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-mechanical 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

Our Engineering Catalogue is available in:

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

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.at**

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

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- hinged bearing plate design
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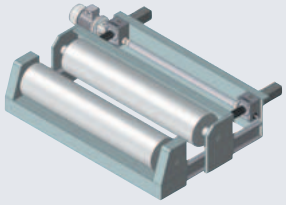

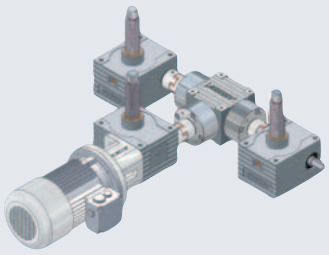

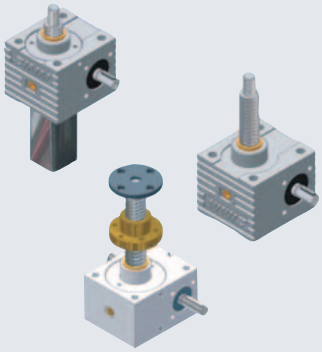

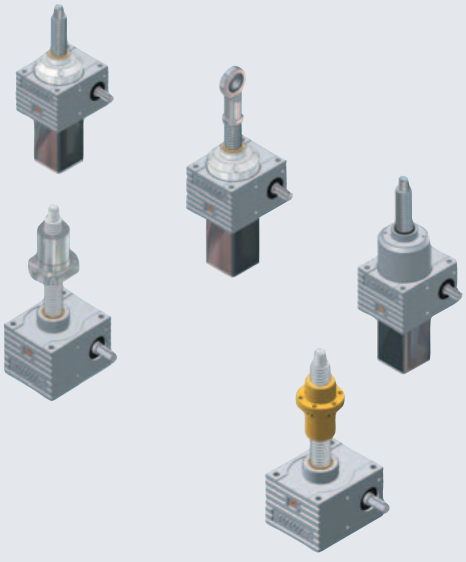

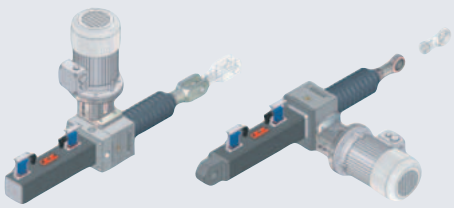

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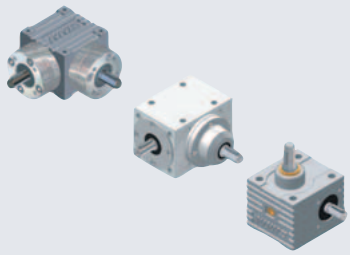
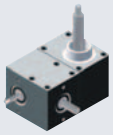
079 12. Bevel gearboxes
with straight bevel gears KLM and KGZ,
with spiral bevel gears KSZ
Heavy duty design KST



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
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158 17. General Terms and Conditions of Sale and Delivery,
160 Sales Partners Worldwide

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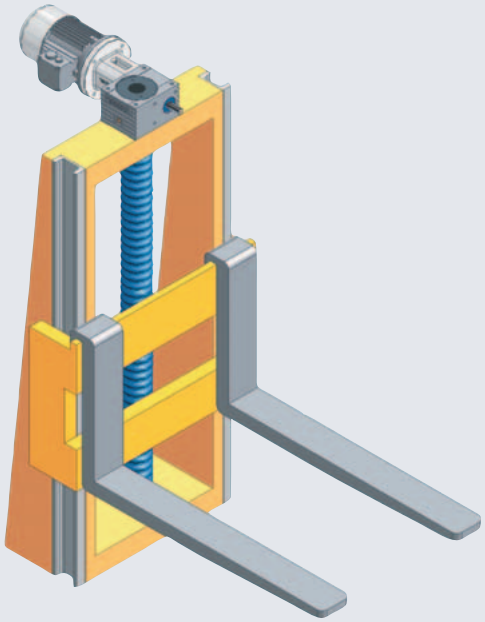
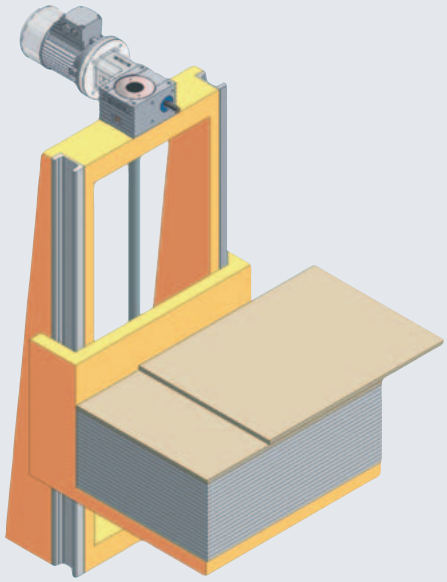
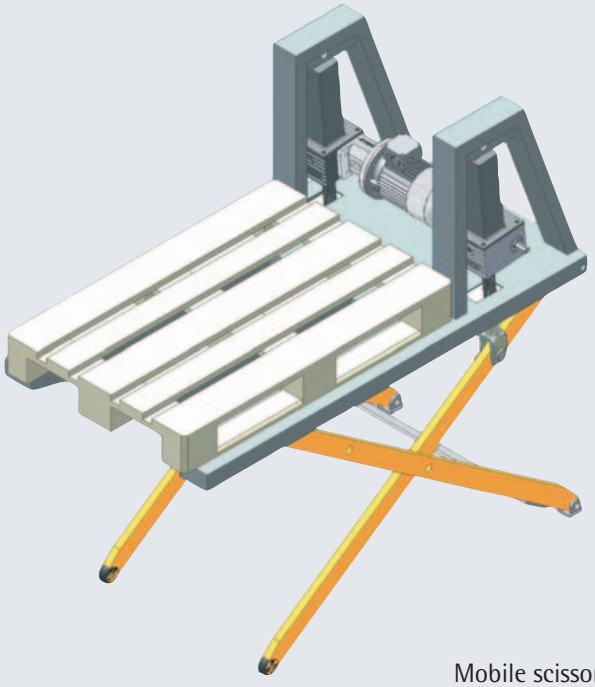
Application Examples of Screw Jacks

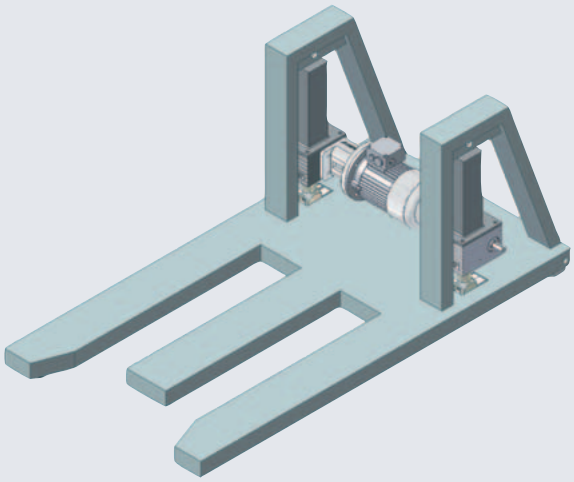


Destacking unit



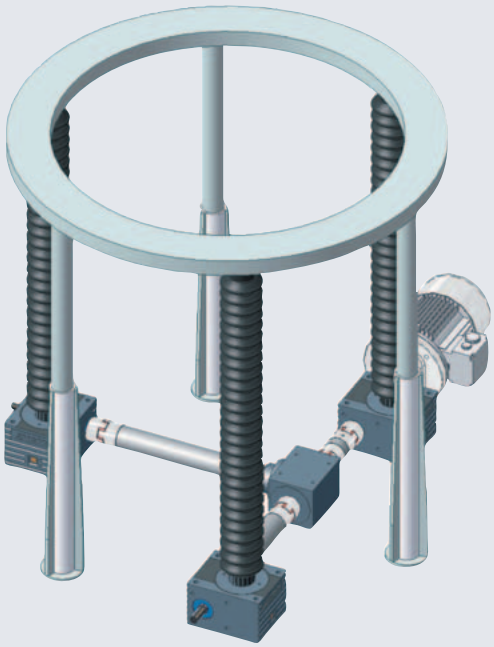
Destacking unit for plates





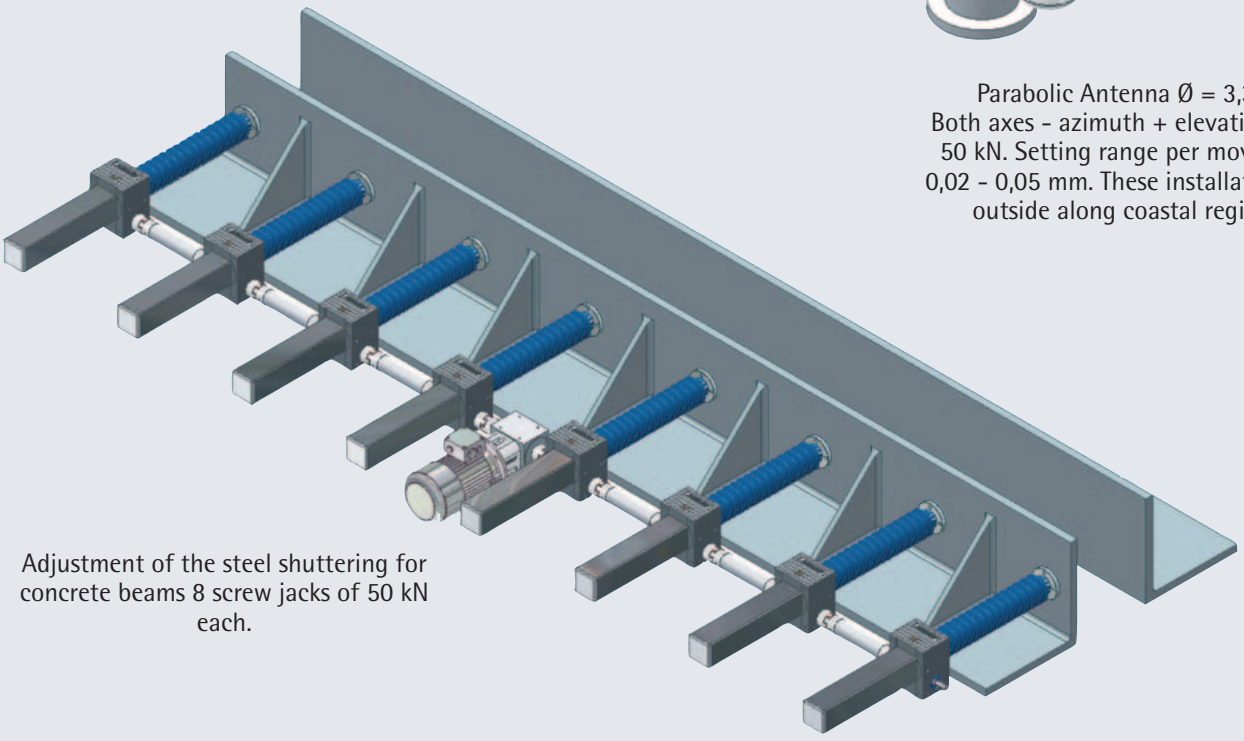
Mobile scissor table for pallet transfer with a hand lift

Application Examples of Screw Jacks



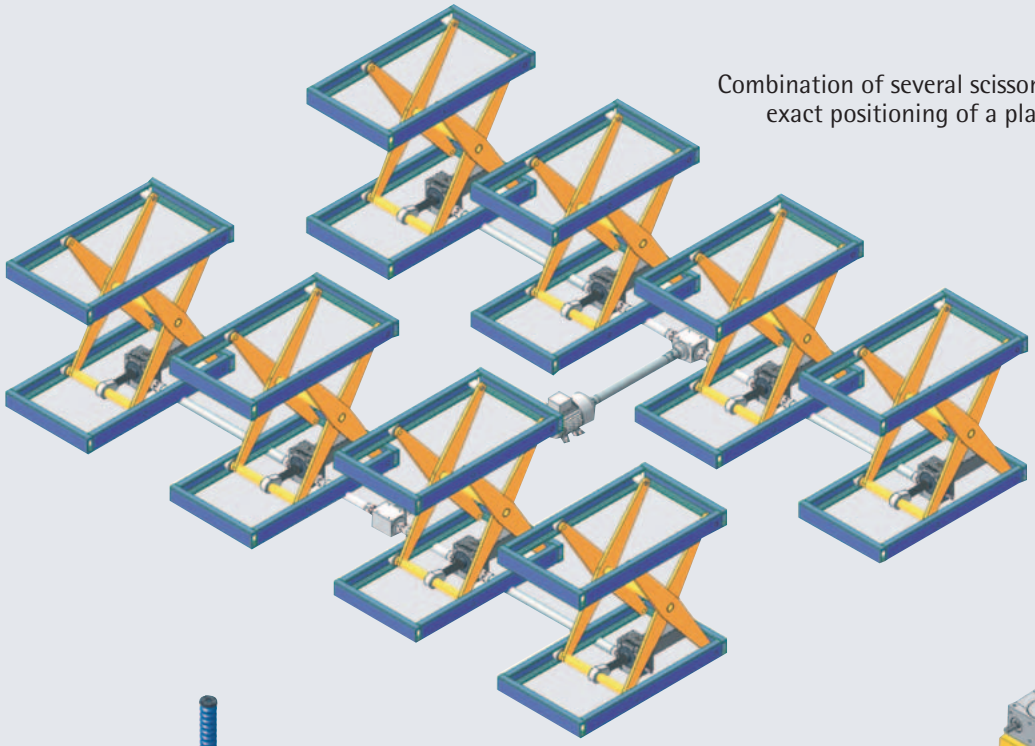
Three-point system of a lapping and polishing apparatus, diameter 7.000 mm. Compensation is made for different component sizes by the screw jack.

Parabolic Antenna Ø = 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.

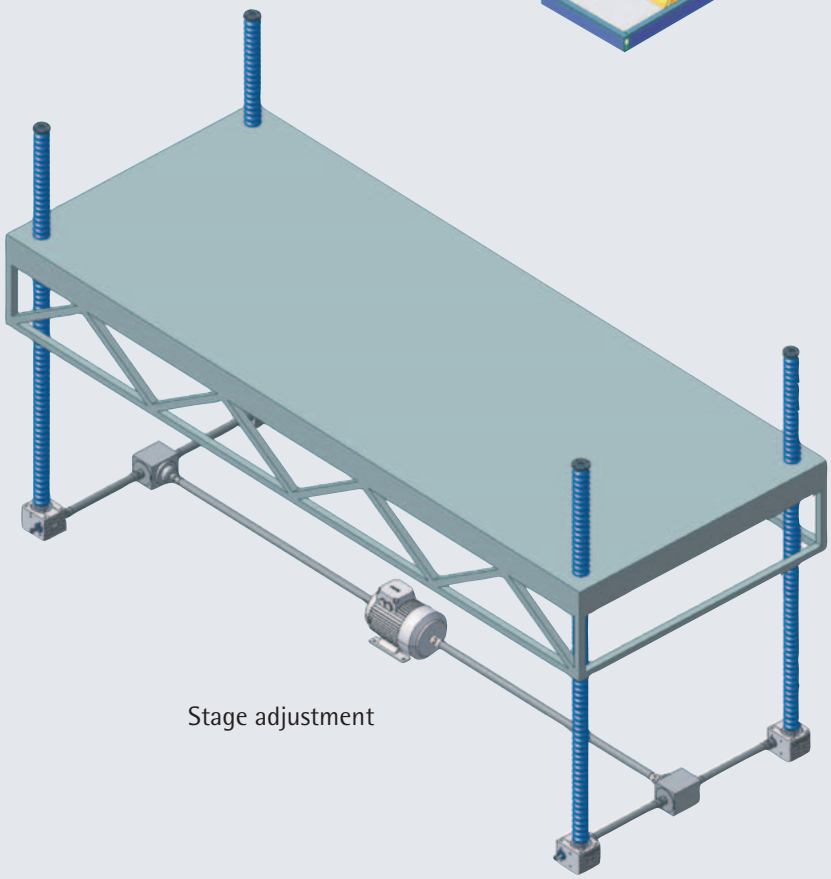


Adjustment of the steel shuttering for concrete beams 8 screw jacks of 50 kN each.

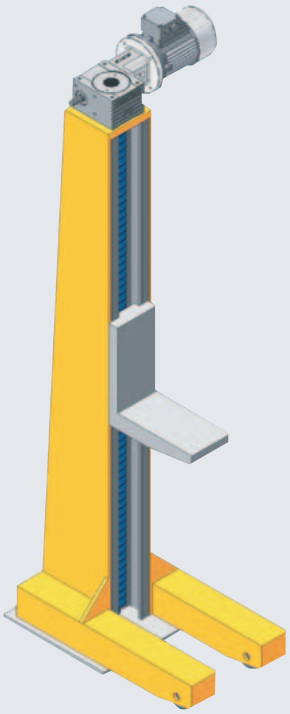
Application Examples of Screw Jacks



Combination of several scissor tables for exact positioning of a platform

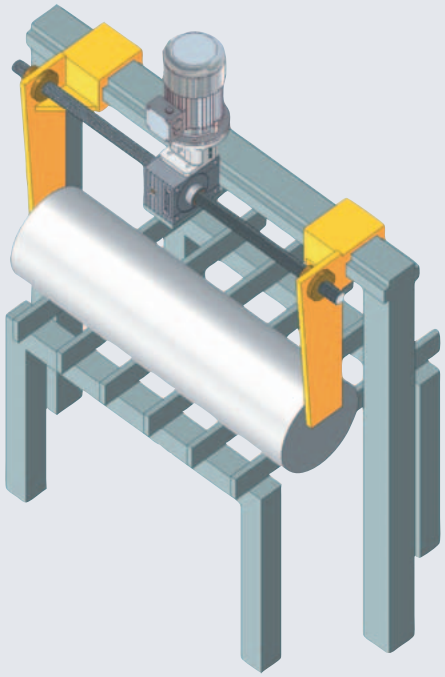


Stage adjustment

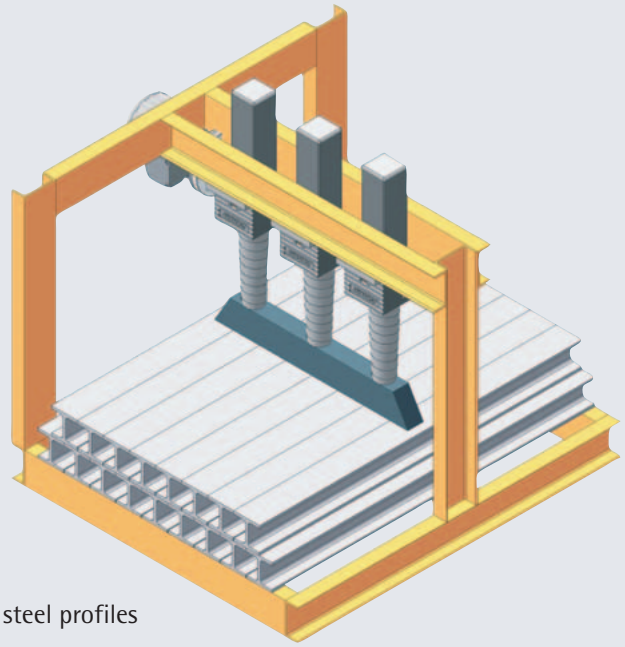


Mobile lifting platform for heavy vehicles

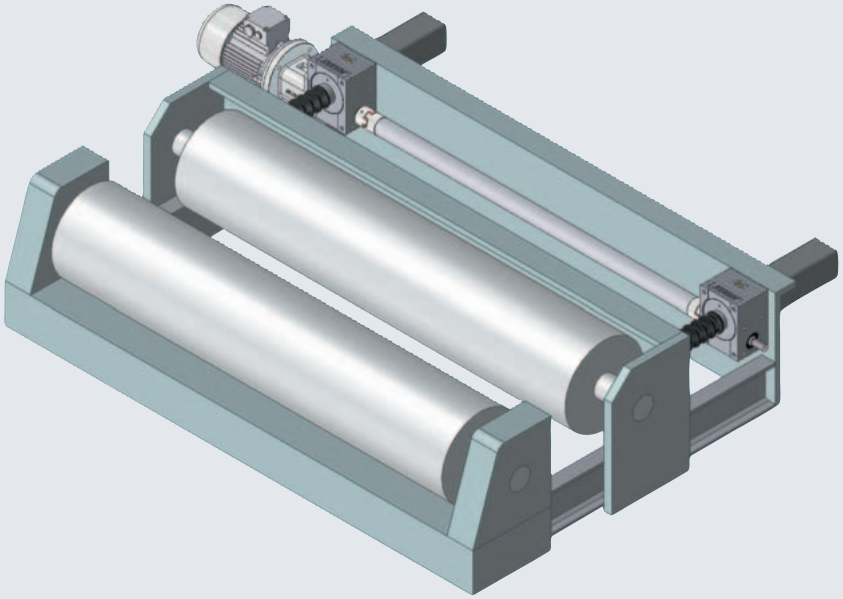
Application Examples of Screw Jacks



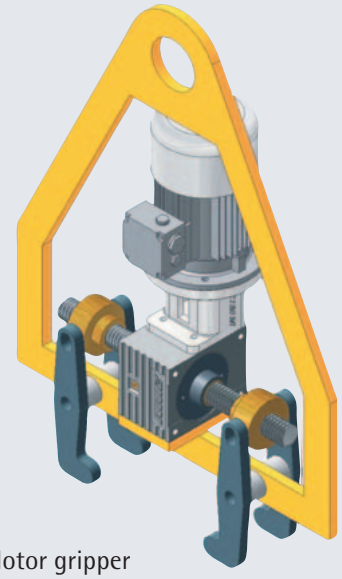
Centering mechanism with
right and left threaded spindles



Alignment of steel profiles

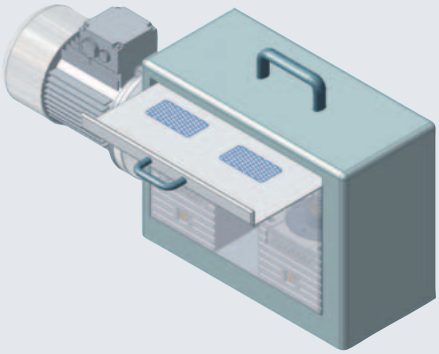


Adjustment of a roller system
in the textile industry

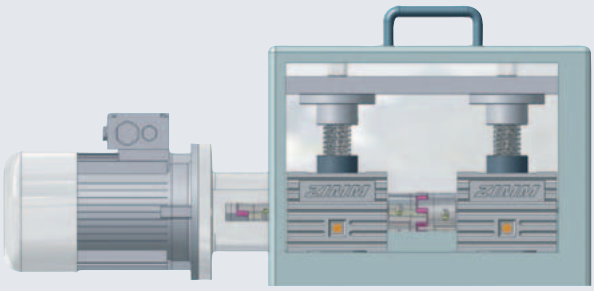


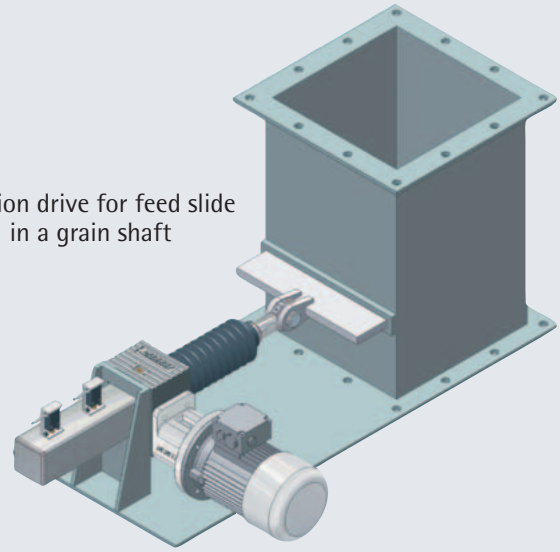
Motor gripper
for steel profile

Application Examples of Screw Jacks

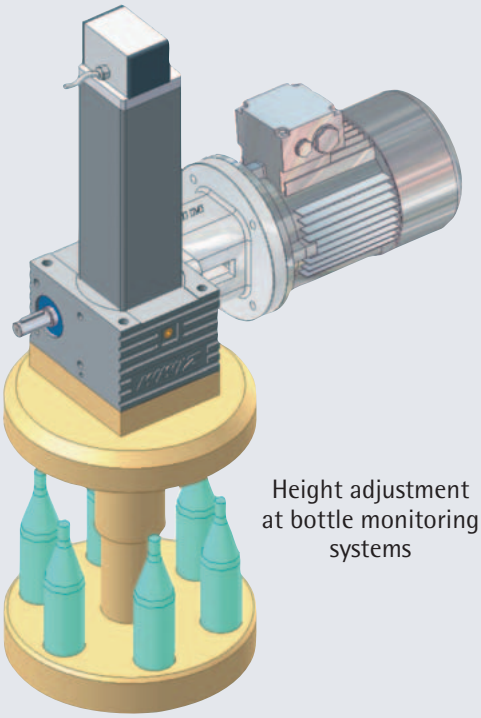


Compact press

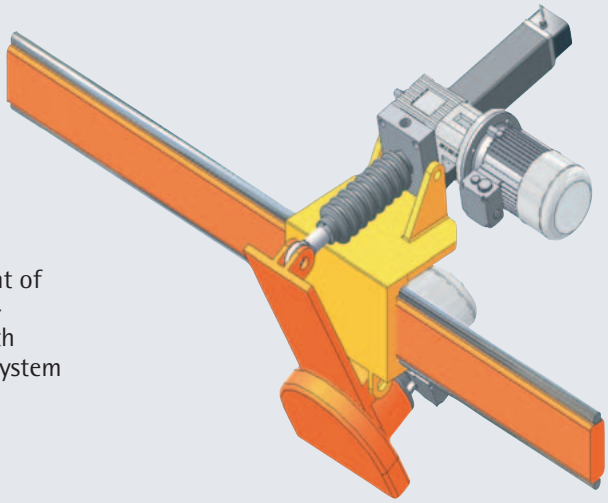




Position drive for feed slide
in a grain shaft

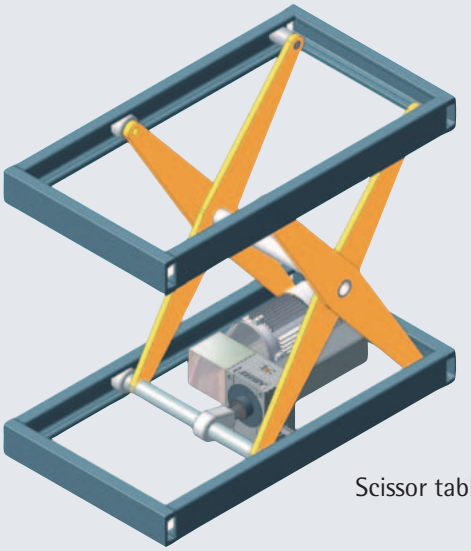


Height adjustment
at bottle monitoring
systems

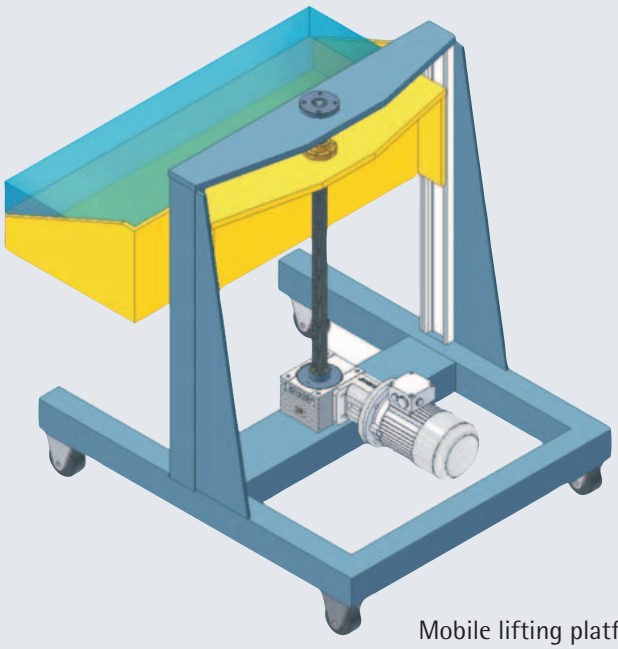


Angle adjustment of
a plate saw -
screw jack with
linear measuring system

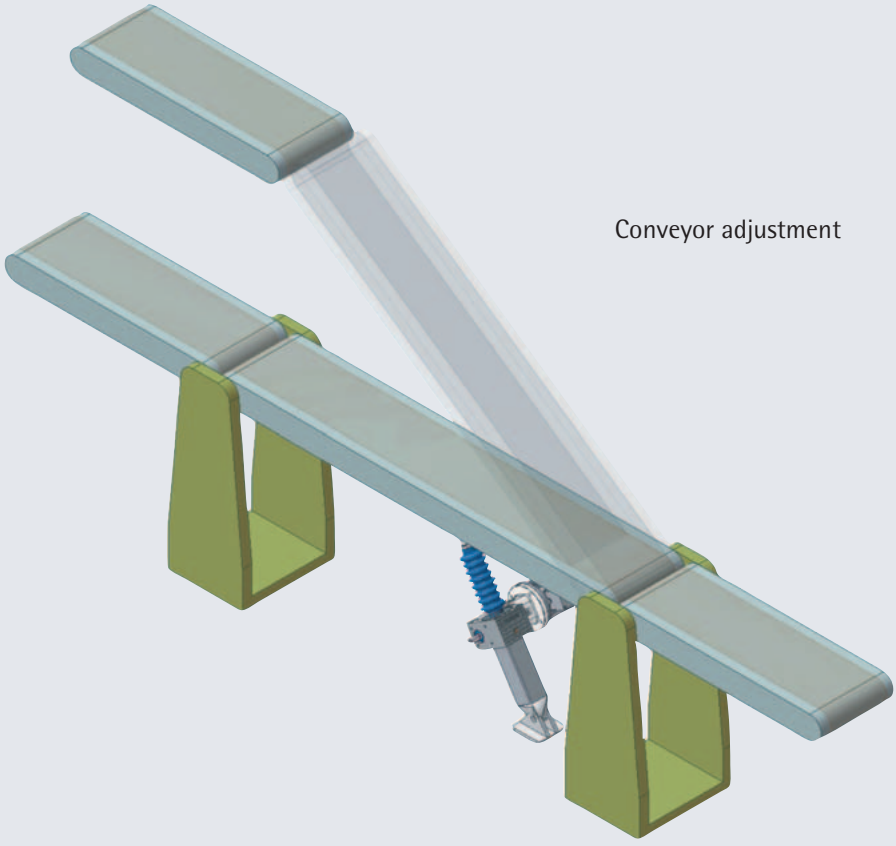
Application Examples of Screw Jacks



Scissor table

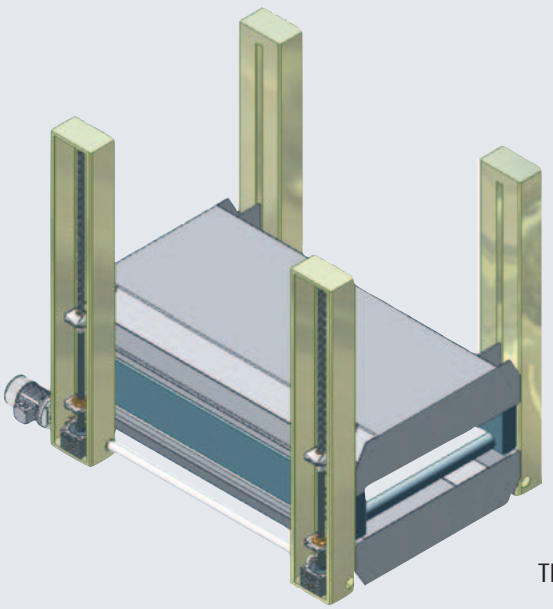


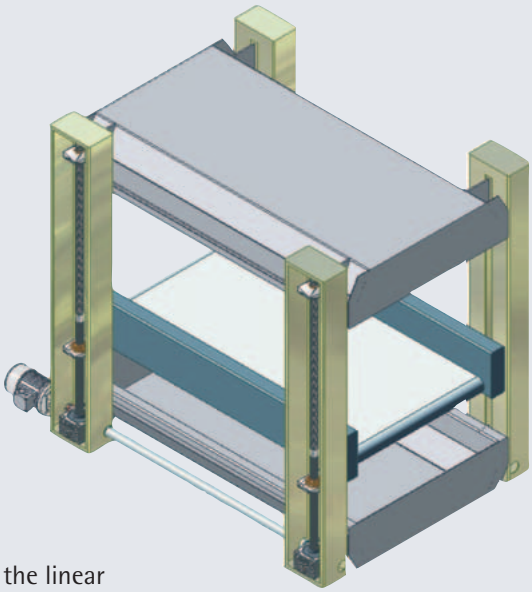
Mobile lifting platform



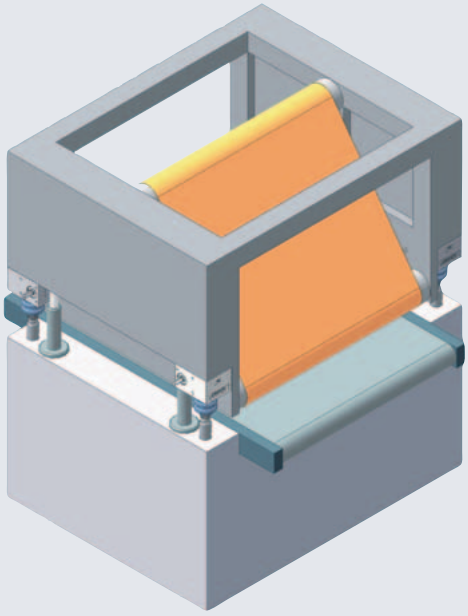
Conveyor adjustment

Application Examples of Screw Jacks

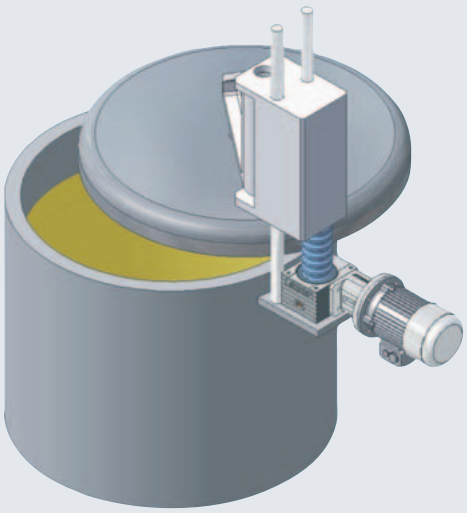




The lower and upper part of the linear freeze-dryer system is opened electro-mechanically with screw jacks for cleaning.

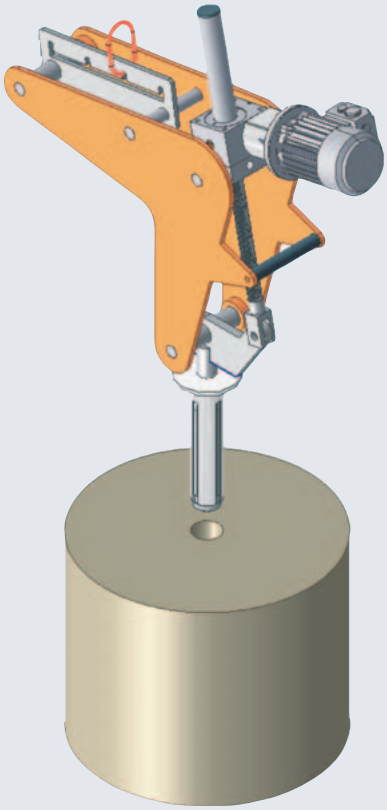


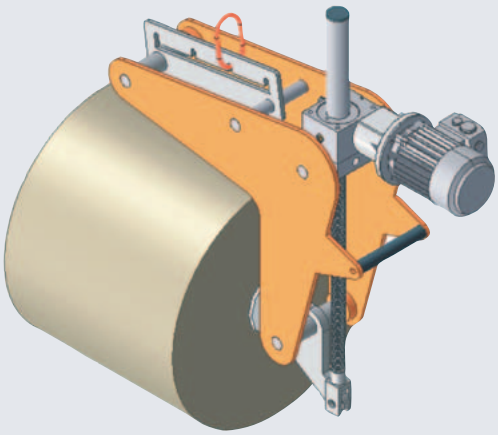
Wide belt grinding machine - precise adjustable stop with 4 screw jacks



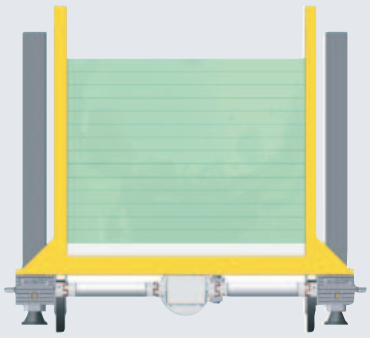
Opening and closing of a sealed pressure tank

Application Examples of Screw Jacks



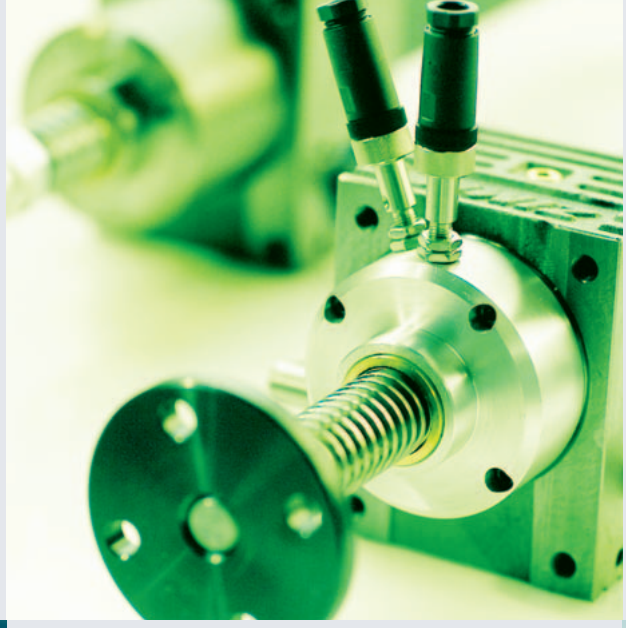


Turning over of foil coils
(horizontal + vertical take up)



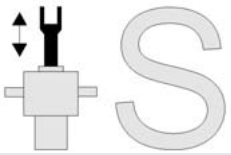
Permanent discharge level regulation
by means of lifting gears in a mobile
container for panel production.

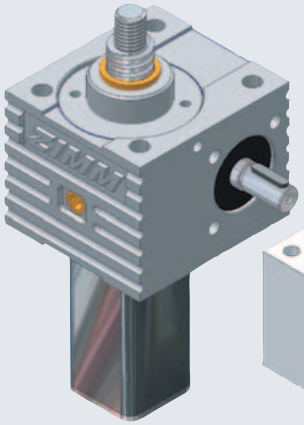
Innovation in Design



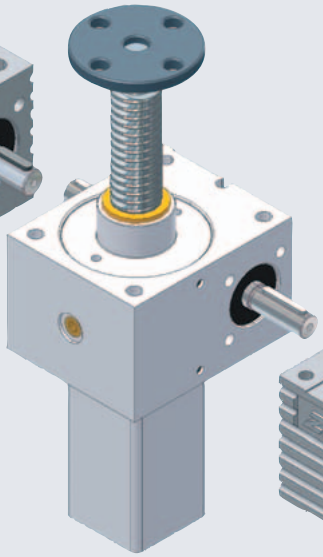
Advanced Screw Jack Building Block System

3.1 Standard Version with Standing Spindle S



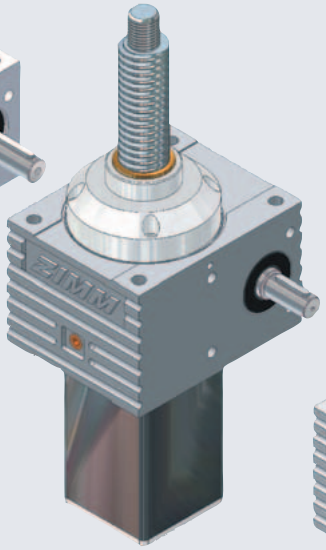


Cast iron housing - version S

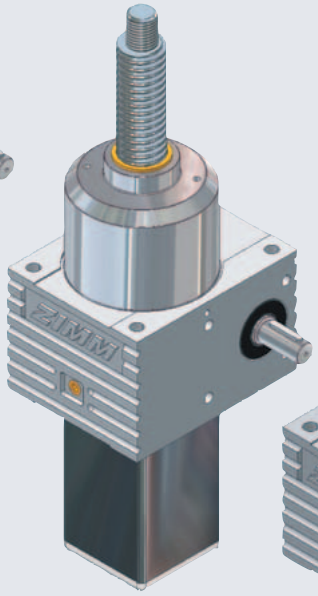


Aluminium housing - version S

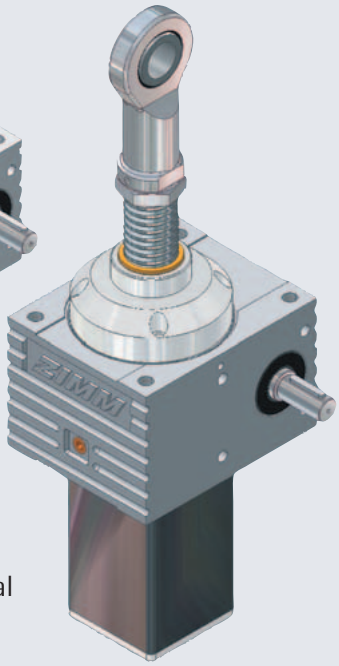
Standing spindle S
The worm wheel has an internal thread and transforms rotary motion into linear movement as long as the spindle is prevented from rotating either by connection to the customer's fabrication or by incorporating the protection against rotation VS option - chapter 14.1)



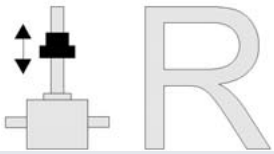
Safety nut SIFA
for fail safe wear control



Ball Screws with optional pitches - **version KGT**

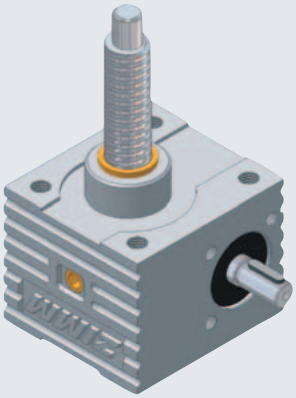


Anti Backlash AB
with adjustable thread play

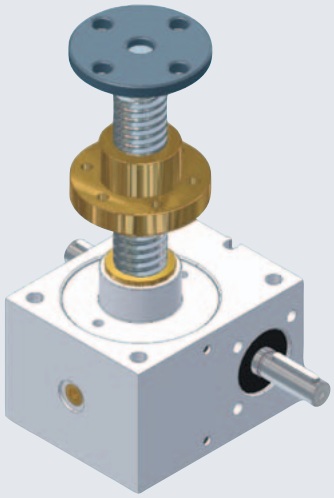


3.2 Standard Version with Rotating Spindle R

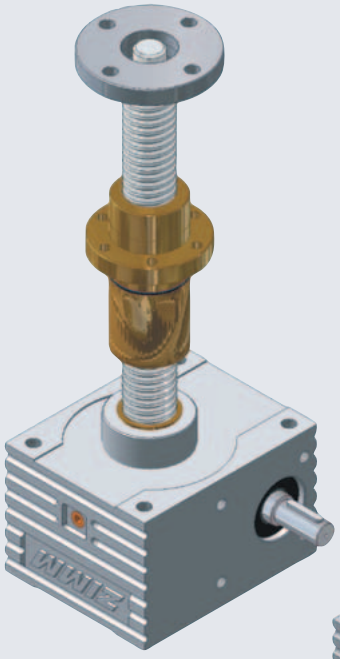
Rotating spindle R
A flange nut moves up and down on a rotating screw.



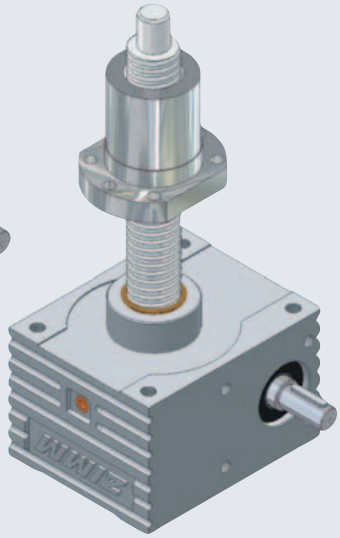
Cast iron housing - version R



Aluminium housing - version R

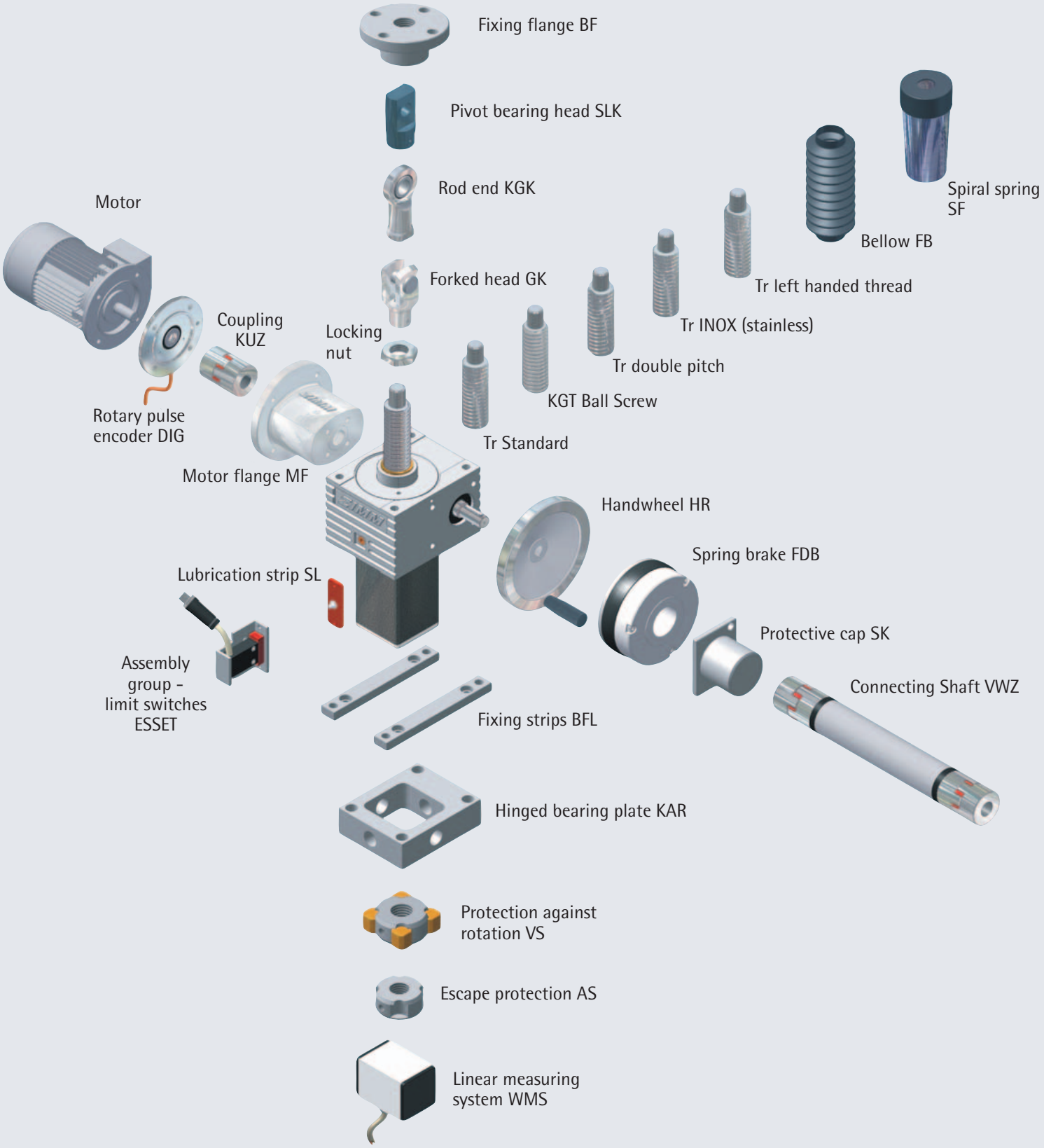


Safety nut SIFA
for fail safe wear control

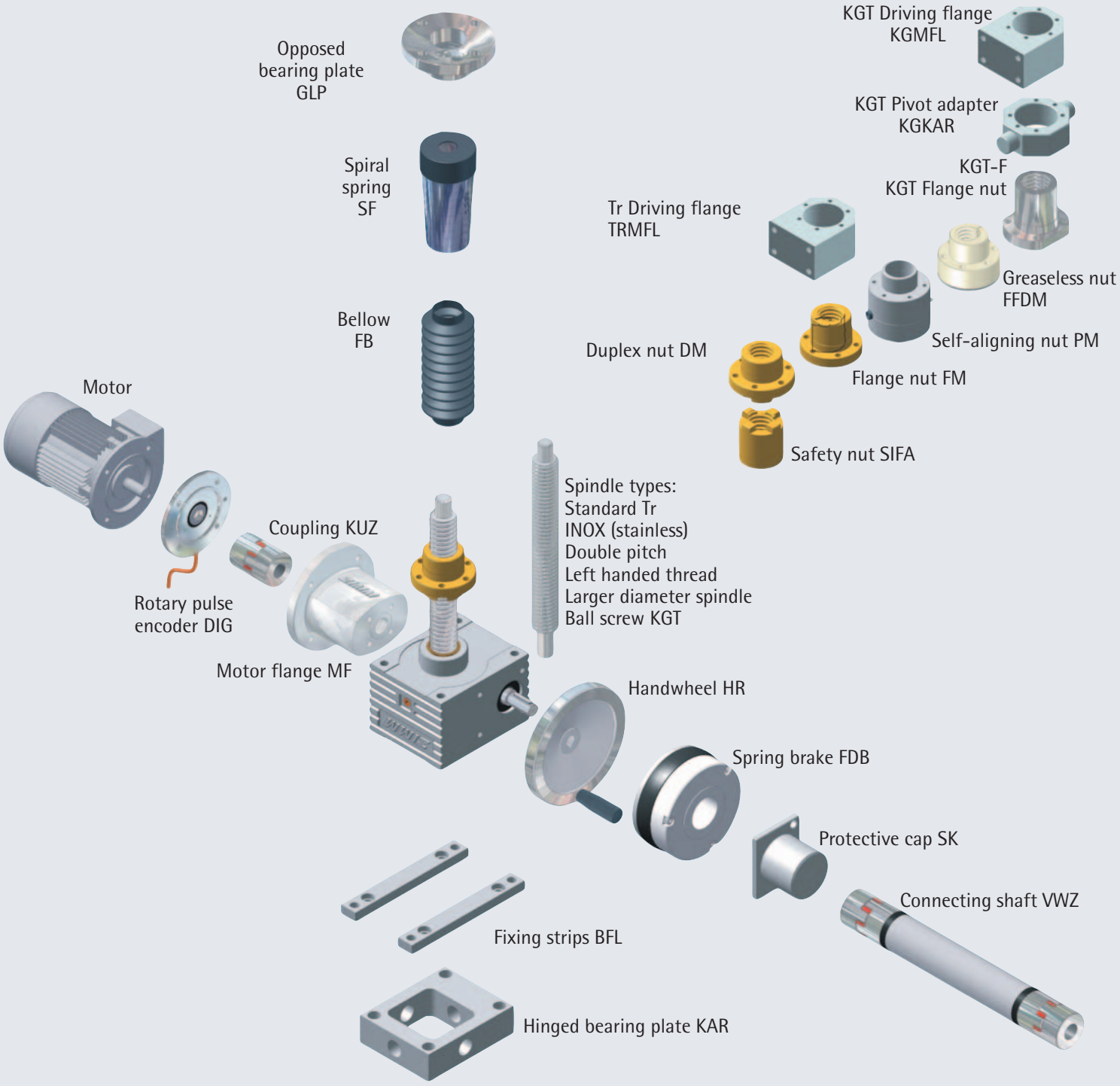


Ball Screws with optional pitches **- version KGT**

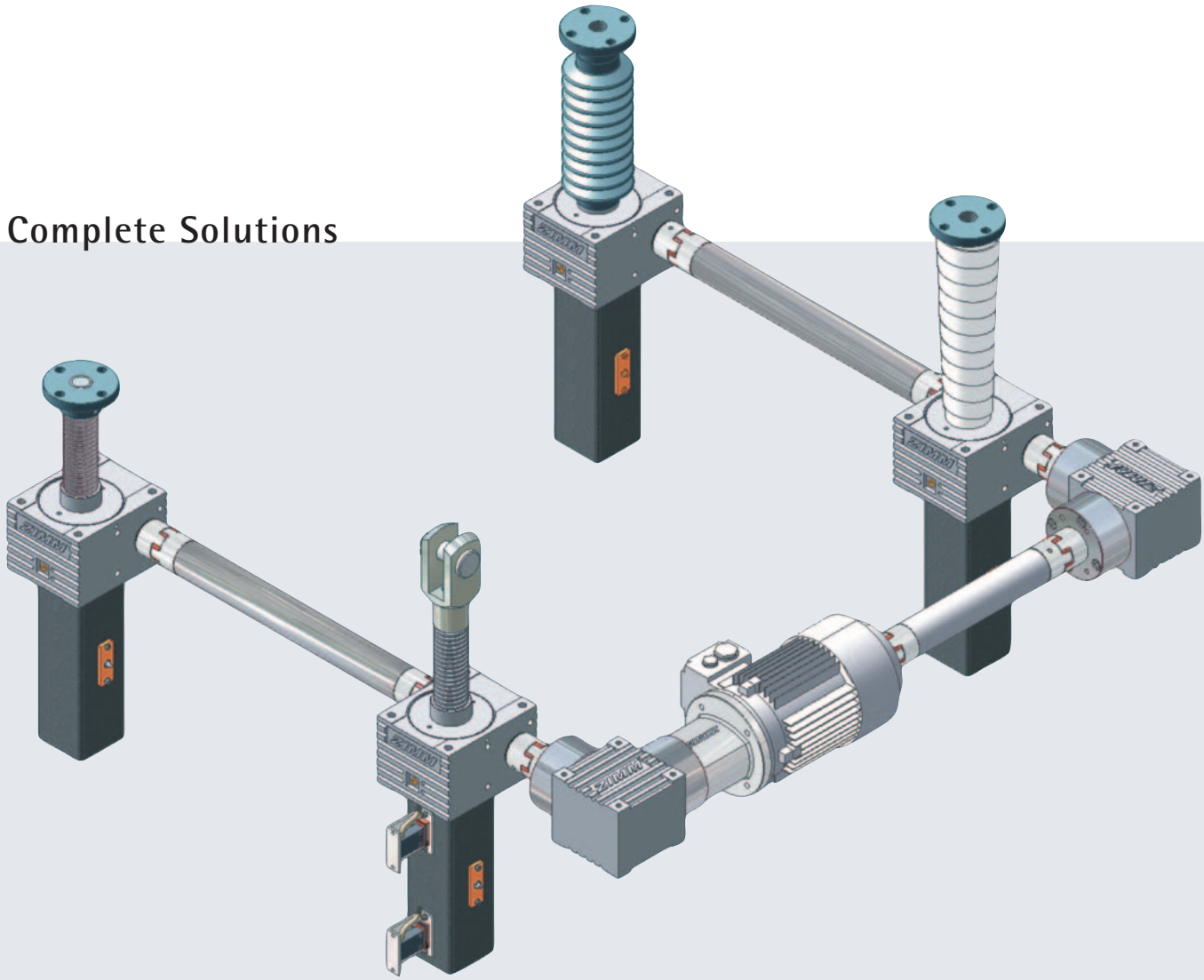
3.3 System Components, Standing Spindle S



3.4 System Components, Rotating Spindle R



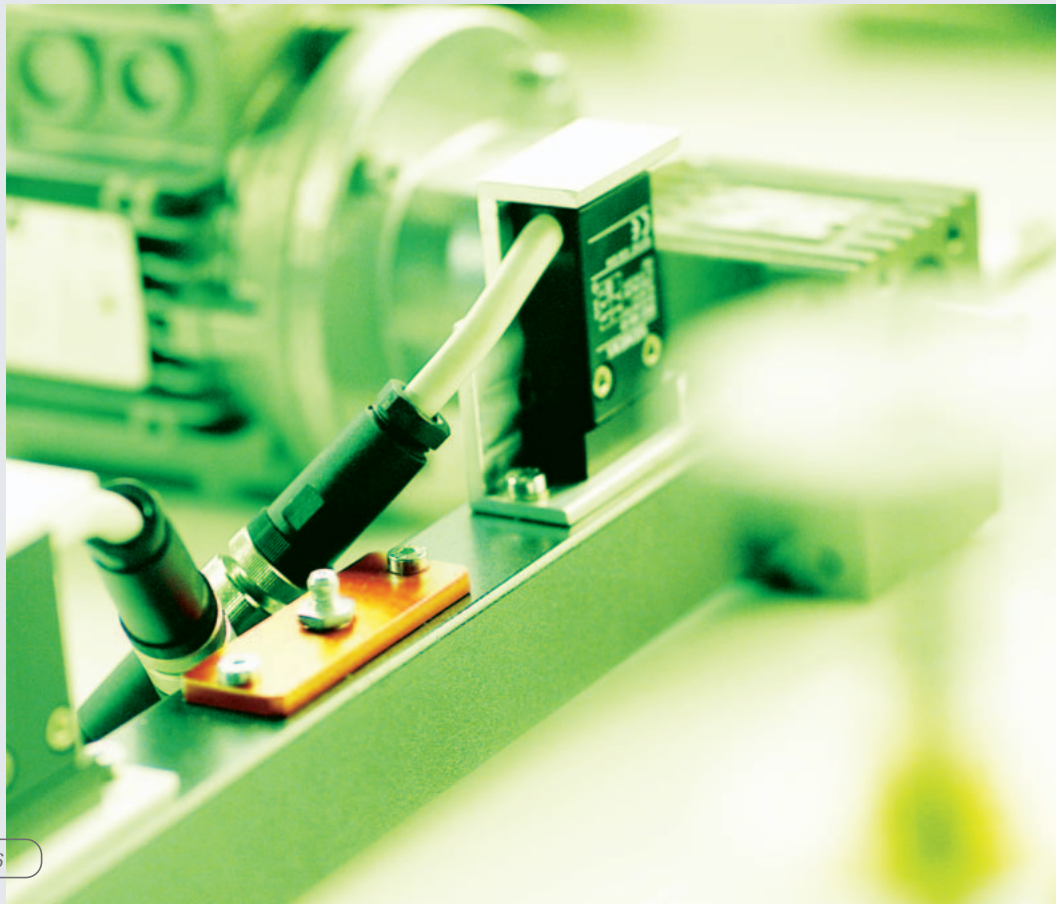
3.5 Complete Solutions



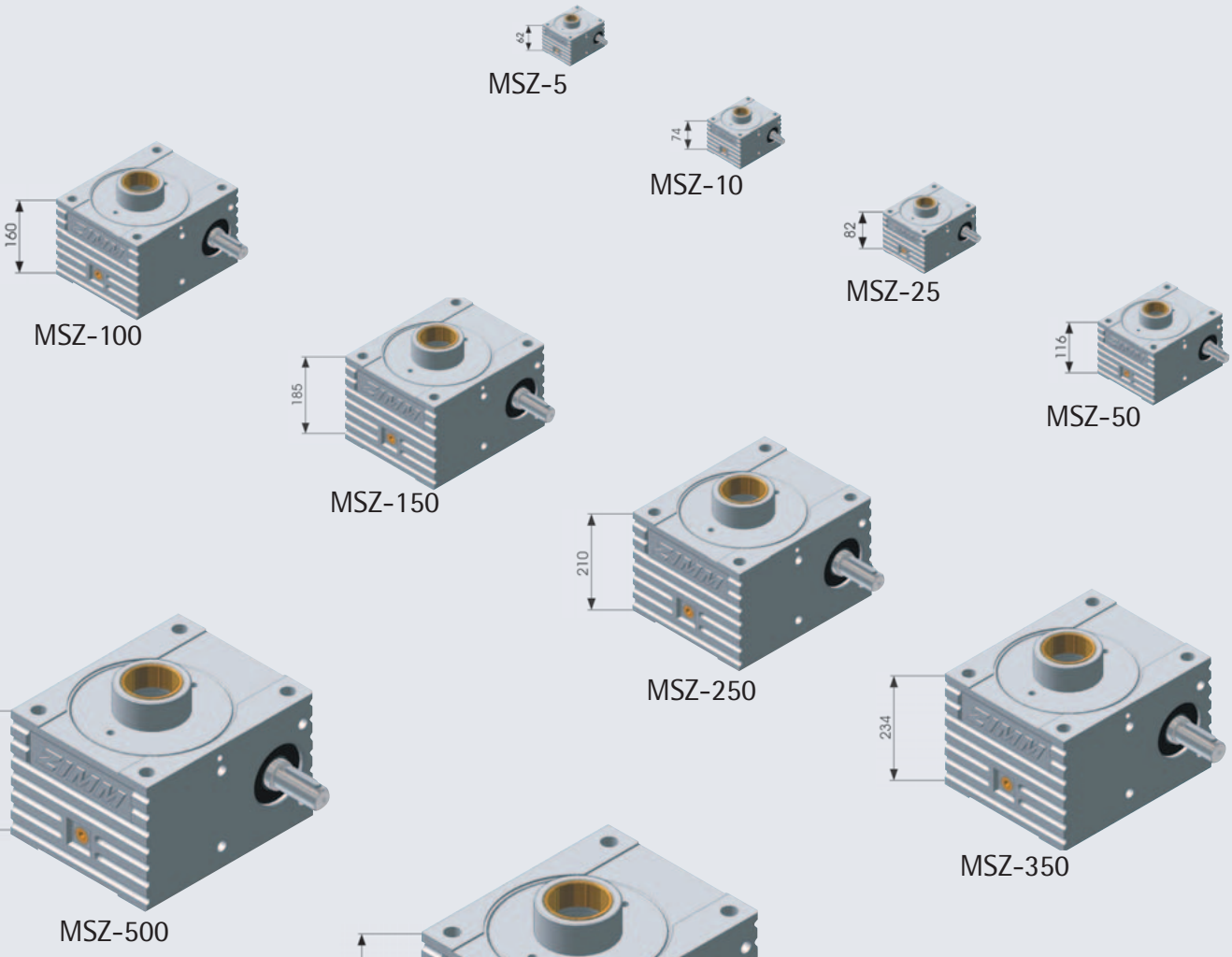
ZIMM – Screw Jack Building Block System

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.



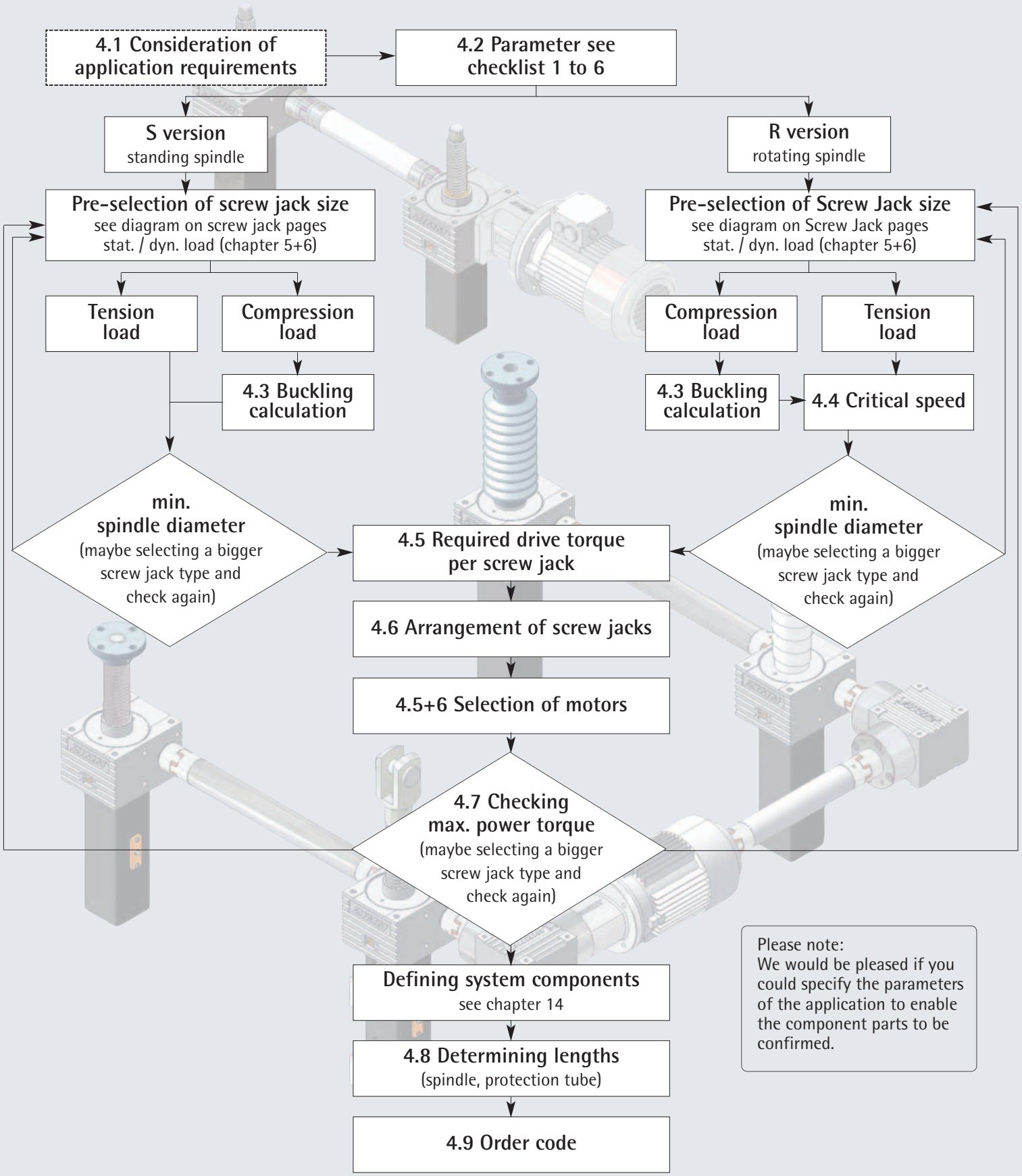
3.6 Sizes



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



Please note:
We would be pleased if you could specify the parameters of the application to enable the component parts to be confirmed.

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

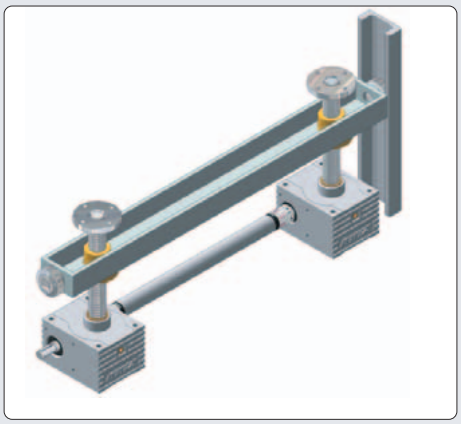
Normal version N:	1 mm stroke per movement of drive shaft (MSZ-150 and bigger sizes - higher speed acc. to table) at 1500 min^{-1}: ➞ 1,5 m/min
Slow version L:	0,25 mm stroke per movement of drive (MSZ-150 and bigger sizes - higher speed acc. to table) at 1500 min^{-1}: ➞ 0,375 m/min

<u>In order to increase the speed of the system the following options can be considered:</u>
- 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.

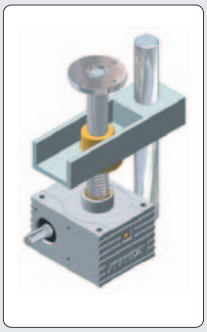
<u>To reduce system speed</u>
- Use a motor with more poles / lower speed (6, 8, 10 or 12 poles)
- Rotary pulse encoder (for slower speed operation below 25 Hz an adequate method of cooling the motor is required)
- Geared motor (Attention to max input torque is required)
- Bevel gearbox with gear reduction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

Temperature and Operating time
Screw jacks are generally not designed for continuos 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 celsius.

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.



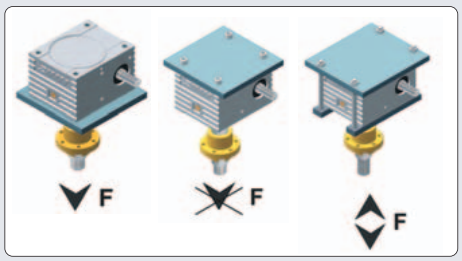
Guidance
The guide bushes incorporated in the screw jack gearbox can only tolerate a play of between 0.2 & 0.6mm are not designed to take high side forces on the system. For most applications a suitable additional guidance system should be designed into the application to counteract any side forces.



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).

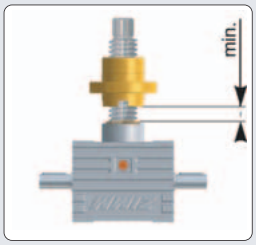
4.1 Construction Advice

Design & Specification



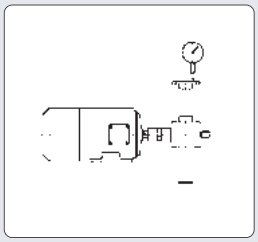
A flat-machined surface is necessary. The four attachment bolts are designed for the rated static loads of the gearbox in tension and compression. Additional impact loads and vibration must be taken into account (Grey cast iron housing GG25). The length of the mounting screws must be observed. Tension 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.

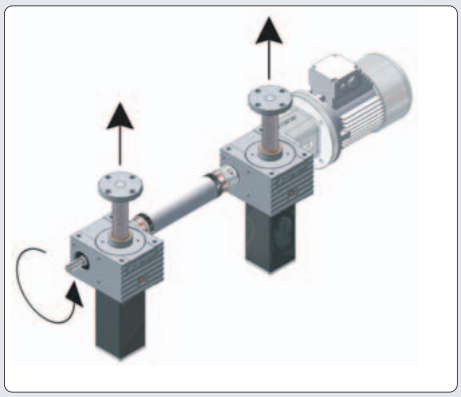
Accuracy



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

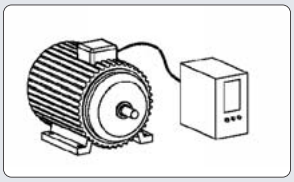


Check the direction of the required rotation and detail this in your design drawing or select one of the standard system layouts (chapter 4). With T bevel gearbox the direction of rotation can be changed by rotating the gearbox around.

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.

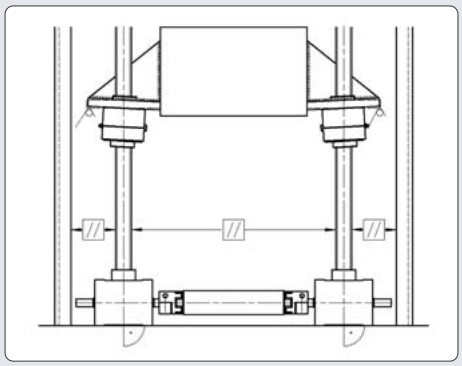
4.1 Construction Advice

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).

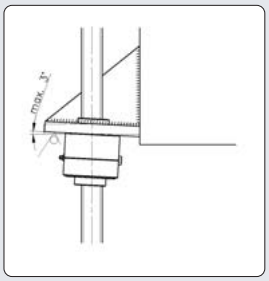
Mounting, Operation and Maintenance Instruction
The installation instructions (chapter 16) must be adhered to.

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:

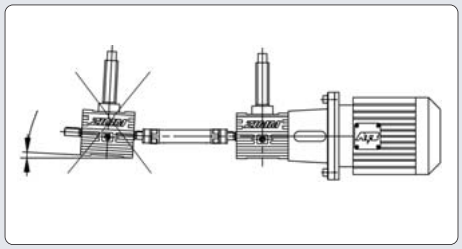
Parallelism / Angularity:
Screws and linear guides must be parallel otherwise the whole system could seize up during operation. All mounting surfaces for the gearboxes must be at right angles to the linear guides otherwise wear or damage to the components could occur.



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).



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.at**

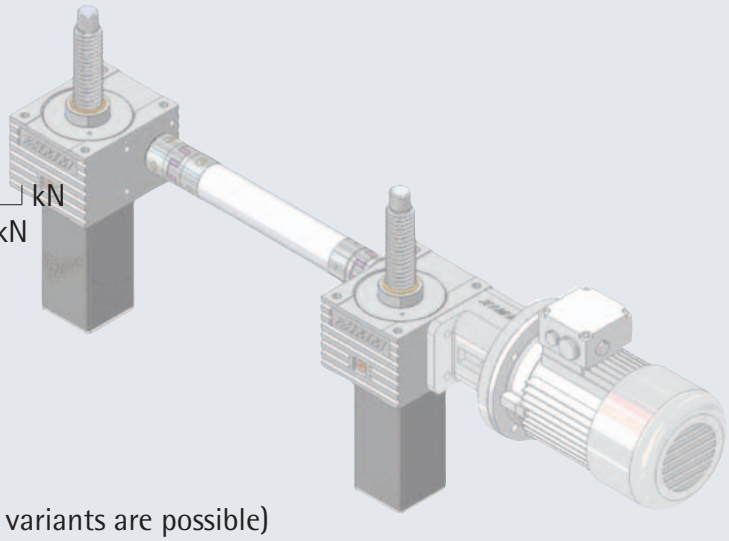
We are certified according to EN ISO 9001, 17.12.1996, Reg. No. 953/0

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.

With an application sketch and the completed checklist it will enable us to submit our quotation more speedily.

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

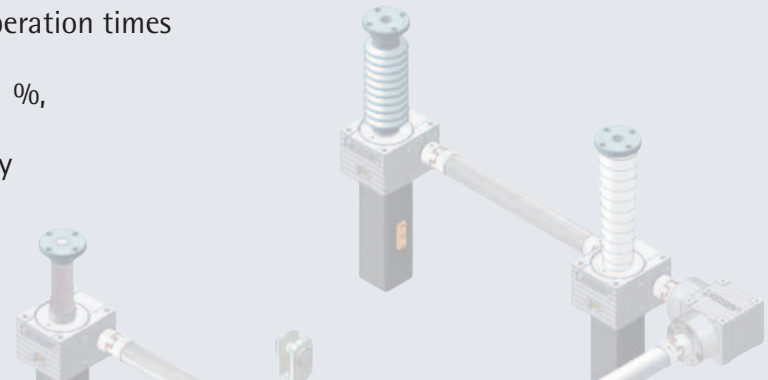
10 Quantity: ⌊_____⌋ piece ☐ prototype first

11 Date: Offer: ⌊_____⌋ Delivery: ⌊_____⌋

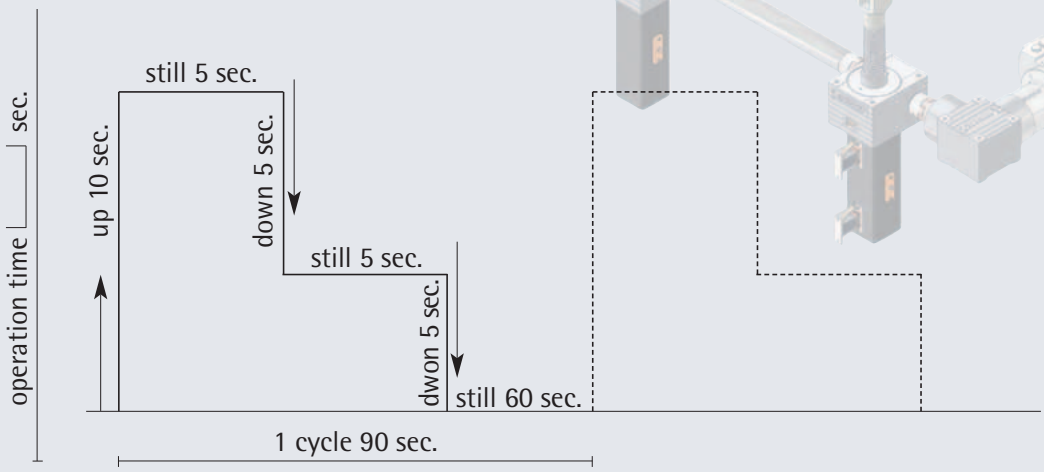
4.2 Checklist - Page 2 - Operating Times

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

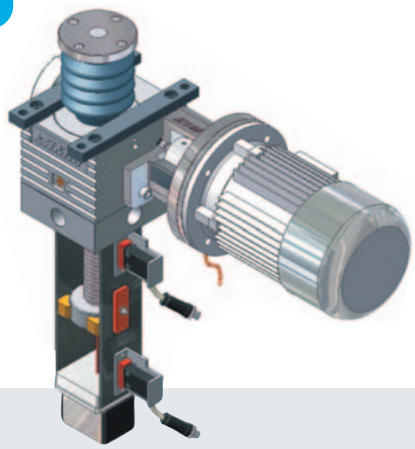
Formula for calculating the relative operating period ED:

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

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

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

when operated 8hr/day



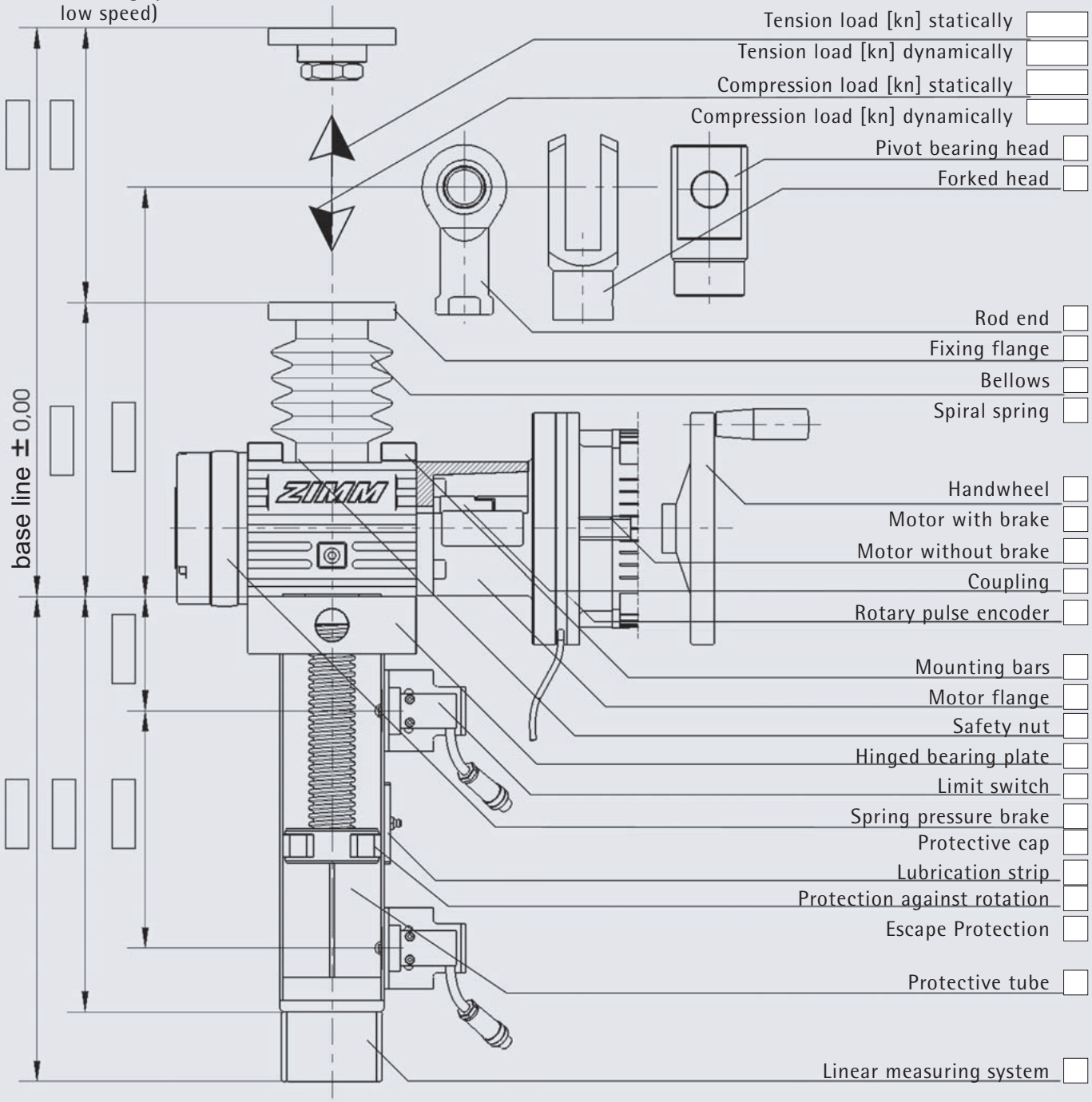
4.2 Checklist - Page 3 - Accessories S

(also see overview chapter 3.3)

Execution:

☐SN (standing spindle, normal speed)

☐SL (standing spindle, low speed)



Tension load [kn] statically ☐

Tension load [kn] dynamically ☐

Compression load [kn] statically ☐

Compression load [kn] dynamically ☐

Pivot bearing head ☐

Forked head ☐

Rod end ☐

Fixing flange ☐

Bellows ☐

Spiral spring ☐

Handwheel ☐

Motor with brake ☐

Motor without brake ☐

Coupling ☐

Rotary pulse encoder ☐

Mounting bars ☐

Motor flange ☐

Safety nut ☐

Hinged bearing plate ☐

Limit switch ☐

Spring pressure brake ☐

Protective cap ☐

Lubrication strip ☐

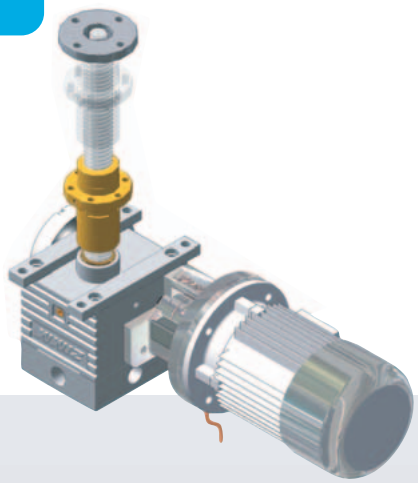
Protection against rotation ☐

Escape Protection ☐

Protective tube ☐

Linear measuring system ☐

R



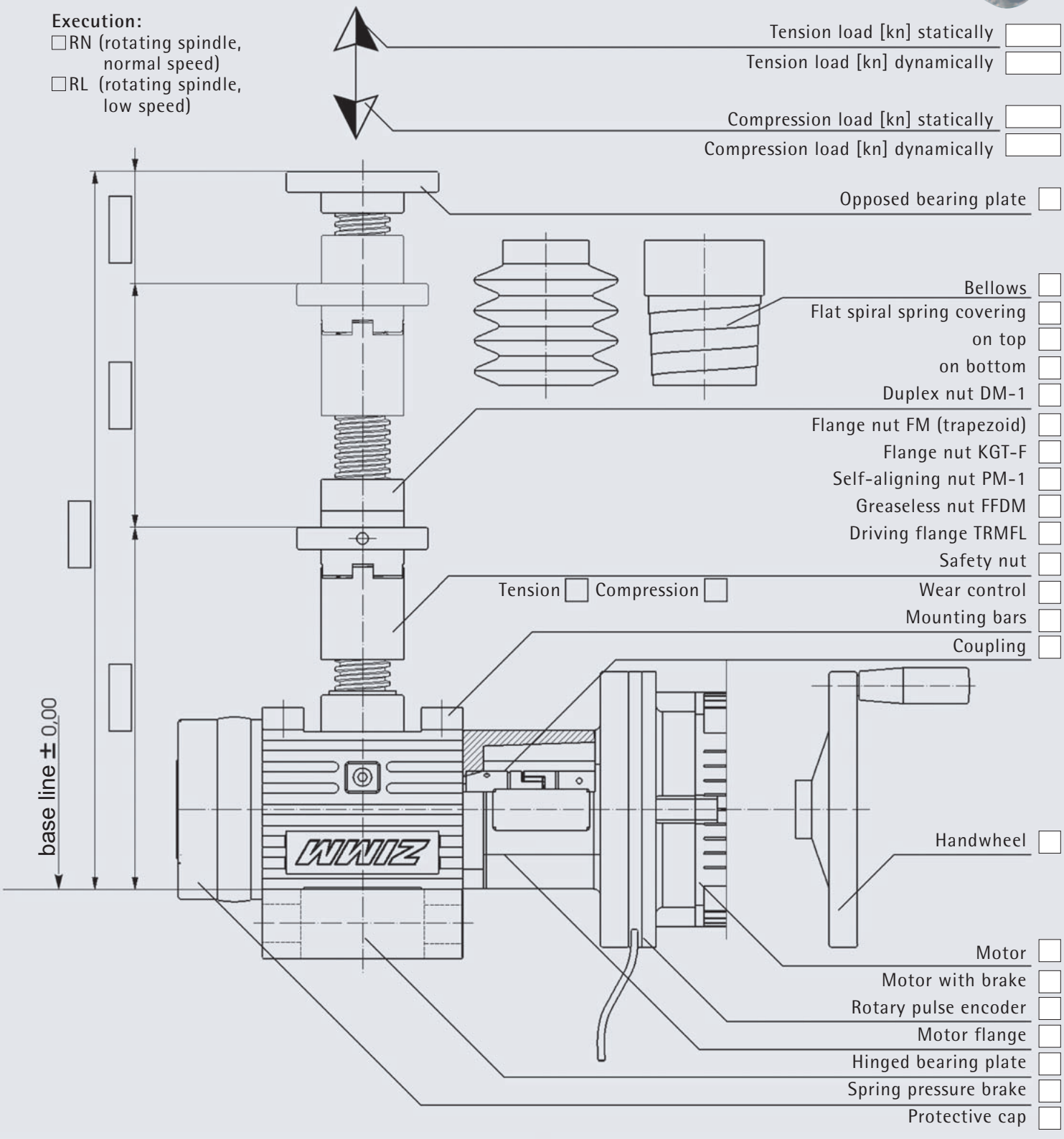
4.2 Checklist - Page 4 - Accessories R

(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 ☐

Tension ☐ Compression ☐ Wear control ☐

Mounting bars ☐

Coupling ☐

Handwheel ☐

Motor ☐

Motor with brake ☐

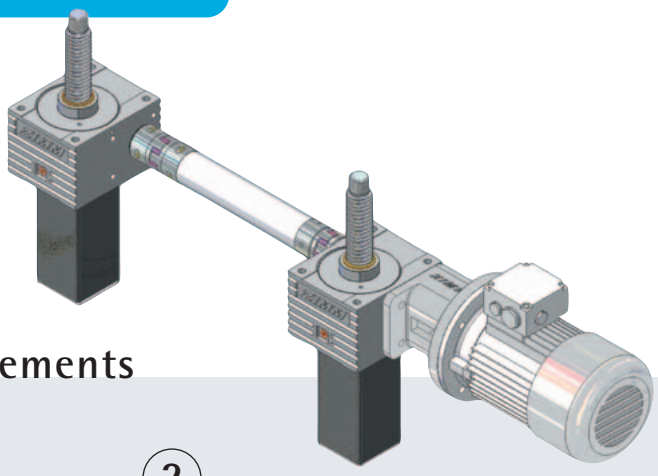
Rotary pulse encoder ☐

Motor flange ☐

Hinged bearing plate ☐

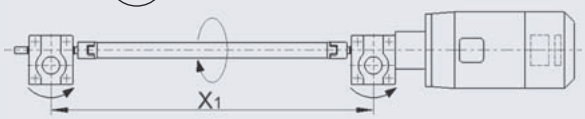
Spring pressure brake ☐

Protective cap ☐



4.2 Checklist - Page 5 - Standard Arrangements

1



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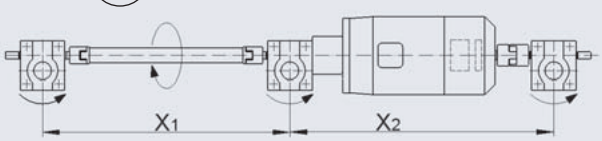

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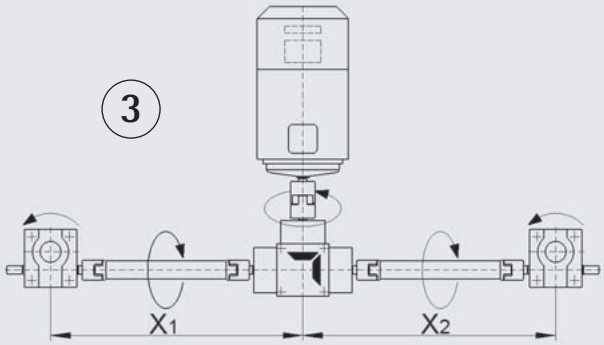
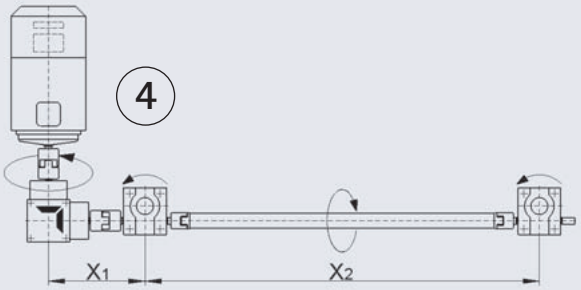


4



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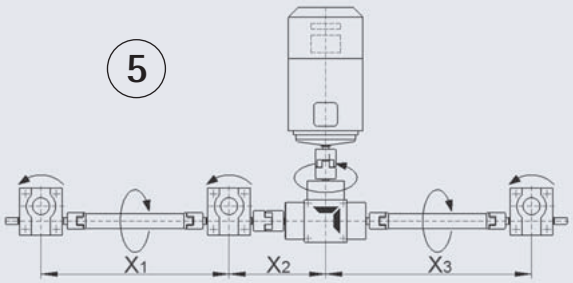

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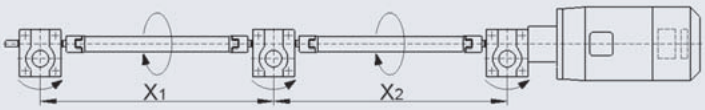

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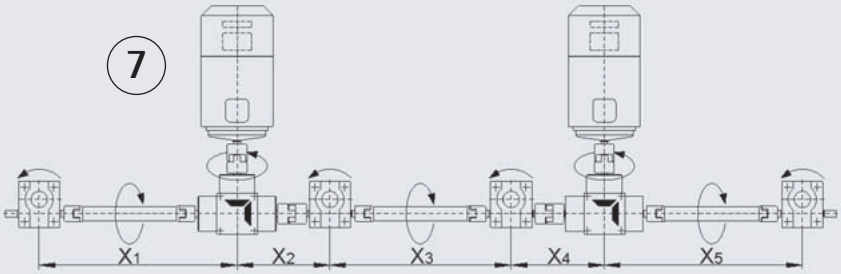

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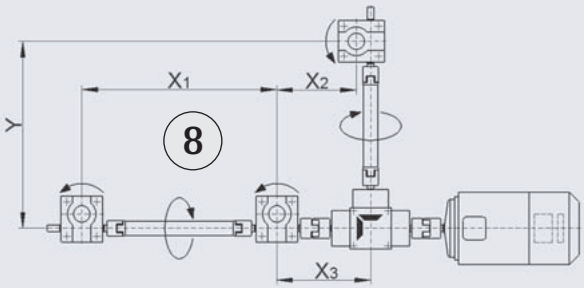

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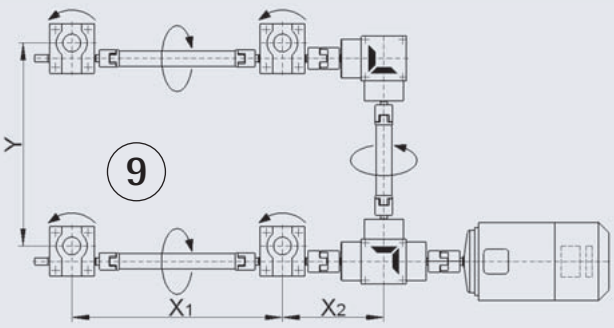

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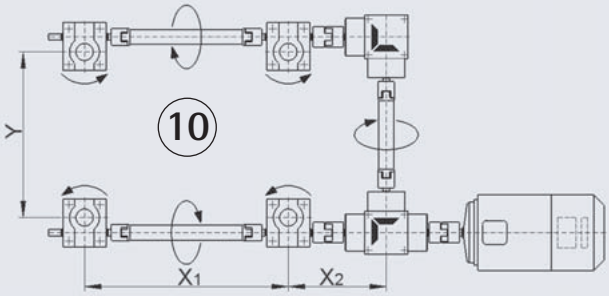
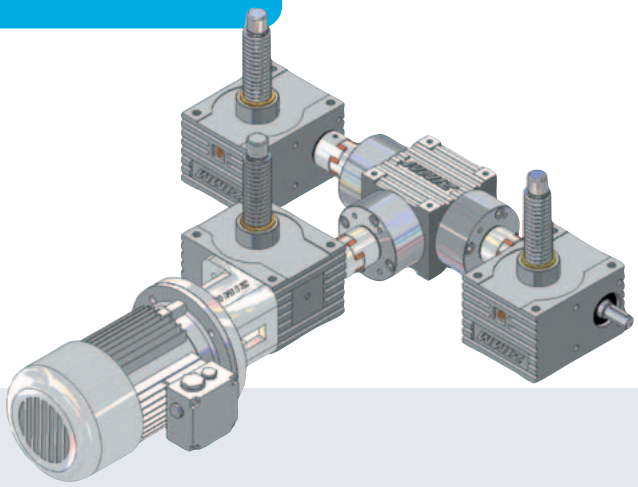
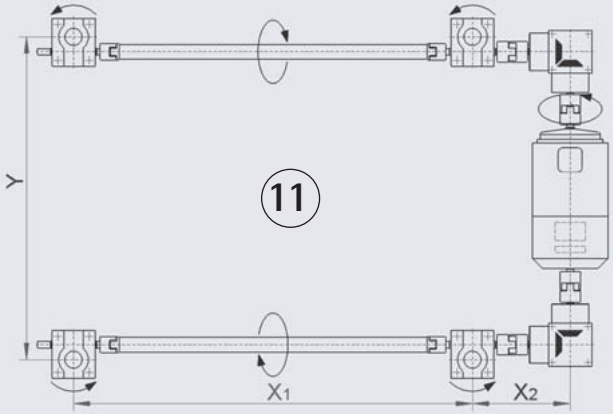
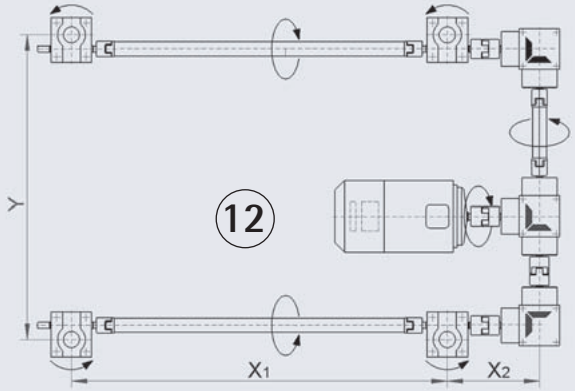
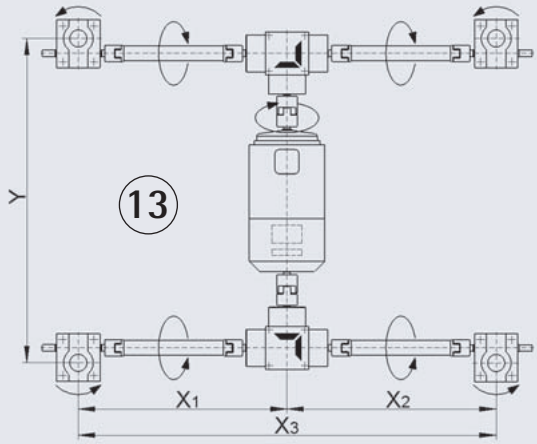


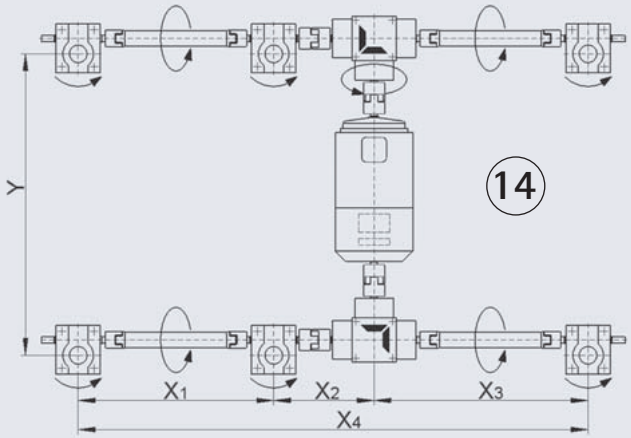


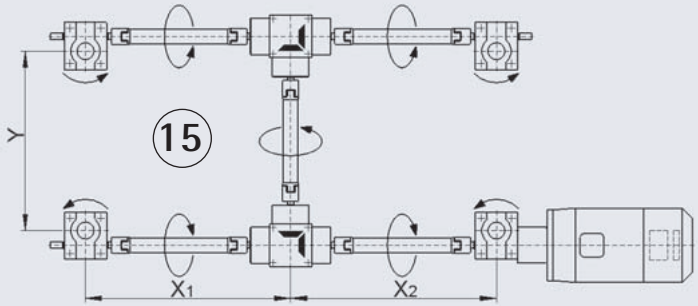
4.2 Checklist - Page 6 - Standard Arrangements

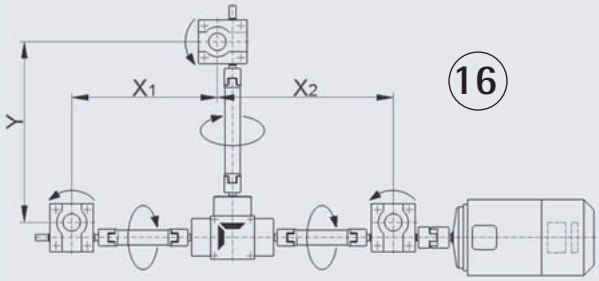


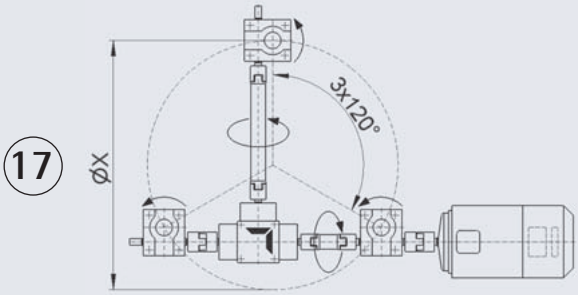






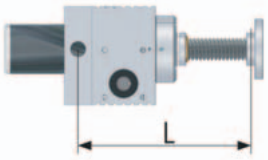






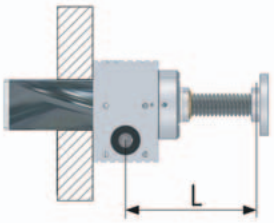
4.3 Critical Buckling Force of the Lifting Screw

$f_k = 1$



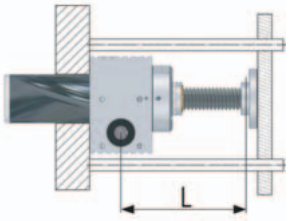
Version S
guided lifting motion with hinged plate

$f_k = 0{,}25$



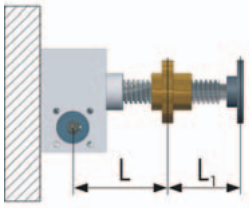
Version S
non guided lifting motion, gear firmly mounted

$f_k = 2$

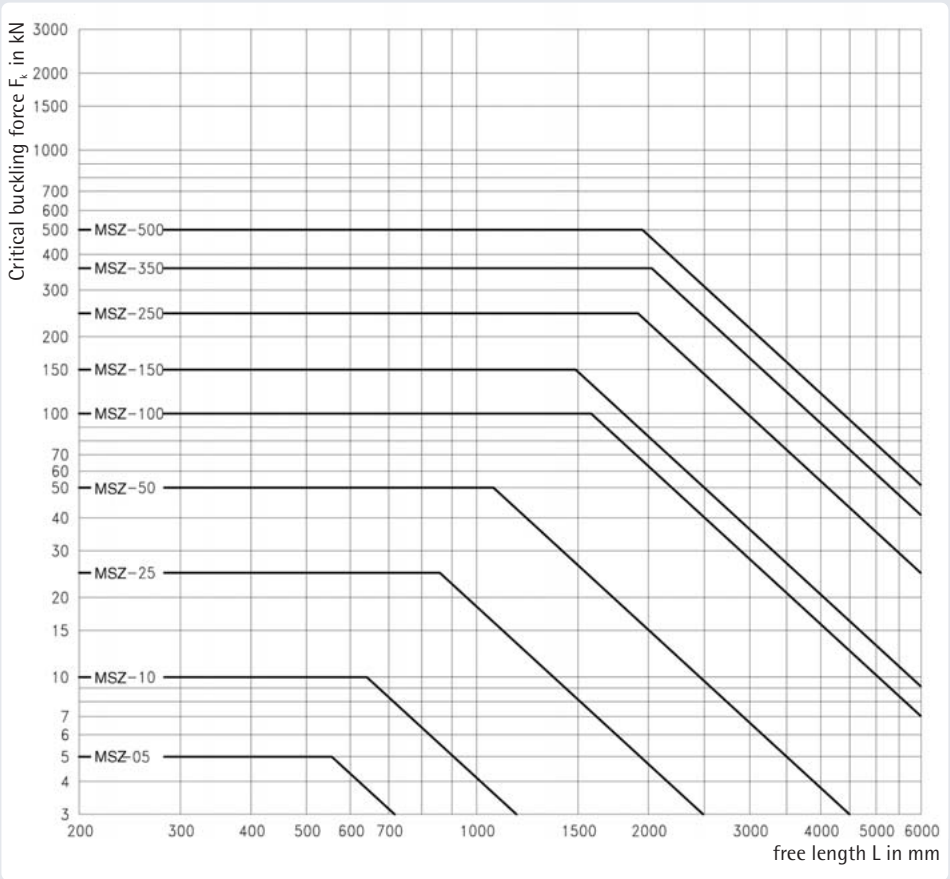


Version S
guided lifting motion, gear firmly mounted

$f_k = 4$



Version R
for a small L_1 there applies: $f_k = 2$
guided lifting motion



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

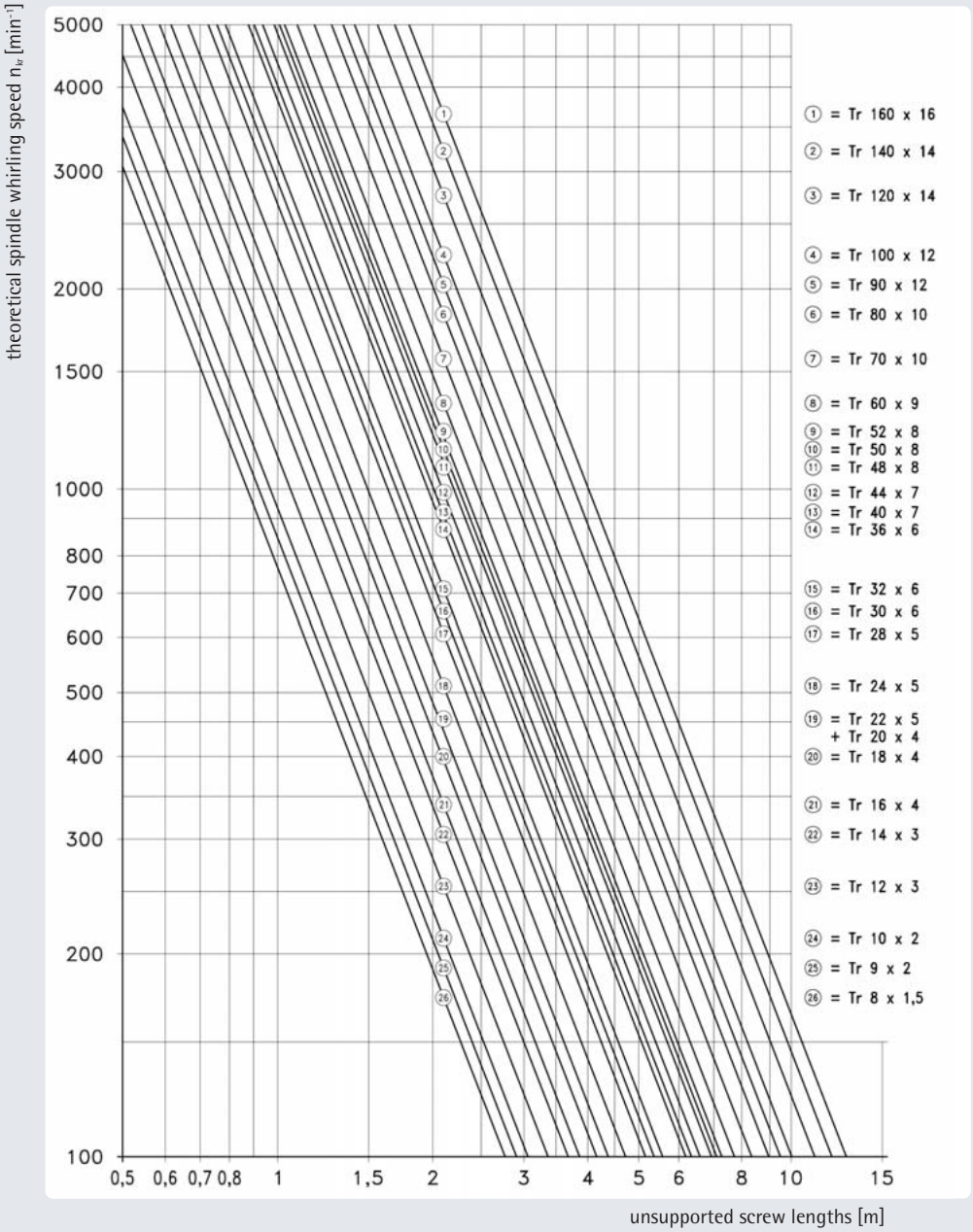
$$F_{all} = 0{,}8 \times F_k \times f_k$$

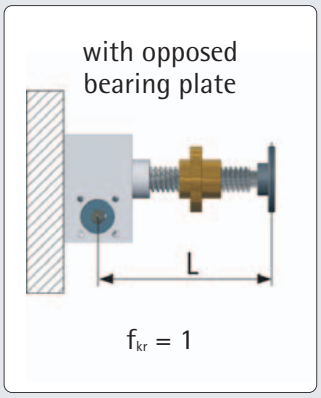
F_{all} maximum allowable axial load (kN)
F_k theoretical critical buckling force (kN) acc. to diagram
f_k correction value (considers kind of bearing support, respectively guidance of lifting load) see pictograms above

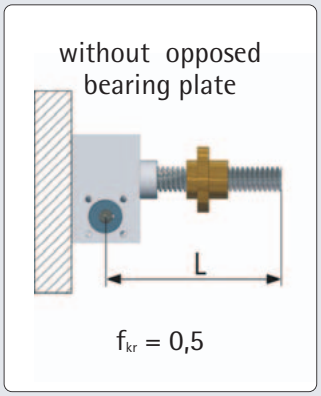
If the max calculated load is lower than required a larger spindle diameter could be selected. The calculations must then be reworked.
With the rotating screw version a larger diameter screw can be selected (from the next bigger gearbox size).
Any increase in pitch/ lifting speed must be taken into account.

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.

4.4 Critical Whirling Speed of Spindle - R Version







Maximum allowable spindle speed

$n_{all} = 0{,}8 \times n_{kr} \times f_{kr}$

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

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 lenghts 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.

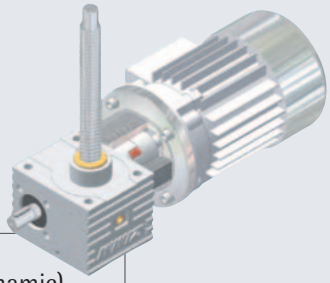
If the calculated max spindle speed is lower than that required, a larger spindle should be selected. The calculations must then be reworked.
If a larger diameter spindle is used in the R version the potential for higher drive torque's must be considered.

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.

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



Formula[1]:

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

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

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

Example:

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

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

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

Example: 0,975 kW · 1,4 = 1,365 kW ⟶ motor 1,5 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 $\eta_{Spindle}$ 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 $\eta_{Spindle}$ 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 **η=0,9** can be used.
It is essential to incorporate a break into a ballscrew system.

Efficiency of gearboxes $\eta_{Gearbox}$ (without spindle) at n = 1.500

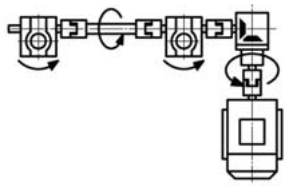
MSZ	2	5	10	25	50	100	150	250	350	500	650
N	0,82	0,84	0,86	0,87	0,89	0,85	0,84	0,86	0,87	0,84	0,85
L	0,77	0,62	0,69	0,69	0,74	0,65	0,67	0,72	0,70	0,62	0,65

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 **η=0,9**.

4.6 Drive Torque for Gearboxes



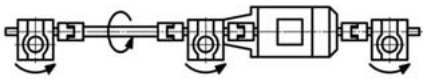
$M_R = M_G \times 2{,}25$

Calculation

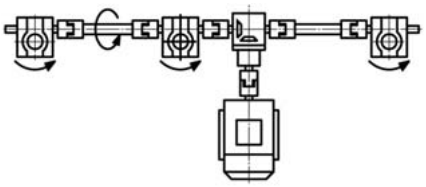
The required drive torque of a lifting gear results from the sum of the moments of the individual lifting units. This is increased due to frictional losses of transmission components like couplings, connecting shafts, bevel gears, etc.

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

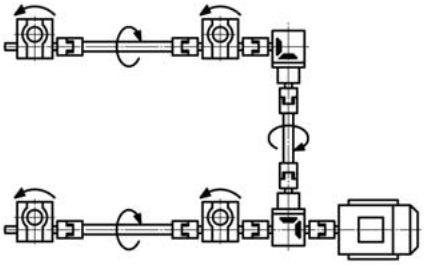
$M_R = M_G \times 2{,}1$



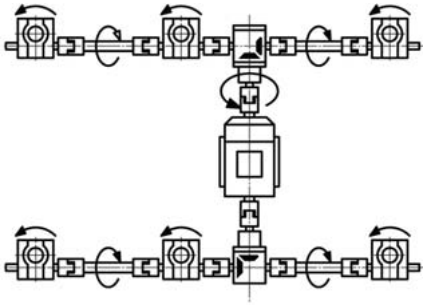
$M_R = M_G \times 3{,}1$



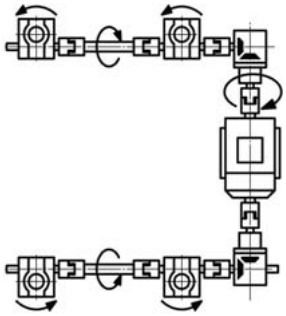
$M_R = M_G \times 3{,}35$



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



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

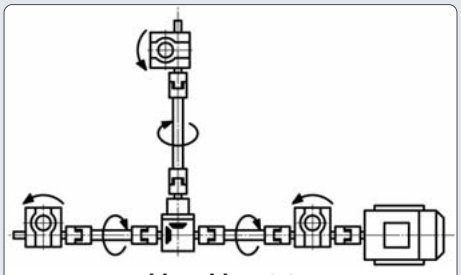


$M_R = M_G \times 4{,}4$

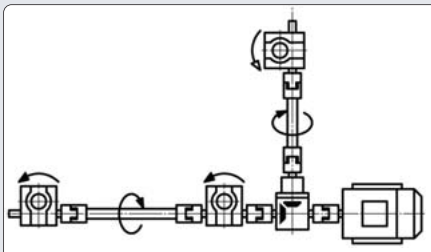
M_R – Total drive torque for the whole system

M_G - Input torque of a single gearbox

M_A – Starting torque max. 1,5 x M_R

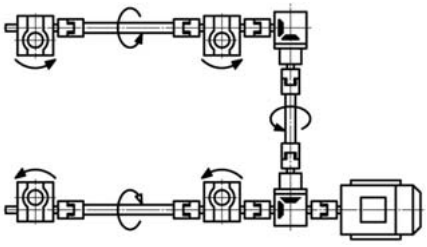


$M_R = M_G \times 3{,}34$



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

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



$M_R = M_G \times 4{,}6 = 6{,}21$ Nm x 4,6 = 28,57 Nm

→ x safety factor 1,3 = 37,14Nm

Attention:

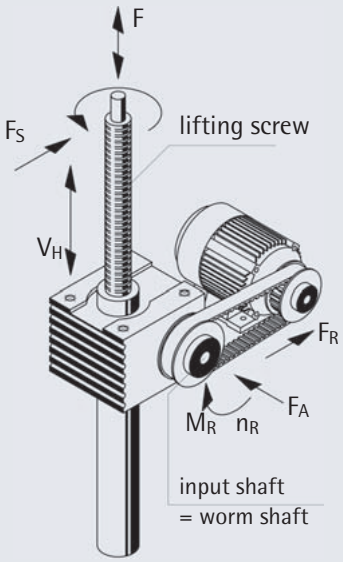
It is recommended to multiply the calculated value with a safety factor of 1.3 to 1.5 (for smaller systems factor up to 2). The indicated values are applicable in cases of uniform distribution of the lifting gear load onto all gears!

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 ajoining table for the maximum permissable 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 ajoining table.
Attention: only statically allowed!

maximum side force F_S [N] (static) — extended screw length in mm

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	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 thermical factors depending on operating time

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.

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

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:

250	+	180	+	43	+	44	=	517 mm
stroke		basic length		bellow (70-27=43)		limit switch + protection against rotation		spindle length

protective tube length SRO:

250	+	55	+	71	=	376
stroke		basic length		limit switch + protection against rotation		protective tube length

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:

250	+	145	+	60	+	55	+	50	=	560 mm
stroke		basic length		bellow gearbox-sided (70-10=60)		2. bellow (70-15=55)		duplex nut		spindle length

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

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 Tr basic length Anti-Backlash	-	192	216	276	362	384	467	522	626	676
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	30	35	40	40
Limit switch3) (+evtl. linear measuring syst.)	41	45	44	55	55	48	48	53	58	59
ES3) 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 2)
Bellows with bushing (GK / KGK)1)	ZD -2	ZD +1	ZD +5	ZD +10	ZD +8	ZD +2	ZD +2	ZD +2	ZD +2	ZD +2
Bellows without bushing (BF / SLK)1)	ZD -22	ZD -24	ZD -27	ZD -36	ZD -40	ZD -18	ZD -18	ZD -18	ZD -18	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

ZD-Measures: see capter 14.3.5

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 lenght.
(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

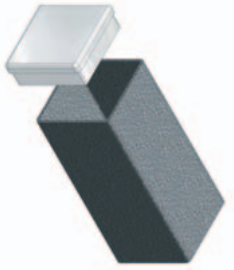
	MSZ-5	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650
Tr basic length 1)	48	50	55	64	75	87	92	102	112	112
KGT basic length 1)	16x05 60	25x05 60	32x05 65	40x05 74	50x10 95	63x10 95	-	-	-	-
	16x10 80	25x10 80	32x10 75	40x10 74	50x20 135		-	-	-	-
		25x25 150	32x20 105	40x20 104			-	-	-	-
		25x50 280	32x40 175	40x40 164			-	-	-	-
Escape prot./prot. ag. rotat. AS/VS	15	20	20	30	30	30	30	35	40	40
Limit switch ES3) (+ evtl. WMS) + VS	69	72	71	82	82	69	69	74	79	79
ES3) 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	46	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	37	32	27	27
min.stroke with ES3) + lubric. strip 2)	118	116	117	107	107	107	107	102	97	97

2) Is a lower stroke required as stated above, the limit swithces 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)



Spindle extension R version

	MSZ-05	MSZ-10	MSZ-25	MSZ-50	MSZ-100	MSZ-150	MSZ-250	MSZ-350	MSZ-500	MSZ-650
Tr basic length without machined end	93	106	120	163	212	251	279	311	352	387
Tr basic length with machined end (= standard for opposed bearing plate GLP)	108	126	145	193	257	306	354	411	472	507
Tr basic length larger diameter with machined end [1]	113	131	150	208	267	326	379	431	472	-
KGT basic length without machined end [2] (including nut)	16x05 145 16x10 178	25x05 158 25x10 191 25x25 241 25x50 394	32x05 185 32x10 209 32x20 250 32x40 285	40x05 230 40x10 244 40x20 283 40x40 348	50x10 327 50x20 367	63x10 379 63x20 449	80x10 407 80x20[3] 487 80x20[4] 502			
KGT basic length larger diameter without machined end [2] (including nut)	25x05 145 25x10 178 25x25 228 25x50 381	32x05 171 32x10 195 32x20 236 32x40 271	40x05 187 40x10 201 40x20 240 40x40 305	50x10 278 50x20 318	63x10 352 63x20 422	80x10 379 80x20[3] 459 80x20[4] 474				
KGT basic lenth with machined end [2] (including nut)	16x05 160 16x10 193	25x05 178 25x10 211 25x25 261 25x50 414	32x05 210 32x10 234 32x20 275 32x40 310	40x05 260 40x10 274 40x20 313 40x40 378	50x10 372 50x20 412	63x10 434 63x20 504	80x10 482 80x20[3] 562 80x20[4] 577			
KGT basic length larger diameter without machined end [2] (including nut)	25x05 165 25x10 198 25x25 248 25x50 401	32x05 196 32x10 220 32x20 261 32x40 296	40x05 217 40x10 231 40x20 270 40x40 335	50x10 323 50x20 363	63x10 407 63x20 477	80x10 454 80x20[3] 534 80x20[4] 549				
Flange nut FM	35	44	46	66	75					-
Duplex nut DM	45	45	50	70	90	115	140	160	180	220
Self-aligning nut PM	78	83	95	129	190	210	224	-	-	-
Greaseless nut FFDM	53	53	59	85	-	-	-	-	-	-
DM + Safety nut SIFA	70	84	95	133	173	211	249	266	303	-
PM + Safety nut SIFA	123	128	158	212	300	330	374	-	-	-
1. FB gearbox-nut [5]	ZD -12	ZD -12	ZD -10	ZD -12	ZD -12	ZD -18	ZD -18	ZD -18	ZD -18	ZD -18
2. FB nut-opposite bearing plate [5]	ZD -10	ZD -14	ZD -15	ZD -15	ZD -10	ZD -26	ZD -36	ZD -56	ZD -21	ZD -41
KAR[6] spindle-sided and1. bellow [5]	ZD +18	ZD +18	ZD +32	ZD +32	ZD +46	ZD +42	ZD +65	ZD +80	ZD +100	ZD +99

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)

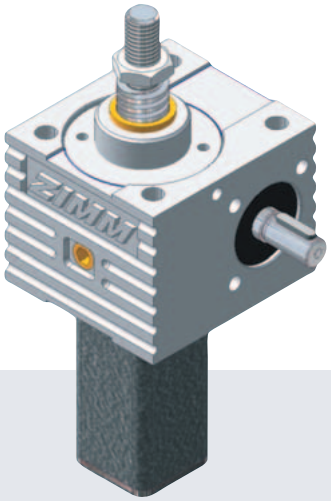
1) When using a larger diameter spindle also select the system components of the next bigger gearbox.
(MSZ-10 with larger diameter spindle has spindle Tr30x6, system components of MSZ-25 - therefore also calculational spindle extension of gearbox size 25).
2) The basic length of KGT spindles includes the length of the KGT nut and the safety distance according to ZIMM catalogue (see chapter 9.2, size L_3).
3) KGT nut with dynamic load rating 135kN and static load rating 322kN (80x20-4EP).
4) KGT nut with dynamic load 161,5kN and static load rating 398kN (80x20-5EP).
5) 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 lenght.
6) 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.

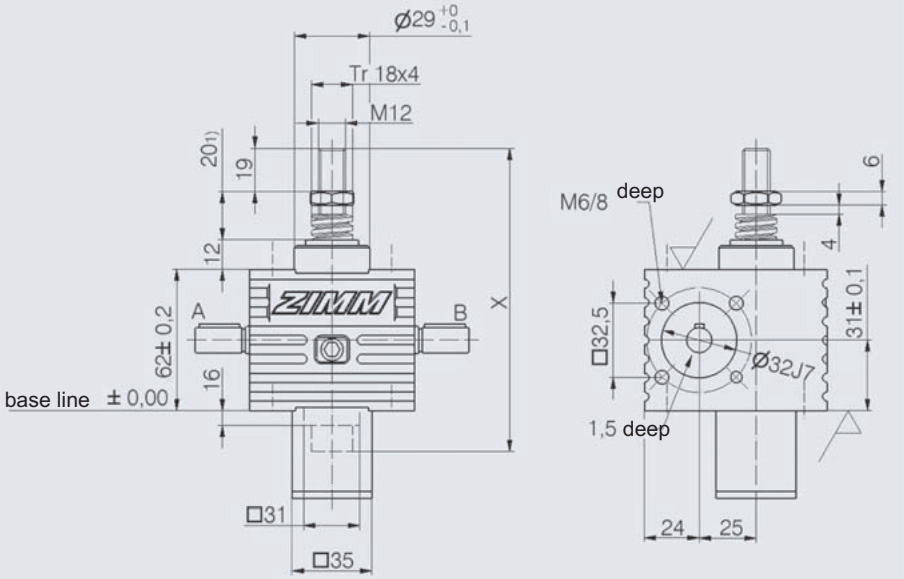
R

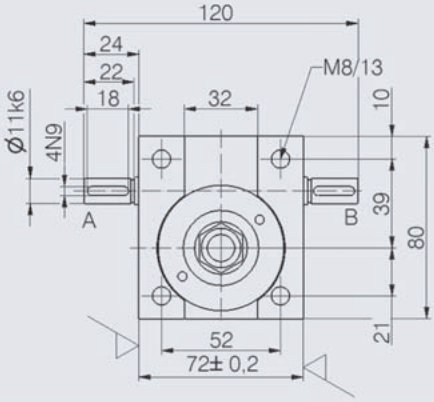
4.9 Order - Code MSZ

5kN



MSZ-5 Standing Screw S 5kN





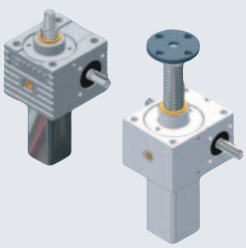
Basic Versions Tr

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

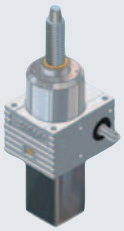
Basic model S
Heavy duty screw jack
grey cast housing



Aluminium housing

capter 7

Ball screw
KGT

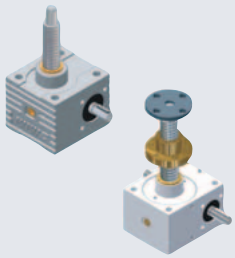


KGT 16 x 5
KGT 16 x 10

capter 9

Standard types R

Basic model R
Heavy duty screw jack
grey cast housing



Aluminium housing

capter 7

Safety nut
SIFA

wear control
of the nut

capter 8

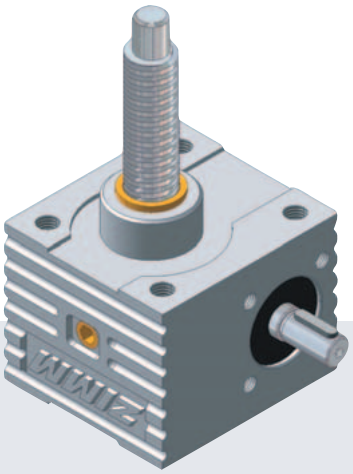
Ball Screw
KGT

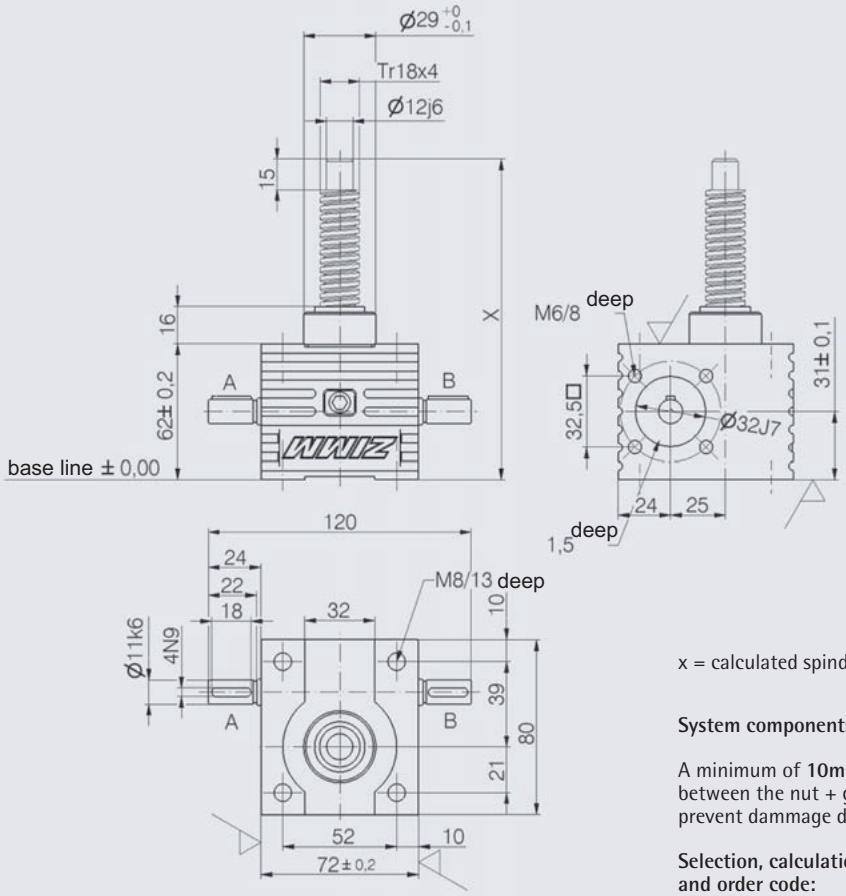
KGT 16 x 5
KGT 16 x 10

capter 9

5kN

MSZ-5 Rotating Screw R 5kN





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 dammage due to possible overun.

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

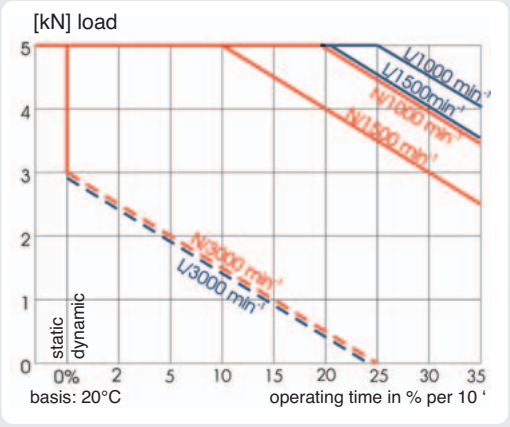
Technical data S and R

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

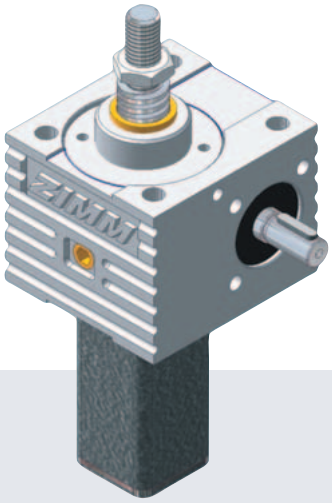


N = Normal speed
L = Low speed

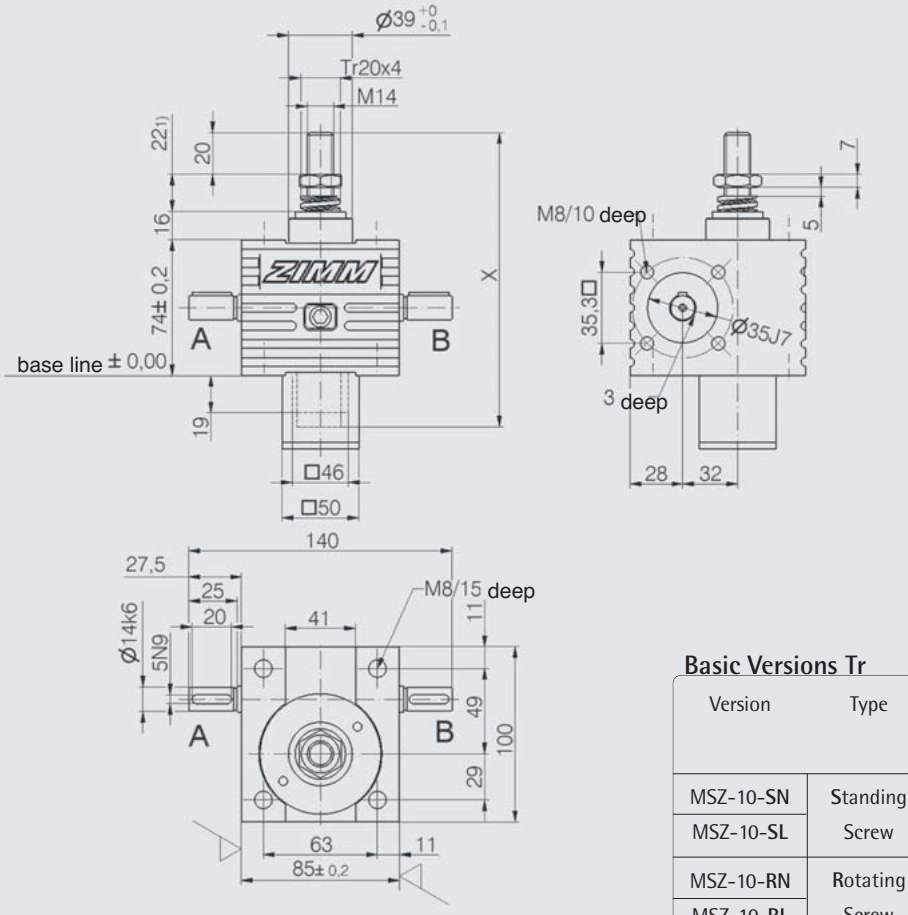
This diagram indicates the maximum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

10kN



MSZ-10 Standing Screw S 10kN

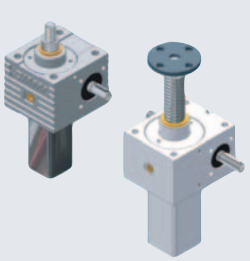
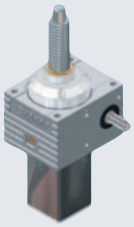
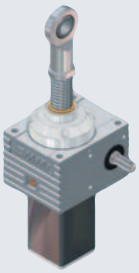


Basic Versions Tr

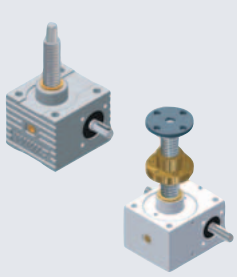
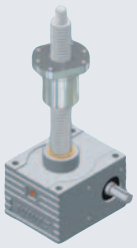
Version	Type	Speed	Standard Screw[2)]	i	Stroke per revolution[5)]
MSZ-10-SN	Standing Screw	Normal	Tr 20x4	4:1	1,00 mm
MSZ-10-SL		Low		16:1	0,25 mm
MSZ-10-RN	Rotating Screw	Normal	Tr 20x4	4:1	1,00 mm
MSZ-10-RL		Low		16:1	0,25 mm

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

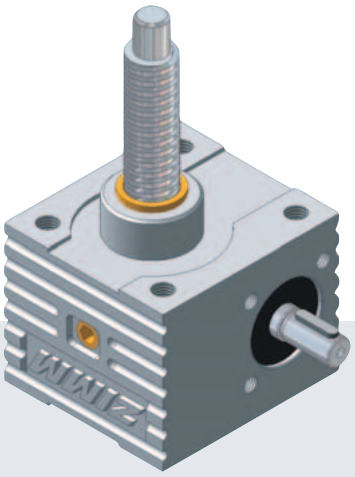
Standard Types S

Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT	Anti-Backlash AB
			
GG-housing / Aluminium housing	rotation control and wear control of the nut	KGT 25 x 5 KGT 25 x 10 KGT 25 x 25 KGT 25 x 50	adjustable anti-backlash
this page / *capter 7*	*capter 8*	*capter 9*	*capter 10*

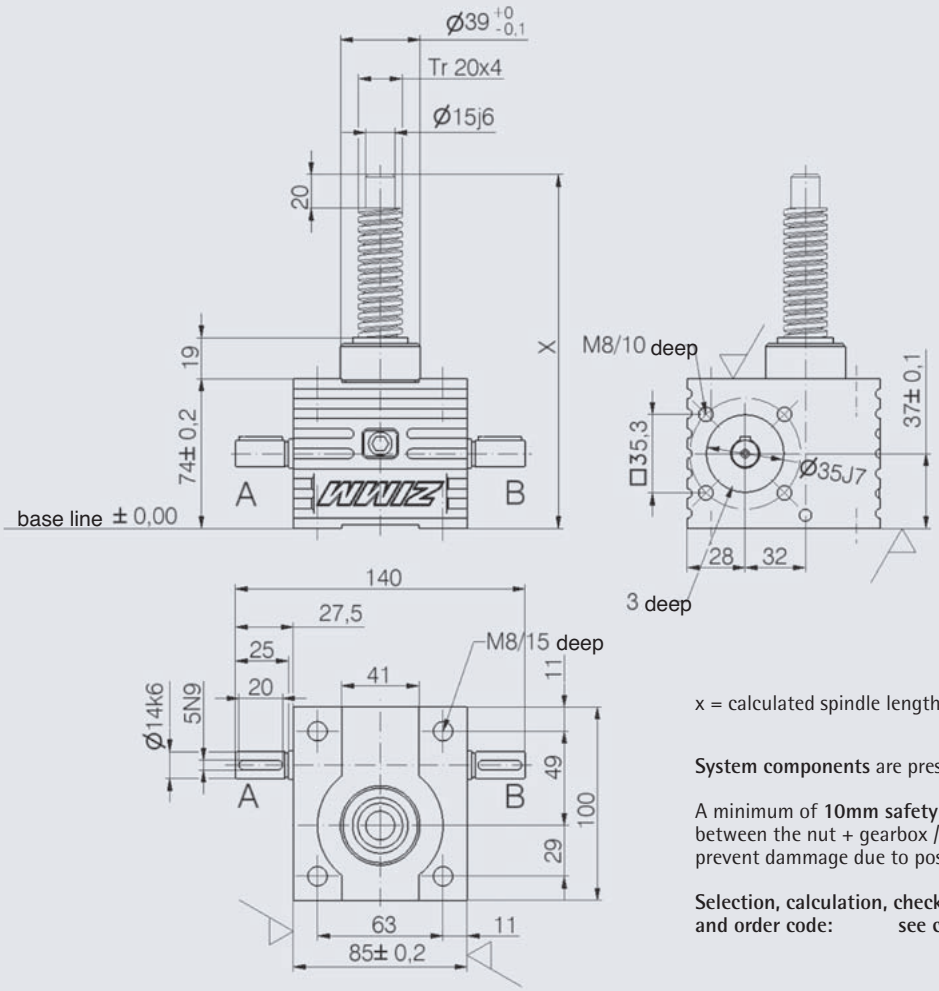
Standard Types R

Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT
		
GG-housing / Aluminium housing	wear control of the nut	KGT 25 x 5 KGT 25 x 10 KGT 25 x 25 KGT 25 x 50
this page / *capter 7*	capter 8	capter 9

10kN



MSZ-10 Rotating Screw R 10kN



x = calculated spindle length (chapter 4.8) + 8 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 dammage due to possible overun.

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

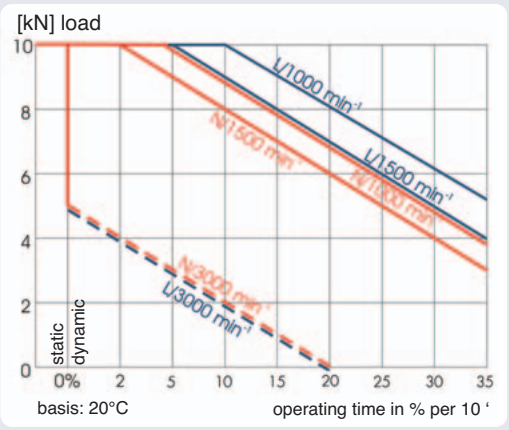
Technical data S and R

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

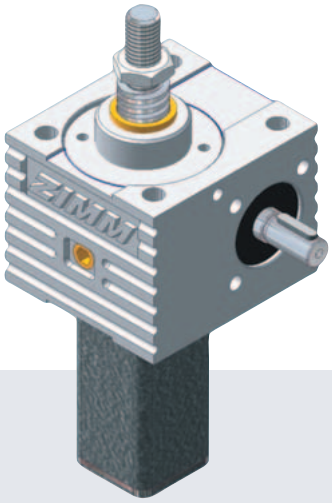


N = Normal speed
L = Low speed

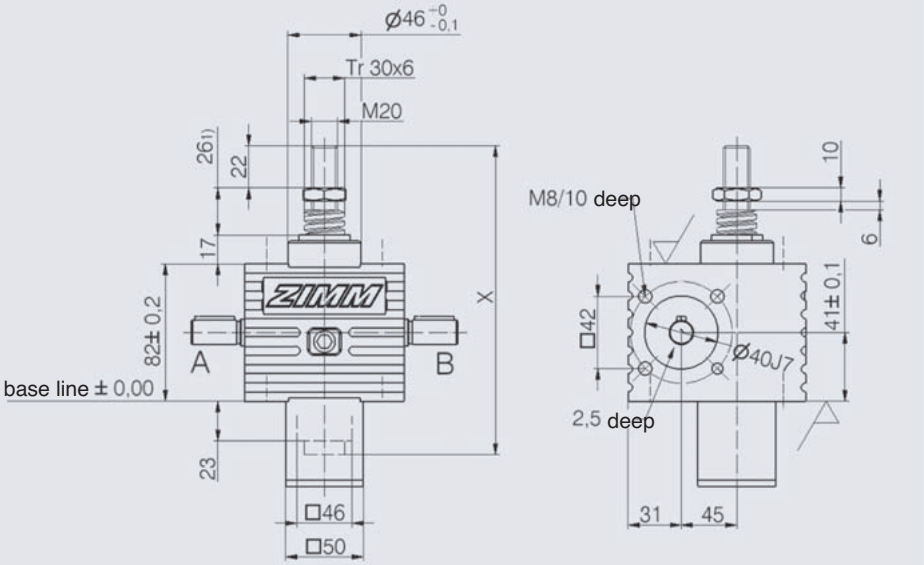
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

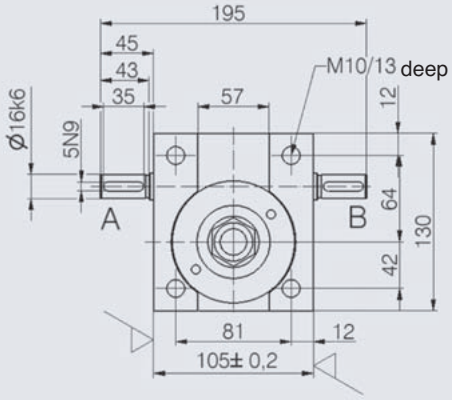
The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.

25kN



MSZ-25 Standing Screw S 25kN



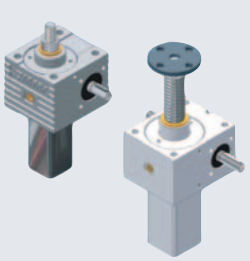
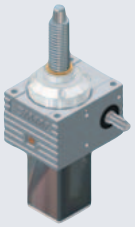
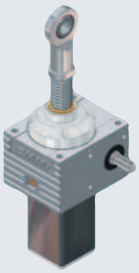


Basic Versions Tr

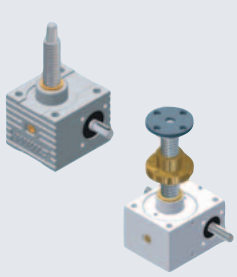
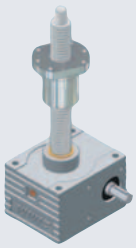
Version	Type	Speed	Standard Screw[2)]	i	Stroke per revolution[5)]
MSZ-25-SN	Standing Screw	Normal	Tr 30x6	6:1	1,00 mm
MSZ-25-SL		Low		24:1	0,25 mm
MSZ-25-RN	Rotating Screw	Normal	Tr 30x6	6:1	1,00 mm
MSZ-25-RL		Low		24:1	0,25 mm

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

Standard Types S

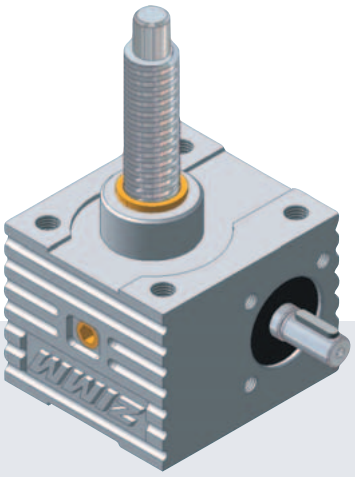
Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT	Anti-Backlash AB
			
Aluminium housing	rotation control and wear control of the nut	KGT 32 x 5 KGT 32 x 10 KGT 32 x 20 KGT 32 x 40	adjustable anti-backlash
capter 7	*capter 8*	*capter 9*	*capter 10*

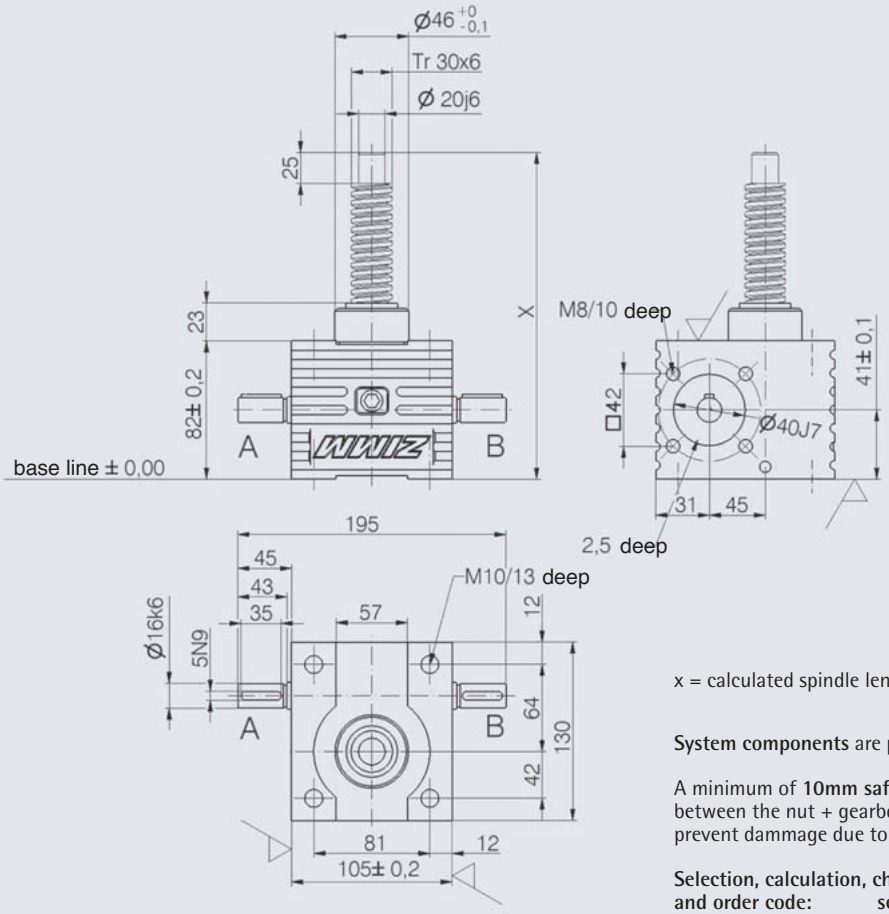
Standard Types R

Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT
		
Aluminium housing	wear control of the nut	KGT 32 x 5 KGT 32 x 10 KGT 32 x 20 KGT 32 x 40
caper 7	*capter 8*	*capter 9*

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 dammage due to possible overun.

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

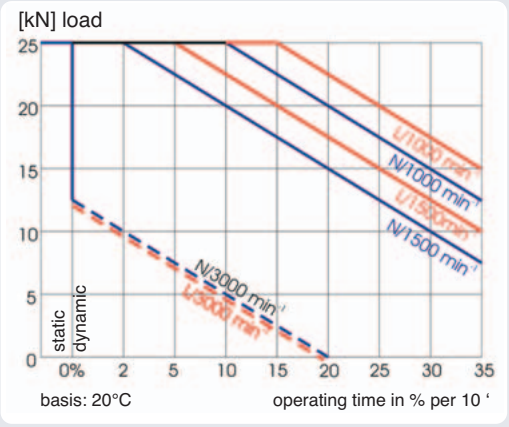
Technical data S and R

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

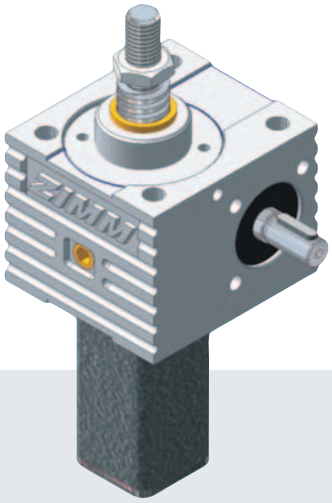


N = Normal speed
L = Low speed

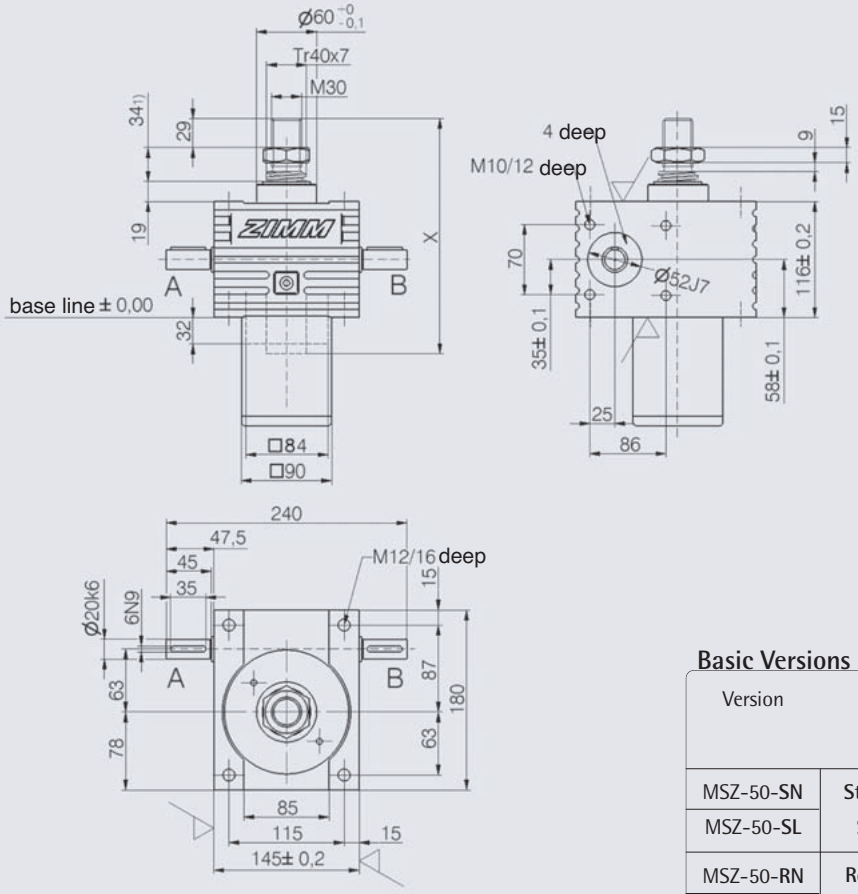
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

50kN



MSZ-50 Standing Screw S 50kN

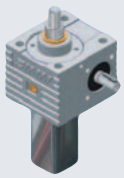
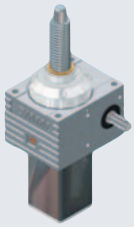
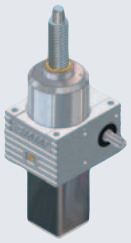
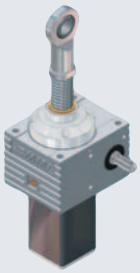


Basic Versions Tr

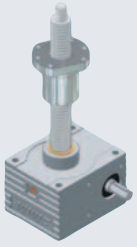
Version	Type	Speed	Standard Screw[2)]	i	Stroke per revolution[5)]
MSZ-50-SN	Standing Screw	Normal	Tr 40x7	7:1	1,00 mm
MSZ-50-SL		Low		28:1	0,25 mm
MSZ-50-RN	Rotating Screw	Normal	Tr 40x7	7:1	1,00 mm
MSZ-50-RL		Low		28:1	0,25 mm

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

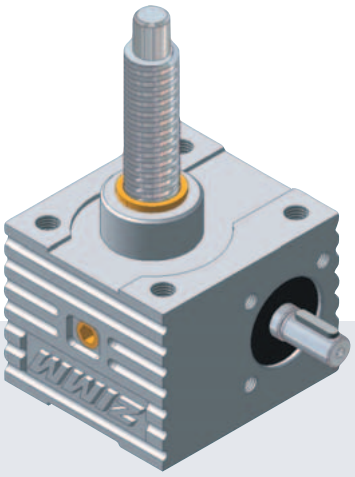
Standard Types S

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
	capter 8	*capter 9*	*capter 10*

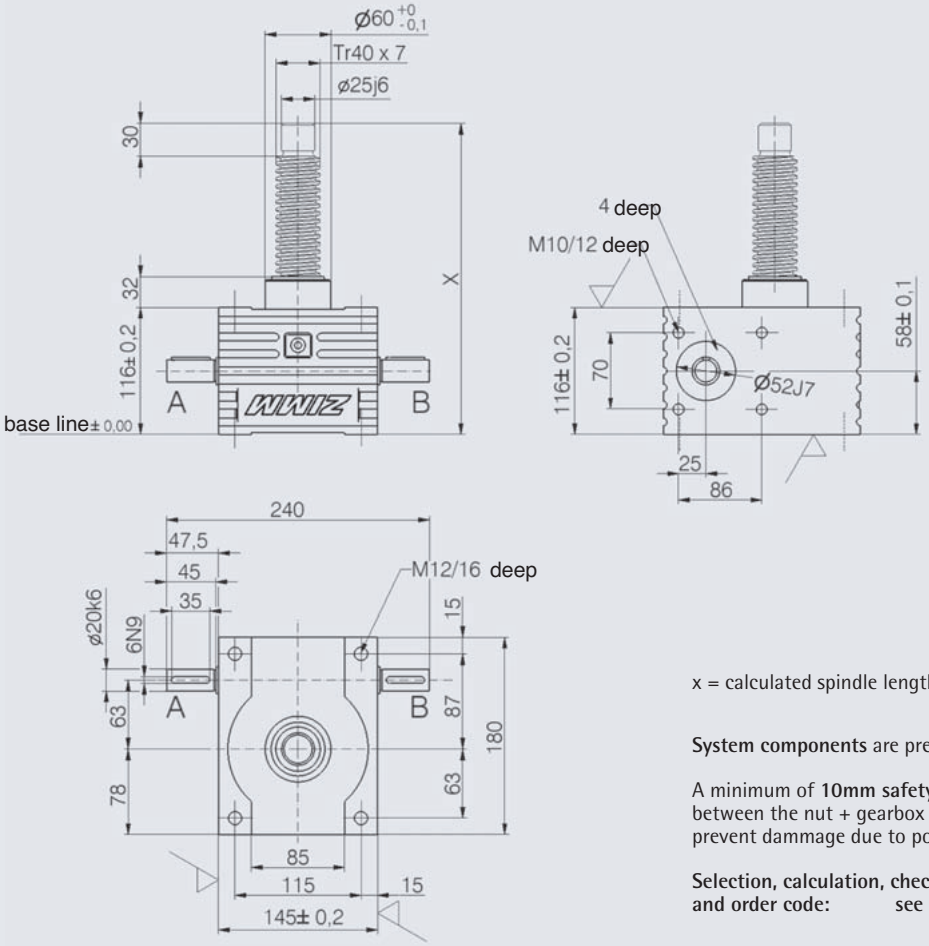
Standard Types R

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
	capter 8	*capter 9*

50kN



MSZ-50 Rotating Screw R 50kN



x = calculated spindle length (chapter 4.8) + 6 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 dammage due to possible overun.

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

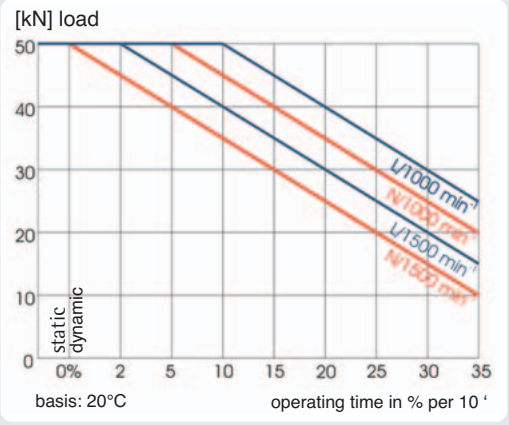
Technical data S and R

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 [kN] x 0,68[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]	-	0,76 (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

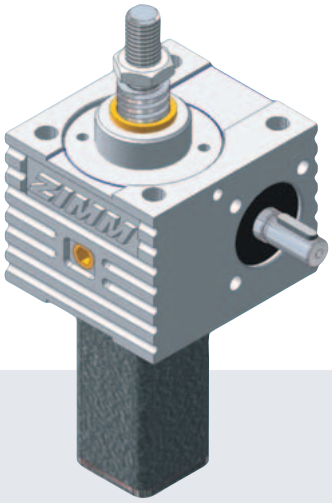


N = Normal speed
L = Low speed

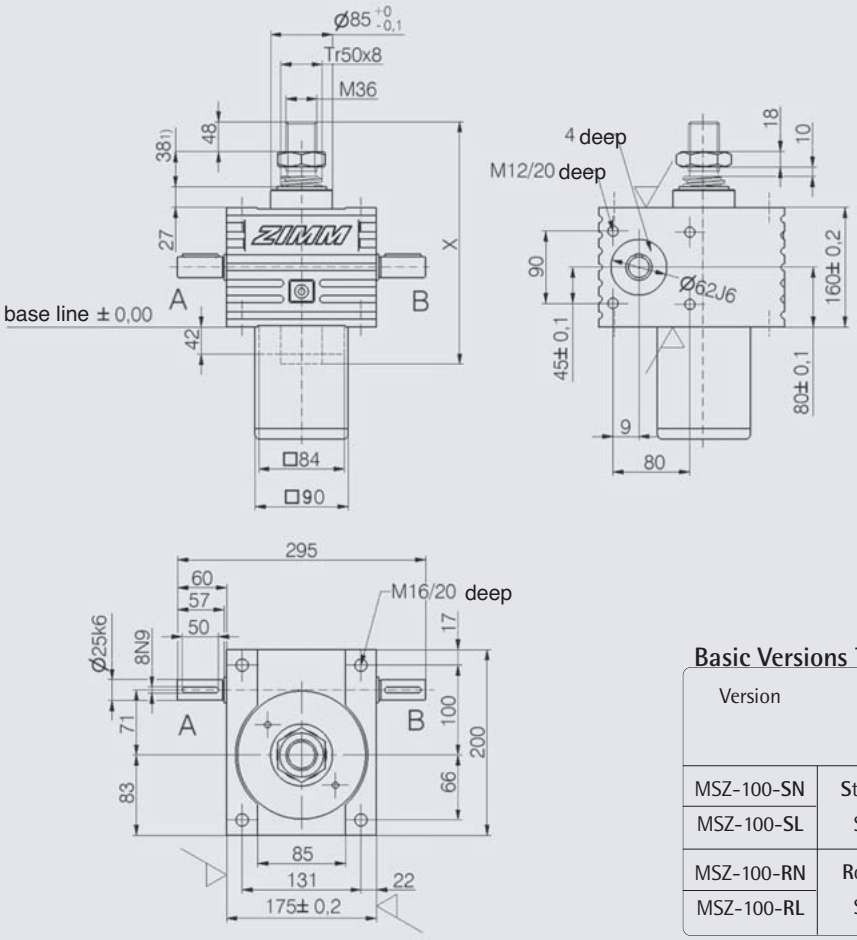
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

100kN



MSZ-100 Standing Screw S 100kN

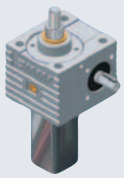
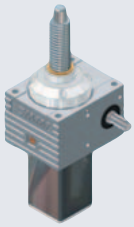
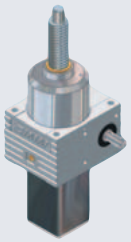
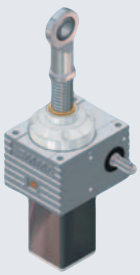


Basic Versions Tr

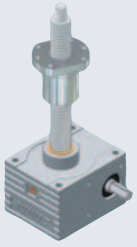
Version	Type	Speed	Standard Screw[2]	i	Stroke per revolution[5]
MSZ-100-SN	Standing Screw	Normal	Tr 50x8	8:1	1,00 mm
MSZ-100-SL		Low		32:1	0,25 mm
MSZ-100-RN	Rotating Screw	Normal	Tr 50x8	8:1	1,00 mm
MSZ-100-RL		Low		32:1	0,25 mm

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

Standard Types S

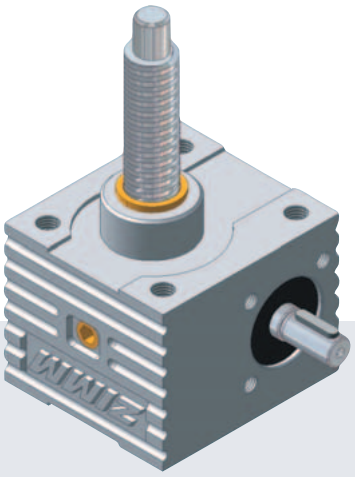
Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT	Anti-Backlash AB
			
	rotation control and wear control of the nut *capter 8*	KGT 50 x 10 KGT 50 x 20 *capter 9*	adjustable anti-backlash *capter 10*

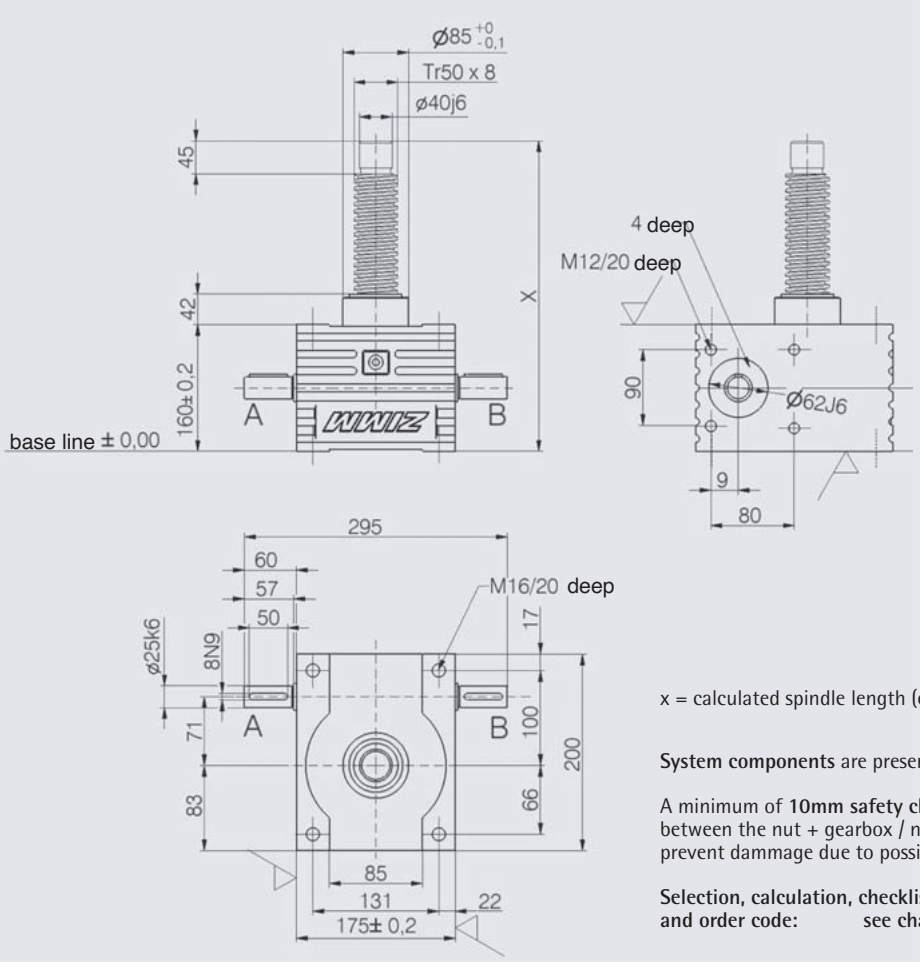
Standard Types R

Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA	Ball screw KGT
		
	wear control of the nut *capter 8*	KGT 50 x 10 KGT 50 x 20 *capter 9*

100kN

MSZ-100 Rotating Screw R 100kN





x = calculated spindle length (chapter 4.8) + 10 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 dammage due to possible overun.

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

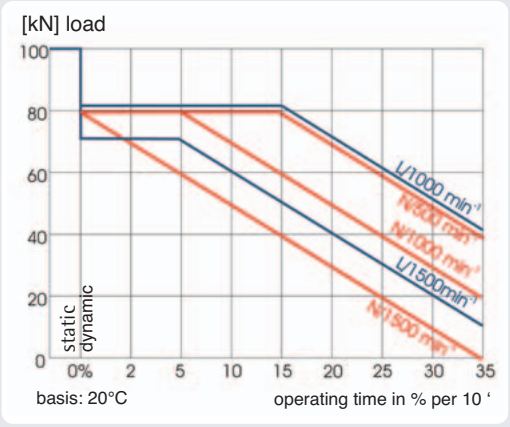
Technical data S and R

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

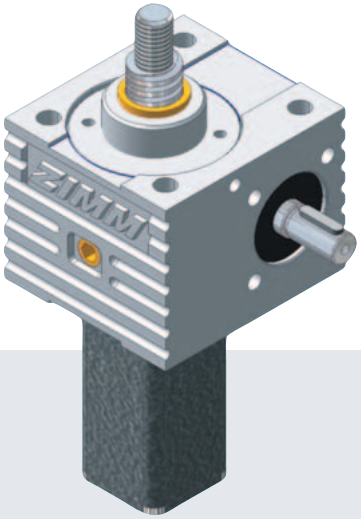


N = Normal speed
L = Low speed

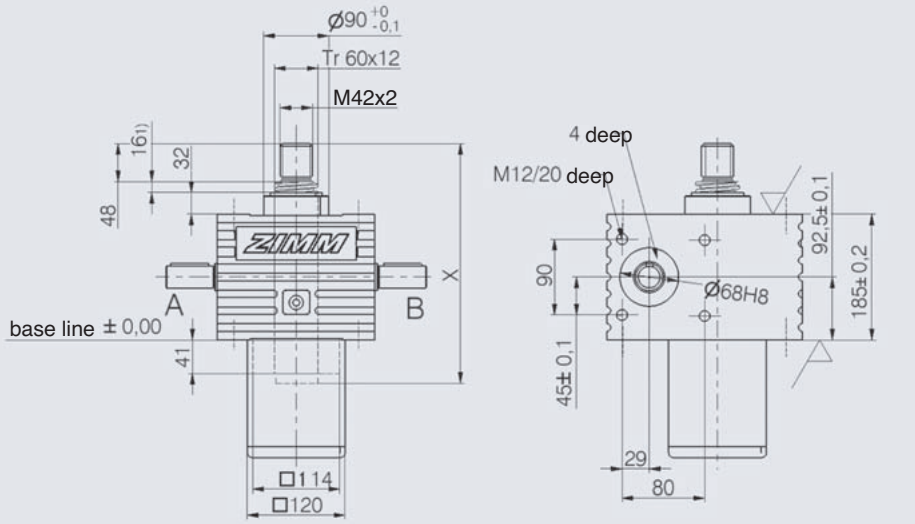
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

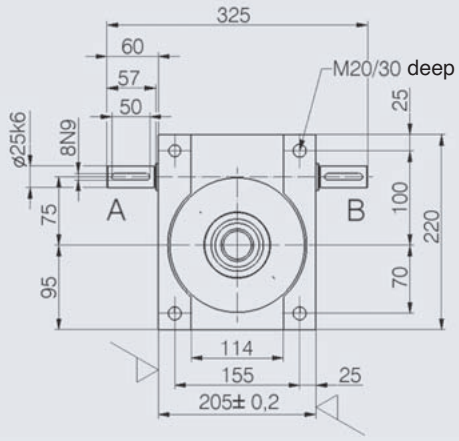
The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.

150kN



MSZ-150 Standing Screw S 150kN



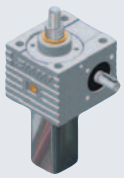
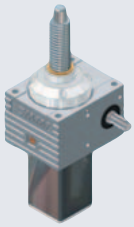
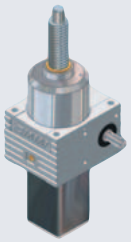
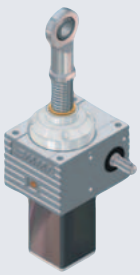


Basic Versions Tr

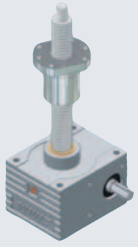
Version	Type	Speed	Standard Screw[2)]	i	Stroke per revolution[5)]
MSZ-150-SN	Standing Screw	Normal	Tr 60x12	9:1	1,33 mm
MSZ-150-SL		Low		36:1	0,33 mm
MSZ-150-RN	Rotating Screw	Normal	Tr 60x12	9:1	1,33 mm
MSZ-150-RL		Low		36:1	0,33 mm

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

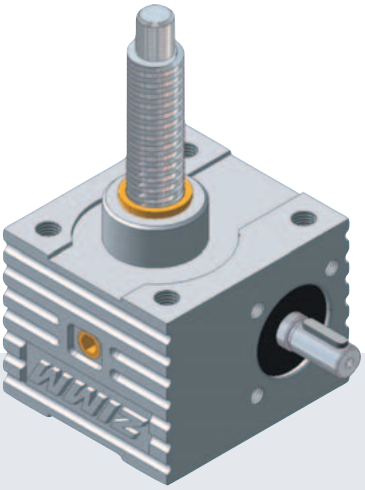
Standard Types S

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
	capter 8	*capter 9*	*capter 10*

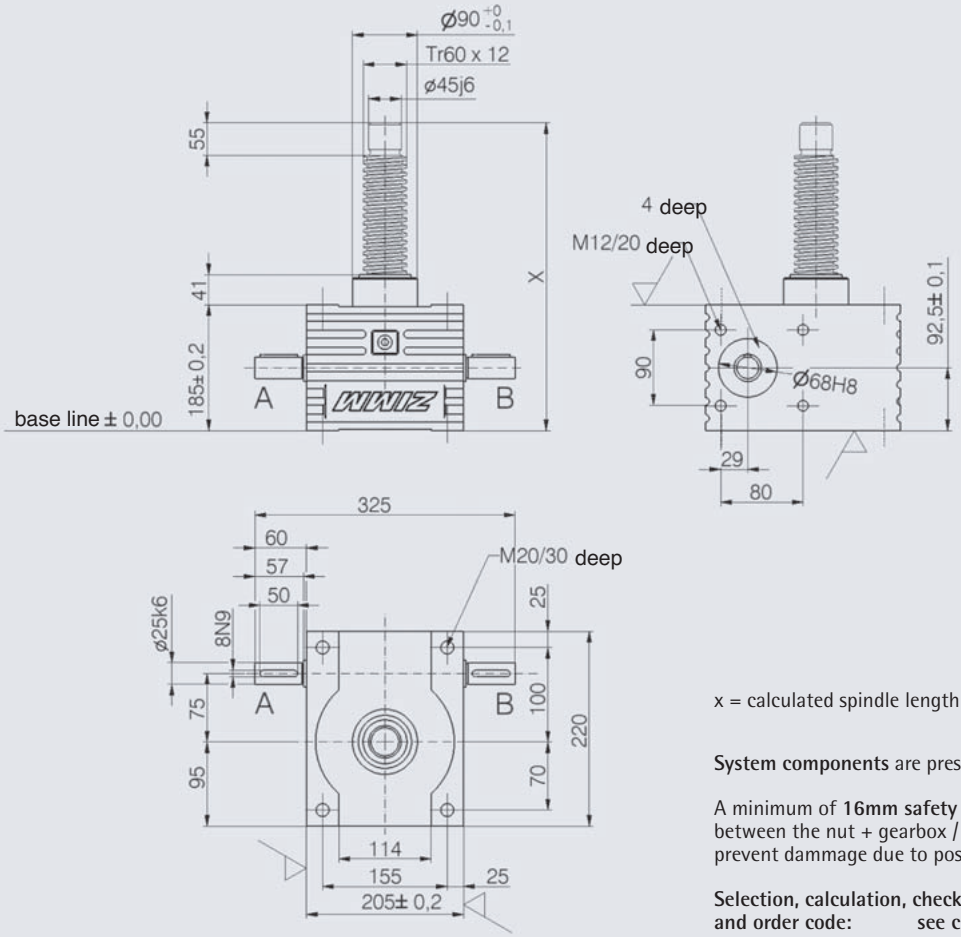
Standard Types R

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
	capter 8	*capter 9*

150kN



MSZ-150 Rotating Screw R 150kN



x = calculated spindle length (chapter 4.8) + 8 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 dammage due to possible overun.

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

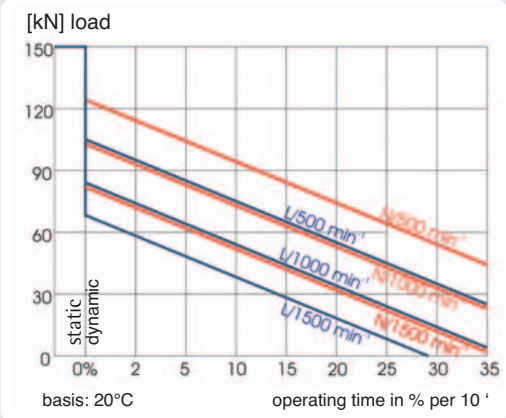
Technical data S and R

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

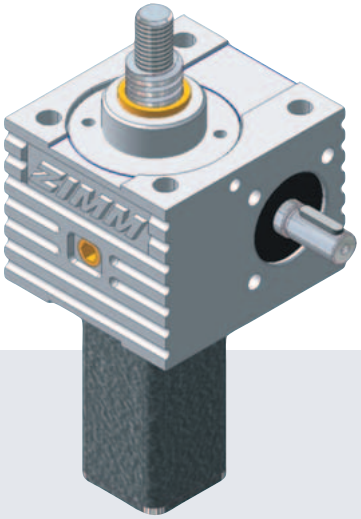


N = Normal speed
L = Low speed

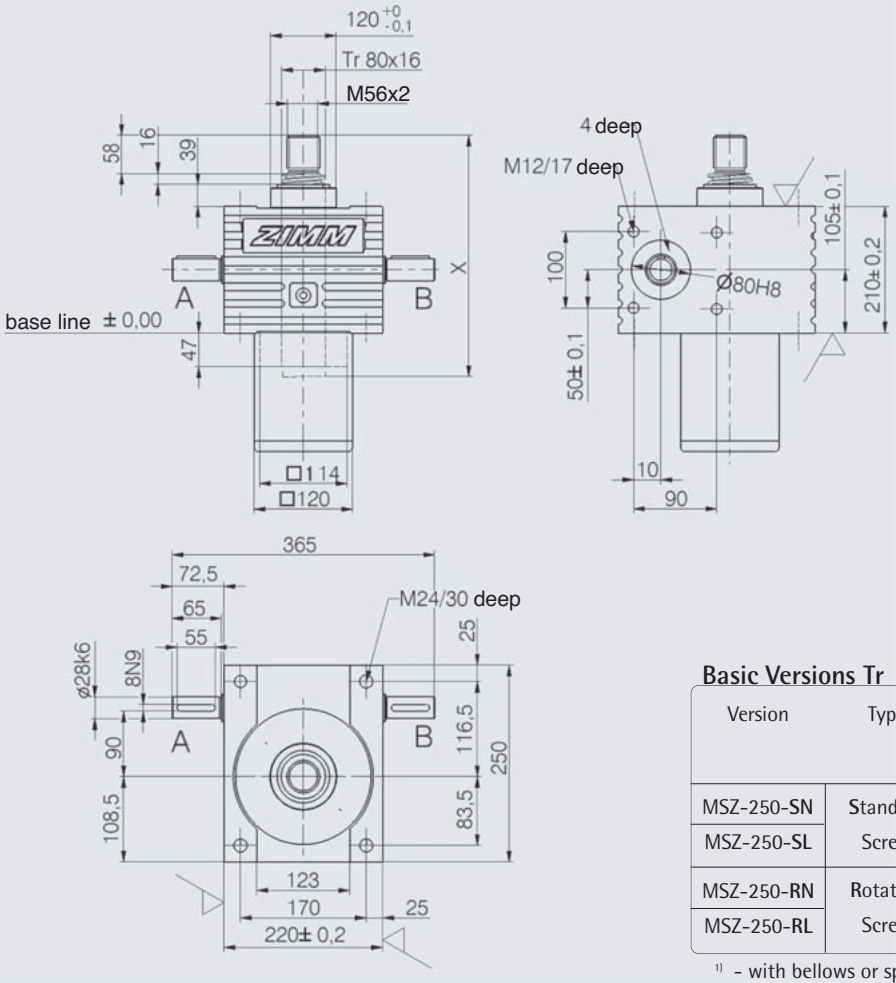
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

250kN



MSZ-250 Standing Screw S 250kN

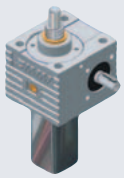
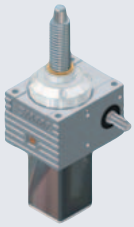
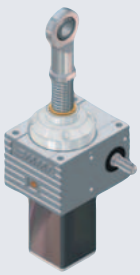


Basic Versions Tr

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

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

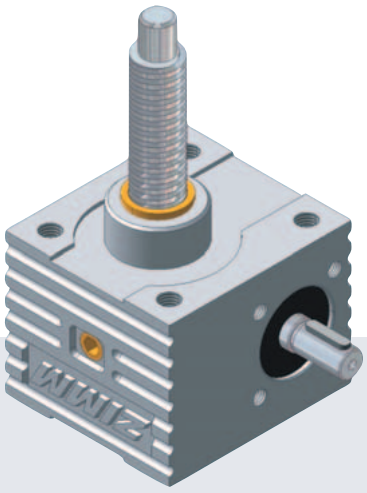
Standard Types S

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
	capter 8	*capter 10*

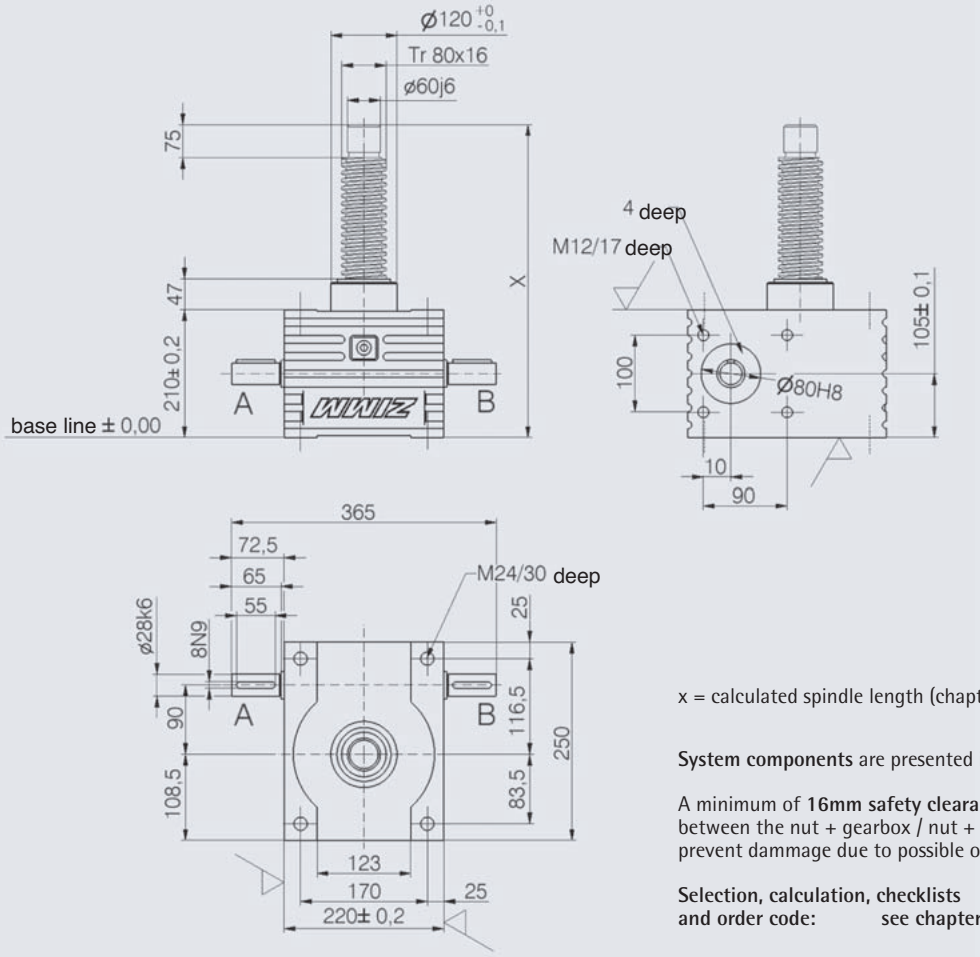
Standard Types R

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
	capter 8	*capter 9*

250kN



MSZ-250 Rotating Screw R 250kN



x = calculated spindle length (chapter 4.8) + 10 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 dammage due to possible overun.

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

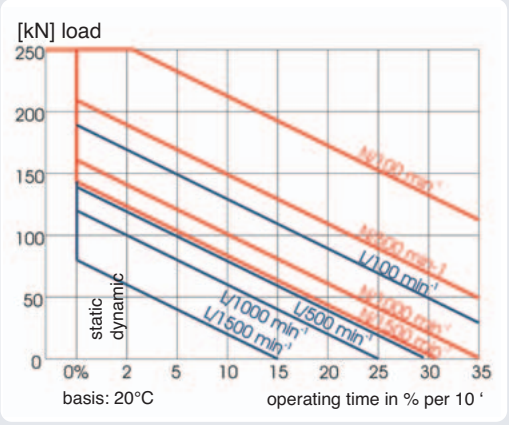
Technical data S and R

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

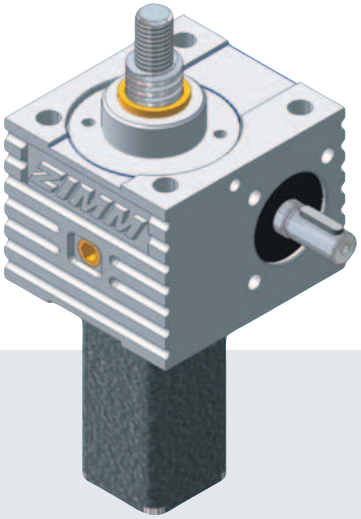


N = Normal speed
L = Low speed

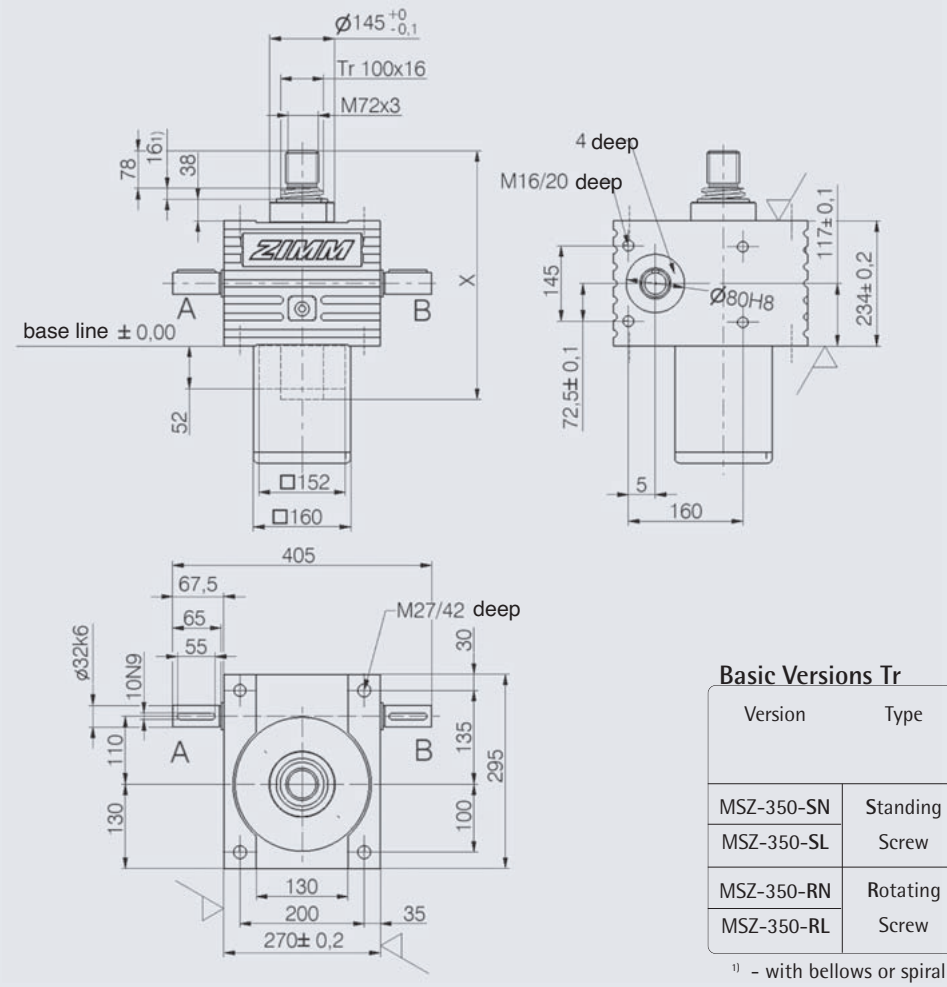
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

350kN



MSZ-350 Standing Screw S 350kN

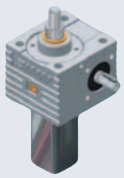
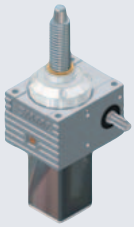
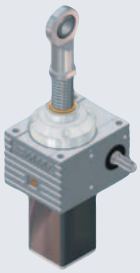


Basic Versions Tr

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

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

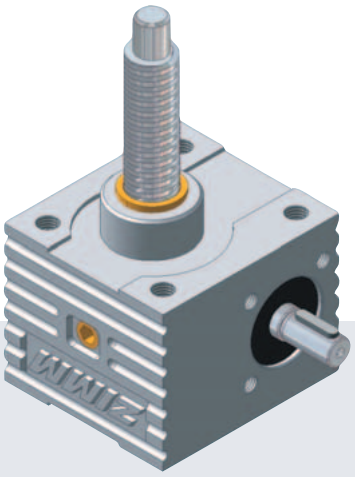
Standard Types S

Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Anti-Backlash AB
		
	rotation control and wear control of the nut *capter 8*	adjustable anti-backlash *capter 10*

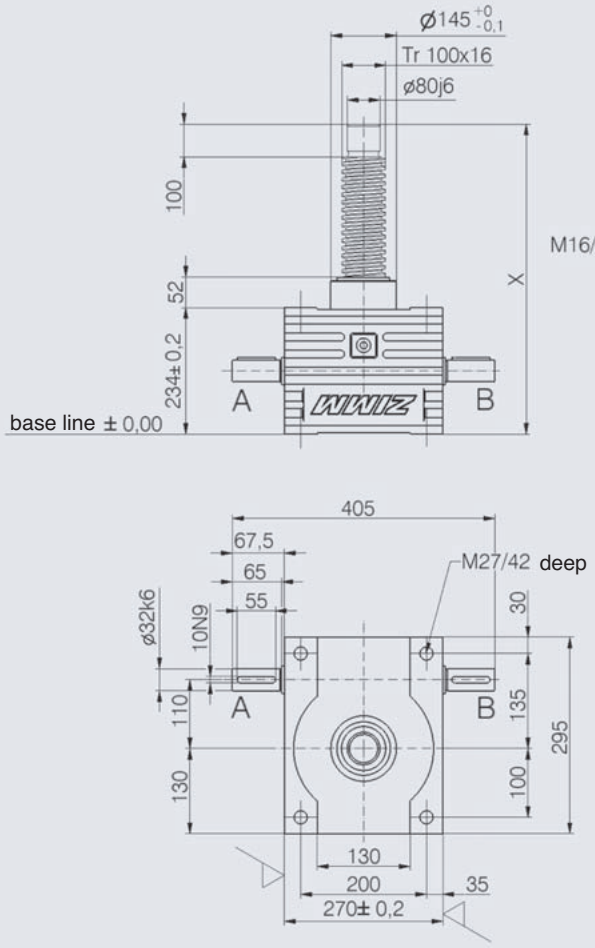
Standard Types R

Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA
	
	wear control of the nut *capter 8*

350kN



MSZ-350 Rotating Screw R 350kN



x = calculated spindle length (chapter 4.8) + 7 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 dammage due to possible overun.

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

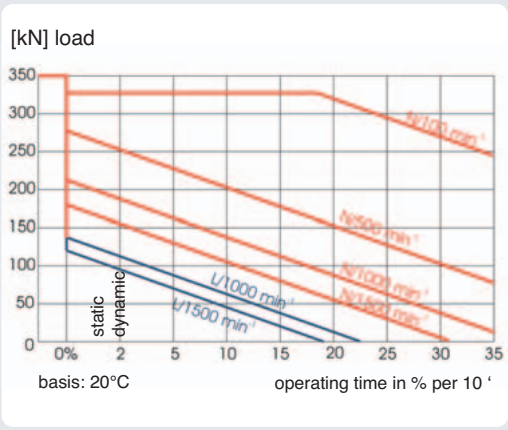
Technical data S and R

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

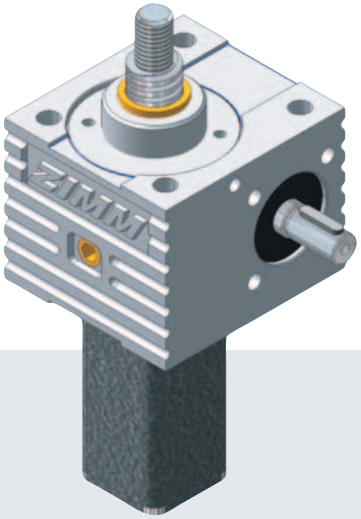


N = Normal speed
L = Low speed

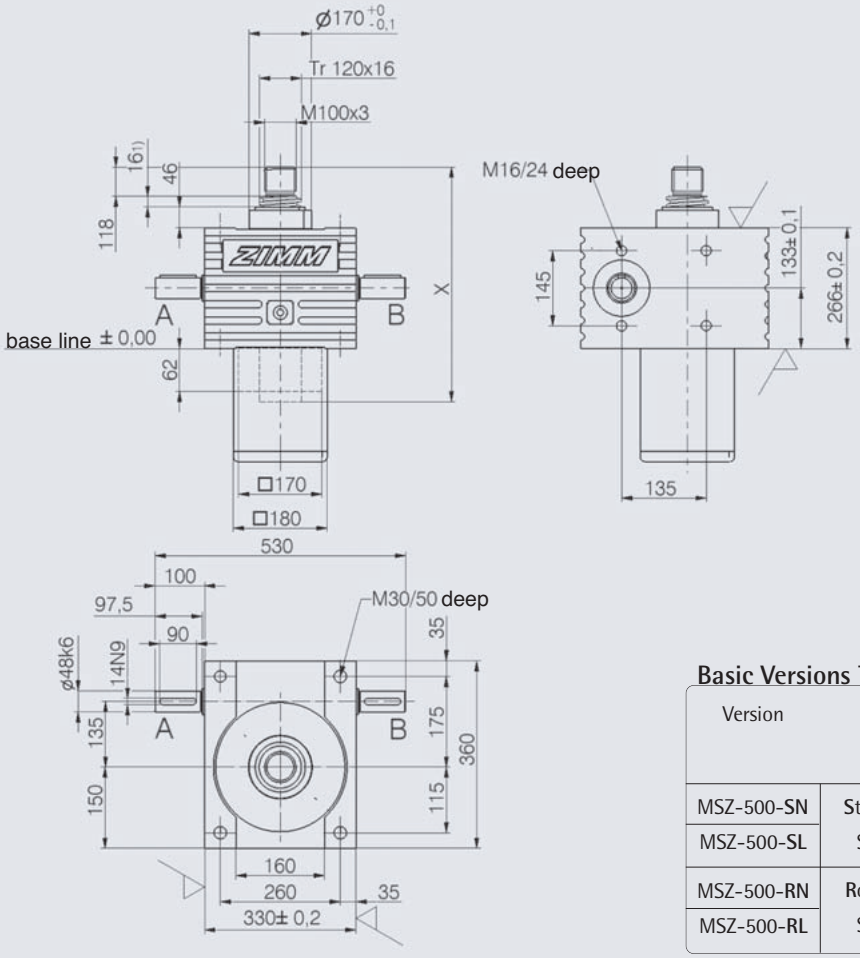
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

500kN



MSZ-500 Standing Screw S 500kN

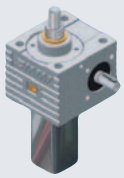
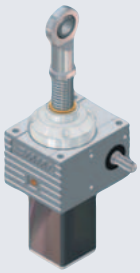


Basic Versions Tr

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

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

Standard Types S

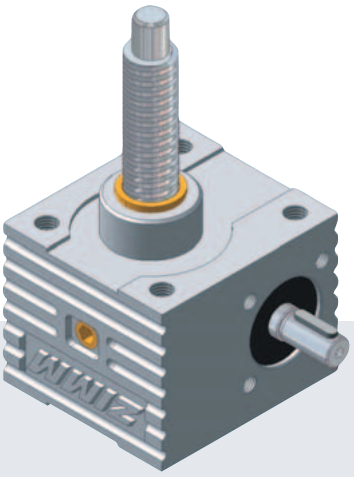
Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Anti-Backlash AB
		
	rotation control and wear control of the nut *capter 8*	adjustable anti-backlash *capter 10*

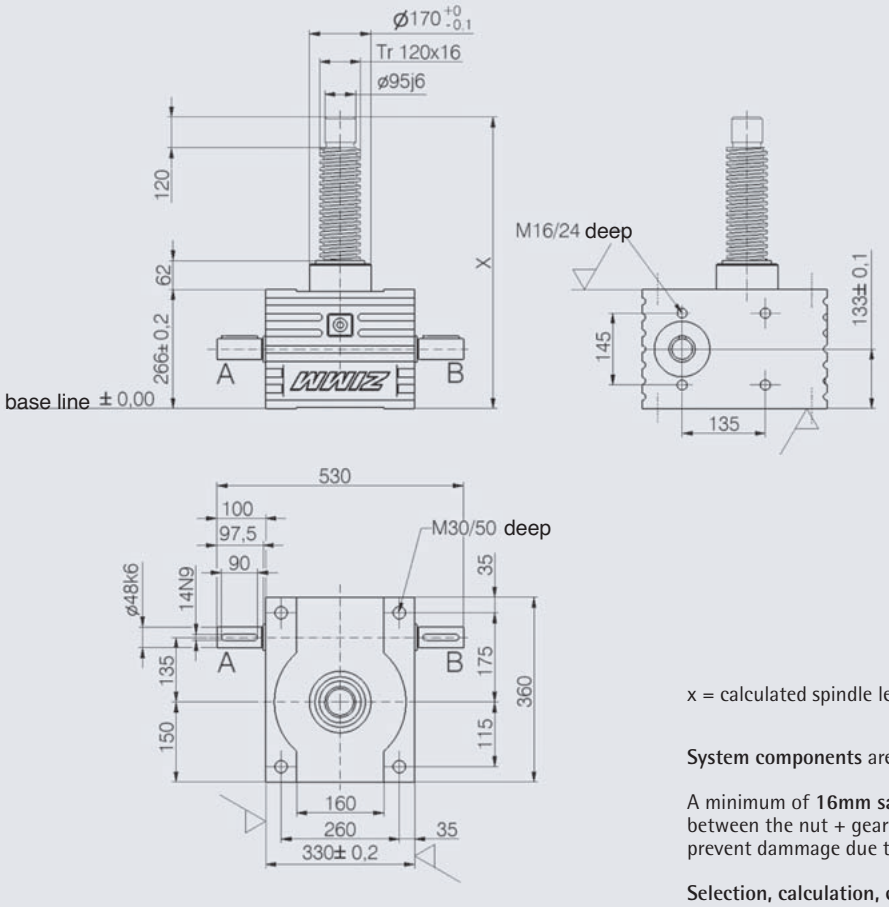
Standard Types R

Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA
	
	wear control of the nut *capter 8*

500kN

MSZ-500 Rotating Screw R 500 kN





x = calculated spindle length (chapter 4.8) + 8 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 dammage due to possible overun.

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

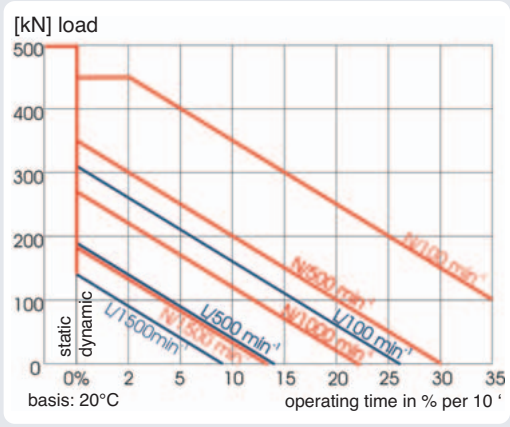
Technical data S and R

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

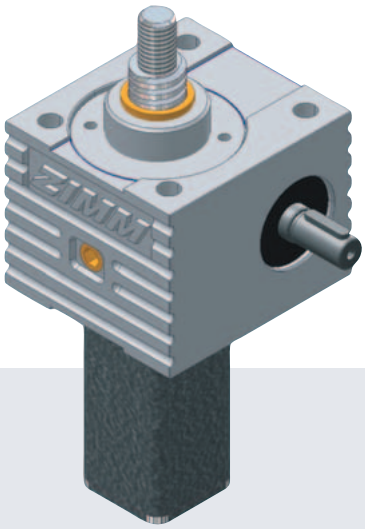


N = Normal speed
L = Low speed

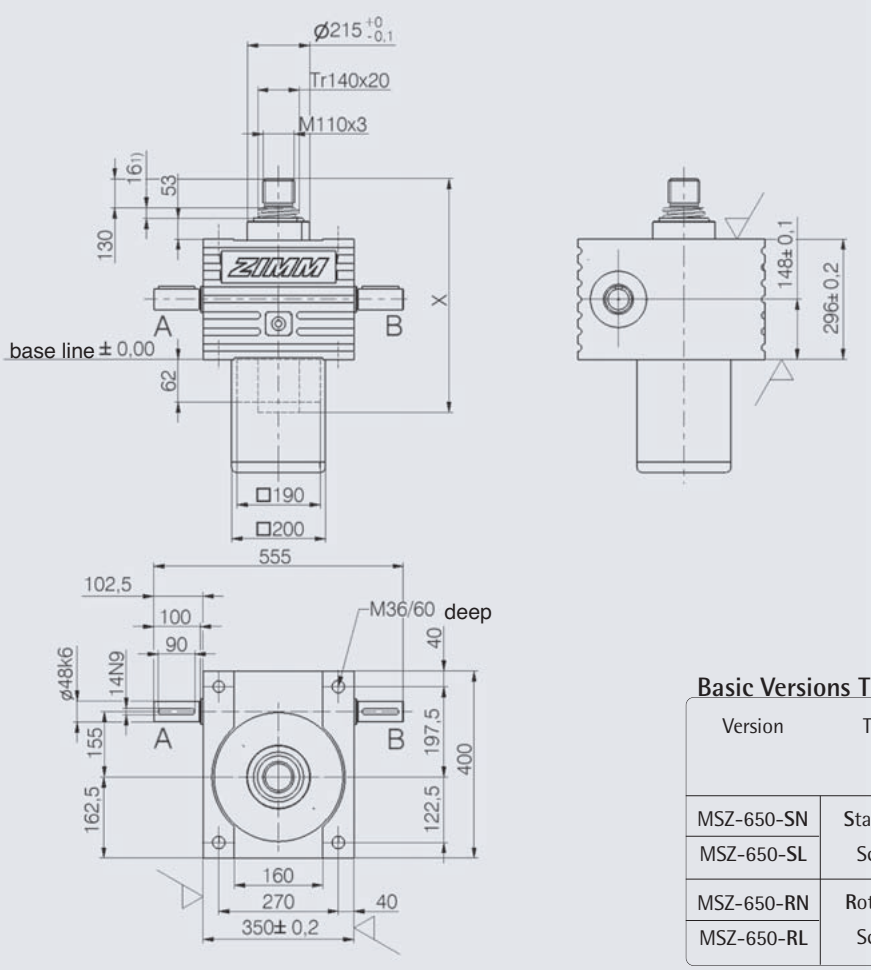
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

650kN



MSZ-650 Standing Screw S 650kN

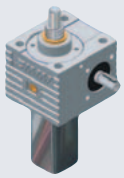
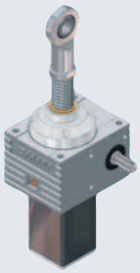


Basic Versions Tr

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

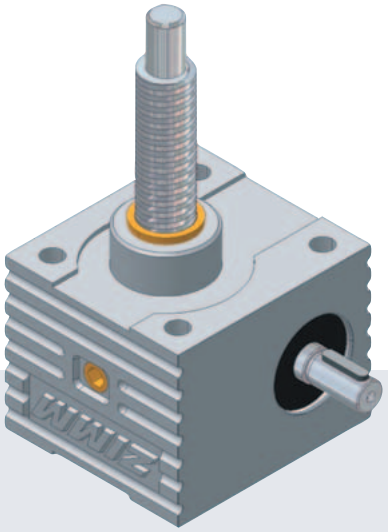
Standard Types S

Basic model S Heavy duty screw jack grey cast housing	Safety nut SIFA	Anti-Backlash AB
		
	rotation control and wear control of the nut *capter 8*	adjustable anti-backlash *capter 10*

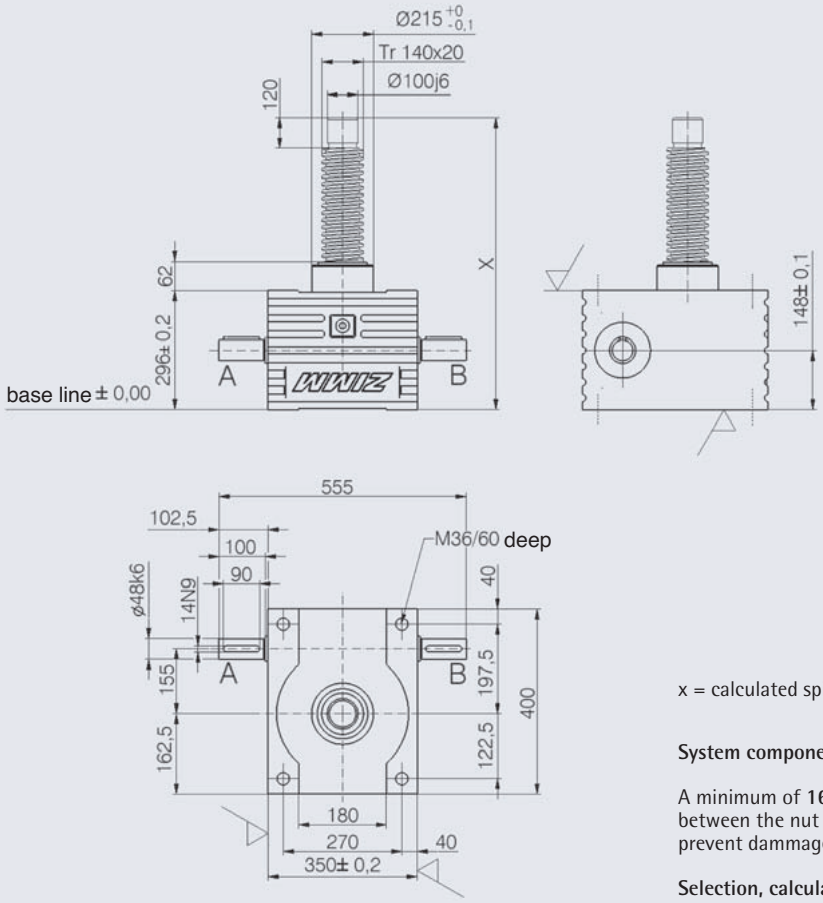
Standard Types R

Basic model R Heavy duty screw jack grey cast housing	Safety nut SIFA
	
	wear control of the nut *capter 8*

650kN



MSZ-650 Rotating Screw R 650kN



x = calculated spindle length (chapter 4.8) + 3 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 dammage due to possible overun.

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

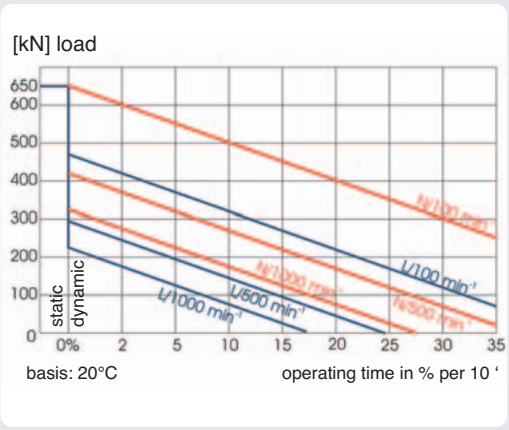
Technical data S and R

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

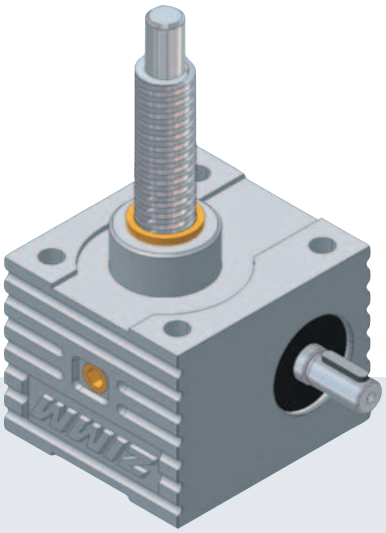


N = Normal speed
L = Low speed

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

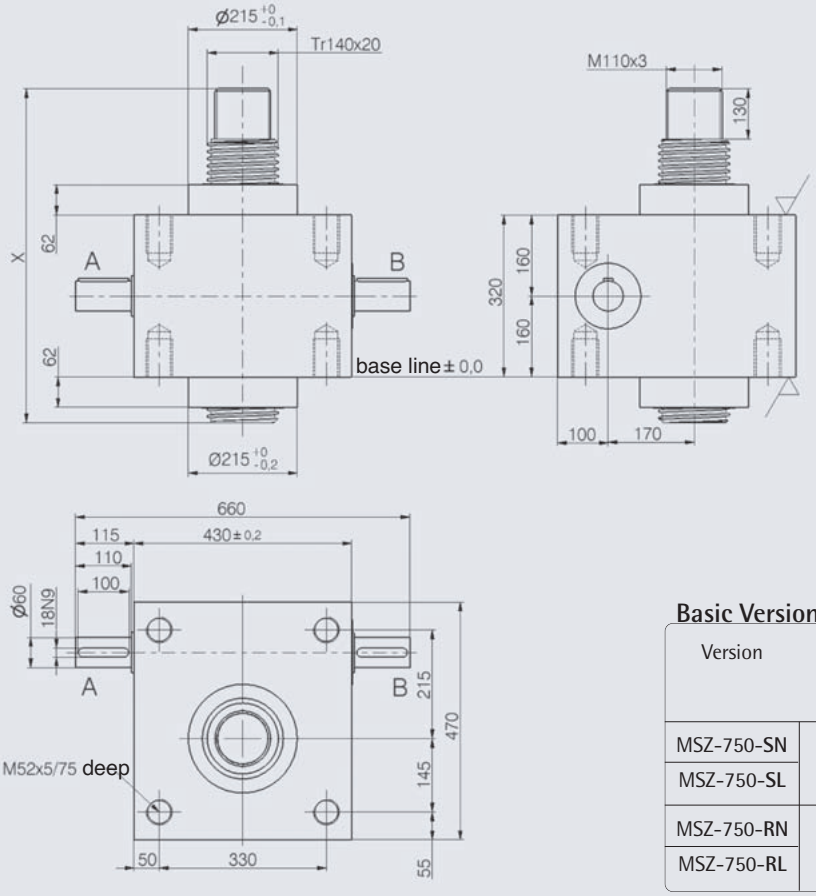
The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.

750kN



MSZ-750 Standing Screw S 750kN

1000 kN on request



Basic Versions Tr

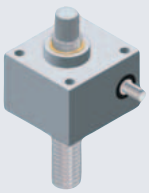
Version	Type	Speed	Standard Screw[2]	i	Stroke per revolution[5]
MSZ-750-SN	Standing Screw	Normal	Tr 140x20	14:1	1,429 mm
MSZ-750-SL		Low		56:1	0,357 mm
MSZ-750-RN	Rotating Screw	Normal	Tr 140x20	14:1	1,429 mm
MSZ-750-RL		Low		56:1	0,357 mm

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

Standard Types S

Basic model S

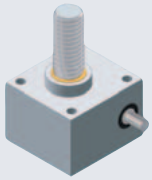
Heavy duty screw jack steel version



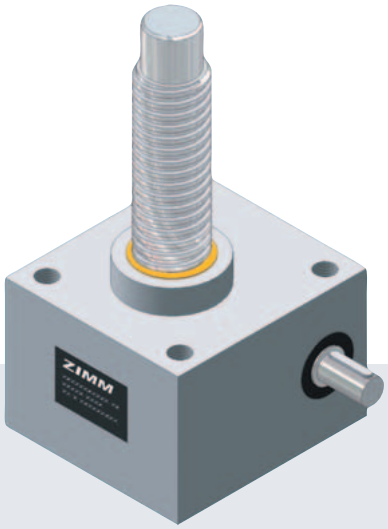
Standard Types R

Basic model R

Heavy duty screw jack steel version

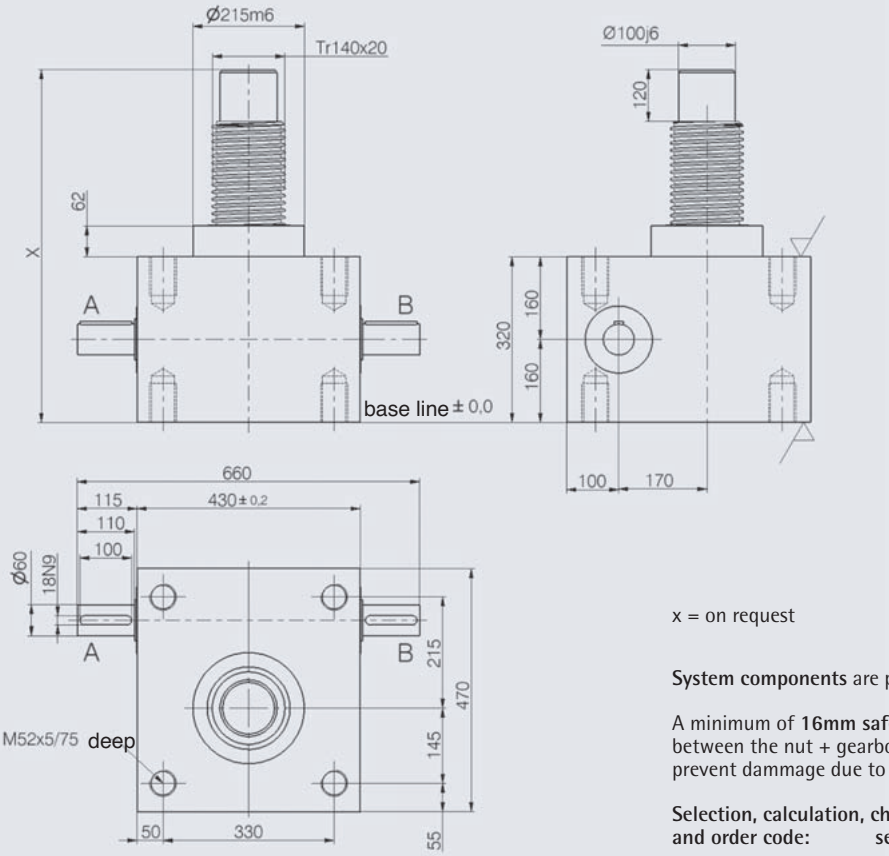


750kN



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 dammage due to possible overun.

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

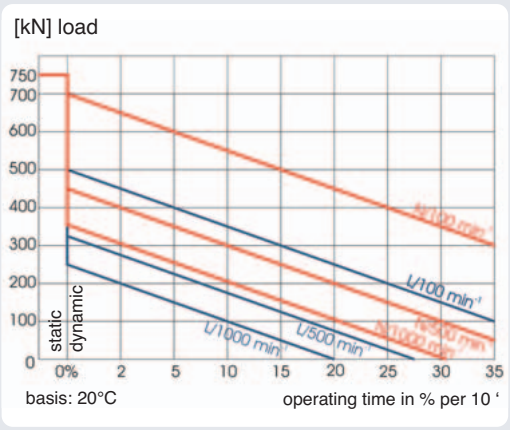
Technical data S and R

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

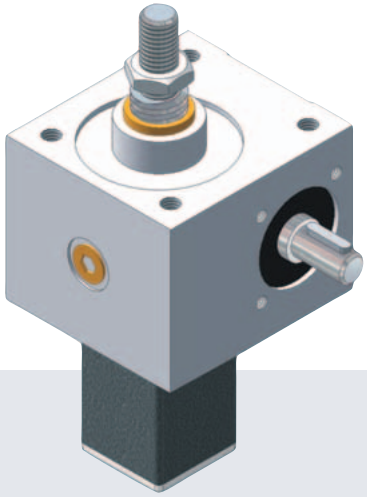


N = Normal speed
L = Low speed

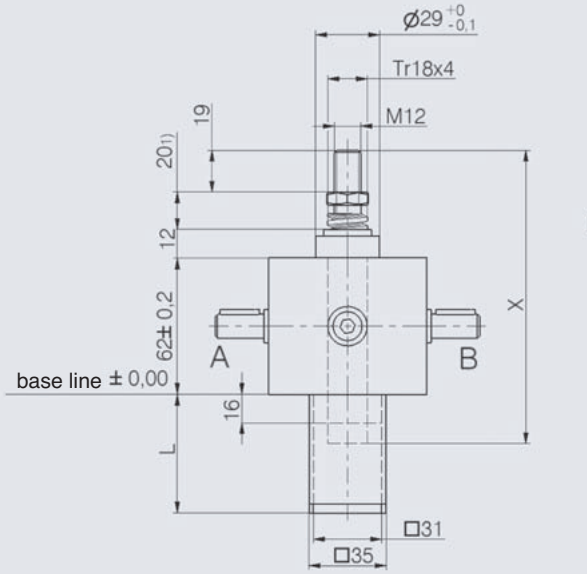
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

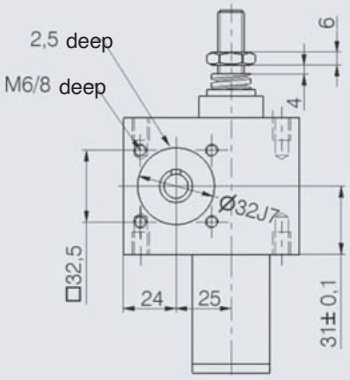
The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.

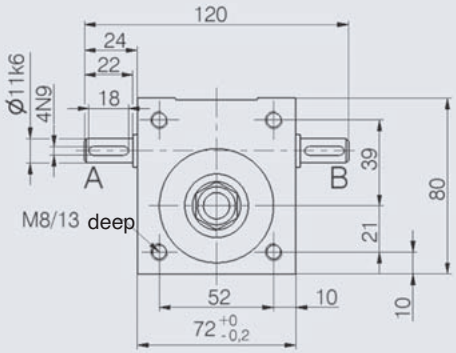
5kN



MSZ-5-A Standing Screw S 5kN



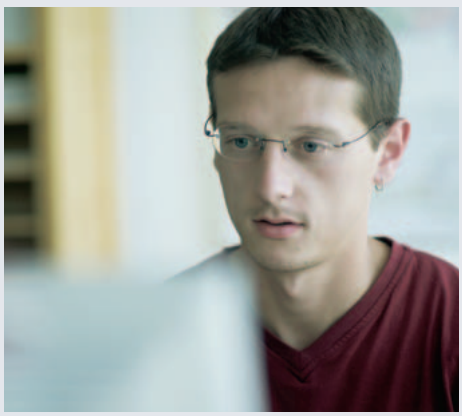




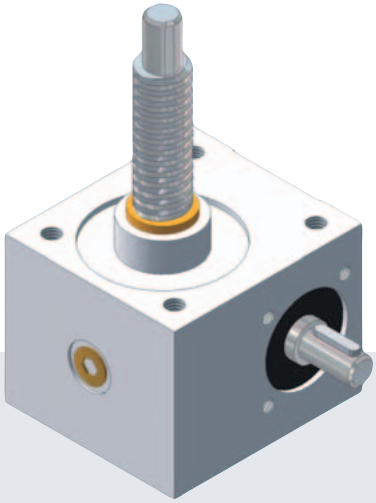
Basic Versions Tr

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

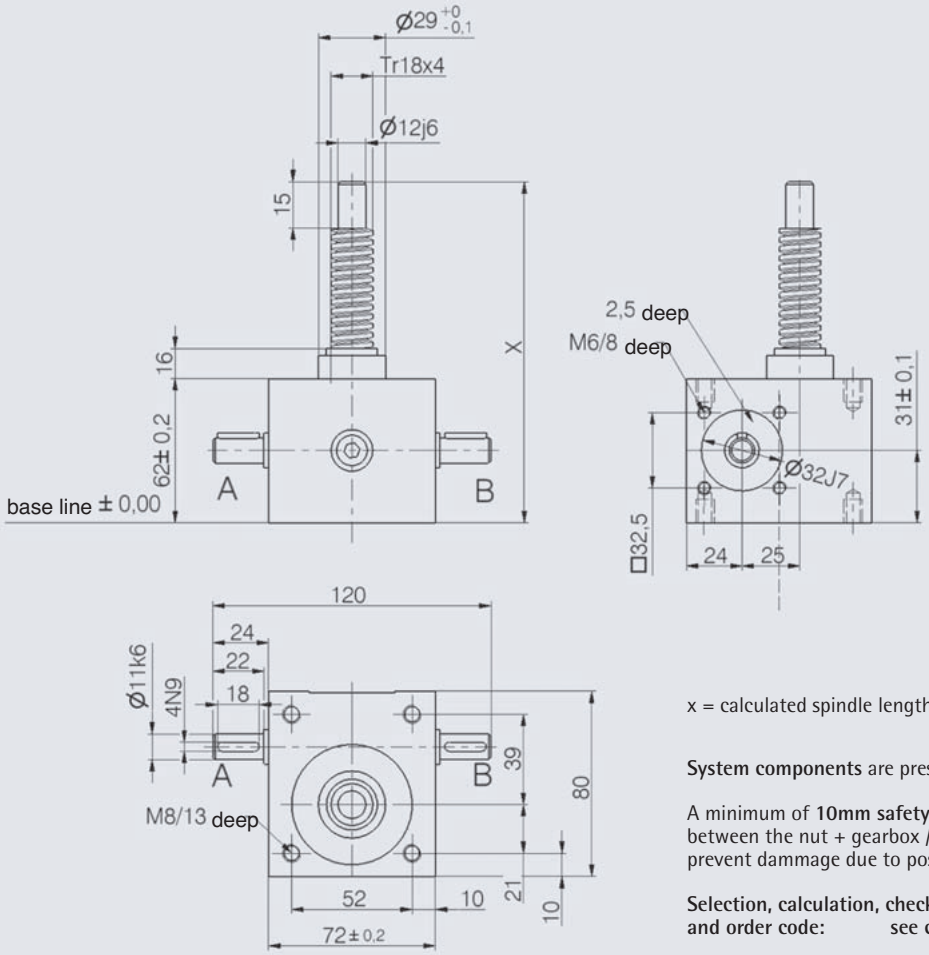
[1)] - with bellows or spiral spring extension: see chapter 4



5kN



MSZ-5-A Rotating Screw R 5kN



x = 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 dammage due to possible overun.

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

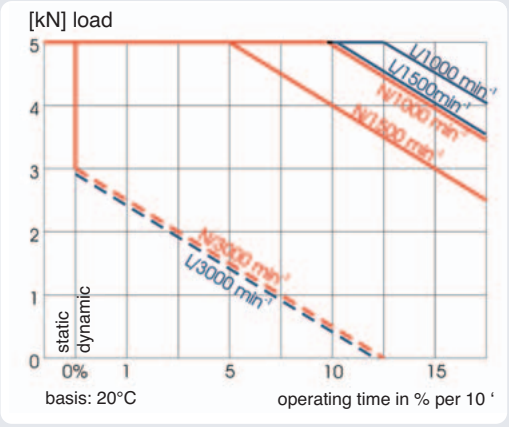
Technical data S and R

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

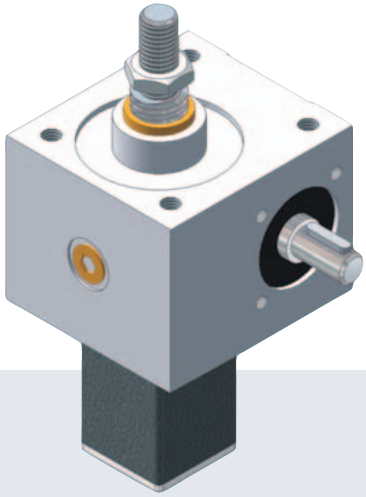


N = Normal speed
L = Low speed

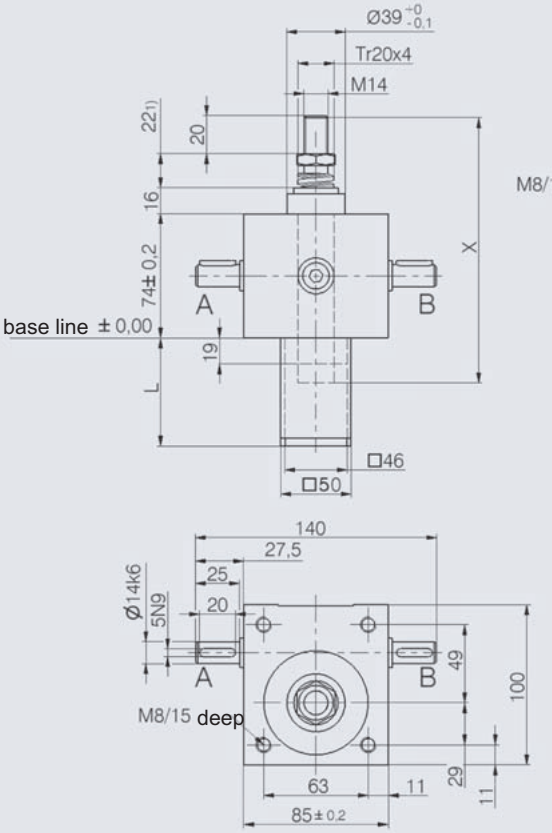
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

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

10kN



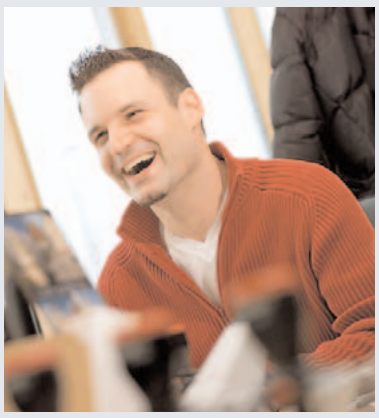
MSZ-10-A Standing Screw S 10kN



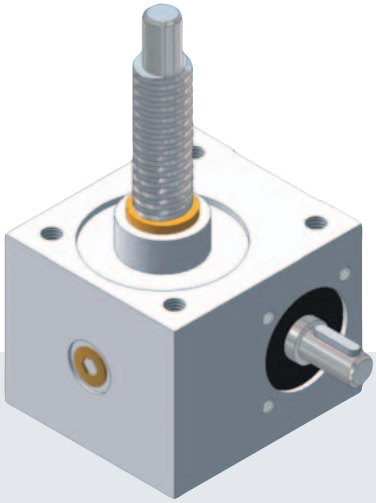
Basic Versions Tr

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

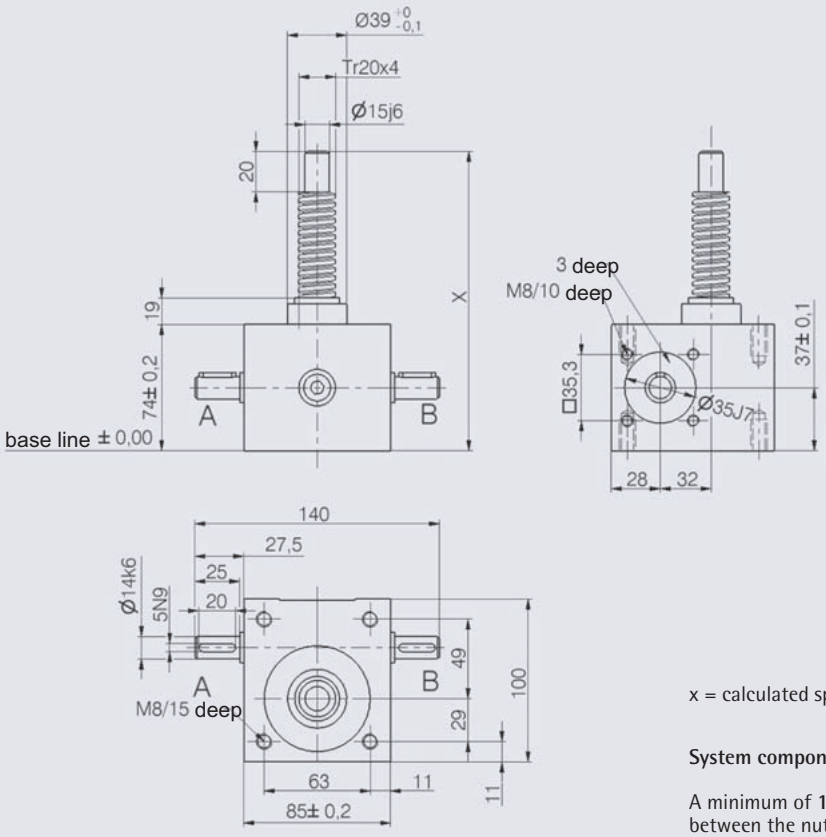
[1)] - with bellows or spiral spring extension: see chapter 4



10kN



MSZ-10-A Rotating Screw R 10kN



x = calculated spindle length (chapter 4.8) + 8 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 dammage due to possible overun.

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

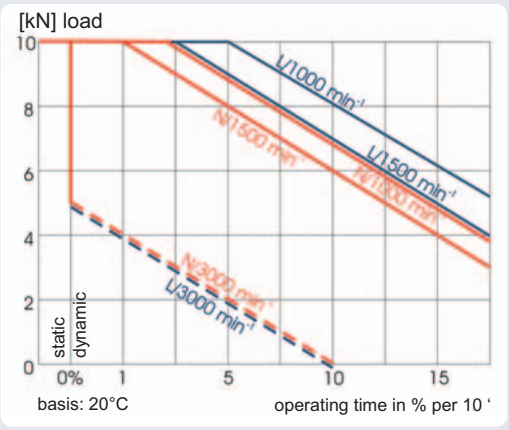
Technical data S and R

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_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

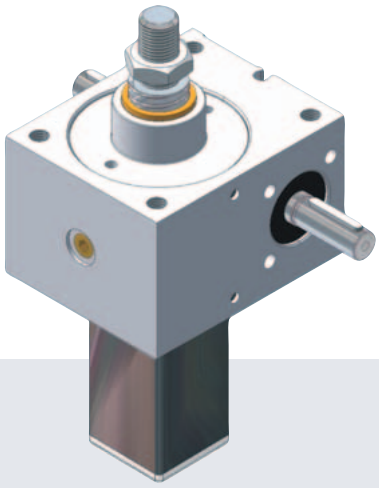


N = Normal speed
L = Low speed

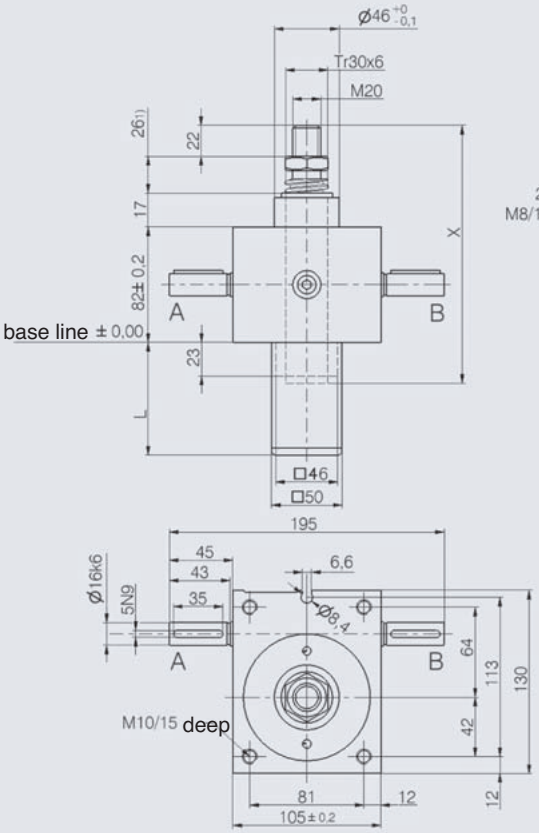
This diagram indicates the mascimum capacity (under optimal conditions). Where duty or load are near upper limits we recommend the selection of a bigger gearbox.

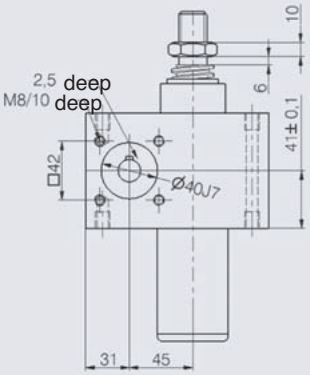
The maximum duty cycle is affected by many factors: e.g.: lubrication, environment temperature, bellows, etc.

25kN



MSZ-25-A Standing Screw S 25kN



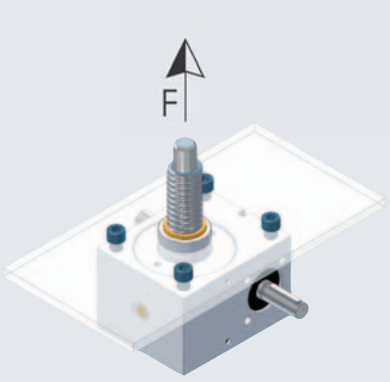


Basic Versions Tr

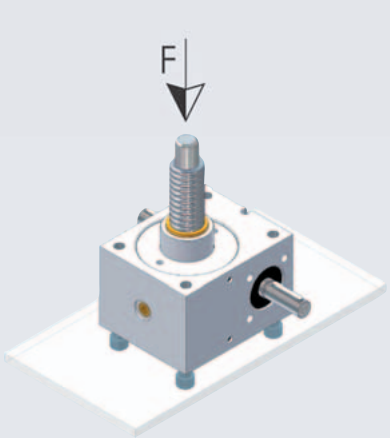
Version	Type	Speed	Standard Screw[2)]	i	Stroke per revolution[5)]
MSZ-25-A-SN	Standing Screw	Normal	Tr 30x6	6:1	1,00 mm
MSZ-25-A-SL		Low		24:1	0,25 mm
MSZ-25-A-RN	Rotating Screw	Normal	Tr 30x6	6:1	1,00 mm
MSZ-25-A-RL		Low		24:1	0,25 mm

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

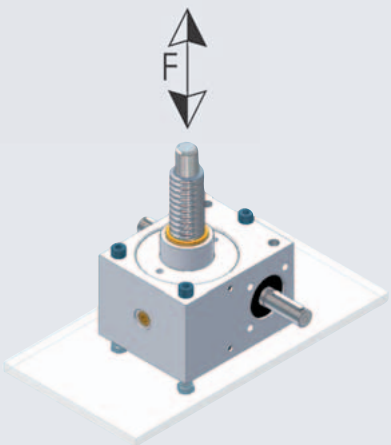
3 Fixing options (only MSZ-25-A)



4 blind hole threads M10

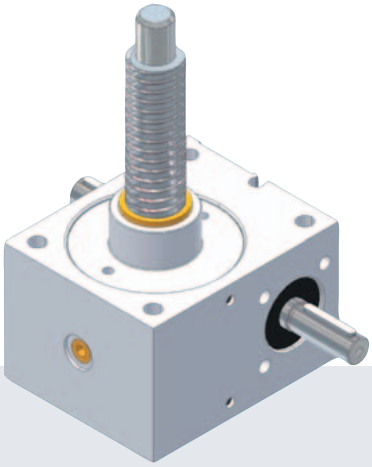


4 blind hole threads M10

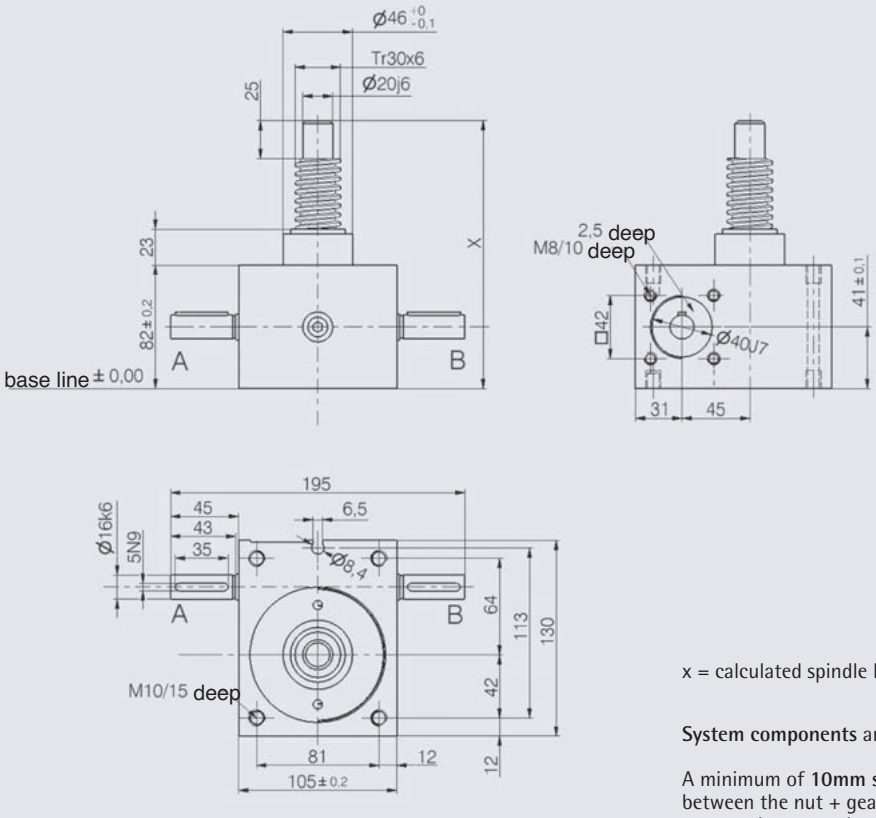


3 through borings ø8,4
(only MSZ-25-A)

25kN



MSZ-25-A Rotating Screw R 25kN



x = 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 dammage due to possible overun.

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

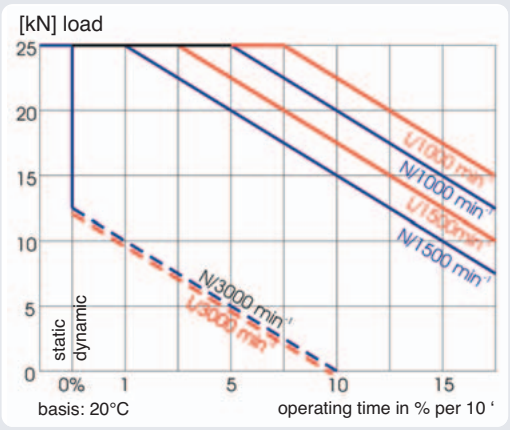
Technical data S and R

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

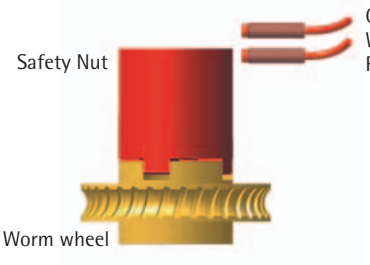
Capacity diagram stat./dyn. S and R



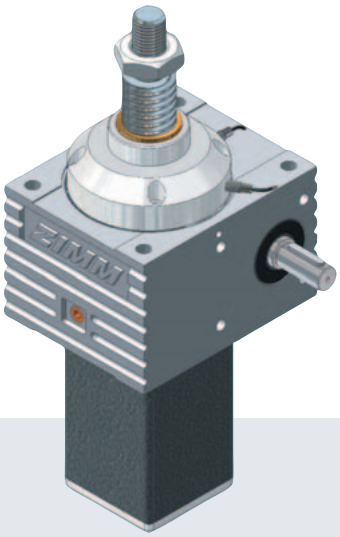
N = Normal speed
L = Low speed

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.

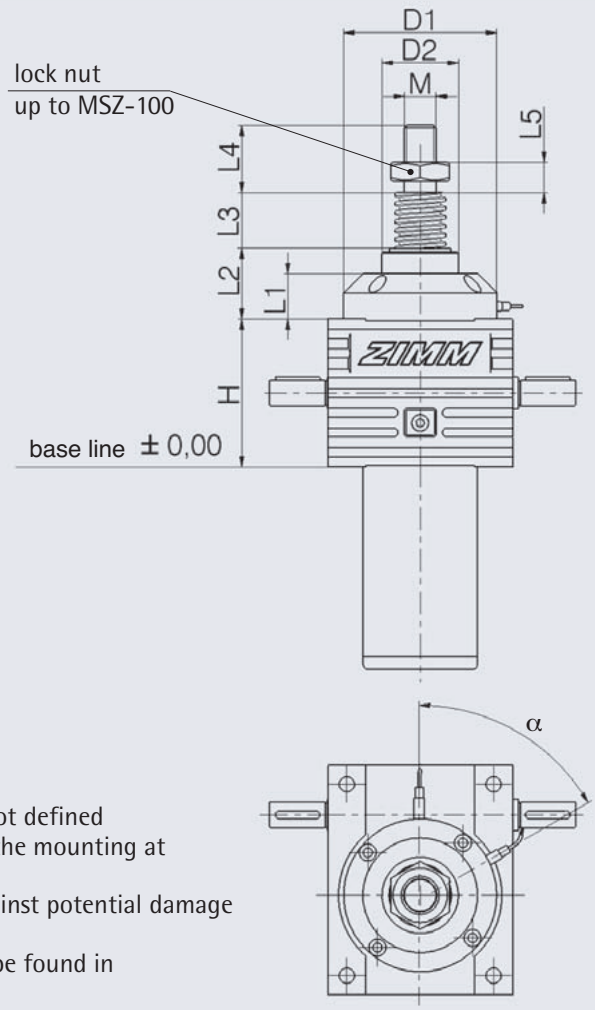
The maximum duty cycle is affected by many factors: e.g.: lubrication, environmental temperature, bellow, etc.



Option:
Wear detection of the nut
Rotation detection of the nut



Safety Nut SIFA-S



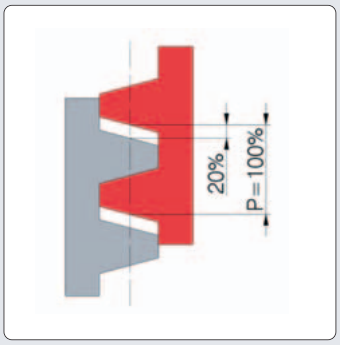
- Position of sensors is not defined
- It is possible to rotate the mounting at 90° intervals
- Protect the sensors against potential damage

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.

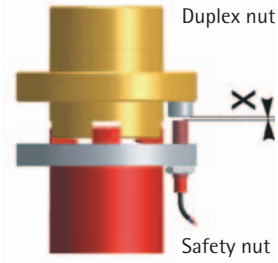


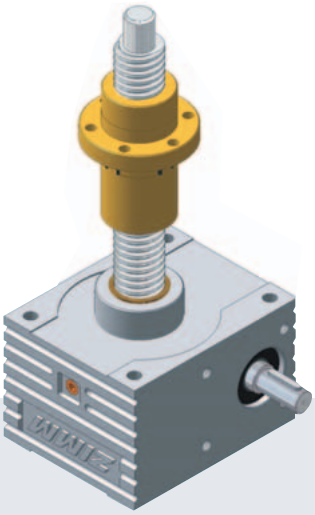
As soon as the thread of the worm wheel has worn more than 20% of the thread pitch (= 40% of tooth dimension), the worm wheel (or the whole gearbox >> most cost effective for gearbox sizes up to MSZ-100) should be replaced.

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.

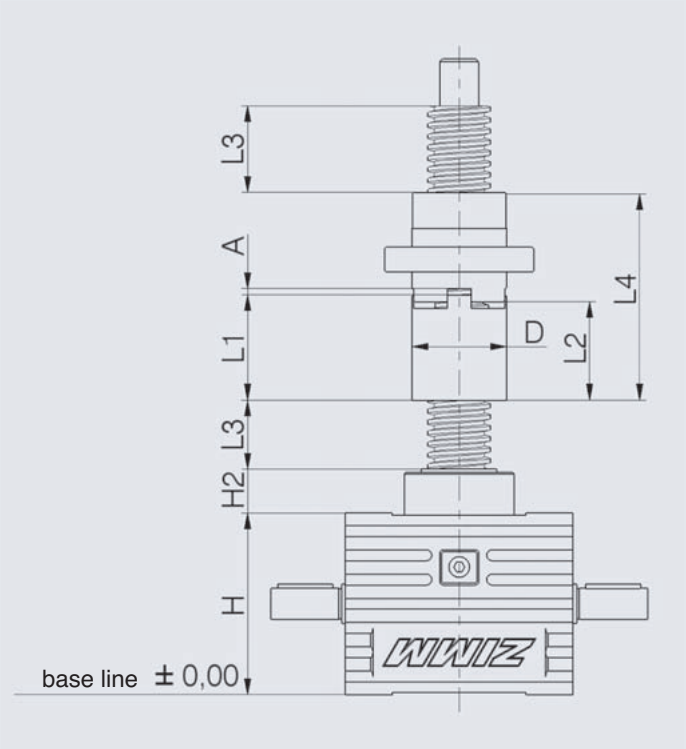
Wear sensor
The sensor is positioned so that the system will be stopped (by the customers control) when the sensor detects wear in the thread in excess of 20% of the screw pitch.

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, ...).

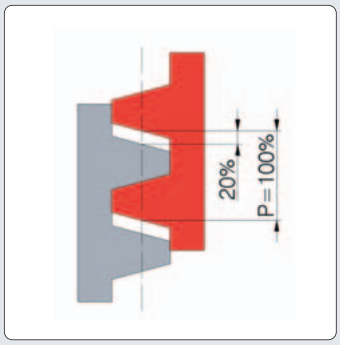




Safety Nut SIFA-R



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.

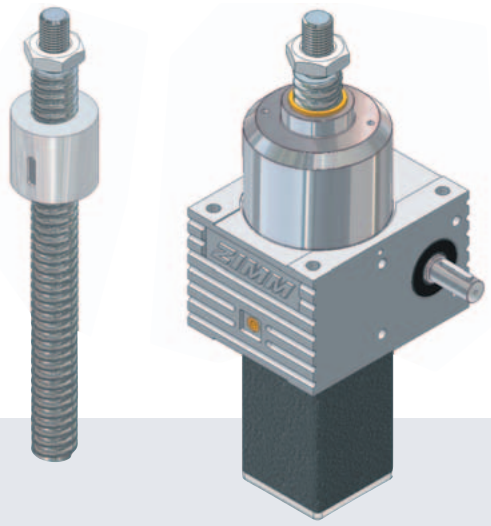
Further dimensions can be found in chapters 5 and 6
System components in chapter 14
SIFA combinated with self-aligning nut PM on request.

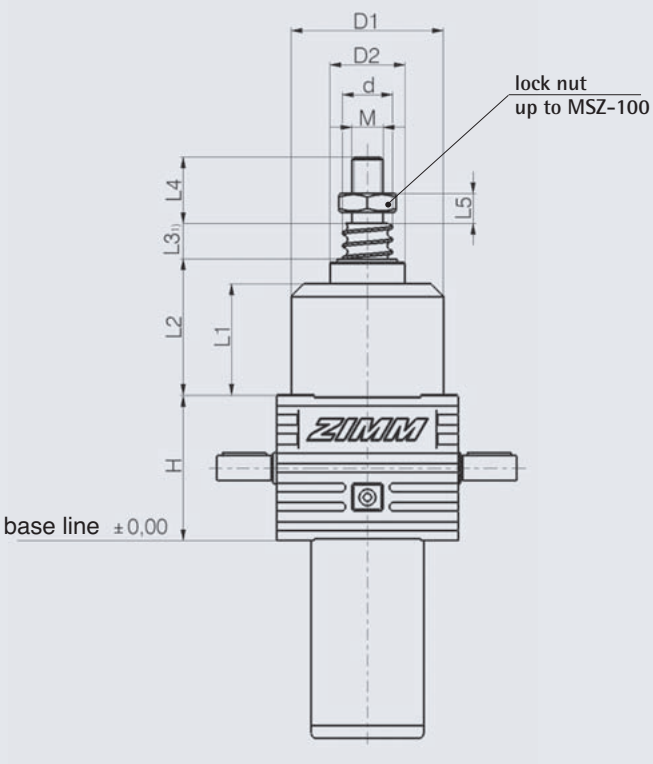
Gearbox	Tr thread	H	H2	D	L1	L2	L3[1]	L4	A[2]
MSZ-10	20x4	74	19	28	42	39	10	84	3
MSZ-25	30x6	82	23	38	48	45	10	95	4
MSZ-50	40x7	116	32	50	67	63	10	133	4
MSZ-100	50x8	160	42	65	88	83	10	173	5
MSZ-150	60x12	185	41	70	101	96	16	211	5
MSZ-250	80x16	210	47	100	115	111	16	251	6
MSZ-350	100x16	234	52	120	115	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.

KGT

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 scrappers. 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.

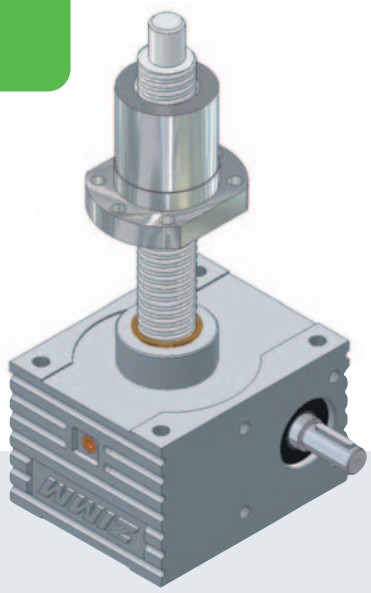
Gearbox	Spindle (ØxP)	mm stroke per revolution		Dimension [mm]										Axial play max[5] [mm]	Load rating [kN]	
		SN	SL	H	d	D_1	D_2	L_1	L_2	L_3[1]	L_4	L_5	M		dyn. C[2]	stat. $C_o=C_{oa}$
MSZ-5	16x05	1,25	0,31	62	15,5	55	29	53	66	15	29	10	M12	0,08	9,3	13,1
	16x10	2,50	0,63	62	15,4	55	29	53	66	25	29	10	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

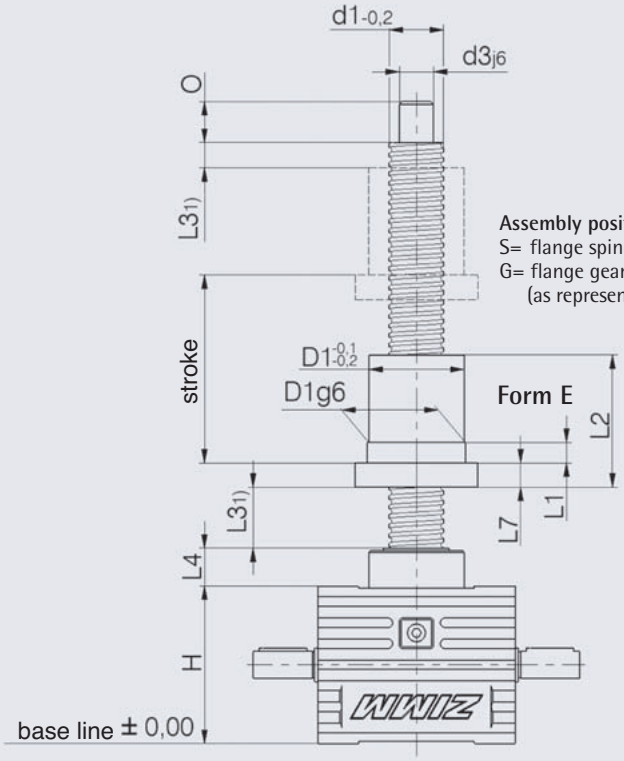
Order code: see chapter 4

KGT

Rotating Version R



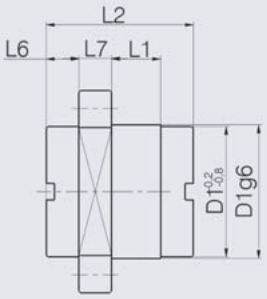
Images and component dimensions are subject to modification



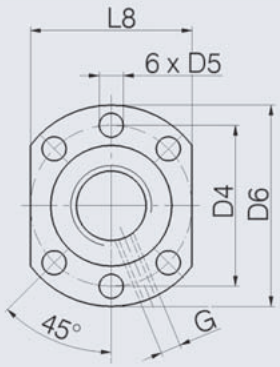
Assembly position of flange nut:
S= flange spindle-sided
G= flange gearbox-sided
(as represented)

See **chapter 5** for further technical data

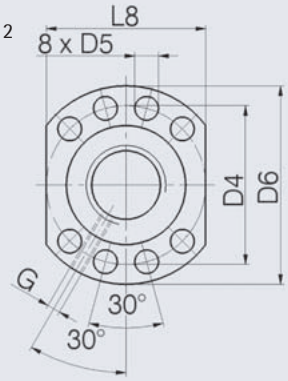
Form S



Drilling template 1
flange form B
acc. DIN 69051



Drilling template 2
flange form B
acc. DIN 69051

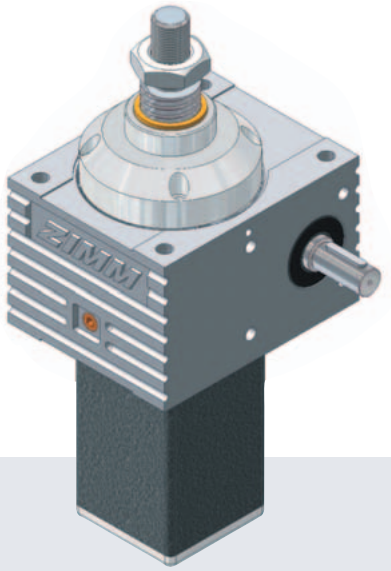


With the rotating version it is also possible to use a larger diameter spindle (e.g.: MSZ-10-RN with spindle 32x10)

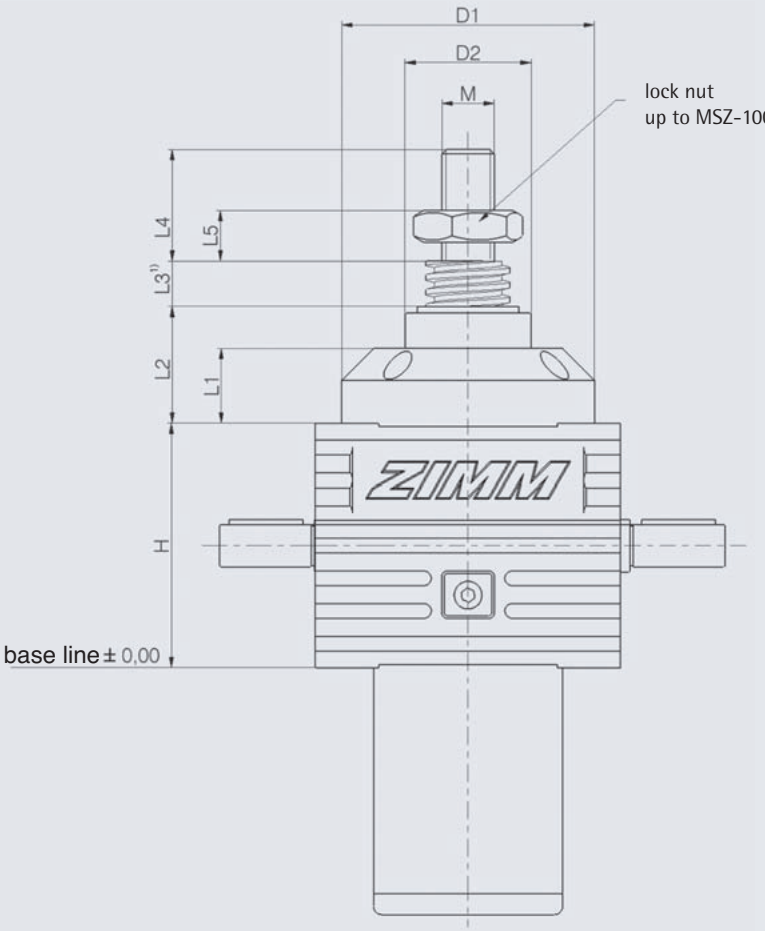
Gearbox	Spindle (ØxP)	mm stroke per revolution RN	RL	Form	Drilling template	Measurements [mm] d_1	d_3	O	H	D_1	D_4	D_5	D_6	L_1	L_2	L_3[1)]	L_4	L_6	L_7	L_8	Lubrication boring G	Axial play max[5)] [mm]	Load rating [kN] dyn. KGT C[2)]	stat. KGT C_0=C_{0a}
MSZ-5	16x05	1,25	0,31	E	1	15,5	12	15	62	28	38	5,5	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
	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
	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
	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	160	40	47	-	25	130	M 8x1	0,05	135,0	322,0
	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.

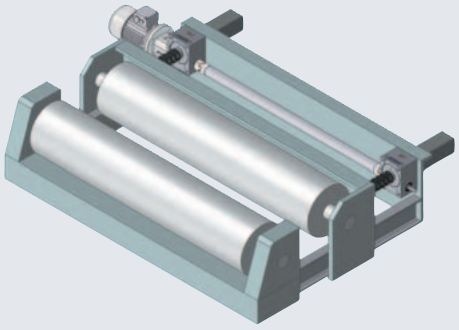
Adjustment
It is very simple to adjust or re-adjust the required play: Remove the aluminium cap and rotate the adjustment nut. (Do not over tighten) Refit the cap.

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

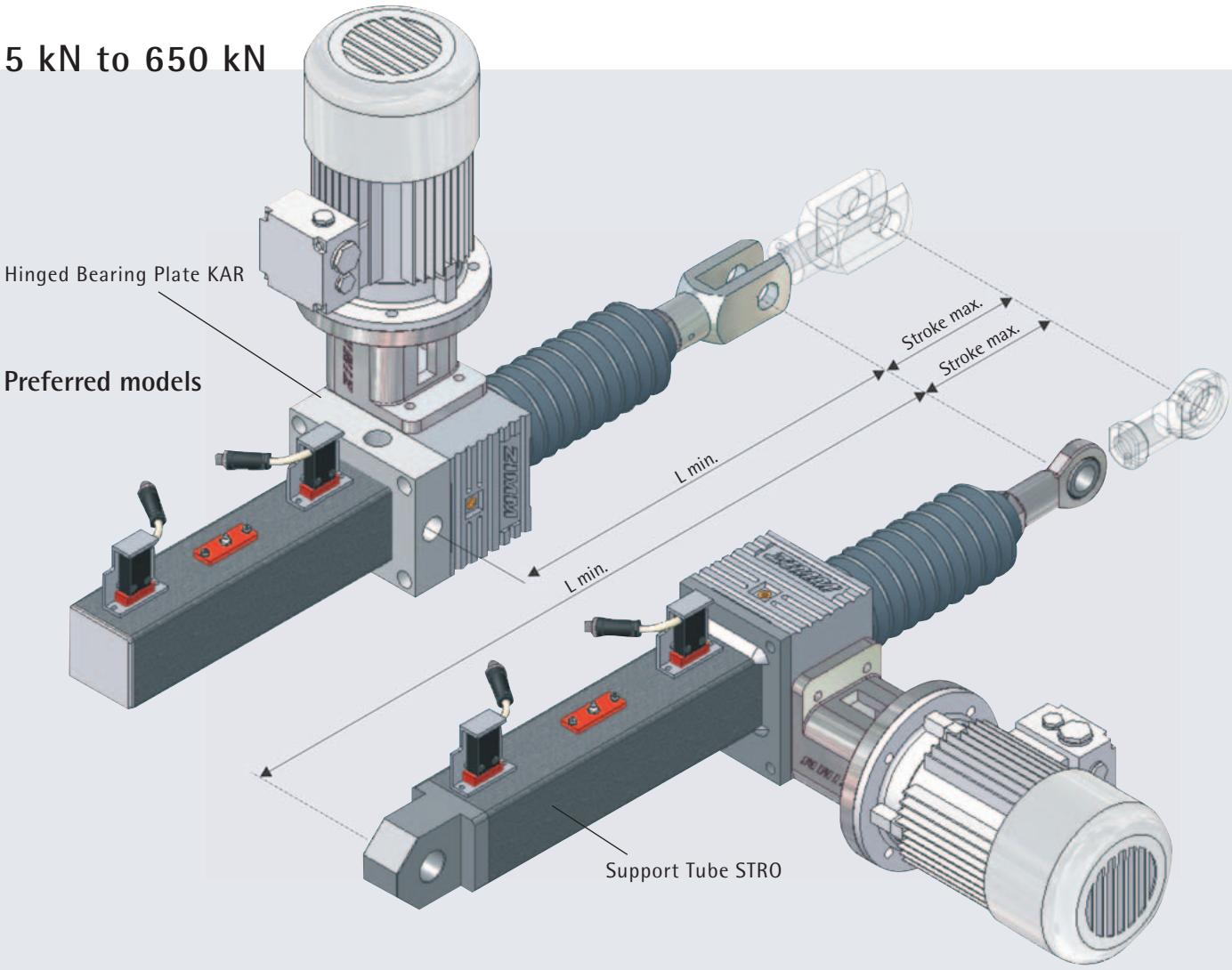
	Tr thread	H	D1	D2	L1	L2	L3[1)]	L4	L5	M
MSZ-10	20x4	74	65	39	31	47	10	32	12	M14
MSZ-25	30x6	82	88	46	36	53	10	38	16	M20
MSZ-50	40x7	116	122	60	36	55	10	53	24	M30
MSZ-100	50x8	160	125	85	37	64	10	76	28	M36
MSZ-150	60x12	185	165	90	46	78	16	48	-	M42x2
MSZ-250	80x16	210	195	120	88	120	16	58	-	M56x2
MSZ-350	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



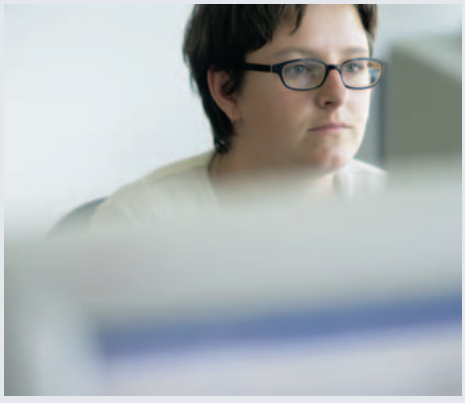
Application:
roller adjustment

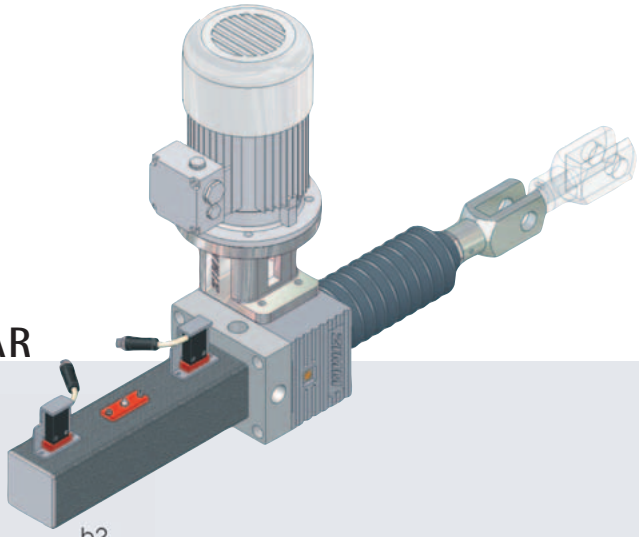
5 kN to 650 kN



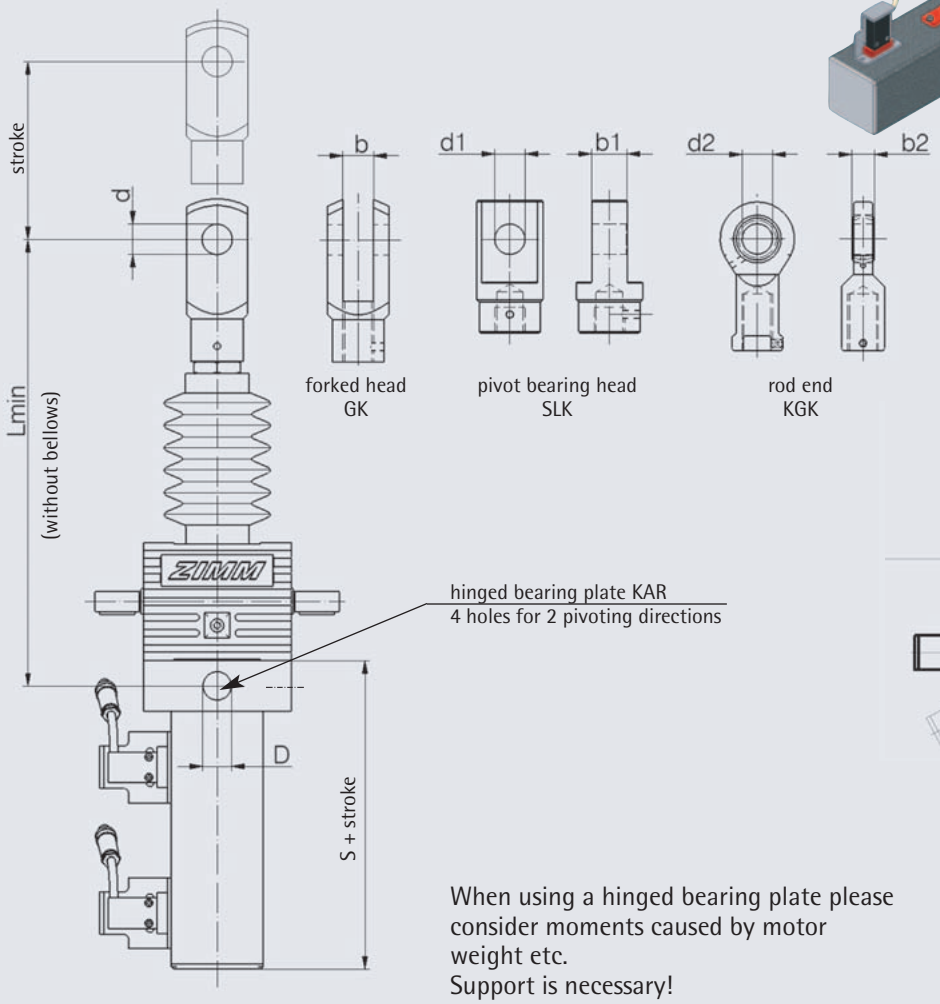
Preferred models

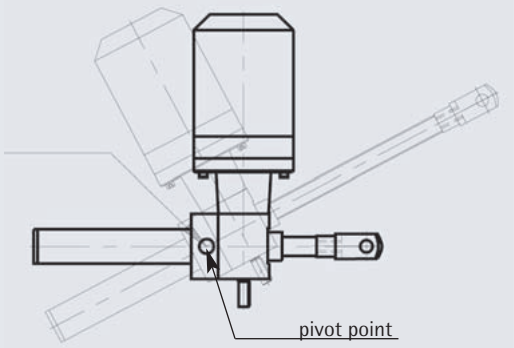
ZIMM actuators are designed for compression loads with eye-eye function. Where the heavy load of a mounted motor would be directly supported by the eye mounting it is recommended to use the hinged bearing plate KAR option instead.
Twin actuators with connecting shaft on request.



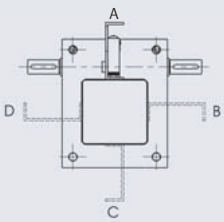


11.1 Actuators with Hinged Bearing Plate KAR





position of limit switches
A=Standard



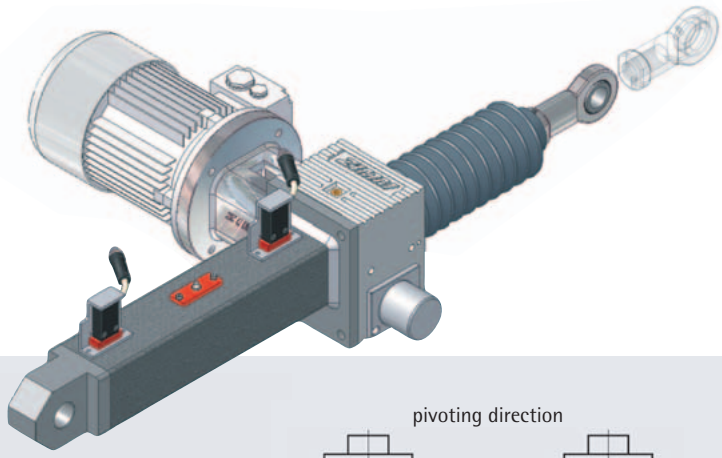
"A" is the standard position of limit switch and lubrication strip (with protection against rotation VS). Please specify if another position is required!

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.

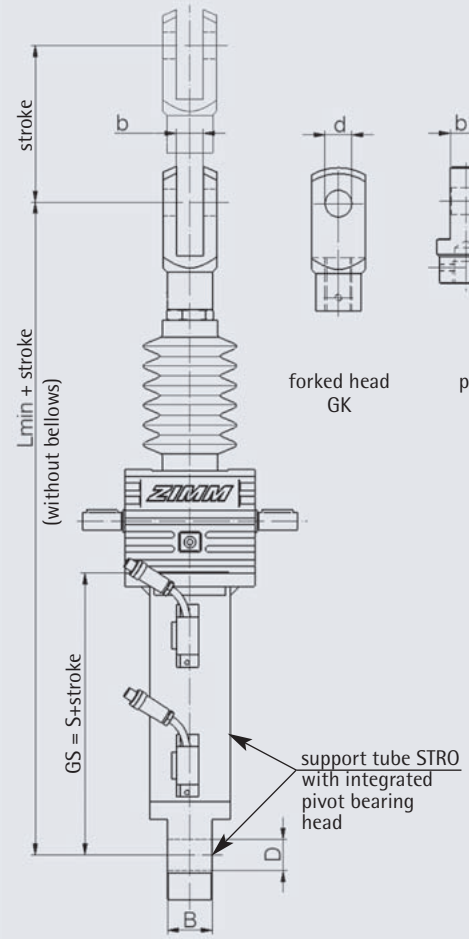
Order code:
Component details in chapter 5, 6 and 14 - or fill out the checklists in chapter 4 and contact our technical department for further information.

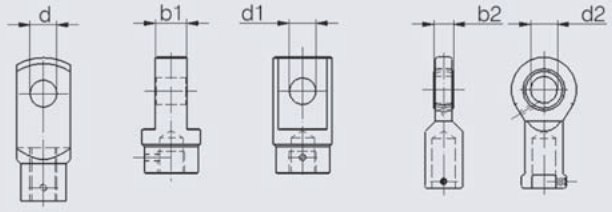
Size	S Standard	S with AS/VS	S with ESSET	L min. GK	L min. SLK	L min. KGK	d	b	d1	b1	d2	b2	D
MSZ-5	52	67	143	157	157	159	12	12	12	18	12	10	16
MSZ-10	54	74	144	183	183	188	14	14	14	24	15	12	16
MSZ-25	58	78	154	225	225	222	20	20	20	30	20	16	20
MSZ-50	67	97	174	314	286	304	30	30	30	35	30	22	30
MSZ-100	77	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

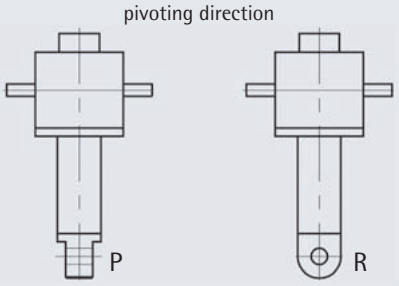




forked head GK

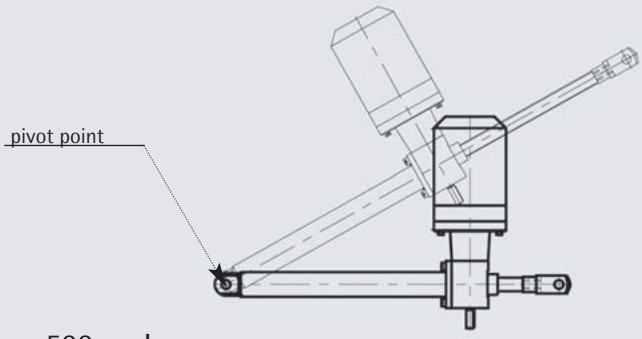
pivot bearing head SLK

rod end KGK



STRO-P
Parallel to drive shaft

STRO-R
at right angles to drive shaft



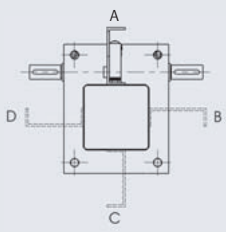
Max. stroke for this type 500mm!

When using a support tube for pivot bearing please consider moments caused by motor weight etc.
Support is necessary!

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

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.

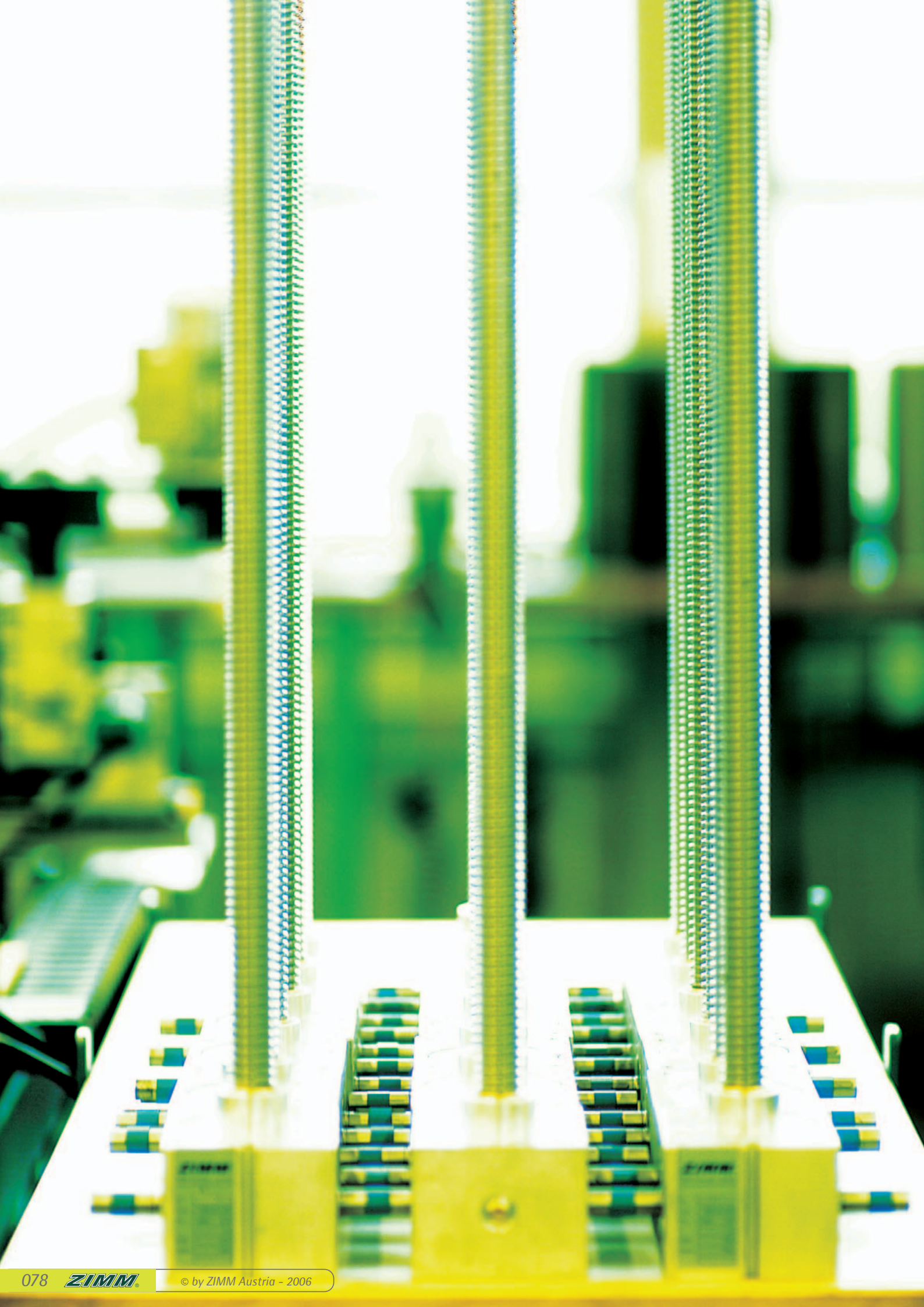
position of limit switch
A=Standard



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

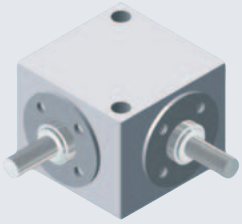
Size	Attachment	S	L min. GK	L min. SLK	L min. KGK	d	b	d1	b1	d2	b2	D	B
MSZ-5	standard	82	224	224	226	12	12	12	18	12	10	12	20
	with AS/VS	97	239	239	241	12	12	12	18	12	10	12	20
	with ESSET	152	294	294	296	12	12	12	18	12	10	12	20
MSZ-10	standard	94	262	262	267	14	14	14	24	15	12	20	30
	with AS/VS	114	282	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

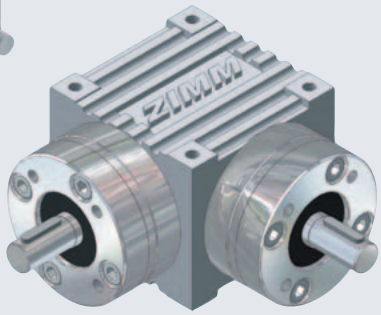


Overview

12.1 KLM-Alu
straight-toothed

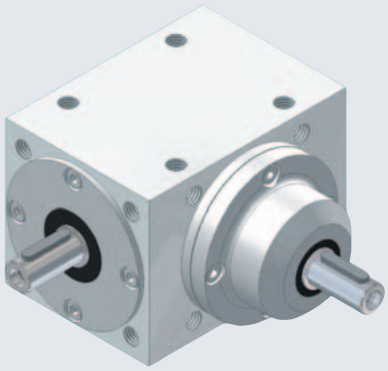


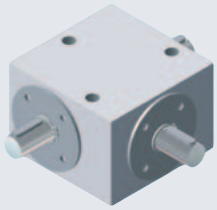
12.2 KGZ
straight-toothed

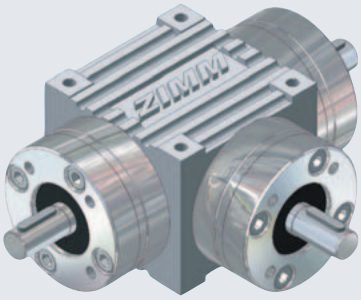


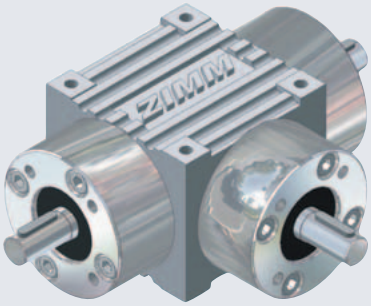
12.3 KSZ
spiral-toothed

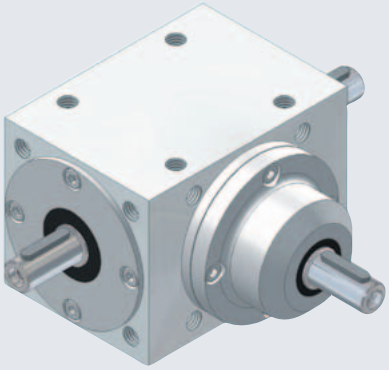
12.4 KST
heavy-duty gearbox
spiral-toothed



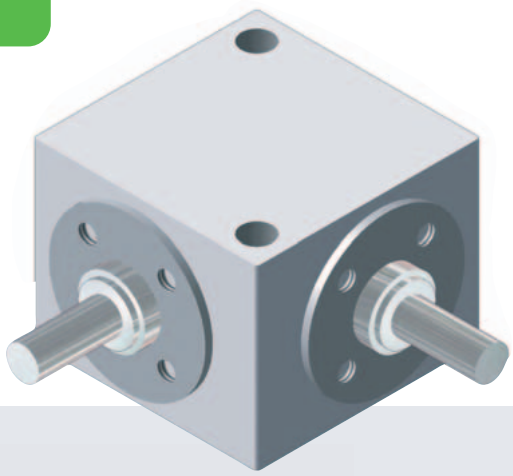






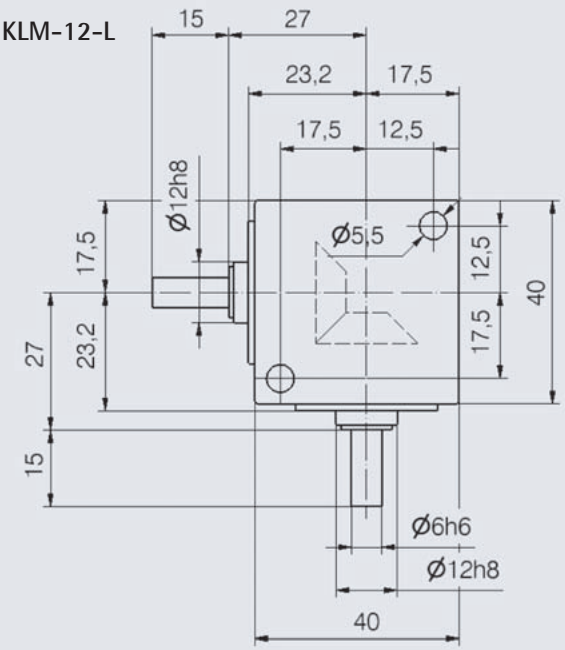


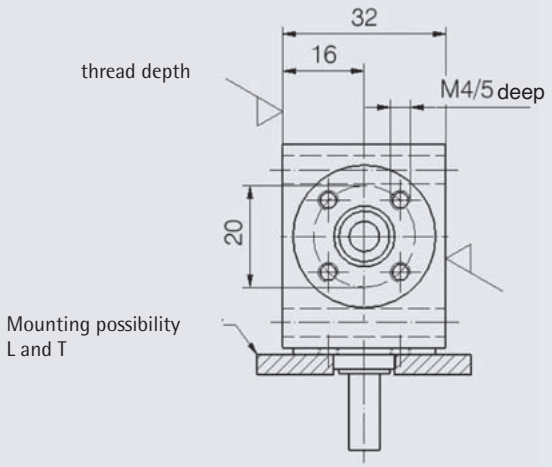
KSZ and KGZ are preferred models which we define as standard.



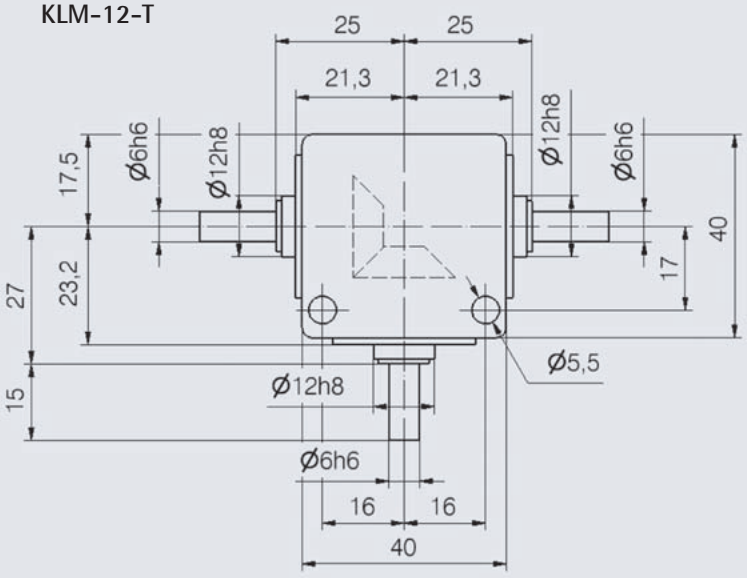
12.1 KLM, Straight Toothed, Aluminium

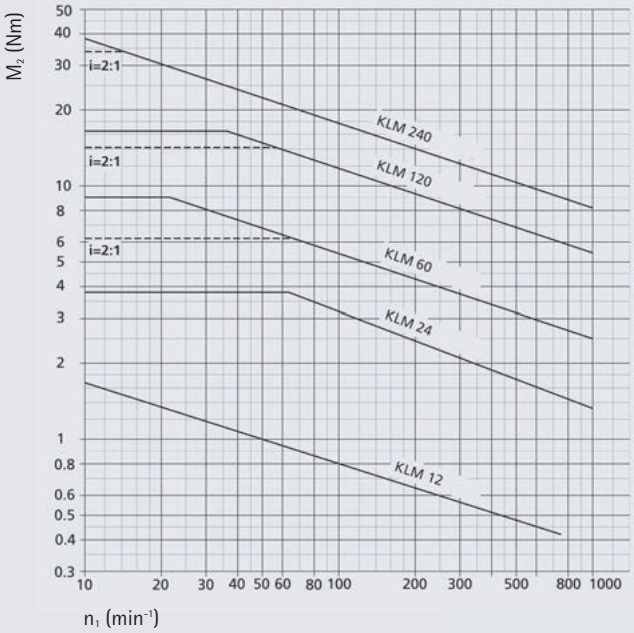
KLM-12-L





KLM-12-T





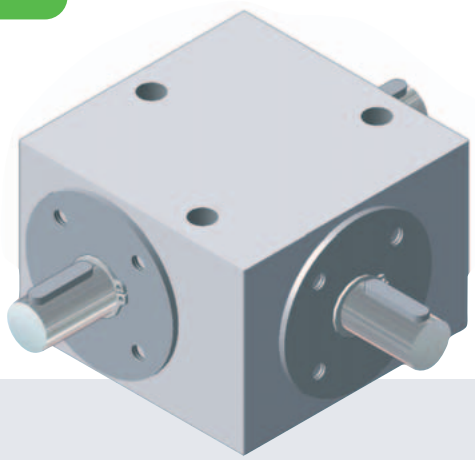
Material: Aluminium
Lubrication: low-viscosity grease (lifetime lubrication)
Rotational speed: max. 750 min^{-1}

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

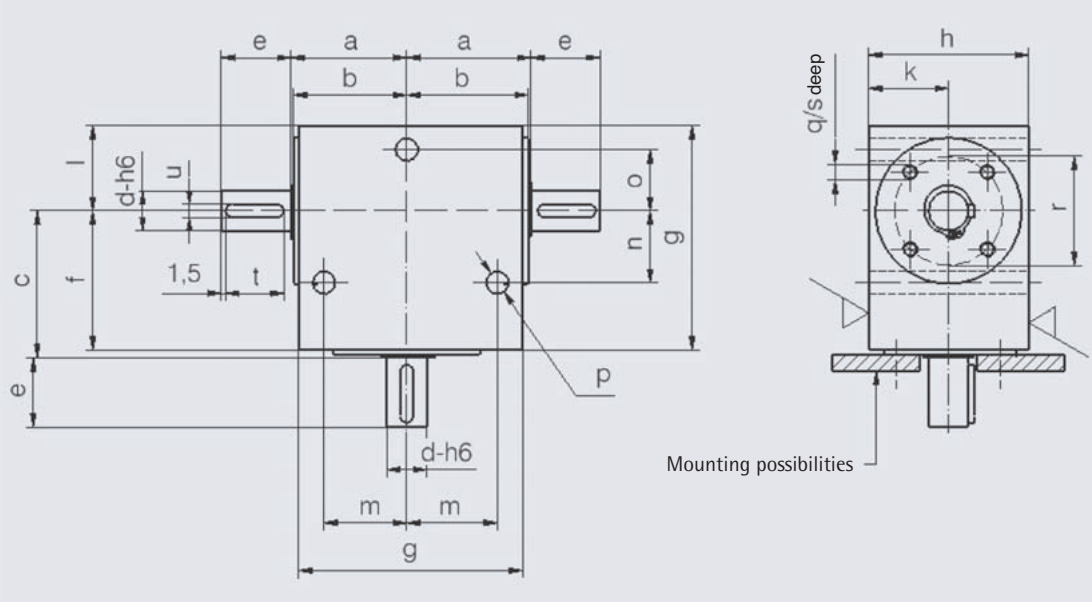
Basics for values in the diagram:

Life time: 6000 hrs. (LM12:2500 hrs.)
Continuous operation

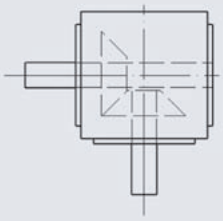
n_1 = input speed (min^{-1})
M_2 = drive torque (Nm)



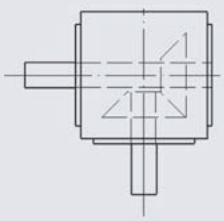
12.1 KLM, Straight Toothed, Aluminium



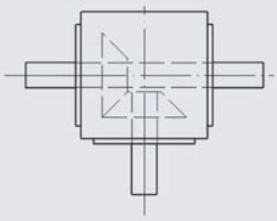
Name: KLM-60-L-RA I



KLM-60-L-RA II



KLM-60-T

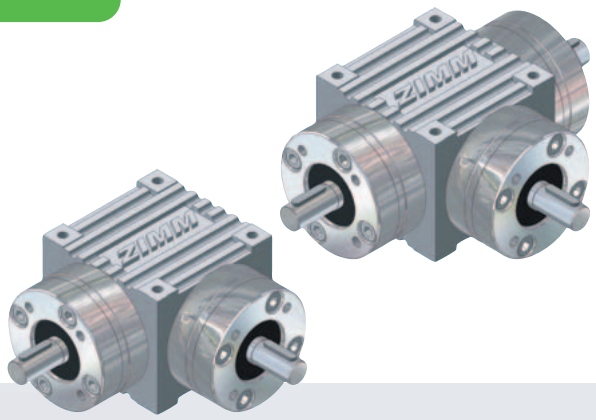


Order example: KLM-60-L-RA I-2:1

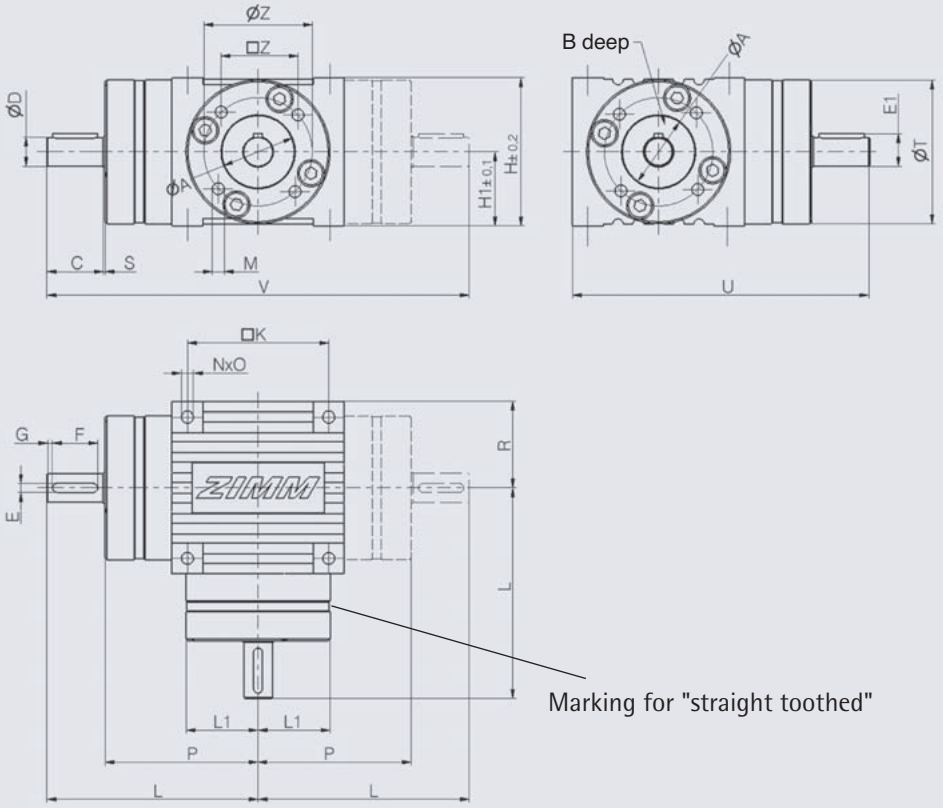
Material: Aluminium
Lubrication: low-viscosity grease (lifetime lubrication)
Rotational speed: max. 1000 min^{-1}

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

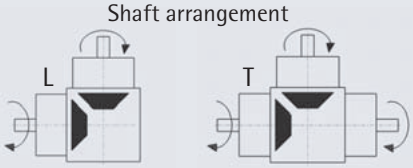


12.2 KGZ Straight Toothed



Marking for "straight toothed"

Shaft arrangement



To alter operating direction of drive shafts rotate gearbox 180 degrees

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

Order no.	Ø A_{H7}	B	C	D_{j6}	E_{h9}	E_1	F	G	H	H_1	□K	L	L_1	M	N	O	P	R	S	Ø T	U	V	Ø Z	□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:

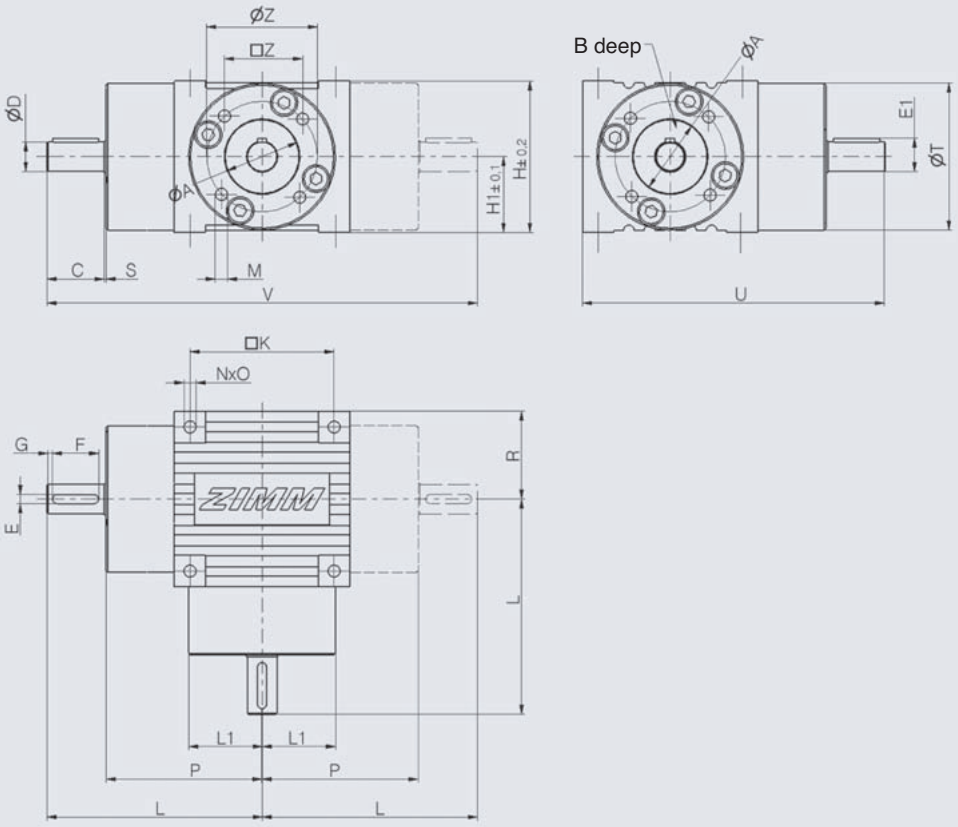
- Housing material: GGL 20
- Bevel gears: straight-toothed, gas nitrated
- Rolling bearing
- Lifetime lubrication with synhetic oil
- Temperature range -10°C to +90°C
- Ratio i = 1:1
- Max. speed max. 1500 U/min
- Operating periode max. 20 %
- Repairs: exchange of complete bevel gearbox
- In the higher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

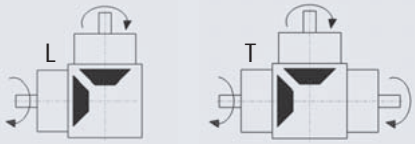
Order example:

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

12.3 KSZ Spiral Toothed



Shaft arrangement



To alter operating direction of drive shafts rotate gearbox 180 degrees

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

Order no.	Ø A_{H7}	B	C	D_{j6}	E_{h9}	E_1	F	G	H	H_1	K	L	L_1	M	N	O	P	R	S	Ø T	U	V	Ø Z	□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_{radial} [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:

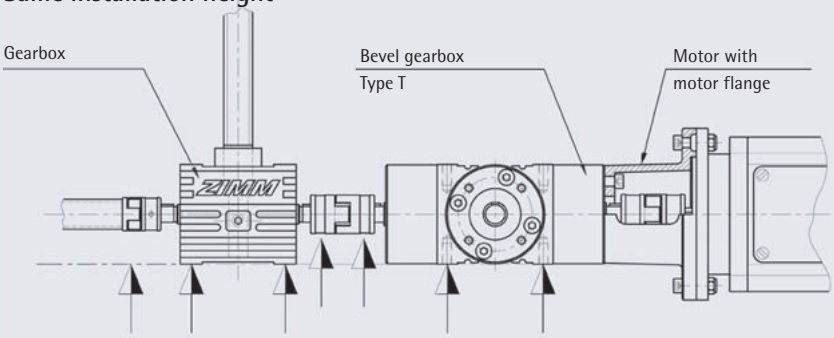
- Housing material: GGL 20
- Minimal backlash
- Quiet operation
- High torque transmission with small size
- Spiral-toothed bevel gears
- Prestressed bevel gear bearings
- Ratio i = 1:1
- Lifetime lubrication with synthetic oil, Oil change only after very high load.
- Sealing using rotary shaft or O-ring seals
- Max. 40 % operating period with1500 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		Shaft arrangement
KSZ	-	25	-	T

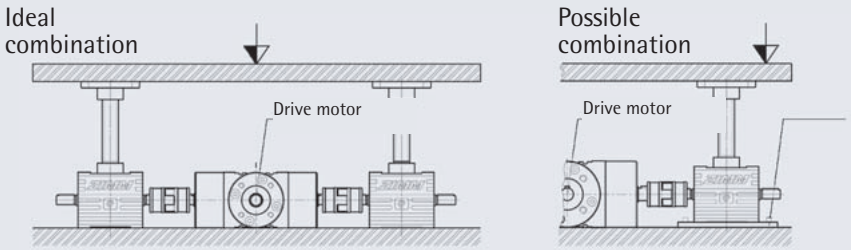
Advantages of KSZ and KGZ

Same installation height



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).

Example - dimensioning of a lifting unit



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

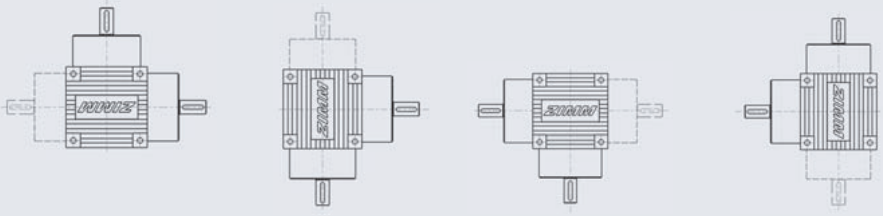
Size MSZ-5 – KSZ-5

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.

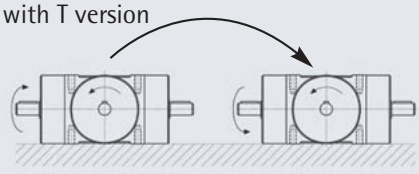
Size MSZ-5 – KSZ-10

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

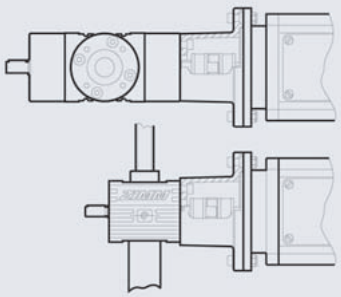


All-round rotatable bevel gearbox

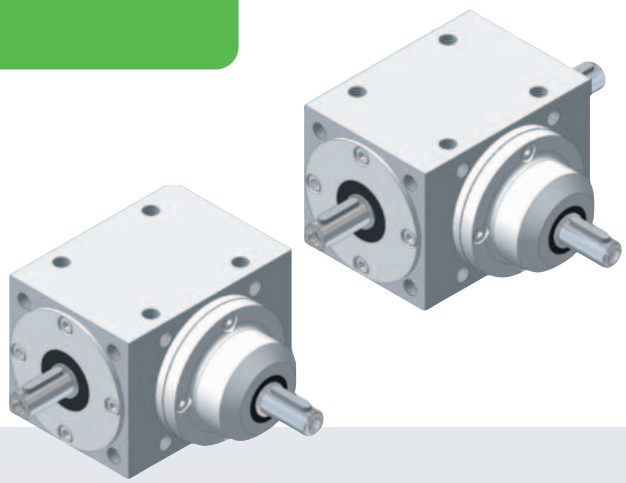
Our bevel gearboxes can be rotated and mounted in all directions around their center line. To change the direction of rotation, the bevel gearboxes can be turned around 180°.

Advantage

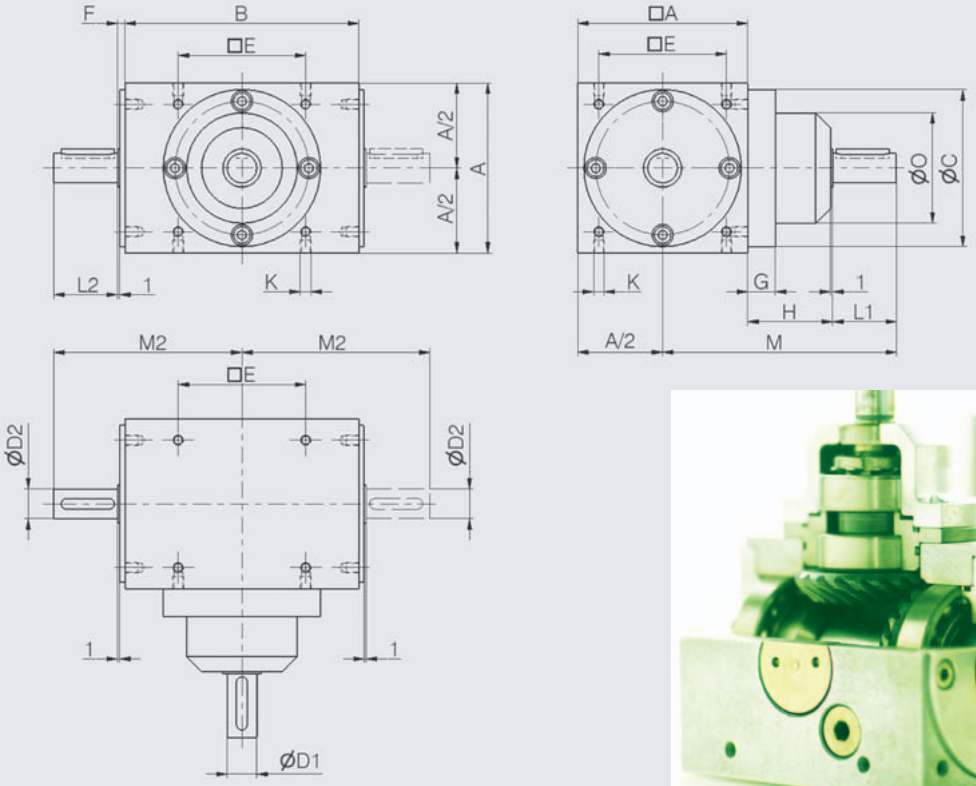
Type T and L have the same arrangement of mounting holes and shaft positions which allow mounting in any direction. KGZ (straight-toothed) and KSZ (spiral-toothed) gearboxes also have the same dimensions.



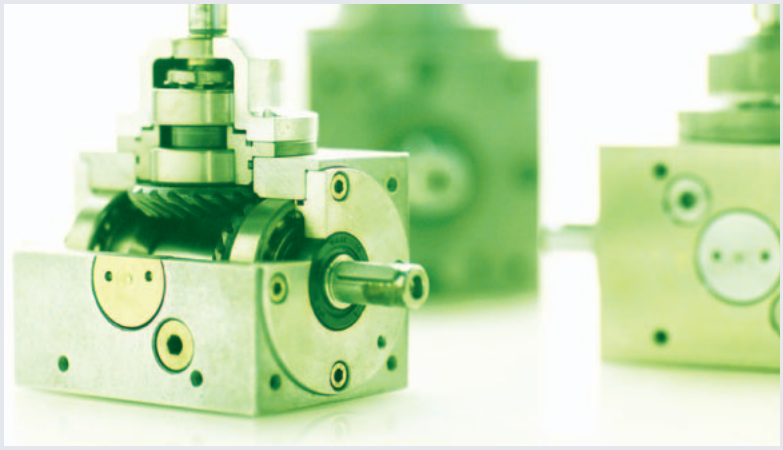
The screw jack and bevel gearbox have the same arrangement of mounting holes for mounting of the motor flange.



12.4 KST Bevel Gearboxes



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



Gearbox size	□A	B	C_{j7}	D_{1j6} D_{2j6}	□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

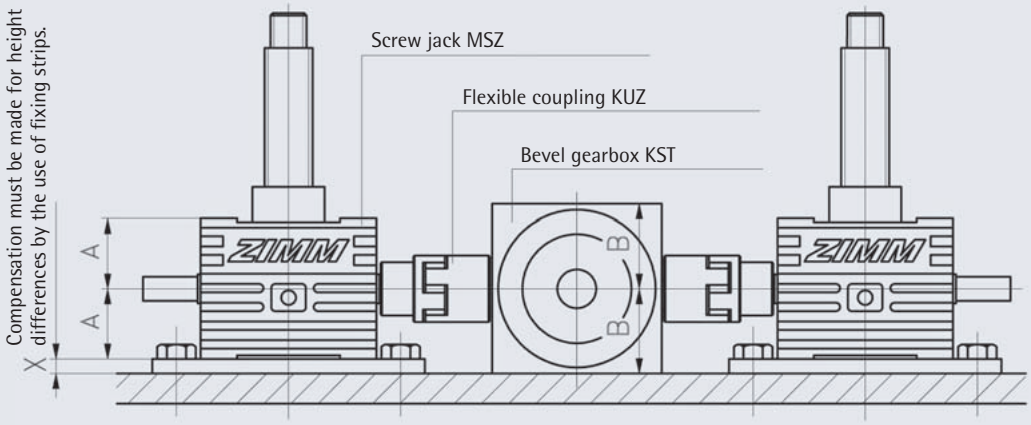
$K_{deep} = K \cdot 1,5$

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 +/- 15µ 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

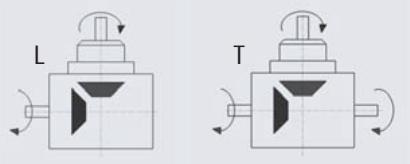


Specific features:
For operating periods of more than 20 %, speed 3000 min^{-1}, lubricating oil and oil inspection glass must be specified with the order.

Size	Perm. torque [Nm] max. M_d	1500min^{-1}	3000min^{-1}	Perm. radial load F_R [N] at shaft end d_1	d_2	Weight [Kg]
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

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

Shaft arrangement

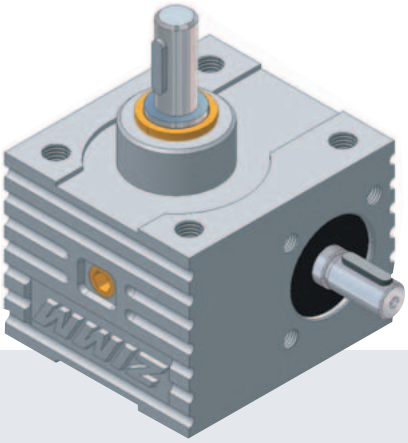


To alter operating direction of drive shafts rotate gearbox 180 degrees

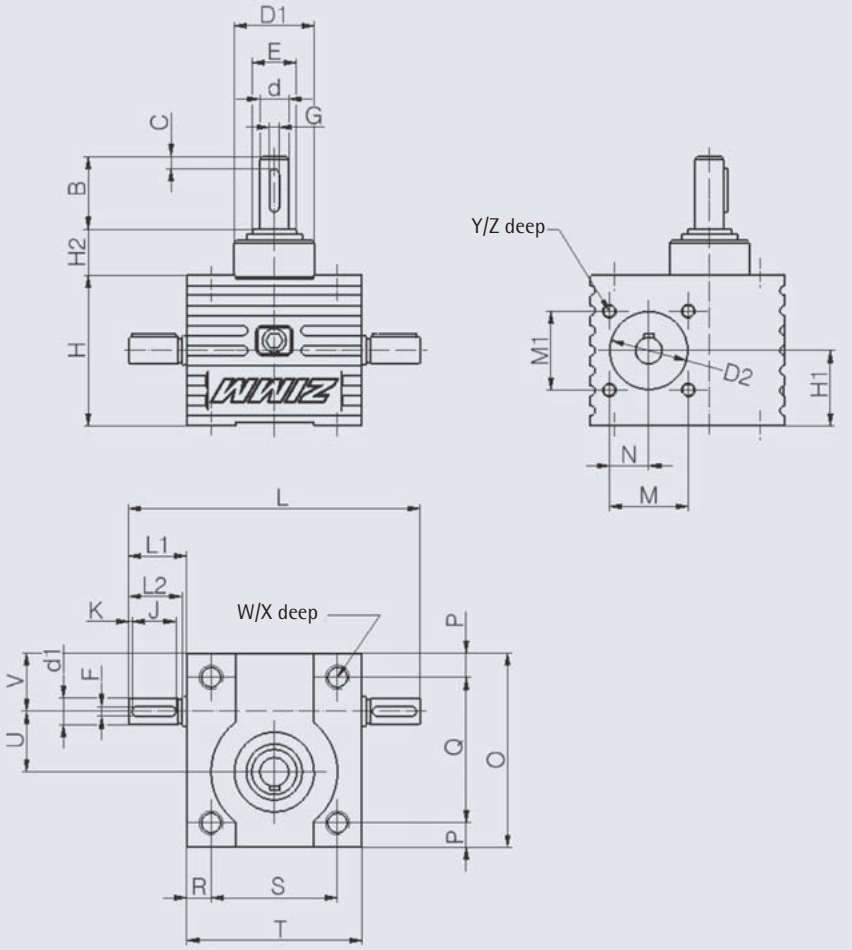
Ordering example:

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

On request we also deliver bevel gearboxes KST with ration 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



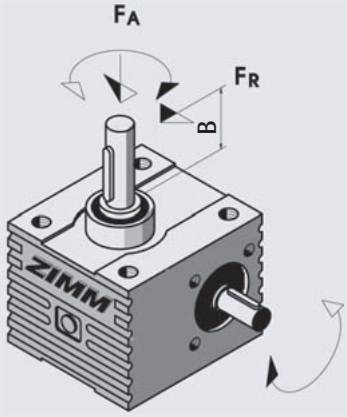
The ZIMM – worm gearbox MSG features especially by its high axial load capacity.

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

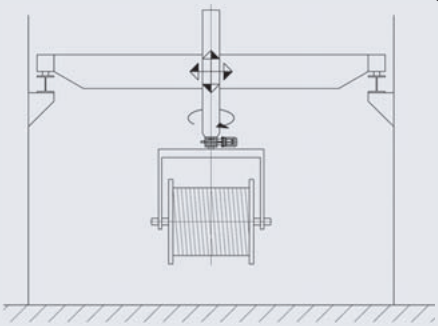


The ZIMM – worm gearbox MSG features high axial load capacity.

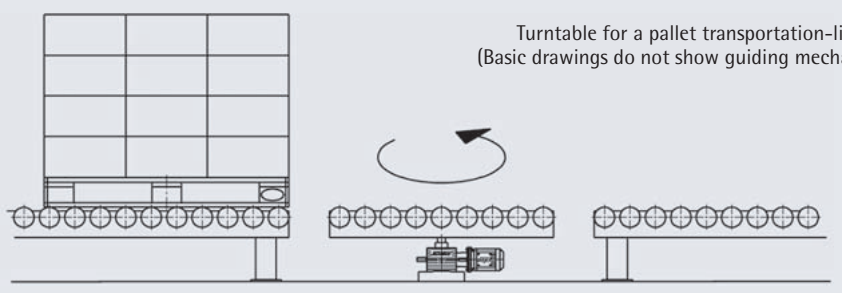
Type	F_A[kN] max. axial load	Input speed 500 U/min		Input speed 1500 U/min		Reduction	F_R[N] max. radial load	B [mm]
		M_1[Nm] max. input torque	M_2[Nm] max. output torque	M_1[Nm] max. input torque	M_2[Nm] max. output torque			
MSG-5-L	5	4,3	43,7	2,6	30,4	16:1	360	30
MSG-5-N	5	10,4	35,8	6,4	23,0	4:1	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

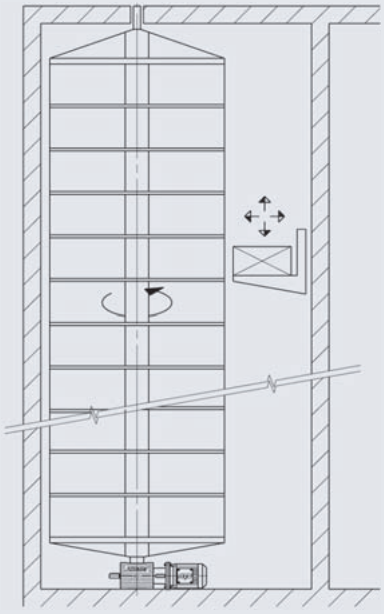
Turning device mounted on a selfdriving system
(Basic drawings do not show guiding mechanisms)



Portal crane robot for cable drums



Turntable for a pallet transportation-line
(Basic drawings do not show guiding mechanisms)



Automated turning magazine

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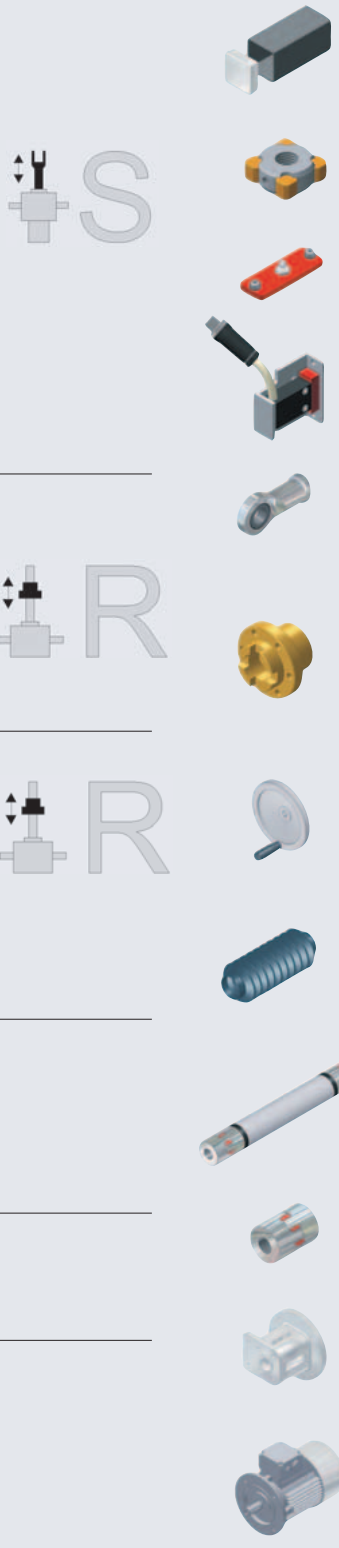
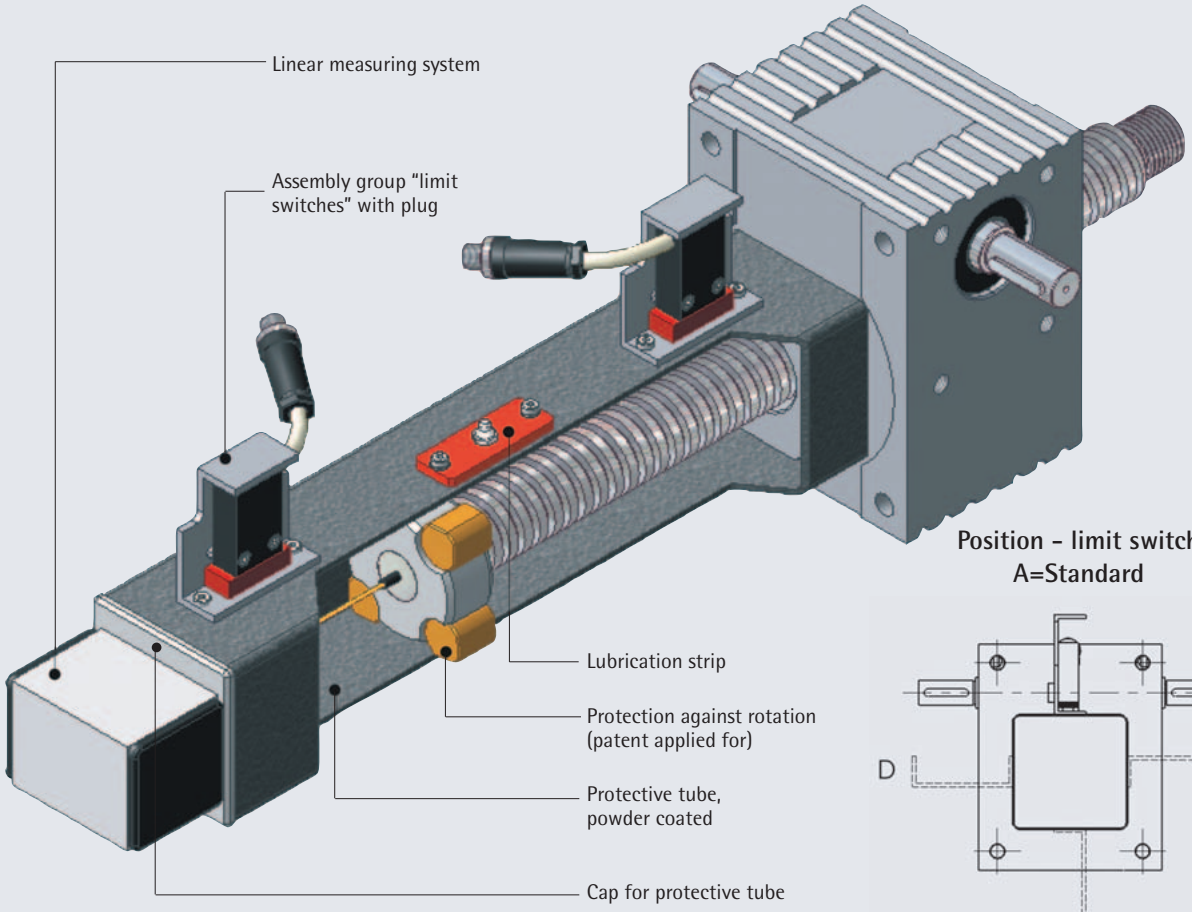
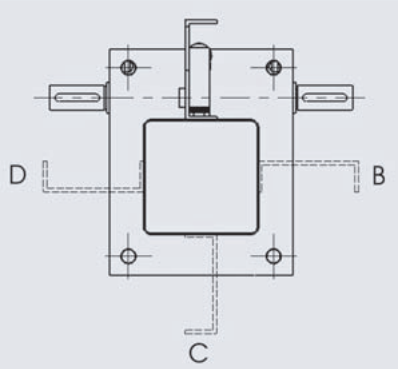


14.1.1 System Drawing: Assembly Group "Protective Tube" Standing Version S



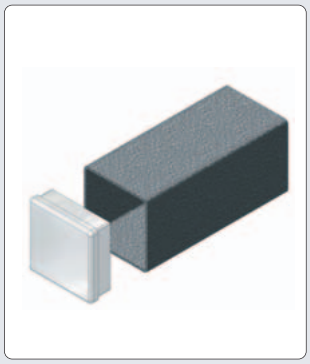
Position - limit switch
A=Standard



Safety cutoff

Tip: Chose 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.

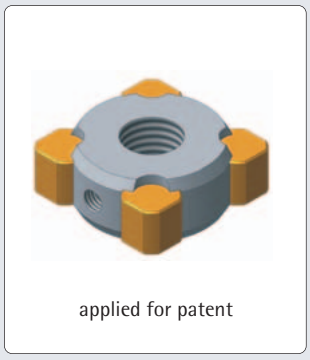
14.1 For Standing Version S



14.1.2 Protective tube SRO with cap

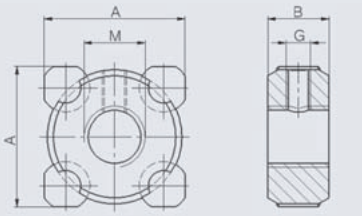
Material: steel, powder coated/cap: aluminium

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



applied for patent

14.1.3 Protection against rotation VS

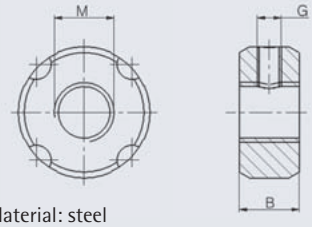


Protection against rotation is required to prevent the screw from rotating or when used in combination with limit switches or rod end KGK.
Material: steel, bronze

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

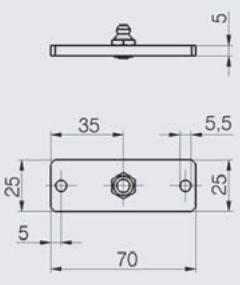
14.1.4 Escape protection AS



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"
Material: aluminium anodiced

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

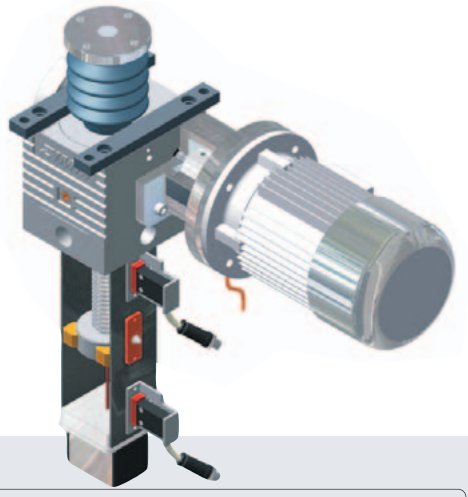
Order no.: MSZ-SL

For lubrication please use ZIMM-GREASE-UNI.

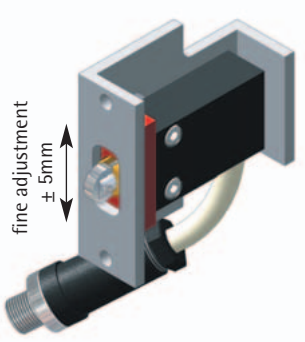
At ZIMM available in 1kg cans.

Order no.:
ZIMM-GREASE-UNI 1 kg

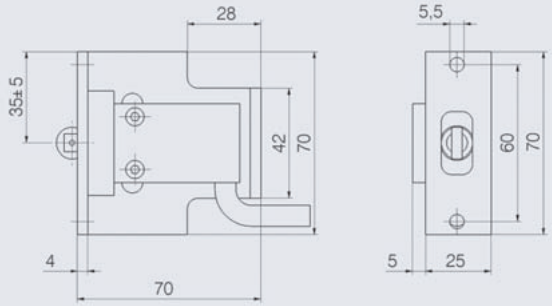
If you require more than one lubrication strip please advise. The following mounting positions can be specified:
A (= standard), B, C or D



14.1.6 Limit Switch

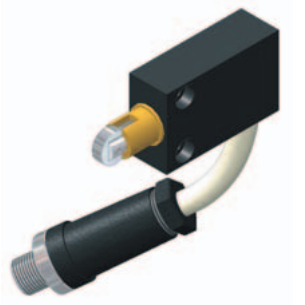


Assembly group "limit switch" ESSET

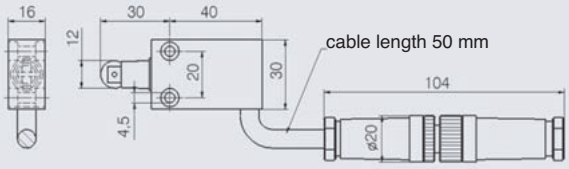


Assembly group consist of:
1 limit switch with 5-pole plug and bushing for cable Ø 6 to 8 mm
1 fixing angle (aluminium)
1 distance piece (plastic)
2 screws M4
1 strip with thread 2xM4 (steel)
2 screws M5x8
2 spring washers for M5

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



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

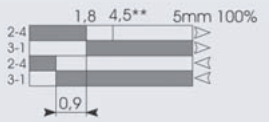
Order no.:
MSZ-ES

Control element
Switch diagram
Connection designation acc. EN50 013

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

Skip switching elements
1 S + 1 Ö

switching element closed
switching element opened

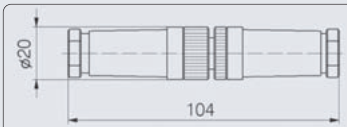


Technical data:

Type: Siemens	
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:	10^7 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

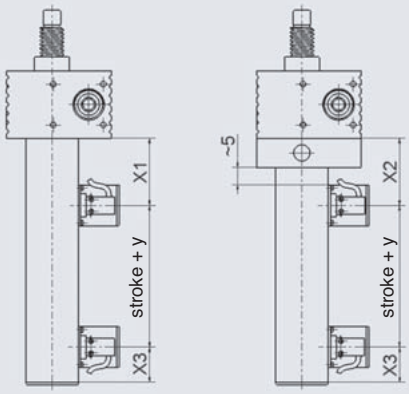


Plug (ES sided)

for cable Ø 6 to 8 mm
M12x1, type of protection: IP67
Order no.: MSZ-ES-STE

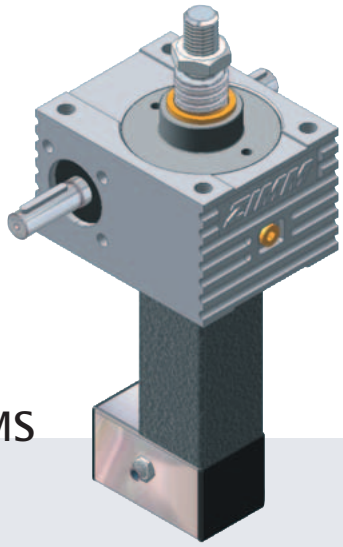
Bushing
for cable Ø6 to 8 mm
M12x1, type of protection: IP67
Order no.: MSZ-ES-BU
nominal voltage max. 125 V AC

Mounting positions of limit switches

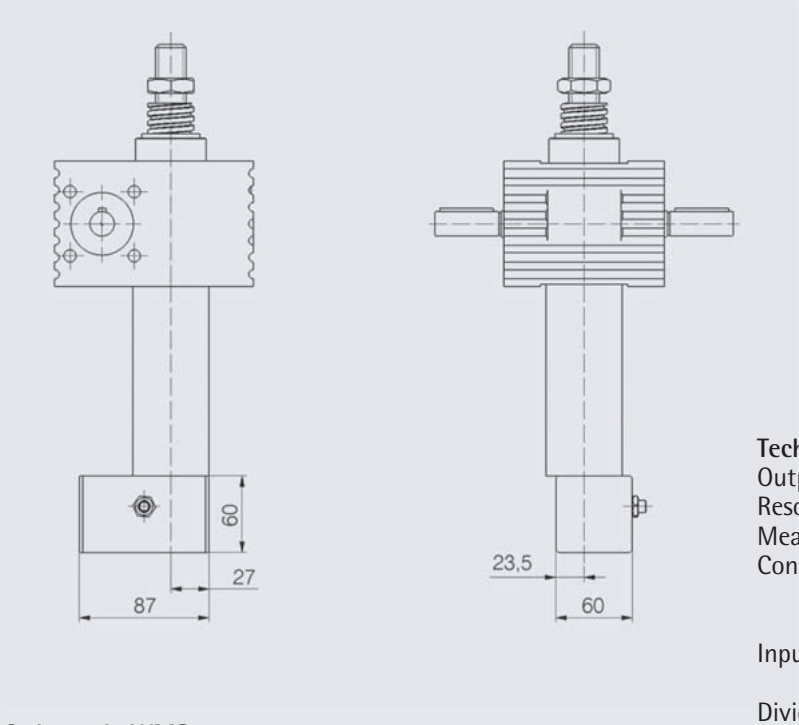


The values X1, X2 and X3 change with MSZ with ball screw KGT, stroke + Y remain.

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



14.1.7 Analog, Absolute Linear Measuring System WMS



The new analog and absolute linear measuring system saves time in construction and production: The linkage potentiometer is situated at the end of the protective tube and will be delivered pre-assembled with plug and female plug (incl. 2m cable).

Technical data

Output type	Potentiometer 1 k Ω
Resolution	Infinite
Measuring range	250, 500, 1000
Connection	plug M8x1, 3-pole, female plug with 2m cable
Input voltage	max. 32 V DC at 1 k Ω (max. performance 1 W)
Divider resistance	1 k Ω ±10%,
Work range	-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 k Ω
(other values on request, e.g. 10 k Ω)

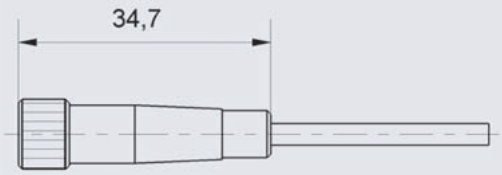
Linearity
L35 = ±0,35%

Accuracy of the linear measuring system WMS

Linearity	±0,35% referring to measuring range
Positioning accuracy	±0,35% referring to measuring range e.g.: Type up to 250mm → ± 0,875mm
Repeat accuracy	±0,035% referring to measuring range e.g.: Type up to 250mm → ± 0,0875mm

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

Plug (integrated)



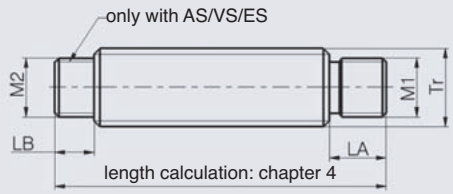
Female plug
(incl. 2m cable)

Pin assignment of female plug

1	brown	Poti +
3	blue	GND
4	black	slider

14.1 For Standing Screw S

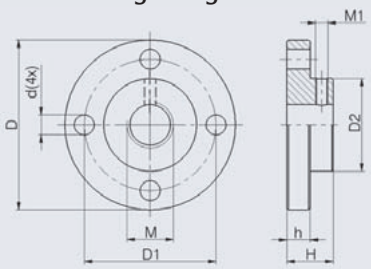
14.1.8 Trapezoid threaded screw MSZ-..S-Tr



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

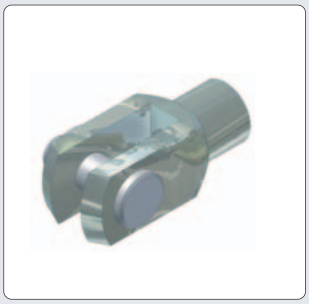
Order no.	Tr	M1	LA	M2	LB
MSZ- 5-S-Tr	Tr 18x4	M 12	29	M12	15
MSZ- 10-S-Tr	Tr 20x4	M 14	32	M14	20
MSZ- 25-S-Tr	Tr 30x6	M 20	38	M20	20
MSZ- 50-S-Tr	Tr 40x7	M 30	53	M30	30
MSZ-100-S-Tr	Tr 50x8	M 36	76	M36	30
MSZ-150-S-Tr	Tr 60x12	M 42x2	48	M48x2	30
MSZ-250-S-Tr	Tr 80x16	M 56x2	58	M64x3	30
MSZ-350-S-Tr	Tr 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

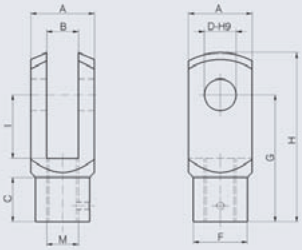


Order no.	ØD	ØD1	ØD2	M	Ød	h	H	M1
MSZ- 5-BF	65	48	29	M 12	9	7	20	5
MSZ- 10-BF	80	60	38	M 14	11	8	21	6
MSZ- 25-BF	90	67	46	M 20	11	10	23	8
MSZ- 50-BF	110	85	60	M 30	13	15	30	8
MSZ-100-BF	150	117	85	M 36	17	20	50	10
MSZ-150-BF	170	130	90	M 42x2	21	25	50	10
MSZ-250-BF	210	165	120	M 56x2	26	30	60	12
MSZ-350-BF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



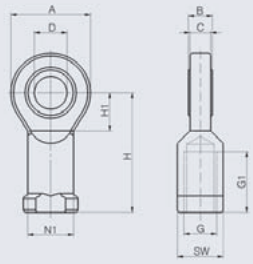
14.1.10 Forked head GK



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

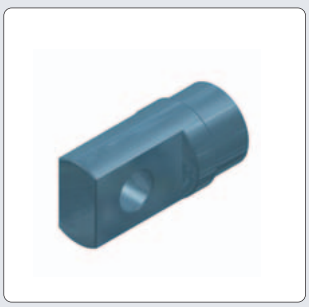
14.1.11 Rod end KGK



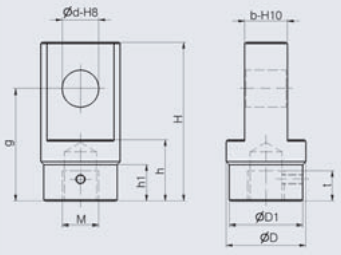
Order no.	A	B	C	D	G	G1	H	H1	SW	N1
MSZ- 5-KGK	34	10	8	12	M12(x1,75)	23	50	17,5	18	17
MSZ- 10-KGK	40	12	10	15	M14(x2)	30	61	20	21	20
MSZ- 25-KGK	53	16	13	20	M20(x2,5)	40	77	27,5	32	27,5
MSZ- 50-KGK	73	22	19	30	M30(x3,5)	56	110	37	41	40
MSZ-100-KGK	82	25	21	35	M36(x4)	60	125	42	50	47
MSZ-150-KGK	112	35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



14.1.12 Pivot bearing head SLK

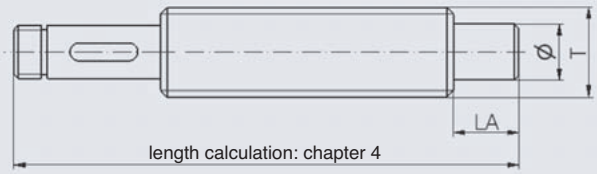


Order no.	H	D	D1	d	g	b	h	h1	t	M
MSZ- 5-SLK	65	30	29	12	48	18	25	20	22	M12
MSZ- 10-SLK	80	40	39	14	56	24	25	20	25	M14
MSZ- 25-SLK	110	50	46	20	80	30	45	25	25	M20
MSZ- 50-SLK	130	60	60	30	92	35	50	-	33	M30
MSZ-100-SLK	144	85	85	35	108	40	65	-	55	M36
MSZ-150-SLK	210	100	90	50	155	57	90	50	70	M42x2
MSZ-250-SLK	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

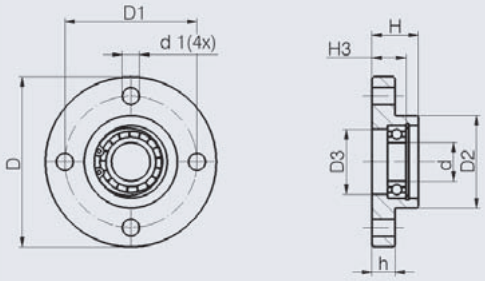
14.2.1 Trapezoid threaded screw MSZ-..-R-Tr



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

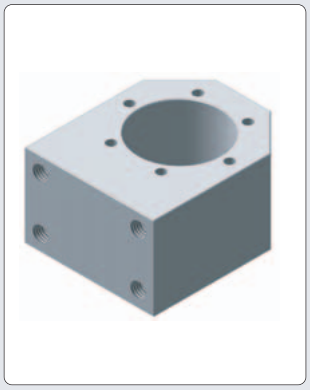


Material: steel, short-time nitrided
The ball bearing is already pre-assembled.
Identical to previous SHZ type

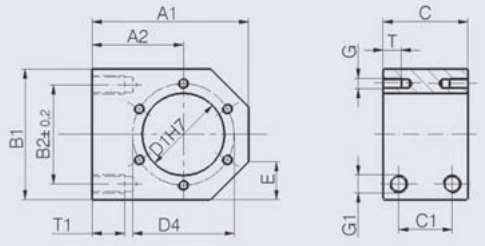
The opposed bearing plate improves the quiet running and the buckling resistance of the lifting gear.

Òrder 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



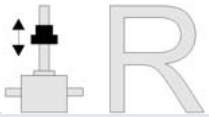
Order no.	for gearbox	A1	A2max*	A2min*	Weight
TRMFL-18x4	MSZ- 5	60	35,0	25,0	0,7 Kg
TRMFL-20x4	MSZ- 10	68	37,5	29,0	0,9 Kg
TRMFL-30x6	MSZ- 25	75	42,5	32,5	1,1 Kg
TRMFL-40x7	MSZ- 50	120	70,0	50,0	4,5 Kg

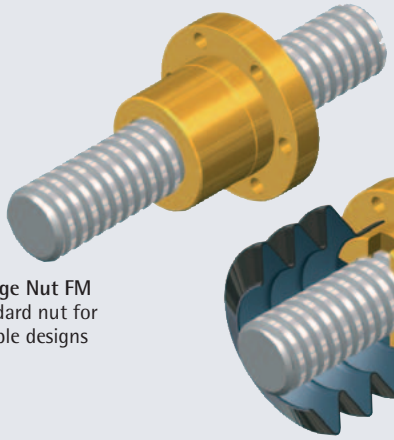
Order no.	B1	B2	C	C1	G1	D1	D4	GxT
TRMFL-18x4	50	34	40	24	M 8x15	28	38	M 5x10
TRMFL-20x4	58	39	40	24	M 8x15	32	45	M 6x12
TRMFL-30x6	65	49	40	24	M10x15	38	50	M 6x12
TRMFL-40x7	100	76	65	41	M14x25	63	78	M 8x14

* Supplied ex works with size A2max!

Material: steel, short-time nitrided

14.2.4 Nuts

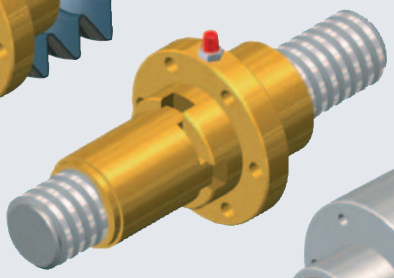




Flange Nut FM
Standard nut for simple designs

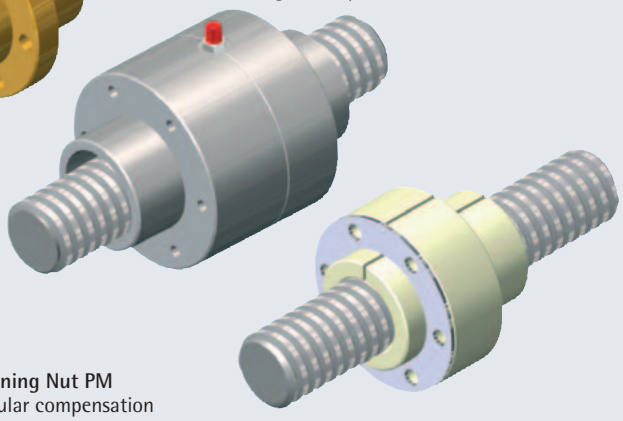
Design patent

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



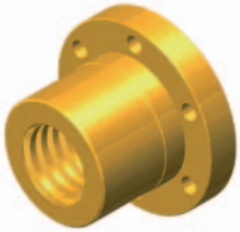
Safety Nut SIFA
In combination with Duplex Nut or Self-Aligning Nut. Function and use see chapter 8

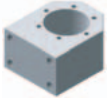
Registered patent



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)

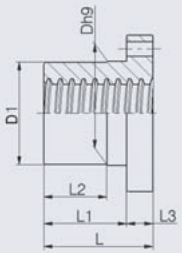
Greaseless Nut FFDM
- Specially designed for non-lubricated operation (e.g. textiles, foodstuffs, chemicals,...)
- Possibility to fix 2 flanges
- Reinforced with stainless steel disk

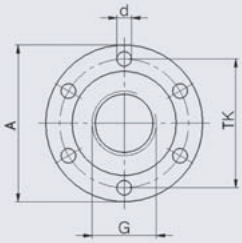




Driving flange TRMFL see 14.2.3 (previous page)

Flange Nut MSZ..-FM



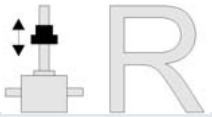


Order no.	G	Dh9	TK	A	d (6x)	L	L1	L2	L3
MSZ- 5-FM[2)]	Tr 18x4	28	38	48	6	35	23	15	12
MSZ- 10-FM[2)]	Tr 20x4	32	45	55	7	44	32	24	12
MSZ- 25-FM[2)]	Tr 30x6	38	50	62	7	46	32	24	14
MSZ- 50-FM[2)]	Tr 40x7	63	78	95	9	66	50	38	16
MSZ-100-FM	Tr 50x8	72	90	110	11	75	57	43	18

[2)] identical to previous SHZ type
Material: 2.1090.01 (RG7 red brass alloy)
Quality: 7H DIN 103
right-handed (left-handed, double-pitch on request)

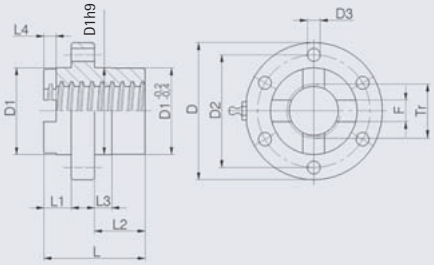
D1=D-0,2 mm

14.2.4 Nuts



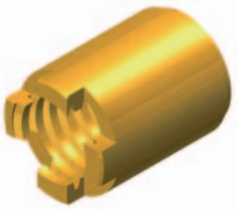
Design patent

Duplex Nut MSZ-..-DM



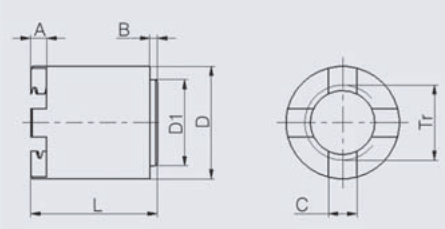
Order no.	Tr	D	D1	D2	D3	L	L1	L2	L3	L4	F
MSZ- 5-DM[2)]	Tr 18x4	52	29	40	6	45	13	20	12	6	6
MSZ- 10-DM[2)]	Tr 20x4	68	39	54	7	45	13	20	12	6	8
MSZ- 25-DM[2)]	Tr 30x6	79	46	61	7	50	13	23	14	7	12
MSZ- 50-DM[2)]	Tr 40x7	95	60	78	9	70	18	36	16	8,5	15
MSZ-100-DM	Tr 50x8	130	85	108	11	90	18	54	18	10	20
MSZ-150-DM	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

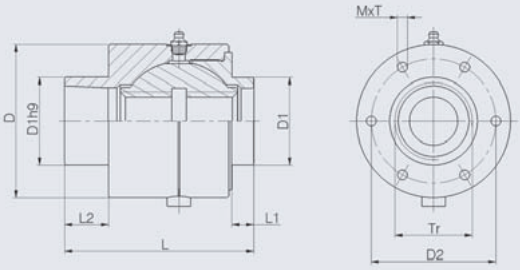


Order no.	Tr	A	B	C	D	D1	L
MSZ- 5-SIFA[2)]	Tr 18x4	6	3	6	24	20	28
MSZ- 10-SIFA[2)]	Tr 20x4	6	3	8	28	23	42
MSZ- 25-SIFA[2)]	Tr 30x6	7	4	12	38	33	47,5
MSZ- 50-SIFA[2)]	Tr 40x7	8,5	4	15	50	46	67
MSZ-100-SIFA	Tr 50x8	10	5	20	65	59	88
MSZ-150-SIFA	Tr 60x12	10	5	20	70	64	101
MSZ-250-SIFA	Tr 80x16	10	6	25	100	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
Material: RG7

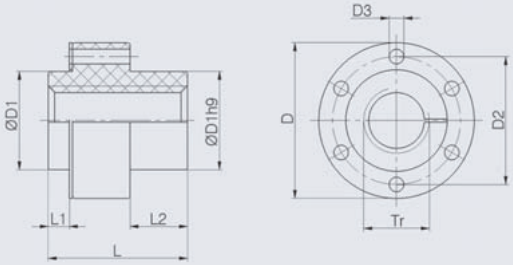
Registered patent

Self-Aligning Nut MSZ-..-PM



Please turn over! ☞
You will find a detailed description
on the next page.

Greaseless Nut MSZ-..-FFDM



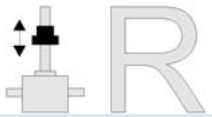
Order no.	Tr	D	D1	D2	D3	L	L1	L2	kN max. limit load[1)]
MSZ- 5-FFDM[2)]	Tr 18x4	52	29	40	6	53	13	20	1
MSZ-10-FFDM[2)]	Tr 20x4	68	39	54	7	53	13	20	2
MSZ-25-FFDM[2)]	Tr 30x6	79	46	61	7	59	13	23	5
MSZ-50-FFDM[2)]	Tr 40x7	95	60	78	9	85	15	35	7

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

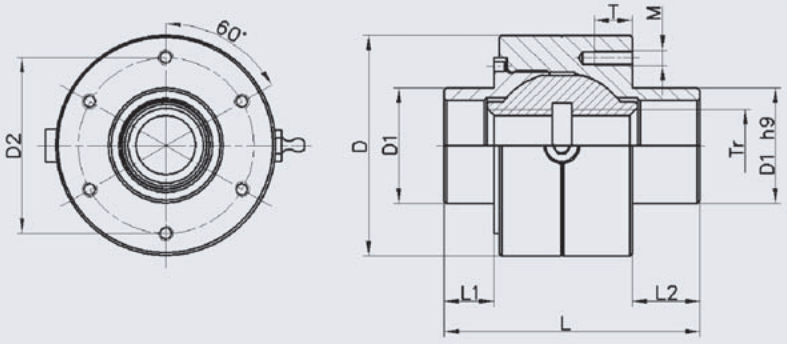
Quality: 7H DIN 103, right-handed

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

14.2.4 Nuts / Self-Aligning Nut PM

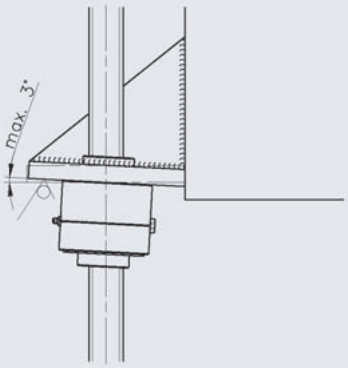


Registered patent



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.



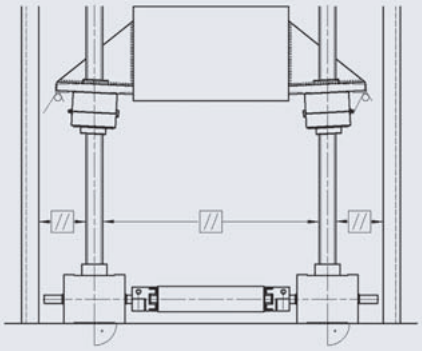
Advantage
- 2 options to fix the bellows
- Grease nipple or connecting thread for centralised lubrication
- Max. 3° angular compensation

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)

Safety nut for PM on request.

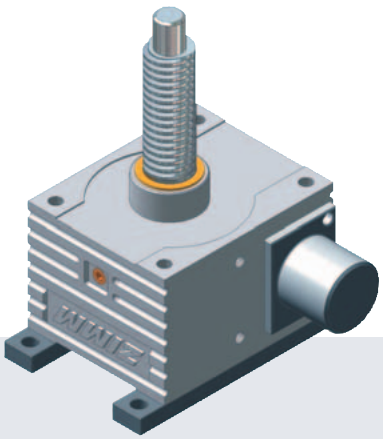


Order no.	Thread Tr d x P	D	D1	D2	M x T	L	L1	L2
MSZ- 5-PM[2)]	18x4	52	29	40	5x12	78	13	21
MSZ- 10-PM[2)]	20x4	74	39	60	6x12	83	13	24
MSZ- 25-PM[2)]	30x6	88	46	70	6x12	95	13	27
MSZ- 50-PM[2)]	40x7	105	60	85	8x16	129	15	30
MSZ-100-PM new	50x8	148	85	120	10x20	190	15	45
MSZ-150-PM new	60x12	165	90	125	12x24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

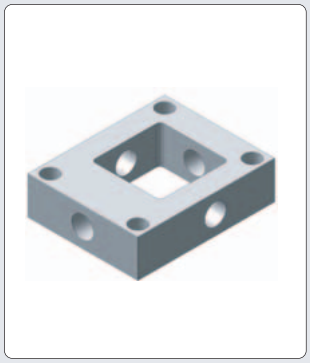
[2)] identical to previous SHZ type SHZ-..-PM1

Higher quality and service life
- +/- 3° angular compensation
- large grease reservoir

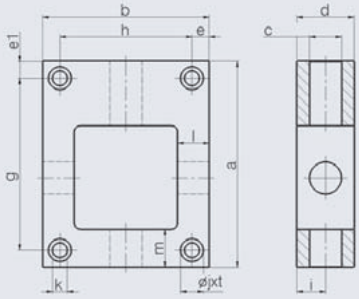
Saving of time and costs by
- simplified customer construction
- simplified production
- simplified mounting
- no additional components required
- long service intervals



14.3 For S and R Version



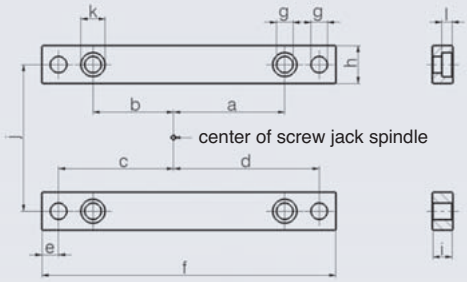
14.3.1 Hinged bearing plate KAR



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	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

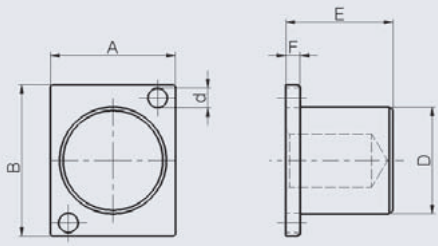
14.3.2 Fixing strips MSZ-..-BFL



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

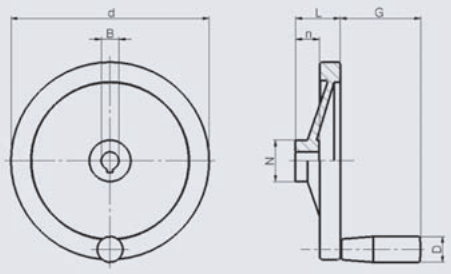
14.3.3 Protective cap MSZ-..-SK



Order no.	D	d	A	B	E	F	Screws DIN 912
MSZ- 5-SK	30	7	50	50	32	8	M 6x16
MSZ-10-SK	30	9	50	50	35	8	M 8x16
MSZ-25-SK	40	9	60	60	53	8	M 8x16
MSZ-50-SK	60	11	70	85	56	8	M 10x16
MSZ-100/150-SK	56	13	110	130	70	20	M12x25
MSZ-250-SK	60	13	115	130	82	25	M12x25

for sizes bigger than MSZ-250 on request
Material: plastic, POM
Compatible with MSZ and bevel gearboxes (KGZ, KSZ)
identical to previous SHZ type

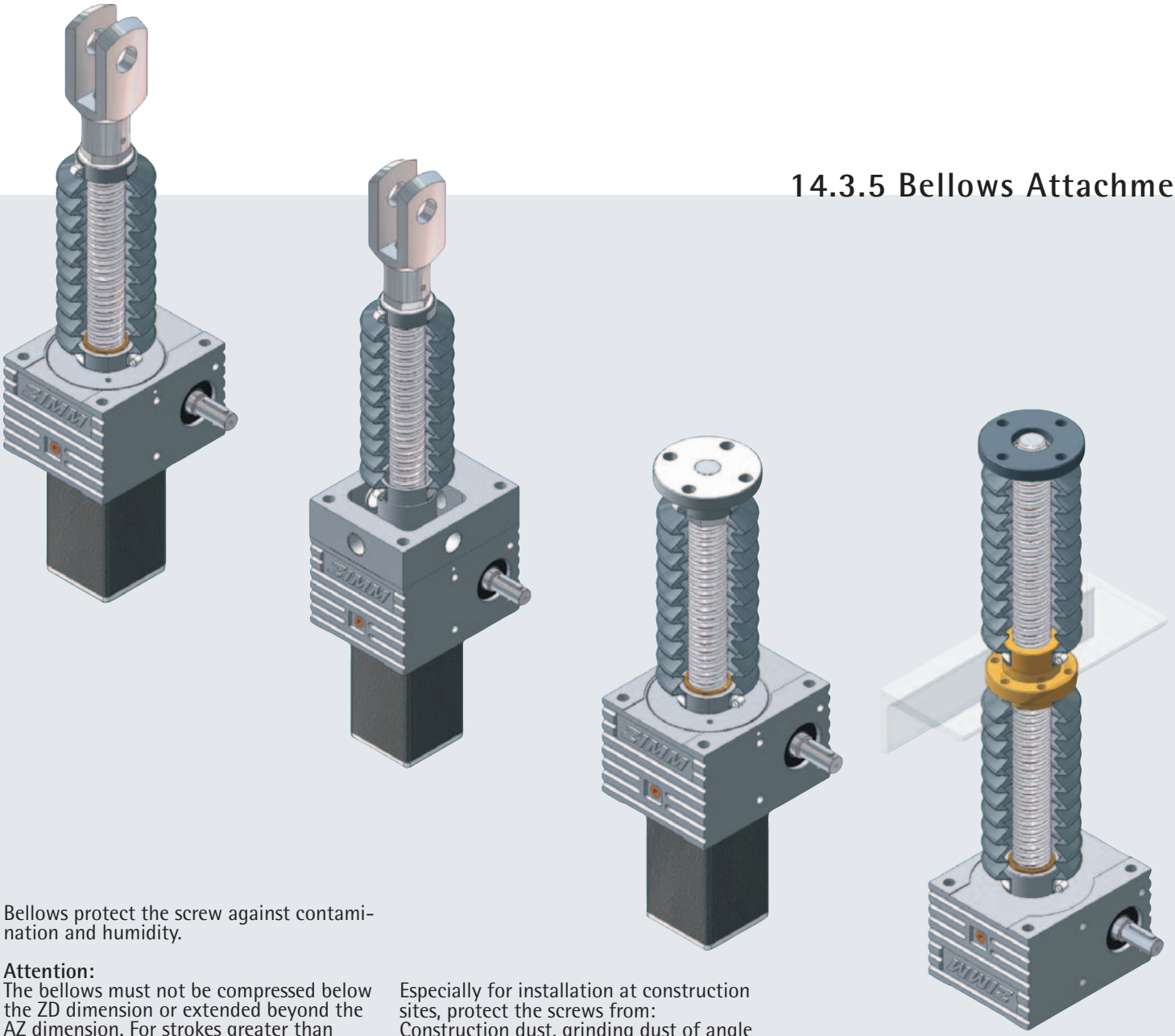
14.3.4 Handwheel HR



Order no.	d	N	b	n	L	G	D	B H7 rough hole	B H7 with keyway	Weight (kg)
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)

14.3.5 Bellows Attachment

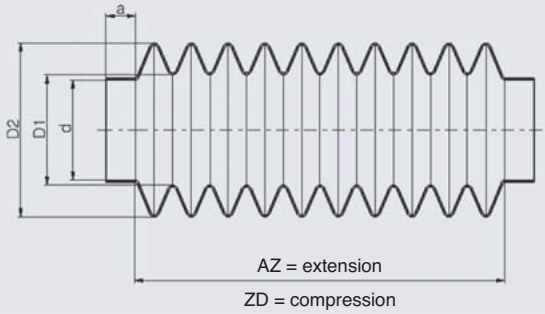


Bellows protect the screw against contamination and humidity.

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 occure! 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

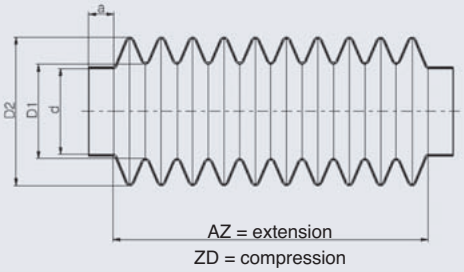


Order no.	a	d	ZD	AZ	Stroke	D1	D2
MSZ- 5-FB-265	10	29	35	300	265	40	76
MSZ- 10-FB-340	10	39	80	420	340	40	80
MSZ- 25-FB-300	15	46	70	370	300	50	83
MSZ- 50-FB-390	15	60	85	475	390	66	102
MSZ-100-FB-285	15	85	75	360	285	85	118
MSZ-150-FB-350	15	90	50	400	350	92	141
MSZ-250-FB-390	15	120	90	480	390	125	166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

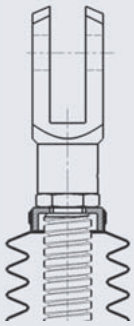
Bellow MSZ- . . -FB square



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

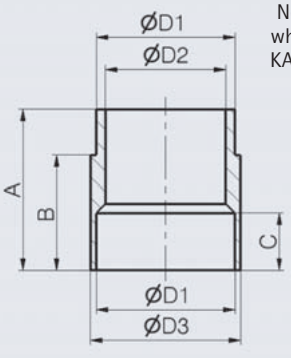
Bushing MSZ-..-FBR



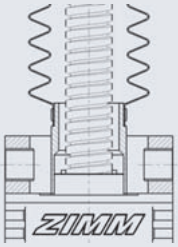
The bushing FBR is used with forked head GK or rod end KGK in order to fix the bellow FB.
Identical with previous SHZ type.
Material: POM (plastic)

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 seperately.

Bellow adapter MSZ-..-FBA



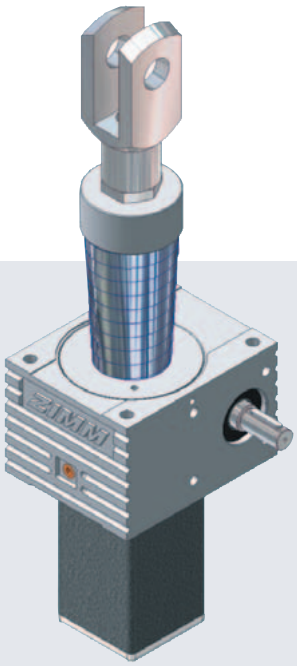
Necessary for fixing a bellow, when the hinged bearing plate KAR is mounted on the spindle side of the gearbox

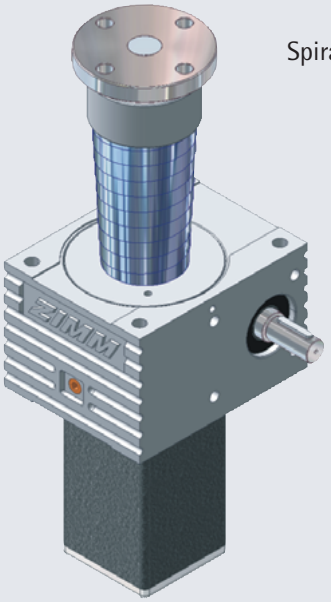


Order no.	D1	D2	D3	A	B	C
MSZ-5-FBA	29	25	32	44	32	20
MSZ-10-FBA	39	30	42	42	32	22
MSZ-25-FBA	46	40	50	57	42	26
MSZ-50-FBA	60	52	65	70	52	40
MSZ-100-FBA	85	80	90	90	72	50
MSZ-150-FBA	90	85	95	100	82	50
MSZ-250-FBA	120	115	125	118	100	60
MSZ-350-FBA	145	140	150	130	112	60
MSZ-500-FBA	170	150	180	172	152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

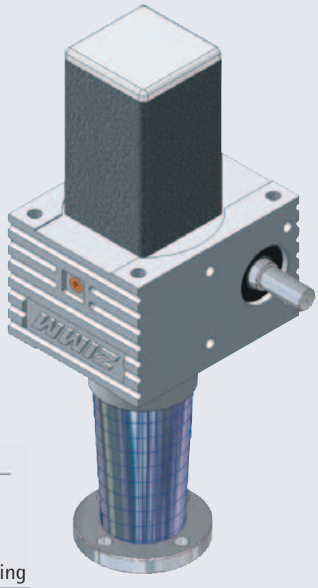
Material: Aluminium or steel

14.3.6 Spiral Springs

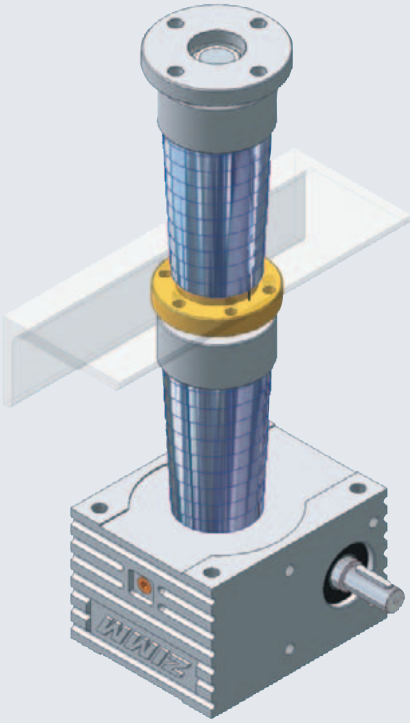


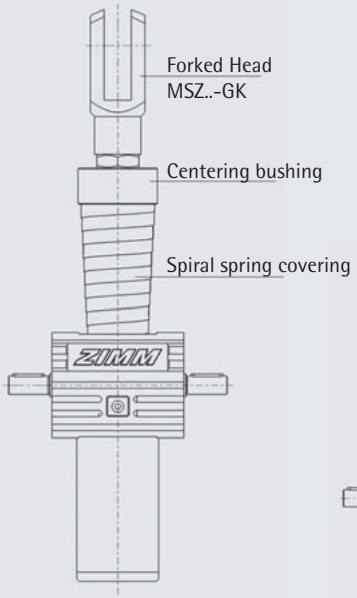


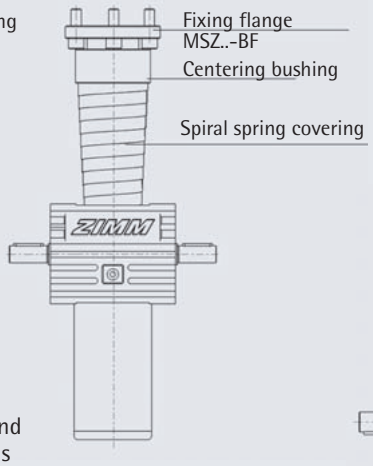
Spiral spring covering
for SN/SL

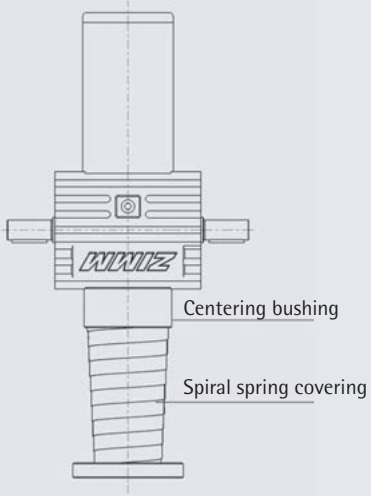


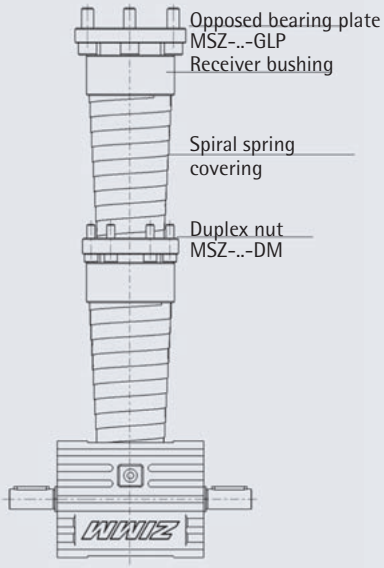
Spiral spring covering
for RN/RL











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 SF

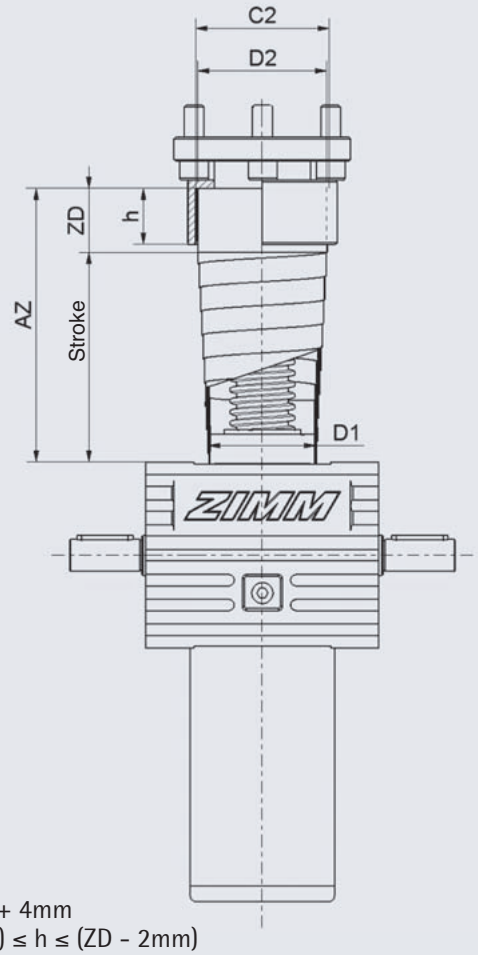
Material: Band steel for springs (blued)

Also available in corrosion resistant material.

Ordering example:

Spiral spring	smallest diameter D1	longest length AZ*	smallest length ZD	horizontal mounting	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.



C2 ≥ D2 + 4mm
(0,6 x ZD) ≤ h ≤ (ZD - 2mm)

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

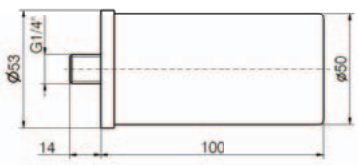
Screw jack MSZ-50			
Type SF	D1	D2	ZD
065-0150-030	65	78	30
065-0250-030	65	85	30
065-0350-050	65	83	50
065-0450-050	**65**	**88**	**50**
065-0550-060	65	88	60
065-0650-060	65	92	60
065-0750-060	65	95	60
065-0900-060	65	98	60
065-0750-075	65	93	75
065-0900-075	65	99	75
065-1100-075	**65**	**107**	**75**
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 ZIMM-Lubricator, Z-LUB

Automatic Lubricator



Stepless adjustment of
1 to 12 months dispensing time
with a 3 mm Allen key

The ZIMM lubricator "Z-LUB" continuously provides the screw with grease.
The lubricator is screwed directly on the lubrication point. It works independent and will be activated by setting up the operating time. It is always possible to control the level of lubricant inside the transparent housing.

Advantages

- Saving time and money due to automatic lubrication
- Longer life time, operation and reliability due to permanent lubrication
- The ZIMM lubricator has an dispensing time between 1 - 12 months

Technical data:

Power generation:	hydrogen gas producing drycells
Adjustment:	stepless 1 to 12 months
Volume:	125ml
Working pressure:	max. 5 bar
Dispensing quantity:	see table below
Operating temperature:	- 20°C to + 55°C ambient temperature
Usage:	The lubricator can be mounted in all positions. Attention: Do not expose the lubricator to direct heat.
Usage period:	Within 2 years of filling date.
Storage temperature:	Recommended at 20°C, +/- 5°C
Weight:	approx. 190 g

Time of dispense / Dispensing quantity

Adjustment	1		3		6		9		12	
Temperature	days	ml/day	days	ml/day	days	ml/day	days	ml/day	days	ml/day
-20°C	50	2,5	140	0,9	270	0,5	360	0,4	500	0,3
4°C	35	3,6	100	1,3	200	0,6	300	0,4	420	0,3
20°C	**30**	**4,2**	**90**	**1,4**	**180**	**0,7**	**270**	**0,5**	**360**	**0,4**
40°C	28	4,5	86	1,5	172	0,7	262	0,5	352	0,4
55°C	25	5,0	80	1,6	160	0,8	250	0,5	340	0,4

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

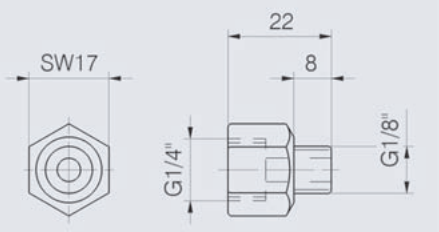
Available grease types:

ZIMM-GREASE-UNI	Standard grease
ZIMM-GREASE-UNI-HT[1)]	High temperature grease[1)]
ZIMM-GREASE-UNI-LT	Low temperature grease
ZIMM-GREASE-UNI-FOOD	Grease for food industry

[1)] Ambient temperature of Z-LUB may not exceed +55°C.

Ordering example:

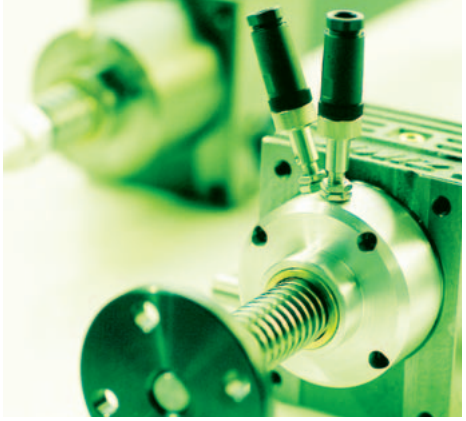
Z-LUB, ZIMM-Lubricator
Filling: ZIMM-GREASE-UNI

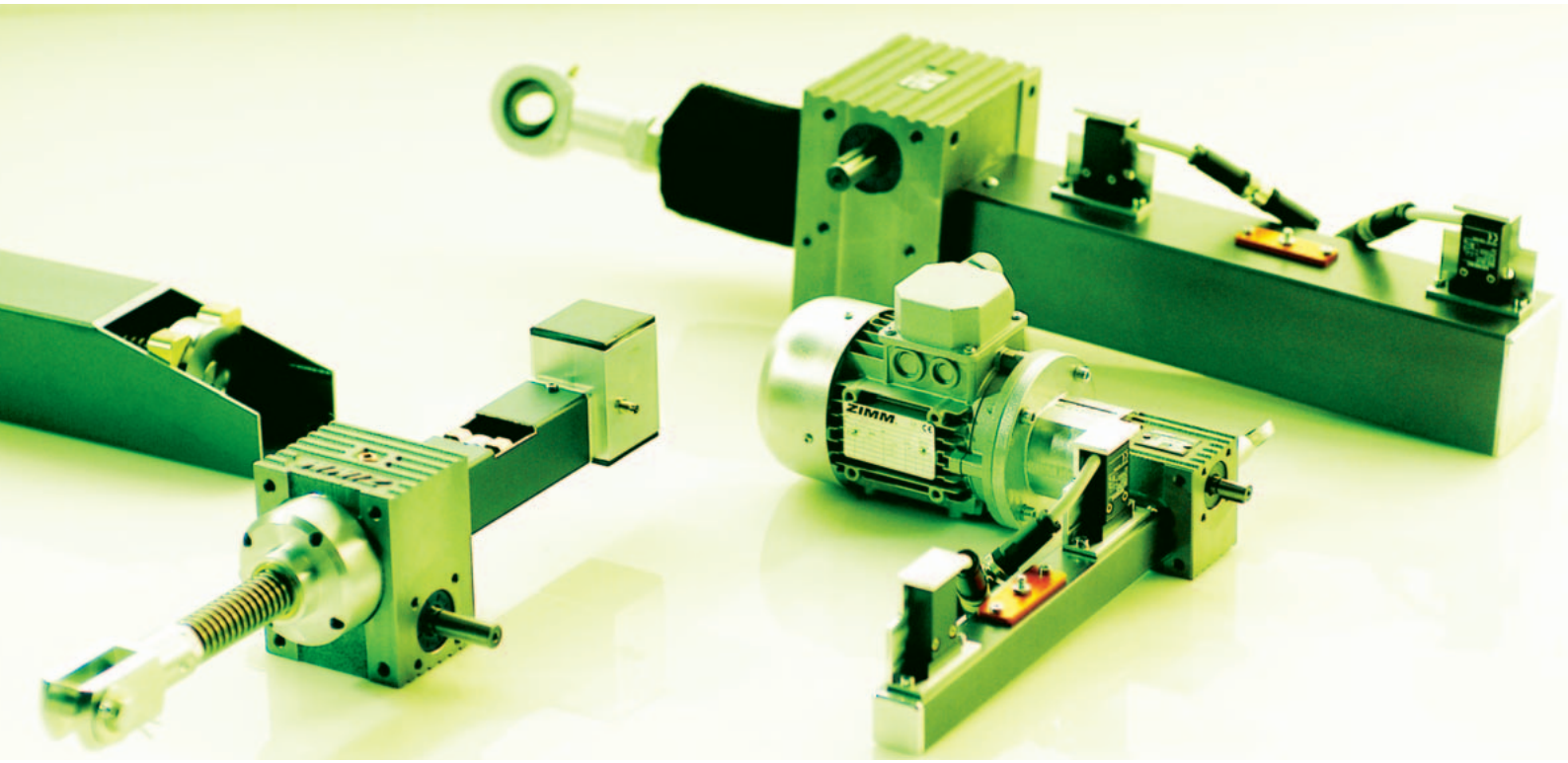


Reducer RS

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





Overview

14.4 + 14.5 Connecting Shafts, Couplings

14.4.1

Connecting Shaft VWZ
- Easy assembly – saving time and costs
- Radial assembly due to splited couplings
- Stepless adjustment due to clamping couplings
- Top design
- Low mass moment of inertia
- Lengths up to 6 meters without pedestal bearing

14.4.2

Pedestal Bearing STL
Used for intermediate bearing of very long dimensioned connecting shafts VWZ and GX

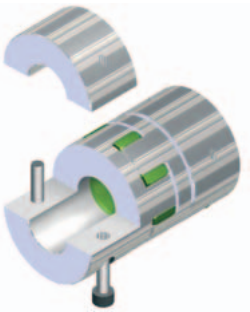
14.4.3

Precision Shaft Joints Extendable KGW
Torque transmission in case of axis offset

14.4.4

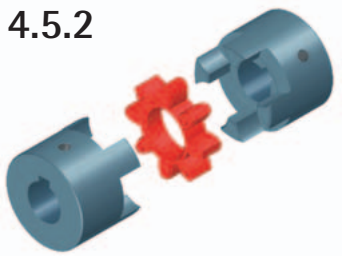
Connecting Shaft GX
Connecting shaft made of a steel tube

14.5.1

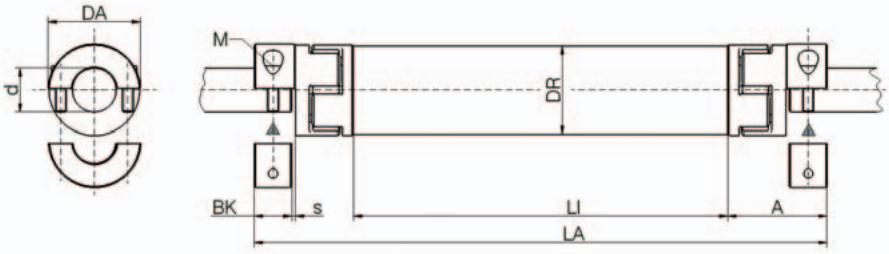


Clamp coupling KUZ-KK
Split coupling design

14.5.2



Standard coupling KUZ
With keyway and locking screw



14.4.1 Connecting Shaft VWZ

Clamping hub with split coupling

- High concentric precision
- Easy radial assembly and disassembly
- High clamping strength
- Quick assembly
- No backlash
- Additional connection securing with pin and keyway not necessary.

Elastomer star

- Heat treatment preempts ageing.
- Permanently free of play and vibration absorption
- Electrical insulating properties
- Shore-hardness 64D
  color: ZIMM-green
  Temperature range: 0°C to +70°C,
  reduced from -20°C to +100°C

Size	DA	DR	BK*	s	LA min	A
VWZ-30	32	30	15	1,5	99	34
VWZ-40	42	40	17	1,5	133	46
VWZ-60	56	60	30	2	177	63
VWZ-60V	67	60	35	2	205	73
VWZ-80	82	80	40	2	249	84
VWZ-100	102	100	50	2	283	97
INOX stainless						
VWZ-40-I	42	40	17	1,5	133	46
VWZ-60-I	56	50	30	2	177	63
VWZ-60V-I	67	60	35	2	205	73

*BK=Clamping length of shaft extension

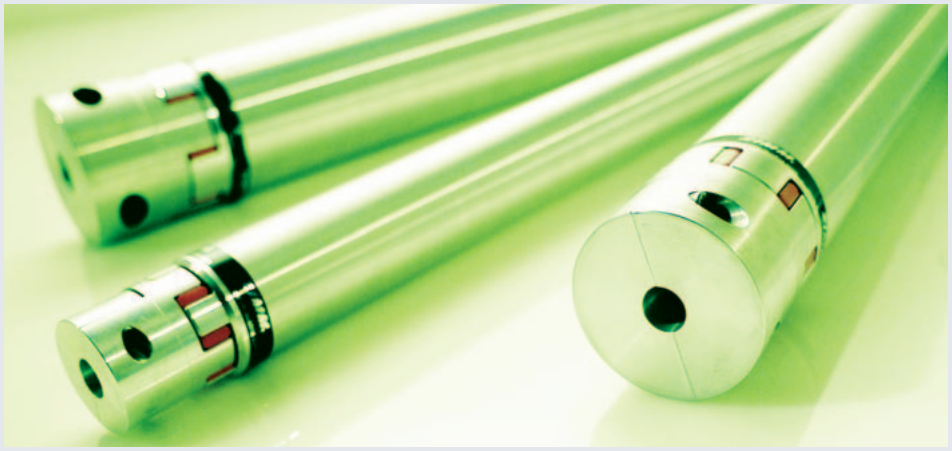
Size	Rated torque** [Nm]	max. torque** [Nm]	Inertia moment per coupling [10^{-3}kgm²]	Inertia moment tube/m [10^{-3}kgm²]	Coupling - type	M 10.9	Screw tightening torque [Nm]	Torsion stiffness per star C_{Tdyn} [Nm/rad]	Torsion stiffness tube/m C_{Tdyn} [Nm/rad]	Weight complete coupling [Kg]	Weight tube/m [Kg]
VWZ- 30	12	25	0,01	0,11	KUZ-KK-16	M 4	4	1650	1104	0,14	0,58
VWZ- 40	17	34	0,08	0,2	KUZ-KK-24	M 5	8	2540	2332	0,36	0,76
VWZ- 60	60	120	0,24	0,8	KUZ-KK-32	M 6	15	7940	8292	0,94	0,97
VWZ- 60V	160	320	0,46	0,8	KUZ-KK-35	M 8	35	13400	8292	1,42	0,97
VWZ- 80	325	650	2,4	3,0	KUZ-KK-45	M10	70	23700	29102	2,98	2,00
VWZ- 100	530	1060	6,0	5,8	KUZ-KK-60	M12	120	55400	58178	4,62	2,47
INOX stainless											
VWZ-40-I	17	34	0.10	0,53	KUZ-KK-24	M 5	7	2540	4002	1,30	1,99
VWZ-60-I	60	120	0,45	1,92	KUZ-KK-32	M 6	12	7940	17350	2,78	3,45
VWZ-60V-I	160	320	1,07	3,41	KUZ-KK-35	M 8	29	13400	30894	4,10	4,19

** max. transmittable torque of clamping hub - in dependence on the bore diameter:

	Ø 11	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32	Ø 38	Ø 42	Ø 55
VWZ- 30	26	33	37							
VWZ- 40	41	52	60	74						
VWZ- 60	60	76	87	109	136	153	175			
VWZ- 60V			120	188	235	260	301			
VWZ- 80			325	406	508	568	650	772	854	
VWZ- 100					570	638	730	866	960	1250
INOX stainless										
VWZ-40-I	33	42	48	59						
VWZ-60-I	48	61	70	87	109	122	140			
VWZ-60V-I			96	150	188	208	241			

Standard
bore diameter "d" [mm]

VWZ-30:	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-60V:	12, 16, 18, 20, 22, 25, 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



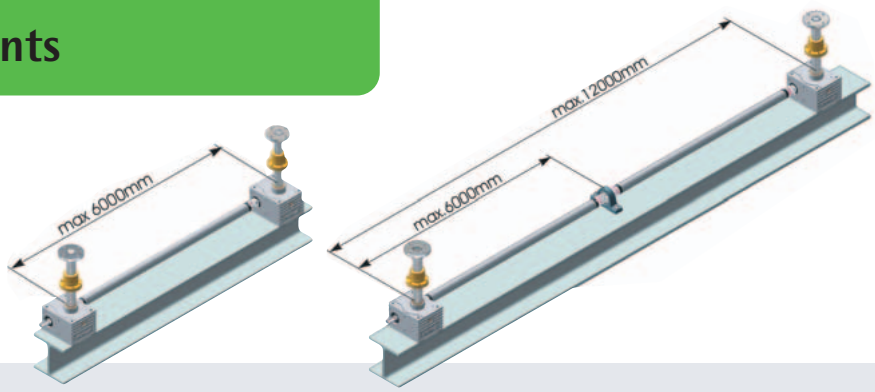
Ordering example:

Size - LA - outer length - Coupling bore

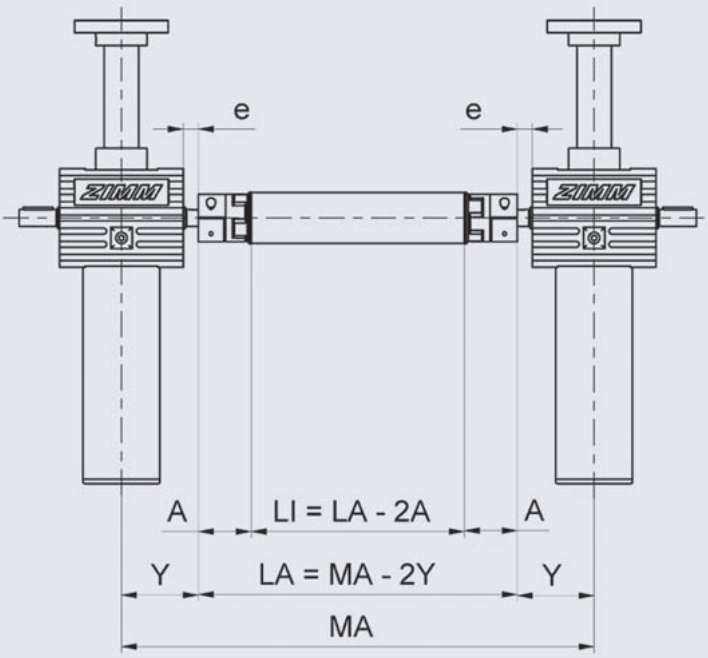
VWZ - 60 - LA 1800 - 20/25

Revolutions

n = 1500 min^{-1}



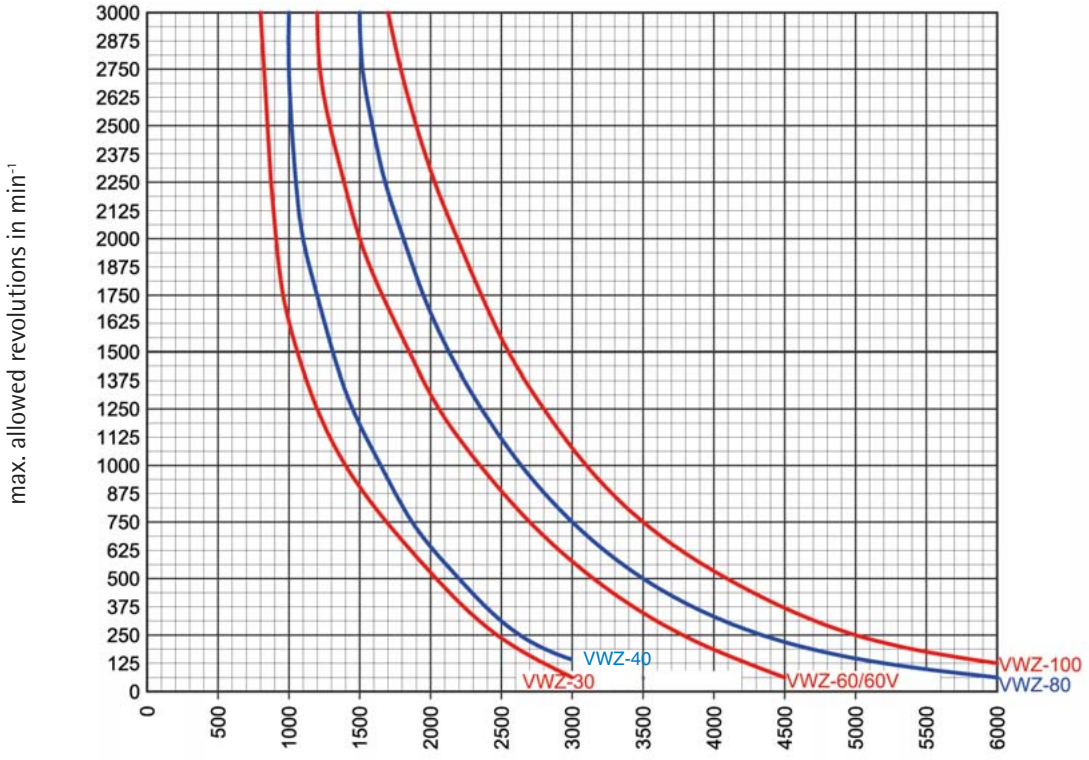
Length Determination

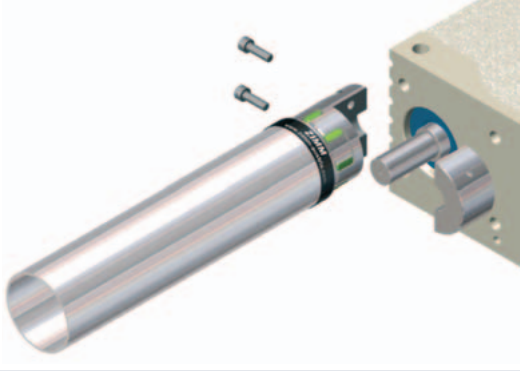


LI = inner length (tube length)
LA = outer length (incl. coupling)
MA = centre distance - gearboxes

Gearbox	Connecting Shaft	e	Y	A
MSZ- 5	VWZ- 30	9	45	34
MSZ- 5	VWZ- 40	7	43	46
MSZ- 5	VWZ- 60	2	38	63
MSZ- 10	VWZ- 30	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-60V	12,5	85	73
MSZ- 50	VWZ- 80	7,5	80	84
MSZ-100	VWZ- 60	30	117,5	63
MSZ-100	VWZ-60V	25	112,5	73
MSZ-100	VWZ- 80	20	107,5	84
MSZ-150	VWZ- 60	30	132,5	63
MSZ-150	VWZ-60V	25	127,5	73
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

Revolutions / Length selection





14.4.1 Connecting Shaft VWZ

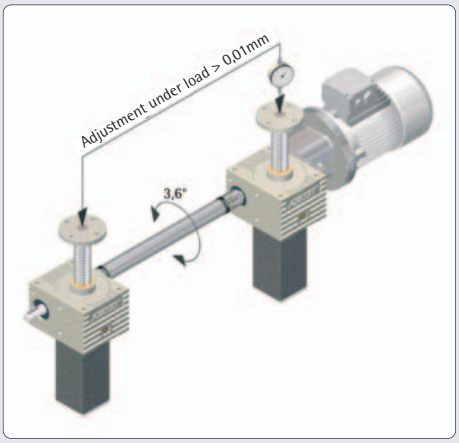
Mounting

Using split 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).

Set screw tightening torque acc. to table

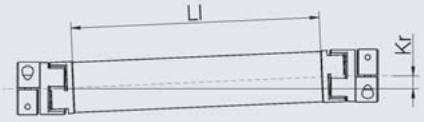
Height adjustment

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 stepless movement.
For example: With the standard gear reduction this means one 360° rotation is equivalent to 1 mm stroke, e.g. 3,6° = 0,01 mm stroke. When setting under load, one lifting system with several screw jacks can be positioned very accurately.



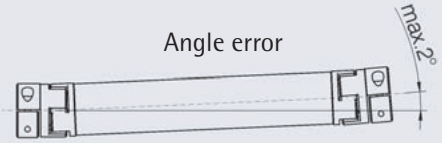
max. allowable axis offset

Offset - lateral



Kr max. 1,5 mm per 100 mm LI

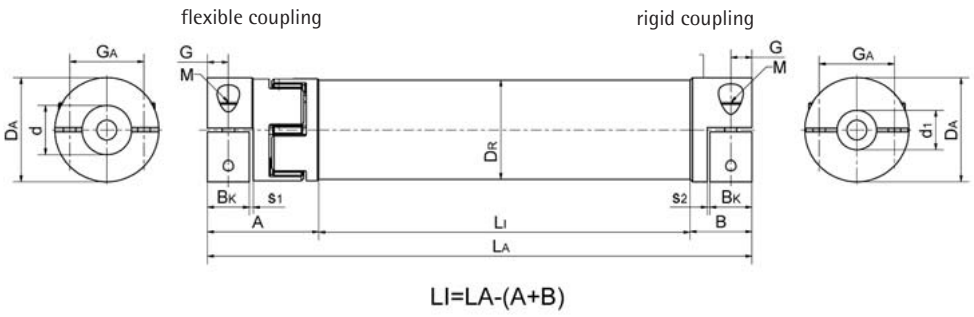
Angle error



max. 2° (1° per coupling)

Offset axial

approx. +/- 1 to 2 mm

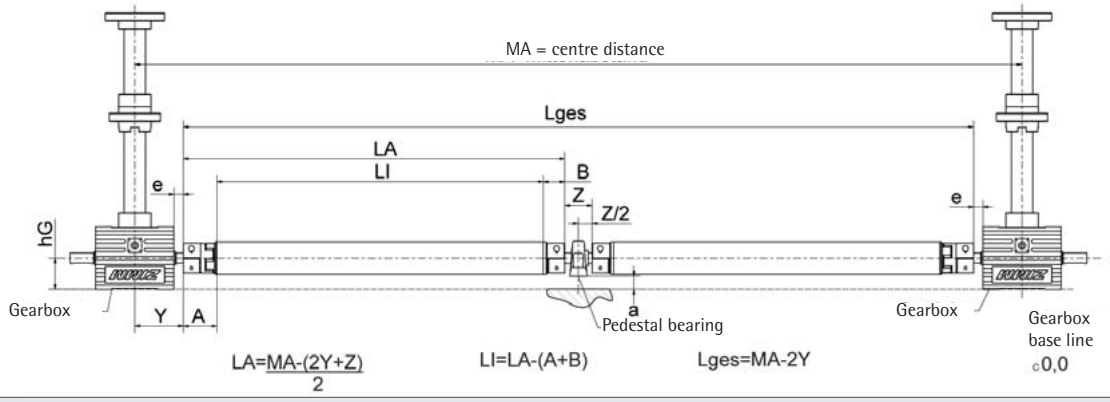


VWZ with Rigid Coupling for Use with Pedestal Bearing

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.
For this version we use the rigid coupling, so that no tangential deviation in the pedestal bearing is possible.

Size	A	B	s1	s2	Bk	LI	LA min
VWZ- 30	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-60V	73	42	2	2	35	LA-115	175
VWZ- 80	84	55	2	2	40	LA-139	220
VWZ-100	97	65	2	2	50	LA-162	251

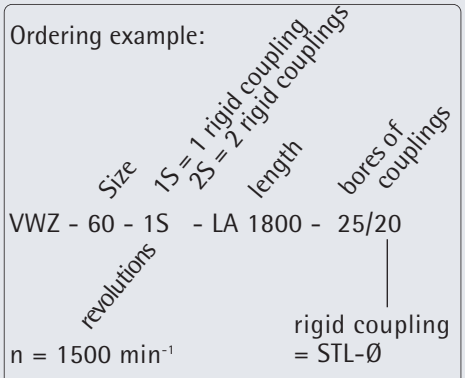
Gearbox – connecting shaft – pedestal bearing
Length specification and calculation

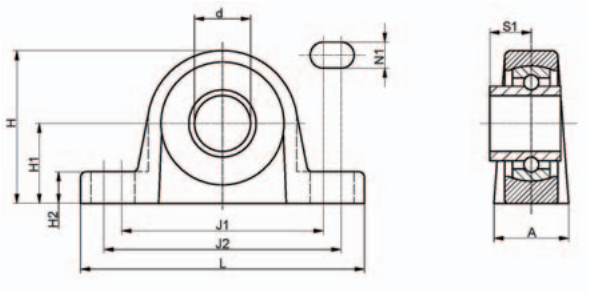


Gearbox	Connecting shaft	e	Y	A	B	Z	L_{WZ}	STL-Ø	hG	hL	a
MSZ- 5	VWZ-30	9	45	34	20	44	74	15	31	30,2	0,8
MSZ- 5	VWZ-40	7	43	46	25	42	76	20	31	33,3	-2,3
MSZ- 5	VWZ-60	2	38	63	40	42	102	20	31	33,3	-2,3
MSZ- 10	VWZ-30	12,5	55	34	20	44	74	15	37	30,2	6,8
MSZ- 10	VWZ-40	10,5	53	46	25	42	76	20	37	33,2	3,8
MSZ- 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-60V	12,5	85	73	42	60	130	30	58	42,9	15,1
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-60V	25	112,5	73	42	60	130	30	80	42,9	37,1
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-60V	25	127,5	73	42	60	130	30	92,5	42,9	49,6
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
- Revolutions
- Torque
- Pedestal bearing support: yes / no

Ordering example:





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

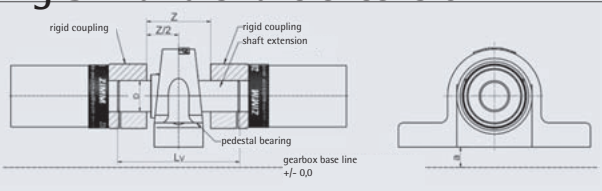
Order no.	Design	d	A	H	H1	H2	J1	J2	L	N1	S1
STL-15-G	cast iron	15	32	56	30,2	14	88	106	127	11,5	15,3
STL-20-S	plastic black	20	32	64	33,3	16	91,5	101,5	126	11,5	18,3
STL-20-W	plastic white	20	32	64	33,3	16	91,5	101,5	126	11,5	18,3
STL-20-G	cast iron	20	32	65	33,3	14	88	106	127	11,5	18,3
STL-30-S	plastic 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

Shaft Extension WZ

Material: ground steel

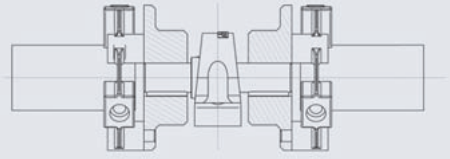
Order no.	d	L_{WZ}
WZ-15/74-?P	15	74
WZ-20/76-?P	20	76
WZ-20/102-?P	20	102
WZ-30/130-?P	30	130
WZ-40/170-?P	40	170
WZ-50/170-?P	50	170

Utilization of pedestal bearing STL and shaft extension WZ



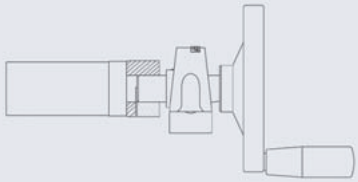
VWZ shaft with rigid coupling for pedestal bearing

Shaft extension without fitting key



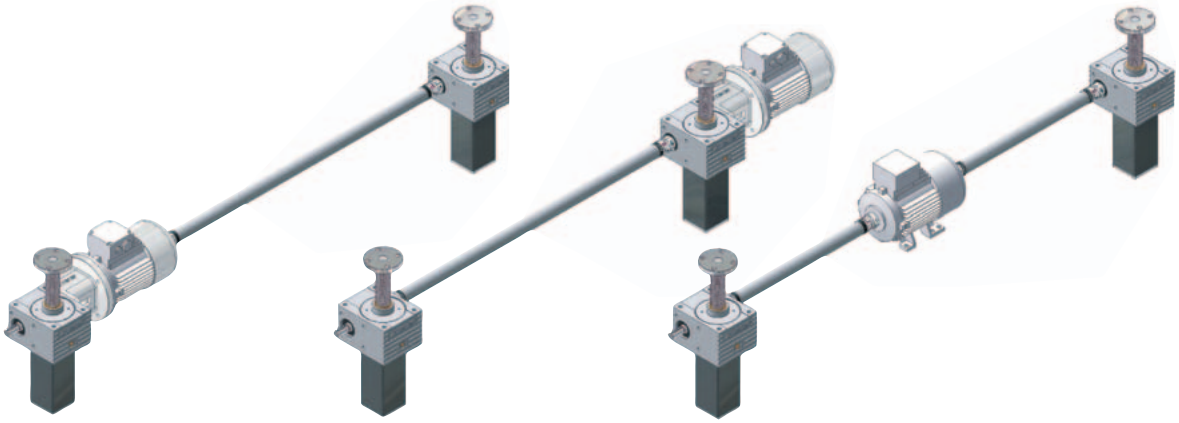
GX shaft with pedestal bearing

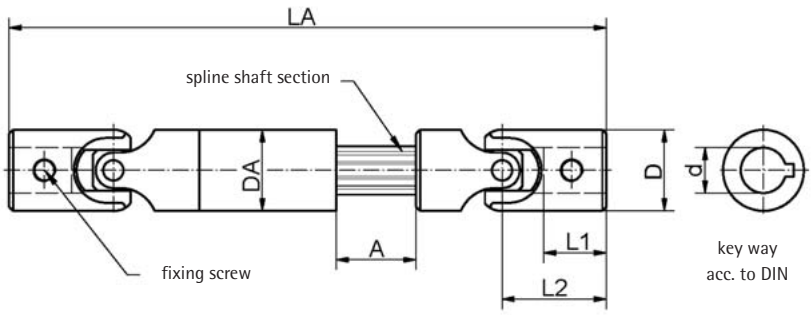
Shaft extension with fitting key on both sides



Pedestal bearing with handwheel for VWZ shaft drive

Shaft extension with fitting key on one side



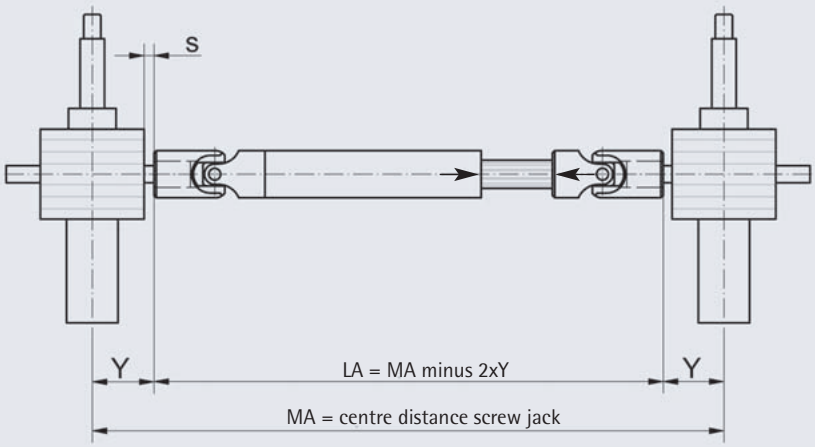


14.4.3 Precision Shaft Joints Extendable KGW

Size = Order no.	max. torque (1500 rpm) with deflection angle 0° to 10°	30°	Extension A*	L max. LA* ±1	L min.= LA - A	DA	D	d max. d H7	L1	L2	Spline shaft section DIN ISO 14
KGW-22	8,5 Nm	3,8 Nm	80	320	240	22	22	11	18	31	6x11x14
KGW-25	14 Nm	6,3 Nm	90	370	280	26	25	16	21	37	6x13x16
KGW-32	31 Nm	14 Nm	110	450	340	32	32	20	24	43	6x16x20
KGW-42	52 Nm	23 Nm	130	550	420	42	42	25	31	54	6x21x25
KGW-50	80 Nm	36 Nm	150	650	500	52	50	30	38	66	6x26x32

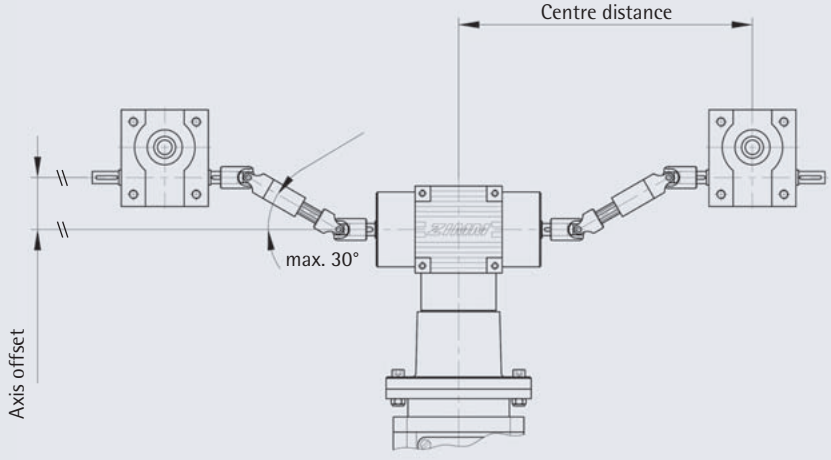
*other lengths on request

☞ **Usage advice:**
- When having higher torques and big deflection angles the operation noise will increase.
- As standard we deliver needle beared universal joints.
- When putting the KGW together it is absolutely necessary to pay attention to the marks (arrows).



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.



Ordering example:

KGW-32 - LA-350 - 16/18

(Size | LA = outer length | Bore of couplings)

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

14.4.4 Connecting Shaft GX

Size	Gearbox Size	Rated torque in Nm	Max. allw. torque in Nm	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

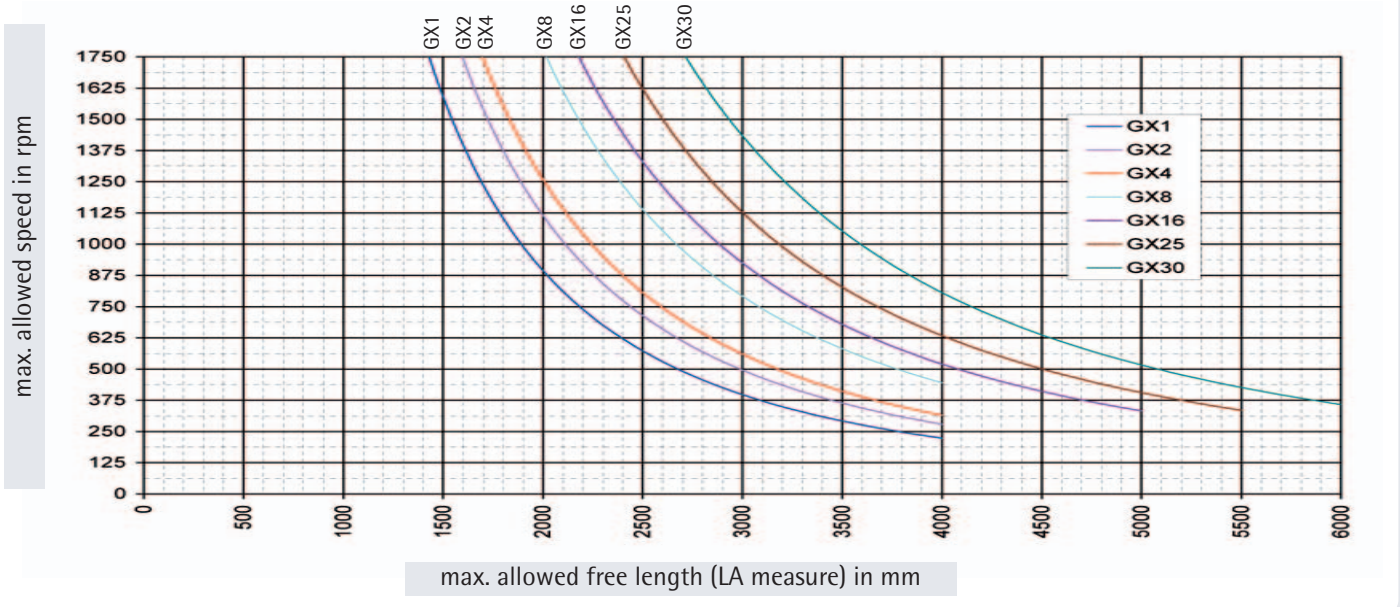
- Precision steel tubes acc. to DIN 2391
- Tube wall thickness: 1,5mm
- G1 = Weight - coupling
- G2 = Weight - tube (1m)
- d2 incl. keyway acc. to DIN 6885 and adjusting screw
- Environmental temperature max. 150° C
- Radial offset tolerance: 1°

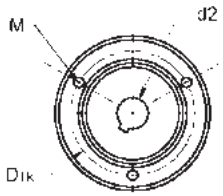
Ordering example:

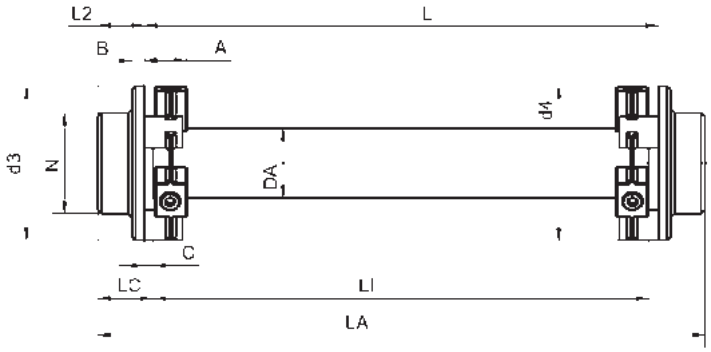
Size | LA = outer length | Bore of coupling

GX 2 - LA-1500 - 16/20

Speed / length selection



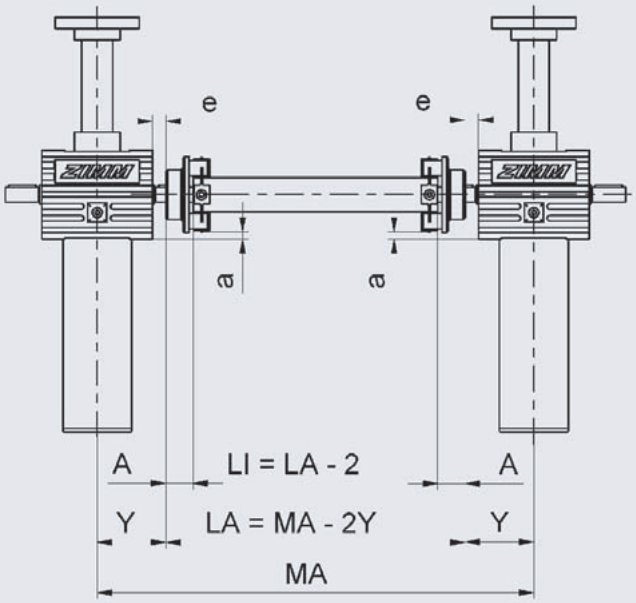




N	DA	C	DTk / ratio	Weight G1 (kg)	Weight G2 (kg)
36	30	1	44 / 2	0,47	1,05
55	40	4	68 / 2	1,06	1,42
65	45	2,5	80 / 3	2,31	1,61
80	60	3	100 / 3	3,55	2,16
100	70	3	125 / 3	6,16	2,53
115	85	3	140 / 3	9,50	3,09
140	100	5	165 / 3	15,21	3,60

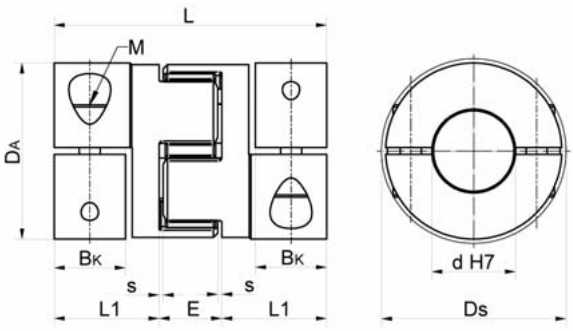
Length determination

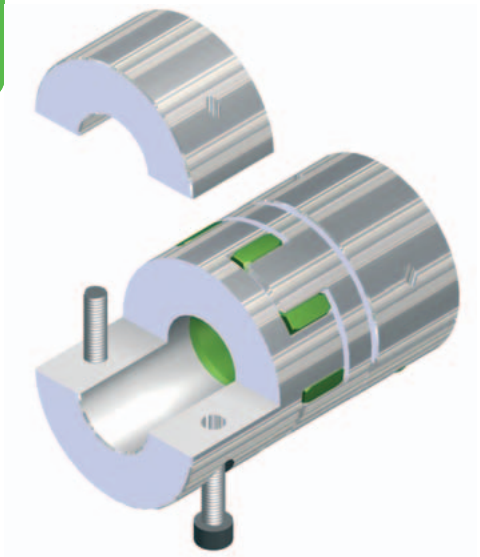
LI = inner length (tube length)
LA = outer length (incl. coupling)
MA = centre distance - gearboxes



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 d4 to surface!





*BK=clamping length shaft extension

14.5.1 Clamp Coupling KUZ-KK

- Long design
- Split coupling for high concentricity (without keyway)

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 64D , color: ZIMM-green

Temperature range
0°C to +70°C,
reduced from -20°C to +100°C

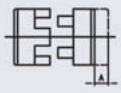
Standard bores "d" [mm]

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-35:	12, 16, 18, 20, 22, 25, 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

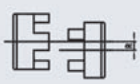
Size	Rated torque** [Nm]	max. torque* [Nm]	DA	Outer Ø with screw D_S	L	BK* fitting length	s	L1	E	M10.9	Screw tightening torque in Nm	Mass moment of inertia in 10^{-3} kgm²	Torsion stiffness C_{Tdny} [Nm/rad]	max. revolutions in min^{-1}
KUZ-KK-16	12	25	32	32	52	15	2	20	9	M 4	4	0,01	1650	19000
KUZ-KK-24	17	34	42	44,5	66	17	2	25	16	M 5	8	0,08	2540	19000
KUZ-KK-32	60	120	56	57	98	30	2	40	18	M 6	15	0,24	7940	14000
KUZ-KK-35	160	320	67	68	114	35	2	47	20	M 8	35	0,51	13400	11500
KUZ-KK-45	325	650	82	85	134	40	3	55	24	M10	70	2,4	23700	9500
KUZ-KK-60	530	1060	102	105	156	50	3	65	26	M12	120	6,0	55400	8000

Size	Weight coupling [kg]	max. axial offset in mm (axial)	max. axial offset in mm (lateral)	max. angle error in grade (angular)
KUZ-KK-16	0,05	±1	0,08	1
KUZ-KK-24	0,15	±2	0,08	1
KUZ-KK-32	0,35	±2	0,10	1
KUZ-KK-35	0,60	±2	0,15	1
KUZ-KK-45	1,10	±2	0,12	1
KUZ-KK-60	1,70	±2	0,14	1

1. Offset - axial



2. Offset - lateral



3. Angle error - angular

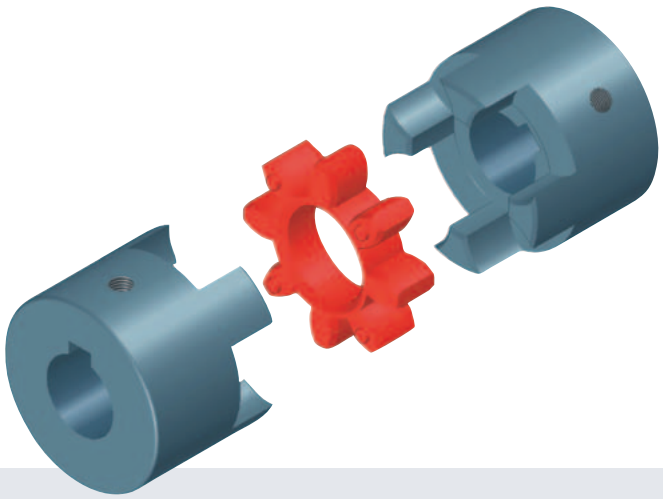
** max. transmittable torque of clamping hub - in dependence on the bore diameter:

	Ø 11	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32	Ø 38	Ø 42	Ø 55
KUZ-KK-16	26	33	37							
KUZ-KK-24	41	52	60	74						
KUZ-KK-32	60	76	87	109	136	153	175			
KUZ-KK-35			120	188	235	260	301			
KUZ-KK-45			325	406	508	568	650	772	854	
KUZ-KK-60					570	638	730	866	960	1250

Ordering example:

KUZ-KK-32 - 20/24

Size — Coupling bores



14.5.2 Standard Coupling KUZ

Standard coupling for general use with keyway and locking screw.

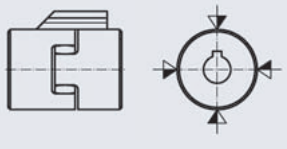
Material - coupling halves
Cast iron GG, sinterized steel, aluminium, acc. to table

Material - coupling star
Polyurethane, Shore hardness 98 A

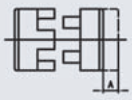
Ordering example:

KUZ-24 - 20/24
(Size: 24; Bore of couplings: 20/24)

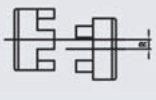
Possible assembly errors



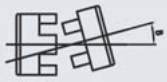
Assembly advice:
Check angle and radial offset in two levels with straight-edge



Axial displacement A
axial



Offset R
lateral



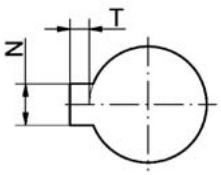
Angle error β
angular

Size	Twist angle with max. torque [grade]	Torsion stiffness C_{Tdyn} [Nm / rad]	Relative absorption	Resonance factor	max. torque [Nm]	Shore hardness star	max. torque [RPM]	allowable assembly error A	R	β	E	L
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

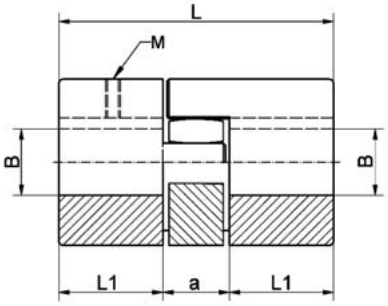
Coupling star for sizes KUZ09 and KUZ19 only available without drillings.

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

Please turn over! ☞

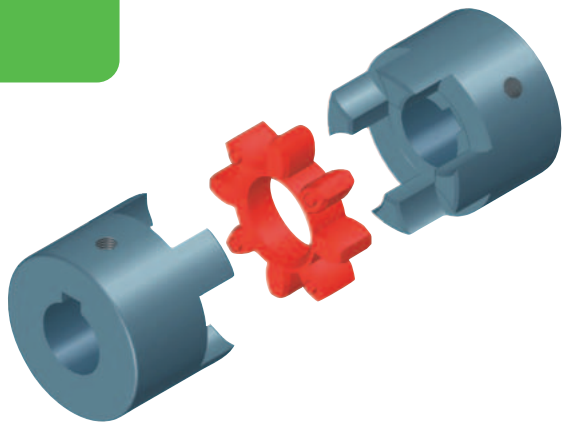


Keyway
DIN 6885/1-P9
Drilling U = not drilled

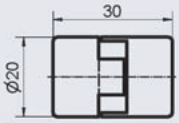


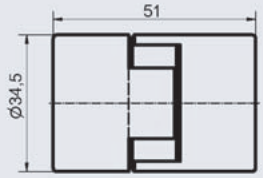
14.5.2 Standard Coupling KUZ

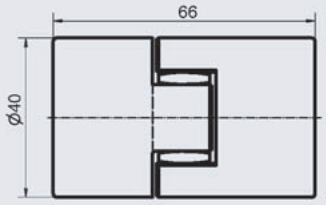
Order no.	Max. torque [Nm]	Max. torque [min^{-1}]	Max. offset [mm]	Max. angle error [grade]	Max. twist angle [grade]	D	L1	a	M	B ISO H7	L	N_{P9}	$T^{+0,2}$	Material	Weight drilled in kg
KUZ-09-05	6	28000	0,08	0,9	-	20	10	10	M4	5	30	-	-	AL-H	0,05
KUZ-09-06									M4	6		-	-		
KUZ-09-07									M4	7		-	-		
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		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		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		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		3,57
KUZ-55-48									M8	48		14	3,8		
KUZ-55-55									M8	55		16	4,3		
KUZ-55- U									-	-		-	-		

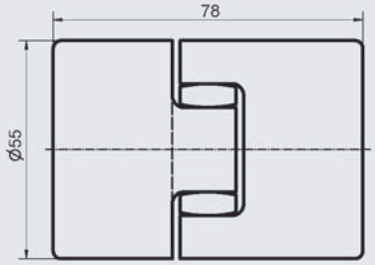


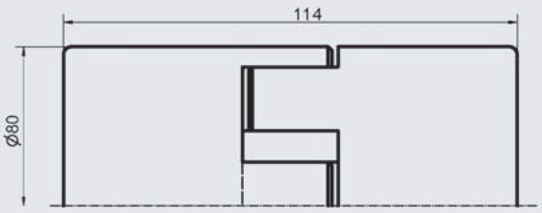
KUZ09	5, 6, 7, 8, U
KUZ14	9, 11, 14, U (pre-drilled Ø 6,3)
KUZ19	11, 14, 16, 19, U (pre-drilled Ø 6,3)
KUZ24	11, 14, 16, 19, 20, 24, U
KUZ28	16, 19, 20, 24, 25, 28, U
KUZ38	25, 28, 32, 38, U
KUZ45	25, 32, 38, 42, 45, U
KUZ55	42, 48, 55, U

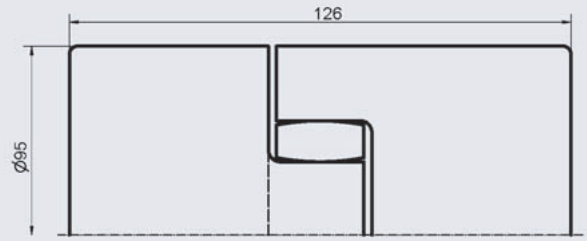






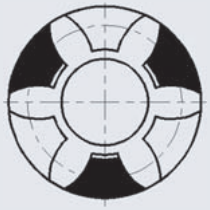


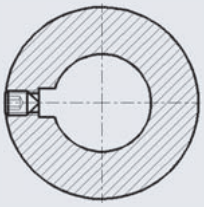




Bore diameter, ISO H7
U = not drilled

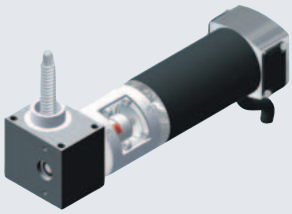
Elastic star
KUZ09 / 92 Shore A, KUZ14 / 80 Shore A,
KUZ24 to KUZ55 / 98 Shore A,
slit couplings, KUZ-GS09 to KUZ-GS26 /
98 Shore A



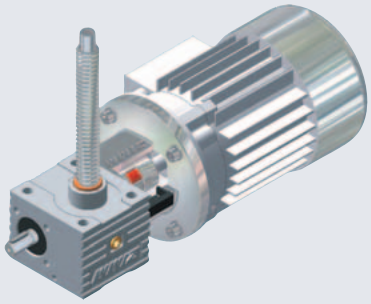


- Pre-drilled
- Grooved DIN 6885/1-P9
- With adjusting screw

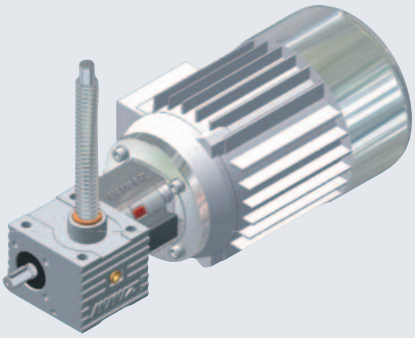
14.6 Standard Combinations - Motor Assembly



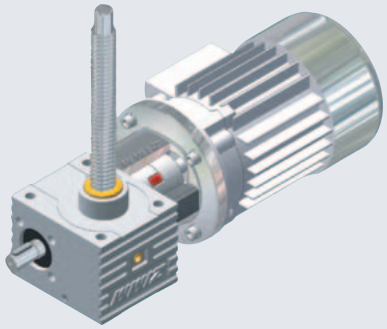
250 N stat.
Screw Jack: SHZ-02
Motor: SHZ-GM-24V
Coupling: KUZ 09-GS-5/8
Flange: SHZ-02-MOTF
Screw: Tr 12x3 / Tr 12x6P3



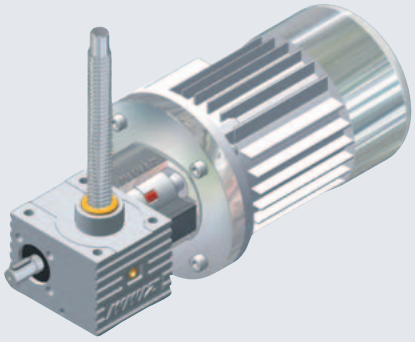
5 kN stat.
Screw Jack: MSZ-5
Motor: 63 B14-120
Coupling: KUZ 14-11/11
Flange: MSZ-5-MF-120-60
Screw: Tr 18x4



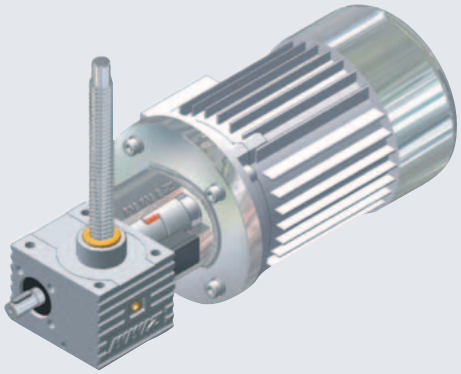
5 kN stat.
Screw Jack: MSZ-5
Motor: 71 B14-105
Coupling: KUZ 19-11/14
Flange: MSZ-5-MF-105-68
Screw: Tr 18x4



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



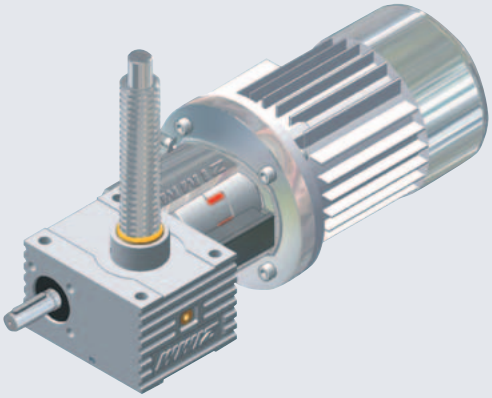
10 kN stat.
Screw Jack: MSZ-10
Motor: 71 B5-160
Coupling: KUZ 19-14/14
Flange: MSZ-10-MF-160-75
Screw: Tr 20x4



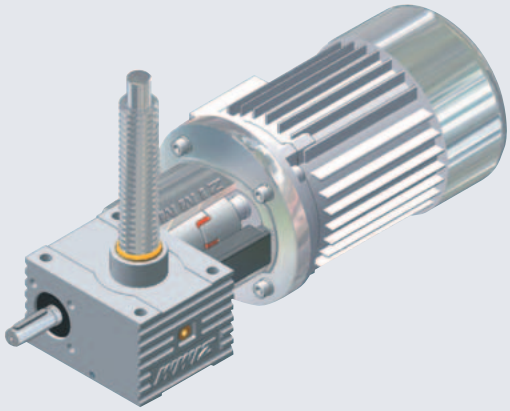
10 kN stat.
Screw Jack: MSZ-10
Motor: 80 B14-160
Coupling: KUZ 24-14/19
Flange: MSZ-10-MF-160-90
Screw: Tr 20x4

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).

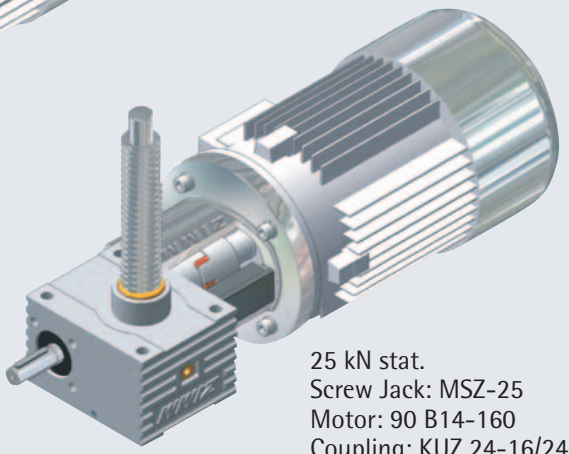
14.6 Standard Combinations - Motor Assembly



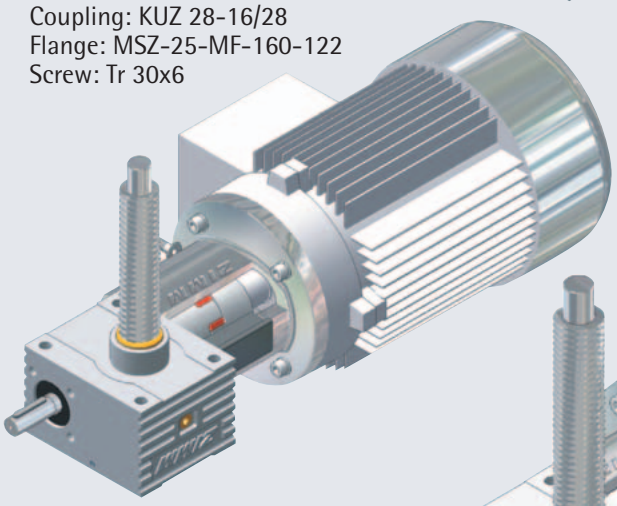
25 kN stat.
Screw Jack: MSZ-25
Motor: 71 B5-160
Coupling: KUZ 28-16/14
Flange: MSZ-25-MF-160-105
Screw: Tr 30x6



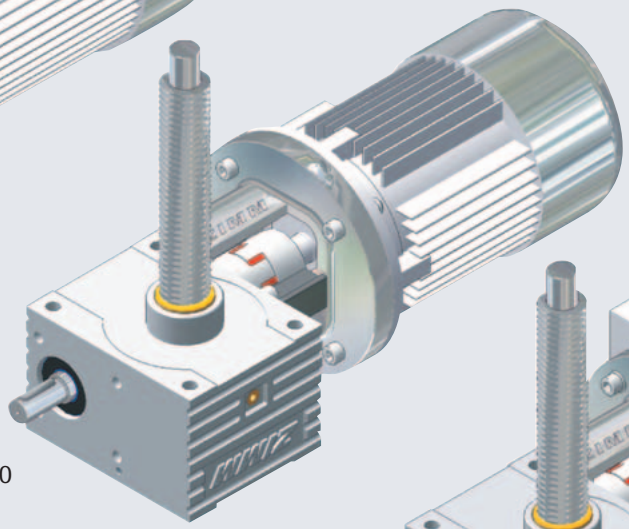
25 kN stat.
Screw Jack: MSZ-25
Motor: 80 B14-160
Coupling: KUZ 24-16/19
Flange: MSZ-25-MF-160-105
Screw: Tr 30x6



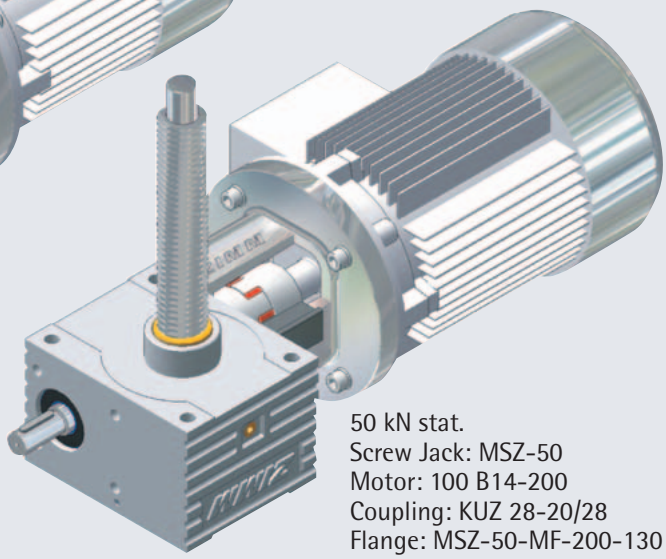
25 kN stat.
Screw Jack: MSZ-25
Motor: 100 B14-160
Coupling: KUZ 28-16/28
Flange: MSZ-25-MF-160-122
Screw: Tr 30x6



25 kN stat.
Screw Jack: MSZ-25
Motor: 90 B14-160
Coupling: KUZ 24-16/24
Flange: MSZ-25-MF-160-105
Screw: Tr 30x6



50 kN stat.
Screw Jack: MSZ-50
Motor: 90 B5-200
Coupling: KUZ 28-20/24
Flange: MSZ-50-MF-200-120
Screw: Tr 40x7

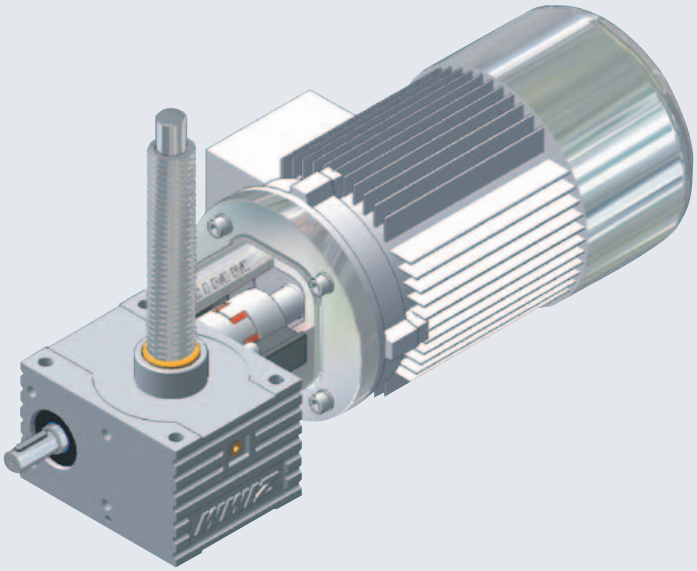


50 kN stat.
Screw Jack: MSZ-50
Motor: 100 B14-200
Coupling: KUZ 28-20/28
Flange: MSZ-50-MF-200-130
Screw: Tr 40x7

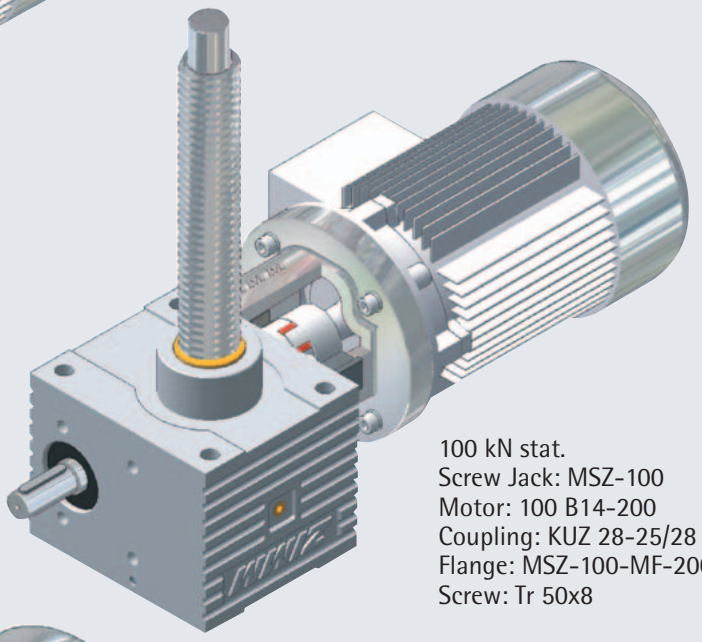
Please look up the calculation in chapter 4 in order to determine the **necessary motor capacity** for the dynamic load, or provide us with your parameters (load, lifting speed).

14.6 Standard Combinations - Motor Assembly

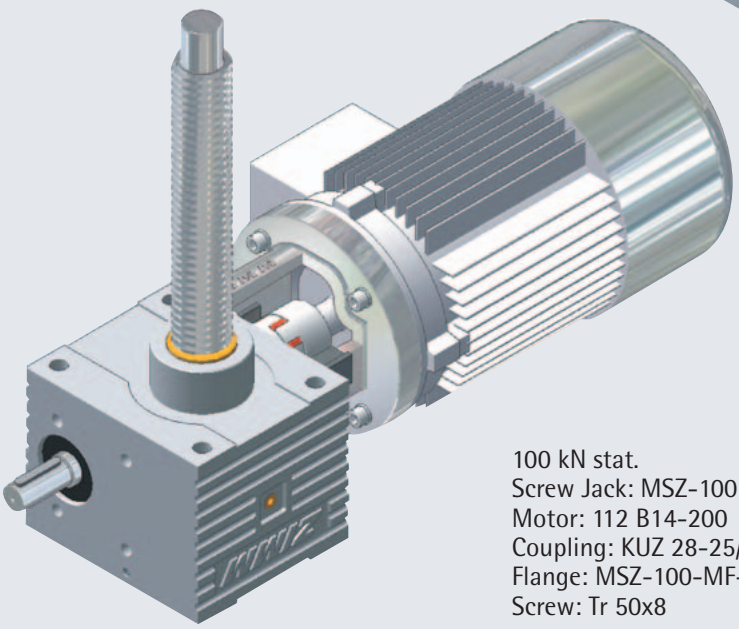
Please look up the calculation in chapter 4 in order to determine the **necessary motor capacity** for the dynamic load, or provide us with your parameters (load, lifting speed).



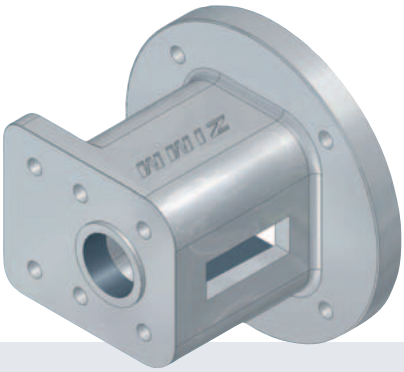
50 kN stat.
Screw Jack: MSZ-50
Motor: 112 B14-200
Coupling: KUZ 28-20/28
Flange: MSZ-50-MF-200-130
Screw: Tr 40x7



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

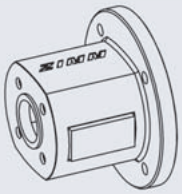


100 kN stat.
Screw Jack: MSZ-100
Motor: 112 B14-200
Coupling: KUZ 28-25/28
Flange: MSZ-100-MF-200-138
Screw: Tr 50x8

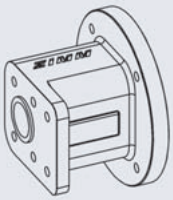


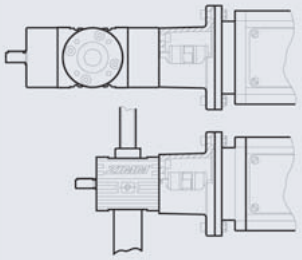
14.6.1 Motor Flange

MSZ-5 to MSZ-25

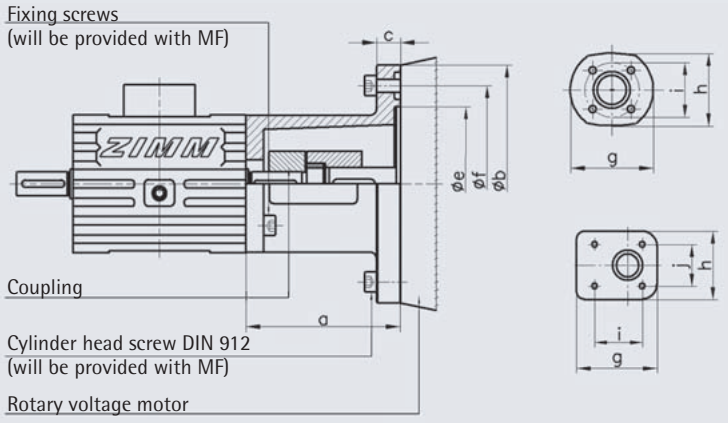


MSZ-50 and MSZ-100





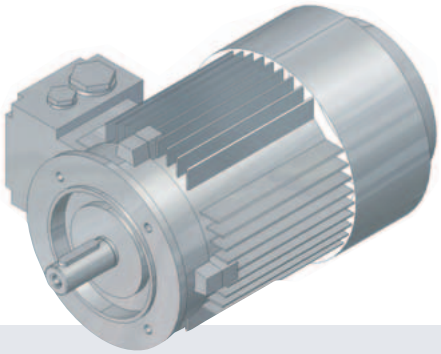
Bevel gearboxes and screw jacks have the same arrangement of mounting holes for motor flange assembly.



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

delivery is including screws!

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	135	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	135	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	135	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

Rotary voltage motors - standard types (asynchronous)
Idling speed ~1500 min^{-1} (others on request)
230/400V 50 Hz, S1, ISO F
AC 3ph motors: IP 55
AC 3ph brake motors: IP 54

Voltage
220 - 240 V Δ 50 Hz
380 - 415 V Δ 50 Hz
440 - 480 V Δ 60 Hz
380 - 415 V Δ 50 Hz
660 - 690 V Δ 50 Hz
440 - 480 V Δ 60 Hz

Size	Motor power	Nominal speed	Torque	Nominal current at 400 V	In case of direct switching ratio starting/nominal current	In case of direct switching ratio starting/nominal torque	Ratio overload / nominal torque	Moment of inertia J	Efficiency (with 100% load)	Power factor (with 100% load)	Weight without brake	Weight with brake
IEC	kW	min^{-1}	Nm	A	I_A/I_N	M_A/M_N	M_K/M_N	ca kgm^2	η %	cos	ca. kg	ca. kg
63	0,18	1330	1,30	0,65	2,3	1,9	1,9	0,0003	58,0	0,70	4,1	6,0
63	0,25	1340	1,81	0,94	2,2	1,7	2,5	0,0004	60,0	0,76	4,2	6,5
71	0,37	1360	2,60	1,2	2,8	2,0	2,0	0,0008	63,0	0,70	6,0	8,0
71	0,75	1370	5,33	2,1	2,9	2,1	2,4	0,0012	69,0	0,78	8,3	10,3
80	0,75	1410	5,10	2,0	4,5	2,2	2,8	0,0020	70,0	0,70	9,3	13,0
80	1,5	1390	10,4	4,7	4,1	3,2	3,2	0,0026	72,0	0,70	11,5	15,2
90L	1,5	1410	10,3	3,7	4,9	3,0	3,0	0,0032	79,0	0,74	14,4	18,0
90L	2,2	1400	15,2	5,2	4,5	2,7	2,7	0,0039	78,0	0,81	17,5	21,1
100L	2,2	1420	14,8	5,3	4,0	2,3	2,7	0,0046	83,0	0,74	19,2	25,5
100L	3,0	1410	20,3	6,7	3,9	2,3	2,5	0,0056	82,0	0,79	22,4	28,0
100L	4,0	1420	27,0	8,9	4,0	2,2	2,2	0,0065	81,0	0,82	26,3	31,9
112M	4,0	1440	27,0	9,4	3,3	2,5	2,9	0,0133	83,0	0,75	30,4	38,0
112M	5,5	1440	36,4	11,7	3,9	2,1	2,3	0,0139	84,0	0,83	33,0	40,6
132S	5,5	1440	36,0	12,0	5,8	3,0	3,0	0,0224	83,0	0,80	41,9	56,0
132M	7,5	1440	50,0	15,4	6,8	3,1	3,1	0,0293	86,0	0,82	51,0	66,0
132M	11	1445	73,1	24,5	8,2	3,5	3,5	0,0458	83,0	0,80	74,0	89,0
160M	11	1460	72,1	20,7	7,6	2,1	2,4	0,0832	89,1	0,86	101,0	111,0
160L	15	1460	96,2	29,2	7,1	2,4	2,6	0,1506	89,4	0,83	110,0	120,0
180M	18,5	1465	119,0	34,3	7,1	2,3	2,6	0,1773	90,4	0,86	135,0	150,0
180L	22	1475	142,0	41,1	6,9	2,4	2,6	0,2936	90,9	0,85	145,0	160,0
200L	30	1475	190,0	54,0	6,6	2,1	2,3	0,6345	92,1	0,87	230,0	253,0
225S	37	1470	238,0	64,7	7,0	2,3	2,5	0,3251	92,8	0,89	338,0	361,0
225M	45	1470	286,0	77,9	7,4	2,3	2,4	0,7866	92,6	0,90	358,0	381,0
250M	55	1465	359,0	94,0	7,5	2,6	2,6	0,9483	93,4	0,90	482,0	517,0
250ML	75	1480	484,0	134,0	6,3	1,2	2,2	0,9988	94,0	0,80	535,0	570,0
280S	75	1475	476,0	136,0	6,8	2,1	2,5	1,8495	93,5	0,85	591,0	631,0
280M	90	1485	591,0	167,0	8,3	2,5	2,9	2,2306	93,6	0,85	662,0	702,0
280ML	110	1480	710,0	190,0	6,9	2,7	3,1	2,6800	94,0	0,89	750,0	790,0
315S	110	1485	709,0	199,0	7,5	2,3	2,5	2,8136	93,9	0,85	867,0	940,0
315M	132	1480	830,0	229,0	7,5	2,4	2,6	3,3435	94,7	0,88	990,0	1063,0
315M	160	1485	1040,0	277,0	7,3	2,7	2,7	3,3435	94,7	0,88	1003,0	1076,0
315M	200	1485	1277,0	349,0	7,6	2,4	2,6	3,3435	95,0	0,87	1003,0	1076,0
355M	250	1475	1619,0	432,0	7,5	2,4	2,5	5,8740	95,0	0,88	1380,0	1490,0
355M	315	1485	2024,0	542,0	6,9	2,5	2,6	6,8900	95,3	0,88	1600,0	1790,0

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

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.

Motor brakes are delivered in standard for connection voltage 230V AC, operating voltage 205 V DC, with bridge rectifier.

Ordering example:

Size – No. of poles - speed 4-pole = 1500 min^{-1} – Power [kW] – Construction design with brake (if required)

90 - P4 - 1,5 - B5 - B

motor with 2nd shaft end

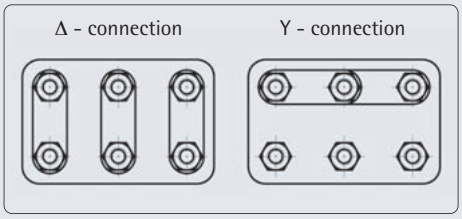
90 - 2W - P4 - 1,5 - B5 - B

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. A star-/delta start is not suitable for screw jack systems because the full torque is already requested at the beginning.
Operating voltage 230 V delta:
Motor winding 230/400 V
Operating voltage 400 V delta:
Motor winding 400/660 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.



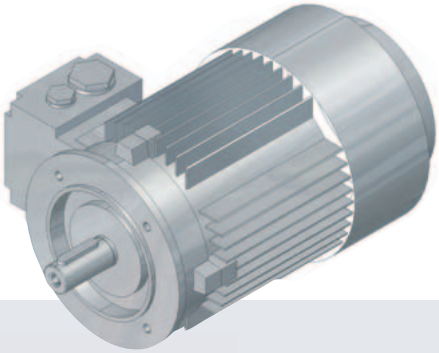
Rotational speed (50 Hz)	No. of poles
3000	2
1500	4 (= preferred type)
1000	6
750	8
500	12

Geared motors
Geared motors are available on request.

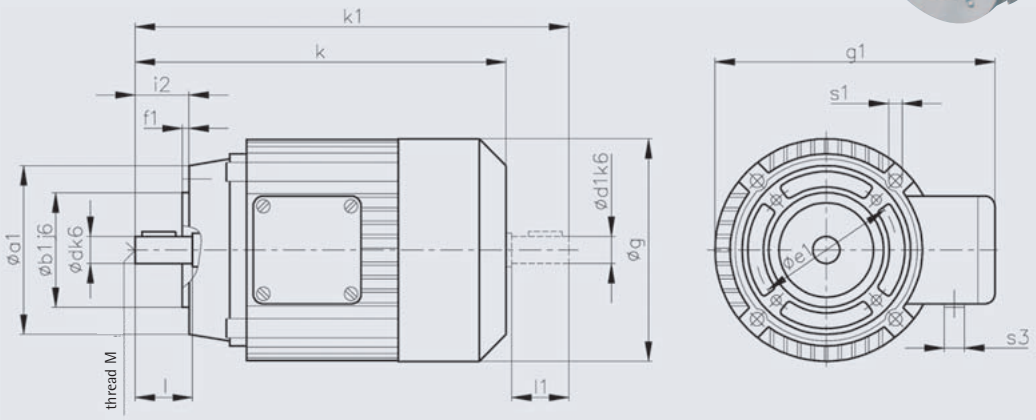
Operation with frequency converter FU
Especially for bigger screw jacks and systems we recommend to use a frequency converter to achieve a smooth start-up and brake ramp. This minimizes the start-up noise and increases lifetime of the screw jack.
When operating with a frequency converter, please consider 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 using 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



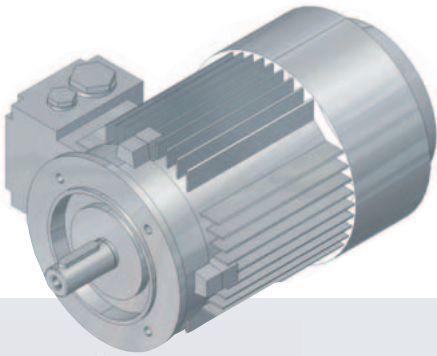
We reserve the right to change the dimensions without changing the motor name.

Size	a1	b1	e1	f1	g	i2	s1	d	l	t	u
63	120	80	100	3,0	125	23	M6	11	23	12,5	4
71	140	95	115	3,0	141	30	M8	14	30	16,0	5
80	160	110	130	3,5	159	40	M8	19	40	21,5	6
90	160	110	130	3,5	179	50	M8	24	50	27,0	8
100	200	130	165	3,5	199	60	M10	28	60	31,0	8
112	200	130	165	3,5	223	60	M10	28	60	31,0	8

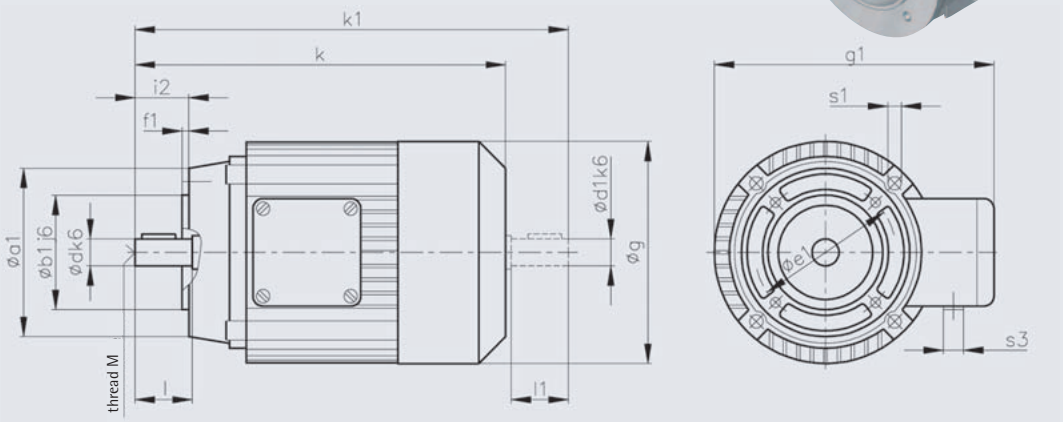
These measurements are standardized and therefore will not change.

Size	kW	k	k1	d1	l1	k	k	k1	d1	l1	g1	M
		without brake				with brake, without 2. shaft end	with brake, with 2. shaft end					
63	0,18 0,25	212	238	11	23	261 239	261	285	9	20	172	4
71	0,37 0,75	248	281	14	30	263	295	325	11	23	188	5
80	0,75 1,5	277	315	19	40	310	330	375	19	40	211	6
90	1,5 2,2	329	378	24	50	390 348	390	432	19	40	227	8
100	3,0 4,0	369	429	28	60	433	433	487	24	50	248	10
112	5,5	391	448	28	60	456	456	511	24	50	266	10

These measurements are our standard (4-pole), however may change in single cases.



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



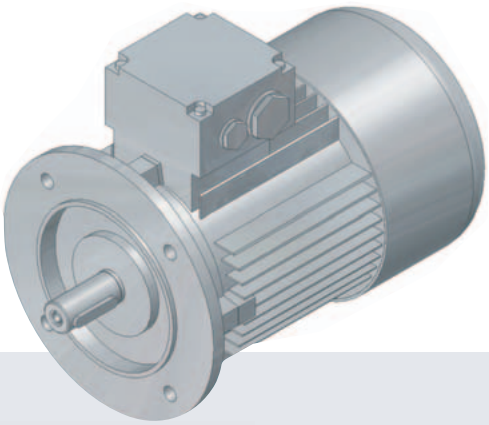
We reserve the right to change the dimensions without changing the motor name.

Size	a1	b1	e1	f1	g	i2	s1	d	l	t	u
63	90	60	75	2,5	125	23	M5	11	23	12,5	4
71	105	70	85	2,5	141	30	M6	14	30	16,0	5
80	120	80	100	3,0	159	40	M6	19	40	21,5	6
90	140	95	115	3,0	179	50	M8	24	50	27,0	8
100	160	110	130	3,5	199	60	M8	28	60	31,0	8
112	160	110	130	3,5	223	60	M8	28	60	31,0	8

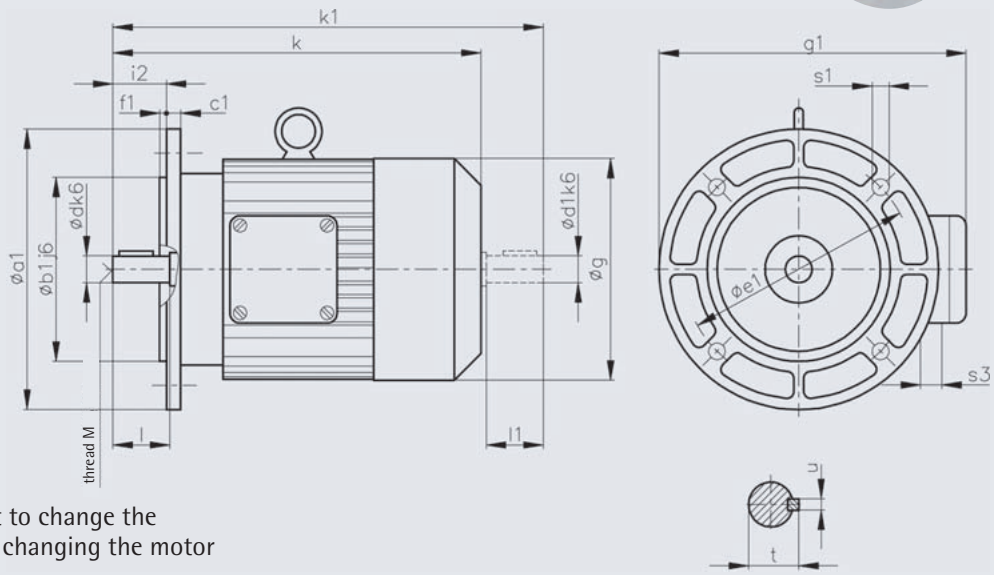
These measurements are standardized and therefore will not change.

Size	kW	k	k1	d1	l1	k	k	k1	d1	l1	g1	M
		without brake				with brake, without 2. shaft end	with brake, with 2. shaft end					
63	0,18 0,25	212	238	11	23	261 239	261	285	9	20	172	4
71	0,37 0,75	248	281	14	30	263	295	325	11	23	188	5
80	0,75 1,5	277	315	19	40	310	330	375	19	40	211	6
90	1,5 2,2	329	378	24	50	390 348	390	432	19	40	227	8
100	3,0 4,0	369	429	28	60	433	433	487	24	50	248	10
112	5,5	391	448	28	60	456	456	511	24	50	266	10

These measurements are our standard (4-pole), however may change in single cases.



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



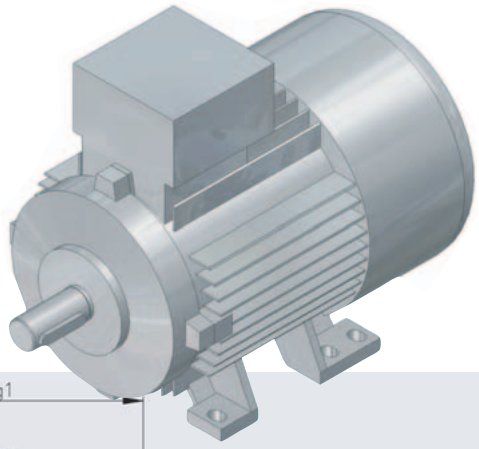
We reserve the right to change the dimensions without changing the motor name.

Size	a1	b1	c1	e1	f1	g	i2	s1	d	l	t	u
63	140	95	5	115	3,0	125	23	9,5	11	23	12,5	4
71	160	110	7	130	3,5	141	30	9,5	14	30	16,0	5
80	200	130	8	165	3,5	159	40	11,5	19	40	21,5	6
90	200	130	8	165	3,5	179	50	11,5	24	50	27,0	8
100	250	180	10	215	4,0	199	60	14	28	60	31,0	8
112	250	180	10	215	4,0	223	60	14	28	60	31,0	8

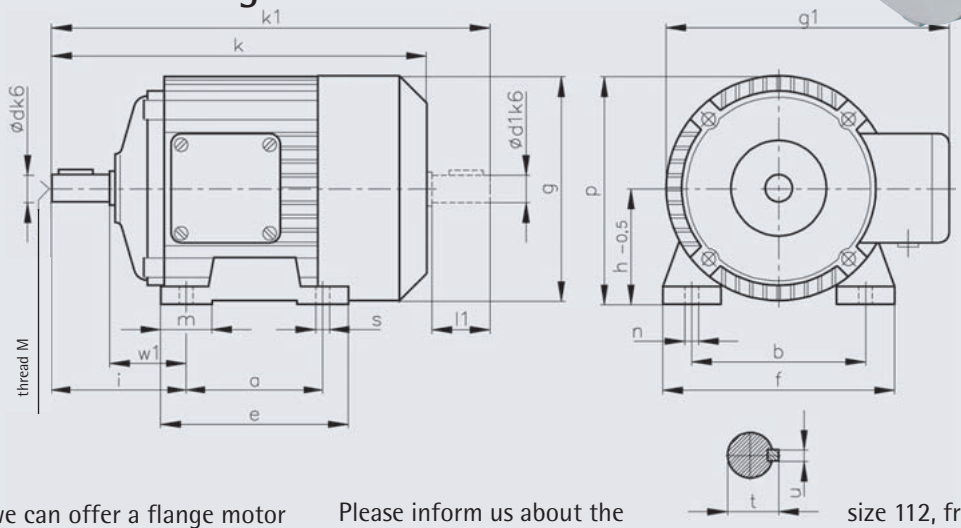
These measurements are standardized and therefore will not change.

Size	kW	k	k1	d1	l1	k	k	k1	d1	l1	g1	M
		without brake				with brake, without 2. shaft end	with brake, with 2. shaft end					
63	0,18 0,25	212	238	11	23	261 239	261	285	9	20	172	4
71	0,37 0,75	248	281	14	30	263	295	325	11	23	188	5
80	0,75 1,5	277	315	19	40	310	330	375	19	40	211	6
90	1,5 2,2	329	378	24	50	390 348	390	432	19	40	227	8
100	3,0 4,0	369	429	28	60	433	433	487	24	50	248	10
112	5,5	391	448	28	60	456	456	511	24	50	266	10

These measurements are our standard (4-pole), however may change in single cases.



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



For this type we can offer a flange motor (e.g. B14) with additionally mounted pedestal plates. This version is in most cases available within a short delivery time. The measurements do not change.

Please inform us about the terminal box (top, right or left side when looking at the motor shaft). If we are not informed otherwise we mount the box on the top till motor size 112, from motor size 132 on, the box will be mounted on the right side. We reserve the right to change the dimensions without changing the motor name.

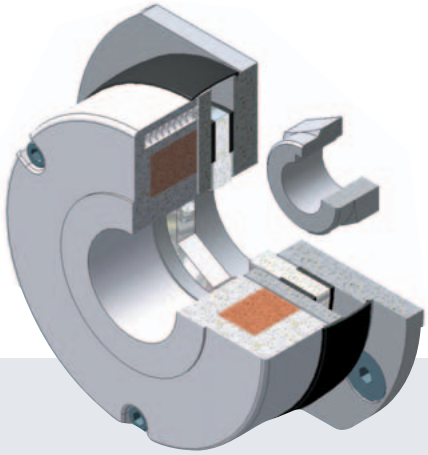
Size	a	b	g	h	i	p*	s	w1	d	l	t	u
63	80	100	125	63	63	126	7	40	11	23	12,5	4
71	90	112	141	71	75	142	7	45	14	30	16,0	5
80	100	125	159	80	90	160	9	50	19	40	21,5	6
90	125	140	179	90	106	180	9	56	24	50	27,0	8
100	140	160	199	100	123	200	12	63	28	60	31,0	8
112	140	190	223	112	130	224	12	70	28	60	31,0	8
132S	140	216	262	132	169	264	12	89	38	80	41,0	10
132M	178	216	262	132	169	264	12	89	38	80	41,0	10
160M	210	254	318	160	218	320	14	108	42	110	45,0	12
160L	254	254	318	160	218	320	14	108	42	110	45,0	12
180M	241	279	358	180	231	360	14	121	48	110	51,5	14
180L	279	279	358	180	231	360	14	121	48	110	51,5	14
200L	305	318	398	200	243	400	19	133	55	110	59,0	16

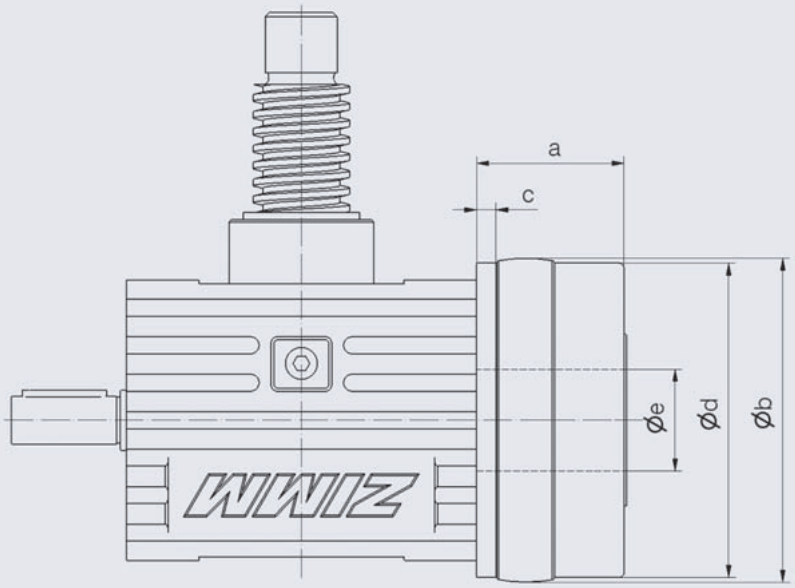
These measurements are standardized and therefore will not change.
*terminal box mounted on top >> height see table dimension g1

Size	kW	k	k1	d1	l1	k	k	k1	d1	l1	c	e	f	g1	M
		without brake				with brake, without 2. shaft end	with brake, with 2. shaft end								
63	0,18 0,25	212	238	11	23	261 239	261	285	9	20	10	105	120	172	4
71	0,37 0,75	248	281	14	30	263	295	325	11	23	11	108	136	188	5
80	0,75 1,5	277	315	19	40	310	330	375	19	40	11	125	154	211	6
90	1,5 2,2	329	378	24	50	390 348	390	432	19	40	13	155	174	227	8
100	3,0 4,0	369	429	28	60	433	433	487	24	50	14	175	192	248	10
112	5,5	391	448	28	60	456	456	511	24	50	14	175	224	266	10
132S	5,5	452				547					16	180	256	326	12
132M	7,5	490				585					16	219	256	326	12
160M	11,0	608									23	264	320	395	16
160L	15,0	652									23	306	320	395	16

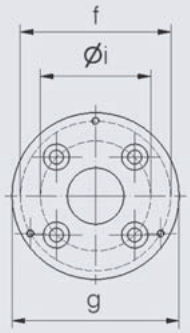
These measurements are our standard (4-pole), however may change in single cases.

14.6.3 Spring Pressure Brake FDB

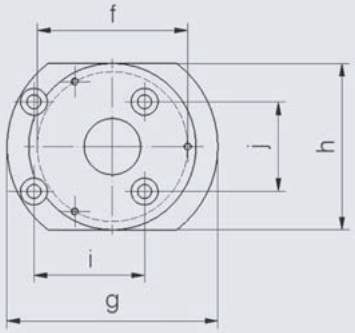




from size
MSZ-5 to MSZ-25



from size MSZ-50 on



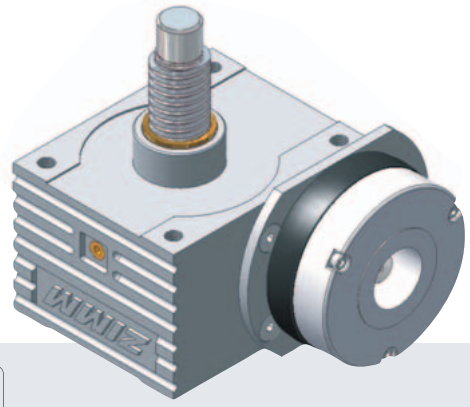
Screw Jack	Version	Brake type	T_B (Nm)	P (W)	Hub Ø	a	b	c	d	e	f	g	h	i	j
MSZ-5	SL/RL	FDB 05	3,5	22	11	46	89	6	85	26	72-3xM4	85	-	46,0	-
	SN/RN	FDB 05	5,0	22	11	46	89	6	85	26	72-3xM4	85	-	46,0	-
MSZ-10	SL/RL	FDB 05	5,0	22	14	46	89	6	85	26	72-3xM4	85	-	49,5	-
	SN/RN	FDB 10	10,0	28	14	54	109	7	105	32	90-3xM5	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: $P = U \bullet I \rightarrow I = \frac{P}{U}$

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

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

T_B = braking torque



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.

Elektrical 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 alternative 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.

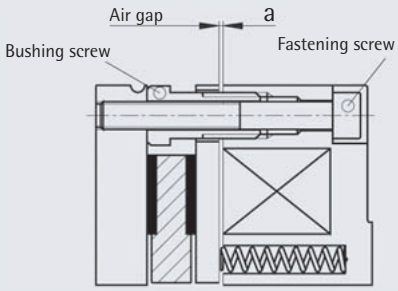
Power supply	Operating voltage of the brake	Rectifier / type
24V DC	24V DC	none
230V AC	105V DC	Single-way rectifier / KSE 500/1-S
230V AC	**205V DC**	**Bridge rectifier / PMB 400-S**
400V AC	180V DC	Single-way rectifier / KSE 500/1-S
500V AC	220V DC	Single-way rectifier / KSE 500/1-S

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
The brake can be released mechanically (e.g., during a power failure) by installing hand release.

! For safety reasons, it is imperative that you do not change the hand release settings.

Almost maintenance-free



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.

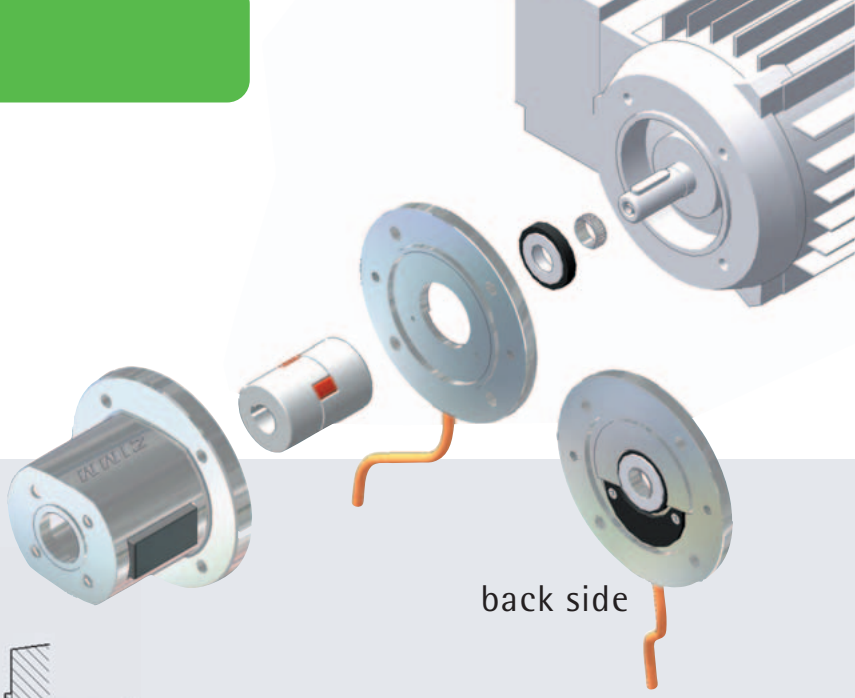
Readjusting the brake air gap:
Loosen the three fastening screws of the brake by half a revolution. Now the bushing screws, which enclose the fastening screws, can be screwed into the magnet body by turning them counterclockwise. The magnet body is moved in the direction of the armature disk until the 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.

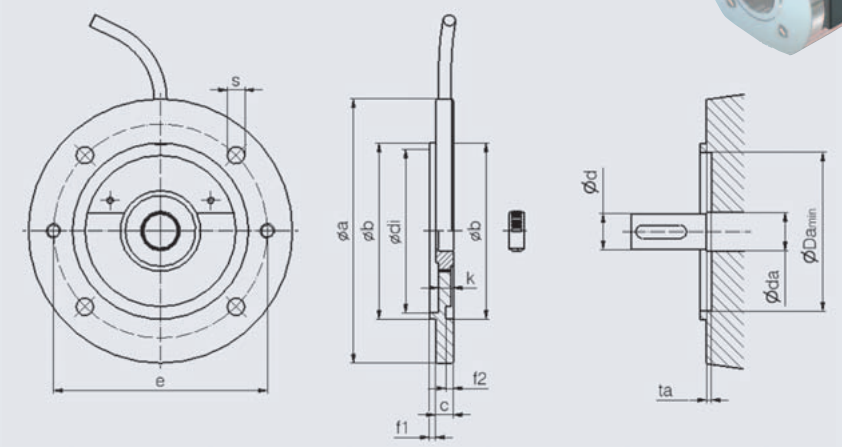
Before working on an installed spring pressure brake, the voltage source feed must be disconnected or switched off as a matter of principle. The brake should be without load to prevent an uncontrolled rotation movement to the shaft.

Ordering example:

Screw jack size		Spring pressure brake		Rated torque (T_B)		Operating voltage		Direct current		Rectifier (if required)		Hand release (if required)
MSZ-10	-	FDB10	-	10Nm	-	205V	-	DC	-	GL	-	HL

14.6.4 Rotary Pulse Encoder DIG incremental





Ordering example:

		Flange diameter		Shaft diameter		impulse no.		HTL or TTL
DIG	-	160	-	19	-	10	-	HTL

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 20, if appropriately sealed IP67
- Universal HTL Signal for all standard evaluations (PNP, NPN, RS 422), or TTL
- 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

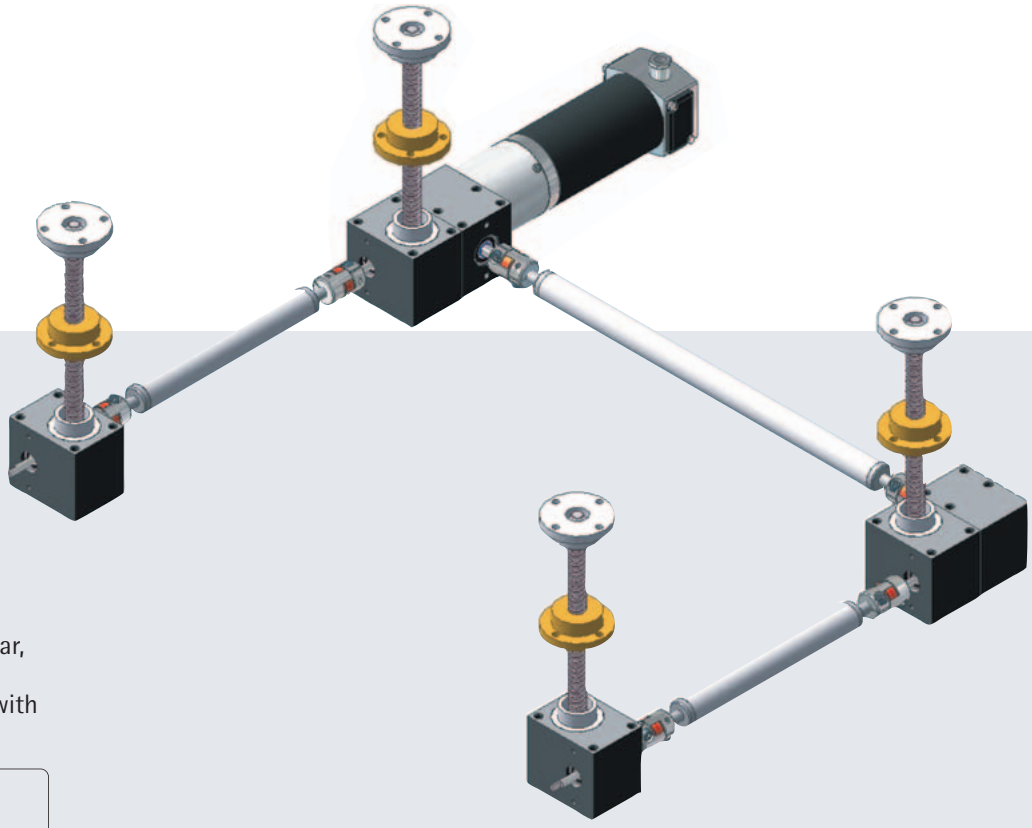
☞ **Please ask for our additional Data Sheet!**

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

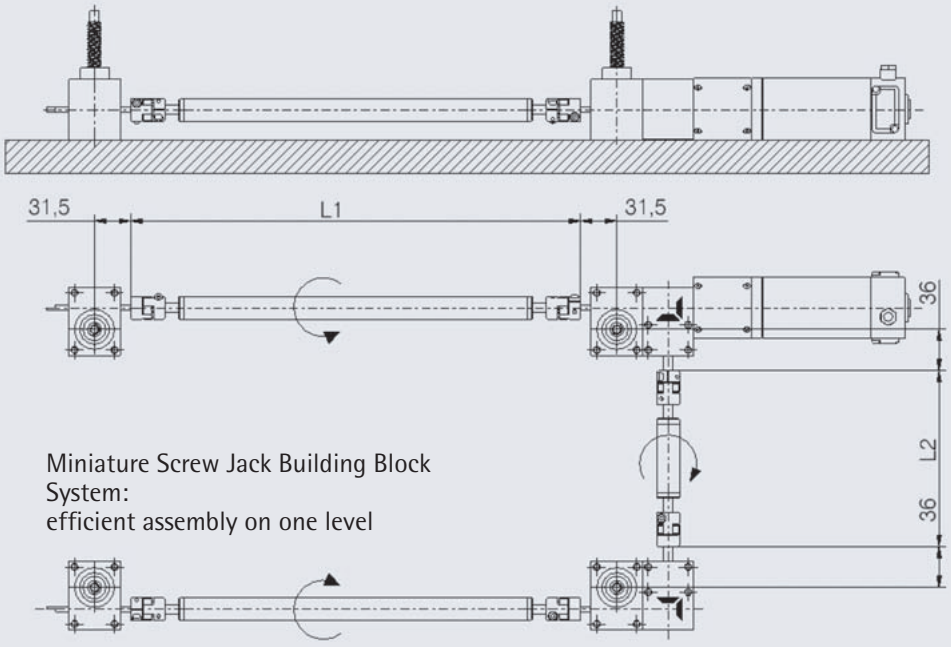
SHZ-02



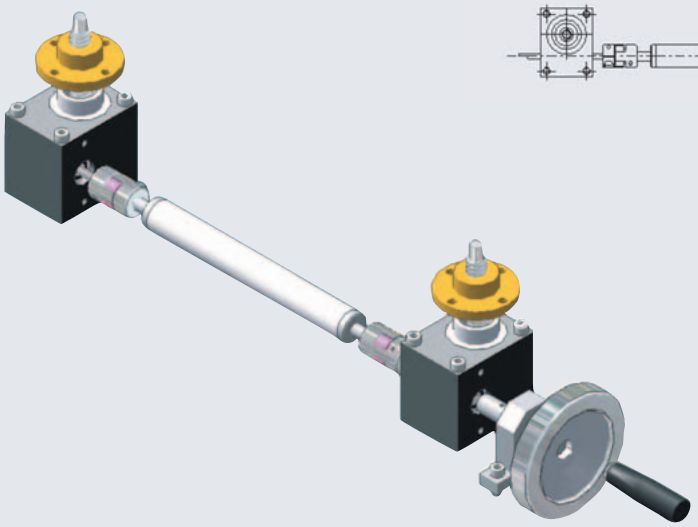
Miniature Screw Jack Building Block System
Whether complete system or single gear, whether driven by hand or by motor: We provide our Miniature Screw Jack with a plug-type building block system.

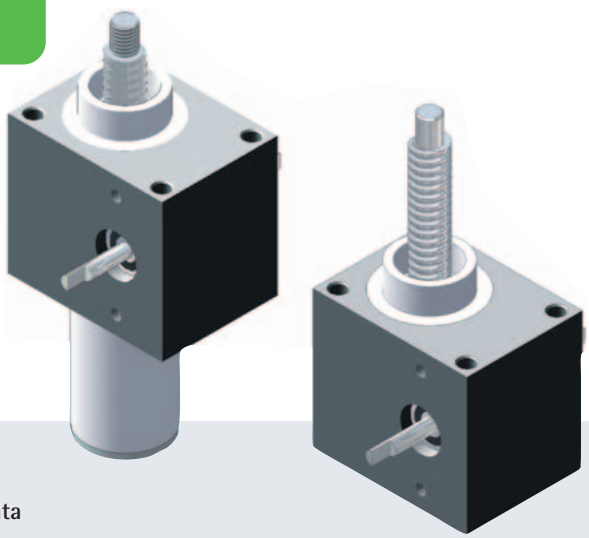
Save time and cost due to quick and simple assembly!

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.

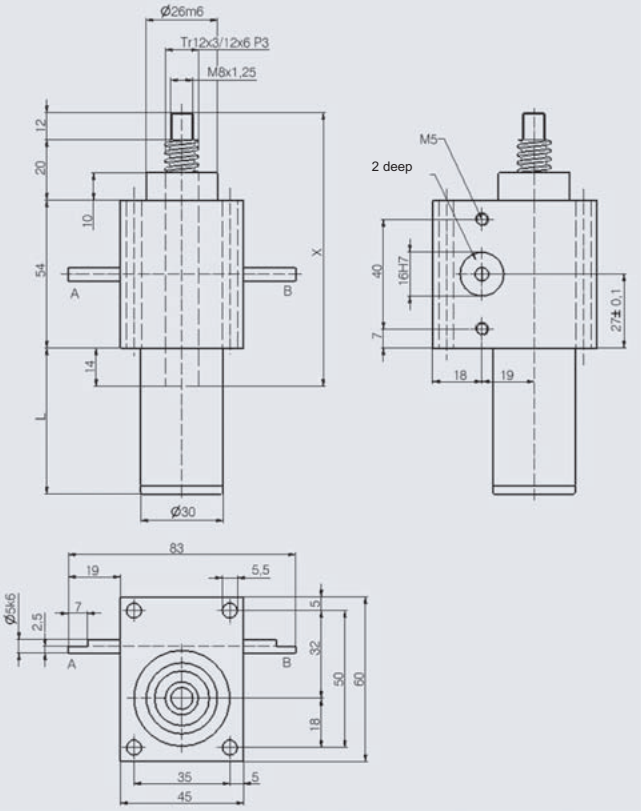


Miniature Screw Jack Building Block System:
efficient assembly on one level

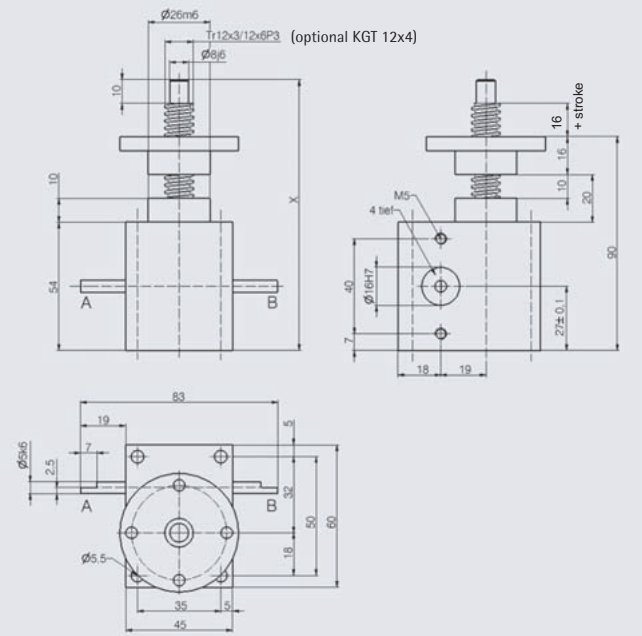




SHZ-02 Standing Spindle S



SHZ-02 Rotating Spindle R



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) x 0,00035* bei i = 7,5:1
	- F(N) x 0,000135* bei i = 12:1
Starting torque	- drive torque x 2
Idling torque in Nm	- 0,03 at i = 7,5:1
	- 0,02 at i = 12:1
Efficiency - without spindle	- 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.		l	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

l = 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

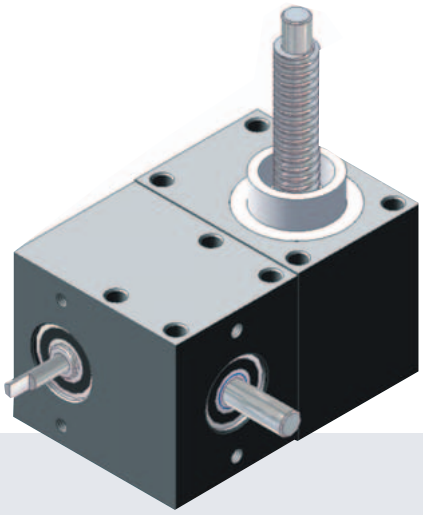
P - lift of the screw or running nut per drive shaft revolution

Attention: Avoid axial forces!

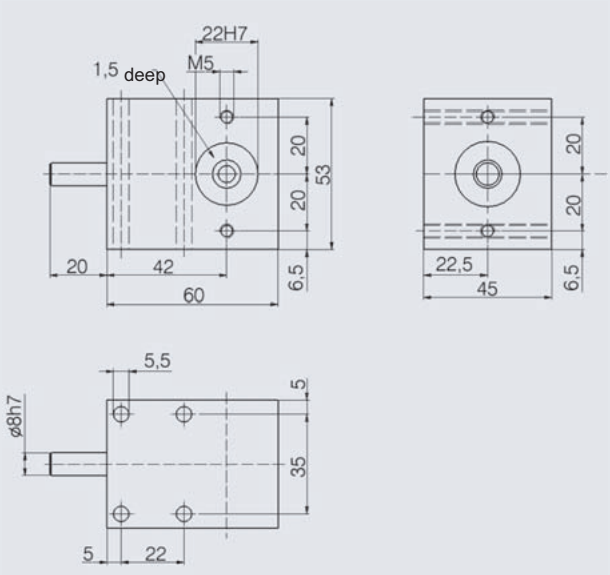
Ordering example without accessories:

Gearbox size		Model		Useful lift
SHZ-02	-	SS	-	350

Please use our checklists in chapter 4 for any inquiries



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

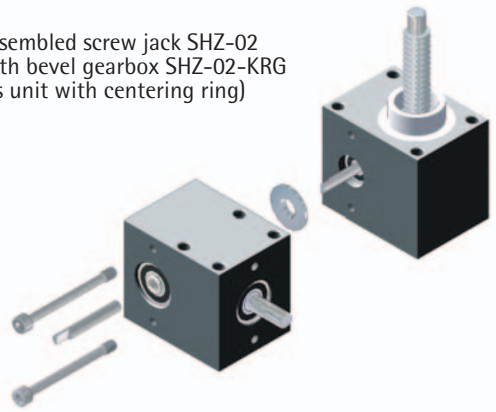


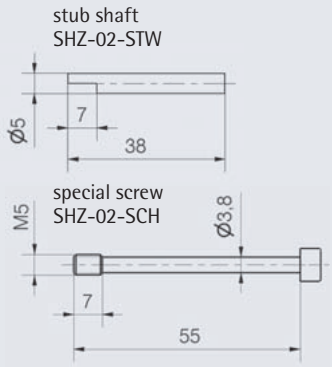
Miniature screw jack gearbox is directly connected by means of plug-in shaft and centering ring with the matching bevel gearbox. The bevel gearbox is screwed directly onto the screw jack assembly.

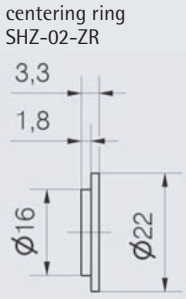
Max. speed 3000min^{-1}
Max. torque = 1 Nm
Lifetime with
Mmax = 2000h
Max. radial load on
shaft = 40N
Max. axial load on
shaft = 20N
Sealed bearings
Alu box black anodized

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)



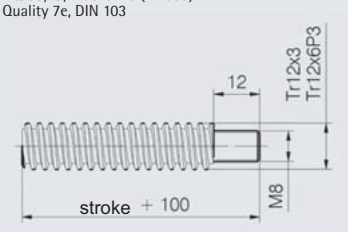




System Components

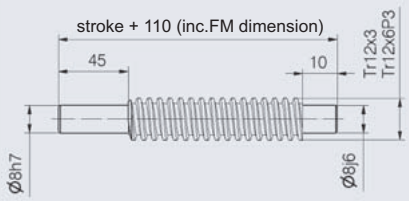
Trapezoid threaded screw SHZ-02-S-Tr

Fits SS/LS, Mat. CK15 (1.4305)
Quality 7e, DIN 103



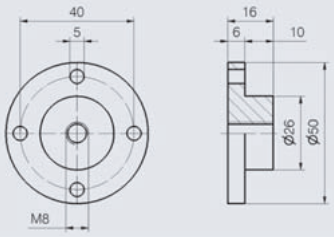
Trapezoid threaded screw SHZ-02-R-Tr

Fits SR/LR, Mat. CK15 (1.4305)
Quality 7e, DIN 103

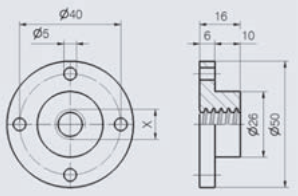


Fixing flange SHZ-02-BF

Fits SS/LS
Material alu anodized



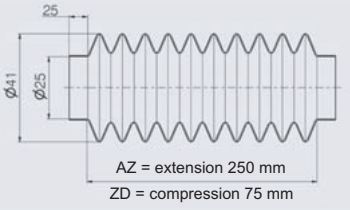
Flange nut SHZ-02-FM-L/SHZ-02-FM-S



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

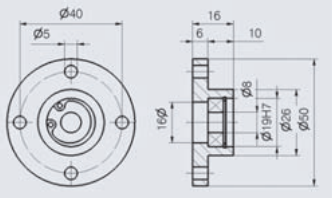
Bellow SHZ-02-FB-175

Material Molerit-TH 59



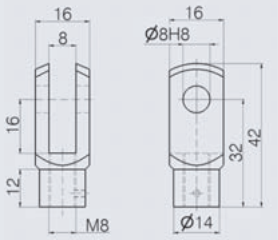
Attention: Spindle extension +60mm required

Opposed bearing plate SHZ-02-GLP

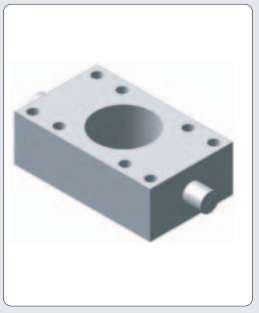


with bearing 698-2Z
Material Alu anodized

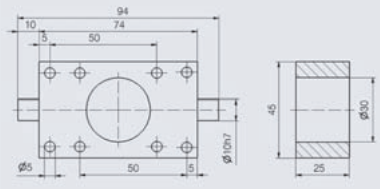
Forked head SHZ-02-GK



Material steel, galvanized, with bolts and locking key

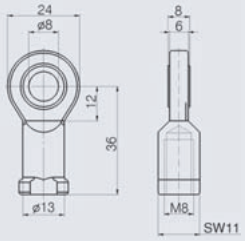


Hinged bearing plate SHZ-02-KAR



Material steel, galvanized

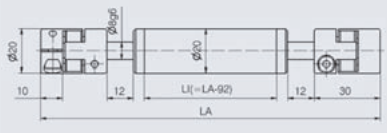
Rod end SHZ-02-KGK



Material steel/steel, galvanized

Connecting shaft SHZ-VBWX-20

Material alu/steel

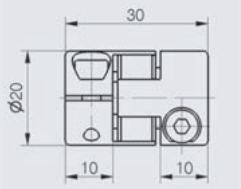


Please define bore-ø
LA_{min}=132mm

System Components

Flexible coupling KUZ-09-GS

Clamping collar coupling, Mat.: Alu



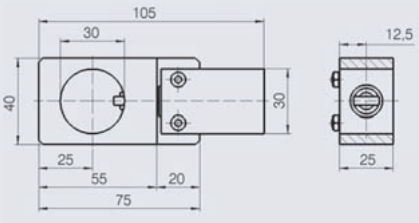
Ordering example: KUZ-09-GS-5 / 8 (d1 / d2)

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 industrie

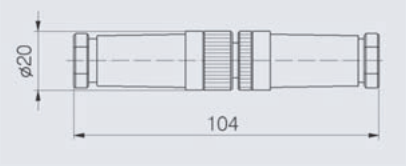
Limit switch set SHZ-02-ESSET



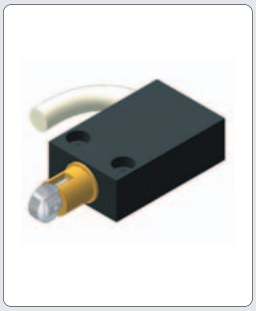
Attention: 2 sets per gearbox are reqired

Plug set

Is supplied with limit switch ES

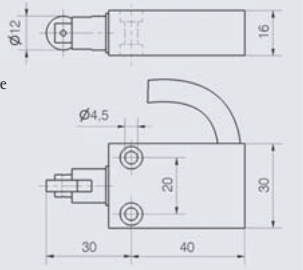


see chapter 14.1.6



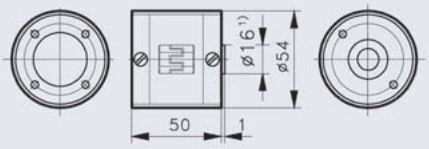
Limit switch ES

Notice: also see chapter 14.1.6



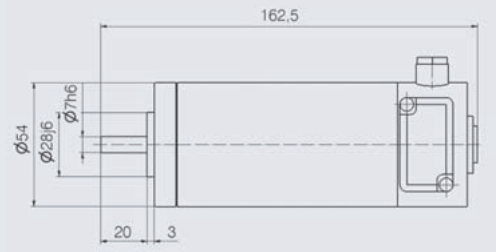
Universal motor flange SHZ-02-MOTF

Suited for both of our standard motors. Should other motors be used, only one ring inside the flange body must be used.



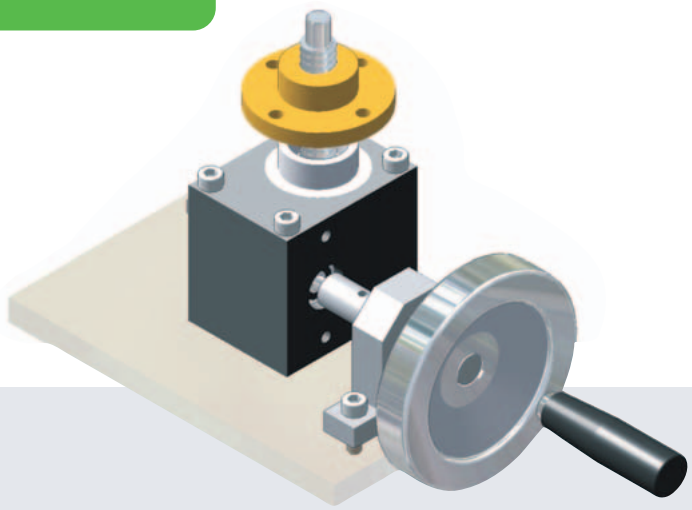
1 - for mounting on screw jack

D.C. magneto-electric motor



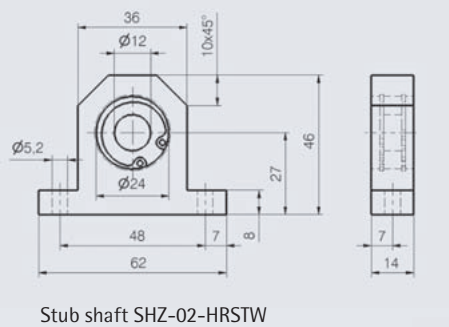
Rotary voltage motor on request

Speed 3000 U/min	Speed 3000 U/min
SHZ-GM-24V	SHZ-GM-180V
I_N=4A	I_N=0,5A
I_{max}=41A	I_{max}=5,5A
P_N=55W	P_N=55W
M_N=17,5Ncm	M_N=17,5Ncm
J=0,5Kgcm²	J=0,5Kgcm²
Cable connection PG11	Cable connection PG11
Protection class IP 44	Protection class IP 44
Weight 1,2 kg	Weight 1,2 kg

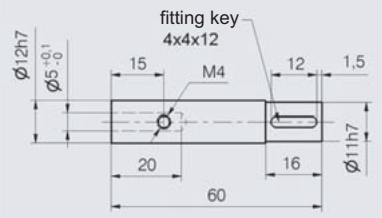


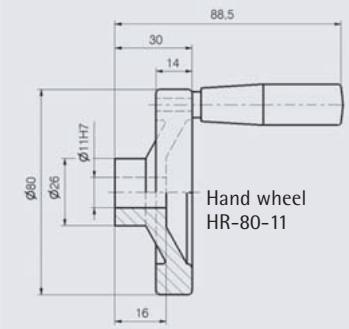
Manual operation/techn. data

Bearing bock SHZ-02-HRLB

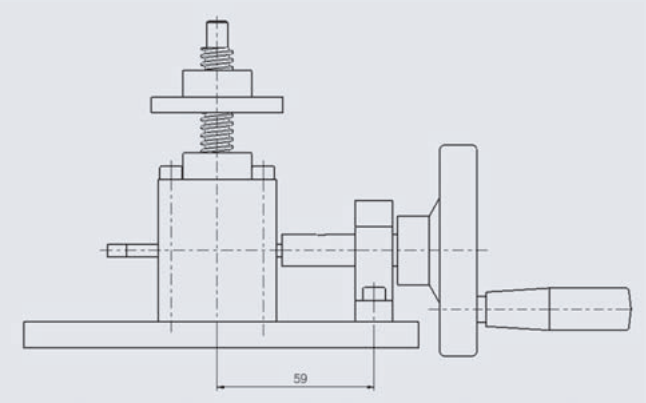


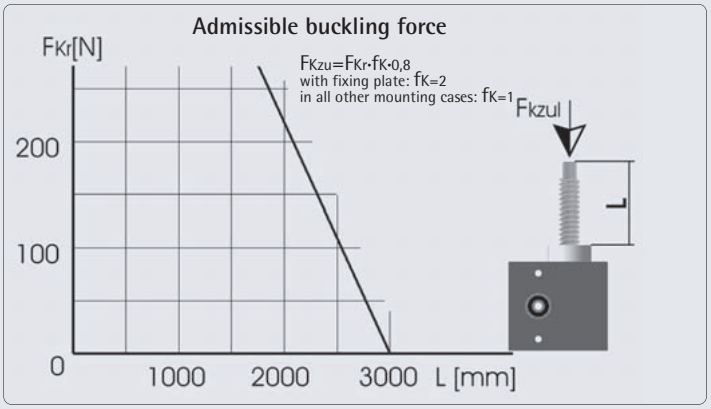
Stub shaft SHZ-02-HRSTW

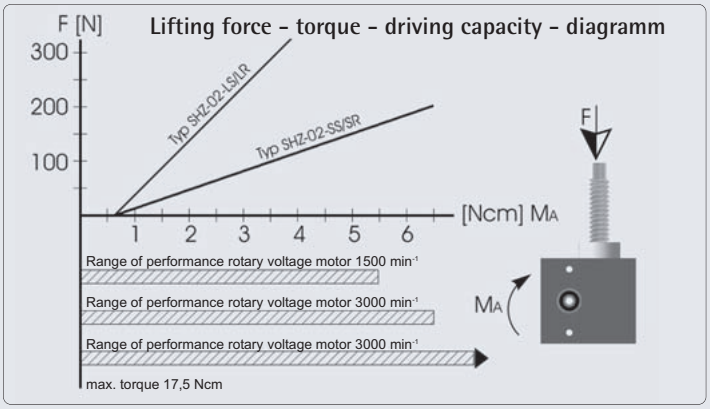




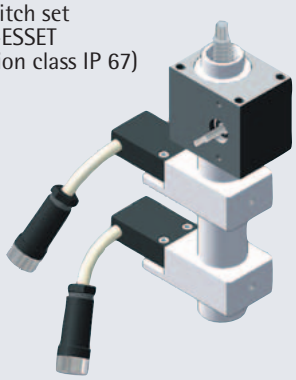
Hand wheel
HR-80-11



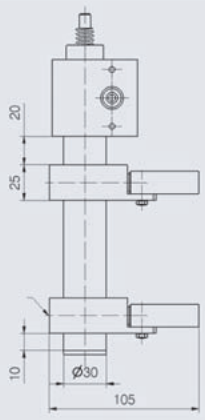




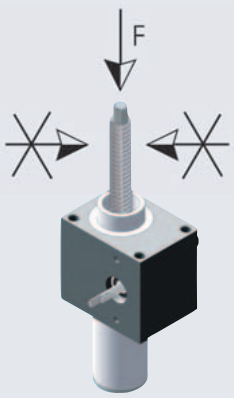
Limit switch set
SHZ-02-ESSET
(protection class IP 67)

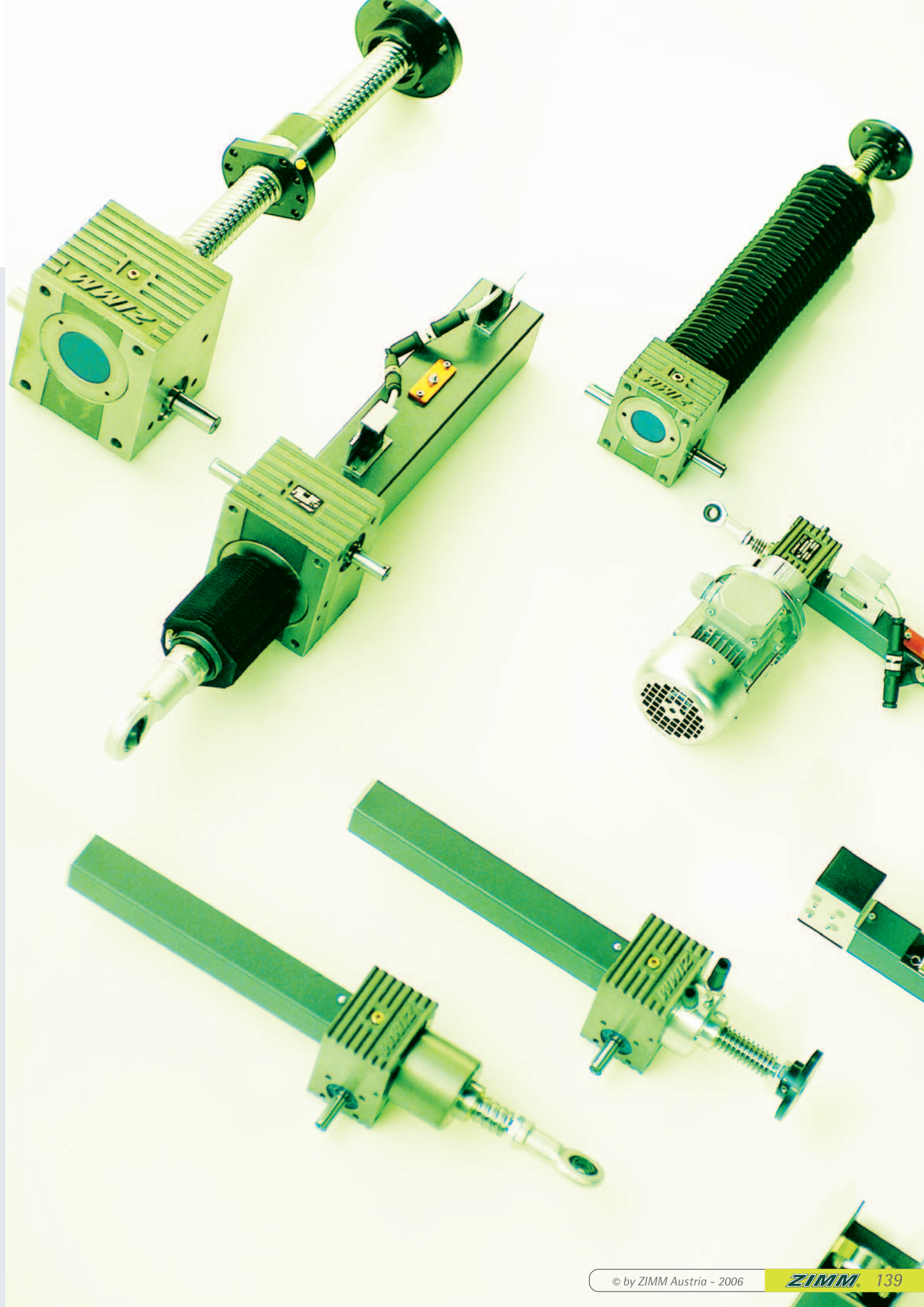


Locking screw M6x10



Avoid axial
forces





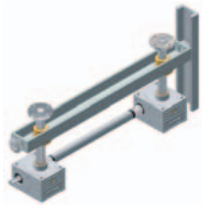
DEUTSCH

☐ **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.

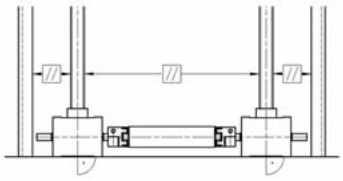
☐ **2. Montage**
Die Berücksichtigung der folgenden Montage- und Wartungshinweise sind wichtig, um eine einwandfreie Funktion der Hubanlage zu erzielen.

☐ **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.

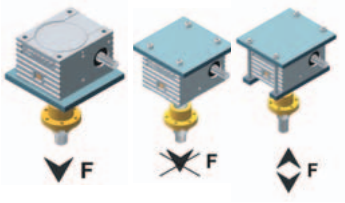
☐ **4. Fluchtung**
Spindeln und Linearführungen müssen parallel sein. Sorgen Sie auch für eine genaue Fluchtung der Trägerkonstruktion zueinander.



☐ **5. Parallelität und Winkeligkeit**
Auf Parallelität, Winkel- und Plangenauigkeit der Anschraubflächen, Getriebe, Muttern und Führungen zueinander ist zu achten. Ebenso auf genaue axiale Fluchtung der Getriebe, Kupplungen, Stehlager, Verbindungswellen und Motor zueinander.



☐ **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.



☐ **7. Führung**
Der Getriebehals ersetzt kein Führungssystem 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.

ENGLISH

☐ **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.

☐ **2. Mounting**
The observation of the following mounting and maintenance information is important to achieve long life of the screw jack equipment.

☐ **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.

☐ **4. Alignment**
Screws and linear guides must be parallel. Also take care that the carrier structures are exactly aligned with respect to each other.

☐ **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.

☐ **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.

☐ **7. Guidance**
In the majority of applications a guidance system is required to protect the screw and internal gearbox compenents 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.

FRANÇAIS

☐ **1. Emballage**
Vérifier l'ensemble des éléments de la livraison afin de constater leur intégralité et l'absence de dommages.
Bien vérifier les matériaux d'emballage pour ne pas prendre d'éventuelles petites pièce restées à l'intérieur.

☐ **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.

☐ **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.

☐ **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.

☐ **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.

☐ **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.

☐ **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

☐ **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.

☐ **2. Montaggio**
E' importante seguire le seguenti istruzioni di montaggio e manutenzione per ottenere il perfetto funzionamento dell'impianto di sollevamento.

☐ **3. Attenzione!**
Carichi ammessi, durata di esercizio e numero giri previsti per l'impianto devono essere rispettati. In caso di dubbi contattare i nostro tecnici.

☐ **4. Allineamento**
Martinetti e guide lineari devono essere paralleli. Fate anche attenzione al preciso allineamento tra loro delle strutture di supporto.

☐ **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.

☐ **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.

☐ **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.

中 文 (CHINESE)

☐ **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。

☐ **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。

☐ **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。

☐ **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。

☐ **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。

☐ **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。

☐ **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。

ESPAGNOL

☐ **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.

☐ **2. Montaje**
Es muy importante seguir las siguientes indicaciones de montaje y mantenimiento para lograr un funcionamiento correcto del mecanismo elevador.

☐ **3. ¡Atención!**
No se deben sobrepasar 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.

☐ **4. Alineación**
Los husillos y las guías lineales deben ser paralelos. Encárguese también de una alineación exacta de la construcción.

☐ **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.

☐ **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 solicitación a golpe adicional etc. Para la dirección de carga principal se debe evitar la solicitación a tracción a los tornillos de sujeción.

☐ **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.

по-русски (RUSSIAN)

☐ **1. Упаковка**
Проверьте все поставленные узлы на комплектность, на повреждения упаковки и на повреждения при транспортировке. Устраняйте упаковочные материалы лишь после тщательного контроля, чтобы входящие в комплект поставки мелкие детали не потерялись.

☐ **2. Монтаж**
Для обеспечения безукоризненной работы подъемного устройства, необходимо соблюдать нижеследующие инструкции по монтажу и техобслуживанию.

☐ **3. Внимание!**
Запрещено превышать рассчитанные для устройства допустимые грузы, продолжительность включения и число оборотов привода. В случае сомнений обращайтесь к нашему технику-проектировщику.

☐ **4. Выверка**
Шпиндель и линейные направляющие должны быть расположены параллельно друг другу. Необходимо также обеспечить точную выверку параллельности несущей конструкции.

☐ **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.

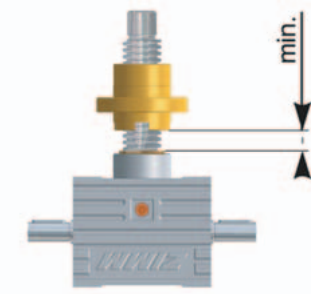
☐ **6. Крепление**
Необходимо соблюдать глубину ввинчивания. Четыре крепежных винта рассчитаны на статическую номинальную нагрузку, на тяговые усилия и давления редукторов. Необходимо учитывать дополнительные ударные нагрузки и т.д. Крепежные винты не должны подвергаться тяговым усилиям основного направления нагрузки.

☐ **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.

DEUTSCH

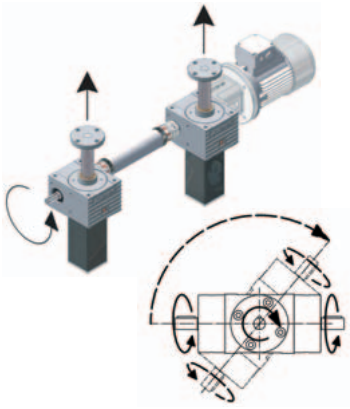
8. Schutzrohr
Das Schutzrohr schützt die Spindel vor Verschmutzungen und kann in der Standardausführung keine Kräfte aufnehmen.

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 Sicherheitsabstandes bzw. Blockfahren können Folgeschäden entstehen, bei denen die Produkthaftung entfällt. Zum Schutz eignen sich unser neues Endschaltersystem und ein Bremsmotor.

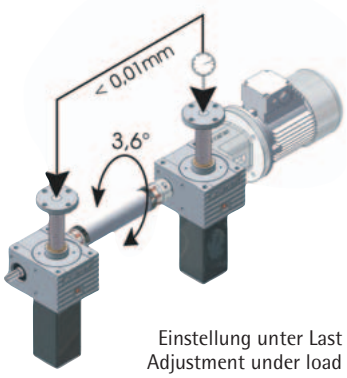


10. Selbsthemmung / Nachlauf
Spindelhubgetriebe mit eingängiger Trapezgewindespindel sind bedingt selbsthemmend. Wenn ungenügend Selbsthemmung Schaden verursacht, ist eine Bremse notwendig. Bei 2-gängiger Spindel oder Kugelgewindetrieb KGT ist immer eine Bremse notwendig.

11. 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).



12. 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 Kugelgewindetrieben 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 Höhenein-stellungen ist die Ausführung mit der Klemmnaben-Kupplung KUZ-KK oder Verbindungswelle VWZ erforderlich. z.B.: 3,6 ° Verdrehung = 0,01 mm Verstellhöhe.



Einstellung unter Last
Adjustment under load
Réglage sous charge
Fasatura solto carico
负重下进行调节
Ajuste bajo carga
Установка под нагрузкой

ENGLISH

8. Protective Tube
The protective tube protects the screw from contamination and, in the standard configuration, is not designed to be load bearing.

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.

10. Self-locking / after-running
Screw jacks with single-speed trapezoidal thread spindles are not completely self-locking. Fit a brake when inadequate self-locking causes damage.
A brake is always required for double-speed spindles and KGTs.

11. 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).

12. 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.

FRANÇAIS

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.

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 fabriquant. Une bonne protection est, par exemple, assurée par notre nouveau système de fins de course et un moteur-frein.

10. Blocage automatique / Marche par inertie
Les vérins mécaniques de levage à vis trapézoïdale à un filet sont autobloquants sous conditions. Si un blocage automatique insuffisant provoque des dommages, il est nécessaire de monter un frein. Pour les vis à filet double et les vis à billes, un frein est toujours nécessaire.

11. 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).

12. 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.

ITALIANO

8. Tubo di protezione
Il tubo di protezione protegge la vite da sporcizia e nell'esecuzione standard non può ricevere alcuna sollecitazione.

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.

10. Bloccaggio automatico / rotazione per inerzia
I martinetti con vite trapezoidale ad un principio sono solo limitatamente irreversibili. In caso di danno provocato da insufficiente irreversibilità è necessario montare un freno. In caso di vite a due principi e sfere KGT è sempre necessario un freno.

11. 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).

12. 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.

中 文 (CHINESE)

8. 护管
护管保护主轴不受污染，在标准结构中不能受力。

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

10. 自制动 / 惯性运动
带有单档梯形螺纹主轴的起重齿轮箱具在特定的条件下有一定的自制动能力。如果自制动力不够而可能造成损坏时，就必须安装制动器。对双档主轴和 KGT 来说，在任何情况下都需要制动器。

11. 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）。

12. 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。

ESPAGNOL

8. Tubo protector
El tubo protector protege el husillo contra ensuciamiento y en la versión estándar no puede absorber fuerzas.

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.

10. Retención automática / marcha en inercia
Los engranajes elevadores por husillo con husillo de rosca trapezoidal de un paso son autobloqueantes con restricciones. En caso de que una retención automática insuficiente cause daños, se debe montar un freno. En los husillos de dos pasos y KGT siempre hace falta montar un freno.

11. 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).

12. Nivelación
Para la nivelación de los elevadores hemos desarrollado un sistema preciso y fácil de montar. La nivelación se realiza bajo carga. Se pueden nivelar los engranajes entre si 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.

по-русски (RUSSIAN)

8. Защитная труба
Защитная труба предохраняет ходовой винт от загрязнений. В стандартном исполнении она не предусмотрена для воздействия усилий.

9. Безопасное расстояние между подвижными и неподвижным 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.

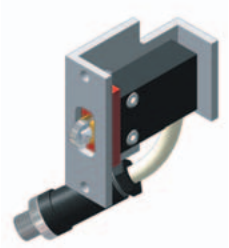
10. Самоторможение / выбег
Винтовые подъемные редукторы с однозаходной трапецеидальной резьбой лишь ограничено самотормозящие. Если недостаточное самоторможение приводит к повреждениям, то необходимо встроить тормоз. Для двухзаходных ходовых винтов и для KGT всегда необходим тормоз.

11. 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).

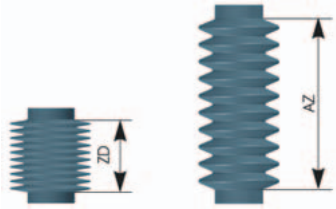
12. Нивелировка
Для нивелировки редукторов нами разработана точная и удобная система. Нивелировка производится под нагрузкой. Нивелировку редукторов относительно друг друга возможно производить с помощью муфт или соединительных валов. Учитывайте, что подъемные редукторы с шариковыми ходовыми винтами или многозаходными винтами с трапецеидальной 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.

DEUTSCH

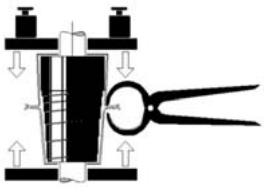
☐ 13. Endschalter
Die Funktion der Steuerung in Zusammenhang mit den Endschaltern muss so gestaltet sein, dass ein Blockfahren zu 100% vermieden wird.
Prüfen Sie die Endschalterfunktion vor dem Motorprobelauf. Wenn der Motornachlauf ein sicheres Anhalten nicht gewährleistet, soll ein Bremsmotor eingesetzt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



☐ 14. 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.



☐ 15. 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.



☐ 16. 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.

☐ 17. 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.

ENGLISH

☐ 13. 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.

☐ 14. Bellows
The bellows must not be compressed below the ZD dimension or extended to exceeded 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 occure! 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.

☐ 15. 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).

☐ 16. 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.

☐ 17. 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. Repclace the cover after adjustment.

FRANÇAIS

☐ 13. 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.

☐ 14. 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.

☐ 15. 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).

☐ 16. 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.

☐ 17. 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.

ITALIANO

☐ 13. 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.

☐ 14. 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.

☐ 15. 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 contro-pressione. Le molle a spirale sono fornite in pretensionamento nella lunghezza di montaggio (ZD).

☐ 16. 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.

☐ 17. 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.

中 文 (CHINESE)

☐13. 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。

☐14. 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。

☐15. 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)。

☐16. 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。

☐17. 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。

ESPAGNOL

☐ 13. 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 interruptr de fin de carrrera 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.

☐ 14. 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:
- polvo de obras
- polvo de amoladoras angulares, etc.
- salpicaduras de soldadura etc.

☐ 15. 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 sujeciones 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).

☐ 16. 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.

☐ 17. 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.

по-русски (RUSSIAN)

☐ 13. 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.

☐ 14. Сильфон
Размер ZD нельзя принижать, 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:
- строительной пыли
- шлифовальной пыли угловых шлифовальных машин
- сварочных брызг и т.д.

☐ 15. Спиральная пружина
Внимание: в связи с предварительным натяжением пружины, при неосторожном устранении крепежной стальной ленты, возможны ранения! Производите монтаж спиральной пружины только в сжатом состоянии и устраняйте крепежную стальную ленту только если спираль находится под давлением. Спиральные пружины поставляются предварительно натянутые с монтажной длиной (ZD).

☐ 16. 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 клеем Loctite. До типоразмера MSZ-100 дополнительно монтирована контргайка. Крепление необходимо тщательно проверить.

☐ 17. 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.

DEUTSCH

☐ 18. Kupplungen / Verbindungswellen

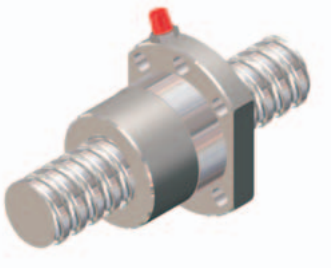
Achten Sie bitte auf axiale Fluchtung der Verbindungswellen mit Stehlagern und Getrieben (siehe auch Punkt 4, 5, 11). Kontrollieren Sie die Sicherung aller Kupplungen und Verbindungswellen gegen axiales Verschieben auf den Antriebswellen. Bei der Verbindungswelle VWZ und der Klemmnabenkupplung KUZ-KK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

Verbindungswelle	Kupplung	Anzugsmoment
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

Lassen Sie bei der Montage 1 bis 2 mm axiale Luft für den Längsausgleich.

☐ 19. Kugelgewindetriebe KGT

Unsere Lieferung erfolgt mit montierter Mutter auf der Spindel. Vermeiden Sie die Demontage der Mutter.
ACHTUNG: Sollte eine Demontage erforderlich sein, muss die Mutter mit 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 Ausdrehsicherung. Ein Bremsmotor oder eine Federdruckbremse FDB sind erforderlich.
Schmierung:
Schmieren Sie den KGT alle 500 Stunden effektive Laufzeit nach.
Fettmenge: Richtwert ca. 1 ml pro cm Spindeldurchmesser.



☐ 20. 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

☐ 18. 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

Leave 1 to 2 mm axial play when mounting.

☐ 19. 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.
Lubrication:
Regrease the KGT all 500 hours running time.
Quantity: approx. 1 ml per cm spindle diameter.

☐ 20. 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 seperately. Please also note our separate mounting instructions for FDB.

FRANÇAIS

☐ 18. 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

☐ 19. 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.

☐ 20. 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.

ITALIANO

☐ **18. 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

☐ **19. 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.
Meccanismi 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 elettromagnetico FDB.

☐ **20. Freno pneumatico a molla FDB**

In caso di ingrassaggio della vite protegete 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 quantitá 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.

中 文 (CHINESE)

☐ **18. 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。请遵守下表中的紧固扭矩。

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

☐ **19. 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。

☐ **20. 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。

ESPAGNOL

☐ **18. 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

☐ **19. 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.

☐ **20. 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.

по-русски (RUSSIAN)

☐ **18. 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

☐ **19. Редуктор с шариковым ходовым винтом**

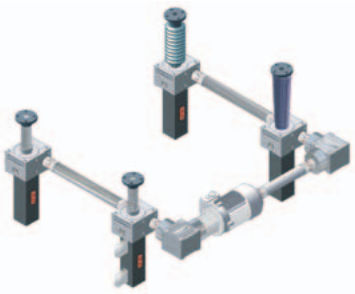
Ходовой винт поставляется с монтированной гайкой. Избегайте демонтаж гайки.
ВНИМАНИЕ: в случае необходимости демонтажа гайки, гайку запрещено устранять без монтажной гильзы. Гильза удерживает шарики. У версии S ни в коем случае нельзя вывинчивать ходовой винт из редуктора.
Редукторы с шариковыми ходовыми винтами не самотормозящие! Принципиально рекомендуем применение защиты от вывинчивания. Необходимо применение тормозного серводвигателя или пружинного тормоза FDB.

☐ **20. 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.

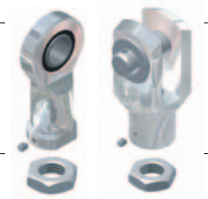
DEUTSCH

☐ 21. 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.



☐ 22. 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 (Schmiermittel siehe Punkt 30).
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 Probe-lauf wird das überschüssige Fett entfernt.

☐ 23. Verschraubungen
Überprüfen Sie bitte alle Verschraubungen nach dem Probelauf.



☐ 24. Verschleißkontrolle der Trapezgewindemuttern
Kontrollieren Sie je nach Einschaltdauer 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 mit der Überwachungseinheit "SIFA-Control". Diese Ausführung liefern wir als komplette Baueinheit.

ENGLISH

☐ 21. 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.

☐ 22. 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 (see point 30).
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.

☐ 23. Screw Connections
Check all screw connections after the trial run.

☐ 24. 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 with the "SIFA-Control" monitoring unit. We deliver this configuration as complete component.

FRANÇAIS

☐ 21. 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.

☐ 22. Graissage avant l'essai de fonctionnement
Version R:
Les modèles à vis tournante sont livrés non graissés en raison des risques d'encrassement. Avant le premier essai de fonctionnement, la vis et l'écrou doivent être nettoyés et suffisamment graissés sur toute leur longueur.
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.

☐ 23. Vis de maintien et/ou de serrage
Après l'essai, vérifier le serrage approprié de toutes les vis.

☐ 24. 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 l'unité de contrôle « SIFA-Control ». Nous livrons ce modèle en tant qu'unité complète.

ITALIANO

☐ 21. 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 !

☐ 22. Lubrificazione prima del ciclo di prova
Versione R:
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 lungheza.
Versione S:
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.

☐ 23. Viti di serraggio
Controllate tutte le viti di serraggio dopo il ciclo di prova.

☐ 24. Controllo usura delle chiocciole 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 controdado di sicurezza con l'unità di controllo "SIFA-Control". Questa versione viene consegnata come unità costruttiva completa.

中 文 (CHINESE)

☐21. 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。不正常的耗费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。

☐22. 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涂脂。必须在第一次试车之前清洗主轴和L游走走螺母，在整个长度上充分润滑
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。

☐23. 螺纹连接
请您在试车之后检查所有的螺纹连接。

☐24. 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，并使用监控单元"SIFA-Control"监视其磨损状况。我们提供这一结构的完整单元。

ESPAGNOL

☐ 21. 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.

☐ 22. Lubricación antes de la marcha de prueba
Versión R:
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.
Versión S:
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.

☐ 23. Tornillos
Controle todos los tornillos después de la marcha de prueba.

☐ 24. 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 con unidad de control "SIFA-Control". Suministramos esta versión como unidad de construcción completa.

по-русски (RUSSIAN)

☐21. 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.

☐22. Смазка перед пробным пуском
Версия R
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.
Версия S
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.

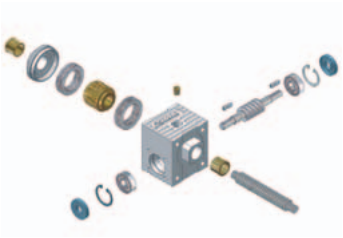
☐23. Резьбовые соединения
После пробного пуска необходимо проверить все резьбовые соединения.

☐24. 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 концевого выключателя с контрольным узлом "SIFA-Control". Это исполнение поставляется в комплекте, в качестве готового узла.

DEUTSCH

☐ **25. Reparatur**
Eine Reparatur ist durch Komplettaustausch des Hubgetriebes am wirtschaftlichsten zu realisieren.

☐ **26. Ersatzteile**
Zum Schutz vor Produktionsausfall bei hoher Einschaltdauer oder hoher Belastung empfehlen wir Ihnen, einen Satz Getriebe (inkl. Gewindespindeln, etc. und mit Montagezeichnungen) bei Ihnen bzw. Ihrem Kunden auf Lager zu legen. Bei Reparaturen immer neue Dichtungen verwenden.



☐ **27. Schmierung**
ZIMM-Spindelhubgetriebe werden im betriebsbereiten Zustand geliefert und sind mit einem gut haftenden Schmierfett gefüllt. Eingebaute 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 Einschaltdauer ab. Der Schneckentrieb im Getriebegehäuse ist gut geschmiert, nur bei hoher Einschaltdauer 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.

KGT Schmierung: Schmieren Sie den KGT alle 500 Stunden effektive Laufzeit nach. Fettmenge: Richtwert ca. 1 ml pro cm Spindeldurchmesser.

Bei **langlebigen Anlagen** (z. B. Arbeits- u. Theaterbühnen) verliert das Fett nach ca. 5 Jahren seine Schmiereigenschaften. Staub- und Schmutzeintrag verstärkt diesen Effekt. Wir empfehlen nach 5 Jahren eine komplette Reinigung und Neufettung.
Füllmenge siehe letzter Punkt.

☐ **28. Schmierstoffgeber**
Für eine automatische Schmierung empfiehlt sich ein Schmierstoffgeber, der die Schmierstelle permanent mit Fett versorgt. Die Spendedauer beträgt 1 bis 12 Monate. Sie finden den Schmierstoffgeber in unserem Katalog in Kapitel 14.

ENGLISH

☐ **25. Repairs**
Repairs are made most economically by completely replacing the screw jack.

☐ **26. Spare Parts**
For protection against production loses 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. Use new seals when repair.

☐ **27. 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.

KGT Lubrication: Regrease the KGT all 500 hours running time. Quantity: approx. 1 ml per cm spindle diameter.

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.
Quantities see last Point.

☐ **28. 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 1 to 12 mounth. Automatic lubricators can be found in our catalogue in chapter 14.

FRANÇAIS

☐ **25. Réparation**
La réparation la plus économique d'un vérin de levage usé consiste à le remplacer par un nouveau.

☐ **26. 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).

☐ **27. 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 axiales 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'encrassement. 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.

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.

☐ **28. Graisseur**
Pour un graissage automatique, il est recommandé d'utiliser un graisseur qui alimente en permanence les points de graissage.
Selon les types de graisseurs, avec cartouche, la durée de graissage peut atteindre deux ans. Vous trouverez des graisseurs dans notre catalogue au chapitre 14.

ITALIANO

☐ **25. Riparazione**
La riparazione è realizzata nel modo più economico, con la sostituzione completa del martinetto.

☐ **26. 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).

☐ **27. Lubrificazione**
I martinetti ZIMM sono forniti in condizione pronta all'uso e prottetti 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.

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.

☐ **28. 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.

中 文 (CHINESE)

☐25. **维修**
整个更换起重齿轮箱是最经济的修理方法。

☐26. **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）。

☐27. **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，可以直接使用。
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。齿轮箱中的蜗轮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。

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。

☐28. **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。

ESPAGNOL

☐ **25. Reparación**
La reparación más económica es la sustitución del elevadores mecánico.

☐ **26. 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).

☐ **27. 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 elvadores 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.

Al tratarse de **instalaciones de larga vida** (p. ej. plataformas de trabajo y de teatro), la grasa pierde su poder lubricante 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.

☐ **28. 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.

по-русски (RUSSIAN)

☐ **25. Ремонт**
Наиболее экономичным является замена комплектного подъемного редуктора.

☐ **26. 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.).

☐ **27. Смазка**
Винтовые подъемные редукторы фирмы ZIMM поставляются в готовом к эксплуатации состоянии и заполнены бессменной 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 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.

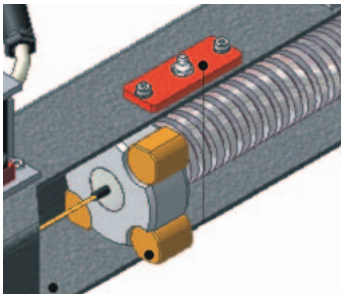
У долговечных установок (например, рабочие платформы или театральные подмостки) после, примерно, 5 лет смазка теряет свою смазочную способность. Пыль и загрязнения влияют дополнительно отрицательно на смазочную способность. Рекомендуем, после 5 лет производить очистку всего механизма и его повторную смазку.

☐ **28. 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.

DEUTSCH

☐ 29. Schmierempfehlung für die Verdrehsicherung

Bei Getrieben mit Verdrehsicherung 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.



☐ 30. Schmiermittel für ZIMM-Spindelhubgetriebe

Verwenden Sie den optimalen Schmierstoff für eine lange Lebensdauer!

Wir liefern ausgewählte Fette „ZIMM-Grease“ in 1 kg Dosen

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. 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.
Positon 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.

☐ 30. Lubricants for ZIMM Screw Jacks

Always use the best lubricants for long service life!

We delivery selected "ZIMM-Grease" lubricants in 1 kg cans.

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. Recommandation pour le graissage de la protection anti-rotation

Pour les vérins avec anti-rotation, des bandes de graissage (liteau) 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.

☐ 30. Lubrifiant pour les vérins de levage à vis ZIMM

Utilisez le lubrifiant optimal pour une longue durée de vie !

Nous livrons les graisses sélectionnées « ZIMM-Grease » en boîtes de 1 kg.

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 por vérin

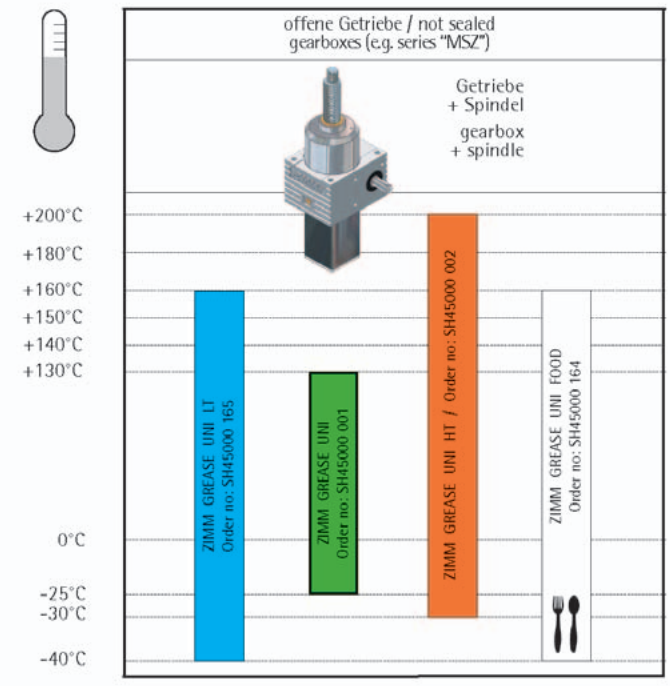
SHZ - 02 - lubrifié à vie
MSZ - 5 - 0,10 Litre
MSZ - 10 - 0,15 Litre
MSZ - 25 - 0,20 Litre
MSZ - 50 - 0,50 Litre
MSZ-100 - 1,00 Litre
MSZ-150 - 1,30 Litre
MSZ-250 - 2,00 Litre
MSZ-350 - 3,00 Litre
MSZ-500 - 4,20 Litre

Verwenden Sie den optimalen Schmierstoff für eine lange Lebensdauer!
Bestellnummern für ZIMM-Spezialfette
(Schmierstoffe für Reinraum, Hochvakuum oder radioaktive Anwendungen auf Anfrage)

Use an optimal lubricant for a long lifetime!
Order numbers for ZIMM special grease
(Lubricants for cleanroom, high vacuum or radio active application on request)

erhältliche Fette:

ZIMM-GREASE-UNI	**1 Kg**	**Standardfett**
ZIMM-GREASE-UNI-HT	1 Kg	Hochtemperaturfett
ZIMM-GREASE-UNI-LT	1 Kg	Niedertemperaturfett
ZIMM-GREASE-UNI-FOOD	1 Kg	Lebensmittelfett



ITALIANO

☐ **29. 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.

☐ **30. Sostanza lubrificante per martinetti ZIMM**

Per assicurare una lunga durata utilizzare sempre il lubrificante ottimale!

Forniamo lubrificanti selezionati "ZIMM-Grease" in lattine da 1 kg.

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. 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。

☐ **30. ZIMM螺旋式起重齿轮箱用润滑剂**

请您使用最好的润滑剂来保证设备使用寿命长！

我们向您提供精选润滑剂“ZIMM-Grease”，1千克罐装。

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. 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 conéctelos 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.

☐ **30. Lubricantes para los elevadores mecánicos por husillo de ZIMM**

¡Utilice el lubricante óptimo para lograr una larga vida útil!

Suministramos las grasas seleccionadas "ZIMM-Grease" en latas de 1 kg.

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. 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.

☐ **30. Смазочные вещества для подъемных редукторов фирмы ZIMM**

Применяйте оптимальные смазки чтобы обеспечить долгий срок службы!

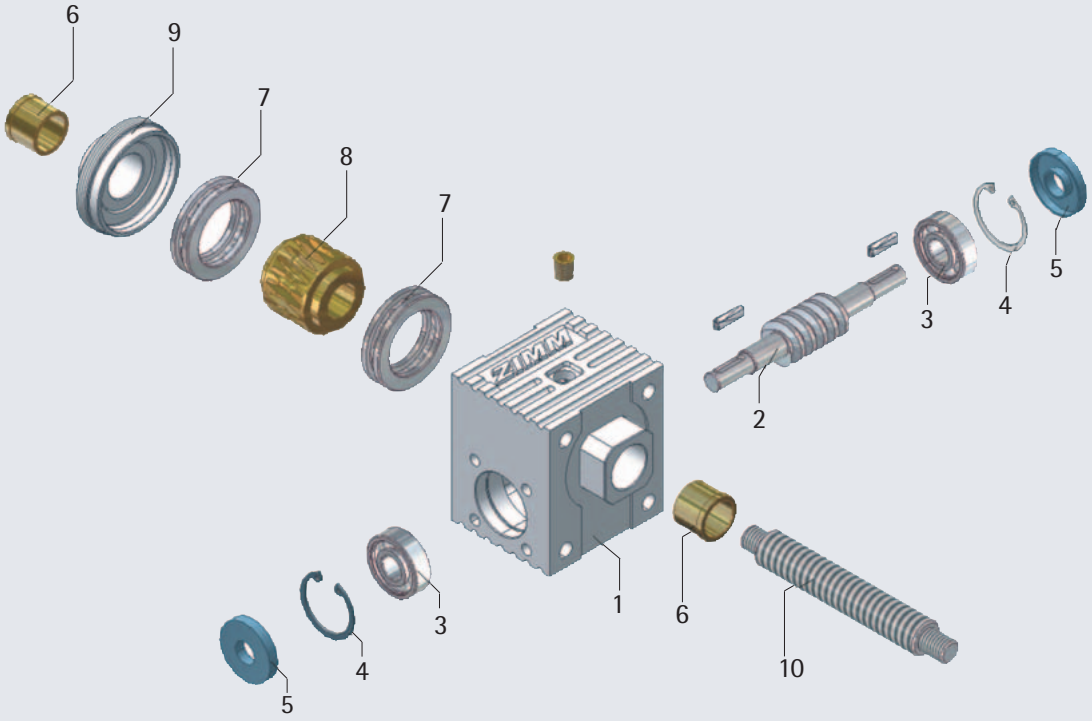
Мы поставляем отборные смазки "ZIMM-Grease" в банках по 1 кг.

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



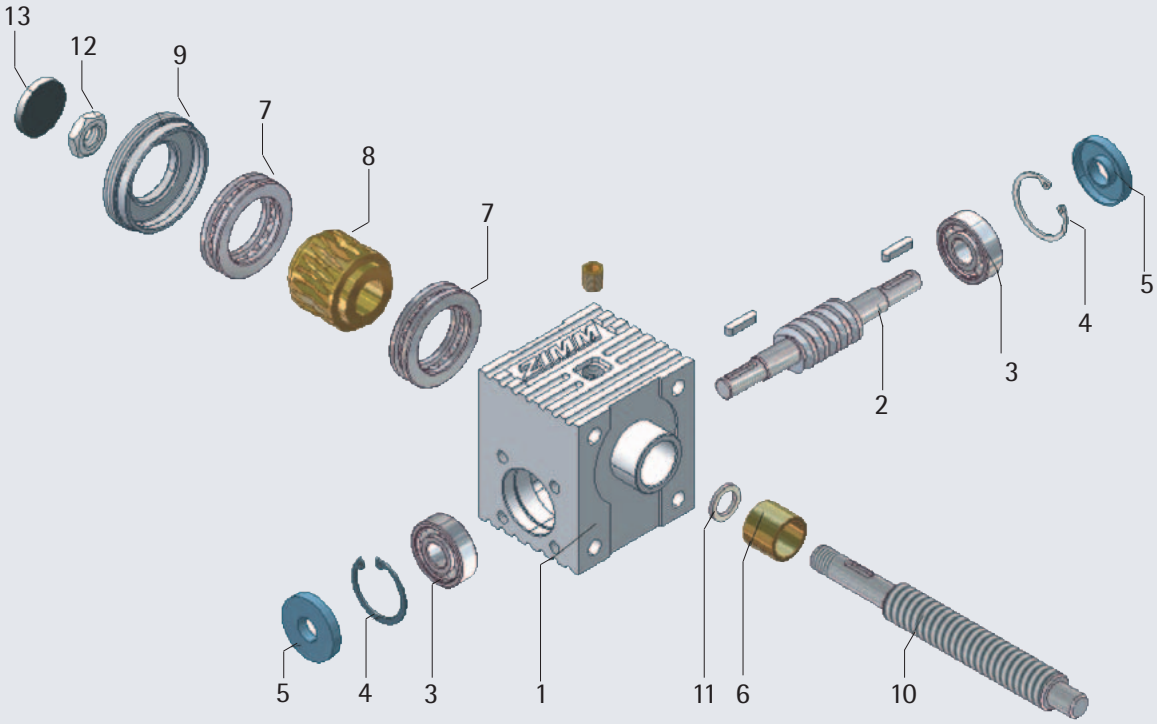
Repair
Repairs are made most economically by completely replacing the screw jack gearbox.

Spare Parts
For protection against production 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
	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
1	Gearbox housing-ALU	MSZ-5-GH-A-S	MSZ-10-GH-A-S	MSZ-25-GH-A-S	-	-	-	-	-	-	-
	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
	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
	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
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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
	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
1	Gearbox housing-ALU	MSZ-5-GH-A-R	MSZ-10-GH-A-R	MSZ-25-GH-A-R	-	-	-	-	-	-	-
	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
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-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
	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
8	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
	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
10	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 vial 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 counterclaims 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 connecting 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 for 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.

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