steel.

Technical data VWZ

Size	max. ¹⁾ rated torque for continuous transmission with smallest bore-Ø	max. ¹⁾ rated torque for continuous transfer with largest bore-Ø	Couplings inertia moment in 10 ⁻³ kgm ²	Tube / m inertia moment in 10 ⁻³ kgm ²	Coupling type	M 10.9	Screw tightening torque in Nm	Torsion stiffness per star C _{Tdyn} [Nm/rad]	Weight in kg	
									Tube/m	Complete coupling
VWZ- 28	Ø11 - 12Nm	Ø16 - 12 Nm	0,01	-	KUZ-KK-16	M 4	4	1650	0,33	0,14
VWZ- 40	Ø11 - 17Nm	Ø22 - 17 Nm	0,08	0,2	KUZ-KK-24	M 5	8	2540	0,76	0,36
VWZ- 60	Ø11 - 40Nm	Ø32 - 60 Nm	0,24	0,8	KUZ-KK-32	M 6	15	7940	0,97	0,94
VWZ- 80	Ø16 - 160Nm	Ø45 - 325 Nm	2,4	3	KUZ-KK-45	M10	70	23700	2,00	2,98
VWZ-100	Ø25 - 450Nm	Ø55 - 450 Nm	6	5,8	KUZ-KK-60	M12	120	55400	2,47	4,62

1. The stated rated torque is valid for continuous transmission.

For short-time load it is possible to exceed the rated torque about 60%.
The limit of the torque is given by the load capacity of the star.

Standard Drilling diameters "d" [mm]

VWZ-28:	11, 14, 16
VWZ-40:	11, 14, 16, 19, 20, 22
VWZ-60:	11, 14, 16, 19, 20, 22, 24, 25, 28, 30, 32
VWZ-80:	16, 19, 20, 22, 24, 25, 28, 30, 32, 38, 42, 45
VWZ-100:	25, 28, 32, 38, 40, 42, 45, 48, 55

Notice

The black screws of the aluminium connecting shafts must not be replaced to ensure adequate security.

Ordering example:

VWZ - 60 - LA 2200 - 20/25
Size LA - outer length Coupling bore



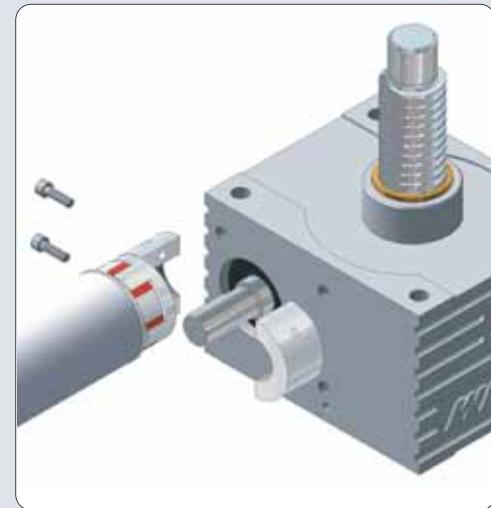
14.4.1 Connecting Shaft VWZ

Product description

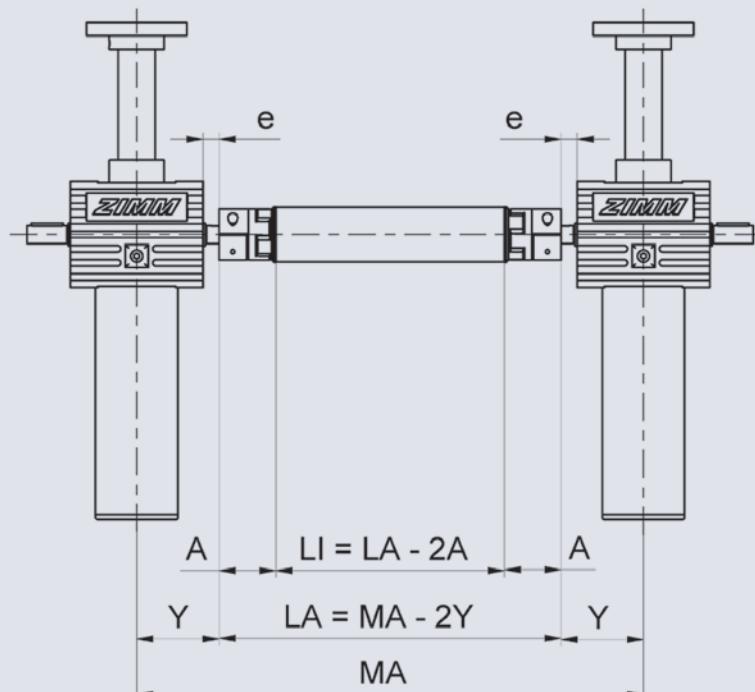
- Coupling hub and shaft: high-tensile aluminium, untreated, precision manufactured
 - Alu shaft: ground cylindrical
 - Coupling star: precision, extreme resistance against wear and temperature resistant elastomer plastic, Shore-hardness 98A (attention: VWZ-28 Shore-hardness 64D).
- Temperature range: 0°C to +70°C, reduced from -20°C to 0°C and from +70°C to +100°C

Mounting

Using half-shell couplings the connecting shafts can be assembled after installation of the screw jack gearboxes. Mount the connection shaft onto the gearbox drive shaft and assemble the half coupling tightening the screws to the required torque (see table - no keyway necessary).

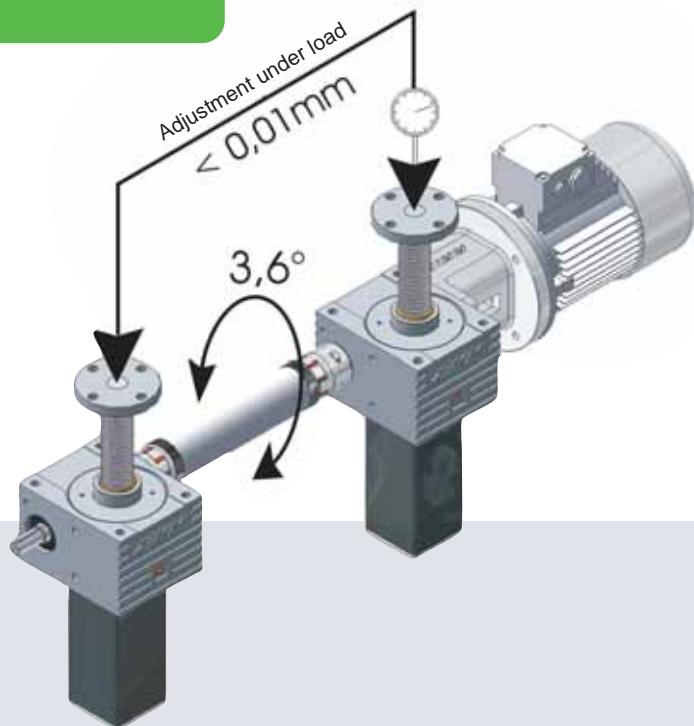


Length calculation



LI = inner length (tube length)
 LA = outer length (incl. coupling)
 MA = centre distance - gearboxes

Gearbox	Connecting Shaft	e	Y	A
MSZ- 5	VWZ- 28	9	45	34
MSZ- 5	VWZ- 40	7	43	46
MSZ- 5	VWZ- 60	2	38	63
MSZ- 10	VWZ- 28	12,5	55	34
MSZ- 10	VWZ- 40	10,5	53	46
MSZ- 10	VWZ- 60	2,5	45	63
MSZ- 25	VWZ- 40	28	80,5	46
MSZ- 25	VWZ- 60	15	67,5	63
MSZ- 25	VWZ- 80	5	57,5	84
MSZ- 50	VWZ- 60	17,5	90	63
MSZ- 50	VWZ- 80	7,5	80	84
MSZ-100	VWZ- 60	30	117,5	63
MSZ-100	VWZ- 80	20	107,5	84
MSZ-150	VWZ- 60	30	132,5	63
MSZ-150	VWZ- 80	20	122,5	84
MSZ-250	VWZ- 80	27,5	142,5	84
MSZ-250	VWZ-100	17,5	132,5	97
MSZ-350	VWZ- 80	27,5	162,5	84
MSZ-350	VWZ-100	17,5	152,5	97
MSZ-500	VWZ- 80	60	225	84
MSZ-500	VWZ-100	50	215	97
MSZ-650	VWZ-100	52,5	227,5	97



Height adjustment

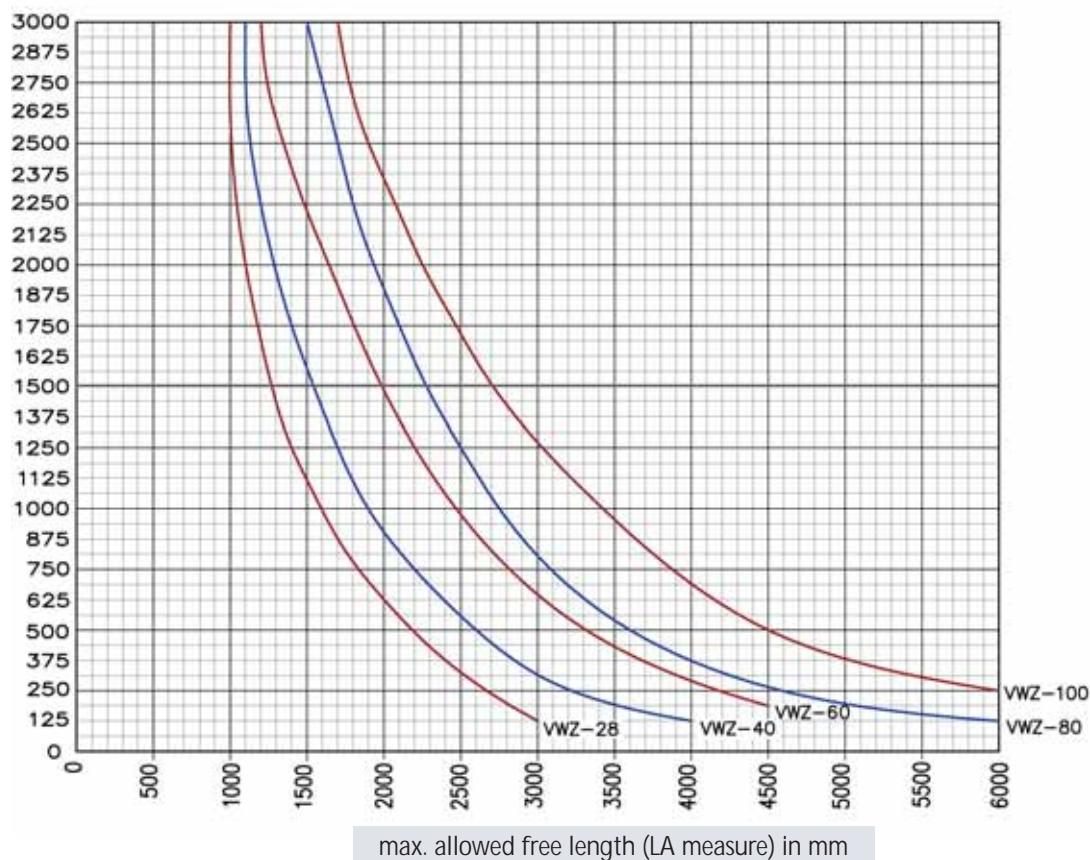
Adjusting the height of the various screw jacks connected by VWZ connecting shafts is very quick and easy. Loosening one clamping hub and adjusting on one side allows very precise movement. For example: With the standard gear reduction this means one 360° rotation is

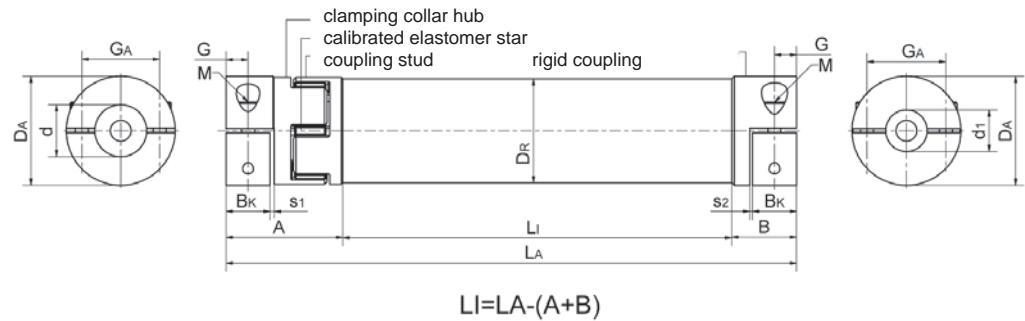
equivalent to 1 mm stroke, e.g. $3.6^\circ = 0.01\text{mm}$ stroke. When setting under load, one lifting system with several screw jacks can be positioned very accurately.



Set screw tightening torque acc. to table

Speed / length selection





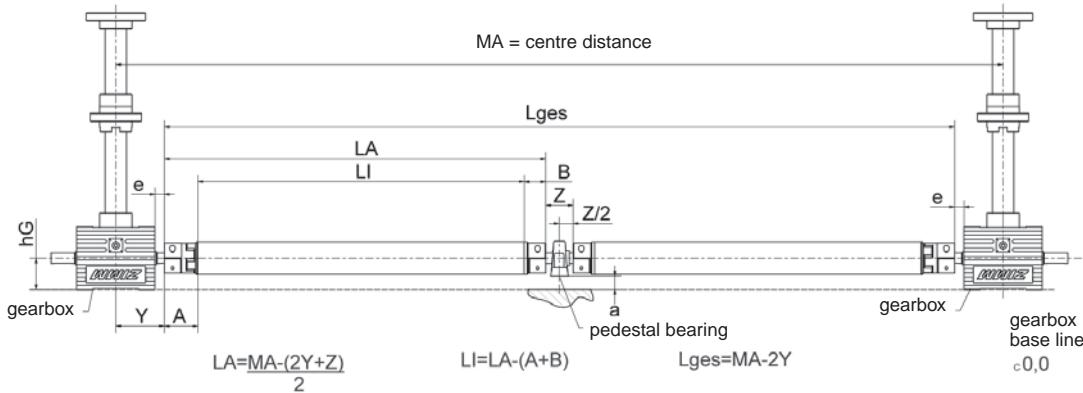
VWZ with Rigid Coupling for Use with Pedestal Bearing

In order to specify the correct shaft the method of assembly is very important. E.g. a larger diameter shaft which does not require additional support can be considerably lower cost than a smaller shaft

requiring additional pedestal bearings and support fabrication.

Size	A	B	s1	s2	Bk	LI	LA min
VWZ- 28	34	20	2	1,2	15	LA-54	85
VWZ- 40	46	25	2	1,6	17	LA-71	112
VWZ- 60	63	40	2	2	30	LA-103	154
VWZ- 80	84	55	2	2	40	LA-139	220
VWZ-100	97	65	2	2	50	LA-162	251

Gearbox - connecting shaft - pedestal bearing
Length specification and calculation



Gearbox	Connecting shaft	e	Y	A	B	Z	L_{wz}	STL	hG	hL	a
MSZ- 5	VWZ-28	9	45	34	20	44	74	15	31	30,2	0,8
MSZ- 5	VWZ-40	7	43	46	25	42	76	20	31	33,3	-2,3
MSZ- 5	VWZ-60	2	38	63	40	42	102	20	31	33,3	-2,3
MSZ- 10	VWZ-28	12,5	55	34	20	44	74	15	37	30,2	6,8
MSZ- 10	VWZ-40	10,5	53	46	25	42	76	20	37	33,2	3,8
MSZ- 10	VWZ-60	2,5	45	63	40	42	102	20	37	33,2	3,8
MSZ- 25	VWZ-40	28	80,5	46	25	42	76	20	41	33,2	7,8
MSZ- 25	VWZ-60	15	67,5	63	40	42	102	20	41	33,2	7,8
MSZ- 25	VWZ-80	5	57,5	84	55	50	130	30	41	42,9	-1,9
MSZ- 50	VWZ-60	17,5	90	63	40	42	102	20	58	33,3	24,7
MSZ- 50	VWZ-80	7,5	80	84	55	50	130	30	58	42,9	15,1
MSZ-100	VWZ-60	30	117,5	63	40	42	102	20	80	33,3	46,7
MSZ-100	VWZ-80	20	107,5	84	55	50	130	30	80	42,9	37,1
MSZ-150	VWZ-60	30	132,5	63	40	42	102	20	92,5	33,3	59,2
MSZ-150	VWZ-80	20	122,5	84	55	50	130	30	92,5	42,9	49,6
MSZ-250	VWZ-80	32,5	142,5	84	55	50	130	30	110	42,9	67,1
MSZ-250	VWZ-100	22,5	132,5	97	65	70	170	50	110	57,2	52,8
MSZ-350	VWZ-80	27,5	162,5	84	55	50	130	30	117	42,9	74,1
MSZ-350	VWZ-100	17,5	152,5	97	65	70	170	50	117	57,2	59,8
MSZ-500	VWZ-80	60	225	84	55	50	130	30	133	42,9	90,1
MSZ-500	VWZ-100	50	215	97	65	70	170	50	133	57,2	75,8
MSZ-650	VWZ-100	52,5	227,5	97	65	70	170	50	148	57,2	90,8

To achieve concentricity an exact axial alignment of shaft and pedestal bearings in both axes is required.

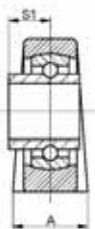
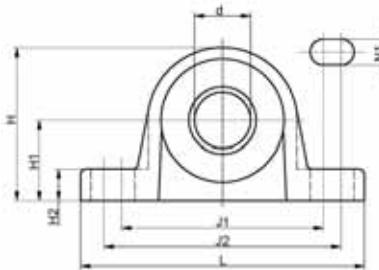
Check the following parameters to optimise selection:

- Distance between gearboxes
- Speed
- Torque
- Pedestal bearing support: yes / no

Ordering example:

Size 1S = 1 rigid coupling
2S = 2 rigid couplings
Length Length
Bores for
coupling
VWZ - 60 - 1S - LA 1800 - 20/25

n = 1500 min⁻¹



14.4.2 Pedestal Bearing STL for Connecting Shafts VWZ + GX

We use high-quality pedestal bearings in three housing designs:

- S = Standard version:
black plastic
- W = White plastic version
for food industry
- G = Cast iron version
as alternative

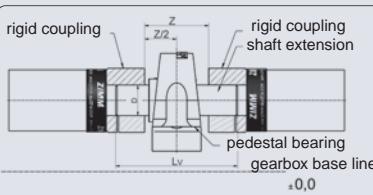
Types "S" and "W" have the same design, type "G" has minimum dimension deviation.

Type "S" is our preferred version.

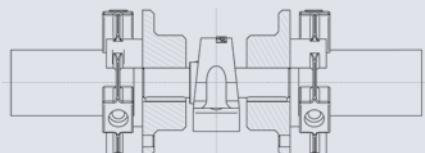
Temperature range: -30°C to +120°C

Order no.	Design	d	A	H	H1	H2	J1	J2	L	N1	S1
STL-15-G	cast iron	15	32	56	30,2	14	88	106	127	11,5	15,3
STL-20-S	plastic black	20	32	64	33,3	16	91,5	101,5	126	11,5	18,3
STL-20-W	plastic white	20	32	64	33,3	16	91,5	101,5	126	11,5	18,3
STL-20-G	cast iron	20	32	65	33,3	14	88	106	127	11,5	18,3
STL-30-S	plastic black	30	40	82	42,9	19	114	128	159	14	22,2
STL-30-W	plastic white	30	40	82	42,9	19	114	128	159	14	22,2
STL-30-G	cast iron	30	40	82,5	42,9	17	108	127	152	14	22,2
STL-40-S	plastic black	40	48	99	49,2	19	129	143	176	14	30,2
STL-40-W	plastic white	40	48	99	49,2	19	129	143	176	14	30,2
STL-40-G	cast iron	40	48	99	49,2	19	125	146	175	14	30,2
STL-50-G	cast iron	50	54	114,5	57,2	22	149	165	203	18	32,6

Pedestal bearing STL with shaft extension WZ

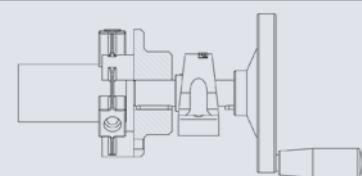


VWZ shaft with rigid coupling for pedestal bearing
Shaft extension without fitting key



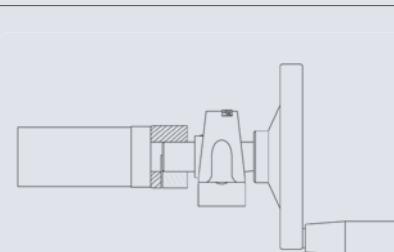
GX shaft with pedestal bearing

Shaft extension with fitting key on both sides



GX shaft with pedestal bearing and handwheel

Shaft extension with fitting key on both sides



Pedestal bearing with handwheel for VWZ shaft drive

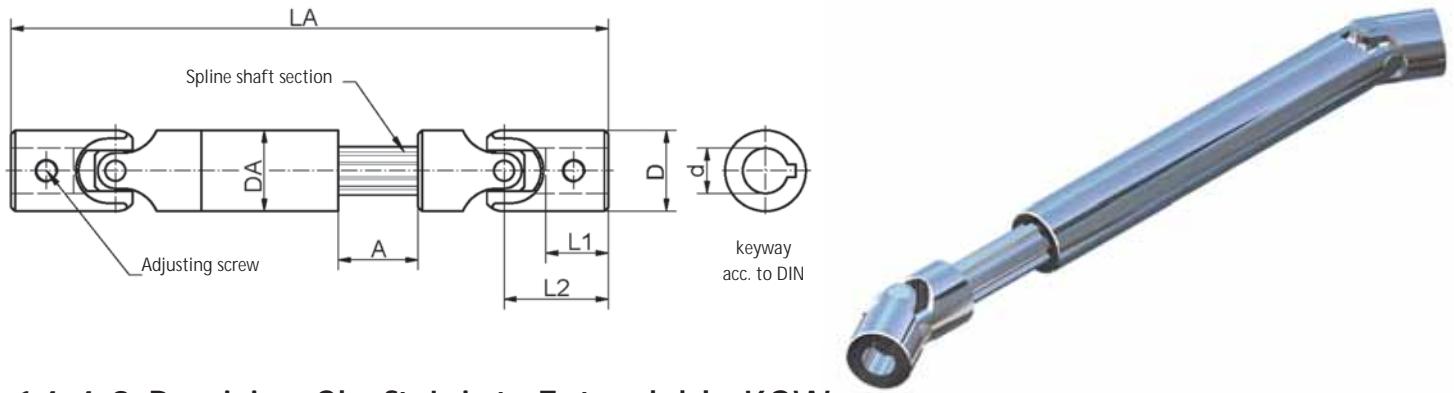
Shaft extension with fitting key on one side

Ordering example:

Shaft extension
Diameter (STL)
Length
number of fitting
keys (2 pc.)

WZ - 30 / 110 - 2P

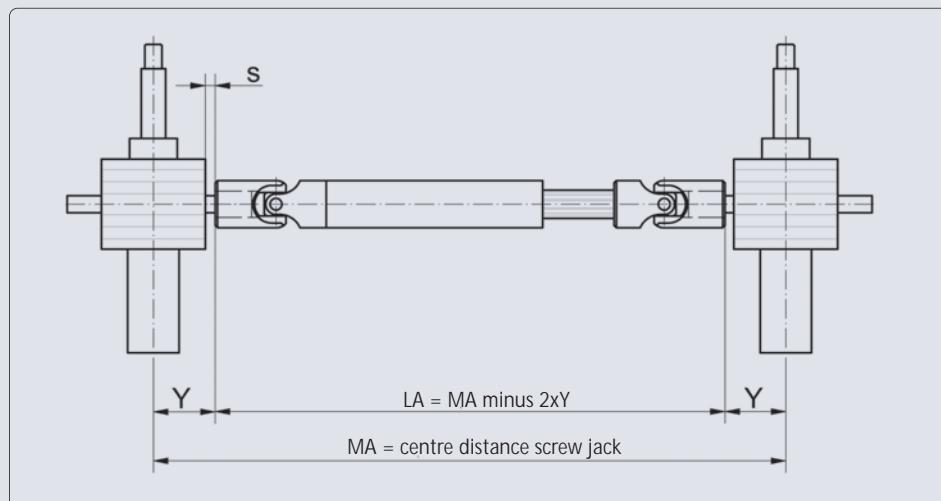
Material - shaft extension (all 4 types):
Ground steel



14.4.3 Precision Shaft Joints Extendable KGW

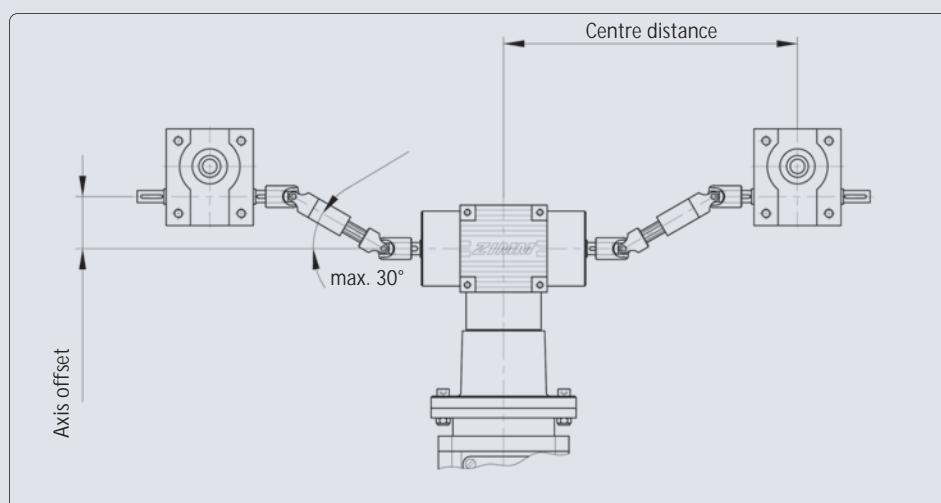
Size = order no.	Gearbox type	Extension A	L max. LA ±1	L min.= LA - A	DA	d max. d H7	L1	L2	Spline shaft section DIN ISO 14
KGW-22	MSZ-5	80	320	240	22	22	18	31	6x11x14
KGW-25	MSZ-10 / MSZ-25	90	370	280	26	25	16	21	6x13x16
KGW-32	MSZ-50	110	450	340	32	32	20	24	6x16x20
KGW-42	MSZ-100 / MSZ-150	130	550	420	42	42	25	31	6x21x25
KGW-50	MSZ-250	150	650	500	52	50	30	38	6x26x32

Other lengths on request



Gearbox type	Joint shaft	s	Y
MSZ- 5	KGW-22	6	42
MSZ- 10	KGW-25	6,5	49
MSZ- 25	KGW-25	24	76,5
MSZ- 50	KGW-32	23,5	96
MSZ-100	KGW-40	29	116,5
MSZ-150	KGW-40	29	131,5
MSZ-250	KGW-50	29,5	144,5

Dimensions can deviate due to product changes.



Axis offset and centre distance MA must be defined with a drawing when ordering (max. angle 30°).

Ordering example:

Size LA = outer length
Bore of coupling

KGW-32 - LA-350 - 16/18



14.4.4 Connecting Shaft GX

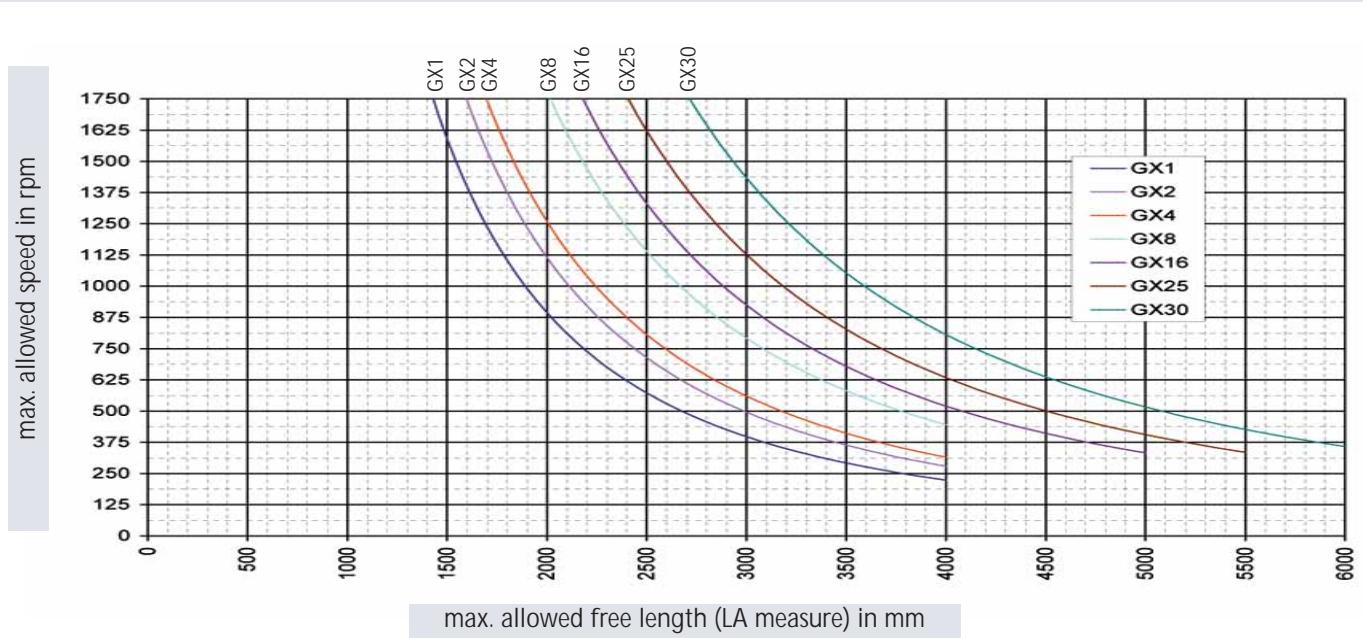
Size	Gearbox Size	Rated torque in Nm	Max. allw. torque in Nm	d2 from - to								
				A	B	d2 from - to	d3	d4	L	L2	LC	M
GX 1	MSZ-5 / MSZ-10	10	25	18	7	11 - 25	56	57	LA - 2L2	24	25	M 6
GX 2	MSZ-25	20	60	24	8	14 - 38	85	88	LA - 2L2	28	32	M 8
GX 4	MSZ-50	50	125	25	8	16 - 45	100	100	LA - 2L2	30	32,5	M 8
GX 8	MSZ-100	100	280	30	10	20 - 55	120	125	LA - 2L2	42	45	M10
GX16	MSZ-150/MSZ-250	200	560	35	12	22 - 70	150	155	LA - 2L2	50	53	M12
GX25	MSZ-350/MSZ-500	315	875	40	14	20 - 85	170	175	LA - 2L2	55	58	M14
GX30	MSZ-500	500	1400	50	16	25 - 100	200	205	LA - 2L2	66	71	M16

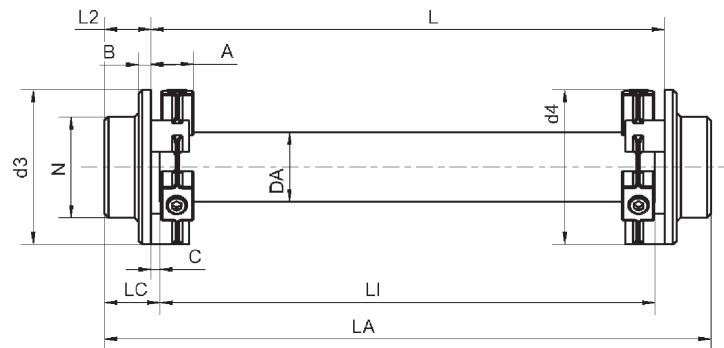
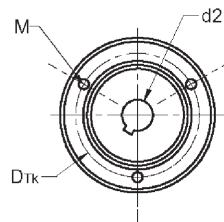
- Precision steel tubes acc. to DIN 2391
- Tube wall thickness: 1,5mm
- G1 = Weight - coupling
- G2 = Weight - tube (1m)
- d2 incl. keyway acc. to DIN 6885 and adjusting screw
- Environmental temperature max. 150° C
- Radial offset tolerance: 1°

Ordering example:

Size LA = outer length
Bore of coupling
GX 2 - LA-1500 - 16/20

Speed / length selection





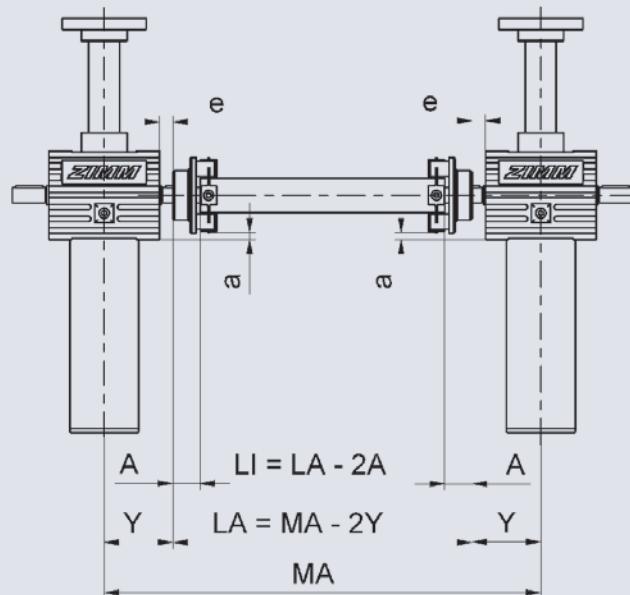
N	DA	C	D_{Tk} / ratio	Weight	
				G1 (kg)	G2 (kg)
36	30	1	44 / 2	0,47	1,05
55	40	4	68 / 2	1,06	1,42
65	45	2,5	80 / 3	2,31	1,61
80	60	3	100 / 3	3,55	2,16
100	70	3	125 / 3	6,16	2,53
115	85	3	140 / 3	9,50	3,09
140	100	5	165 / 3	15,21	3,60

Length determination

LI = inner length (tube length)

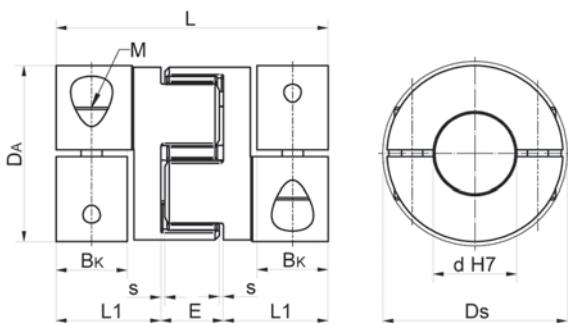
LA = outer length (incl. coupling)

MA = centre distance - gearboxes



Gearbox	GX type	e	Y	Distance a
MSZ- 5	GX 1	2	38	2,5
MSZ- 10	GX 1	3	46	8,5
MSZ- 25	GX 2	15	69,5	-1,5
MSZ- 50	GX 4	15	90	8
MSZ-100	GX 8	15	105,5	17,5
MSZ-150	GX16	7	112,5	15
MSZ-250	GX16	15	132,5	27,5
MSZ-350	GX25	10	147,5	29,5
MSZ-500	GX25	42,5	210	45,5
MSZ-500	GX30	31,5	199	45,5

Attention: Observe measure d_4 to surface!



14.5.1 Friction Coupling KUZ-KK

- Long design
- Half-shell clamp for high concentricity (without keyway)
- High-tensile aluminium
- With bore

Material

- Coupling hubs: high-tensile aluminium
- Elastomer star: precision made, high wear and temperature resistant plastic

Design

Two coupling hubs manufactured with high concentricity.

- Elastomer star - standard:
Shore hardness 98A, colour: red
(Attention: KUZ-KK-16 - colour: green - Shore hardness 64D)

Wider temperature range
0°C to 70°C,
reduced from - 20°C to 0°C
and from + 70°C to + 100°C

Standard drillings "d" [mm]

Coupling type	11, 14, 16
KUZ-KK-16:	11, 14, 16
KUZ-KK-24:	11, 14, 16, 19, 20, 22
KUZ-KK-32:	11, 14, 16, 19, 20, 22, 24, 25, 28, 30, 32
KUZ-KK-45:	16, 19, 20, 22, 24, 25, 28, 30, 32, 38, 42, 45
KUZ-KK-60:	25, 28, 32, 38, 40, 42, 45, 48, 55

Size	max. ¹⁾ rated torque for continuous trans- mission with smallest bore-Ø	max. ¹⁾ rated torque for continuous trans- mission with largest bore-Ø	DA	Outer Ø with screw Ds	L	BK fitting length	s	L1	E	M10.9	Screw tighten- ing tor- que in Nm	Mass moment of inertia in 10 ⁻³ kgm ²	Twist angle with max. torque (grade)	Weight coupling in kg
KUZ-KK-16	Ø 11 - 12 Nm	Ø 16 - 12 Nm	32	32	52	15	2	20	9	M 4	4	0,01	2	0,05
KUZ-KK-24	Ø 11 - 17 Nm	Ø 22 - 17 Nm	42	44,5	66	17	2	25	16	M 5	8	0,08	3	0,15
KUZ-KK-32	Ø 11 - 40 Nm	Ø 32 - 60 Nm	56	57	98	30	2	40	18	M 6	15	0,24	3	0,35
KUZ-KK-45	Ø 16 - 160 Nm	Ø 45 - 325 Nm	82	85	134	40	3	55	24	M10	70	2,4	4	1,1
KUZ-KK-60	Ø 25 - 450 Nm	Ø 55 - 450 Nm	102	105	156	50	3	65	26	M12	120	6	5	1,7

1) The stated rated torque is valid for continuous transmission.
For short-time load it is possible to exceed the rated torque about 60%.

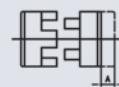
The limit of the torque is given by the load capacity of the star.

Size	Torsion stiffness C_{dyn} [Nm / rad]	max. torque in min ⁻¹	max. axial offset in mm (axial)	max. axial offset in mm (lateral)	max. angle error in grade (angular)
KUZ-KK-16	1650	19000	±2	0,08	1
KUZ-KK-24	2540	19000	±2	0,08	1
KUZ-KK-32	7940	14000	±2	0,1	1
KUZ-KK-45	23700	11500	±2	0,12	1
KUZ-KK-60	55400	9500	±2	0,14	1

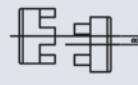
Set screw tightening torque acc. to table



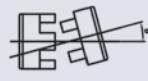
1. Offset - axial



2. Offset - lateral

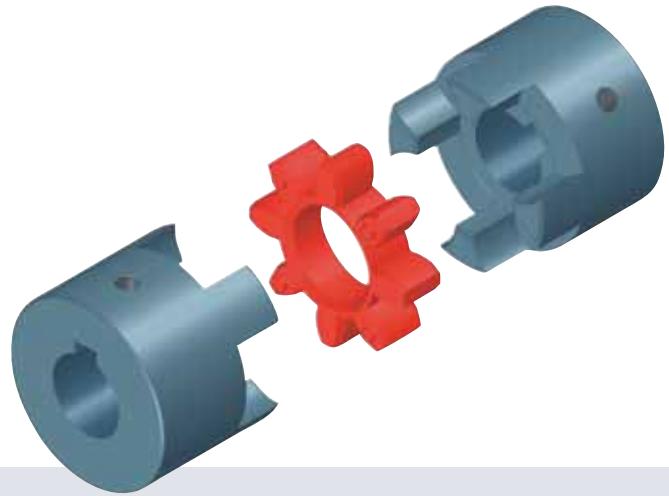


3. Angle error - angular



Ordering example:

Size Bore of
couplings
KUZ-KK-32 - 20/24



14.5.2 Standard Coupling KUZ

Standard coupling for general use with keyway and locking screw.

Material - coupling halves

Cast iron GG, sinterized steel, aluminium,
acc. to table

Material - coupling star

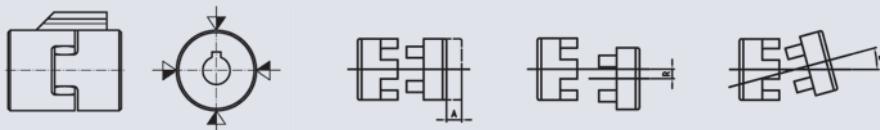
Polyurethane, Shore hardness 98 A

Ordering example:

Size Bore of
couplings

KUZ-24 - 20/24

Possible assembly errors



Assembly advice:
Check angle and radial offset in
two levels with straight-edge

Axial displacement A
axial

Offset R
lateral

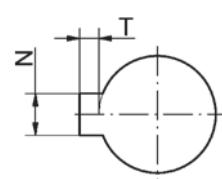
Angle error β
angular

Size	Twist angle with max. torque [grade]	Torsion stiff- ness $C_{T\text{dyn}}$ [Nm / rad]	Relative absorption	Resonance factor	max. torque [Nm]	Shore hardness star	max. torque [RPM]	allowable assembly error			E	L
								A	R	β		
KUZ-09	-	-	0,7	9	6	92A	28000	0,8	0,13	1,0°	-	30
KUZ-14	-	-	0,7	9	2,9	80A	20000	0,75	0,4	0,5°	-	44
KUZ-19	3,5°±0,5	-	0,7	9	4,8	80A	14000	0,75	0,4	0,5°	-	51
KUZ-24	3,5°±0,5	4200	0,7	9	34	98A	14000	1,2	0,2	0,4°	-	66
KUZ-28	3,5°±0,5	4875	0,7	9	120	98A	10600	1,4	0,22	0,9°	30	78
KUZ-38	4,0°±0,5	11535	0,7	9	320	98A	8500	1,5	1,25	0,9°	38	90
KUZ-45	4,5°±0,5	31355	0,65	10	650	98A	7100	1,8	1,28	1,1°	40	114
KUZ-55	3,5°±0,5	39900	0,7	9	910	98A	6000	2	1,32	1,1°	46	126

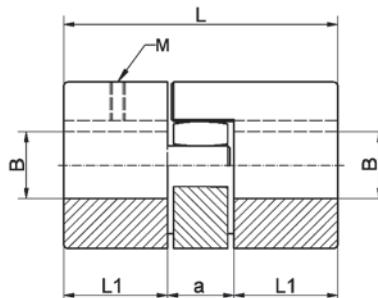
Coupling star for sizes KUZ09 and KUZ19
only available without drillings.

Measure the coupling so that the permissible coupling load is never exceeded in any operating state.

Please turn over!

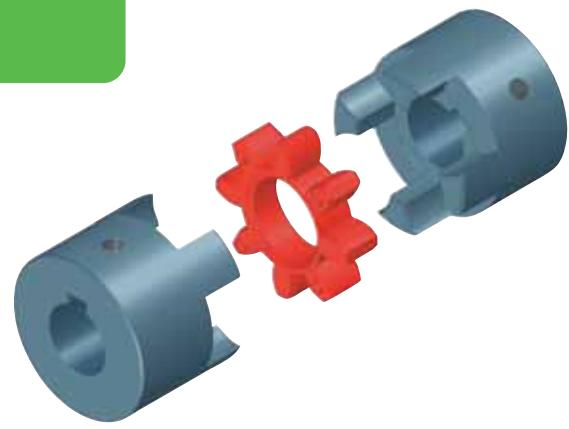


Keyway
DIN 6885/1-P9
Drilling U = not drilled

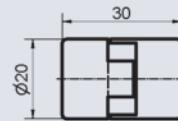


14.5.2 Standard Coupling KUZ

Order no.	Max. torque [Nm]	Max. torque [min ⁻¹]	Max. offset [mm]	Max. angle error [grade]	Max. twist angle [grade]	D	L1	a	M	B	ISO H7	L	N _{p9}	T ^{+0,2}	Material	Weight drilled in kg
KUZ-09-05	6	28000	0,08	0,9	-	20	10	10	M4	5	30	-	-	-	AL-H	0,05
KUZ-09-06									M4	6		-	-			
KUZ-09-07									M4	7		-	-			
KUZ-09-08									M4	8		-	-			
KUZ-09- U									-	-		-	-			
KUZ-14-09	2,9	20000	0,4	1,5	-	27,5	16	12	M3	9	44	3	1,4		Sinterized steel / Cast iron GG	0,14
KUZ-14-11									M4	11		4	1,8			
KUZ-14-14									M5	14		5	2,3			
KUZ-14- U (pre-drilled Ø 6,3)									-	-		-	-			
KUZ-19-11	4,8	14000	0,35	1	3,5±0,5	34,5	19	13	M4	11	51	4	1,8		0,027	
KUZ-19-14									M5	14		5	2,3			
KUZ-19-16									M5	16		5	2,3			
KUZ-19-19									M6	19		6	2,8			
KUZ-19- U (pre-drilled Ø 6,3)									-	-		-	-			
KUZ-24-11	34	14000	0,2	0,9	3,5±0,5	40	25	16	M5	11	66	4	1,8		Sinterized steel / Cast iron GG	0,34
KUZ-24-14									M5	14		5	2,3			
KUZ-24-16									M5	16		5	2,3			
KUZ-24-19									M5	19		6	2,8			
KUZ-24-20									M5	20		6	2,8			
KUZ-24-24									M6	24		8	3,3			
KUZ-24- U									-	-		-	-			
KUZ-28-16	120	10600	0,22	0,9	3,5±0,5	55	30	18	M5	16	78	5	2,3		Cast iron GG	0,9
KUZ-28-19									M5	19		6	2,8			
KUZ-28-20									M5	20		6	2,8			
KUZ-28-24									M5	24		8	3,3			
KUZ-28-25									M5	25		8	3,3			
KUZ-28-28									M5	28		8	3,3			
KUZ-28- U									-	-		-	-			
KUZ-38-25	320	8500	0,25	0,9	4±0,5	65	35	20	M6	25	90	8	3,3		Cast iron GG	1,5
KUZ-38-28									M6	28		8	3,3			
KUZ-38-32									M6	32		10	3,3			
KUZ-38-38									M6	38		10	3,3			
KUZ-38- U									-	-		-	-			
KUZ-45-25	650	7100	0,28	1	4,5±0,5	80	45	24	M8	25	114	10	3,3		Cast iron GG	2,35
KUZ-45-32									M8	32		10	3,3			
KUZ-45-38									M8	38		10	3,3			
KUZ-45-42									M8	42		12	3,3			
KUZ-45-45									M8	45		14	3,8			
KUZ-45- U									-	-		-	-			
KUZ-55-42	910	6000	0,32	1	3,5±0,5	95	50	26	M8	42	126	12	3,3		Cast iron GG	3,57
KUZ-55-48									M8	48		14	3,8			
KUZ-55-55									M8	55		16	4,3			
KUZ-55- U									-	-		-	-			



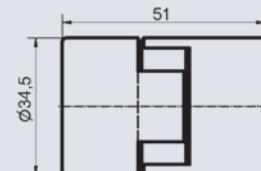
KUZ09

5, 6, 7, 8,
UBore diameter, ISO H7
U = not drilled

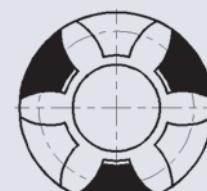
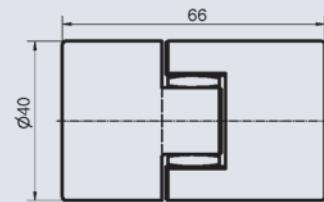
KUZ14

9, 11, 14,
U (pre-drilled Ø 6,3)Elastic star
KUZ09 / 92 Shore A, KUZ14 / 80 Shore A,
KUZ24 to KUZ55 / 98 Shore A,
slit couplings, KUZ-GS09 to KUZ-GS26 /
98 Shore A

KUZ19

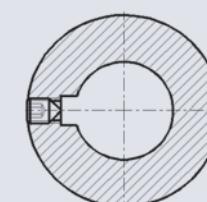
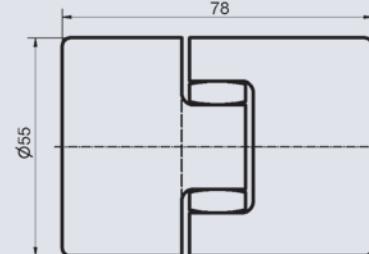
11, 14, 16, 19,
U (pre-drilled Ø 6,3)

KUZ24

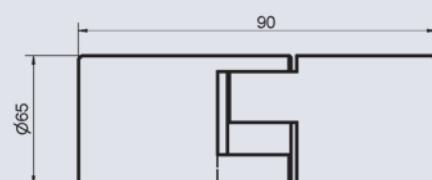
11, 14, 16, 19,
20, 24,
U

- Pre-drilled
- Grooved DIN 6885/1-P9
- With adjusting screw

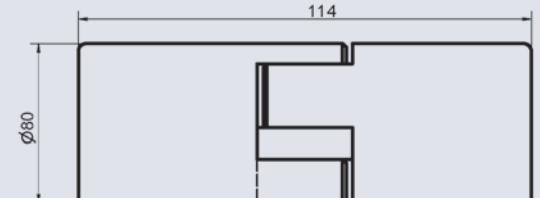
KUZ28

16, 19, 20,
24, 25, 28,
U

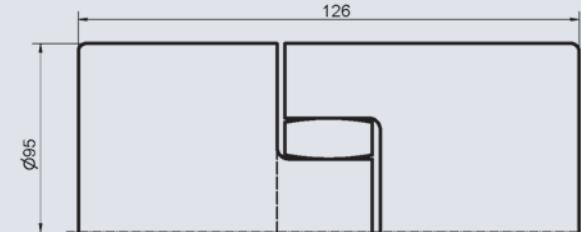
KUZ38

25, 28, 32, 38,
U

KUZ45

25, 32, 38,
42, 45,
U

KUZ55

42, 48, 55,
U

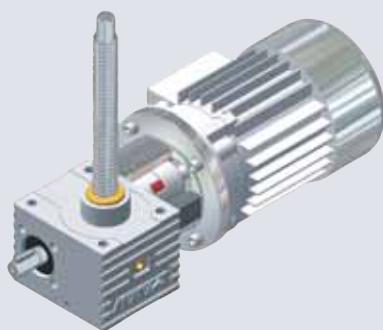
14.6 Standard Combinations - Motor Assembly



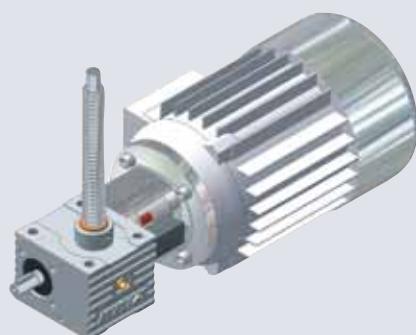
250 N stat.
 Screw Jack: SHZ-02
 Motor: SHZ-GM-24V
 Coupling: KUZ 09-GS-5/8
 Flange: SHZ-02-MOTF
 Screw: Tr 12x3 / Tr 12x6P3



5 kN stat.
 Screw Jack: MSZ-5
 Motor: 63 B14-120
 Coupling: KUZ 14-11/11
 Flange: MSZ-5-MF-120-60
 Screw: Tr 18x4



10 kN stat.
 Screw Jack: MSZ-10
 Motor: 63 B14-120
 Coupling: KUZ 19-14/11
 Flange: MSZ-10-MF-120-66
 Screw: Tr 20x4



5 kN stat.
 Screw Jack: MSZ-5
 Motor: 71 B14-105
 Coupling: KUZ 19-11/14
 Flange: MSZ-5-MF-105-68
 Screw: Tr 18x4



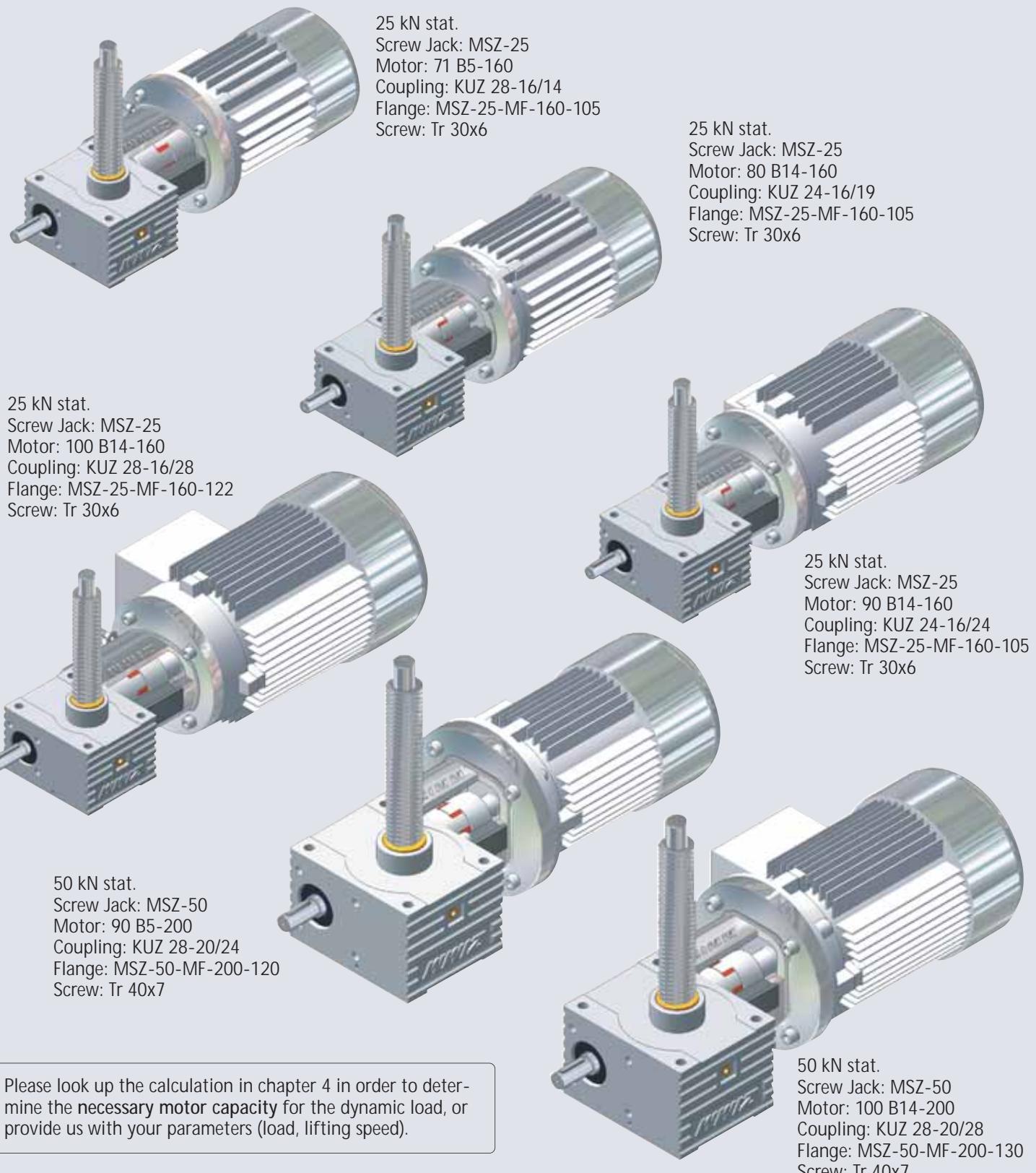
10 kN stat.
 Screw Jack: MSZ-10
 Motor: 71 B5-160
 Coupling: KUZ 19-14/14
 Flange: MSZ-10-MF-160-75
 Screw: Tr 20x4



10 kN stat.
 Screw Jack: MSZ-10
 Motor: 80 B14-160
 Coupling: KUZ 24-14/19
 Flange: MSZ-10-MF-160-90
 Screw: Tr 20x4

Please look up the calculation in chapter 4 in order to determine the **necessary motor capacity** for the dynamic load, or provide us with your parameters (load, lifting speed).

14.6 Standard Combinations - Motor Assembly

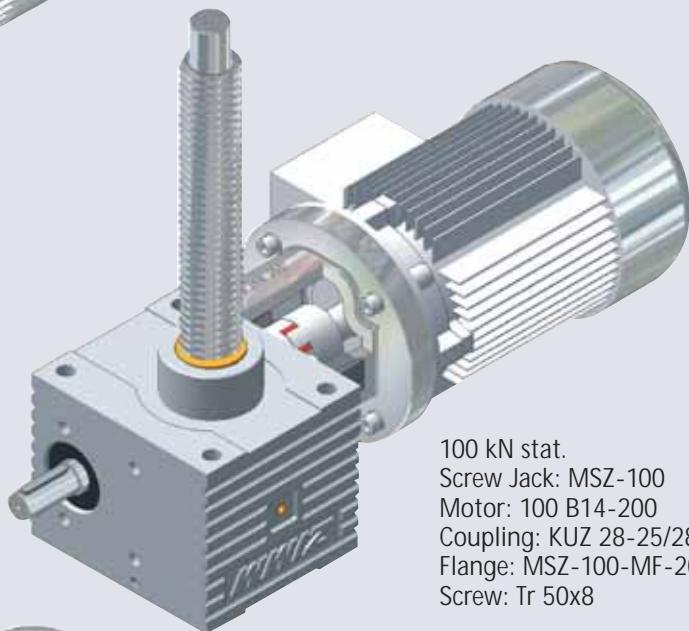


14.6 Standard Combinations - Motor Assembly

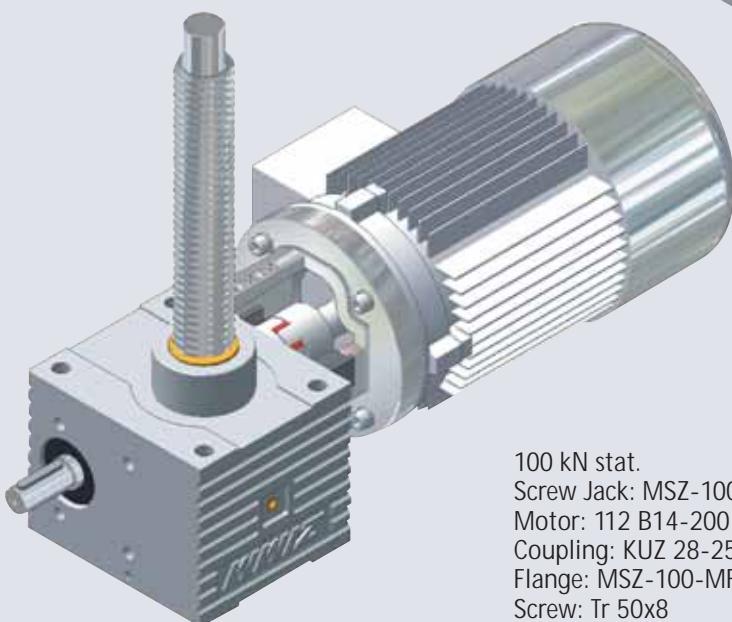
Please look up the calculation in chapter 4 in order to determine the necessary motor capacity for the dynamic load, or provide us with your parameters (load, lifting speed).



50 kN stat.
Screw Jack: MSZ-50
Motor: 112 B14-200
Coupling: KUZ 28-20/28
Flange: MSZ-50-MF-200-130
Screw: Tr 40x7



100 kN stat.
Screw Jack: MSZ-100
Motor: 100 B14-200
Coupling: KUZ 28-25/28
Flange: MSZ-100-MF-200-138
Screw: Tr 50x8

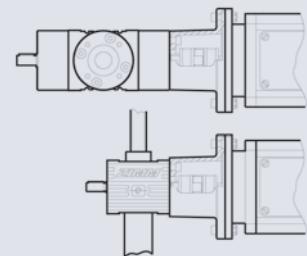
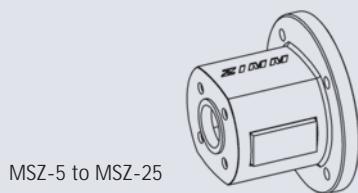


100 kN stat.
Screw Jack: MSZ-100
Motor: 112 B14-200
Coupling: KUZ 28-25/28
Flange: MSZ-100-MF-200-138
Screw: Tr 50x8





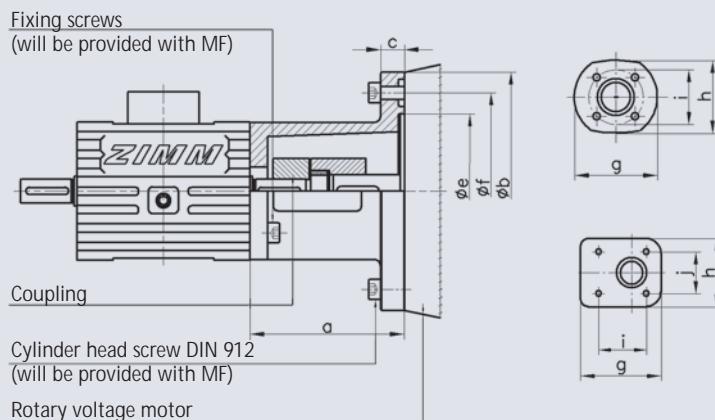
14.6.1 Motor Flange



MSZ-5 to MSZ-25

MSZ-50 and MSZ-100

Bevel gearboxes and screw jacks have the same arrangement of mounting holes for motor flange assembly.



Material: MSZ-5 to MSZ-100: Aluminium
MSZ-150: steel, short-time nitrided

Motor flange Order no.	Motor type	Coupling order no.	Coupling drilling-Ø	4 pcs. screws gearbox-sided 8.8	4 pcs. cylinder head screws 8.8 DIN 912 for motor	a	b	c	e	f	g	h	i	j	
			Gearbox	Motor											
MSZ- 5-MF-120 - 60	63 B14B	KUZ-14	11	11	M6x12 - DIN 7991	M6x20 + spring rings	60	120	10	80	100	70	61	46	-
MSZ- 5-MF-105 - 68	71 B14C	KUZ-19	11	14	M6x12 - DIN 7991	M6x20 + spring rings	68	105	10	70	85	70	61	46	-
MSZ- 10-MF-120 - 66	63 B14B	KUZ-19	14	11	M8x16 - DIN 7991	M6x20 + spring rings	66	120	10	80	100	80	73	50	-
MSZ- 10-MF-160 - 75	71 B5	KUZ-19	14	14	M8x16 - DIN 7991	M8x35 + nuts	75	160	15	110	130	88	73	50	-
MSZ- 10-MF-160 - 90	80 B14B	KUZ-24	14	19	M8x16 - DIN 7991	M8x30 + spring rings	90	160	15	110	130	88	73	50	-
MSZ- 25-MF-160-105	71 B5	KUZ-28	16	14	M8x20 - DIN 7991	M8x35 + nuts	105	160	15	110	130	110	81	59	-
MSZ- 25-MF-160-105	80 B14B	KUZ-24	16	19	M8x20 - DIN 7991	M8x30 + spring rings	105	160	15	110	130	110	81	59	-
MSZ- 25-MF-160-105	90 B14B	KUZ-24	16	24	M8x20 - DIN 7991	M8x30 + spring rings	105	160	15	110	130	110	81	59	-
MSZ- 25-MF-160-122	100 B14C	KUZ-28	16	28	M8x20 - DIN 7991	M8x30 + spring rings	122	160	15	110	130	110	81	59	-
MSZ- 50-MF-200-120	90 B5	KUZ-28	20	24	M10x25 - DIN 912	M10x45 + nuts	120	200	20	130	165	100	115	86	70
MSZ- 50-MF-200-130	100 B14B	KUZ-28	20	28	M10x25 - DIN 912	M10x35 + spring rings	130	200	20	130	165	100	115	86	70
MSZ- 50-MF-200-130	112 B14B	KUZ-28	20	28	M10x25 - DIN 912	M10x35 + spring rings	130	200	20	130	165	100	115	86	70
MSZ-100-MF-200-138	100 B14B	KUZ-28	25	28	M12x35 - DIN 912	M10x40 + spring rings	138	200	25	130	165	140	142	80	90
MSZ-100-MF-200-138	112 B14B	KUZ-28	25	28	M12x35 - DIN 912	M10x40 + spring rings	138	200	25	130	165	140	142	80	90
MSZ-150-MF-200-138	100 B14B	KUZ-28	25	28	M12x35 - DIN 912	M10x40 + spring rings	138	200	25	130	165	132	132	80	90
MSZ-150-MF-200-138	112 B14B	KUZ-28	25	28	M12x35 - DIN 912	M10x40 + spring rings	138	200	25	130	165	132	132	80	90



Overview

14.6.2 AC 3ph Motors, AC 3ph Brake Motors

Idling speed 1500 min ⁻¹ (others on request) 230/400V 50 Hz Rotary voltage motors - standard types, type of protection IP 55										Weight in pedestal execution without brake
Size	Motor output	Nominal speed	Torque	Nominal voltage at 400 V	In case of direct switching ratio star- ting/nomi- nal voltage I_A/I_N	Ratio overload / nominal torque	Moment of inertia J	Efficiency (with 100% load)	Power factor (with 100% load)	Weight in pedestal execution without brake
IEC	kW	min ⁻¹	Nm	A		M_k/M_N	ca kgm ²	h %	cos	ca. kg
63	0,18	1410	1,24	0,64	5,8	2,4	2,5	0,0005	62,0	0,65
71	0,37	1380	2,54	1,14	6,6	2,5	2,5	0,0008	67,0	0,70
80	0,75	1395	5,03	1,72	7,4	2,4	2,8	0,0027	75,0	0,84
90L	1,5	1400	10,00	3,43	7,9	2,4	2,5	0,0052	76,1	0,83
100L 100L	2,2 3,0	1400 1410	15,00 19,90	4,70 6,30	6,8 6,7	2,5 2,5	2,6 2,5	0,0070 0,0086	78,6 80,9	0,86 0,85
112M	4,0	1440	26,80	8,20	6,9	2,5	2,9	0,0156	82,8	0,85
132S 132M	5,5 7,5	1470 1465	35,80 47,90	10,80 14,20	7,6 8,1	2,4 2,3	2,8 2,8	0,0407 0,0465	88,3 88,7	0,83 0,86
160M 160L	11,0 15,0	1460 1460	72,10 96,20	20,70 29,20	7,6 7,1	2,1 2,4	2,4 2,6	0,0832 0,1506	89,1 89,4	0,86 0,83
180M 180L	18,5 22,0	1465 1475	119,00 142,00	34,30 41,10	7,1 6,9	2,3 2,4	2,6 2,6	0,1773 0,2936	90,4 90,9	0,86 0,85
200L	30	1475	190,00	54,00	6,6	2,1	2,3	0,6345	92,1	0,87
225S 225M	37 45	1470 1470	238,00 286,00	64,70 77,90	7,0 7,4	2,3 2,3	2,5 2,4	0,3251 0,7866	92,8 92,6	0,89 0,90
250M	55	1465	359,00	94,00	7,5	2,6	2,6	0,9483	93,4	0,90
280S 280M	75 90	1475 1485	476,00 591,00	136,00 167,00	6,8 8,3	2,1 2,5	2,5 2,9	1,8495 2,2306	93,5 93,6	0,85 0,85
315S 315M 315M 315M	110 132 160 200	1485 1480 1485 1485	709,00 830,00 1040,00 1277,00	199,00 229,00 277,00 349,00	7,5 7,5 7,3 7,6	2,3 2,4 2,7 2,4	2,5 2,6 2,7 2,6	2,81036 3,3435 3,3435 3,3435	93,9 94,7 94,7 95,0	0,85 0,88 0,88 0,87
355M 355M	250 315	1475 1485	1619,00 2024,00	432,00 542,00	7,5 6,9	2,4 2,5	2,5 2,6	5,874 6,890	95,0 95,3	0,88 0,88
										1380,0 1600,0

Attention:

If the motor capacity is too high, there is the danger of overloading the components. The effects must not only be considered under load, but also when idling.

Sizes 63 to 132 available on short notice. Sizes 160 to 355 on request.

Ordering example:

Size No. of poles - speed
4-pole = 1500 min⁻¹
Output [kW]
Construction design
with brake
(if required)

90 - P4 - 1,5 - B5 - B

14.6.1 AC 3ph Motors, General Information

Pin assignment

The motors usually have a connector block with 6 mounting posts and one ground conductor mounting post in the terminal box. By means of the connecting links, the stator winding can be switched into star or delta connection. In case of a star-delta start, the operating voltage must be indicated. The service connections of the motor must be the delta connection in this case.

Operating voltage 400 V delta:

Motor winding 400/660 V

Operating voltage 230 V delta:

Motor winding 230/400 V

Direction of rotation

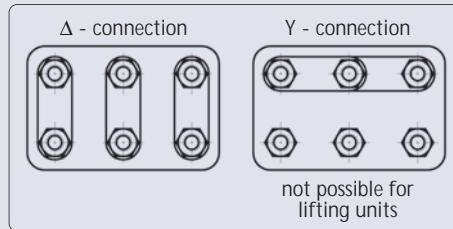
The motors can be operated in both directions. When connecting the line phases in the order L1, L2, L3 to the motor binding posts U1, V1 W1, the direction of rotation is right-handed. A reversal of the direction of rotation is effected by reversing two of the supply lines.

Rotational speed

AC 3ph motors have different rotational speeds depending on the numbers of poles.

Generally we recommend selection of our standard motor with 1500 min⁻¹ (4-pole).

Other numbers of pole on request. Double polarity motors can be operated with 2 different rotational speeds.



Geared motors

Geared motors on request.

Operation with frequency converter FU

Especially for bigger screw jacks and systems we recommend to use a frequency converter to achieve a smooth startup and brake ramp. This minimizes the startup noise and increases lifetime of the screw jack.

When operating with a frequency converter, please consider that a separately driven fan is required for longer operation periods under 25 Hz. This is necessary to ensure an adequate motor cooling.

If you operate a brake motor with frequency converter, control the brake with a separate wire from the converter.

Brake motor

In order to minimize wake of the system we recommend to use a brake motor.

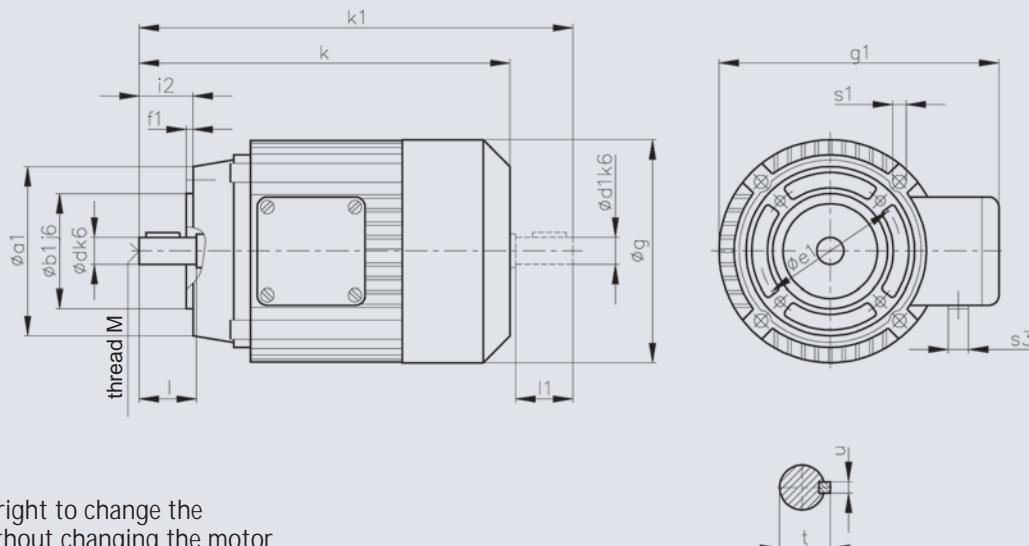
For gearboxes with ball screws or double-pitch screw a brake is absolutely necessary. We deliver brake motors standard for connected load of 230V AC / operating voltage 205V DC with a bridge rectifier. Other connected loads on request (24V DC, 400V AC, 500V AC).

Temperature control

Generally we do not deliver a temperature control as the operating period of screw jacks is normally very low or as the motor is adequately specified. Temperature control PTC (posistor) or TKÖ (thermostat relay over bimetal) on request.



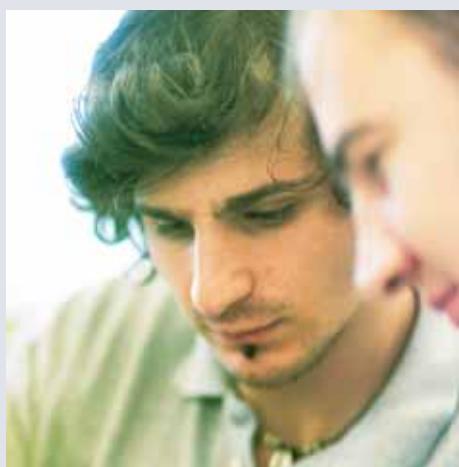
14.6.2 AC 3ph Motors, AC 3ph Brake Motors, Flange Construction B14B, Big Flange



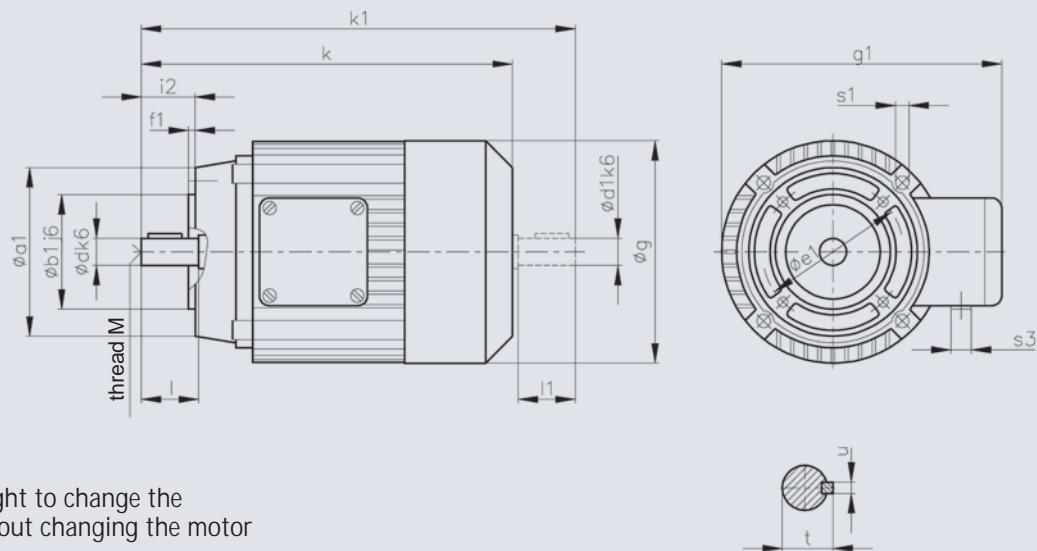
We reserve the right to change the dimensions without changing the motor name.

Size	a1	b1	e1	f1	g	g1	i2	l1	k	k Brake motor	k1	s1	s3	d	l	t	u	M
63	120	80	100	3	126	161	23		211	258	M 6	1x Pg13,5	11	23	12,5	4	-	
71	140	95	115	3	142	178	30		247	295	M 8	2x Pg13,5	14	30	16,0	5	-	
80	160	110	130	3,5	159	202	40		275	323	M 8	2x Pg16	19	40	21,5	6	-	
90L	160	110	130	3,5	179	219	50		326	395	M 8	2x Pg16	24	50	27,0	8	8	
100L	200	130	165	3,5	200	242	60		368		M10	2x Pg16	28	60	31,0	8	10	
112M	200	130	165	3,5	222	266	60		388		M10	2x Pg21	28	60	31,0	8	10	

Dimensions on requ.
Dimensions on requ.



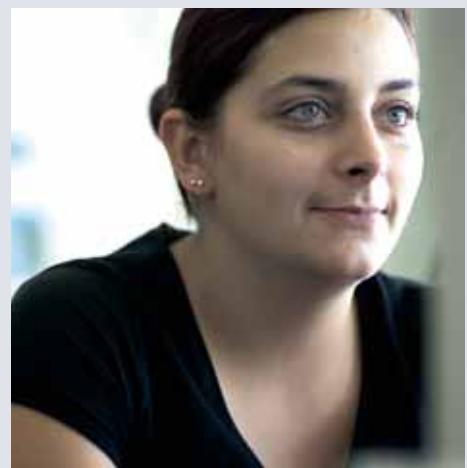
14.6.2 AC 3ph Motors, AC 3ph Brake Motors, Flange Construction B14C, Small Flange



We reserve the right to change the dimensions without changing the motor name.

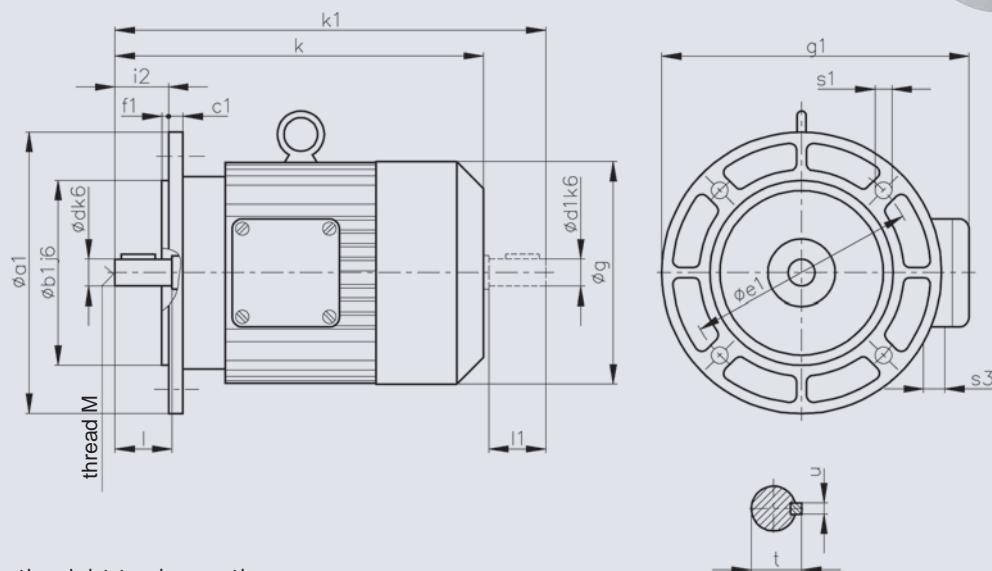
Size	a1	b1	e1	f1	g	g1	i2	k	k Brake motor	l1	k1	s1	s3	d	l	t	u	M
63	90	60	75	2,5	126	161	23	211	258			M 5	1x Pg13,5	11	23	12,5	4	-
71	105	70	85	2,5	142	178	30	247	295			M 6	2x Pg13,5	14	30	16,0	5	-
80	120	80	100	3,0	159	202	40	275	323			M 6	2x Pg16	19	40	21,5	6	-
90L	140	95	115	3,0	179	219	50	326	395			M 8	2x Pg16	24	50	27,0	8	8
100L	160	110	130	3,5	200	242	60	368				M 8	2x Pg16	28	60	31,0	8	10
112M	160	110	130	3,5	222	266	60	388				M 8	2x Pg21	28	60	31,0	8	10

Dimensions on requ.
Dimensions on requ.





14.6.2 AC 3ph Motors, AC 3ph Brake Motors, Flange Construction B5

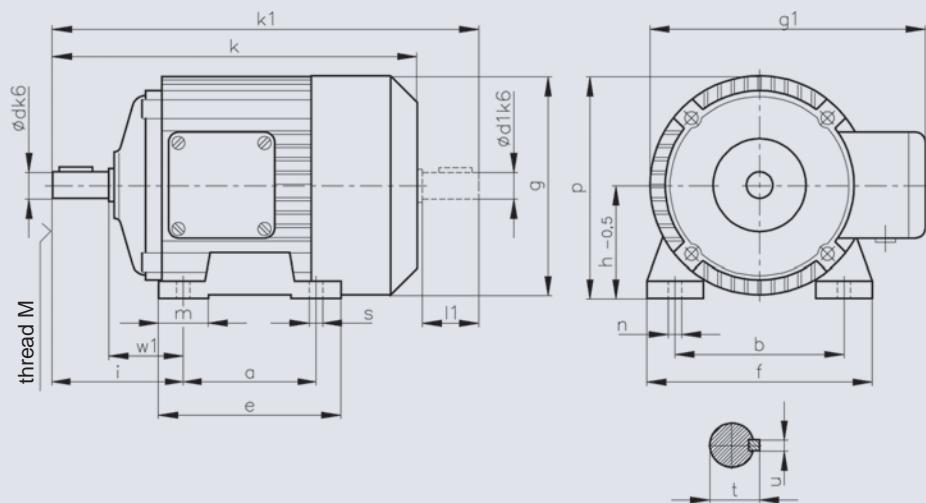
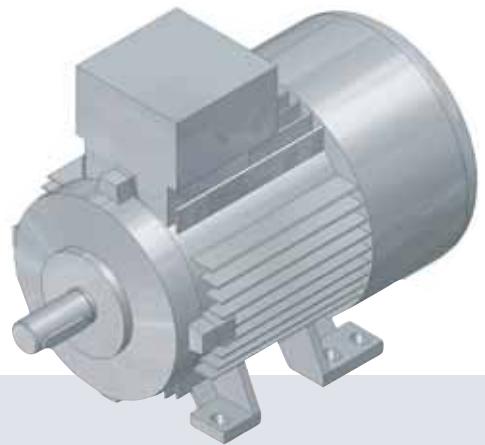


We reserve the right to change the dimensions without changing the motor name.

Size	a1	b1	c1	e1	f1	g	g1	i2	k	k Brake motor	l1	k1	s1	s3	d	l	t	u	M
63	140	95	5	115	3	126	168	23	211	258		10	1x Pg13,5	11	23	12,5	4	-	
71	160	110	7	130	3,5	142	187	30	247	295		10	2x Pg13,5	14	30	16,0	5	-	
80	200	130	8	165	3,5	159	222	40	275	323		12	2x Pg16	19	40	21,5	6	-	
90L	200	130	8	165	3,5	179	229	50	326	395		12	2x Pg16	24	50	27,0	8	8	
100L	250	180	10	215	4	200	267	60	368			15	2x Pg16	28	60	31,0	8	10	
112M	250	180	10	215	4	222	279	60	388			15	2x Pg21	28	60	31,0	8	10	
132S	300	230	12	265	4	270	355	80	452			15	2x Pg21	38	80	41,0	10	12	
132M									490										
160M	350	250	18	300	5	310	423	110	595			19	2x Pg29	42	110	45,0	12	16	
160L									639										
180M	350	250	18	300	5	353	443	110	687			19	2x Pg29	48	110	51,5	14	16	
180L									705										
200L	400	300	16	350	5	380	495	110	767			19	2x Pg29	55	110	59	16	20	



14.6.2 AC 3ph Motors, AC 3ph Brake Motors, Pedestal Design B3



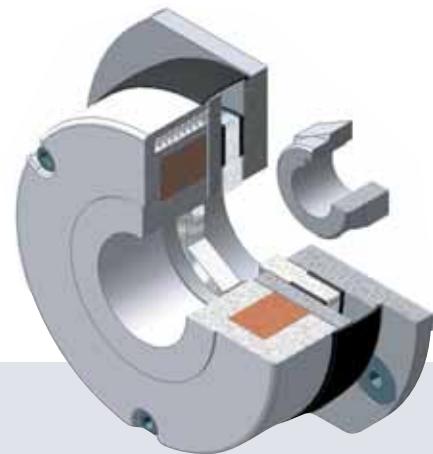
Terminal box BGR 63 - 112 above.
From BGR 132 on, on the right side (left-sided and above on request).

We reserve the right to change the
dimensions without changing the motor
name.

¹⁾k Brake motor: on request

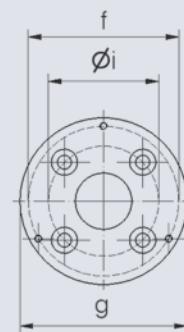
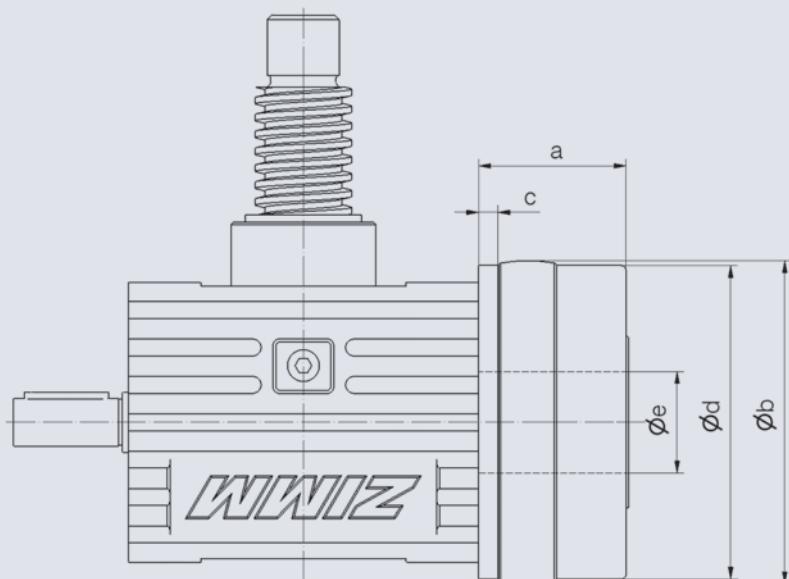
Size	a	b	c	e	f	g	g1	h	i	k ¹⁾	m	n	p	k1	l ₁	s	w1	d	l	t	u	M
63	80	100	6	95	116	126	164	63	63	213	22	22	164		7	40	11	23	12,5	4	-	
71	90	112	7	110	132	142	176	71	75	243	30	30	176		7	45	14	30	16,0	5	-	
80	100	125	8	126	150	159	194	80	90	273	35	35	194		10	50	19	40	21,5	6	-	
90L	125	140	9	149	164	179	213	90	106	330	35	35	213		10	56	24	50	27,0	8	8	
100L	140	160	9	168	188	200	242	100	123	368	40	40	242		12	63	28	60	31,0	8	10	
112M	140	190	10	176	220	222	266	112	130	388	50	50	266		12	70	28	60	31,0	8	10	
132S	140	216	20	187	248	270	335	132	169	452	55	51	262		12	89	38	80	41,0	10	12	
132M	178			225			490															
160M	210	254	20	256	308	310	365	160	218	595	65	64	312		15	108	42	110	45,0	12	16	
160L	254			300			639															
180M	241	279	28	294	350	353	400	180	231	687	75	80	357		15	121	48	110	51,5	14	16	
180L	279			332			705															
200L	305	318	30	370	385	380	445	200	243	767	85	82	397		19	133	55	110	59,0	16	20	



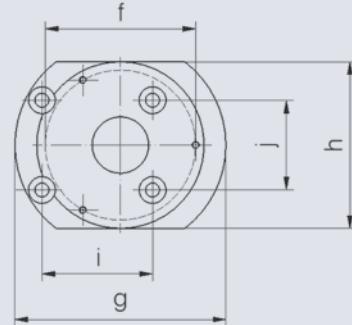


14.6.3 Spring Pressure Brake FDB

from size
MSZ-5 to MSZ-25



from size MSZ-50 on



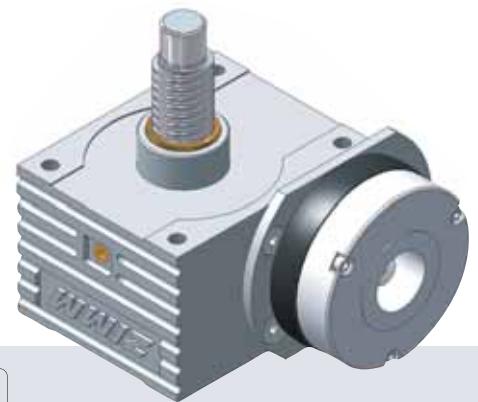
Screw Jack	Version	Brake type	T _B (Nm)	P (W)	Hub Ø	a	b	c	d	e	f	g	h	i	j
MSZ-5	SL/RL	FDB 05	3,5	22	11	46	89	6	85	26	72-3xM4	85	-	46,0	-
	SN/RN	FDB 05	5,0	22	11	46	89	6	85	26	72-3xM4	85	-	46,0	-
MSZ-10	SL/RL	FDB 05	5,0	22	14	46	89	6	85	26	72-3xM4	85	-	49,5	-
	SN/RN	FDB 10	10,0	28	14	54	109	7	105	32	90-3xM5	105	-	49,5	-
MSZ-25	SL/RL	FDB 10	10,0	28	16	54	109	7	105	32	90-3xM5	105	-	60,0	-
	SN/RN	FDB 20	20,0	34	16	62	135	9	130	42	112-3xM6	130	-	60,0	-
MSZ-50	SL/RL	FDB 20	20,0	34	20	65	135	12	130	42	112-3xM6	164	130	86,0	70
	SN/RN	FDB 40	40,0	42	20	72	155	12	150	52	132-3xM6	164	-	86,0	70
MSZ-100	SL/RL	FDB 40	28,0	42	25	74	155	14	150	52	132-3xM6	195	150	80,0	90
	SN/RN	FDB 60	60,0	50	25	84	175	14	170	62	145-3xM8	195	170	80,0	90
MSZ-150	SL/RL	FDB 40	28,0	42	25	74	155	14	150	52	132-3xM6	195	150	80,0	90
	SN/RN	FDB 80	100,0	64	25	94	201	14	195	72	170-3xM8	195	-	80,0	90
MSZ-250	SL/RL	FDB 40	40,0	42	28	74	155	14	150	52	132-3xM6	225	150	90,0	100
	SN/RN	FDB 150	150,0	76	28	104	231	14	225	80	196-3xM8	225	90,0	100	

Direct current: $P = U \cdot I \rightarrow I = \frac{P}{U}$

e.g.: FDB 60 with 205 V DC coil voltage

T_B = braking torque

$$I = \frac{50W}{205V} = 0,24 A$$



14.6.3 Spring Pressure Brake FDB

Operation of the Spring Pressure Brakes

General

The FDB spring pressure brakes described here are dihedral brakes for non-lubricated operation. The braking moment is generated by the pressure springs in a currentless state. Release is electromagnetic by applying direct current. Rubbing surfaces are largely protected from external contamination thanks to the standard protection rings employed. When relubricating the screw, make sure that the rubbing coatings and rubbing surfaces are carefully protected against soiling. The rubbing surfaces must not come into contact with oil, grease or other lubricants under any circumstances. Slight soiling of this type can greatly reduce the braking efficiency. The protection category in the standard model corresponds to IP 54. The maximum

permissible temperature is 145 °C; operating period 100% ED.

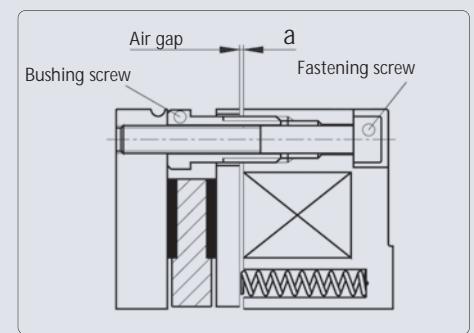
Operating method

While braking, the rotor which is axially movable on the hub or drive shaft, is pressed against the flange by means of the pressure springs via the armature disk.

The braking moment is generated.

A magnetic force is generated by applying direct current to the exciting winding in the magnet body; this pulls the armature disk to the magnetic body. The braking rotor and the brake are released.

Almost maintenance-free



Electrical connection

Single-way and bridge rectifiers are available for supplying power to the brakes from the alternating voltage network. Both types are available for switching direct or alternating current. Due to the inductivity of the magnetic coil, the armature disk falls with a time delay after the power is switched off. The shutdown delay period is relatively long when you switch off the power before the rectifier on the alter-

native voltage side. The shutdown delay period can be reduced if connections on the rectifier are used for switching on the direct current side (6 times faster). If you want to switch on the alternating current side, install a bridge to the contacts. The electrical connection should only be made in a currentless state. The operating voltage (DC) of the brake is indicated on the magnet housing.

The spring pressure brakes are almost maintenance-free. The air gap "a" and consequently the rotor wear must be checked periodically. If necessary, make adjustments or replace the rotor.

Readjusting the brake air gap:
Loosen the three fastening screws of the brake by half a revolution. Now the bushing screws, which enclose the fastening screws, can be screwed into the magnet body by turning them counterclockwise. The magnet body is moved in the direction of the armature disk until the nominal air gap is achieved (see table). Now the three bushing screws are turned clockwise out of the magnet body until a firm, rigid position is achieved. Then the fastening screws are tightened and the air gap is checked using a feeler gauge.

Before working on an installed spring pressure brake, the voltage source feed must be disconnected or switched off as a matter of principle. The brake should be without load to prevent an uncontrolled rotation movement to the shaft.

Power supply	Operating voltage of the brake	Rectifier / type
24V DC	24V DC	none
230V AC	105V DC	Single-way rectifier / KSE 500/1-S
230V AC	205V DC	Bridge rectifier / PMB 400-S
400V AC	180V DC	Single-way rectifier / KSE 500/1-S
500V AC	220V DC	Single-way rectifier / KSE 500/1-S

Size of Brake FDB	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

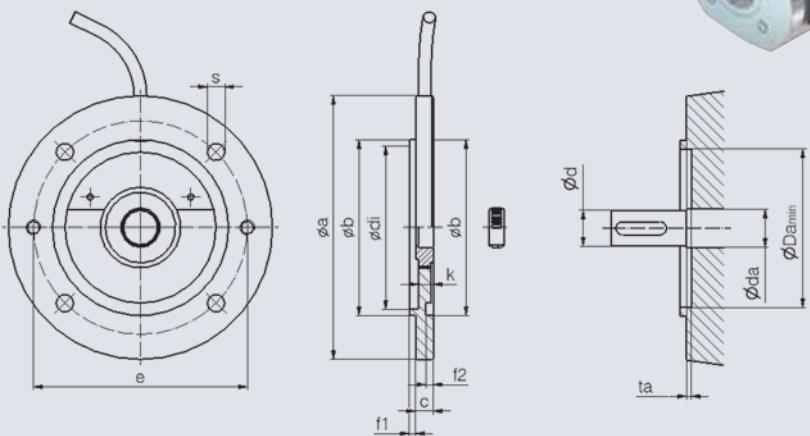
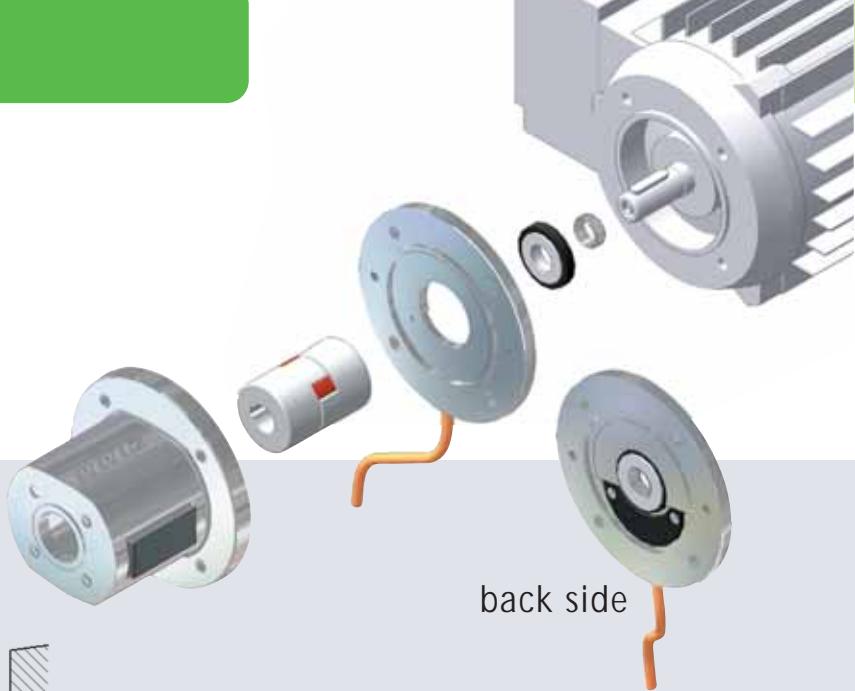
Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150
air gap a_{Nominal}	0,2	0,2	0,3	0,3	0,3	0,4	0,4
air gap a_{max}	0,8	0,8	0,8	0,9	1,0	1,1	1,1
rotor thickness	4,5	5,5	7,5	9,5	11,5	12,5	14,5

Hand release	FDB 5	FDB 10	FDB 20	FDB 40	FDB 60	FDB 80	FDB 150

<

14.6.4 Rotary Pulse Encoder DIG incremental



Ordering example:

DIG - 160 - 19 - 10

Rotary pulse encoder DIG

We developed an intelligent in-between flange which simplifies recordal of rotational speed and direction of rotation as well as connection to superior control systems. Till now this was only possible by circuitous mountage and implementations to drive systems. This solution is very cost effective and has a very simple handling, also when re-fitting of drives.

This magnetic pulse encoder is executed as in-between flange which is mounted between motor flange and machine flange. That also simplifies the integration of incremental encoder in drive system - it does not matter whether they are used for adaption of rotational speed, as positioning control or e.g. for dosage control or digital synchronisation control.

Advantages

- Compact design (7 to 10mm thick)
- Simple and quick assembly
- Protected between motor and motor flange
- Protection system IP 120, if appropriately sealed IP67
- Universal HTL Signal for all standard evaluations (PNP, NPN, RS 422)
- Short-circuit proof, polarized and overvoltage protected transmitter electronics, in SMD technology; fully integrated into the flange.

Note

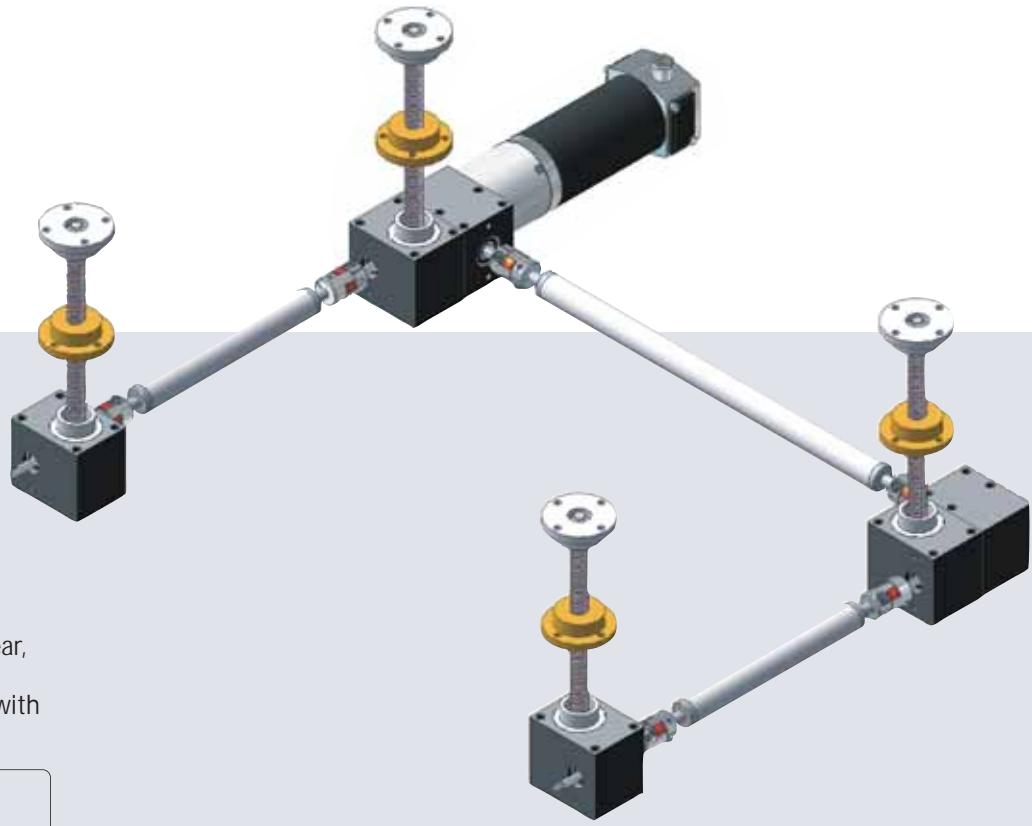
Also notice our analog, absolute linear measuring system WMS in chapter 14.1.7

Gearbox	Motor flange	Motor	Rotary pulse encoder DIG	c	Screw motor sided DIN 912	Coupling	Available impulse number						
							1	5	10	20	25	50	100 ²⁾
MSZ-5	MF-120-60	63-B14B	DIG-120-11	7	M6x30	KUZ-19-11/11	x	x	x	x			
MSZ-5	MF-105-68	71-B14C	DIG-105-14	7	M6x30	KUZ-19-11/14	x	x	x	x			
MSZ-10	MF-120-66	63-B14B	DIG-120-11	7	M6x30	KUZ-19-14/11	x	x	x	x			
MSZ-10	MF-160-75	71-B5	DIG-160-14	7	M8x45	KUZ-19-14/14	x	x	x	x	x	x	x
MSZ-10	MF-160-90	80-B14B	DIG-160-19	7	M8x35	KUZ-24-14/19	x	x	x	x	x	x	x
MSZ-25	MF-160-105	71-B5	DIG-160-14	7	M8x45	KUZ-28-16/14	x	x	x	x	x	x	x
MSZ-25	MF-160-105	80-B14B	DIG-160-19	7	M8x35	KUZ-28-16/19	x	x	x	x	x	x	x
MSZ-25	MF-160-105	90-B14B	DIG-160-24	10	M8x40	KUZ-28-16/24	x	x			x	x	x
MSZ-25	MF-160-122	100-B14C	DIG-160-28	10	M8x40	KUZ-28-16/28	x	x			x	x	x
MSZ-50	MF-200-120	90-B5	DIG-200-24	10	M10x55	KUZ-28-20/24	x	x			x	x	x
MSZ-50	MF-200-130	100-B14B	DIG-200-28	10	M10x45	KUZ-28-20/28	x	x			x	x	x
MSZ-50	MF-200-130	112-B14B	DIG-200-28	10	M10x45	KUZ-28-20/28	x	x			x	x	x
MSZ-100/150	MF-200-138	100-B14B	DIG-200-28	10	M10x50	KUZ-28-25/28	x	x			x	x	x
MSZ-100/150	MF-200-138	112-B14B	DIG-200-28	10	M10x50	KUZ-28-25/28	x	x			x	x	x

Notice: The motor fitting key must eventually be shortened.

²⁾ additional charge

SHZ-02

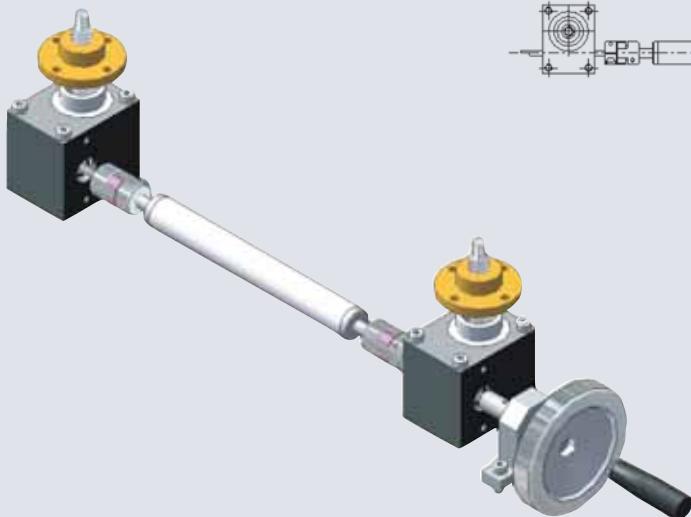
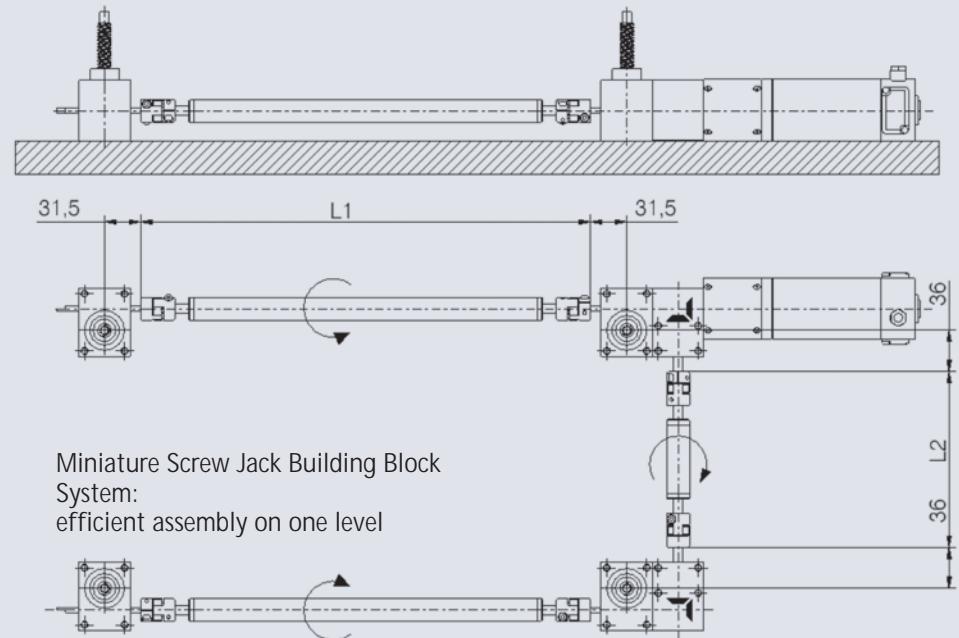


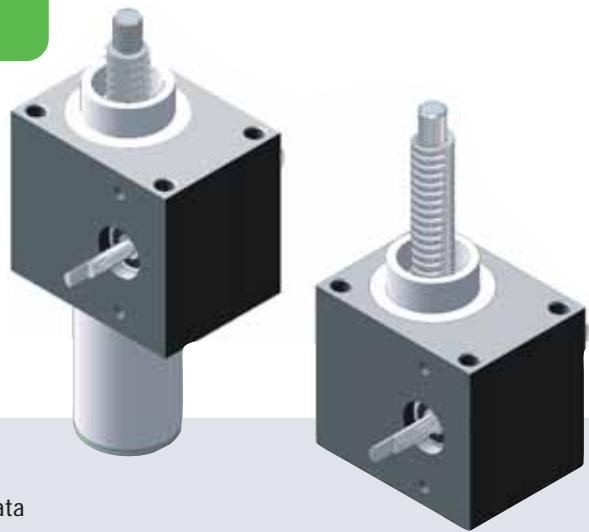
Miniature Screw Jack Building Block System

Whether complete system or single gear, whether driven by hand or by motor: We provide our Miniature Screw Jack with a plug-type building block system.

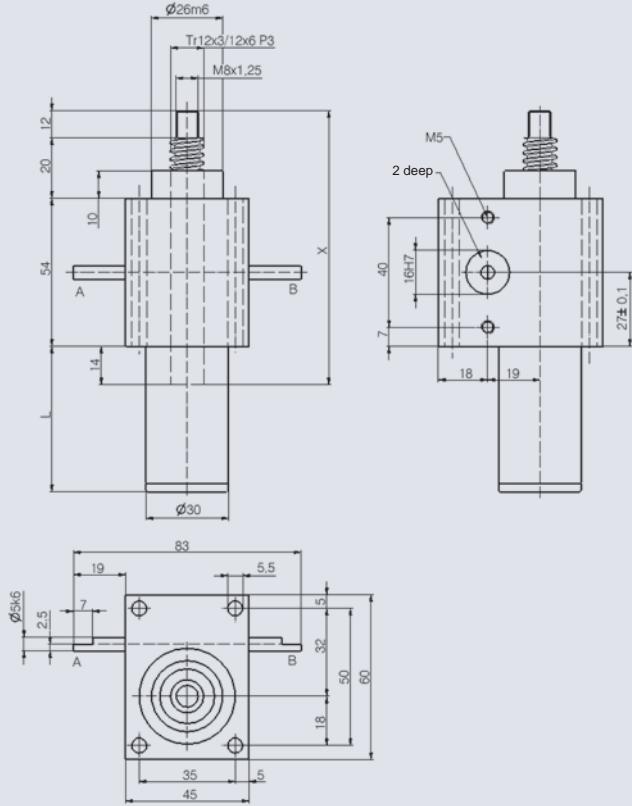
Save time and cost due to quick and simple assembly!

The bevel gearbox can be mounted directly onto the screw jack drive shaft. The integral (flattened) input shaft connects directly with the hollow shaft of the bevel gearbox. A centering ring ensures the correct alignment of the shaft axis. The bevel gearbox is fixed to the screw jack by means of special through bolts.





SHZ-02 Standing Spindle S



Technical data

Max. pressure / tensile force	- 250 N
Max. drive shaft speed	- 3000 min ⁻¹
Screw dimension	- Tr 12x3 / Tr 12x6P3
Gear reduction	- 7,5:1 / 12:1
Material of box	- Aluminium black anodized
Operating time at 250 N	- 20% in 10 min; 10% in 1h
Lubrication	- Grease
Weight of lifting gear	- 0,49 kg
Weight of screw/m	- 0,75 kg
Drive torque in Nm	- $F(N) \times 0,00035^*$ bei $i = 7,5:1$
Starting torque	- $F(N) \times 0,000135^*$ bei $i = 12:1$
Idling torque in Nm	- drive torque x 2
Efficiency - without spindle	- 0,03 at $i = 7,5:1$
	- 0,02 at $i = 12:1$
	- S version = 82%
	- L version = 77%

F - lifting load in N per screw

* - factor containing all efficiencies and transmission ratios

Extensions of spindle and protective tube, S version

Order no.	I	L
basic length	100	40
SHZ-02-VS protection against rotation	+22	+22
SHZ-02-AS escape protection	+22	+22
SHZ-02-ESSET-IP67 limit switch set	+17	+27
SHZ-02-ESSET (+AS or VS)	+29	+22

I = necessary extension of spindle

L = necessary extension of protective tube
see description of limit switch set

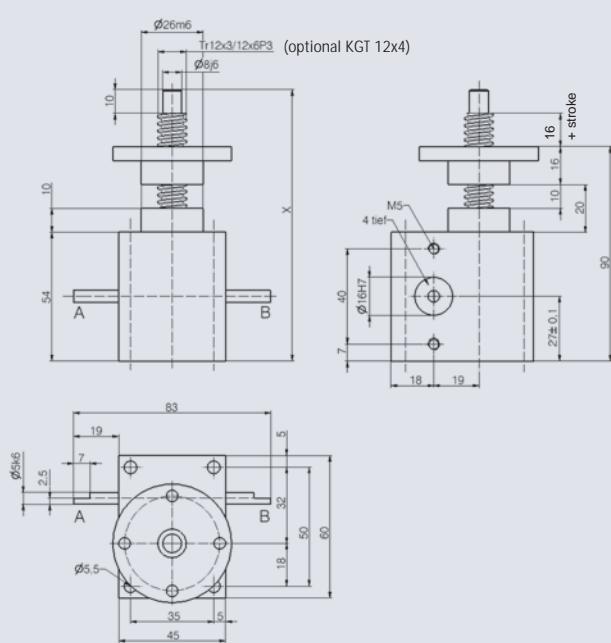
R version: basic length 94 mm, flange nut 16 mm

Models available

SS	-	Spindle	Tr 12x6P3	$i = 7,5:1$	P = 0,80mm
LS	-	Spindle	Tr 12x3	$i = 12:1$	P = 0,25mm
SR	-	Spindle	Tr 12x6P3	$i = 7,5:1$	P = 0,80mm
LR	-	Spindle	Tr 12x3	$i = 12:1$	P = 0,25mm
P	-	lift of the screw or running nut per drive shaft revolution			

Attention: Avoid axial forces!

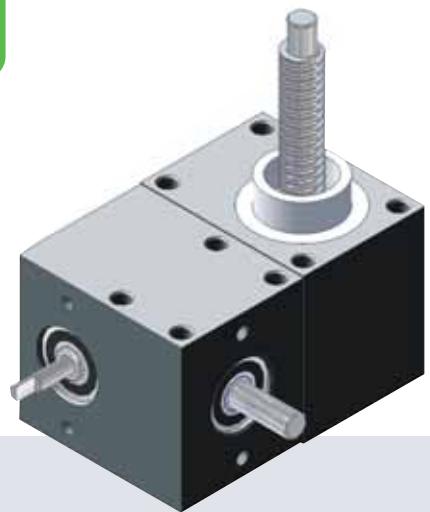
Ordering example without accessories:



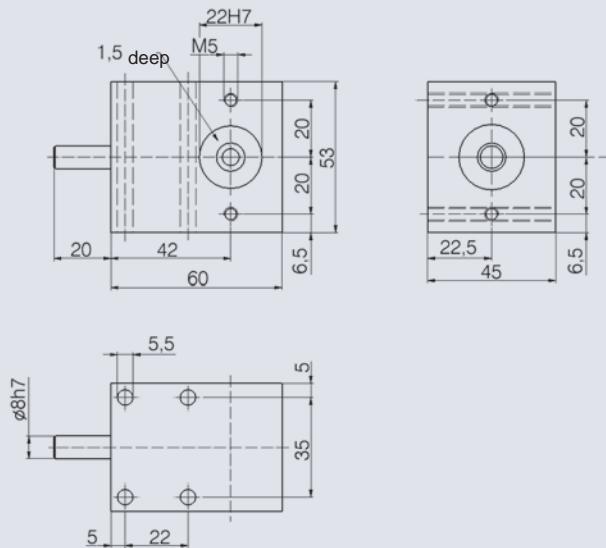
SHZ-02 - SS - 350

Gearbox size
Model
Useful lift

Please use our checklists
in chapter 4
for any inquiries



Miniature Bevel Gearbox SHZ-02-KRG $i=1:1$



Miniature screw jack gearbox is directly connected by means of plug-in shaft and centering ring with the matching bevel gearbox. The bevel gearbox is screwed directly onto the screw jack assembly.

Max. speed 3000min⁻¹
Max. torque = 1 Nm
Lifetime with
Mmax = 2000h
Max. radial load on
shaft = 40N
Max. axial load on
shaft = 20N
Sealed bearings
Alu box black anodized

When ordering please define accessories:
Stub shaft, centering ring, special screws

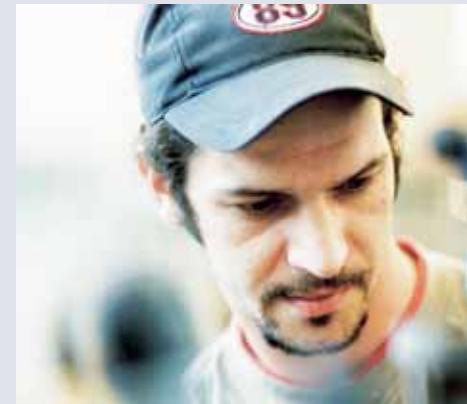
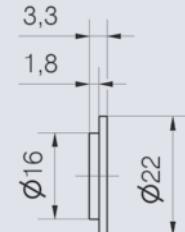
Assembled screw jack SHZ-02 with bevel gearbox SHZ-02-KRG (as unit with centering ring)



stub shaft
SHZ-02-STW

special screw
SHZ-02-SCH

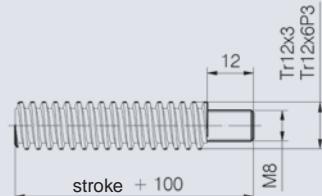
centering ring
SHZ-02-ZR



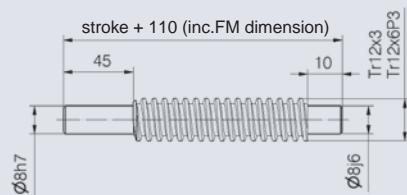
System Components



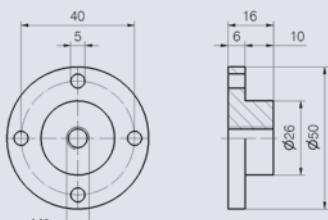
Trapezoid threaded screw SHZ-02-S-Tr
Fits SS/LS, Mat. CK15 (1.4305)
Quality 7e, DIN 103



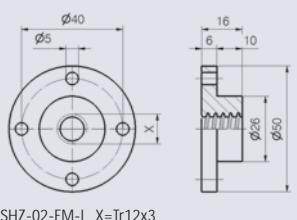
Trapezoid threaded screw SHZ-02-R-Tr
Fits SR/LR, Mat. CK15 (1.4305)
Quality 7e, DIN 103



Fixing flange SHZ-02-BF
Fits SS/LS
Material alu anodized



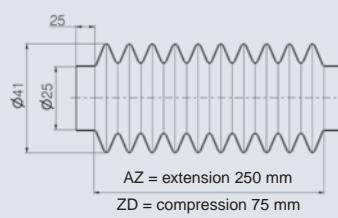
Flange nut
SHZ-02-FM-L/SHZ-02-FM-S



SHZ-02-FM-L X=Tr12x3
SHZ-02-FM-S X=Tr12x6 P3 Mat.CuSnZnPb



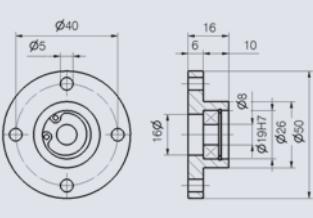
Bellow SHZ-02-FB-175
Material Molerit-TH 59



Attention: Spindle extension +60mm required



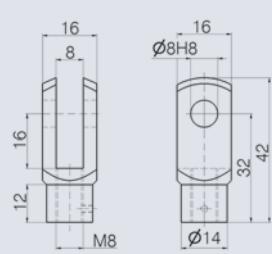
Opposed bearing plate SHZ-02-GLP



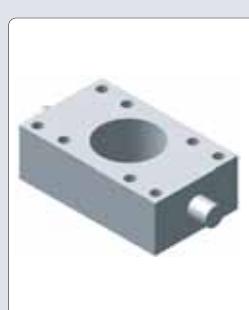
with bearing 698-2Z
Material Alu anodized



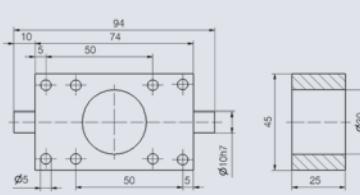
Forked head SHZ-02-GK



Material steel, galvanized, with bolts and locking key



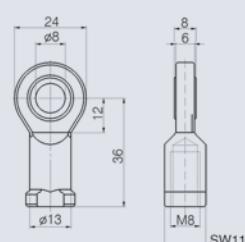
Hinged bearing plate SHZ-02-KAR



Material steel, galvanized



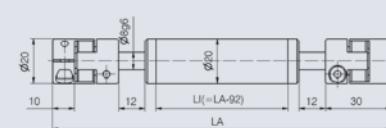
Rod end SHZ-02-KGK



Material steel/steel, galvanized



Connecting shaft SHZ-VBX-20
Material alu/steel

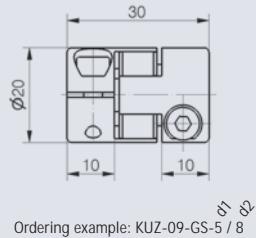


Please define bore-Ø
LA_{min}=132mm

System Components



Flexible coupling KUZ-09-GS
Clamping collar coupling, Mat.: Alu

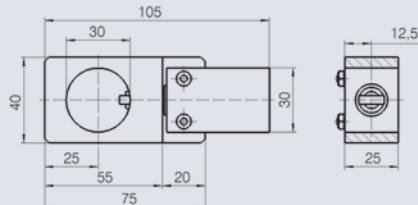


Cover plate SHZ-02-AB
Is supplied with gearboxes
R version: 1 bearing cap with flange
1 cover plate

For sealing the box,
e.g. in the food industry



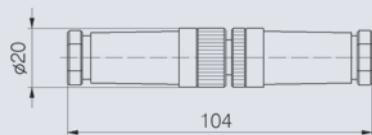
Limit switch set SHZ-02-ESSET



Attention: 2 sets per gearbox are required



Plug set
Is supplied with limit switch ES

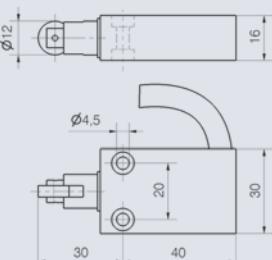


see chapter 14.1.6

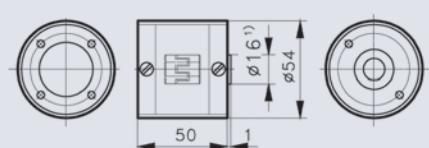


Limit switch ES

Notice: also see
chapter 14.1.6



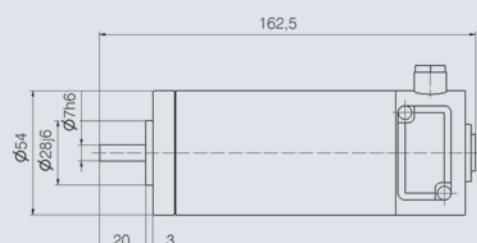
**Universal motor flange
SHZ-02-MOTF**
Suited for both of our standard motors. Should other motors be used, only one ring inside the flange body must be used.



1 - for mounting on screw jack



D.C. magneto-electric motor



Rotary voltage motor on request

Speed 3000 U/min

SHZ-GM-24V

$I_N = 4A$

$I_{max} = 41A$

$P_N = 55W$

$M_N = 17,5Ncm$

$J = 0,5Kgcm^2$

Cable connection PG11

Protection class IP 44

Weight 1,2 kg

Speed 3000 U/min

SHZ-GM-180V

$I_N = 0,5A$

$I_{max} = 5,5A$

$P_N = 55W$

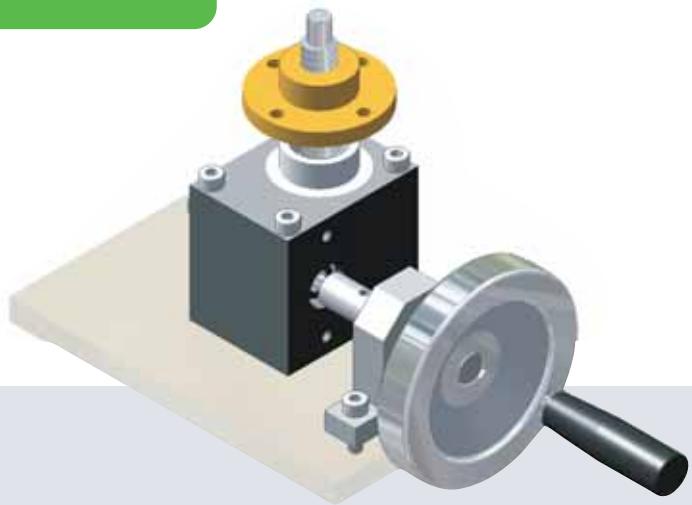
$M_N = 17,5Ncm$

$J = 0,5Kgcm^2$

Cable connection PG11

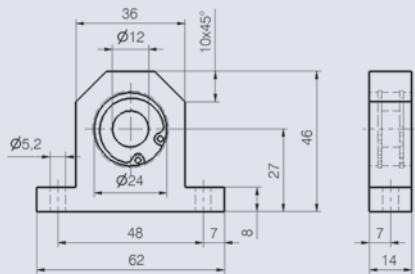
Protection class IP 44

Weight 1,2 kg

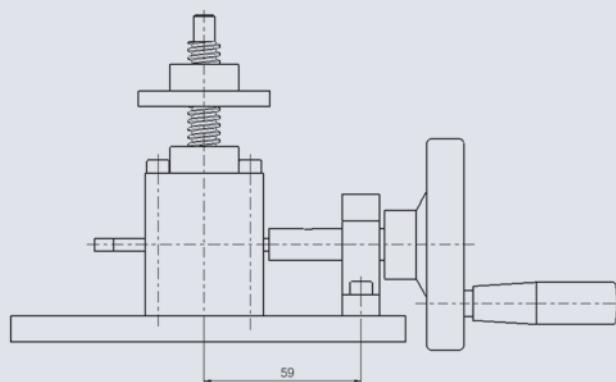
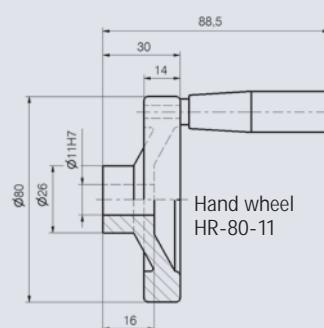
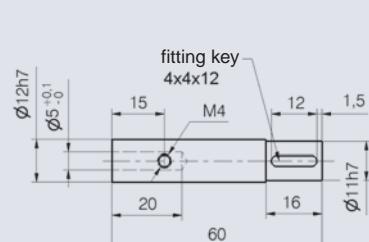


Manual operation/techn. data

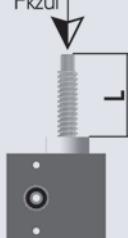
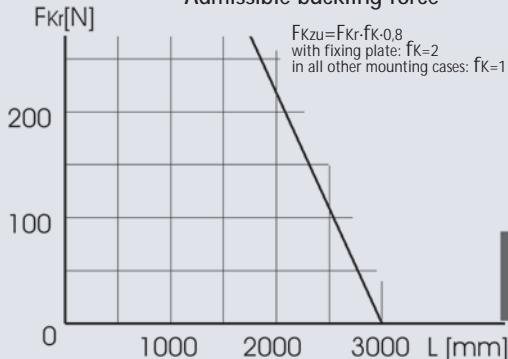
Bearing bock SHZ-02-HRLB



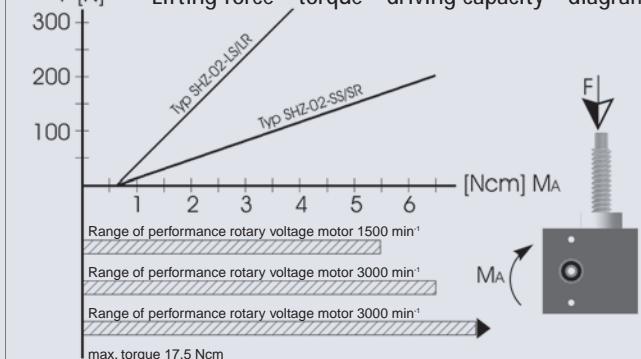
Stub shaft SHZ-02-HRSTW



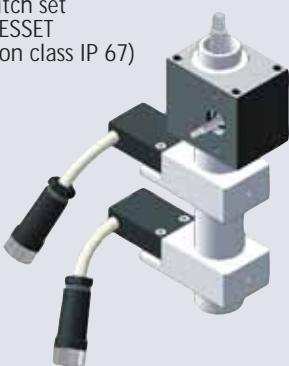
Admissible buckling force



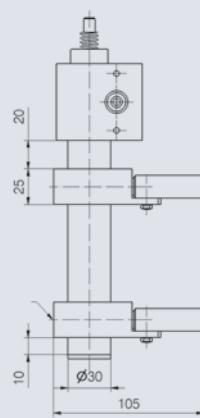
Lifting force - torque - driving capacity - diagramm



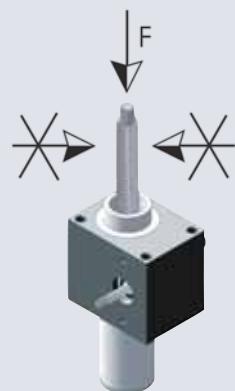
Limit switch set
SHZ-02-ESSET
(protection class IP 67)

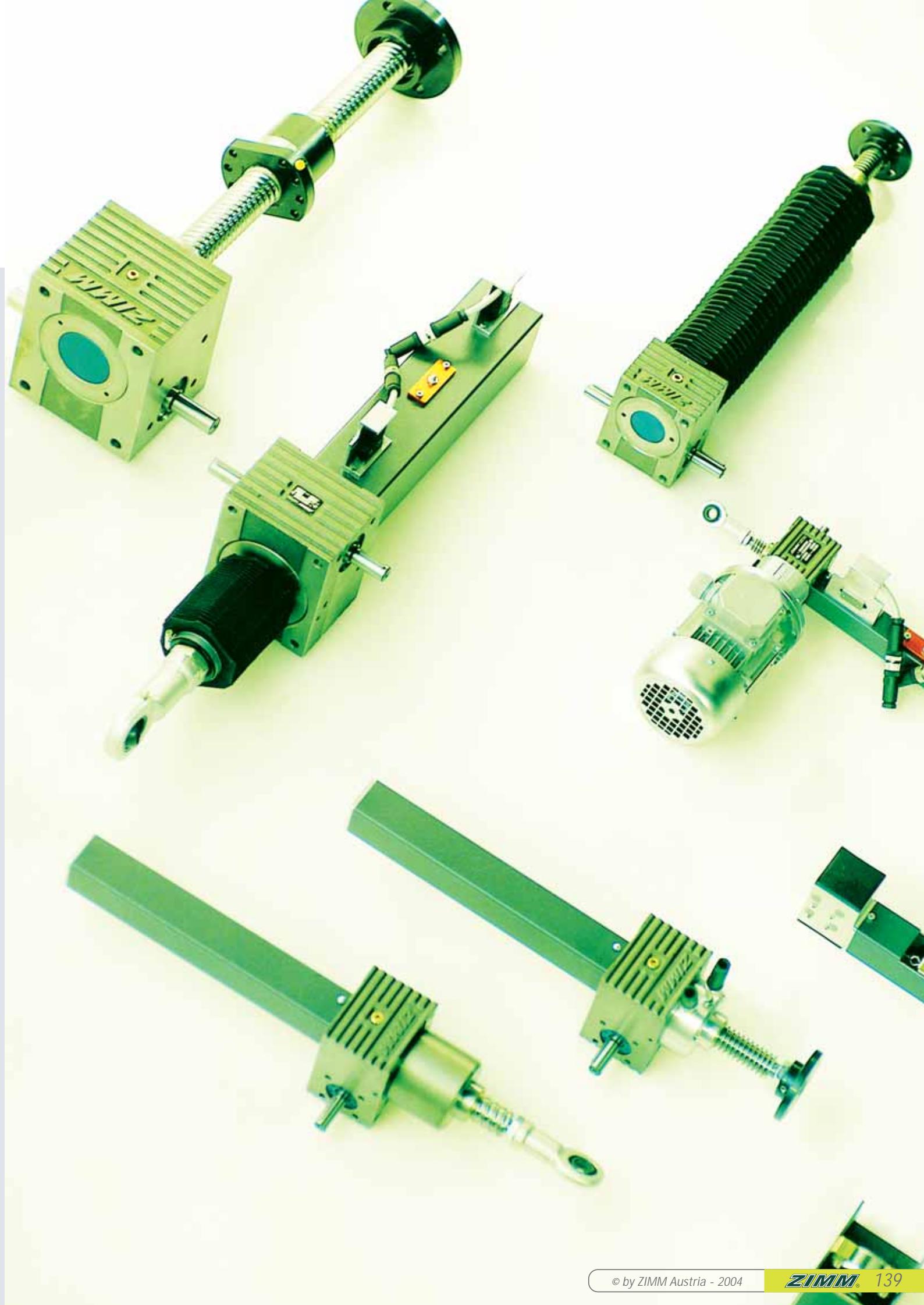


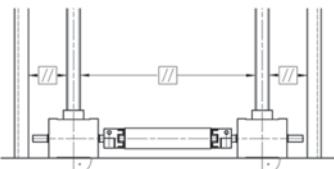
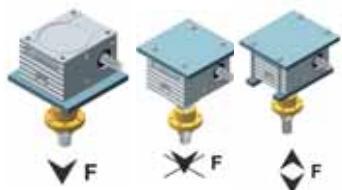
Locking screw M6x10



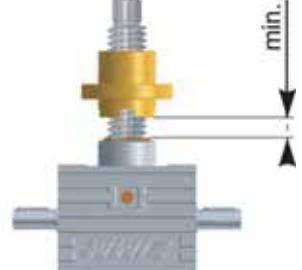
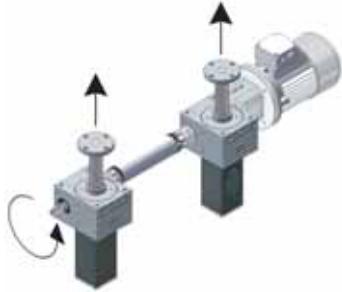
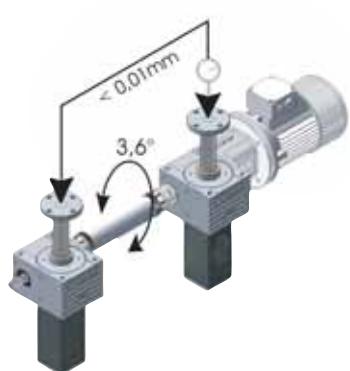
Avoid axial forces





D E U T S C H		E N G L I S H	F R A N Ç A I S
<input type="checkbox"/> 1. Verpackung Prüfen Sie alle gelieferten Bauteile auf Vollständigkeit, Verpackungs- oder Transportschäden. Verpackungsmaterialien entsorgen Sie bitte erst nach gründlicher Kontrolle, damit keine mitgelieferten Kleinteile verloren gehen.		<input type="checkbox"/> 1. Packaging Check all delivered components against order as well as for packaging or transport damage. Dispose of the packing material only after thorough checking so that no small parts are lost.	<input type="checkbox"/> 1. Emballage Vérifier l'ensemble des éléments de la livraison afin de constater leur intégrité et l'absence de dommages. Bien vérifier les matériaux d'emballage pour ne pas prendre d'éventuelles petites pièce restées à l'intérieur.
<input type="checkbox"/> 2. Montage Die Berücksichtigung der folgenden Montage- und Wartungshinweise sind wichtig, um eine einwandfreie Funktion der Hubanlage zu erzielen.		<input type="checkbox"/> 2. Mounting The observation of the following mounting and maintenance information is important to achieve long life of the screw jack equipment.	<input type="checkbox"/> 2. Montage Il est important de prendre en compte les instructions de montage et de maintenance suivantes, afin de garantir un fonctionnement correct de l'installation de levage.
<input type="checkbox"/> 3. Achtung! Zulässige Lasten, Einschaltdauer und Antriebsdrehzahl, für die die Anlage ausgelegt ist, dürfen nicht überschritten werden. In Zweifelsfällen wenden Sie sich bitte an unsere Projekttechniker.		<input type="checkbox"/> 3. Caution! Maximum loads, duty cycle and drive speed for which the equipment is designed are not to be exceeded. In case of queries, please contact our sales department.	<input type="checkbox"/> 3. Attention! Les charges, les durées de fonctionnement et le nombre de tours d'entraînement pour lesquels la machine est conçue ne doivent pas être dépassés. En cas de doute, veuillez vous adresser à notre technicien chargé de projet.
<input type="checkbox"/> 4. Fluchtung Spindeln und Linearführungen müssen parallel sein. Sorgen Sie auch für eine genaue Fluchtung der Trägerkonstruktion zueinander.		<input type="checkbox"/> 4. Alignment Screws and linear guides must be parallel. Also take care that the carrier structures are exactly aligned with respect to each other.	<input type="checkbox"/> 4. Alignement Les vis de vérin et les guidages linéaires doivent être parallèles. Assurer également un alignement précis des structures porteuses les unes par rapport aux autres.
<input type="checkbox"/> 5. Parallelität und Winkeligkeit Auf Parallelität, Winkel- und Plangenaugigkeit der Anschraubflächen, Getriebe, Muttern und Führungen zueinander ist zu achten. Ebenso auf genaue axiale Fluchtung der Getriebe, Kupplungen, Stehlager, Verbindungswellen und Motor zueinander.		<input type="checkbox"/> 5. Parallelism and Angularity Care is to be taken to achieve parallelism as well as angle and plane accuracy of the attachment surfaces, gearboxes, nuts and guides with respect to each other. Also the gearboxes, couplings, pillow bearings, connecting shafts and motors must be axially aligned with each other.	<input type="checkbox"/> 5. Parallélisme et équerrage Respecter le parallélisme, l'équerrage et la planéité des surfaces de fixation des boîtiers, des écrous et des guidages. Il convient également de bien veiller à l'exactitude de l'alignement axial des boîtiers, des accouplements, des paliers de maintien, des arbres de raccordement et des moteurs.
<input type="checkbox"/> 6. Befestigung Die Einschraubtiefe muss eingehalten werden. Die vier Befestigungsschrauben sind für die statische Nennlast der Getriebe auf Zug und Druck ausgelegt. Zusätzliche Stoßbelastung etc. sind zu berücksichtigen. Für die Hauptlastrichtung soll die Zugbelastung auf die Befestigungsschrauben vermieden werden.		<input type="checkbox"/> 6. Attachment The screw-in depth must be observed. The four attachment bolts are designed for the rated static loads of the gearbox for tension and compression. Additional shock loads, etc. are to be taken into consideration. For the main load direction, tension loads on the mounting bolts should be avoided.	<input type="checkbox"/> 6. Fixation Respecter la profondeur de vissage. Les quatre vis de fixation sont conçues pour la charge nominale statique à la traction et à la compression des boîtiers. Prendre en compte des charges par à coups, etc. Respecter aussi la profondeur des taraudages. La charge principale ne doit pas s'appliquer, en traction, sur les vis de fixation.
<input type="checkbox"/> 7. Führung Der Getriebehals ersetzt kein Führungs- system um Seitenkräfte aufzunehmen. Achten Sie bitte darauf, dass keine Seitenkräfte auf die Spindel wirken. Das zulässige Spiel zwischen Spindel und Führungsbuchse im Getriebehals liegt je nach Baugröße zwischen 0,2 und 0,6 mm.		<input type="checkbox"/> 7. Guidance In the majority of applications a guidance system is required to protect the screw and internal gearbox components against side forces which will seriously compromise the lifetime of the system. The bronze bushings in the gearbox are a secondary support only and must not be relied upon as adequate guidance. The play in the guidance system should fall between 0,2 and 0,6mm depending on the type of gearbox.	<input type="checkbox"/> 7. Guidage La douille de guidage dans le boîtier du vérin ne remplace pas un système de guidage destiné à compenser les forces latérales. Bien veiller à ce qu'aucune force latérale n'agisse sur la vis du vérin. Le jeu admissible entre la bague de guidage dans le palier du boîtier et le diamètre extérieur de la vis de levage varie, selon la taille du vérin, entre 0,2 et 0,6 mm.

ITALIANO	中 文 (CHINESE)	ESPAGNOL	по-русски (RUSSIAN)
<p><input type="checkbox"/> 1. Imballo Verificate i componenti forniti per quanto riguarda completezza, integrità dell'imballo ed eventuali danni da trasporto. I materiali d'imballo dovranno essere smaltiti dopo aver controllato con cura che non siano rimasti piccoli componenti al loro interno.</p>	<p><input type="checkbox"/> 1. 包装 请您检查交货的所有零部件是否齐全、是否存在由于包装和运输造成的损坏。请在检查完毕后才丢弃包装材料，以免丢失货物中的小零件。</p>	<p><input type="checkbox"/> 1. Embalaje Controle todos los componentes incluidos en el suministro, si están completos o si presentan daños de embalaje o de transporte. Elimine el material de embalaje únicamente después de un control a fondo, para que no se pierdan piezas pequeñas incluidas en el volumen de suministro.</p>	<p><input type="checkbox"/> 1. Упаковка Проверьте все поставленные узлы на комплектность, на повреждения упаковки и на повреждения при транспортировке. Устранийте упаковочные материалы лишь после тщательного контроля, чтобы входящие в комплект поставки мелкие детали не потерялись.</p>
<p><input type="checkbox"/> 2. Montaggio E' importante seguire le seguenti istruzioni di montaggio e manutenzione per ottenere il perfetto funzionamento dell'impianto di sollevamento.</p>	<p><input type="checkbox"/> 2. 安装 为了保证起重设备工作正常，必须遵守以下安装和保养说明。</p>	<p><input type="checkbox"/> 2. Montaje Es muy importante seguir las siguientes indicaciones de montaje y mantenimiento para lograr un funcionamiento correcto del mecanismo elevador.</p>	<p><input type="checkbox"/> 2. Монтаж Для обеспечения безуказицненной работы подъемного устройства, необходимо соблюдать нижеследующие инструкции по монтажу и техобслуживанию.</p>
<p><input type="checkbox"/> 3. Attenzione! Carichi ammessi, durata di esercizio e numero giri previsti per l'impianto devono essere rispettati. In caso di dubbi contattare i nostri tecnici.</p>	<p><input type="checkbox"/> 3. 注意！ 严禁超过设备的额定负荷、开机持续时间和驱动转数。如果有不明之处，请询问我们的项目技术人员。</p>	<p><input type="checkbox"/> 3. ¡Atención! No se deben sobreasar cargas, período de funcionamiento y número de revoluciones de entrada, para los que está concebida la instalación. En caso de dudas le rogamos diríjase a nuestros técnicos de proyectos.</p>	<p><input type="checkbox"/> 3. Внимание! Запрещено превышать рассчитанные для устройства допустимые грузы, продолжительность включения и число оборотов привода. В случае сомнений обращайтесь к нашему технику-проектировщику.</p>
<p><input type="checkbox"/> 4. Allineamento Martinetti e guide lineari devono essere paralleli. Fate anche attenzione al preciso allineamento tra loro delle strutture di supporto.</p>	<p><input type="checkbox"/> 4. 对中 主轴和线性导轨必须相互平行。请您给支架结构准确相互对中。</p>	<p><input type="checkbox"/> 4. Alineación Los husillos y las guías lineales deben ser paralelos. Encárguese también de una alineación exacta de la construcción.</p>	<p><input type="checkbox"/> 4. Выверка Шпиндель и линейные направляющие должны быть расположены параллельно друг другу. Необходимо также обеспечить точную выверку параллельности несущей конструкции.</p>
<p><input type="checkbox"/> 5. Parallelismo ed angolarità Si deve porre molta attenzione al parallelismo, angolarità e planarità di superfici di attacco, martinetto, chiocciola e guide, l'uno rispetto agli altri. Attenzione anche all'esatto allineamento assiale del martinetto, giunti, supporto alberi, alberi di collegamento e motore.</p>	<p><input type="checkbox"/> 5. 平行和角度 必须注意螺栓固定面、齿轮箱、螺母和导向相互之间的平行、角度和平面性精度。同样也要注意齿轮箱、联轴节、轴承座、连接轴和电机之间的精确轴向对中。</p>	<p><input type="checkbox"/> 5. Paralelismo e inclinación Hay que observar el paralelismo, la precisión angular y plana de las superficies de atornillamiento, de los engranajes, tuercas y guías entre sí. De la misma manera hay que considerar la alineación axial de los engranajes, acoplamientos, soportes rectos, ejes de transmisión y motor entre sí.</p>	<p><input type="checkbox"/> 5. Параллельность и прямоугольность Необходимо обеспечить параллельное, прямоугольное расположение плоскостей крепления, редукторов, гаек и направляющих друг к другу. Необходимо обеспечить аксиальную соосность редукторов, муфт, вертикальных подшипников, соединительных валов и двигателя.</p>
<p><input type="checkbox"/> 6. Fissaggio La profondità di avvitamento deve essere rispettata. Le quattro viti di fissaggio sono dimensionate per il carico nominale statico del martinetto in trazione ed in spinta. Si deve tenere conto di ulteriori sollecitazioni d'urto ecc. Per la direzione di carico principale deve essere evitata la sollecitazione di trazione sulle viti di fissaggio.</p>	<p><input type="checkbox"/> 6. 固定 必须保证旋入深度。四个固定螺栓的设计符合齿轮箱在拉伸和压缩时的静额定负荷。要考虑冲击负荷等额外因素。在主要负荷方向上，应该避免拉伸负荷施加到固定螺栓上。</p>	<p><input type="checkbox"/> 6. Sujeción Ha de observarse la profundidad de enroscado. Los cuatro tornillos de sujeción están concebidos a tracción y presión para la carga nominal estática de los elevadores. Ha de considerarse una solicitud a golpe adicional etc. Para la dirección de carga principal se debe evitar la solicitud a tracción a los tornillos de sujeción.</p>	<p><input type="checkbox"/> 6. Крепление Необходимо соблюдать глубину ввинчивания. Четыре крепежных винта рассчитаны на статическую номинальную нагрузку, на тяговые усилия и давления редукторов. Необходимо учитывать дополнительные ударные нагрузки и т.д. Крепежные винты не должны подвергаться тяговым усилиям основного направления нагрузки.</p>
<p><input type="checkbox"/> 7. Guida La boccola guida nel martinetto aiuta parzialmente il sistema di guida ad assorbire le forze laterali. Fate attenzione che nessuna forza laterale agisca sul martinetto. A seconda del tipo di costruzione, il gioco ammesso tra il mandrino e la boccola di guida nel collare alberino è di 0,2 fino a 0,6 mm.</p>	<p><input type="checkbox"/> 7. 导向 齿轮箱的动力输出延伸壳不能代替导向系统来承受侧向力。请您注意，不能有任何侧向力施加在主轴上。根据齿轮箱规格不同，主轴和动力输出延伸壳中的导向轴套之间的额定间隙在0.2和0.6毫米之间。</p>	<p><input type="checkbox"/> 7. Guía El casquillo guía en el cuello del engranaje no sustituye un sistema de guía para absorber las fuerzas laterales. Preste atención, que no actúen fuerzas laterales sobre el husillo. El juego admisible entre el husillo y el casquillo guía en el cuello del engranaje es de 0,2 a 0,6 mm, dependiendo del tamaño.</p>	<p><input type="checkbox"/> 7. Направляющая Направляющая втулка в горловине редуктора не заменяет направляющую систему для компенсации боковых усилий. Необходимо обеспечить, чтобы на ходовой винт не влияли боковые усилия. В зависимости от типоразмера, допустимый зазор между ходовым винтом и направляющей втулки в редукторе соответствует 0,2 - 0,6 мм.</p>

D E U T S C H	E N G L I S H	F R A N Ç A I S
<p><input type="checkbox"/> 8. Schutzrohr Das Schutzrohr schützt die Spindel vor Verschmutzungen und kann in der Standardausführung keine Kräfte aufnehmen.</p>	 <p><input type="checkbox"/> 8. Protective Tube The protective tube protects the screw from contamination and, in the standard configuration, is not designed to be load bearing.</p>	<p><input type="checkbox"/> 8. Tube de protection Le tube de protection protège la vis des encrassements et, pour le modèle standard, ce tube ne peut pas supporter de charges.</p>
<p><input type="checkbox"/> 9. Sicherheitsabstand der beweglichen zu den fixen Bauteilen Der Mindestabstand laut Katalog darf nicht unterschritten werden. Ein Fahren auf Block ist kundenseitig durch geeignete elektronische oder konstruktive Maßnahmen zu verhindern. Bei Unterschreitung des Sicherheitsabstands bzw. Blockfahren können Folgeschäden entstehen, bei denen die Produkthaftung entfällt. Zum Schutz eignen sich unser neues Endschaltersystem und ein Bremsmotor.</p>	 <p><input type="checkbox"/> 9. Safety Distances between Moving and Stationary Components The minimum spacing according to the catalogue is to be observed. Hard driving against the stop is to be prevented by the customer with suitable electronic or mechanical measures. When going below the safety distances or driving against the stop, subsequent damage can occur for which the product liability does not apply. Our new limit switch system and a brake motor provide suitable protection.</p>	<p><input type="checkbox"/> 9. Écart de sécurité des pièces mobiles par rapport aux éléments fixes La garde minimum indiquée dans le catalogue doit être respectée. Par la mise en place de fins de course ou autres mesures de construction l'utilisateur ne doit jamais venir en butée mécanique. Le non respect de la garde de sécurité et/ou venir en butée mécanique sur le boîtier peut entraîner des dommages excluant la responsabilité du fabricant. Une bonne protection est, par exemple, assurée par notre nouveau système de fins de course et un moteur-frein.</p>
<p><input type="checkbox"/> 10. Dreh- und Bewegungsrichtung Kontrollieren Sie die Drehrichtung vor dem Motorprobelauf, indem Sie im Handkurbelbetrieb überprüfen, ob alle gekoppelten Hubgetriebe dieselbe Bewegungsrichtung haben. Beim Einsatz von Kegelradgetrieben kann die Bewegungsrichtung der Hubgetriebe durch einfaches Umdrehen der Kegelradgetriebe geändert werden (dies gilt jedoch nur für T-Ausführung mit 3 Wellenzapfen).</p>	 <p><input type="checkbox"/> 10. Direction of Rotation and Movement Check the direction of rotation before connecting up the motor by operating by hand to ensure all coupled screw jacks have the same direction of movement. With the use of bevel gear type gearboxes, the direction of movement of the screw jack can be changed by simply rotating the bevel gearbox 180° (however, this does not apply for the T-configuration with three shaft journals).</p>	<p><input type="checkbox"/> 10. Sens de rotation et de déplacement Contrôler les sens de rotation avant l'utilisation du moteur, en vérifiant, en manuel, avec une manivelle, que tous les vérins de levage installés se déplacent dans le même sens. En cas d'utilisation de renvois d'angle, le sens de déplacement des vérins de levage peut être modifié par une simple rotation à 180° du renvoi d'angle (cela n'est toutefois valable que pour le modèle en T à trois arbres).</p>
<p><input type="checkbox"/> 11. Nivellierung Für die Nivellierung der Getriebe haben wir ein präzises und montagefreundliches System entwickelt. Die Nivellierung erfolgt unter Last. Die Getriebe können untereinander über die Kupplungen oder Verbindungswellen nivelliert werden. Bitte beachten Sie, dass Hubgetriebe, die mit Kugelgewindegetrieben oder mehrgängigen Trapezgewindespindeln ausgerüstet sind, nicht selbsthemmend sind und deshalb während der Montage gestützt werden müssen. Die Höhenverstellung erfolgt durch Lösen und Verdrehen der Kupplung oder Welle um 120° (= 0,33 mm Verstellhöhe bei der N-Version). Für stufenlose Höheneinstellungen ist die Ausführung mit der Klemmhaben-Kupplung KUZ-KK oder Verbindungs-welle VWZ erforderlich. z.B.: 3,6 ° Verdrehung = 0,01 mm Verstellhöhe.</p>	 <p><input type="checkbox"/> 11. Levelling For the levelling of the gearbox, we have developed an accurate and simple mounting system. The levelling takes place under load. The gearboxes can be levelled by means of the couplings or the connection shafts. Please note that screw jacks that are equipped with ball screw drives or multi-speed, trapezoidal thread spindles are not self-locking and therefore must be supported during mounting. The height adjustment takes place by loosening and rotating the coupling or shaft by 120° (= 0.33 mm adjustment height for the N version). For continuous height adjustment, the KUZ-KK version with the clamping hub coupling or VWZ connection shaft is necessary, for example, 3.6 ° rotation = 0.01 mm height adjustment.</p>	<p><input type="checkbox"/> 11. Nivelage Pour mettre les vérins à niveau, nous avons développé un système précis et facile à monter. La mise à niveau s'effectue sous charge. Les vérins peuvent être nivelés les uns par rapport aux autres, par l'intermédiaire des accouplements ou des arbres de raccordement. Veuillez observer que les vérins de levage équipés de vis d'entraînement à billes ou de vis à filets trapézoïdaux multiples ne sont pas irréversibles et doivent donc être étayés pendant le montage. Le réglage en hauteur s'effectue en desserrant et en tournant l'accouplement ou l'arbre de 120° (= 0,33 mm de hauteur de réglage pour la version N). Les réglages continus en hauteur nécessitent le modèle doté de l'accouplement à manchon KUZ KK ou l'arbre de raccordement VWZ, par ex. : rotation de 3,6 ° = variation de réglage en hauteur de 0,01 mm.</p>

ITALIANO	中 文 (CHINESE)	ESPAGNOL	по-русски (RUSSIAN)
<p><input type="checkbox"/> 8. Tubo di protezione Il tubo di protezione protegge la vite da sporcizia e nell'esecuzione standard non può ricevere alcuna sollecitazione.</p>	<p><input type="checkbox"/> 8. 护管 护管保护主轴不受污染, 在标准结构中不能受力。</p>	<p><input type="checkbox"/> 8. Tubo protector El tubo protector protege el husillo contra ensuciamiento y en la versión estándar no puede absorber fuerzas.</p>	<p><input type="checkbox"/> 8. Защитная труба Защитная труба предохраняет ходовой винт от загрязнений. В стандартном исполнении она не предусмотрена для воздействия усилий.</p>
<p><input type="checkbox"/> 9. Distanza di sicurezza tra parti mobili e fisse La distanza minima secondo catalogo non deve essere superata. Il funzionamento in caso di interferenza deve essere evitato dal cliente con l'aiuto di misure elettroniche o costruttive idonee. Il mancato rispetto della distanza di sicurezza o le interferenze possono provocare danni che fanno decadere la responsabilità di prodotto. Come protezione, dotatevi del nostro nuovo sistema di finecorsa e di un motore con freno.</p>	<p><input type="checkbox"/> 9. 运动部件和固定部件之间的安全距离 不许低于产品目录中规定的最小距离。用户要采取合适的电子技术或设计措施防止硬驶到座块上。低于安全距离或硬驶到座块上可能导致损坏，我们对此不负任何责任。作为保护措施，我们提供合适的新型限位开关系统和制动电机。 驶</p>	<p><input type="checkbox"/> 9. Distancia de seguridad entre los componentes móviles y fijos No se puede pasar por debajo de la distancia mínima indicada en el catálogo. El cliente debe evitar con medidas electrónicas o constructivas que los componentes entren en contacto. Al pasar por debajo de la distancia de seguridad o bien, si los componentes móviles y fijos entran en contacto, se pueden producir daños consecuenciales por los que no asumimos la responsabilidad del producto. Como protección son apropiados nuestro sistema de interruptores de fin de carrera y un motor-freno.</p>	<p><input type="checkbox"/> 9. Безопасное расстояние между подвижными и неподвижными деталями Указанное в каталоге минимальное расстояние необходимо соблюдать. Пользователь обязан принять соответствующие электронные и конструктивные меры защиты, чтобы предотвратить возможность столкновений. В случае, если минимальное расстояние не соблюдается, или если происходят столкновения, то возможны повреждения, на которые гарантия не распространяется. Защиту обеспечивают наша новая система концевых выключателей и тормозной серводвигатель.</p>
<p><input type="checkbox"/> 10. Direzione di rotazione e di movimento Verificate la direzione di rotazione prima del ciclo di prova motore controllando, durante il funzionamento manuale a manovella, se tutti martinetti collegati hanno la stessa direzione di movimento. In caso di utilizzo di rinvii angolari, la direzione di movimento del martinetto può essere facilmente modificata ruotando il rinvio angolare (ciò però vale solo per la Versione T con 3 perni albero).</p>	<p><input type="checkbox"/> 10. 转动和运动方向 在进行电机试车运转之前, 请您检查转动方向: 使用手动曲轴操作观察是否连接的全部起重传动系统都具有相同的运动方向。当使用锥齿轮传动时, 可以通过改变锥齿轮传动方向来改变起重传动的运动方向(这只适用于带有3个轴颈的T型结构)。</p>	<p><input type="checkbox"/> 10. Dirección de giro y desplazamiento Controle la dirección de giro antes de la marcha de prueba del motor, comprobando en el régimen con manivela, si todos los elevadores mecánicos acoplados tienen la misma dirección de movimiento. Al utilizar reenvíos angulares, se puede cambiar la dirección de movimiento de los elevadores mecánicos dando simplemente la vuelta al reenvíos angulares (sin embargo, esto sólo vale para la versión T con 3 pivotes del eje).</p>	<p><input type="checkbox"/> 10. Направление вращения и движения Перед пробным пуском двигателя необходимо проверить направление вращения. Проверьте, в ручном режиме, при помощи кривошипной рукоятки, чтобы все подъемные редукторы вращались в одном и том же направлении. В случае применения конического редуктора, направление вращения подъемных редукторов возможно изменить повернув конический редуктор (однако, это действительно только для Т-исполнения с 3 цапфами вала).</p>
<p><input type="checkbox"/> 11. Livellamento Per il livellamento del martinetto abbiamo sviluppato un sistema preciso e di facile montaggio. Il livellamento avviene sotto carico. I martinetti possono essere livellati l'uno rispetto all'altro tramite giunti o alberi di collegamento. Fate attenzione che i martinetti, con vite a ricircolo di sfere o vite trapezoidale a più principi, non sono irreversibili e quindi il carico deve essere supportato durante il montaggio. La regolazione in altezza avviene tramite l'allentamento e la rotazione del giunto e dell'albero di 120° (=0,33 mm di altezza di regolazione nella Versione N). Per regolazioni continue dell'altezza è necessaria la versione con il giunto con fissaggio a morsetto KUZ-KK oppure con l'albero di collegamento VWZ. Ad esempio: 3,6° di rotazione = 0,01 mm di regolazione in altezza.</p>	<p><input type="checkbox"/> 11. 水平调节 我们为水平调节齿轮箱设计了一个精确而且容易安装的系统。水平调节在承载时进行。可以在联轴节或连接轴上给齿轮箱进行相互调平。请您注意, 由球螺纹传动或多挡梯形螺纹传动组成的起重传动机构没有自制动作用, 在安装时必须予以支撑。通过松开联轴节或连接轴并转动120度来调节高度 (N结构时等于调节0.33毫米的高度)。如果要想进行无级调节, 则需要带有夹紧套筒联轴节KUZ-KK或连接轴VWZ的结构。例如, 转动3.6度相当于0.01毫米的高度变化。</p>	<p><input type="checkbox"/> 11. Nivelación Para la nivelación de los engranajes hemos desarrollado un sistema preciso y fácil de montar. La nivelación se realiza bajo carga. Se pueden nivelar los engranajes entre sí a través de los acoplamientos o árboles de transmisión. Rogamos observe, que los elevadores mecánicos, que están equipados con mecanismos de husillo de bolas o husillos de husillo trapezoidal de varias entradas múltiples, no son autobloqueantes y por lo tanto deben apoyarse durante el montaje. La regulación de altura se realiza soltando o girando el acoplamiento o el árbol por 120° (= 0,33 mm de altura de regulación en la versión N). Para ajustes de altura sin escalonamiento hace falta la versión con el acoplamiento de cubo de apriete KUZ-KK el árbol por de transmisión VWZ. P. ej.: 3,6 ° de torsión = 0,01 mm de altura de regulación.</p>	<p><input type="checkbox"/> 11. Нивелировка Для нивелировки редукторов нами разработана точная и удобная система. Нивелировка производится под нагрузкой. Нивелировку редукторов относительно друг друга возможно производить с помощью муфты или соединительных валов. Учитывайте, что подъемные редукторы с шариковыми ходовыми винтами или многозаходными винтами с трапецидальной резьбой не являются самотормозящими, поэтому при монтаже их надо фиксировать. Установка по высоте производится ослаблением или вращением муфты или вала на 120° (у версии N это равняется 0,33 мм перестановки по высоте). Для бесступенчатой установки по высоте необходимо исполнение с муфтой с зажимной ступицей KUZ-KK или соединительным валом VWZ. Например: 3,6° поворота = 0,01 мм перестановки по высоте.</p>

DEUTSCH

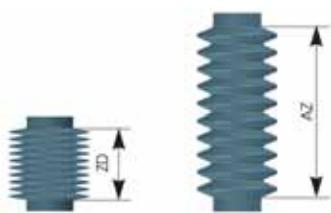
 12. Endschalter

Die Funktion der Steuerung im Zusammenhang mit den Endschaltern muss so gestaltet sein, dass ein Blockfahren zu 100% vermieden wird. Prüfen Sie die Endschalterfunktion vor dem Motorprobelauf. Wenn der Motor nachlauf ein sicheres Anhalten nicht gewährleistet, soll ein Bremsmotor eingesetzt werden. Der Endschalter muss bei Montage auf das Kunststoff-Distanzstück gedrückt werden.

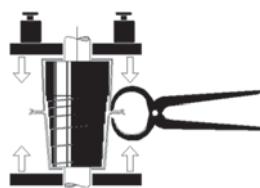
 13. Faltenbalg

Das ZD-Maß darf nicht unterschritten bzw. das AZ-Maß nicht überschritten werden. Bei Hüben ab 1000 mm verwenden Sie den Faltenbalg mit Auszugssperre. Berücksichtigen Sie, dass bei horizontalem Einbau der Faltenbalg die Spindel nicht berühren darf >> Zerstörungsgefahr! Verhindern können Sie dies durch den Einsatz von Stützringen. Besonders bei Baustellenmontage schützen Sie die Spindel vor:

- Baustaub
- Schleifstaub von Winkelschleifen usw.
- Schweißspritzen usw.

 14. Spiralfeder

Achtung: Auf Grund der Federvorspannung besteht bei unachtsamem Lösen der Stahlbandbefestigung erhebliche Unfallgefahr! Bauen Sie die Spiralfedern nur im zusammengedrückten Zustand ein, und lösen Sie die Stahlbandbefestigungen erst, wenn die Spirale unter Gegendruck steht. Die Spiralfedern werden unter Vorspannung in der Einbaulänge (ZD) geliefert.

 15. Fixierungen -

BF, GK, KGK und SLK

Befestigungsflansche, Gabel-, Kugelgelenk- und Schwenklagerköpfe für die S-Version werden auf die Spindelenden aufgeschraubt. Nach Einstellung der Position sind diese Anbauteile mittels einer Sicherungsschraube und Loctite-Schraubensicherung zu fixieren. Bis zur Baugröße MSZ-100 ist zusätzlich eine Kontermutter montiert. Die Fixierung muss sorgfältig überprüft werden.



ENGLISH

 12. Limit Switches

The function of the system control in conjunction with the limit switches must be designed such that hard driving against the stop is prevented. Check the limit switch operation before the trial motor run. When the motor coasts and a definite stopping is not achieved, a brake motor should be used. When mounting, the limit switch must be pressed on the plastic spacer.

 13. Bellows

The bellows must not be compressed below the ZD dimension or extended to exceed the AZ dimension. For strokes greater than 1000 mm, use the bellows with the extension block. Take into consideration that, for horizontal installation of the bellows, it must not come into contact with screw >> serious wear will occur! This can be avoided by the use of support rings. Especially for installation at construction sites, protect the screw from:

- Construction dust
- Grinding dust of angle grinders, etc.
- Welding splatter, etc.

 14. Spiral Spring

Caution: As a result of the spring preload, considerable danger of an accident exists for incorrect loosening of the steel band attachment! Install the spiral spring only in the pressed-together condition and loosen it only when counter pressure is applied. The spiral springs are delivered under preload in the installation length (ZD).

 15. Attachment -

BF, GK, KGK and SLK

Attachment flanges, fork and ball joints as well as drag bearing heads for the S version are screwed onto the end of the spindle. After adjusting the position, the attachment parts are to be secured by means of a safety screw and Loctite screw securing fluid. Up to construction size MSZ-100, an additional locking nut is to be mounted. The security must be carefully checked.

FRANÇAIS

 12. Fin de course

Le fonctionnement de la commande en relation avec les détecteurs de fin de course doit être configuré de manière à éviter à 100 % de venir en butée sur le boîtier. Vérifier la fonction du fin de course avant l'essai du moteur. Lorsque la marche par inertie du moteur n'assure pas l'arrêt précis souhaité, un moteur-frein doit être utilisé.

Lors du montage, le fin de course doit toucher l'entretoise en matière plastique.

 13. Soufflet

La cote ne doit pas être inférieure à ZD ni supérieure à AZ. Pour des courses dépassant 1000 mm, utiliser le soufflet avec blocage d'étirage.

Pour une utilisation horizontale, bien veiller à ce que le soufflet ne se prenne pas dans le filetage >> Danger de destruction ! Pour éviter cela, utiliser des bagues de maintien.

Veiller particulièrement, lors de montage sur chantier, à protéger les vis des vérins :

- de la poussière de construction ;
- des particules de ponçage des meuleuses, etc. ;
- des perles de soudage, etc.

 14. Ressort spiralé de protection

Attention: En raison de la pré-tension du ressort, le desserrage sans précaution de la fixation pour la bande d'acier constitue un risque important ! Monter le ressort spiralé en le maintenant comprimé et ne desserrer la fixation de la bande d'acier que lorsqu'une contre-pression s'exerce sur la spirale. Les ressorts sont livrés prétendus à la longueur de montage (ZD).

 15. Fixations -

BF, GK, KGK et SLK

Les brides de fixation, les chapes, têtes sphériques et têtes pivotantes pour la version S sont vissées sur les extrémités des arbres. Après avoir réglé leur position, fixer les éléments au moyen d'une vis de sécurité et d'un arrêt de vis Loctite. Jusqu'à la dimension MSZ-100, un contre-écrou est monté en supplément. La fixation doit être vérifiée avec soin.

ITALIANO	中 文 (CHINESE)	ESPAGNOL	по-русски (RUSSIAN)
<p><input type="checkbox"/> 12. Interruttore di finecorsa La funzione di comando di finecorsa, deve essere progettata in modo da aggiungere l'immediato blocco del sistema prima che si verifichi una qualsiasi interferenza tra le parti mobili. Verificate la funzione di finecorsa prima del ciclo di prova motore. Se l'inerzia del motore non garantisce un arresto sicuro, si deve applicare un motore con freno. Il fine corsa durante il montaggio deve essere premuto sul distanziale.</p>	<p><input type="checkbox"/> 12. 限位开关 控制系统的功能和限位开关一起要100%地保证不硬驶到座块上。请您在电机试车运转之前检查限位开关的功能。当电机的惯性运转不能保证安全可靠地停止，就要安装制动电机。在安装时，限位开关必须压在塑料定位件上。</p>	<p><input type="checkbox"/> 12. Interruptor de fin de carrera El funcionamiento del mando en relación a los interruptores de fin de carrera debe estar concebido de modo, que se evita al 100% el contacto entre los componentes. Controle la función del interruptor de fin de carrera antes de la marcha en prueba del motor. Si no está garantizado un paro seguro debido a la marcha en inercia del motor se debería utilizar un motor-freno. Hace falta presionar el interruptor de fin de carrera durante el montaje en la pieza distanciadora de plástico.</p>	<p><input type="checkbox"/> 12. Концевые выключатели Управление и работа концевых выключателей должны быть согласованы так, чтобы 100% исключить столкновения. Проверьте работу концевого выключателя перед пробным пуском двигателя. Если вследствие выбега двигателя не обеспечен надежный останов, то необходимо встроить тормозной серводвигатель. При монтаже концевой выключатель необходимо прижать к пластмассовой дистанционной детали.</p>
<p><input type="checkbox"/> 13. Soffietto La quota ZD non deve essere superata e la quota AZ non deve essere inferiore. In caso di corse oltre 1000 mm utilizzate il soffietto con morsetto di tenuta R. Fate attenzione che in caso di montaggio orizzontale il soffietto non tocchi la vite >> Pericolo di rottura! Ciò può essere evitato grazie all'utilizzo di anelli di supporto. In caso di montaggi particolari, proteggete il martinetto da polveri e trucioli di costruzione, di rettifica, spruzzi di saldatura ecc.</p>	<p><input type="checkbox"/> 13. 波纹管 不许小于ZD尺寸或大于AZ尺寸。从行程为1000毫米开时，请您使用带有拉伸闭锁的波纹管。请您注意，水平安装波纹管时，它不能触及主轴>>损坏危险！您可以通过安装支撑环来避免这一危险。尤其是在建筑工地上，您要特别注意保护主轴不受- 建筑灰尘 - 磨角产生的磨粉等 - 焊接溅出的碎片等的污染。</p>	<p><input type="checkbox"/> 13. Fuelle No se debe pasar por debajo de la medida ZD (compresión) o bien no se debe sobrepasar la medida AZ (estiraje). En caso de carreras a partir de 1000 mm rogamos utilice el fuelle con bloqueo. Tenga en cuenta, que en caso de montaje horizontal, el fuelle no debe tocar el husillo >> ¡Peligro de destrucción! Vd. lo puede evitar, utilizando anillos de apoyo. Principalmente durante el montaje en lugar de obras hay que proteger el husillo contra: <ul style="list-style-type: none"> - polvo de obras - polvo de amoladoras angulares, etc. - salpicaduras de soldadura etc. </p>	<p><input type="checkbox"/> 13. Сильфон Размер ZD нельзя прижимать, размер AZ нельзя превышать. При большом ходе, начиная с 1000 мм, необходимо применять сильфон с блокировкой при растяжке. Учитывайте, что при горизонтальном монтаже сильфон не должен касаться ходового винта >> опасность разрушения! Эту опасность возможно предотвратить применяя опорные кольца. В частности, при монтаже на стройке, ходовой винт необходимо защитить от: <ul style="list-style-type: none"> - строительной пыли - шлифовальной пыли угловых шлифовальных машин - сварочных брызг и т.д. </p>
<p><input type="checkbox"/> 14. Molla a spirale Attenzione: a causa del pretensionamento della molla, in caso di allentamento accidentale del fissaggio a nastro d'acciaio, si possono correre seri pericoli! Montate le molle a spirale solo in condizione compressa ed allentate i fissaggi in acciaio solo quando la spirale si trova sotto controllo-pessione. Le molle a spirale sono fornite in pretensionamento nella lunghezza di montaggio (ZD).</p>	<p><input type="checkbox"/> 14. 螺簧 注意：由于弹簧的预应力，如果不小心打开钢板固定装置会产生严重事故！您只能在螺簧压在一起的状态下进行安装：只有当弹簧处于反压力下时，您才能松开钢板固定装置。螺簧在交货时已经具有预应力，压成安装长度(ZD)。</p>	<p><input type="checkbox"/> 14. Muelle espiral Atención: A causa de la tensión preliminar del muelle rige un peligro muy grande de accidente al soltar sin preaviso la sujeción del fleje de acero! Monte sólo los muelles espirales en estado comprimido y suelte las sujeteciones del fleje de acero únicamente, cuando la espiral está bajo contrapresión. Se suministran los muelles espirales bajo tensión preliminar en la longitud de montaje (ZD).</p>	<p><input type="checkbox"/> 14. Спиральная пружина Внимание: в связи с предварительным натяжением пружины, при неосторожном устраниении крепежной стальной ленты, возможны ранения! Производите монтаж спиральной пружины только в скжатом состоянии и устранийте крепежную стальную ленту только если спираль находится под давлением. Спиральные пружины поставляются предварительно натянутые с монтажной длиной (ZD).</p>
<p><input type="checkbox"/> 15. Elementi di Fissaggio BF, GK, KGK e SLK Flange di fissaggio, teste a forcella, teste a snodo sferico e supporto oscillante per la Versione S sono avvitate all'estremità alla vite. Dopo la regolazione della posizione, questi componenti devono essere fissati per mezzo di viti di sicurezza e di Loctite per viti. Fino ad una grandezza di MSZ-100, inoltre, è montata una contro-vite. Il fissaggio deve essere controllato attentamente.</p>	<p><input type="checkbox"/> 15. 固定 - 固定法兰、叉体、万向球接头和回转轴承 S型结构固定法兰、叉体、万向球接头和回转轴承都用螺丝固定在轴端上。调定好这些部件的位置后，使用固定螺丝和Loctite 螺丝固定剂固定。在结构尺寸MSZ-100之下时，还要再使用固定螺母固定。必须仔细检查固定情况。</p>	<p><input type="checkbox"/> 15. Fijaciones - BF, GK, KGK y SLK Las bridas de sujeción, las rótulas horquillas, articuladas y de giratorios para la versión S se enroscan en los extremos de husillos. Después de ajustar la posición, estas piezas de montaje deben ser fijadas con tornillo de seguridad y adhesivo para tornillos Loctite. Hasta el tamaño MSZ-100 está montada adicionalmente una contratuerca. Se debe controlar con esmero la fijación.</p>	<p><input type="checkbox"/> 15. Крепление - КФ, ВГ и ПОГ Крепежные фланцы, вилкообразные головки и поворотные опорные головки для версии S навинчиваются на концы ходового винта. После установки в надлежащую позицию эти элементы необходимо зафиксировать с помощью стопорного винта и kleem Loctite. До типоразмера MSZ-100 дополнительно монтирована контргайка. Крепление необходимо тщательно проверить.</p>

DEUTSCH

 16. Motorflansch

Überprüfen Sie die Länge der Befestigungsschrauben für den Motor. Der Motor kann durch den Einbau zu langer Schrauben beschädigt werden! Die Kupplung wird über das Sichtloch kontrolliert und fixiert. Verschließen Sie den Motorflansch mit der Verschlusskappe.

 17. Kupplungen / Verbindungs-wellen

Achten Sie bitte auf axiale Fluchtung der Verbindungsstellen mit Stehlagern und Getrieben (siehe auch Punkt 4, 5, 11). Kontrollieren Sie die Sicherung aller Kupplungen und Verbindungsstellen gegen axiales Verschieben auf den Antriebswellen. Bei der Verbindungs-welle VWZ und der Klemmabenkupplung KUZ-KK entfällt die Passfeder. Die Klemmschrauben 10.9 dürfen nicht getauscht werden, z.B. Niro-Schrauben haben eine geringere Festigkeit. Anzugsmomente gemäß folgender Tabelle beachten:

Verbindungs-welle	Kupplung	Anzugs-moment
VWZ- 28	KUZ-KK-16	4 Nm
VWZ- 40	KUZ-KK-24	8 Nm
VWZ- 60	KUZ-KK-32	15 Nm
VWZ- 80	KUZ-KK-45	70 Nm
VWZ-100	KUZ-KK-60	120 Nm

 18. Kugelgewindetriebe KGT

Unsere Lieferung erfolgt mit montierter Mutter auf der Spindel. Vermeiden Sie die Demontage der Mutter.
ACHTUNG: Sollte eine Demontage erforderlich sein, darf die Mutter nicht ohne Montagehülse entfernt werden. Die Hülse verhindert, dass die Kugeln herausfallen. Auf keinen Fall darf die Spindel bei der S-Version aus dem Getriebe gedreht werden. Kugelgewindetriebe sind nicht selbsthemmend! Grundsätzlich empfehlen wir eine Ausdrehisierung. Ein Bremsmotor oder eine Federdruckbremse FDB sind erforderlich.



ENGLISH

 16. Motor Flange

Check the length of the attachment bolts for the motor. The motor can be damaged by the installation of bolts that are too long! The coupling is tightened and controlled by means of an inspection hole. Replace the cover after adjustment.

 17. Couplings / Connection Shafts

Pay attention to the axial alignment of the connection shafts between pillow bearings and gearboxes (also see points 4, 5, 11). Check the securing of all couplings and connection shafts against axial movement on the drive shafts. For the VWZ connection shaft and the KUZ-KK clamping hub coupling, the feather key is omitted. The clamping screws 10.9 should not be replaced since, for example, stainless steel screws have a lower strength. Observe the tightening torques according to the following table:

Connection Shaft	Coupling	Tightening Torque
VWZ- 28	KUZ-KK-16	4 Nm
VWZ- 40	KUZ-KK-24	8 Nm
VWZ- 60	KUZ-KK-32	15 Nm
VWZ- 80	KUZ-KK-45	70 Nm
VWZ-100	KUZ-KK-60	120 Nm

 18. Ball Screw Drive KGT

Our units are delivered with the nut mounted on the screw. Avoid the disassembling of the nut.
Caution: Should disassembly be necessary, do not remove the nut without a mounting sleeve. The sleeve prevents the balls from falling out. For the S version, under no circumstances should the screw be rotated out of the gearbox. Ball screw gearboxes are not self-locking! Customers design should ensure screw cannot be wound out. A brake motor or a FDB spring pressure brake is required.



FRANÇAIS

 16. Lanterne bride moteur

Vérifier la longueur des vis de fixation du moteur. Le moteur peut être endommagé par des vis trop longues ! L'accouplement est contrôlé et fixé au travers d'une lumière. Fermer la bride moteur à l'aide du capuchon de fermeture.

 17. Accouplements / Arbres de transmission

Bien veiller à l'alignement axial des arbres de raccordement avec les paliers de maintien et les arbres des vérins à vis (voir également les paragraphes 4, 5, 11). S'assurer que tous les accouplements sont bien fixés sur les arbres de raccordements et des vérins afin qu'ils ne puissent plus se déplacer axialement. Sur l'arbre de raccordement VWZ et le manchon KUZ-KK il n'y a pas de clavette. Les vis de serrage 10.9 ne doivent pas être substituées car, par ex. les vis Niro ont une résistance moindre. Pour les couples de serrage, consulter le tableau ci-dessous :

Arbre de raccordement	Accouplement	Moment
VWZ- 28	KUZ-KK-16	4 Nm
VWZ- 40	KUZ-KK-24	8 Nm
VWZ- 60	KUZ-KK-32	15 Nm
VWZ- 80	KUZ-KK-45	70 Nm
VWZ-100	KUZ-KK-60	120 Nm

 18. Vis d'entraînement à billes KGT

Notre livraison s'effectue avec l'écrou monté sur la vis. Éviter le démontage de l'écrou.

ATTENTION : Si un démontage s'avère nécessaire, l'écrou ne doit pas être retiré sans douille de montage. La douille évite aux billes de tomber. Pour la version S la vis ne doit en aucun cas être dévissée du boîtier. Les vis d'entraînement à billes ne sont pas irréversibles ! Nous recommandons expressément un dispositif anti-translation. Un moteur frein ou un frein à ressort FBD sont nécessaires.

ITALIANO

中 文 (CHINESE)

ESPAGNOL

по-русски (RUSSIAN)

 16. Flangia motore

Verificate la lunghezza delle viti di fissaggio per il motore. Il motore può essere danneggiato da viti troppo lunghe! Il giunto viene controllato e fissato attraverso foro di controllo. Chiudete la flangia motore con la calotta di chiusura.

 17. Giunti / Alberi di collegamento

Fate attenzione all'allineamento assiale degli alberi di connessione con i supporti intermedi e i martinetti (vedere anche Punto 4, 5, 11). Controllate la protezione di tutti i giunti ed alberi di collegamento per evitare lo spostamento assiale sugli alberi comando. Nel caso dell'albero di collegamento VWZ e del giunto con fissaggio a morsetto KUZ-KK, non c'è la chiavetta. Le viti di bloccaggio 10.9 non devono essere sostituite. Coppie di serraggio secondo la seguente Tabella:

Albero di collegamento	Giunto	Coppia di serraggio
VWZ- 28	KUZ-KK-16	4 Nm
VWZ- 40	KUZ-KK-24	8 Nm
VWZ- 60	KUZ-KK-32	15 Nm
VWZ- 80	KUZ-KK-45	70 Nm
VWZ-100	KUZ-KK-60	120 Nm

 18. Martinetti con vite a ricircolo di sfere KGT

La nostra fornitura comprende la chiocciola montata sulla vite. Evitate lo smontaggio della chiocciola.

ATTENZIONE: se dovesse essere necessario lo smontaggio, la chiocciola non deve essere rimossa senza la bussola. La bussola impedisce che le sfere cadano. In nessun caso la vite deve essere sfilata dal martinetto.

Mecanismi con martinetto a ricircolo di sfere non sono anto-bloccanti! In generale consigliamo una protezione anti-svitamento. Sono necessari un motore con freno oppure un freno eletromagnetico FDB.

 16. 电机法兰

请您检查电机固定螺栓的长度。安装的螺栓太长会损坏电机！通过窥视孔检查和安装联轴节。使用密封罩密封电机法兰。

 17. 联轴节 / 连接轴

请您注意连接轴和轴承座以及齿轮箱之间的轴向对中（也参见第4、5、11点）。请您检查所有联轴节和连接轴的固定装置与驱动轴之间的轴向偏差。连接轴VWZ和夹紧套筒联轴节KUZ-KK没有调整弹簧。不许改换夹紧螺丝10.9，例如，不锈钢螺丝的强度较小。请遵守下表中的坚固扭矩。

连接轴	联轴节	紧固扭矩
VWZ- 28	KUZ-KK-16	4 Nm
VWZ- 40	KUZ-KK-24	8 Nm
VWZ- 60	KUZ-KK-32	15 Nm
VWZ- 80	KUZ-KK-45	70 Nm
VWZ-100	KUZ-KK-60	120 Nm

 18. 球螺纹传动 KGT

我们交货时，螺母已经安装在主轴上。要避免拆卸螺母。注意：如果须要拆卸螺母，不能在没有安装套筒时卸下螺母。安装套筒防止球掉出。严禁在S型结构中把主轴从齿轮旋出。球螺纹传动没有自制动作用！我们建议使用采用旋出保护装置。需要安装制动电机或压簧制动器FDB。

 16. Brida de motor

Controle la longitud de los tornillos de sujeción para el motor. ¡Se puede dañar el motor, utilizando tornillos demasiado largos! Se controla y se fija el acoplamiento a través del agujero de inspección. Proteja la brida de motor con la campana de cierre.

 17. Acoplamientos/ejes de transmisión

Rogamos observe la alineación axial de los ejes de transmisión con soportes rectos y engranajes (véase también los puntos 4, 5, 11). Controle el seguro de todos los acoplamientos y ejes de transmisión contra un desplazamiento axial en los ejes de accionamiento. En el eje de transmisión VWZ y el acoplamiento de cubo de apriete KUZ-KK se puede prescindir de la chaveta. No se pueden cambiar los tornillos de apriete 10.9, p. ej. los tornillos Niro tienen poca resistencia. Observe los pares de apriete según la siguiente tabla:

Eje de transmisión	Acoplamiento	Par de apriete
VWZ- 28	KUZ-KK-16	4 Nm
VWZ- 40	KUZ-KK-24	8 Nm
VWZ- 60	KUZ-KK-32	15 Nm
VWZ- 80	KUZ-KK-45	70 Nm
VWZ-100	KUZ-KK-60	120 Nm

 18. Mecanismos con husillo de bolas KGT

Lo suministramos con tuerca montada en el husillo. Evite el desmontaje de la tuerca.

ATENCIÓN: En caso de que haga falta un desmontaje, no se debe retirar la tuerca sin manguito de montaje. El manguito evita que se caigan las bolas. Nunca se puede desenroscar el husillo del elevador en la versión S. ¡Los mecanismos con husillo de bolas no son autobloqueantes! Por principio, recomendamos un seguro contra desenroscado. Hace falta un motor-freno o un freno a presión de muelle FDB.

 16. Фланец двигателя

Проверьте длину крепежных винтов для двигателя. Двигатель может быть поврежден, если используемые винты слишком длинные! Муфта фиксируется и контролируется через смотровое отверстие. Закройте фланец двигателя заглушкой.

 17. Муфта / соединительные валы

Необходимо обеспечить аксиальную соосность соединительных валов, вертикальных подшипников и редукторов (см. также пункты 4, 5, 11). Проверьте защиту от аксиального сдвига всех муфт и соединительных валов на приводных валах. У соединительного вала VWZ и муфты с зажимной ступицей KUZ-KK нет призматической шпонки. Стопорные винты 10.9 нельзя менять, например, прочность винтов из нержавеющей стали ниже. Соблюдайте моменты затяжки соответственно следующей таблицы:

соединительный вал	муфта	момент затяжки
VWZ-28	KUZ-KK-16	4 Нм
VWZ-40	KUZ-KK-24	8 Нм
VWZ-60	KUZ-KK-32	15 Нм
VWZ-80	KUZ-KK-45	70 Нм
VWZ-100	KUZ-KK-60	120 Нм

 18. Редуктор с шариковым ходовым винтом

Ходовой винт поставляется с монтированной гайкой. Избегайте демонтаж гайки.

ВНИМАНИЕ: в случае необходимости демонтажа гайки, гайку запрещено устранять без монтажной гильзы. Гильза удерживает шарики. У версии S ни в коем случае нельзя вывинчивать ходовой винт из редуктора.

Редукторы с шариковыми ходовыми винтами не самотормозящие! Принципиально рекомендуем применение защиты от вывинчивания. Необходимо применение тормозного серводвигателя или пружинного тормоза FDB.

DEUTSCH

 19. Federdruckbremse FDB

Schützen Sie beim Nachschmieren der Spindel immer die Reibflächen der Federdruckbremse vor Verschmutzung. Auf keinen Fall darf Öl oder Fett auf den Reibbelag gelangen. Geringe Verschmutzungen dieser Art können die Funktion der Bremse reduzieren. Die maximal zulässige Grenztemperatur der Federdruckbremse beträgt 145°C. Bei Einsatz einer Federdruckbremse FDB oder eines Bremsmotors in Kombination mit einem Frequenzumformer, steuern Sie die Bremse separat an.

Bitte beachten Sie unsere spezielle Montageanleitung für FDB.



ENGLISH

 19. Spring Pressure Brake FDB

Always protect the friction surface of the spring pressure brake from contamination when relubricating the screw. Under no circumstances should oil or grease get onto the friction linings. Slight contamination of this type can reduce the function of the brake. The maximum allowable limiting temperature of the spring pressure brake is 145°C. When using a FDB spring pressure brake or a brake motor in combination with a frequency converter, the brake must be controlled separately. Please also note our separate mounting instructions for FDB.

 20. Probelauf

Während des Probelaufs messen Sie fortlaufend die Stromaufnahme des Motors. Ist eine erhöhte Stromaufnahme feststellbar, lockern Sie bitte die Befestigungsschrauben und tätigen einen neuen Probelauf. Ungleichmäßiger Kraftbedarf und Laufspuren auf der Spindel lassen auf Fluchtungsfehler schließen. Eine sorgfältige Montage ist Voraussetzung für den einwandfreien Betrieb der Anlage! Die Verwendung von Montagesprays ist nicht ratsam, da es zu Aufplattungen und Toleranzveränderungen kommen kann.

 20. Trial Run

During the trial run, measure continuously the current consumption of the motor. If increased current consumption is determined, loosen the attachment bolts and make another trial run. Uneven power requirements and running traces on the spindle indicate alignment errors. Careful mounting is the prerequisite for flawless operation of the equipment! The use of mounting sprays is not advisable since this can cause blistering and tolerance changes.

 21. Schmierung vor dem Probelauf

R-Version:

Getriebeausführungen mit rotierender Spindel werden aufgrund von Verschmutzungsgefahr ungefettet geliefert. Die Spindel und die Laufmutter müssen vor dem ersten Probelauf gereinigt und ausgiebig auf die ganze Länge geschmiert werden (Klüber LA02 oder gleichwertig).

S-Version:

Getriebeausführungen mit stehender Spindel (mit montiertem Schutzrohr) werden von uns betriebsbereit vorgefettet.

Der erste Probelauf soll lastfrei erfolgen, um eventuelle Fluchtungsfehler zwischen den Spindeln und den Führungen festzustellen. Die Spindel- und Getriebetemperatur darf 80°C nicht überschreiten. Nach dem Probelauf wird das überschüssige Fett entfernt.

 21. Lubrication Before the Trial Run

R version:

The rotating screws are delivered without being greased as a result of the danger of contamination. Before the first trial run, the screw and the runner nut must be cleaned and abundantly lubricated over its entire length (Klüber LA02 or equivalent).

S version:

Gearboxes versions with standing screws (with mounted protective tube) are prelubricated by us and ready for operation.

The first trial runs should take place without load to determine possible alignment errors between the screws and the guides. The screw and gearbox temperature should not exceed 80°C. After the trial run, excessive grease is to be removed.

FRANÇAIS

 19. Frein à ressort FDB

Lors du graissage de la vis, toujours protéger le frein à ressort dont les surfaces de frottement doivent toujours rester propres et sèches. Ne jamais mettre ni huile ni graisse sur les garnitures de friction. Même de faibles encrassements de ce type peuvent réduire la fonction du frein. La température à ne pas dépasser pour le frein à ressort est de 145°C. Si vous utilisez un frein à ressort FDB ou un moteur frein combiné à un variateur de fréquence, prévoyez une commande séparée pour le frein. Veuillez tenir compte de nos instructions spéciales de montage pour FDB.

 20. Essai de fonctionnement

Pendant l'essai, mesurer en continu la consommation de courant du moteur. Si vous constatez que la consommation augmente, desserrez les vis de fixation et procédez à un nouvel essai. Une puissance absorbée irrégulière et des traces de frottement sur la vis du vérin indiquent un défaut d'alignement. Un montage soigneux est la condition du fonctionnement correct de l'installation ! L'utilisation de spray de montage n'est pas conseillée, car elle peut entraîner des défauts de surface et des modifications des tolérances.

 21. Graissage avant l'essai de fonctionnement

Version R:

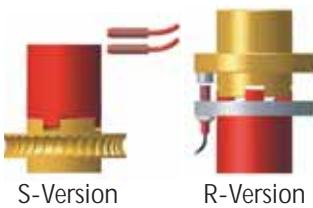
Les modèles à vis tournante sont livrés non graissés en raison des risques d'encaissement. Avant le premier essai de fonctionnement, la vis et l'érouv doivent être nettoyés et suffisamment graissés sur toute leur longueur (Klüber LA02 ou équivalent).

Version S :

Les modèles avec vis à avance axiale (avec tube de protection monté) sont pré-graissés par nos soins et prêts à l'usage.

Le premier essai de fonctionnement doit avoir lieu sans charge, afin de constater d'éventuels défauts d'alignement entre les arbres et les guidages. La température des vis et des boîtiers ne doit pas être supérieure à 80°C. Après l'essai, retirer la graisse excédentaire.

ITALIANO	中 文 (CHINESE)	ESPAGNOL	по-русски (RUSSIAN)
<p><input type="checkbox"/> 19. Freno pneumatico a molla FDB In caso di ingrassaggio della vite proteggete sempre le superfici di attrito del freno elettromagnetico dalla sporcizia. In nessun caso olio o grasso devono raggiungere il pattino di attrito. Anche una piccola quantità di lubrificante può ridurre la funzionalità del freno. La temperatura massima ammessa del freno elettromagnetico è di 145°C. In caso di utilizzo di freno FDB oppure di combinazione motore con freno e convertitore di frequenza, comandate il freno separatamente. Si prega di attenersi alle specifiche istruzioni di montaggio per FDB.</p>	<p><input type="checkbox"/> 19. 压簧制动器 FDB 在给主轴加润滑剂时，要注意保护压簧制动器的摩擦面不受污染。切勿让油或脂污染摩擦片。即使微量的这类污染都会降低制动器的功能。压簧制动器的最大允许极限温度为145°C。当把压簧制动器FDB或制动电机和变频器共同使用时，要单独控制制动器。请您遵守我们为FDB编写的专用安装说明书。</p>	<p><input type="checkbox"/> 19. Freno a presión de muelle FDB Durante una lubricación posterior del husillo, proteja siempre las superficies de fricción del freno a presión de muelle contra la suciedad. Puede llegar aceite o grasa en el forro de fricción. La suciedad puede reducir la función del freno. La temperatura límite máxima admisible del freno a presión de muelle es de 145°C. Al utilizar un freno a presión de muelle FDB o un motor-freno en combinación con un convertidor de frecuencias, actúe el freno por separado. Rogamos observen nuestras Instrucciones de montaje especiales para Frenos a presión de muelle FDB.</p>	<p><input type="checkbox"/> 19. Пружинный тормоз FDB При повторной смазке ходового винта, поверхности трения пружинного тормоза необходимо защищать от загрязнений. Ни в коем случае на поверхности трения не должны попадать масло или смазка. Такие незначительные загрязнения могут снизить эффективность работы тормоза. Допустимая максимальная предельная температура пружинного тормоза равна 145 °C. В случае применения пружинного тормоза FDB или тормозного двигателя в сочетании с преобразователем частот, управление тормозом производится отдельно. Соблюдайте наше отдельное руководство по монтажу FDB.</p>
<p><input type="checkbox"/> 20. Funzionamento di prova Durante il funzionamento di prova misurate costantemente l'assorbimento di corrente del motore. Nel caso in cui rileviate un aumento di assorbimento, allentate le viti di fissaggio ed effettuate una nuova prova di funzionamento. Un fabbisogno non costante di energia e tracce di scorrimento sulla vite indicano un errore di allineamento. Un montaggio ben realizzato è la premessa per il perfetto funzionamento dell'impianto! L'utilizzo di spray di montaggio non è consigliabile poiché può causare appiattimenti e modifiche delle tolleranze !</p>	<p><input type="checkbox"/> 20. 试车 在试车期间，请您不断测量电机的耗用电流。如果确认耗用电流增高，请您旋松一点固定螺栓，再次进行试车。不正常的耗用能量和主轴上由于运转而产生的痕迹都表明对中错误。仔细精确的安装是设备正常运转的前提！我们建议在安装时不使用安装喷剂，因为它会引起发泡和公差变化。</p>	<p><input type="checkbox"/> 20. Marcha de prueba Durante la marcha de prueba se debe controlar continuamente el consumo de corriente del motor. Si hay un consumo de corriente elevado, afloje los tornillos de sujeción y realice una nueva marcha de prueba. Un consumo de energía irregular y huellas de rodadura en el husillo señalan errores de alineación. ¡Un montaje esmerado es condición preliminar para un funcionamiento correcto de la instalación! No se recomienda el uso de sprays de montaje, puesto que se pueden formar capas y se pueden alterar las tolerancias.</p>	<p><input type="checkbox"/> 20. Пробный пуск Во время пробного пуска необходимо постоянно измерять потребление тока двигателя. В случае повышенного потребления тока крепежные винты необходимо ослабить и повторить пробный пуск. Неравномерное потребление энергии и следы на ходовом винте указывают на ошибочную выверку. Условием для исправной работы оборудования является тщательный монтаж! Не рекомендуется применять монтажный аэрозоль, так как это может привести к наслоениям и изменениям допусков.</p>
<p><input type="checkbox"/> 21. Lubrificazione prima del ciclo di prova <u>Versione R:</u> le versioni con vite rotante sono fornite senza lubrificazione per il pericolo di imbrattamento. La vite e la chiocciola rotante devono essere pulite prima del primo ciclo di prova ed ingrassate abbondantemente sull'intera lunghezza (Klüber LA02 o analogo). <u>Versione S:</u> Le versioni a vite fissa (con tubo di protezione montato) sono fornite pronte per il funzionamento, pre-ingrassate. La prima prova deve avvenire senza carico per identificare eventuali errori di allineamento tra vite e guide. La temperatura di vite e martinetto non deve superare 80°C. Dopo il ciclo di prova si rimuove il grasso in eccesso.</p>	<p><input type="checkbox"/> 21. 试车前润滑 R型结构： 由于存在污染危险，带有转动主轴的齿轮箱在交货时没有油脂。必须在第一次试车之前清洗主轴和L游走螺母，在整个长度上充分润滑(Klüber LA02或等同的型号)。 S型结构： 带有固定主轴的齿轮箱(安装有护管) 在交货时已经涂脂，可以直接用。第一次试车时应该没有负载，以确定主轴和导向之间可能存在的对中错误。主轴和齿轮箱的温度不超过80°C。试车运行结束后除去多余的油脂。</p>	<p><input type="checkbox"/> 21. Lubricación antes de la marcha de prueba <u>Versión R:</u> Los elevadores mecánicos en rotación se suministran sin grasa debido al peligro de suciedad. Antes de la primera marcha de prueba hace falta limpiar y engrasar bien el husillo en toda su longitud y la tuerca de rodadura (Klüber LA02 ó de misma calidad). <u>Versión S:</u> Los elevadores mecánicos con husillo de traslación (con tubo protector montado) ya están engrasados previamente por nosotros y están listos para su utilización. La primera marcha de prueba se debería realizar sin carga, para localizar posibles errores de alineación entre los husillos y las guías. La temperatura del husillo y del engranaje no debe sobrepasar los 80°C. Después de la marcha de prueba se elimina la grasa superflua.</p>	<p><input type="checkbox"/> 21. Смазка перед пробным пуском <u>Версия R:</u> Редукторы в исполнении с вращающимся ходовым винтом, поставляются, в связи с опасностью загрязнения, без смазки. Перед первым пробным пуском ходовой винт и рабочую гайку необходимо очистить и смазать тщательно по всей длине винта. (Klüber LA02 или соответствующего качества). <u>Версия S:</u> Редукторы, в исполнении с неподвижным ходовым винтом (с монтированной защитной трубой), поставляются смазанные, готовые к эксплуатации. Первый пробный пуск следует производить без нагрузки, чтобы установить возможную несоосность между ходовыми винтами и направляющими. Температура ходового винта не должна превышать 80 °C. После пробного пуска остаточная смазка устраняется.</p>

D E U T S C H		E N G L I S H	F R A N Ç A I S
<p><input type="checkbox"/> 22. Verschraubungen Überprüfen Sie bitte alle Verschraubungen nach dem Probelauf.</p>		<p><input type="checkbox"/> 22. Screw Connections Check all screw connections after the trial run.</p>	<p><input type="checkbox"/> 22. Vis de maintien et/ou de serrage Après l'essai, vérifier le serrage approprié de toutes les vis.</p>
<p><input type="checkbox"/> 23. Verschleißkontrolle der Trapezgewindemuttern Kontrollieren Sie je nach Einschaltzeit bzw. Betriebszeit in entsprechenden Intervallen den Verschleiß des Trapezgewindes im Schneckenrad bzw. der Laufmutter (bei R-Version) anhand des Gewindeaxialspiels. Achtung: Beträgt der Verschleiß mehr als 20% der Gewindesteigung, ist das Getriebe bzw. Schneckenrad (S-Version) oder die Laufmutter (R-Version) auszutauschen. Für besondere Fälle mit Sicherheitsanforderungen, wie z.B. im Bühnenbau, empfehlen wir unbedingt die Verwendung einer Sicherheitsfangmutter und deren Verschleißüberwachung mittels induktivem Endschalter. Diese Ausführung liefern wir komplett als fertige Baueinheit.</p>		<p><input type="checkbox"/> 23. Wear Control of the Trapezoidal Threaded Nuts Depending on the switched-on time or the operating time, check the wear of the trapezoidal threads of the worm gear or the runner nut (for R version) at appropriate intervals on the basis of axial thread play. Caution: If the wear is more than 20% of the thread pitch, the gearbox or the worm gear (S version) or the runner nut (R version) is to be replaced. For special cases with safety requirements such as, for example, stage construction, we recommend in all cases the use of a safety nut and monitoring of its wear by means of an inductive limit switch. We deliver this configuration as a completely assembled component.</p>	<p><input type="checkbox"/> 23. Contrôle d'usure des écrous à filet trapézoïdal A des intervalles réguliers, en fonction de la durée d'utilisation ou des heures de services, contrôler l'usure du filet trapézoïdal dans la roue tangente ou celle de l'écrou (version R), en vérifiant le jeu axial du filet. Attention : Si l'usure est supérieure à 20 % du pas de la vis, le boîtier ou la roue tangente (version S), ou bien l'écrou (version R) doivent être remplacés. Dans les cas exigeant une sécurité particulière, comme par ex. les plates-formes de levage, nous recommandons impérativement l'utilisation d'un écrou d'arrêt de sécurité avec la surveillance de son usure au moyen d'un fin de course inductif. Nous livrons ce modèle complet comme unité prête à monter.</p>
<p><input type="checkbox"/> 24. Reparatur Eine Reparatur ist durch Kompletttausch des Hubgetriebes am wirtschaftlichsten zu realisieren.</p>		<p><input type="checkbox"/> 24. Repairs Repairs are made most economically by completely replacing the screw jack.</p>	<p><input type="checkbox"/> 24. Réparation La réparation la plus économique d'un vérin de levage usé consiste à le remplacer par un nouveau.</p>
<p><input type="checkbox"/> 25. Ersatzteile Zum Schutz vor Produktionsausfall bei hoher Einschaltzeit oder hoher Belastung empfehlen wir Ihnen, einen Satz Getriebe (inkl. Gewindespindeln, etc. und mit Montagezeichnungen) bei Ihnen bzw. Ihrem Kunden auf Lager zu legen.</p>		<p><input type="checkbox"/> 25. Spare Parts For protection against production losses with high switched-on times or high loads, we recommend that you store a set of gearboxes (including screw spindles, etc. and with mounting drawings) at your or the customer's facilities.</p>	<p><input type="checkbox"/> 25. Pièces de rechange Afin d'éviter un arrêt de la production dans le cas de durée d'utilisation ou de charges élevées, nous recommandons d'entreposer chez vous ou chez votre client un jeu de vérins complets (avec vis filetée etc. comprenant aussi les schémas de montage).</p>
<p><input type="checkbox"/> 26. Schmierung ZIMM-Spindelhubgetriebe werden im betriebsbereiten Zustand geliefert und sind mit einem gut haftenden Schmierfett gefüllt. Eingegebaut Spindeln (S-Version inkl. montiertem Schutzrohr) werden von uns betriebsbereit vorgefettet. Getriebe R-Version werden wegen Verschmutzungsgefahr ohne Fett geliefert. Vor dem Probelauf schmieren Sie die ganze Länge der Spindel durch. Das Erfordernis zum Nachschmieren hängt von der Einschaltzeit ab. Der Schneckentrieb im Getriebegehäuse ist gut geschmiert, nur bei hoher Einschaltzeit ist eine jährliche Nachschmierung des Getriebes erforderlich. Achtung: Der Schmiermittelverbrauch konzentriert sich v. a. auf den Trapezgewindetrieb. Dieser ist regelmäßig nachzuschmieren. Falls eine Verschmutzung der Spindel von außen gegeben ist, ist die Spindel zu reinigen und neu zu fetten.</p>		<p><input type="checkbox"/> 26. Lubrication ZIMM screw jacks are delivered in ready-to-use condition and are filled with a good adhering grease. Installed screws (S versions including mounted protective tubes) are pregreased ready-to-use by us. R version gearboxes are delivered without grease because of the danger of contamination. Before the trial run, lubricate the entire length of the screw. The requirement to relubricate is dependent on the switched-on time. The worm drive in the gearbox housing is well lubricated and only with a high operating time is a yearly relubrication of the gearbox required. Caution: The consumption of lubricant is concentrated primarily on the trapezoidal threaded drive. This is to be relubricated regularly. In case a soiling of the screw from the outside is present, the screw is to be cleaned and regreased.</p>	<p><input type="checkbox"/> 26. Graissage Les vérins mécaniques de levage à vis ZIMM sont livrés prêts à l'usage et sont remplis de graisse à haut pouvoir d'adhérence. Les vis à avance axiale montées (pour la version S avec le tube de protection monté) sont graissées par nos soins et prêts à l'usage. Les vis de la version R sont livrées non graissées à cause des risques d'enrassement. Avant de procéder à l'essai de fonctionnement, graissez la vis sur toute sa longueur. Les besoins en graissages ultérieurs sont fonction de la durée d'utilisation. Le couple roue et vis sans fin dans le boîtier du vérin est bien graissé ; un graissage annuel du boîtier de vérin n'est nécessaire que pour une durée d'utilisation élevée. Attention: L'utilisation de la graisse se concentre essentiellement sur les points d'entraînement par filet trapézoïdal. Ces points font l'objet d'un graissage régulier. Pour les vis encrassées procéder à leur nettoyage complet puis à un nouveau graissage.</p>



ITALIANO	中 文 (CHINESE)	ESPAGNOL	по-русски (RUSSIAN)
<p><input type="checkbox"/> 22. Viti di serraggio Controllate tutte le viti di serraggio dopo il ciclo di prova.</p>	<p><input type="checkbox"/> 22. 螺纹连接 请您在试车之后检查所有的螺纹连接。</p>	<p><input type="checkbox"/> 22. Tornillos Controle todos los tornillos después de la marcha de prueba.</p>	<p><input type="checkbox"/> 22. Резьбовые соединения После пробного пуска необходимо проверить все резьбовые соединения.</p>
<p><input type="checkbox"/> 23. Controllo usura delle chiocciola trapezoidali Controllate ad intervalli regolari, a seconda della durata di esercizio e del tempo di funzionamento, l'usura del filetto trapezoidale della ruota dentata e della chiocciola rotante (a seconda della versione) in base al gioco assiale filetto. Attenzione: se l'usura supera il 20% del passo filetto, il martinetto e la ruota dentata (versione S) oppure la chiocciola rotante (Versione R) devono essere sostituite. In casi con particolari requisiti di sicurezza, consigliamo assolutamente l'impiego di un controdato di sicurezza ed il suo controllo di usura per mezzo di fine corsa inductive. Questa versione viene da noi fornita come unità completa pronta all'installazione.</p>	<p><input type="checkbox"/> 23. 检查梯形螺母的磨损 请您根据开机和工作时间来按照相应的间隔检查蜗形轮中的梯形螺母或游走螺母 (R型结构) 的轴向螺纹间隙，确定磨损情况。注意：当磨损大于螺距的20 % 时，必须更换齿轮箱或蜗形轮 (S型) 或游走螺母 (R型)。在对安全有要求的特殊情况下，例如舞台布置，我们建议必须使用一个安全承接螺母，并使用感应限位开关监视其磨损状况。我们提供这一结构的完整单元。</p>	<p><input type="checkbox"/> 23. Control de desgaste de las tuercas de rosca trapezoidal Dependiendo del período de funcionamiento o bien, el tiempo de funcionamiento, controle en los intervalos correspondientes el desgaste de la rosca trapezoidal en el engranaje sinfín o bien, en la tuerca de rodadura (en la versión R) a base del juego axial de la rosca. Atención: Si el desgaste es superior a 20% del paso de rosca, hay que cambiar el corona o bien, el engranaje sinfín (versión S) o la tuerca de rodadura (versión R). Para casos especiales con exigencias de seguridad, como p. ej. en la construcción de plataformas, recomendamos utilice sin falta una tuerca de retención de seguridad y su control de desgaste mediante interruptor de fin de carrera inductivo. Esta versión suministraremos como unidad completa.</p>	<p><input type="checkbox"/> 23. Контроль гаек с трапециевидной резьбой на износ Проверяйте, в зависимости от продолжительности включения и работы, после определенных интервалов времени, износ трапециевидной резьбы в червячном колесе или рабочей гайке (у версии R), контролируя аксиальный зазор резьбы. Внимание: если износ превышает 20% шага резьбы, то редуктор или червячное колесо (версия S), или рабочую гайку (версия R), необходимо заменить. Для особых случаев со специфическими требованиями к безопасности, как например, при сооружении платформ, настоятельно рекомендуем применение предохранительной ограничительной гайки и ее контроль на износ с помощью индуктивного центрового выключателя. Это исполнение поставляется в комплекте, в качестве готового узла.</p>
<p><input type="checkbox"/> 24 . Riparazione La riparazione è realizzata nel modo più economico, con la sostituzione completa del martinetto.</p>	<p><input type="checkbox"/> 24. 维修 整个更换起重齿轮箱是最经济的修理方法。</p>	<p><input type="checkbox"/> 24. Reparación La reparación más económica es la sustitución del elevadores mecánico.</p>	<p><input type="checkbox"/> 24. Ремонт Наиболее экономичным является замена комплектного подъемного редуктора.</p>
<p><input type="checkbox"/> 25. Componenti di ricambio Per evitare eventuali fermi di produzione in caso di lunga durata di esercizio oppure di alte sollecitazioni, consigliamo di tenere a magazzino presso di Voi o presso il Vostro cliente un gruppo martinetto (compreso di vite e disegni di montaggio).</p>	<p><input type="checkbox"/> 25. 备件 为了避免当开机时间长或大负荷时出现停工现象，我们建议在您或您的用户处储存一套齿轮箱（包括螺纹主轴等，带有安装图纸）。</p>	<p><input type="checkbox"/> 25. Piezas de recambio Para evitar un fallo de producción en caso de un alto factor de servicio o una alta carga le recomendamos tengan en su almacén o en el almacén de su cliente un juego de componentes (incl. husillos roscados, etc. y con dibujos de montaje).</p>	<p><input type="checkbox"/> 25. Запчасти Чтобы избежать простоев оборудования при интенсивной эксплуатации, или высокой нагрузке, рекомендуем держать в запасе на Вашем складе, или на складе Вашего клиента, комплект редуктора (включая ходовые винты и т.д.).</p>
<p><input type="checkbox"/> 26. Lubrificazione I martinetti ZIMM sono forniti in condizione pronta all'uso e protetti con un buon lubrificante. Le viti montate (Versione S compreso tubo di protezione montato) vengono pre-ingrassate da parte nostra e sono pronte all'uso. Il martinetto nella Versione R, per il pericolo di imbrattamento, è fornito senza grasso. Prima del ciclo di prova ingrassate l'intera lunghezza della vite. L'esigenza di ingrassare ulteriormente dipende dalla durata di esercizio. La vite senza fine nel carter è ben lubrificata, solo in caso di lunga durata di funzionamento è necessario aggiungere lubrificante nel martinetto una volta all'anno. Attenzione: il consumo di lubrificante si concentra soprattutto sul martinetto a vite trapezia. Questo deve essere regolarmente lubrificato. In caso di sporco sulla vite, proveniente dall'esterno, la vite dovrà essere pulita e nuovamente ingrassata.</p>	<p><input type="checkbox"/> 26. 润滑 ZIMM螺旋式起重齿轮箱在交货时已经处于可以直接使用的状态，灌装有粘附性能良好的润滑脂。安装的主轴 (S型结构包括装好的护管) 在交货时已经涂好脂，可以直角使用。 由于存在污染危险，R型结构的齿轮箱交货时没有涂脂。在第一次试车之前必须给主轴的整个长度充分润滑。再次润滑与开机时间有关。齿轮箱中的蜗杆蜗杆传动装置已经充分润滑；只有当开机时间长时，每年才要求润滑齿轮箱一次。 注意：润滑剂的消耗主要集中在梯形螺纹传动上。要定期对它进行润滑。如果从外部污染了主轴，要对它进行清洗，重新涂脂。</p>	<p><input type="checkbox"/> 26. Lubricación Se suministran los elevadores mecánicos de ZIMM en estado listo para el funcionamiento y están llenos con grasa lubricante bien adherente. Los husillos incorporados (versión S incl. tubo protector montado) ya están engrasados por nosotros y por lo tanto listos para el funcionamiento. Los elevadores de la versión R se suministran sin grasa debido al peligro de suciedad. Antes de la marcha de prueba hay que lubricar el husillo en toda su longitud. La exigencia de lubricación posterior depende del factor de servicio. El mecanismo sinfín en el cárter del elevador está bien lubricado y sólo en caso de un largo factor de servicio hace falta una lubricación anual del elevador. Atención: El consumo de lubricante se concentra principalmente en el mecanismo de rosca trapezoidal. Este se tiene que lubricar en intervalos constantes. Si se ensucia el husillo por fuera, hace falta limpiarlo y engrasarlo de nuevo.</p>	<p><input type="checkbox"/> 26. Смазка Винтовые подъемные редукторы фирмы ZIMM поставляются в готовом к эксплуатации состоянии и заполнены бессмазенной смазкой с хорошей адгезионной способностью. Встроенные ходовые винты (версия S, включая монтированную защитную трубу) смазываются на нашем заводе, так что они готовы к эксплуатации. Редукторы версии R поставляются, из-за возможных загрязнений, без смазки. Перед пробным пуском ходовой винт необходимо смазать по всей длине. Необходимость повторной смазки зависит от продолжительности эксплуатации. Червячная передача в корпусе редуктора смазана надлежащим образом, дополнительная, ежегодная смазка необходима лишь в случае интенсивной эксплуатации. Внимание: расход</p>



DEUTSCH

Bei langlebigen Anlagen (z. B. Arbeits- u. Theaterbühnen) verliert das Fett nach ca. 5 Jahren seine Schmier-eigenschaften. Staub- und Schmutzeintrag verstärkt diesen Effekt. Wir empfehlen nach 5 Jahren eine komplete Reinigung und Neufettung.



ENGLISH

Especially the grease of systems with long operating times (e.g. working platforms and theater stages) loses its lubrication quality. Dust and dirt reinforce this effect. We recommend to completely clean the gearbox and exchange the grease after 5 years of operation.

FRANÇAIS

Sur les installations à longue durée de vie (par ex.: scène de théâtre) au bout de 5 ans la graisse perd ses propriétés lubrifiantes. La poussière et les salissures renforcent cet effet. Nous recommandons après 5 ans un nettoyage complet puis un nouveau graissage.

 27. Schmierstoffgeber

Für eine automatische Schmierung empfiehlt sich ein Schmierstoffgeber, der die Schmierstelle permanent mit Fett versorgt. Die Spendedauer beträgt je nach Typ bis zu 2 Jahre. Sie finden Schmierstoffgeber in unserem Katalog in Kapitel 14.

 27. Automatic Lubricator

For automatic lubrication, a lubricator that continuously supplies the locations to be lubricated with grease is recommended. This unit will provide constant lubrication for up to two years depending on the type. Automatic lubricators can be found in our catalogue in chapter 14.

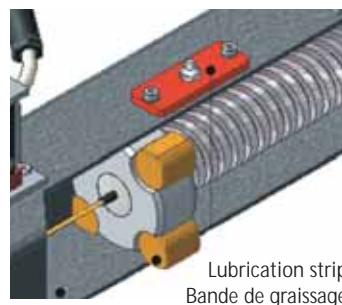
 27. Graisseur

Pour un graissage automatique, il est recommandé d'utiliser un graisseur qui alimente en permanence les points de graissage.

Selon les types de graiseurs, avec cartouche, la durée de graissage peut atteindre deux ans. Vous trouverez des graiseurs dans notre catalogue au chapitre 14.

 28. Schmierempfehlung für die Verdrehssicherung

Bei Getrieben mit Verdrehssicherung sind am Schutzrohr rote Schmierleisten montiert. Schmieren Sie diese regelmäßig je nach Arbeitszyklus. Die Position der Schmierleiste ist je nach Anwendung, Einbaulage und Zugänglichkeit vom Kundenkonstrukteur zu definieren. Es sind auch mehrere Schmierleisten möglich. Eine Überfettung ist zu vermeiden.

 28. Lubrication Recommendations for the Protection Against Rotation

For gearboxes with protection against rotation, red lubrication strips are mounted on the protective tube. Lubricate these regularly depending on the working cycle. Position of the lubrication strip has to be defined from the customer's designer - depending on application, assembly position and accessibility. Multiple lubrication strips are possible. Please avoid congestion with grease.

 28. Recommandation pour le graissage de la protection anti-rotation

Pour les vérins avec anti-rotation, des bandes de graissage (lîteau) rouges sont montées sur le tube de protection. Il faut les graisser régulièrement en fonction du cycle de travail ou les raccorder au dispositif de graissage centralisé. La position de la bande de graissage est à définir par le Client en fonction de son utilisation, implantation et accessibilité. Il est possible d'installer plusieurs bandes de graissage. Il faut aussi éviter le surgraissage.

ITALIANO	中 文 (CHINESE)	ESPAGNOL	по-русски (RUSSIAN)
<p>In caso di impianti di lunga durata (p. es. piattaforme di servizio e piattaforme per teatro) il lubrificante perde le proprie proprietà lubrificanti dopo ca. 5 anni. Infiltrazioni di polvere e di sporcizia aumentano questo effetto. Consigliamo di eseguire dopo 5 anni una pulizia completa e di rinnovare la lubrificazione.</p>	<p>对长年使用的装置来说（例如工作台或舞台）5年后油脂就丧失了其润滑特性。带入的灰尘和污物加重了这一作用。我们建议，5年后进行一次彻底清洗和重新涂脂。</p>	<p>Al tratarse de instalaciones de larga vida (p. ej. plataformas de trabajo y de teatro), la grasa pierde su poder lubrificante después de unos 5 años. La penetración de polvo y suciedad incrementa este efecto. Por lo tanto recomendamos una limpieza completa y un cambio de la grasa después de 5 años.</p>	<p>смазки, в частности, наблюдается у привода с трапециевидной резьбой, смазку которого необходимо производить регулярно. В случае загрязнения ходового винта снаружи, ходовой винт необходимо очистить и заново смазать.</p>
<p><input type="checkbox"/> 27. Ingrassatore Per una lubrificazione automatica si consiglia un distributore di lubrificante che fornisca costantemente di grasso i punti da lubrificare. La durata della distribuzione, a seconda del Modello, va fino a 2 anni. Trovate i distributori di lubrificante nel nostro Catalogo al Capitolo 14.</p>	<p><input type="checkbox"/> 27. 供脂罐 我们建议使用供脂罐提供自动润滑，为润滑位置持续提供油脂。根据型号不同，供应时间最长可达2年。我们的产品目录第14章中列有供脂罐。</p>	<p><input type="checkbox"/> 27. Grupo lubricador Se recomienda un grupo lubricador para la lubricación automática, que alimenta el punto de engrasa permanentemente con grasa. Dependiendo del tipo, la distribución dura hasta 2 años. Puede encontrar grupos lubricadores en nuestro catálogo en el capítulo 14.</p>	<p><input type="checkbox"/> 27. Лубрикатор Для автоматической смазки рекомендуем применение лубрикатора, который обеспечивает постоянную подачу смазки к точке смазки. В зависимости от типа, подача смазки обеспечена в течение двух лет. Лубрикаторы Вы можете найти в нашем каталоге в главе 14.</p>
<p><input type="checkbox"/> 28. Lubrificazione consigliata per la protezione anti-rotazione In caso di martinetti con protezione anti-rotazione sono montati lubrificatori rossi sul tubo di protezione. Lubrificateli costantemente in base al ciclo di lavoro oppure collegateli alla lubrificazione centralizzata. Lubrificare periodicamente a seconda del ciclo operativo. La posizione della piastra di lubrificazione deve essere definita dal progettista a seconda dell'applicazione, posizione d'installazione ed accessibilità. È possibile impiegare anche un numero maggiore di piastre di lubrificazione. Evitare ogni eccesso di lubrificazione.</p>	<p><input type="checkbox"/> 28. 防转动装置的润滑建议 在带有防转动装置的齿轮箱上，护管上安装有红色的润滑板。请您根据工作周期定期进行润滑。 用户设计人员规定的应用、安装位置和到达可能性等因素确定了润滑板的位置。也可以安装多块润滑板。请务必避免润滑过量。</p>	<p><input type="checkbox"/> 28. Recomendación de lubricación para el seguro antirotación En elevadores con seguro antirotación están montados en el tubo protector dispositivos de engrase rojos. Engráselos en intervalos constantes dependiendo del ciclo de trabajo o conectelos al sistema de lubricación central. Engráselos en intervalos constantes dependiendo del ciclo de trabajo. El ingeniero del cliente determina la posición del listón de engrase dependiendo de la aplicación, de la posición de montaje y de la accesibilidad. También hay la posibilidad de instalar varios listones de engrase. Hay que evitarse un sobreengrasado.</p>	<p><input type="checkbox"/> 28. Рекомендация по смазке для защиты от скручивания У редукторов с защитой от скручивания на защитной трубе монтированы красные смазочные рейки. Смазывайте их регулярно, в зависимости от рабочего цикла. Конструктор клиента должен определить позицию смазочной рейки в зависимости от применения, ее положения при монтаже и доступности. Возможно также монтировать несколько смазочных реек. Следует избегать чрезмерной смазки.</p>

DEUTSCH

29. Schmiermittel für ZIMM-Spindelhubgetriebe
ZIMM liefert UNIGEAR LA02 in 1 kg Dosen.
Bestell-Nr.: MSZ-LA02-Dose

Höchstzulässige Grenztemperaturen:
- Fett: -25°C bis +120°C
(höher auf Anfrage)
- Standardwälzlager: max. +125°C
- Standarddichtung: max. +120°C
- Dichtung VITON: max. +160°C

Schmierintervalle:
MSZ-5 bis MSZ-25,
max. 1500 Betriebsstunden
MSZ-50 bis MSZ-750, max. 700
Betriebsstunden, mindestens 1x jährlich.

Fettmengen pro Getriebe

SHZ - 02 -	lebensdauergeschmiert
MSZ - 5 -	0,10 Liter
MSZ - 10 -	0,15 Liter
MSZ - 25 -	0,20 Liter
MSZ - 50 -	0,50 Liter
MSZ - 100 -	1,00 Liter
MSZ - 150 -	1,30 Liter
MSZ - 250 -	2,00 Liter
MSZ - 350 -	3,00 Liter
MSZ - 500 -	4,20 Liter



ENGLISH

29. Lubricants for ZIMM Screw Jacks
ZIMM has UNIGEAR LA02 available in 1 kg cans.
Order number: MSZ-LA02-Dose

Highest allowable limiting temperatures:
- Grease: -25°C to +120°C
(higher on request)
- Standard shaft bearing: +125°C max.
- Standard seals: +120°C max.
- VITON seals: +160°C max.

Lubrication interval:
MSZ-5 to MSZ-25, 1500 hours of operation max.
MSZ-50 to MSZ-750, 700 hours of operation max. or at least once yearly.

Grease quantity per gearbox

SHZ - 02 -	lifetime lubrication
MSZ - 5 -	0,10 Liter
MSZ - 10 -	0,15 Liter
MSZ - 25 -	0,20 Liter
MSZ - 50 -	0,50 Liter
MSZ-100 -	1,00 Liter
MSZ-150 -	1,30 Liter
MSZ-250 -	2,00 Liter
MSZ-350 -	3,00 Liter
MSZ-500 -	4,20 Liter

FRANÇAIS

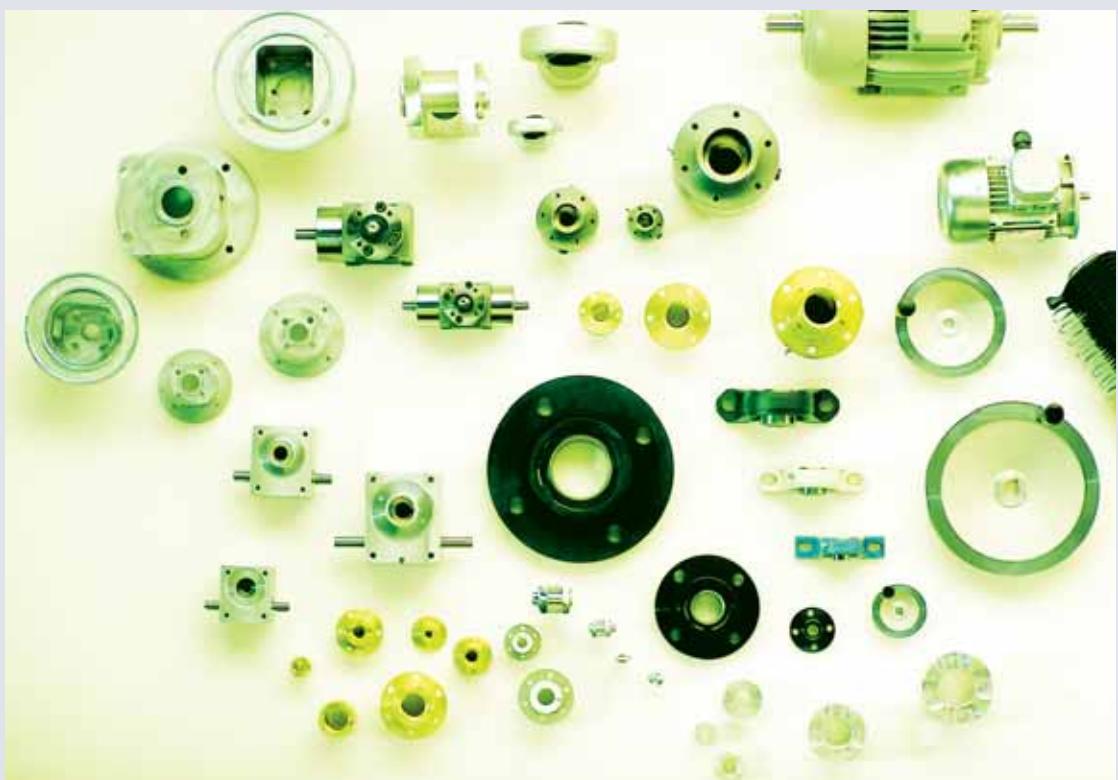
29. Lubrifiant pour les vérins de levage à vis ZIMM
ZIMM livre UNIGEAR LA02 en boîtes de 1 kg.
Référence: MSZ-LA02-Dose

Températures limites:
- graisse: -25°C à +120°C
(supérieures sur demande)
- Palier à roulement standard: +125°C maxi
- Joint d'étanchéité standard: +120°C maxi
- Joint d'étanchéité VITON: +160°C maxi

Fréquences de graissage: MSZ-5 à MSZ-25, 1500 heures de service maxi
MSZ-50 à MSZ-750, 700 heures de service maxi, ou au moins une fois par an.

Quantité de graisse par vérin

SHZ - 02 -	lubrifié à vie
MSZ - 5 -	0,10 Litre
MSZ - 10 -	0,15 Litre
MSZ - 25 -	0,20 Litre
MSZ - 50 -	0,50 Litre
MSZ-100 -	1,00 Litre
MSZ-150 -	1,30 Litre
MSZ-250 -	2,00 Litre
MSZ-350 -	3,00 Litre
MSZ-500 -	4,20 Litre



ITALIANO

29. Sostanza lubrificante per martinetto ZIMM
La ZIMM fornisce UNIGEAR LA02 in latte da 1 kg. Codice: MSZ-LA02-Dose (latta)

Massime temperature ammesse:
 - Grasso da -25°C a +120°C (maggior se richiesto)
 - Cuscinetto a rulli standard: max. +125°C
 - Guarnizione standard: max. +120°C
 - Guarnizione VITON: max. +160°C

Intervalli di lubrificazione:
 Da MSZ-5 a MSZ-25, max. 1500 ore di esercizio
 Da MSZ-50 a MSZ-750, max. 700 ore di esercizio. Almeno 1 x all'anno

Quantità di grasso per martinetto:

SHZ - 02 - Lubrificazione per l'intera durata
 MSZ - 5 - 0,10 Litri
 MSZ - 10 - 0,15 Litri
 MSZ - 25 - 0,20 Litri
 MSZ - 50 - 0,50 Litri
 MSZ - 100 - 1,00 Litri
 MSZ - 150 - 1,30 Litri
 MSZ - 250 - 2,00 Litri
 MSZ - 350 - 3,00 Litri
 MSZ - 500 - 4,20 Litri

中 文 (CHINESE)

29. ZIMM 螺旋式起重齿轮箱用润滑剂
ZIMM提供1千克罐装UNIGEAR LA02 润滑剂
货号: MSZ-LA02-Dose

最高允许极限温度:

- 油脂: -25° C 至 +120° C
(更高温度时根据要求供货)
- 标准滚动轴承: 最高 +125° C
- 标准密封: 最高 +120° C
- VITON密封: 最高 +160° C

润滑间隔:

MSZ-5至MSZ-25, 最长1500工作小时
MSZ-50至MSZ-750, 最长700工作小时, 每年至少1次。

ESPAGNOL

29. Lubricantes para los elevadores mecánicos por husillo de ZIMM
ZIMM suministra UNIGEAR LA02 en latas de 1 kg. Número de pedido: lata MSZ-LA02

Temperaturas límite máximas admisibles:

- Grasa: -25°C a +120°C
(más alta sobre demanda)
- Cojinetes estándar: máx. +125°C
- Juntas estándar: máx. +120°C
- Junta VITON: máx. +160°C

Intervalos de lubricación:

MSZ-5 a MSZ-25, máx. 1500 horas de servicio
MSZ-50 a MSZ-750, máx. 700 horas de servicio, como mínimo 1 vez al año.

Cantidad de grasa por elevador:

SHZ - 02 - lubricación permanente
 MSZ - 5 - 0,10 litros
 MSZ - 10 - 0,15 litros
 MSZ - 25 - 0,20 litros
 MSZ - 50 - 0,50 litros
 MSZ - 100 - 1,00 litros
 MSZ - 150 - 1,30 litros
 MSZ - 250 - 2,00 litros
 MSZ - 350 - 3,00 litros
 MSZ - 500 - 4,20 litros

по-русски (RUSSIAN)

29. Смазочные вещества для подъемных редукторов фирмы ZIMM

Фирма ZIMM поставляет смазку UNIGEAR LA02 в банках по 1 кг. Номер заказа: MSZ-LA02-банка

Допустимые предельные температуры:

- смазка: -25 °C до +120 °C (для более высоких температур по запросу)
- стандартный подшипник качения: макс. +125 °C
- стандартное уплотнение: макс. +120 °C
- уплотнение ВИТОН: макс. +160 °C

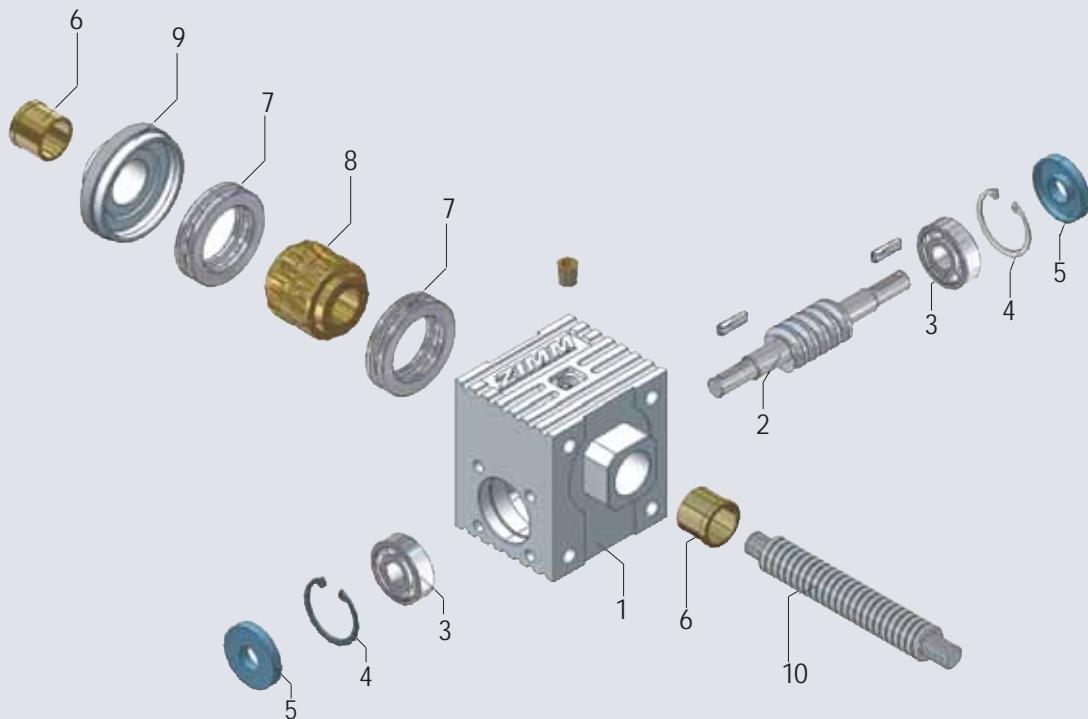
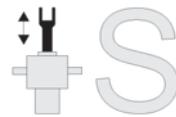
Смазочные интервалы:

MSZ-5 по MSZ-25
макс. 1500 рабочих часов
MSZ-50 по MSZ-750, макс. 700 рабочих часов, как минимум, 1 раз в год

Количество смазки на каждый редуктор:

SHZ 02 - бессменная смазка
 MSZ 05 - 0,10 литра
 MSZ 10 - 0,15 литра
 MSZ 25 - 0,20 литра
 MSZ 50 - 0,50 литра
 MSZ 100 - 1,00 литр
 MSZ 150 - 1,30 литра
 MSZ 250 - 2,00 литра
 MSZ 350 - 3,00 литра
 MSZ 500 - 4,20 литра

Spare Parts List: Screw Jack Version with Standing Spindle S



Repair

Repairs are made most economically by completely replacing the screw jack gearbox.

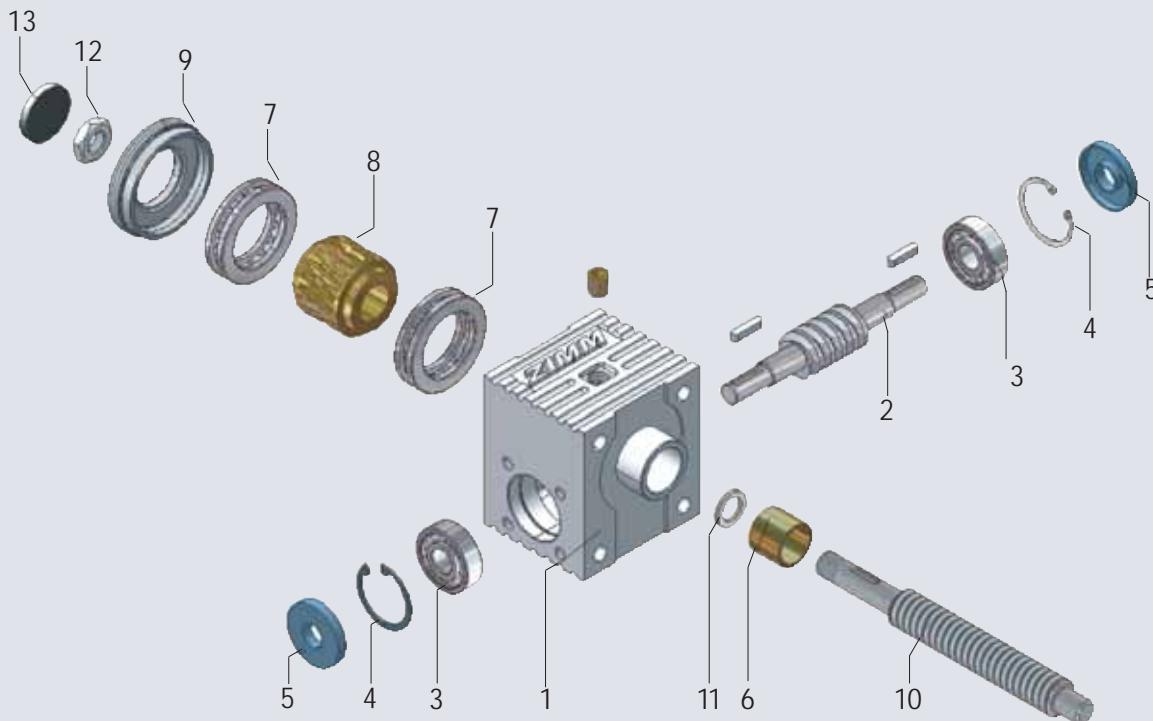
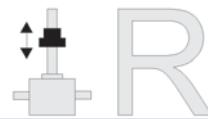
Spare Parts

For protection against production losses with high production times or high loads, we recommend that you store a set of gearboxes (including screw spindles, etc. and with mounting drawings) at your or the customer's facilities.

	Pos. Name	MSZ-5	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650
1	Gearbox housing-Grey Cast	MSZ-5-GH-G-S	MSZ-10-GH-G-S	MSZ-25-GH-G-S	MSZ-50-GH-G-S	MSZ-100-GH-G-S	MSZ-150-GH-G-S	MSZ-250-GH-G-S	MSZ-350-GH-G-S	MSZ-500-GH-G-S	MSZ-650-GH-G-S
	Gearbox housing-ALU	MSZ-5-GH-A-S	MSZ-10-GH-A-S	MSZ-25-GH-A-S	-	-	-	-	-	-	-
2	Worm Shaft-Version-N	MSZ-5-SW-N	MSZ-10-SW-N	MSZ-25-SW-N	MSZ-50-SW-N	MSZ-100-SW-N	MSZ-150-SW-N	MSZ-250-SW-N	MSZ-350-SW-N	MSZ-500-SW-N	MSZ-650-SW-N
2	Worm Shaft-Version-L	MSZ-5-SW-L	MSZ-10-SW-L	MSZ-25-SW-L	MSZ-50-SW-L	MSZ-100-SW-L	MSZ-150-SW-L	MSZ-250-SW-L	MSZ-350-SW-L	MSZ-500-SW-L	MSZ-650-SW-L
3	Radial Bearing	6201 C C3	6202 C C3	6203 C C3	7205 B C	32206 C	30207 C	30307 C	31307 C	30212 C	32214 C
4	Retaining Ring	J-32	J-35	J-40	J-52	J-62	MSZ-150-SIR	MSZ-250-SIR	MSZ-350-SIR	MSZ-500-SIR	MSZ-650-SIR
5	Shaft Sealing Ring	ø12/32x5	ø15/35x5	ø17/40x7	ø25/52x7	ø30/62x8	ø35/47x7	ø35/52x7	ø35/52x7	ø60/90x10	ø70/100x12
6	Bushing Gearbox Neck	MSZ-5-BB-S	MSZ-10-BB-S	MSZ-25-BB-S	MSZ-50-BB-S	MSZ-100-BB-S	MSZ-150-BB-S	MSZ-250-BB-S	MSZ-350-BB-S	MSZ-500-BB-S	MSZ-650-BB-S
7*	Axial Bearing/ball joint bearing	51106	51206	51208	51310	51214	51315	51320	29324 E	29328 E	29334
8	Worm Wheel-Version-N	MSZ-5-SR-SN	MSZ-10-SR-SN	MSZ-25-SR-SN	MSZ-50-SR-SN	MSZ-100-SR-SN	MSZ-150-SR-SN	MSZ-250-SR-SN	MSZ-350-SR-SN	MSZ-500-SR-SN	MSZ-650-SR-SN
8	Worm Wheel-Version-S	MSZ-5-SR-SL	MSZ-10-SR-SL	MSZ-25-SR-SL	MSZ-50-SR-SL	MSZ-100-SR-SL	MSZ-150-SR-SL	MSZ-250-SR-SL	MSZ-350-SR-SL	MSZ-500-SR-SL	MSZ-650-SR-SL
9	Bearing Cap	MSZ-5-LA-S	MSZ-10-LA-S	MSZ-25-LA-S	MSZ-50-LA-S	MSZ-100-LA-S	MSZ-150-LA-S	MSZ-250-LA-S	MSZ-350-LA-S	MSZ-500-LA-S	MSZ-650-LA-S
10	Tr-Spindle	MSZ-5-S-TR	MSZ-10-S-TR	MSZ-25-S-TR	MSZ-50-S-TR	MSZ-100-S-TR	MSZ-150-S-TR	MSZ-250-S-TR	MSZ-350-S-TR	MSZ-500-S-TR	MSZ-650-S-TR
10	KGT-Spindle	MSZ-5-S-KGT	MSZ-10-S-KGT	MSZ-25-S-KGT	MSZ-50-S-KGT	MSZ-100-S-KGT	MSZ-150-S-KGT	-	-	-	-

* for version AB and KGT on request

Spare Parts List: Screw Jack Version with Rotating Spindle R



Repair

Repairs are made most economically by completely replacing the screw jack gearbox.

Spare Parts

For protection against production loses with high production times or high loads, we recommend that you store a set of gearboxes (including screw spindles, etc. and with mounting drawings) at your or the customer's facilities.

Pos.	Name	MSZ-5	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650
1	Gearbox housing-Grey Cast	MSZ-5-GH-G-R	MSZ-10-GH-G-R	MSZ-25-GH-G-R	MSZ-50-GH-G-R	MSZ-100-GH-G-R	MSZ-150-GH-G-R	MSZ-250-GH-G-R	MSZ-350-GH-G-R	MSZ-500-GH-G-R	MSZ-650-GH-G-R
	Gearbox housing-ALU	MSZ-5-GH-A-R	MSZ-10-GH-A-R	MSZ-25-GH-A-R	-	-	-	-	-	-	-
2	Worm Shaft-Version-N	MSZ-5-SW-N	MSZ-10-SW-N	MSZ-25-SW-N	MSZ-50-SW-N	MSZ-100-SW-N	MSZ-150-SWN	MSZ-250-SW-N	MSZ-350-SW-N	MSZ-500-SWN	MSZ-650-SW-N
	Worm Shaft-Version-L	MSZ-5-SW-L	MSZ-10-SW-L	MSZ-25-SW-L	MSZ-50-SW-L	MSZ-100-SW-L	MSZ-150-SWL	MSZ-250-SW-L	MSZ-350-SW-L	MSZ-500-SWL	MSZ-650-SW-L
3	Radial Bearing	6201 C C3	6202 C C3	6203 C C3	7205 B C	32206 C	30207 C	30307 C	31307 C	30212 C	32214 C
4	Retaining Ring	J-32	J-35	J-40	J-52	J-62	MSZ-150-SIR	MSZ-250-SIR	MSZ-350-SIR	MSZ-500-SIR	MSZ-650-SIR
5	Shaft Sealing Ring	ø12/32x5	ø15/35x5	ø17/40x7	ø25/52x7	ø30/62x8	ø35/47x7	ø35/52x7	ø35/52x7	ø60/90x10	ø70/100x12
6	Bushing Gearbox Neck	MSZ-5-BB-R	MSZ-10-BB-R	MSZ-25-BB-R	MSZ-50-BB-R	MSZ-100-BB-R	MSZ-150-BBR	MSZ-250-BB-R	MSZ-350-BB-R	MSZ-500-BBR	MSZ-650-BB-R
7	Axial Bearing/ball joint bearing	51106	51206	51208	51310	51214	51315	51320	29324 E	29328 E	29334
8	Worm Wheel-Version-N	MSZ-5-SR-RN	MSZ-10-SR-RN	MSZ-25-SR-RN	MSZ-50-SR-RN	MSZ-100-SR-RN	MSZ-150-SR-RN	MSZ-250-SR-RN	MSZ-350-SR-RN	MSZ-500-SRRN	MSZ-650-SR-RN
	Worm Wheel-Version-S	MSZ-5-SR-RL	MSZ-10-SR-RL	MSZ-25-SR-RL	MSZ-50-SR-RL	MSZ-100-SR-RL	MSZ-150-SR-RL	MSZ-250-SR-RL	MSZ-350-SR-RL	MSZ-500-SRRL	MSZ-650-SR-RL
9	Bearing Cap	MSZ-5-LA-R	MSZ-10-LA-R	MSZ-25-LA-R	MSZ-50-LA-R	MSZ-100-LA-R	MSZ-150-LA-R	MSZ-250-LA-R	MSZ-350-LA-R	MSZ-500-LADR	MSZ-650-LA-R
10	Tr-Spindle	MSZ-5-R-TR	MSZ-10-R-TR	MSZ-25-R-TR	MSZ-50-R-TR	MSZ-100-R-TR	MSZ-150-R-TR	MSZ-250-R-TR	MSZ-350-R-TR	MSZ-500-R-TR	MSZ-650-R-TR
	KGT-Spindle	MSZ-5-R-KGT	MSZ-10-R-KGT	MSZ-25-R-KGT	MSZ-50-R-KGT	MSZ-100-R-KGT	MSZ-150-R-KGT	MSZ-250-R-KGT	-	-	-
11	Supporting Disk	ø11/18x4	ø13/20x4	ø20/30x4	ø28/38x4	ø36/48x4	-	-	-	-	-
12	Spindle Nut	MSZ-5-SMU	MSZ-10-SMU	MSZ-25-SMU	MSZ-50-SMU	MSZ-100-SMU	MSZ-150-SMU	MSZ-250-SMU	MSZ-350-SMU	MSZ-500-SMU	MSZ-650-SMU
13	Cap	ø28x4	ø30x7	ø47x7	ø52x7	ø72x10	ø72x7	ø100x10	ø150x3	ø190x3	ø225x3

General Terms and Conditions of Sale and Delivery



1. Applicability and legally binding effect:

- 1.1. The following stipulations shall be applicable to all orders accepted and executed by us and shall be deemed accepted by our customer upon placing of the order even if we fail to expressly object to individual provisions to the contrary.
- 1.2. Unless expressly otherwise agreed in writing (including fax or signed e-mail) at the time of conclusion of the contract, the following stipulations shall be a supplemental part of any contract entered into by and between us and our customers. This shall also apply to modifications, amendments and/or deviating commitments. They shall require a duly signed confirmation in order to be valid.
- 1.3. As a matter of principle our staff is not entitled to make any commitments that deviate from these stipulations.
- 1.4. By placing his order with us or by confirming delivery of the subject-matter of contract our customer agrees to these General Terms and Conditions of Sale and Delivery as well as to the fact that the same shall apply to future transactions between our customer and our company.

2. Offer and conclusion of contract:

- 2.1. Offers shall in principle be made in writing.
- 2.2. The contract shall be deemed concluded upon our written (also via fax, signed e-mail) declaration of acceptance in the form of an acknowledgement of order or actual execution of the order on our part.
- 2.3. The information about our products contained in catalogues, brochures or sketches and drawings shall only be relevant if explicitly referred to in our acknowledgement of the order. If the order is based on sketches or drawings, they shall be duly signed by our customer as a sign of his approval.
- 2.4. Subsequent rectification of errors reserved.
- 2.5. Plans, sketches, technical documentation from our company, offers and project documentation as well as samples, catalogues - in particular the present catalogue - brochures and illustrations are our intellectual property. We shall have the right to demand that they be returned to us at any time and they shall in any case be returned immediately if the contract is not concluded.
- 2.6. Any exploitation, reproduction, dissemination, publication and presentation - even of excerpts - of such information (item 2.5.) shall be prohibited. Any violation of this provision leads to damages (Copyright 2002).

3. Performance and delivery periods:

- 3.1. Delivery periods shall commence as of the day of acceptance of the order (acknowledgement), however, not before our customer has fulfilled all of his contractual obligations, i.e. in particular the agreed opening of a letter of credit or the provision of a payment bond. Our entitlement to compensation for cost caused by delays for which our customers are responsible shall remain unaffected.
- 3.2. Delivery periods shall be suspended as long as our customer is in default of fulfilment of his obligations - even in connection with other transactions entered into with us - and in any case until all technical and contractual details have been clarified and agreed upon by mutual consent and the legal prerequisites for an execution of the order have been fulfilled.
- 3.3. We shall be entitled to effect partial deliveries. Each partial delivery shall in principle be considered an independent transaction.
- 3.4. As of our notification of readiness for shipment the delivery period shall be deemed observed by us even if the goods cannot be shipped at all or cannot be shipped in time and there is no fault on our part or on the part of the supplying plant/producer.
- 3.5. No liability shall be assumed for delays in delivery due to force majeure (item 8.) and we shall be entitled to postpone performance of obligations assumed for an appropriate period of time or to rescind the contract in whole or in part at our discretion.
- 3.6. In such events damages or claims for subsequent delivery shall be excluded. In such events our customer shall not be entitled to unilaterally rescind his order either.
- 3.7. If we fail to fulfil the contract in time, our customer shall in any case grant us a reasonable grace period.

4. Delivery and acceptance:

- 4.1. Benefit, risk and accident shall pass to our customer upon dispatch of the delivery "ex works" Lustenau (place of performance) unless otherwise agreed in the individual case (in particular by means of INCOTERMS).

- 4.2. We shall be free to choose the shipping routes and means of transport and exclude any liability (in principle the goods shall be delivered at our customer's risk and uninsured).
- 4.3. We shall only take out an insurance for the goods and/or transportation if expressly agreed.

5. Prices:

- 5.1. The prices are net prices without any deductions and shall, unless otherwise agreed, apply "ex works" exclusive of packaging and loading.
- 5.2. Additional costs caused by a specific mode of shipment requested by our customer shall in any case be borne by our customer.
- 5.3. Incidental costs, such as public charges, customs duties, variable export/import levies, import/export taxes and fees shall be borne by our customer unless otherwise stated or agreed.

6. Payment, due date, consequences of default:

- 6.1. For payments to us Lustenau shall be the place of performance.
- 6.2. Unless otherwise agreed payments shall be effected within 30 days of invoicing without deductions; any rights of retention or setoff against counter-claims that have not expressly been accepted by us in writing shall be excluded.
- 6.3. Payments shall be deemed effected at the date at which we are able to dispose of the amount in the agreed currency.
- 6.4. If the price is stated in euros, default interest of 1% per month shall be payable in the event of a delay in payment. In addition, any and all charges in connection with dunning, collection, investigation and credit reporting as well as the fees of legal counsel called in by us, if any, shall be reimbursed to us.
- 6.5. Unless an explicit payment purpose is stated, payments shall be set off against the oldest outstanding account receivable; with respect to the individual accounts receivable first of all against the costs, then against interest and finally against the principal.
- 6.6. In case of non-compliance with the agreed payment terms and/or if circumstances occur which give reason to doubt our customer's creditworthiness, we shall, in addition, be entitled to demand immediate payment of all of our accounts receivable from our customer, to rescind any and all pending purchase contracts and/or delivery contracts as well as to claim damages for non-performance.

7. Retention of title:

- 7.1. We shall retain title to the goods until full payment of the purchase price and all of our subsidiary claims, such as, in particular, interest and costs. The retention of title shall also apply to new or different products resulting from processing or connection.
- 7.2. Our customer shall be obliged to make a respective note in his books indicating retention of title and to notify us immediately of any seizure (in particular attachments and the like) by third parties of the goods being subject to retention of title or accounts receivable assigned. Likewise, assignments of accounts receivable of our customer to us shall be documented in an appropriate form and notified to our customer's contracting party not later than at the time the invoice is issued. In such a case our customer shall advise third parties of our rights and reimburse us any and all costs in connection with the safeguarding of our rights including attorney's fees, if any.

8. Force majeure:

- 8.1. In events of force majeure we shall be entitled to postpone delivery for the term of impairment and a reasonable start-up period or to rescind the contract in whole or in part. This shall not lead to any liabilities on our part vis-à-vis the contracting party, in particular not to claims for damages vis-à-vis us.
- 8.2. The following events shall be considered force majeure: strike, lockout, mobilisation, war, terrorist attacks, blockade, export and import bans, shortage of raw materials and fuels, fire, traffic blockades, impairments of operations or transport or other circumstances which substantially impair or make it impossible to carry out the business, and irrespective of whether such circumstances occur with us, our suppliers or their subsuppliers, our customer or otherwise in his sphere. Non-delivery or delayed delivery by our suppliers to us shall also be considered events of force majeure unless caused by us.

9. Warranty:

- 9.1. The warranty period shall commence upon passing of the risk and shall be one year.
- 9.2. As resellers we only assume warranty according to the scope of liability of the manufacturer, supplying plant and/or producer. We shall not assume any additional guarantees and/or compensation.
- 9.3. Warranty shall only be granted for expressly agreed qualities of our products and/or qualities usually expected in such cases but not for the fact that the products are suitable for certain processes or purposes of our customer.
- 9.4. Warranty claims shall in any case forfeit immediately if the customer carries out own repair work on our products.
- 9.5. We shall only accept returns upon express prior agreement but only in the original packaging or appropriately secure substitute packaging.

10. Defects:

- 10.1. Our customer shall inspect the goods delivered by us immediately upon delivery and notify us of any defects in detail without delay. Notification of defects (also hidden defects) shall be made in writing (including fax, signed e-mail) or by telegram not later than 5 working days after delivery and/or noticing of the defects, respectively.
- 10.2. In the case of defects we shall be free to choose to offer improvement, additional delivery of the parts missing, replacement of the goods or price reduction. Any additional claims vis-à-vis us, in particular, rights of cancellation of contract, damages and/or substitute performance shall be excluded.
- 10.3. Notifications of defects shall not be recognised if the goods are not at the place of destination any longer or not in the state of delivery anymore.

11. Liability:

- 11.1. We shall only be liable for damage to objects belonging to our customer which has occurred directly in the course of performance and was caused by us with gross negligence or wilful intent. Any other claims of the contracting party, in particular for any additional damages including consequential damages, if any, shall be excluded.
- 11.2. Claims for damages vis-à-vis us that exist as to the merits according to mandatory statutory provisions shall be limited to the value of the object that caused the damage and if this should not be admissible, to the invoice value; if this is not admissible either according to mandatory statutory provisions, the claim shall be limited to the actual damage; compensation for lost profit and consequential damages, indirect damages and third-party damages shall be excluded.
- 11.3. The goods delivered by us will only provide the security that can usually be expected on the basis of permit requirements, operating instructions and instructions for use, instructions of the manufacturer, the supplying plant and/or producer and other information.
- 11.4. The margins that are customary in trade shall always be reserved for quantities, measurements, form and design and shall be deemed agreed.
- 11.5. If we are commissioned to solve construction jobs, we shall only be liable if our customer proves that our delivery and/or service does not comply with the state of the art due to gross negligence.
- 11.6. If our customer violates his obligations under these General Terms and Conditions of Delivery and Sale as well as in the event that we are held liable for damage caused by such products marketed by the customer, our customer shall in any case be obliged to fully indemnify and hold us harmless (including any attorney's fees and costs of proceedings) irrespective of fault. If our customer paid damages to a third party with respect to a product delivered by us on the basis of the provisions of product liability law, rights of recourse vis-à-vis us shall in any case be excluded.

12. Product liability:

- 12.1. Within the scope of application of the Product Liability Act (*Produkthaftungsgesetz*) we shall be liable for damage to persons or property suffered by a consumer. We shall not be liable for damage to property caused by our products at the place of any of our customers (commercial or craft undertakings) (Section 9 Product Liability Act).
- 12.2. We undertake to duly represent the interests of our customers vis-à-vis the manufacturer but, in principle, have to refer our customers to the manufacturer(s) in this respect.
- 12.3. Undertakings which purchased goods from us shall on their part be obliged to fully inform themselves about handling, operation and maintenance of our product. In particular, they shall inform themselves in detail about the respective product-specific hazards by means of the instructions for use as well as about the possibilities to use the product.

12.4. Our customers shall be obliged to keep accurate documentation on the goods received to be able to determine exactly whether the product delivered originated from us or not.

Our customers shall further be obliged to keep such documentation for a period of 10 years as of the time of delivery of our product.

12.5. If we are held liable under the Product Liability Act, the customer shall be obliged to immediately provide us with all documentation and any other evidence without being entitled to reimbursement of cost. Our customers shall also be obliged to provide us with any support whatsoever.

13. Rescission of contract:

- 13.1. We shall be entitled to rescind the contract:
 - if delivery or commencement or continuing of the service is delayed for reasons for which the contracting party is responsible or is further delayed although a grace period was granted;
 - if doubts with respect to our customer's solvency arise and if the customer upon our request neither effects an advance payment nor provides adequate collateral security prior to delivery.
- 13.2. Rescission of contract may also be declared with respect to any outstanding part of the delivery or service for the above reasons.
- 13.3. In case insolvency proceedings are opened over the assets of either contracting party or a petition for opening of insolvency proceedings is dismissed for lack of assets to cover the cost, the respective other contracting party shall be entitled to rescind the contract without having to grant a grace period.
- 13.4. Notwithstanding our claims for damages, in the case of rescission of the contract services or partial services which have already been rendered shall be accounted for and shall be due for payment.
This shall also apply to advance deliveries already made or services already rendered by us and/or if the delivery or service has not been accepted yet by our customer. However, we shall also be entitled to demand that goods already delivered be returned to us.

14. Applicable law:

- 14.1. The contract and these General Terms and Conditions of Sale and Delivery shall be subject to Austrian substantive law as amended at the time of conclusion of the contract.

15. Mediation clause:

- 15.1. The contracting parties shall at first try to settle any and all disputes and/or conflicts arising out of or in connection with this contract or the breach of contract itself, termination or invalidity of contractual provisions in an amicable way within the scope of mediation proceedings by a neutral third party (mediator).
- 15.2. Within a period of four weeks after the conflict (15.1.) has been addressed for the first time, the parties shall conclude an agreement on the course of the proceedings with the mediator. As long as the proceedings continue all time periods and deadlines shall be suspended and strictest confidentiality and secrecy shall apply between the parties.
- 15.3. If no agreement on mediation is reached within four weeks or the mediation proceedings are terminated without result, the parties shall settle all disputes out of such proceedings according to the provisions stated below.

16. Arbitration clause (applicable to our non-EU customers):

- 16.1. Any and all disputes arising out of or in connection with the present contract or these General Terms and Conditions of Sale and Delivery shall be finally settled according to the Rules of Arbitration of the International Chamber of Commerce (ICC Paris) by an arbitrator appointed according to the said Rules.
- 16.2. The place of arbitration shall be Zurich; the language of the arbitration proceedings shall be German.

17. Place of jurisdiction (applicable to our EU customers):

- 17.1. The court in Feldkirch having jurisdiction over the subject-matter shall be the place of jurisdiction.

18. Miscellaneous:

- 18.1. If individual provisions of the contract or these General Terms and Conditions of Sale and Delivery shall be or become ineffective in whole or in part, the remaining provisions shall remain effective. In case of partial invalidity our customer undertakes, in agreement with us, to replace ineffective provisions by provisions which come as close as possible to the purpose of the ineffective provision.



Austria

ZIMM Maschinenelemente
GmbH + Co
Millenniumpark 3
A-6890 Lustenau
Phone 0043 (0) 5577 / 806-0
Fax 0043 (0) 5577 / 806-8
sales@zimm-austria.com
www.zimm-austria.com

Gerhard Bell
Billrothstraße 32
A-4050 Traun
Mobile 0043 (0) 664 / 422 79 12
Fax 0043 (0) 7229 / 75 5 46
gerhard.bell@zimm-austria.com

Reinhardt Mayer
Hochrattenstraße 14
A-8700 Leoben
Mobile 0043 (0) 664 / 183 66 00
Fax 0043 (0) 3842 / 47951
reinhardt.mayer@zimm-austria.com



Germany

Ingenieurbüro Ricke
Beckersbergstraße 16
D-24558 Henstedt-Ulzburg
Phone 0049 (0) 4193 / 93828
Fax 0049 (0) 4193 / 93829
info@ricke.info

Hagener Fördertechnik GmbH
Koksstraße 10
D-58135 Hagen
Phone 0049 (0) 2331 / 94 80-0
Fax 0049 (0) 2331 / 94 80-99
info@hafoe.de
www.hafoe.de

August Dreckshage
GmbH & Co KG
Postfach 180 105
D-33691 Bielefeld
Phone 0049 (0) 521 / 92 59-0
Fax 0049 (0) 521 / 92 59-299
lineartechnik@dreckshage.de
www.dreckshage.de

Ing.-Büro Risse
Ketscher Straße 5 a
D-08141 Reinsdorf/ OT Vielau
Phone 0049 (0) 375 / 606 704-0
Fax 0049 (0) 375 / 606 704-1
Mobil 0049 (0) 171 / 703 19 40
r.risse@ib-risse.de
www.ib-risse.de

Nozag GmbH
Kleines Feldlein 5
D-74889 Sinsheim-Dühren
Phone 0049 7261 927650
Fax 0049 7261 927655
info@nozag.de
www.nozag.de

Max Lamb GmbH & Co KG
Am Bauhof 2
D-97076 Würzburg
Phone 0049 (0) 931 / 2794-0
Fax 0049 (0) 931 / 2745-57
ant@lamb.de
www.lamb.de

Kania + Edinger GmbH
Am Diestelbach 13
D-32825 Blomberg
Phone 0049 (0) 5235 / 50 15 8-0
Fax 0049 (0) 5235 / 50 15 8-25
kania_edinger_gmbh@t-online.de

Axel Stross
Riedanger 5
D-86830 Schwabmünchen
Phone 0049 (0) 8232 / 9685797
Fax 0049 (0) 8232 / 996704
Mobil 0049 (0) 171 / 3794962
axel-stross@t-online.de



Worldwide



AUS

MECCO
Mechanical Components P/L
193 Orange Valley Road
Kalamunda W.A. 6076
Phone 0061 (0) 8 / 9291 0000
Fax 0061 (0) 8 / 9291 0066
mecco@arach.net.au
www.mecco.com.au



AUS

T.E.A. Transmissions Pty Ltd.
Tahiti Road
Tiaro, QLD 4650
Phone 0061 (0) 7 / 412 925 33
Fax 0061 (0) 7 / 412 924 37
sales@tea.net.au
www.tea.net.au



B

Caron Vector S.A.
Avenue Eiffel 5
B-1300 Wavre
Phone 0032 (0) 10 / 231 311
Fax 0032 (0) 10 / 231 336
info@caron-vector.be
www.caron-vector.be

**CH**

Nozag AG
Pünten 4
CH-8602 Wangen bei Dübendorf
Phone 0041 (0) 1 / 8051717
Fax 0041 (0) 1 / 8051718
info@nozag.ch
www.nozag.ch

**CZ, SK**

BETZ s.r.o.
Zeyerova 6/234
CZ-35301 Marianske Lazne
Phone 00420 354 / 620 095
Fax 00420 354 / 627 307
betz@betz.cz
www.betz.cz

**DK**

ZF Danmark ApS
Taastrupgaardsvej 8-10
DK-2630 Taastrup
Phone 0045 (0) 43 / 436 243
Fax 0045 (0) 43 / 432 643
zfdk@zf.com
www.zf-group.dk

**F**

AGORA Technique S.a.r.l.
Parc Volta
3, Rue Parmentier
F-94140 Alfortville
Phone 0033 (0) 1 / 451 843 70
Fax 0033 (0) 1 / 451 843 71
agora@agora-technique.com
www.agora-technique.com

**GB**

HEPCO Slide Systems Ltd.
Lower Moor Business Park
Tiverton Way, Tiverton
Devon, EX16 6TG,
Phone 0044 (0) 1884 / 24 34 00
Fax 0044 (0) 1884 / 24 35 00
hepco@hepco.co.uk
www.hepco.co.uk

**HU**

Iramko Trade Kft
Mátéháza u. 24
HU-1163 Budapest
Phone 0036 (0) 1 / 4024845
Fax 0036 (0) 1 / 4024846
info@iramko.com
www.iramko.com

**I**

TECNO CENTER S.r.l.
C.so Lombardia, 41
I-10078 Venaria Reale (TO)
Phone 0039 011 / 455 11 21
Fax 0039 011 / 455 75 95
info@tecnocenter.it
www.tecnocenter.it

**N**

KGK NORGE AS
Caspar Storms Vei 19
N-0664 Oslo
Phone 0047 2288 46 80
Fax 0047 2272 09 02
kgknorge@zf-group.no
www.zf-group.no

**NL**

Groneman BV
Amarilstraat 11, Postbus 24
NL-7550 AA Hengelo (O)
Phone 0031 (0) 74 / 255 11 40
Fax 0031 (0) 74 / 255 11 09
aandrijftechniek@groneman.nl
www.groneman.nl

**NZ**

SAECO Bearings & Transmission
36 Hastie Ave, Mangere
Auckland
Phone 0064 (0) 9 / 6347540
Fax 0064 (0) 9 / 6347552
www.saeco.co.nz

**PL**

INMET sp. z o.o.
Innovation & Engineering Enterprise
Ul. Jasna 1-5
PL-43-190 Mikolów
Phone 0048 (0) 32 / 738 50 19
Fax 0048 (0) 32 / 738 50 19-119
info@inmet.com.pl
www.inmet.com.pl

**PL**

JORDAN matcon sp. z o.o.
ul. Pradzynskiego 20
PL-63-000 Sroda Wlkp.
Phone 0048 (0) 61 / 2865548-49
Fax 0048 (0) 61 / 2865550
info@jordan-matcon.pl
www.jordan-matcon.pl

**S, SF**

EIE Maskin AB
Box 7
S-12124 Bandhagen
Phone 0046 (0) 8 / 7278800
Fax 0046 (0) 8 / 7278899
eie@eie.se
www.eie.se

**SLO**

STK Lesnik s.p.
Zg. Zerjavci 33/a
SLO-2230 Lenart
Phone 00386 (0) 2 / 72 92 403
Fax 00386 (0) 2 / 72 92 404
lesnik@siol.net

**SP**

TECNOPOWER, S.L.
Poligono Industrial Moli dels Frares,
Calle C n° 10
08620 Sant Vicenc Dels Horts
BARCELONA
Phone 0034 936568050
Fax 0034 936568026
tp@tecnopower.es
www.tecnopower.es

**USA, CAN**

DIEQUA Corporation
180 Covington Drive
Bloomingdale, Illinois 60108-3105
Phone 001 (0) 630 / 980 1133
Fax 001 (0) 630 / 980 1232
info@diequa.com
www.diequa.com

Printing errors, mistakes regarding dimensions, etc., as well as technical changes and improvements are excepted. Valid are the drawings which are have been checked and approved by both partners in accordance with the order acknowledgement.

Protection mark for restricting the use of documents DIN 34

Schutzvermerk zur Beschränkung der Nutzung von Unterlagen nach DIN 34

Note de protection pour la restriction de l'usage de documents DIN 34

D (deutsch)	„Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhalts nicht gestattet, soweit nicht ausdrücklich zugestanden. Zu widerhandlungen verpflichten zu Schadenersatz. Alle Rechte für den Fall der Patenterteilung oder Gebrauchsmuster-Eintragung vorbehalten.“
E (englisch)	Copying of this document, and giving it to others and the use or communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of the grant of a patent or the registration of a utility model or design.
F (französisch)	Toute communication ou reproduction de ce document, toute exploitation ou communication de son contenu sont interdites, sauf autorisation expresse. Tout manquement à cette règle est illicite et expose son auteur au versement de dommages et intérêts. Tous nos droits sont réservés pour le cas de la délivrance d'un brevet ou celui de l'enregistrement d'un modèle d'utilité.
I (italienisch)	Non è permesso consegnare a terzi o riprodurre questo documento, né utilizzarne il contenuto o renderlo comunque noto a terzi senza la nostra autorizzazione esplicita. Ogni infrazione comporta il risarcimento dei danni subiti. E'fatta riserva di tutti i diritti derivanti da brevetti o modelli.
Pt (portugiesisch)	A entrega a terceiros e a reproducao deste documento, assim como o uso e a revelacao do seu conteudo, sao proibidos, salvo por autorizacao expressa. Os infratores respondem por perdas e danos. No caso da concessao de patentes de invencao, modelos de utilidade, modelos ou desenhos industriais, licam reservados os direitos de exclusividade.
R (russisch)	Не разрешается передача и размножение настоящей документации, а также ее использование и сообщение содержания, насколько это определено не дозволяется. Нарушения обязуют к возмещению за ущерб. Сохраняются все права на случай выдачи патента или внесения полезного образца в реестр.
Sv (schwedisch)	Utan vart uttryckliga tillstånd far denna handling icke utlämnas till obehöriga eller kopieras; ej heller far dess innehall delgivas oberöriga eller utnyttjas. Överträdelse medför skadestandsansvar. All rätt förbehalles, om patent eller mönsterskydd erhålls.
S (spanisch)	Sin nuestra expresa autorización, queda terminantemente prohibida la reproducción total o parcial de este documento, así como su uso indebido y/o su exhibición o comunicación a terceros. De los infractores se exigirá el correspondiente resarcimiento de daños y perjuicios. Se reserva todos los derechos para el caso de la concesión de patente de invención o el registro de Modelo Industrial.



Photos
Klaus Andorfer
Studio Andorfer



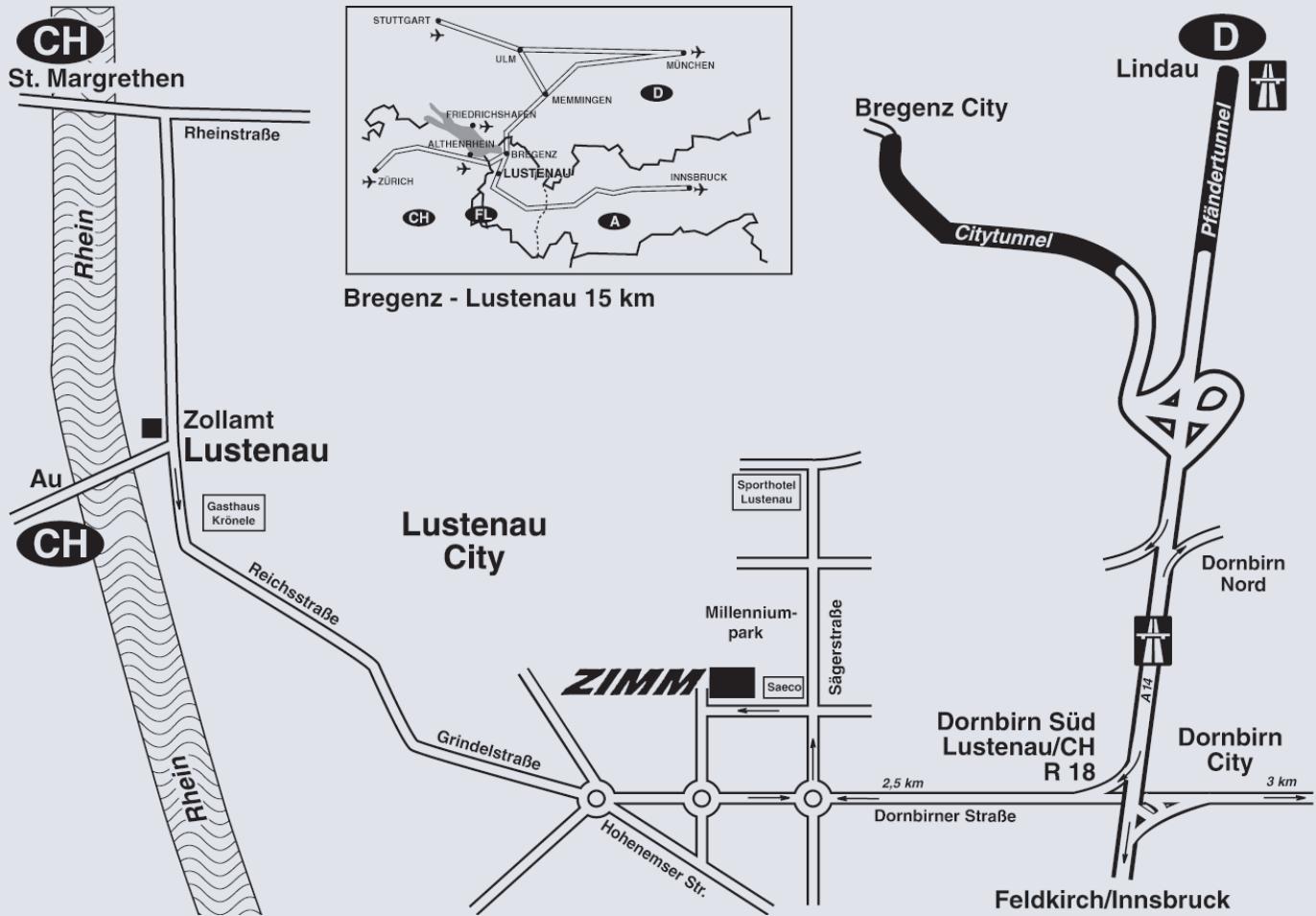
Graphic
Christina Scheffknecht-Zimmermann
comart



Editor
Gebhard Stadelmann
ZIMM



3-D Illustration
Peter Rangger



ZIMM Maschinenelemente GmbH + Co
Millenniumpark 3
A-6890 Lustenau/Austria
Phone 0043(0)5577/806-0
Fax 0043(0)5577/806-8
E-mail: sales@zimm-austria.com
Internet: www.zimm-austria.com





05/04

Our Engineering Catalogue is available in:

- > German
- > English
- > French
- > Italian
- > Spanish

ZIMM Maschinenelemente GmbH + Co
Millenniumpark 3
A-6890 Lustenau/Austria
Phone 0043(0)5577/806-0
Fax 0043(0)5577/806-8
E-mail: sales@zimm-austria.com
Internet: www.zimm-austria.com

ZIMM
Screw Jack Systems