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# General Technical Data

The range includes a total of 11 worm gear screw jack models in two series: MULI® 0 to MULI® 5 with lifting capacities up to 100 kN and JUMBO® 1 to JUMBO® 5 with lifting capacities from 150 kN to 500 kN statically.

**Speed of travel - gear ratio H (high speed)**
Worm gear screw jacks with trapezoidal screw produce an advance of 1 mm for each revolution of the worm shaft. The linear speed is 1500 mm per min at 1500 RPM. Worm gear screw jacks with ball screws achieve between 1071 mm per min and 2124 mm per min, depending on size and lead.

**Speed of travel - gear ratio L (low speed)**
Worm gear screw jacks with trapezoidal screw produce an advance of 0.25 mm for each full revolution of the worm shaft. That is, the linear speed is 375 mm per min at 1500 RPM. Worm gear screw jacks with ball screws achieve between 312 mm per min and 535 mm per min, depending on size and lead.

Please note that higher speeds of travel can be achieved with larger screw pitches or multiple start screws.

The worm gear screw jack's maximum drive revs (standard grease lubrication) of 1500 RPM must not be exceeded.


The higher efficiency of the ball screw drive also permits a longer duty cycle.

**Tolerances and backlash**
The gearbox housings are machined on the four mounting sides. The tolerances conform to DIN ISO 2768-mH. The sides C and D that are not machined conform to DIN 1688-T1/GTA 16 for MULI 0 – 2 as well as DIN 1685, GTB 18 – GGG-40 from MULI 3.

The axial backlash of the jack screw under alternating load is as follows:
- Trapezoidal screws: up to 0.4 mm (to DIN 103)
- Ball screws: 0.08 mm.

The lateral play between the outside diameter of the screw and the guide diameter is 0.2 mm.

The backlash in the worm gears is ± 4° for gear ratio L and ± 1° for gear ratio H based on the drive shaft.

Trapezoidal screws are manufactured to a straightness of 0.3 – 1.5 mm/m, ball screws to a straightness of 0.08 mm/m over a length of 1000 mm and to the following pitch accuracies:
- MULI 0 – MULI 5: 0.05 mm/300 mm length
- JUMBO 1 – JUMBO 5: 0.2 mm/300 mm length.

**Lateral forces on the jack screw.**
Any lateral forces that may occur should be taken by an external guide rail.

# General Technical Data

**Stop collar A**
Prevents the screw from being removed from the jack gearbox. Fitted as standard on ball screw versions N and V. Optionally available for screw jacks with trapezoidal screws. The stop collar cannot be used as a fixed stop.

**Self-locking**
The self-locking function depends on a variety of parameters:

- Large pitches
- Different gear ratios
- Lubrication
- Friction parameters
- Ambient influences, such as high or low temperatures, vibrations, etc.
- The mounting position

Versions with ball screw and TGS/KGS with large pitches are consequently not self-locking. Suitable brakes or braking motors must therefore be considered in such cases. Limited self-locking can be assumed for smaller pitches (single-start).

**Special versions**
In addition to the extensive standard range, anti-clockwise, multi-start and special material worm gear screw jacks can be supplied upon request.

Surfaces are basic coated starting from size Muli® 3. Upon request the following surface treatments are available:

- electroless nickel plating
- stainless steel for selected parts
- epoxy-colour-coated with 2 top layer surfaces (according to RAL)
- ATC-coated ball screws and ball screw nuts

Please ask our product specialists.

# General Technical Data

## Trapezoidal screw

| | | | MULI 0 | MULI 1 | MULI 2 | MULI 3 | MULI 4 | MULI 5 | JUMBO 1 | JUMBO 2 | JUMBO 3 | JUMBO 4 | JUMBO 5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum static lifting capacity [1] | [kN] | | 2,5 | 5 | 10 | 25 | 50 | 100 | 150 | 200 | 250 | 350 | 500 |
| Diameter x pitch | [mm] | | 14x4 | 18x4 | 20x4 | 30x6 | 40x7 | 55x9 | 60x9 | 70x10 | 80x10 | 100x10 | 120x14 |
| Stroke per full turn of the drive shaft | [mm] | ratio H[2] | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | ratio L[2] | 0,25 | 0,25 | 0,25 | 0,25 | 0,25 | 0,25 | 0,25 | 0,25 | 0,25 | 0,25 | 0,25 |
| Gear ratio | | ratio H[2] | 4:1 | 4:1 | 4:1 | 6:1 | 7:1 | 9:1 | 9:1 | 10:1 | 10:1 | 10:1 | 14:1 |
| | | ratio L[2] | 16:1 | 16:1 | 16:1 | 24:1 | 28:1 | 36:1 | 36:1 | 40:1 | 40:1 | 40:1 | 56:1 |
| Efficiency [3] | [%] | ratio H[2] | 35 | 31 | 29 | 29 | 26 | 24 | 23 | 22 | 20 | 19 | 19 |
| | | ratio L[2] | 27 | 25 | 23 | 23 | 21 | 19 | 18 | 17 | 15 | 15 | 15 |
| Weight (zero stroke) | [kg] | | 0,60 | 1,20 | 2,10 | 6,00 | 17,00 | 32,00 | 41,00 | 57,00 | 57,00 | 85,00 | 160,00 |
| Weight per 100 mm stroke | [kg] | | 0,10 | 0,26 | 0,42 | 1,14 | 1,67 | 3,04 | 3,10 | 4,45 | 6,13 | 7,90 | 11,50 |
| Idling torque | [Nm] | ratio H[2] | 0,02 | 0,04 | 0,11 | 0,15 | 0,35 | 0,84 | 0,88 | 1,28 | 1,32 | 1,62 | 1,98 |
| | | ratio L[2] | 0,016 | 0,03 | 0,10 | 0,12 | 0,25 | 0,51 | 0,57 | 0,92 | 0,97 | 1,10 | 1,42 |
| Housing material | | | G – AL | | | EN – GJS | | | | | | | |

## Ball screw

| | | | MULI 0 | MULI 1 | MULI 2 | MULI 3 | MULI 4 | | MULI 5 | JUMBO 3 |
|---|---|---|---|---|---|---|---|---|---|---|
| Maximum static lifting capacity [1] | [kN] | | 2,5 | 5 | 10 | 12,5 | 22 | 42 | 65 | 78 |
| Diameter x pitch | [mm] | | 1205 | 1605 | 2005 | 2505 | 4005 | 4010 | 5010 | 8010 |
| Dynamic load rating KGF – KGM | [kN] | | 2,5 | 5 | 10 | 12,2 | 23,8 | 38 | 68,7 | 86,2 |
| Stroke per full turn of the drive shaft | [mm] | ratio H[2] | 1,25 | 1,25 | 1,25 | 0,83 | 0,71 | 1,43 | 1,1 | 1 |
| | | ratio L[2] | 0,31 | 0,31 | 0,31 | 0,21 | 0,18 | 0,36 | 0,28 | 0,25 |
| Gear ratio | | ratio H[2] | 4:1 | 4:1 | 4:1 | 6:1 | 7:1 | | 9:1 | 10:1 |
| | | ratio L[2] | 16:1 | 16:1 | 16:1 | 24:1 | 28:1 | | 36:1 | 40:1 |
| Efficiency [3] | [%] | ratio H[2] | 60 | 57 | 56 | 55 | 53 | 56 | 47 | 45 |
| | | ratio L[2] | 48 | 46 | 44 | 43 | 43 | 45 | 37 | 34 |
| Weight (zero stroke) | [kg] | | 0,60 | 1,30 | 2,30 | 7,00 | 19,00 | | 35,00 | 63,00 |
| Weight per 100 mm stroke | [kg] | | 0,09 | 0,26 | 0,42 | 1,14 | 1,67 | | 3,04 | 6,13 |
| Idling torque | [Nm] | ratio H[2] | 0,02 | 0,04 | 0,11 | 0,15 | 0,35 | | 0,84 | 1,32 |
| | | ratio L[2] | 0,016 | 0,03 | 0,10 | 0,12 | 0,25 | | 0,51 | 0,97 |
| Housing material | | | G – AL | | | EN – GJS | | | | |

1) Depending on travel speed, duty-cycle, etc.
2) H = high travel speed
2) L = low travel speed
3) The specified efficiency values are average values.

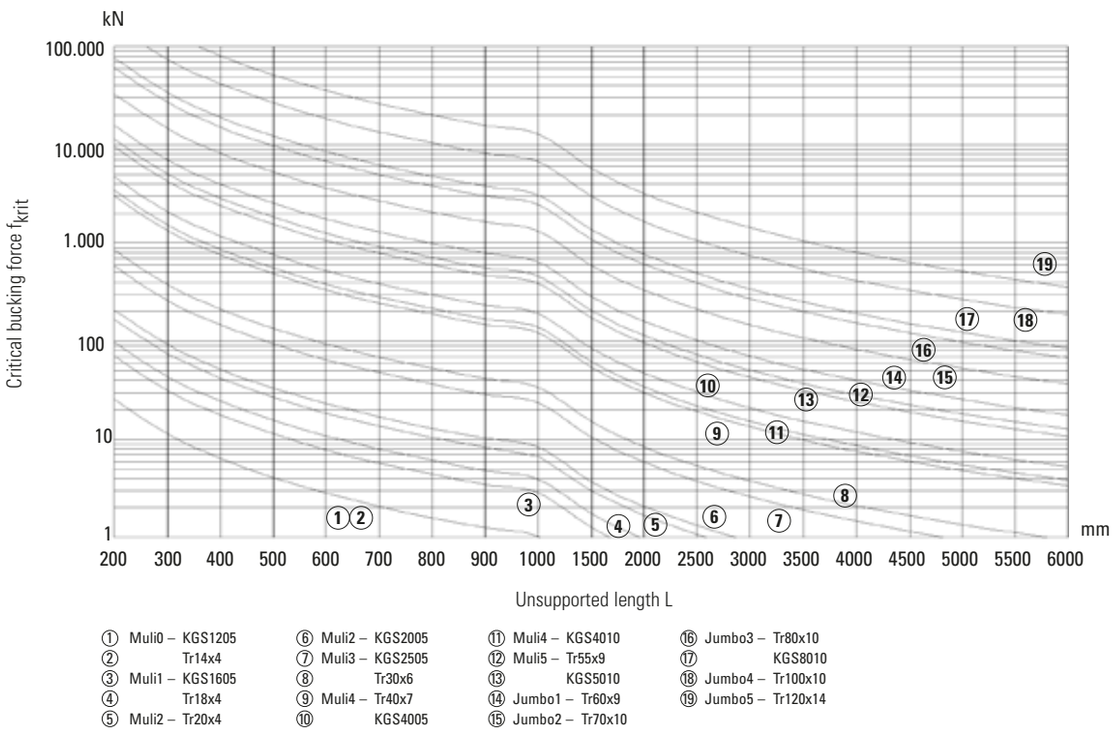
Note: Initial breakaway torque: approx. 2-3 times nominal torque in run-up (Frequence inverter control!)

# Critical Buckling Force Calculations

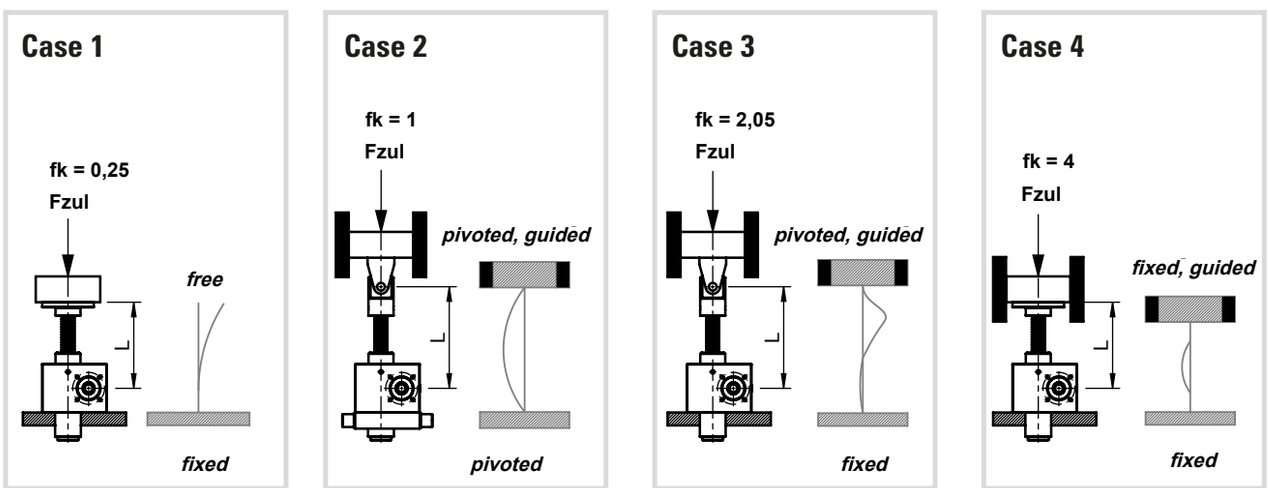
Thin lifting screws may buckle sideways when subjected to compressive loads. Before the permissible compressive force is defined for the screw, allowance must be made for safety factors as appropriate to the installation.

$$F_{zul} = f_k \cdot F_{krit} \cdot 0{,}8$$

$F_{zul}$ Max. allowable axial force [kN].
$f_k$ Correction factor that considers the type of screw jack bearing.
$F_{krit}$ Theortical critical buckling force as a function of the unsupported length L [kN].
0,8 Safety factor $C_K$




① Muli0 – KGS1205
② Tr14x4
③ Muli1 – KGS1605
④ Tr18x4
⑤ Muli2 – Tr20x4
⑥ Muli2 – KGS2005
⑦ Muli3 – KGS2505
⑧ Tr30x6
⑨ Muli4 – Tr40x7
⑩ KGS4005
⑪ Muli4 – KGS4010
⑫ Muli5 – Tr55x9
⑬ KGS5010
⑭ Jumbo1 – Tr60x9
⑮ Jumbo2 – Tr70x10
⑯ Jumbo3 – Tr80x10
⑰ KGS8010
⑱ Jumbo4 – Tr100x10
⑲ Jumbo5 – Tr120x14



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# Critical Speed Calculations

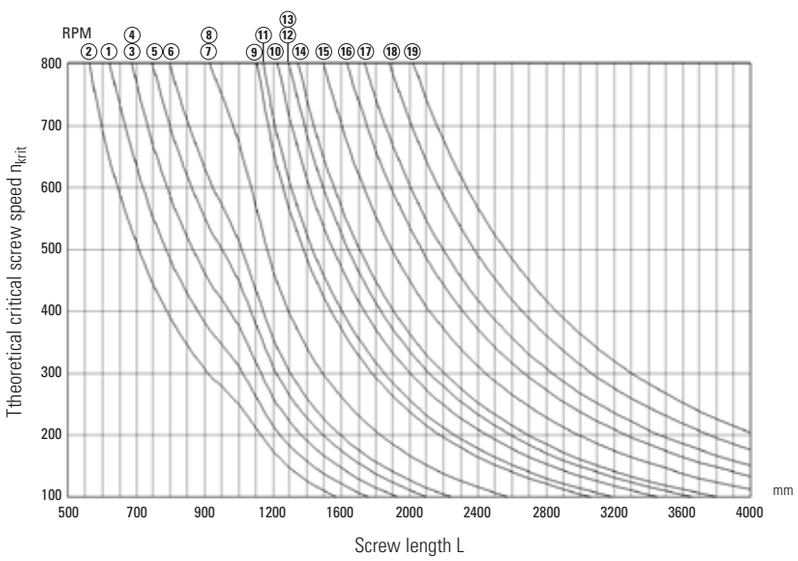
Resonant bending vibration may develop with thin screws rotating at high speed. Assuming a sufficiently rigid assembly, the resonant frequency can be estimated with the aid of the following method.

Worm gear screw jacks with multi-start screws are also available for applications with high lifting speeds. These versions run at a considerably lower screw speed and better efficiency for the same lifting speed. They are generally not self-locking.

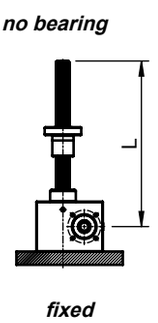
$$n_{zul} = n_{krit} \cdot 0{,}8$$

$n_{zul}$ Maximum permissible screw revolution speed [RPM]
$n_{krit}$ Theoretical critical screw revolution speed [RPM]
0,8 Safety factor $C_K$

## Case 1

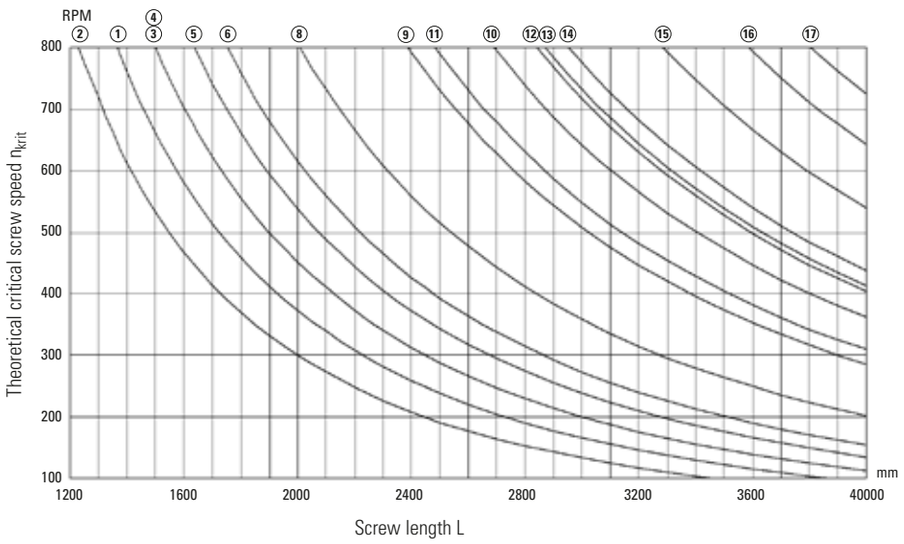


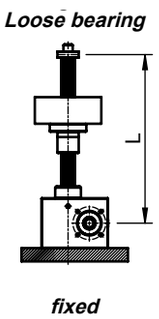

① Muli0 – KGS1205
② Tr14x4
③ Muli1 – KGS1605
④ Tr18x4
⑤ Muli2 – Tr20x4
⑥ Muli2 – KGS2005
⑦ Muli3 – KGS2505
⑧ Tr30x6
⑨ Muli4 – Tr40x7
⑩ KGS4005
⑪ Muli4 – KGS4010
⑫ Muli5 – Tr55x9
⑬ KGS5010
⑭ Jumbo1 – Tr60x9
⑮ Jumbo2 – Tr70x10
⑯ Jumbo3 – Tr80x10
⑰ KGS8010
⑱ Jumbo4 – Tr100x10
⑲ Jumbo5 – Tr120x14



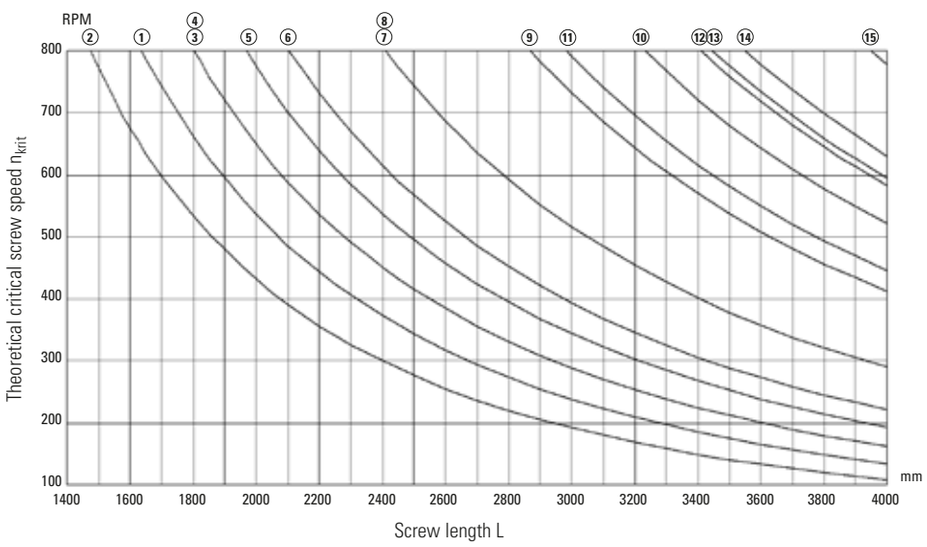
# Critical Speed Calculations

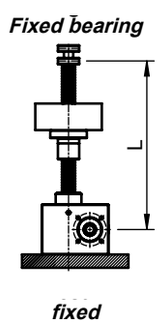
## Case 3




## Case 4



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# Drive Torque and Holding Moment Calculations

## Required drive torque of a worm gear screw jack

The required drive torque of a worm gear screw jack is the result of the axial load acting on the jack screw, the transmission ratio and the efficiency. It should be noted that the breakaway torque may be considerably higher than the torque required for continuous running. This applies in particular to worm gear screw jacks with low efficiency after a long standstill period. The acceleration torque should be checked if necessary in cases with large screw pitches and very short run-up times.

$$M_T = \frac{F_{eff}}{2 \cdot \pi \cdot \eta} \cdot \frac{p}{i} + M_o$$

$M_T$ required drive torque of the worm gear screw drive at the worm shaft [Nm]. It should be noted that the start-up torque (breakaway torque and possibly acceleration torque) may be considerably higher than the torque required for continuous operation.

$F_{eff}$ actual force acting on the jack screw [kN].

$\eta$ is the efficiency of the worm gear screw jack in decimal notiation, e. g. 0.32 instead of 32 % (for values, see table on page 14).

$p$ Pitch of the screw

$i$ Ratio of the worm gear screw jack

$M_o$ Idling torque is determined by measurements undertaken after a brief running-in period with liquid grease lubrication at room temperature. It represents an average value which may vary to a greater or lesser extent, depending on the running-in state, lubricant and temperature (for values, see table on page 14)

$n_K$ Efficiency of the bevel gear box $n_K$ = 0,85 to 0,96 depending on size of the bevel geares KRG (for values, see page 78)

## Required drive torque for a worm gear screw jack system

The required drive torque for a worm gear screw jack system (page 33) is relating on the drive torque values for the individual jacks with allowance for the static and dynamic frictional losses in transmission components. It is useful to draw a diagram illustrating the flow of forces.

| | |
|---|---|
| A | $M = 2 \cdot M_T$ |
| B | $M = 3 \cdot M_T$ |
| C, G | $M = 4 \cdot M_T \cdot 1/n_k$ |
| D | $M = 2 \cdot M_T \cdot 1/n_k$ |
| E, F | $M = 2 \cdot M_T \cdot (1/n_k^2 + 1)$ |
| H | $M = 4 \cdot M_T \cdot (1/n_k^2 + 1)$ |

## Required holding moment

$$M_d = \frac{F_{eff} \cdot p \cdot n \cdot 0{,}7}{2 \cdot \pi \cdot i} - M_o$$

$M_d$ is the required holding torque [Nm] of the Screw jack

# Lifetime, Force and Torque Considerations

### Lifetime calculations of a ball screw

The (nominal) lifetime of a ball screw drive can be calculated analogue to that of a ball bearing. Please note that vibrations and shocks reduce the lifetime of the ball screw drive. Dirt or lack of lubricant may significantly reduce the lifetime. Reduced life must also be expected in the case of very short strokes – please contact us in these cases.

$$L_{10} = \left(\frac{C}{F_{eff}}\right)^3 \cdot 10^6$$

$$L_h = \frac{L_{10}}{n \cdot 60}$$

C Axial, dynamic load rating [N]. Centrally applied load [N] of constant force direction at which an appropriately large number of identical ball screw drives achieve a nominal lifetime of $10^6$ revolutions. Technical data for KGF/KGM, see page 45-46.

$L_{10}$ Lifetime of the ball screw drive. Expressed as the number of revolutions achieved or exceeded by 90 % ($L_{10}$) of a sufficiently large sample of obviously identical ball screw drives before the first signs of material fatigue occur.

$L_h$ Lifetime in hours

n Screw speed [RPM]

### Maximum drive torque $M_T$

$M_T$ is the maximum drive torque that can be applied to the worm shaft until the toothing is damaged or until the shaft breaks due to torsion. Please consider this in case of high static loads and when screw jacks are connected in series. Please feel free to ask our specialists.

### Acceleration values

3-phase asynchronous motor, 4-pole:

- Approx. 0.5 m/s² (when switched on directly).

Servo motor:

- Max. 5 m/s² (limited by max. drive torque).

When using gear jacks in combination with servo motors, note that:

- Greater masses are moved, compared with linear axes.
- Predominantly, constant speeds with different revolutions are used.
- Use is often in the area of the adjustment/ positioning of equipment.
- Positions with comparatively short power-on times are travelled to, and high acceleration values are therefore less frequently required.
- High acceleration values have only a negligible effect on the overall stroke time, because of the low stroke speeds.

### Selection of drive motor

A suitable drive motor can be selected when the required drive torque and drive speed are known. After selecting a drive motor, check that it will not overload any of the worm gear screw jacks or transmission components. This risk may occur, in particular, in installations with several screw jacks if they are loaded unevenly. It will generally be necessary to install limit switches or torque-limiting couplings to protect the installation against impacting against end positions and obstacles.

### Forces and torque values on the motor shaft

Toothed-belt or chain drives may exert considerable radial forces on the motor shaft if a very small sprocket is used.
Please consult the motor manufacturer in cases of doubt.

### Selection of a bevel gear box

Selection of a bevel gearbox is the result of the following factors:

- Drive torque
- Drive speed (see dimensional tables)
- Duty cycle and drive power
- Forces and torque values acting on the ends of the shafts (please contact us in cases of doubt)

# Lifetime, Force and Torque Considerations

## Required drive speed

The required drive speed is the result of the desired lifting speed, the transmission ratio of the jack and the transmission ratio of the other transmission components. A particular lifting speed can normally be achieved in several ways. Correct selection depends on the following criteria:

- favourable efficiency
- minimum load on transmission components in order to achieve compact, low-cost design
- avoiding critical speeds for lead screws and connecting shafts.

Note: Forces and torque values can only be estimated by making simplified assumptions. The coefficients of friction of sliding pairs, and thus the heat which these generate, and the resultant service lifetime depend on load, speed, temperature and lubrication conditions. Critical speeds and buckling lengths depend on the rigidity and mass of the clamping systems and machine frames, etc.

$F_{eff}$ = Axial force acting on the jack screw

$F_S$ = Result of all lateral forces acting on the jack screw

M = Torque of the lead screw or nut (not applicable for version V)

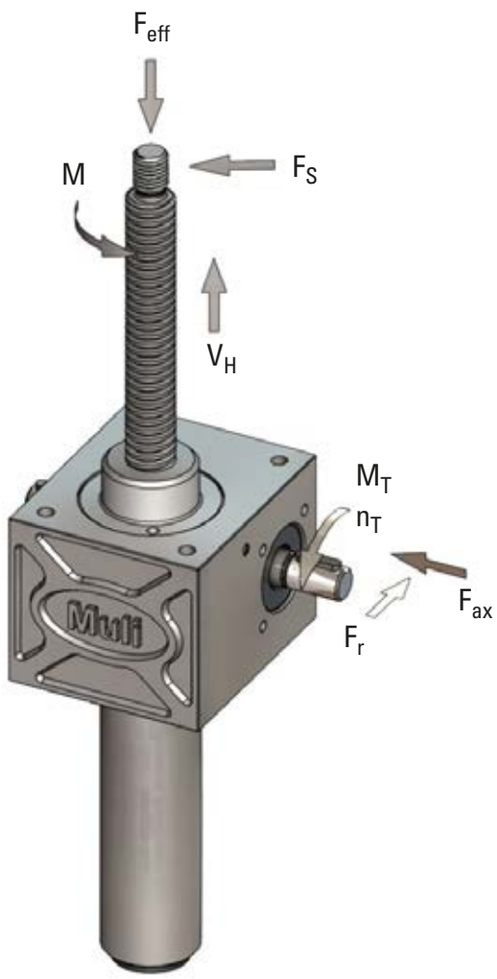
$V_H$ = Lifting speed

$F_{ax}$ = Axial force acting on drive shaft

$F_r$ = Radial force acting on drive shaft

$M_T$ = Drive torque

$n_T$ = Drive speed



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# Performance Tables

Data for MULI® 0 – JUMBO® 5 with gear ratio H and L with single-start trapezoidal screw and 20 % duty cycle per hour at a normal temperature of 20 °C. Additional performance data upon request.

## MULI 0 – Screw Tr 14 x 4

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2,5 | | | | 2 | | | | 1,5 | | | | 0,75 | | | | 0,5 | | | | 0,25 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 1,20 | 0,18 | 0,40 | 0,10 | 0,90 | 0,15 | 0,30 | 0,10 | 0,70 | 0,20 | 0,20 | 0,10 | 0,40 | 0,10 | 0,10 | 0,10 | 0,20 | 0,10 | 0,10 | 0,10 | 0,10 | 0,10 | 0,00 | 0,10 |
| 1000 | 1,00 | 0,250 | | 0,12 | | | | 0,10 | | | | | | | | | | | | | | | | | | |
| 750 | 0,75 | 0,187 | | 0,10 | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 0,50 | 0,125 | | 0,10 | | | | | | | | | | | | | | | | | | | | | | |

## MULI 1 – Screw Tr 18 x 4

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 5 | | | | 4 | | | | 3 | | | | 2 | | | | 1,5 | | | | 1 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 2,61 | 0,41 | 0,83 | 0,13 | 2,09 | 0,33 | 0,67 | 0,10 | 1,58 | 0,25 | 0,51 | 0,08 | 1,07 | 0,17 | 0,35 | 0,05 | 0,81 | 0,13 | 0,27 | 0,04 | 0,55 | 0,09 | 0,19 | 0,03 |
| 1000 | 1,00 | 0,250 | | 0,27 | | 0,09 | | 0,22 | | 0,07 | | 0,17 | | 0,05 | | 0,11 | | 0,04 | | 0,08 | | 0,03 | | 0,06 | | 0,02 |
| 750 | 0,75 | 0,187 | | 0,20 | 0,83 | 0,06 | 2,09 | 0,16 | | 0,05 | 1,58 | 0,12 | | 0,04 | | 0,08 | | 0,03 | | 0,06 | | 0,02 | | 0,04 | | 0,01 |
| 500 | 0,50 | 0,125 | 2,61 | 0,14 | | 0,04 | | 0,11 | | 0,03 | | 0,08 | | 0,03 | | 0,06 | | 0,02 | | 0,04 | | 0,01 | | 0,03 | | |

## MULI 2 – Screw Tr 20 x 4

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 10 | | | | 7,5 | | | | 5 | | | | 4 | | | | 3 | | | | 2 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 5,60 | 0,88 | 1,83 | 0,29 | 4,23 | 0,66 | 1,40 | 0,22 | 2,86 | 0,45 | 0,97 | 0,15 | 2,31 | 0,36 | 0,79 | 0,12 | 1,76 | 0,28 | 0,62 | 0,10 | 1,21 | 0,19 | 0,45 | 0,07 |
| 1000 | 1,00 | 0,250 | | 0,59 | | 0,19 | | 0,44 | | 0,15 | | 0,30 | | 0,10 | | 0,24 | | 0,08 | | 0,18 | | 0,06 | | 0,13 | | 0,05 |
| 750 | 0,75 | 0,187 | | 0,44 | 1,83 | 0,14 | | 0,33 | 1,40 | 0,11 | 2,86 | 0,22 | 0,97 | 0,08 | 2,31 | 0,18 | | 0,06 | | 0,14 | | 0,05 | | 0,09 | | 0,04 |
| 500 | 0,50 | 0,125 | 5,60 | 0,29 | | 0,10 | 4,23 | 0,22 | | 0,07 | | 0,15 | | 0,05 | | 0,12 | | 0,04 | | 0,09 | | 0,03 | | 0,06 | | 0,02 |

! The screw jacks can overheat or an excessive area pressure develop in the screw thread at the speeds stated in the grey fields with white text. For this range no liability can be requested.

# Performance Tables

## MULI 3 – Screw Tr 30 x 6

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 25 | | | | 20 | | | | 15 | | | | 10 | | | | 5 | | | | 2,5 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 13,88 | 2,81 | 4,45 | 0,70 | 11,13 | 1,75 | 3,58 | 0,56 | 8,39 | 1,32 | 2,72 | 0,43 | 5,64 | 0,89 | 1,85 | 0,29 | 2,90 | 0,45 | 0,99 | 0,15 | 1,52 | 0,24 | 0,55 | 0,09 |
| 1000 | 1,00 | 0,250 | | 1,45 | | 0,47 | | 1,17 | | 0,38 | | 0,88 | | 0,28 | | 0,59 | | 0,19 | | 0,30 | | 0,10 | | 0,16 | | 0,06 |
| 750 | 0,75 | 0,187 | | 1,09 | 4,45 | 0,35 | | 0,87 | 3,58 | 0,28 | | 0,66 | 2,72 | 0,21 | | 0,44 | | 0,15 | | 0,23 | | 0,08 | | 0,12 | | 0,04 |
| 500 | 0,50 | 0,125 | | 0,73 | | 0,23 | 11,13 | 0,58 | | 0,19 | 8,39 | 0,44 | | 0,14 | | 0,30 | | 0,10 | | 0,15 | | 0,05 | | 0,08 | | 0,03 |

## MULI 4 – Screw Tr 40 x 7

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 50 | | | | 40 | | | | 30 | | | | 20 | | | | 10 | | | | 5 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 30,97 | 4,86 | 9,73 | 1,53 | 24,85 | 3,90 | 7,83 | 1,23 | 18,72 | 2,94 | 5,94 | 0,93 | 12,60 | 1,98 | 4,04 | 0,63 | 6,47 | 1,02 | 2,15 | 0,34 | 3,41 | 0,54 | 1,20 | 0,19 |
| 1000 | 1,00 | 0,250 | | 3,24 | | 1,02 | | 2,60 | | 0,82 | | 1,96 | 0,62 | 0,62 | | 1,32 | | 0,42 | | 0,68 | | 0,22 | | 0,36 | | 0,13 |
| 750 | 0,75 | 0,187 | | 2,43 | | 0,76 | | 1,95 | 7,83 | 0,62 | | 1,47 | 5,94 | 0,47 | 12,60 | 0,99 | | 0,32 | | 0,51 | | 0,17 | | 0,27 | | 0,09 |
| 500 | 0,50 | 0,125 | | 1,62 | 9,73 | 0,51 | | 1,30 | | 0,41 | 18,72 | 0,98 | 5,94 | 0,31 | | 0,66 | | 0,21 | | 0,34 | | 0,11 | | 0,18 | | 0,06 |

## MULI 5 – Screw Tr 55 x 9

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 100 | | | | 80 | | | | 60 | | | | 40 | | | | 20 | | | | 10 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 67,19 | 10,55 | 21,46 | 3,37 | 53,92 | 8,47 | 17,27 | 2,71 | 40,65 | 6,38 | 13,08 | 2,05 | 27,38 | 4,30 | 8,89 | 1,40 | 14,11 | 2,22 | 4,70 | 0,74 | 7,47 | 1,17 | 2,61 | 0,41 |
| 1000 | 1,00 | 0,250 | | 7,04 | | 2,25 | | 5,65 | | 1,81 | | 4,26 | | 1,37 | | 2,87 | | 0,93 | | 1,48 | | 0,49 | | 0,78 | | 0,27 |
| 750 | 0,75 | 0,187 | | 5,28 | | 1,69 | | 4,23 | 17,27 | 1,36 | | 3,19 | 13,08 | 1,03 | 27,38 | 2,15 | | 0,70 | | 1,11 | | 0,37 | | 0,59 | | 0,20 |
| 500 | 0,50 | 0,125 | | 3,52 | 21,46 | 1,12 | | 2,82 | | 0,90 | 40,65 | 2,13 | | 0,68 | | 1,43 | | 0,47 | | 0,74 | | 0,25 | | 0,39 | | 0,14 |

! The screw jacks can overheat or an excessive area pressure develop in the screw thread at the speeds stated in the grey fields. For this range no liability can be requested.

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# Performance Tables

## Jumbo 1 – Screw Tr 60 x 9

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 150 | | | | 120 | | | | 100 | | | | 70 | | | | 50 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 104,73 | 16,44 | 33,74 | 5,30 | 83,96 | 13,18 | 27,11 | 4,26 | 70,11 | 11,01 | 22,69 | 3,56 | 49,34 | 7,75 | 16,05 | 2,52 | 35,50 | 5,57 | 11,63 | 1,83 |
| 1000 | 1,00 | 0,250 | | 10,96 | | 3,53 | | 8,79 | | 2,84 | | 7,34 | | 2,37 | | 5,16 | | 1,68 | | 3,72 | | 1,22 |
| 750 | 0,75 | 0,187 | | 8,22 | | 2,65 | | 6,59 | | 2,13 | | 5,50 | | 1,78 | | 3,87 | 16,05 | 1,26 | | 2,79 | | 0,91 |
| 500 | 0,50 | 0,125 | | 5,48 | | 1,77 | | 4,39 | | 1,42 | | 3,67 | 22,69 | 1,19 | | 2,58 | | 0,84 | 35,50 | 1,86 | | 0,61 |

## Jumbo 2 – Screw Tr 70 x 10

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 200 | | | | 150 | | | | 100 | | | | 75 | | | | 50 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 146,04 | 22,94 | 47,75 | 7,50 | 109,85 | 17,25 | 36,05 | 5,66 | 73,66 | 11,56 | 24,34 | 3,82 | 55,56 | 8,72 | 18,48 | 2,90 | 37,47 | 5,88 | 12,63 | 1,98 |
| 1000 | 1,00 | 0,250 | | 15,29 | | 5,00 | | 11,50 | | 3,77 | | 7,71 | | 2,55 | | 5,82 | | 1,93 | | 3,92 | | 1,32 |
| 750 | 0,75 | 0,187 | | 11,47 | | 3,75 | | 8,62 | | 2,83 | | 5,78 | 24,34 | 1,91 | | 4,36 | | 1,45 | 37,47 | 2,94 | | 0,99 |
| 500 | 0,50 | 0,125 | | 7,65 | | 2,50 | | 5,75 | | 1,89 | | 3,85 | | 1,27 | 55,56 | 2,91 | | 0,97 | | 1,96 | | 0,66 |

## Jumbo 3 – Screw Tr 80 x 10

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 250 | | | | 200 | | | | 150 | | | | 100 | | | | 50 | | | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | | L | |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 200,36 | 31,46 | 67,32 | 10,57 | 160,56 | 25,21 | 54,05 | 8,49 | 120,75 | 18,96 | 40,78 | 6,40 | 80,94 | 12,71 | 27,51 | 4,32 | 41,13 | 6,46 | 14,24 | 2,24 |
| 1000 | 1,00 | 0,250 | | 20,97 | | 7,05 | | 16,80 | | 5,66 | | 12,64 | | 4,27 | | 8,47 | | 2,88 | | 4,30 | | 1,49 |
| 750 | 0,75 | 0,187 | | 15,73 | | 5,28 | | 12,60 | | 4,24 | | 9,48 | | 3,20 | | 6,35 | 27,51 | 2,16 | | 3,23 | | 1,12 |
| 500 | 0,50 | 0,125 | | 10,49 | | 3,52 | | 8,40 | | 2,83 | | 6,32 | | 2,13 | | 4,24 | | 1,44 | 41,13 | 2,15 | | 0,75 |

! The screw jacks can overheat or an excessive area pressure develop in the screw thread at the speeds stated in the grey fields with white text. For this range no liability can be requested.

# Performance Tables

## Jumbo 4 – Screw Tr 100 x 10

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 350 | | | | 300 | | | | 150 | | | | 100 | | | | 50 | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | L |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 325,51 | 51,47 | 107,46 | 16,83 | 279,25 | 44,12 | 92,27 | 14,49 | 140,45 | 22,06 | 46,71 | 7,34 | 94,18 | 14,79 | 31,52 | 4,95 | 47,92 | 7,53 | 16,34 | 2,57 |
| 1000 | 1,00 | 0,250 | | 34,31 | | 11,25 | | 29,41 | | 9,66 | | 14,71 | | 4,89 | | 9,86 | | 3,30 | | 5,02 | | 1,71 |
| 750 | 0,75 | 0,187 | | 25,74 | 107,46 | 8,44 | | 22,06 | | 7,25 | 140,45 | 11,03 | | 3,67 | | 7,40 | | 2,48 | | 3,76 | | 1,28 |
| 500 | 0,50 | 0,125 | | 17,16 | | 5,63 | 279,25 | 14,62 | | 4,83 | | 7,35 | | 2,45 | | 4,93 | | 1,65 | | 2,51 | | 0,86 |

## Jumbo 5 – Screw Tr 120 x 14

| Speed [RPM] | Lifting speed [m/min] | | Lifting force [kN] | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 500 | | | | 400 | | | | 300 | | | | 200 | | | | 100 | |
| | | | H | | L | | H | | L | | H | | L | | H | | L | | H | L |
| | H | L | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] | [Nm] | [kW] |
| 1500 | 1,50 | 0,375 | 441,62 | 69,44 | 147,68 | 24,04 | 353,69 | 55,56 | 118,43 | 18,60 | 265,76 | 41,67 | 89,17 | 14,01 | 177,83 | 27,78 | 59,91 | 9,41 | 89,90 | 14,12 | 30,66 | 4,82 |
| 1000 | 1,00 | 0,250 | | 46,30 | | 12,25 | | 37,04 | | 12,40 | | 27,78 | | 9,34 | | 18,62 | | 6,27 | | 9,41 | | 3,21 |
| 750 | 0,75 | 0,187 | | 34,72 | 147,68 | 9,17 | | 27,78 | | 9,30 | 265,76 | 20,87 | | 7,00 | 177,83 | 13,97 | | 4,71 | | 7,06 | | 2,41 |
| 500 | 0,50 | 0,125 | | 23,15 | | 6,13 | 353,69 | 18,52 | | 6,20 | | 13,91 | | 4,67 | | 9,31 | | 3,14 | | 4,71 | | 1,61 |

! The screw jacks can overheat or an excessive area pressure develop in the screw thread at the speeds stated in the grey fields. For this range no liability can be requested.

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# Order Code

## Order code structure

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

**1. Size**
M0 - M5 = Muli 0 to Muli 5
J1 - J5 = Jumbo 1 to Jumbo 5

**2. Type**
N = axial translating screw
R = rotating screw
V = axial translating screw and anti-rotation

**3. Gear ratio**
H = high ratio
L = low ratio

**4. Screw type**
TGS = trapezoidal screw
KGS = ball screw

**5. Stroke [mm]**
• • • •

**6. Screw end**
G = standard screw end $D_3$ (only for type N and V)
Z = cylindrical end (only for type R)
0 = no end machining
S = special to customer specification

**7. End fitting (for version N, V with standard screw end G)**
00 = no end fitting (standard for version R)
BP = top plate
GA = fork end
GK = clevis end

**8. Bellows**
0 = without
F = with 1 pc. bellow (for R-version please advise if you would need a 2nd bellow cover)

**9. Nut (for version R; when using N, V version = 0) ***
0 = without nut (always for type N and V)
1 = trapezoidal nut (for type R with screw type TGS)
2 = flanged ball nut (for type R with screw type KGS)
3 = cylindrical ball nut (for type R with screw type KGS)
* flange of nut shows towards screw end as standard

**10. Stop collar**
0 = without (always for type R)
A = with (standard for type N and V with screw type KGS)

**11. Special features**
0 = without
Z = standard accessories as per catalog *
S = custom design *
* please describe in field 21 on page 30what accessories or/and custom design changes you require

**12. Screw dimension (only for MULI 4 KGS)**
1 = KGS 4005 (possible for size M4 only)
2 = KGS 4010 (possible for size M4 only)

## Order code example

| M 3 | N | H | K G S | 0 4 2 5 | G | B P | F | 0 | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |

# Checklist

Fill out the form to your best ability. Enclose any drawings, specifications, outlines and any other information you may have regarding the application. When done please e-mail or print it out and send in by fax. Do not hesitate to contact us if you have any questions.

Send fax to +49 (0) 7022-504-405 or email to sales.germany@thomsonlinear.com.

* = required information

Date

Company: *

Your project code (if any):

Contact: *

Department:

Street/ P.O. box address: *

Phone: *

ZIP, City: *

Fax: *

Country: *

E-mail: *

1. Application description:

2. Complete ordering code for desired scew jack model:

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | - | - | - | - | - | - | - | - | - | - | |

3. Screw jack size

4. Screw jack type

5. Screw version — Trapez. screw ☐ Ball screw ☐

6. Axial static load [Nm] — Push: Pull:

7. Axial dynamic load [Nm] — Push: Pull:

8. Type of load — Constant ☐ Oscillating ☐ Reversing ☐ Shock ☐ Vibrating ☐

9. Bearing case — Case 1 ☐ Case 2 ☐ Case 3 ☐ Case 4 ☐

10. Number of screw jacks that share the load — 1 ☐ 2 ☐ 3 ☐ 4 ☐

11. Mounting position — Vertical screw pointing up ☐ Vertical screw pointing down ☐ Horizontal ☐

12. Linear speed [mm/min]

13. Stroke length [mm]

14. Duty cycle [%/hour]

Continue on next page > > >

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# Checklist

15. Cycle time [s]

16. Usage of external guide(s) No ☐ Yes ☐ If yes, enter total friction factor for the guide(s)

17. Shift work One shift per day ☐ Two shifts per day ☐ Three shifts day ☐

18. Operation temperature (if under +10 °C or/and over +60 °C)

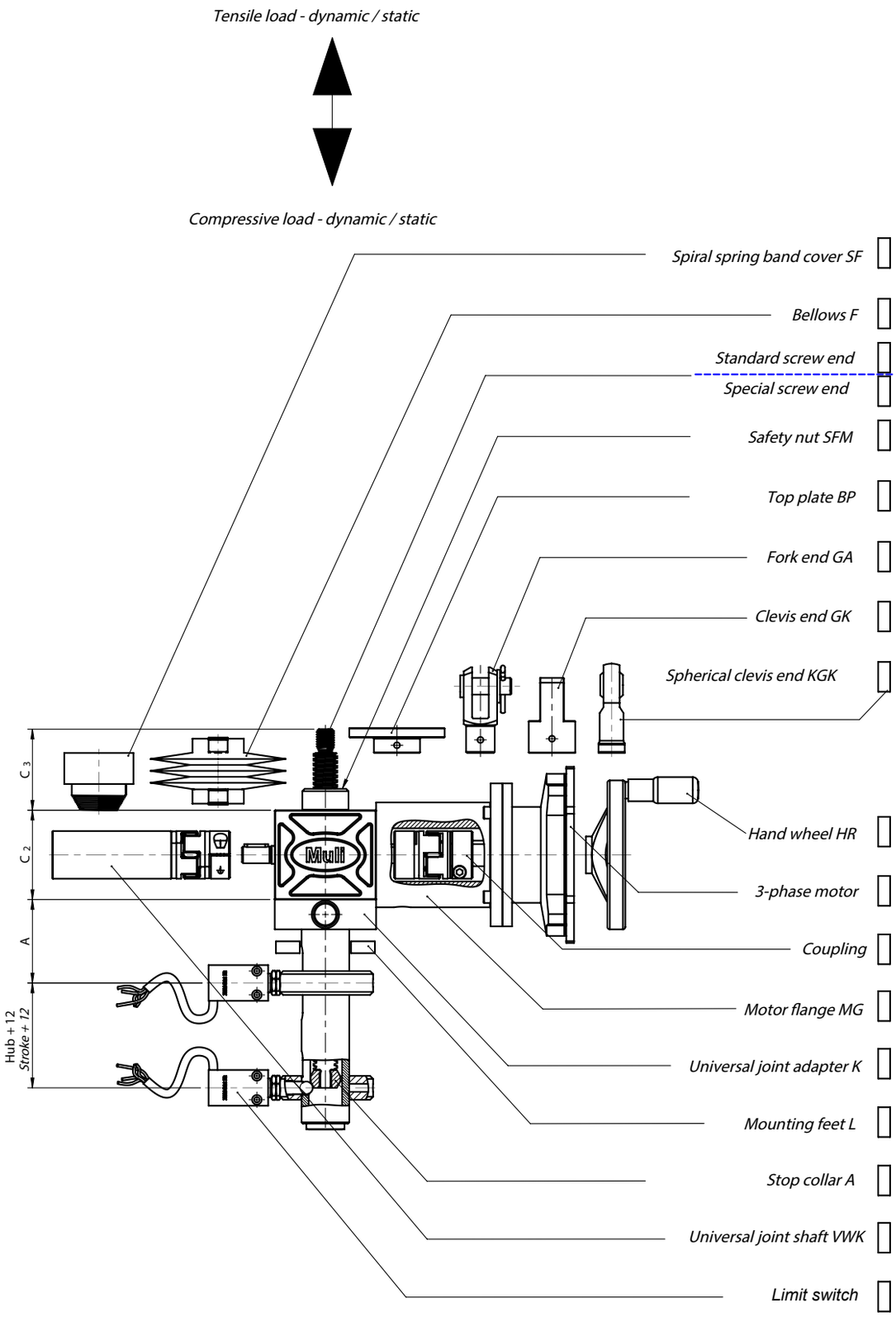
19. Operation relative humidity [%]

20. Operation conditions (select the appropriate) Chips, dirt, dust ☐ Hazardous materials ☐ Outdoor operation ☐ Personal transportation ☐

21. Desired options or custom design request (see catalog for available options)

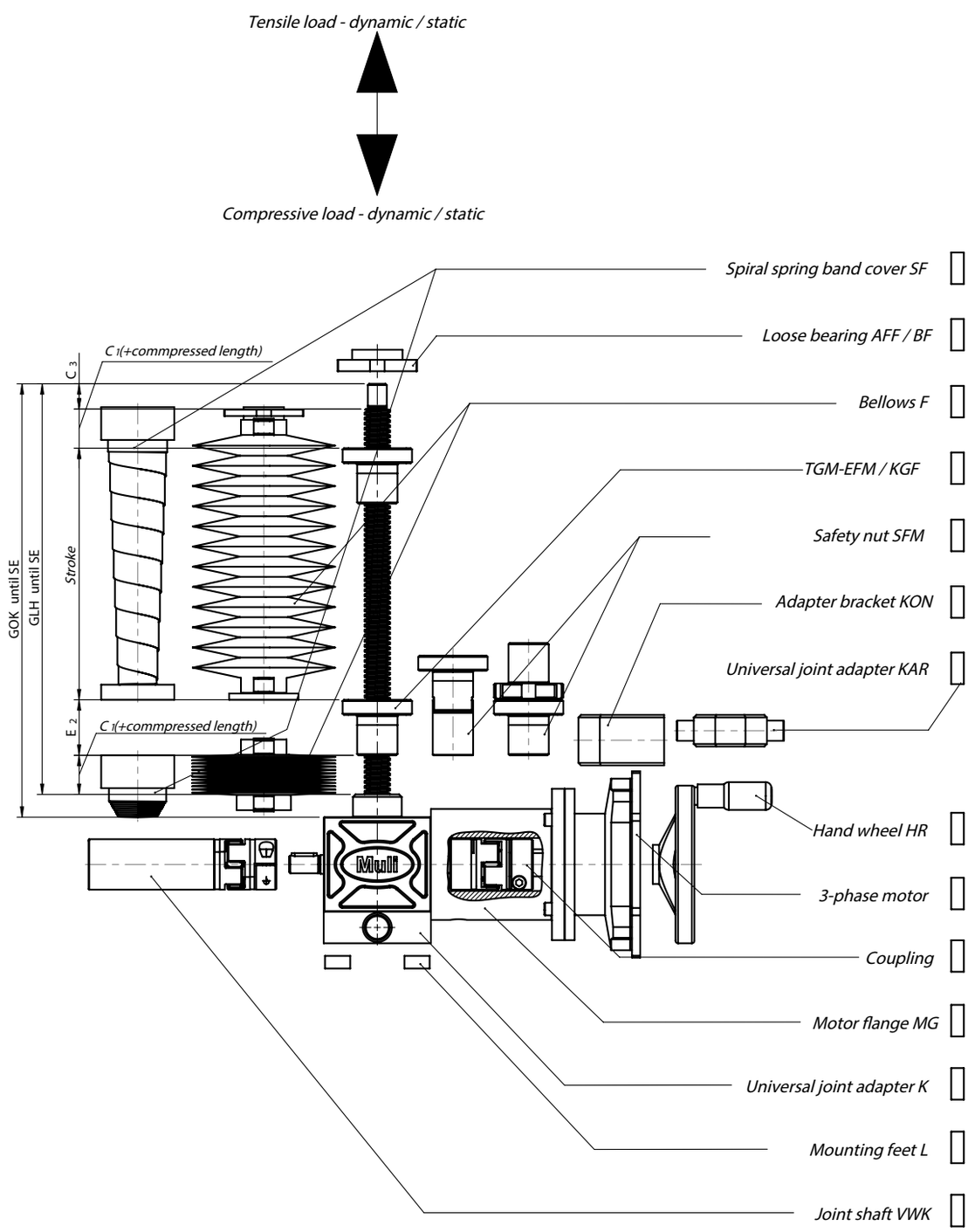
# Checklist

For N/V-versions



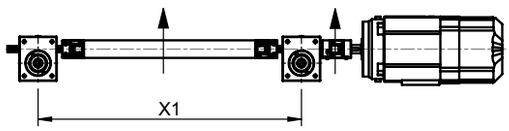
# Checklist

For N/V-versions

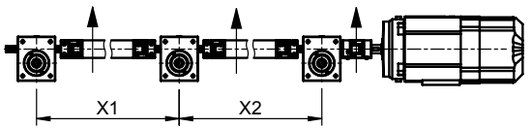


# Screw Jack System Configurations

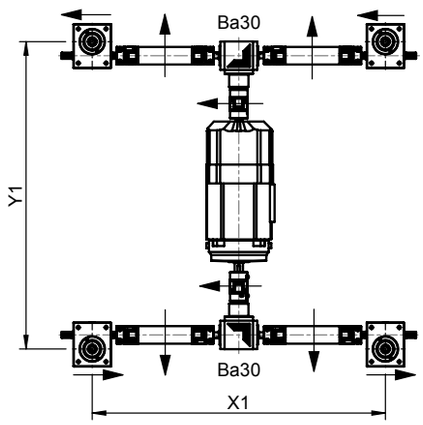
**A** X1 = _____



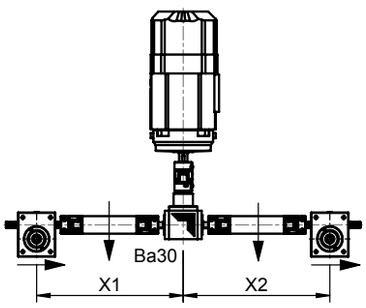

**B** X1 = _____ X2 = _____



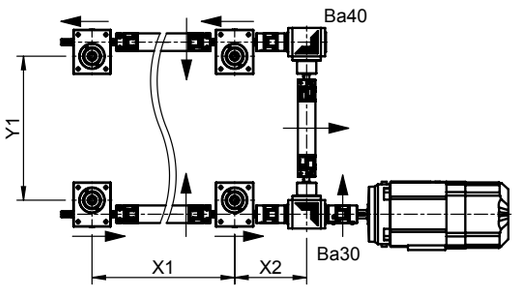

**C** X1 = _____ Y1 = _____



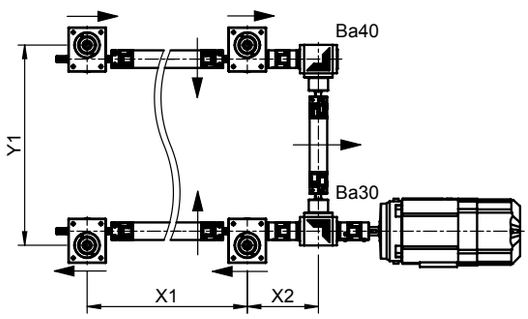

**D** X1 = _____ X2 = _____



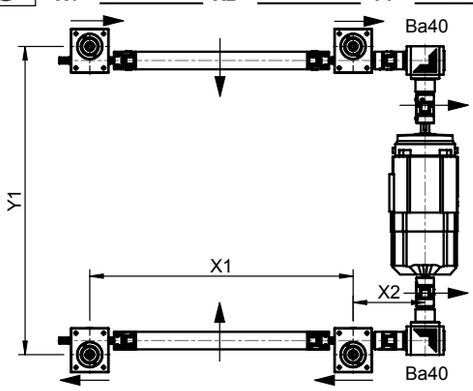

**E** X1 = _____ X2 = _____ Y1 = _____




**F** X1 = _____ X2 = _____ Y1 = _____




**G** X1 = _____ X2 = _____ Y1 = _____




**H** X1 = _____ X2 = _____ Y1 = _____