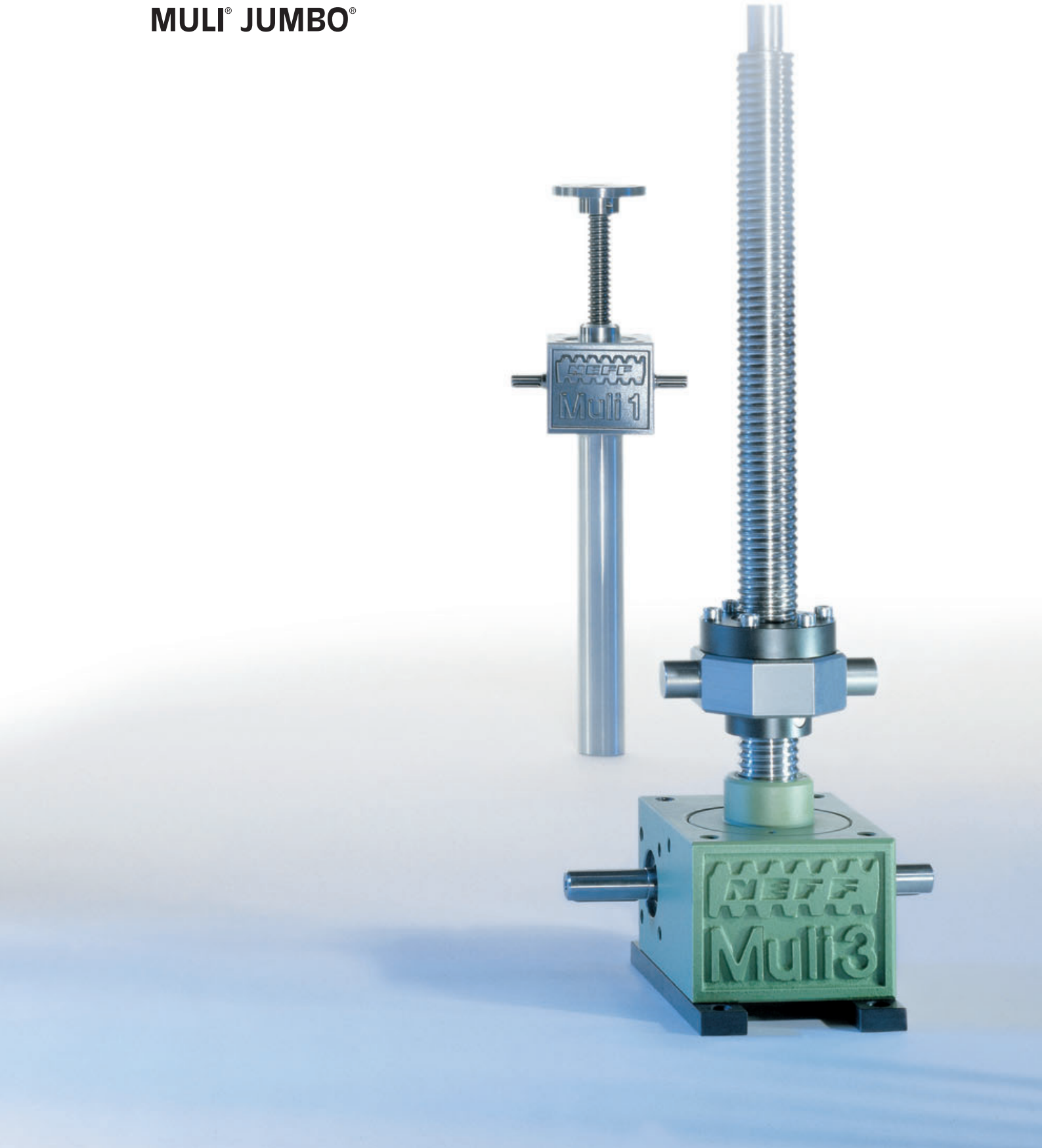
NEFF®
Antriebstechnik · Automation

Worm Gear Screw Jacks

MULI® JUMBO®



Linear to success.

Movement starts in the head and then has to be consistently turned into innovative product solutions of a high technical standard. As a first-class supplier of components for electrically powered linear technology, NEFF offers carefully designed standard products that can be flexibly modified to suit individual customer requirements. In-house development and research, design and production combined with total quality management guarantee that our versatile product range and complete accessory programme meet the highest possible standards. Our international sales division with the NEFF Business Service is always ready to help – consulting advice, help with product selection and carrying out repairs – worldwide.

Contents

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NEFF *BUSINESS* *Service*

What requirements must be met by a modern worm gear screw jack?

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The jobs that worm gear screw jacks are expected to do are as varied as their applications: lifting, lowering, tipping or moving. But in each case, the different sectors of industry and the different power parameters require a powerful, reliable screw jack that is easy to adapt to the specific application, and to extend to a complete worm gear screw jack system.

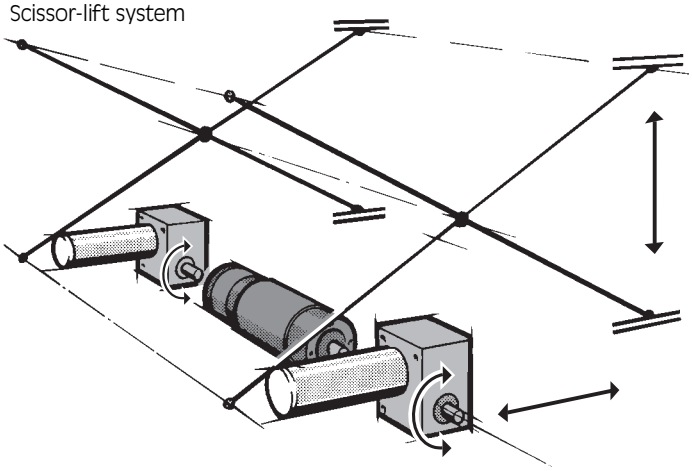
But apart from the technical aspects, it is to an increasing extent the economical conditions that oblige every engineer to consider carefully:

How can I make my system more economical?
Mechanical engineering systems must produce more and more performance in spite of reduced investment costs. The requirement can be summed up as: Shorter cycle times for the same price.

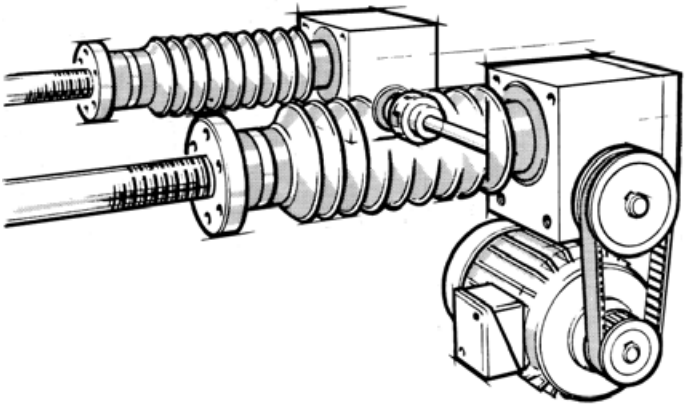
How can I increase the reliability of my system?
The components are expected to combine high reliability with low maintenance costs and fast repair service.

How do I lower the costs of purchasing, manufacturing and assembly?
The number of suppliers, and the diversity of parts purchased must be reduced. This demands rigorous assembly concepts and competent, service-oriented partners.

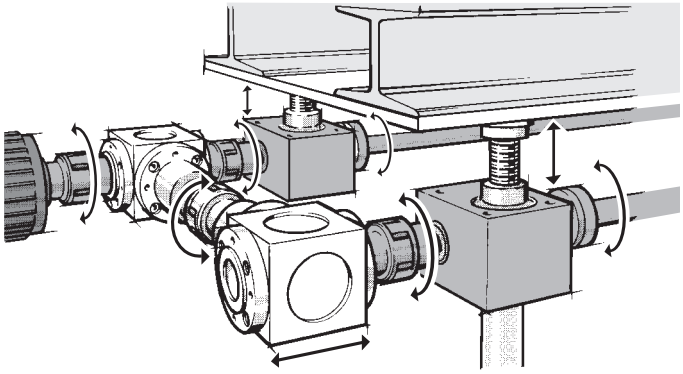
Scissor-lift system



Positioning device



Lifting device for an automatic bar-machining installation



NEFF worm gear screw jacks: Systematic gear technology

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The MULI®, JUMBO® worm gear screw jack program stands for reliability in use and versatility in application. Technically matured, and with its easy-to-mount, rectangular housing, it can easily be extended to form wide-area jack systems with the help of its wide range of accessories. And last but not least, the heart of every NEFF screw jack is a precision trapezoidal or ball screw drive in acknowledged high quality from our own screw production.

You will find the answers here:

- The comprehensive portfolio offers a wide range of types and sizes of gears. These permit even heavy loads to be moved at high speed.
- The consistent high quality of the components used, rationalised manufacturing and the NEFF 24-hour repair service guarantee smooth, reliable use of your machine.
- We undertake the entire dimensioning of the jack system for you, including the drive technology. And you are saved the time-consuming procurement of lots of individual components.

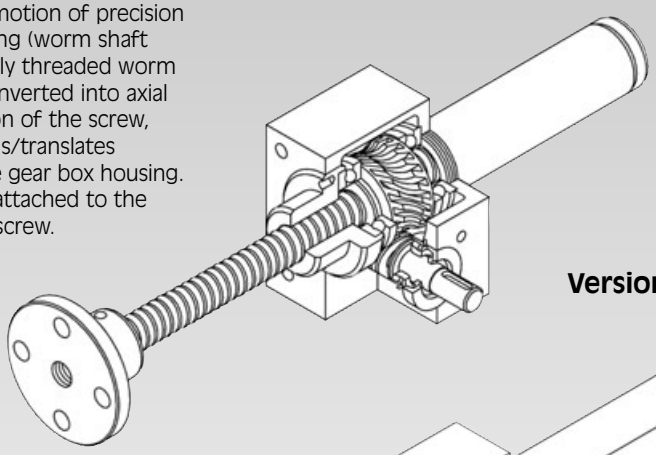
Selection of worm gear screw jacks
The optimum solution for every application

MULI®1 to MULI®5 (5–100 kN)

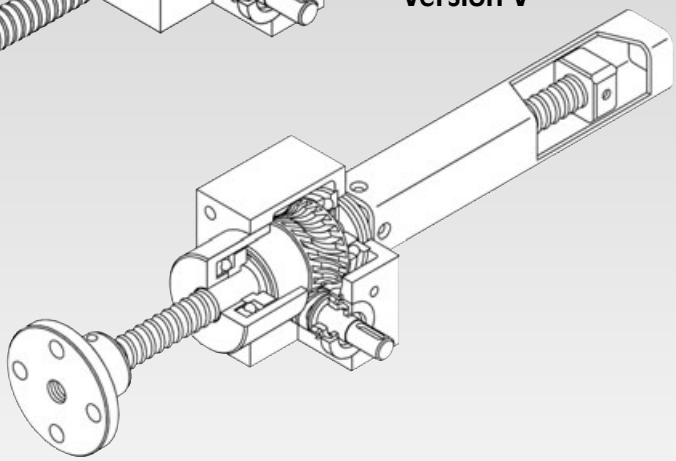
Axially translating screw

The rotary motion of precision worm gearing (worm shaft and internally threaded worm wheel) is converted into axial linear motion of the screw, which travels/translates through the gear box housing. The load is attached to the end of the screw.

Version N



Version V

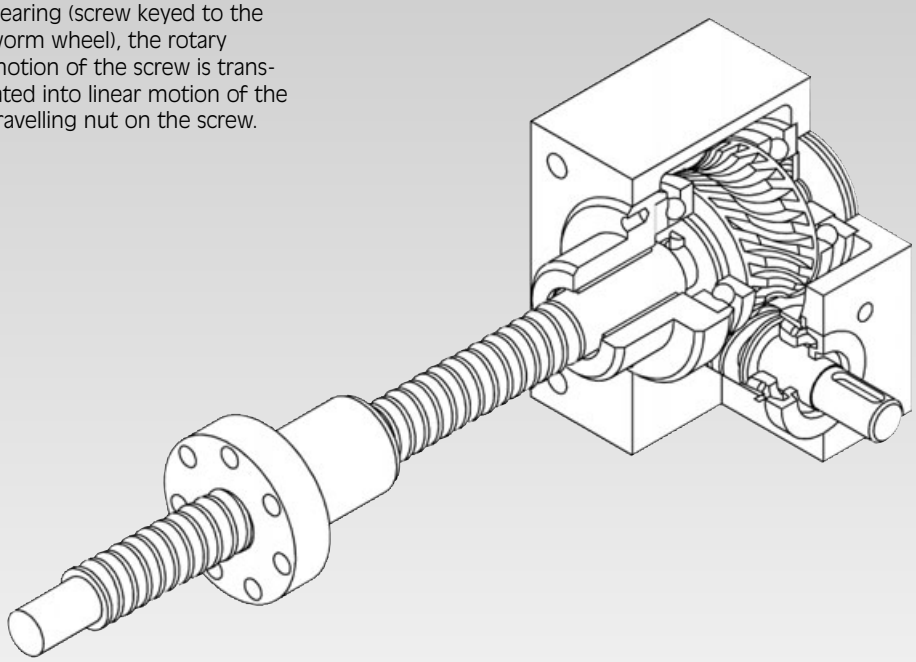


JUMBO®1 to JUMBO®5 (150–500 kN)

Rotating screw

Driven by a precision worm gearing (screw keyed to the worm wheel), the rotary motion of the screw is translated into linear motion of the travelling nut on the screw.

Version R



Version N

Rotation of the screw is prevented by its permanent attachment to the guided load.

Version V

Version V with anti-rotation device is recommended if the srew cannot be secured externally to prevent rotation.

Version R

Gear ratio H

One full turn of the worm shaft produces a stroke of 1 mm.

Gear ratio L

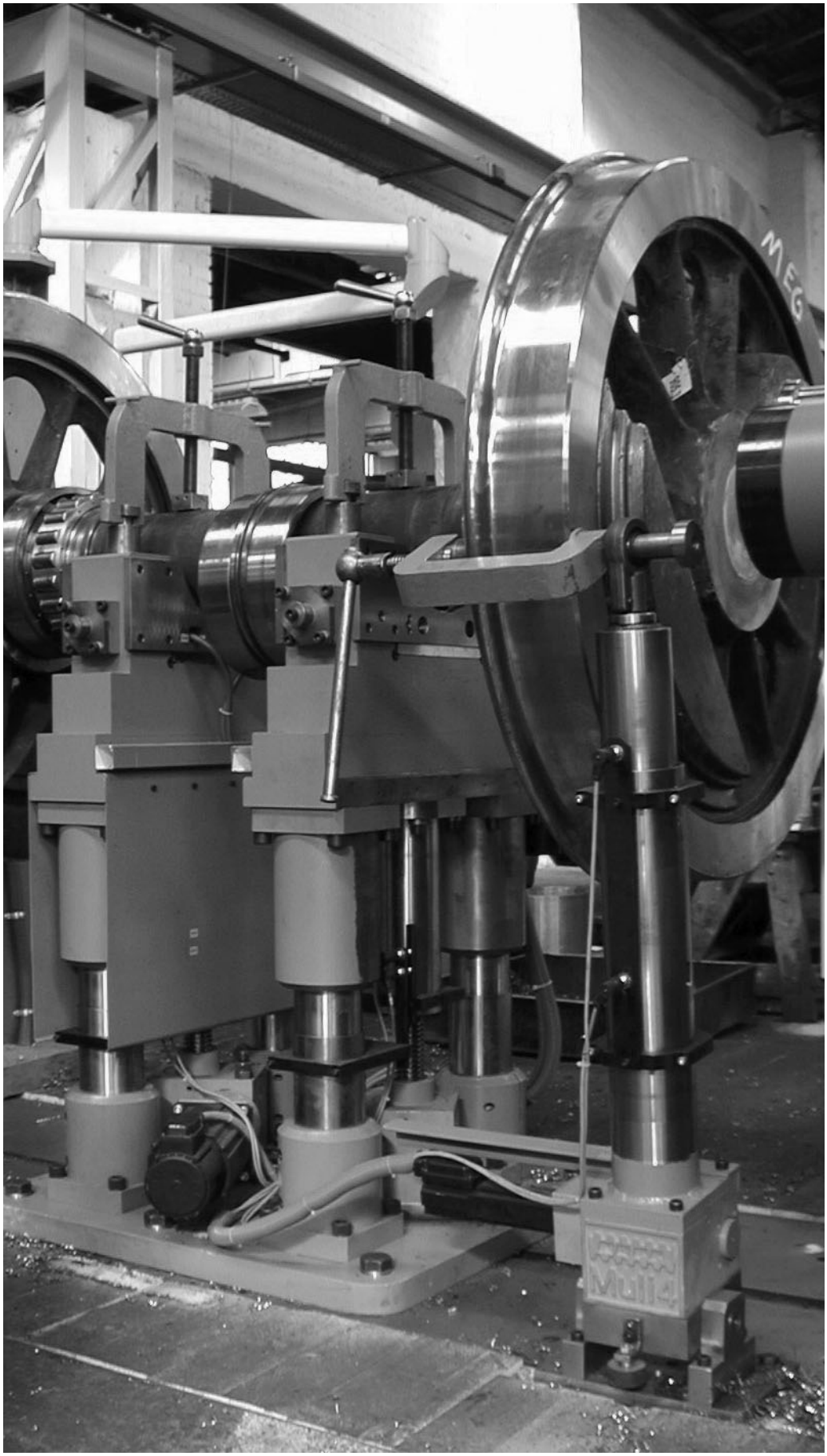
One full turn of the worm shaft produces a stroke of 0.25 mm.

Trapeziodal screw

For tough conditions, good price/performance ratio.

Ball srew

For longer duty cycles, with higher efficiency, high positional accuracy.



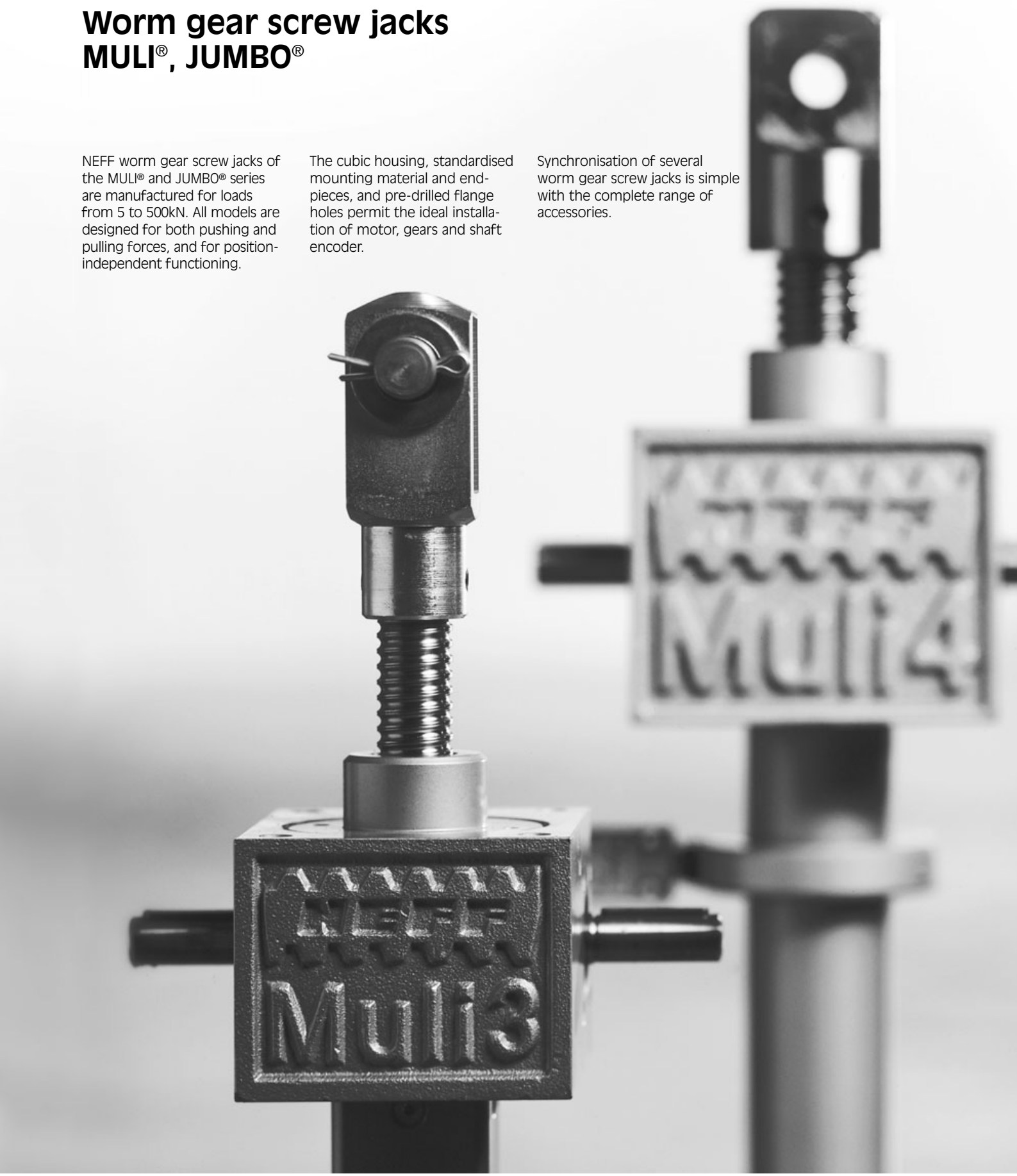
Surveying axles for rod locomotives,
Hörmann Railway Technology, Germany

Worm gear screw jacks MULI®, JUMBO®

NEFF worm gear screw jacks of the MULI® and JUMBO® series are manufactured for loads from 5 to 500kN. All models are designed for both pushing and pulling forces, and for position-independent functioning.

The cubic housing, standardised mounting material and end-pieces, and pre-drilled flange holes permit the ideal installation of motor, gears and shaft encoder.

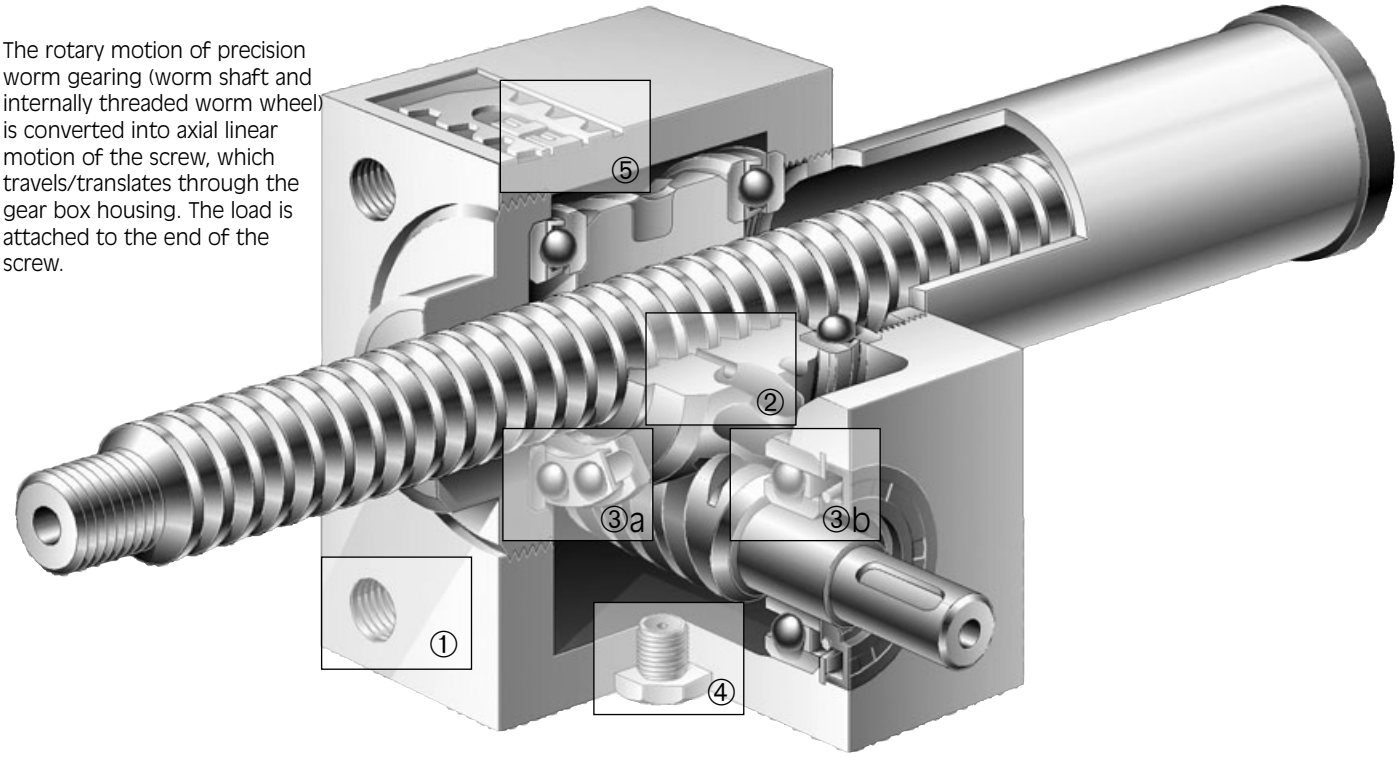
Synchronisation of several worm gear screw jacks is simple with the complete range of accessories.



Overview of NEFF worm gear screw jacks
Design versions

Axially translating screw
Version N or V

The rotary motion of precision worm gearing (worm shaft and internally threaded worm wheel) is converted into axial linear motion of the screw, which travels/translates through the gear box housing. The load is attached to the end of the screw.



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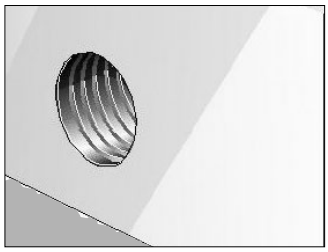
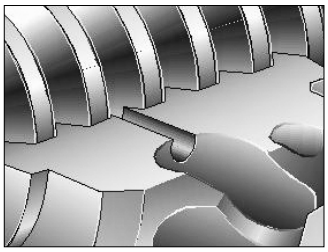


Functional Design

The cubic housing with its pre-drilled flange holes makes for simple mounting, and allows longer power-on times. Because the heat is more efficiently dissipated, ensuring longer lubricant lifetimes.

②



Lubrication of the Worm Wheel

Radial lubrication holes in the worm wheel grease the trapezoidal screw. The resultant lower friction and warming lead to an increased lifetime, especially in the case of longer strokes.

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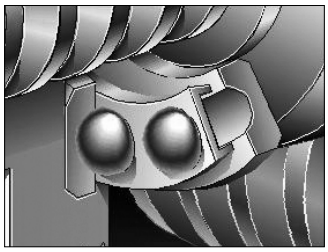
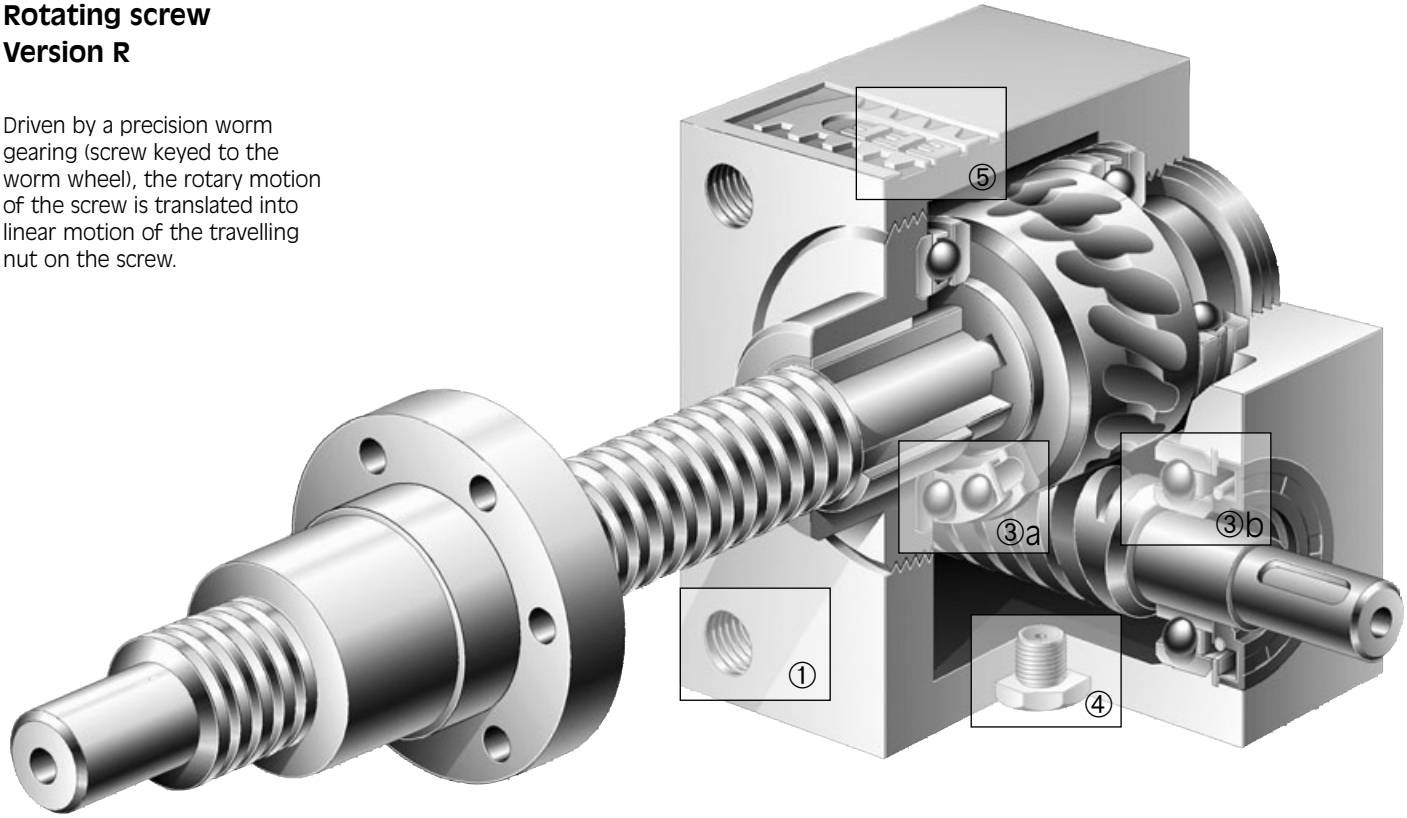


Heavy Duty Bearings

Radial deep-groove ball bearings (Muli® 1–3) and conical roller bearings (Muli® 4+5 and JUMBO® 1–5) on the screw shaft make it possible to handle heavy loads. Axial ball bearings as the main pressure bearings (for all sizes) give a large safety margin, and increase the overall lifetime.

Rotating screw
Version R

Driven by a precision worm gearing (screw keyed to the worm wheel), the rotary motion of the screw is translated into linear motion of the travelling nut on the screw.



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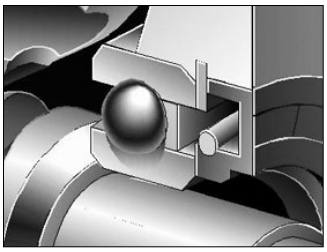

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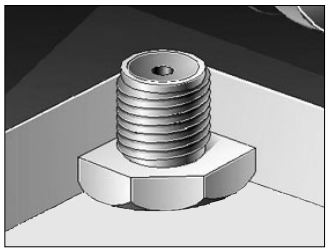
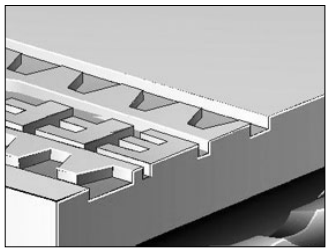


Central Lubrication

The worm gear screw jack is conveniently lubricated at one point. Maintenance – whether manual or automatic – is child's play.

⑤



Housing Material

The housing in aluminium (Muli® 1+2) or highly stable spheroidal graphite cast iron (Muli® 3 and higher) provides more stability, especially at higher temperatures. This provides a safety margin, even under rugged conditions.

MULI®, JUMBO®
General technical data

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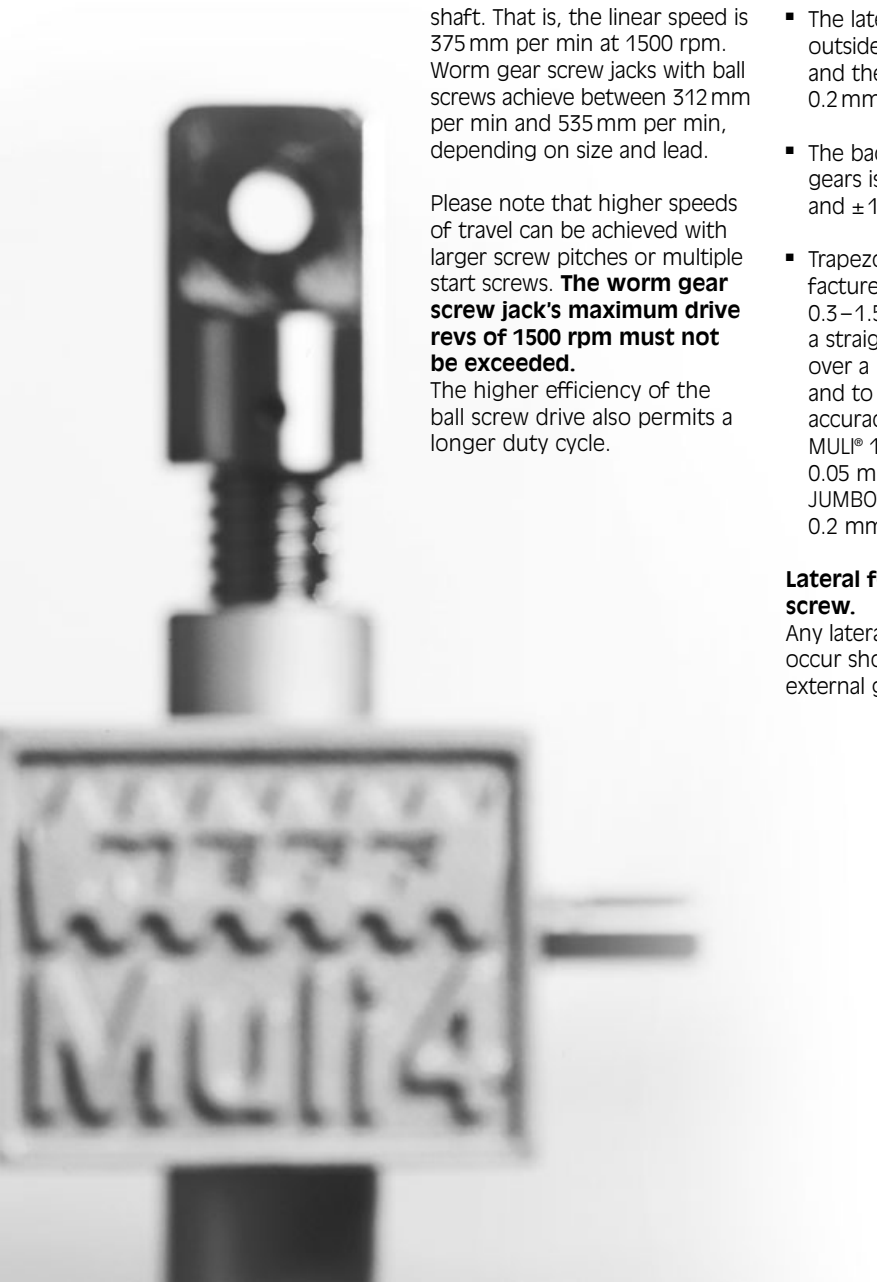
The range includes a total of ten worm gear screw jack models in two series: MULI®1 to MULI®5 with lifting capacities up to 100 kN and JUMBO® 1 to JUMBO® 5 with lifting capacities from 150 kN to 500 kN statically.



Speed of travel

Gear Ratio H (high speed)
Worm gear screw jacks with trapezoidal screw produce an advance of 1 mm for each full revolution of the worm shaft. That is, 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.

Gear Ratio (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 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 that are not machined (the cooling ribs) conform to DIN 1688-T1/GTA 16 for MULI® 1+2, 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.
- 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® 1–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.

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** is available for smaller pitches (single-start). Self locking in individual cases on demand.

Special versions

In addition to the extensive standard range, NEFF can also supply anticlockwise, multi-start and special material worm gear screw jacks on request. Please ask our product managers.

MULI®, JUMBO®
General technical data

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Trapezoidal srews

		MULI 1	MULI 2	MULI 3	MULI 4	MULI 5	JUMBO 1	JUMBO 2	JUMBO 3	JUMBO 4	JUMBO 5
Maximum lifting capacity [kN][1]		5	10	25	50	100	150	200	250	350	500
Screw diameter and pitch [mm]		18 x 4	20 x 4	30 x 6	40 x 7	55 x 9	60 x 9	70 x 10	80 x 10	100 x 10	120 x 14
Stroke in mm per full turn	Ratio H[2]	1	1	1	1	1	1	1	1	1	1
of the worm shaft [mm]	Ratio L[2]	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	6:1	7:1	9:1	9:1	10:1	10:1	10:1	14:1
	Ratio L[2]	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]	31	29	29	26	24	23	22	20	19	19
	Ratio L[2]	25	23	23	21	19	18	17	15	15	15
Weight [kg] (zero stroke)		1,2	2,1	6	17	32	41	57	57	85	160
Weight [kg per 100 mm stroke]		0.26	0.42	1.14	1.67	3.04	3.1	4.45	6.13	7.9	11.5
Idling torque [Nm]	H	0.04	0.11	0.15	0.35	0.84	0.88	1.28	1.32	1.62	1.98
	L	0.03	0.10	0.12	0.25	0.51	0.57	0.92	0.97	1.10	1.42
Housing material		G – AL		GGG – 40							

Ball screws

		MULI 1	MULI 2	MULI 3	MULI 4		MULI 5	JUMBO 3
Maximum lifting capacity [kN][1]		5	10	12.5	22	42	65	78
Screw diameter and pitch [mm]		1605	2005	2505	4005	4010	5010	8010
Stroke in mm per full turn	Ratio H[2]	1.25	1.25	0.83	0.71	1.43	1.1	1
of the worm shaft [mm]	Ratio L[2]	0.31	0.31	0.21	0.18	0.36	0.28	0.25
Gear ratio	Ratio H[2]	4:1	4:1	6:1	7:1		9:1	10:1
	Ratio L[2]	16:1	16:1	24:1	28:1		36:1	40:1
Efficiency [%][3]	Ratio H[2]	57	56	55	53	56	47	45
	Ratio L[2]	46	44	43	43	45	37	34
Weight [kg] (zero stroke)		1.3	2.3	7	19		35	63
Weight [kg per 100 mm stroke]		0.26	0.42	1.14	1.67		3.04	6.13
Idling torque [Nm]	H	0.04	0.11	0.15	0.35		0.84	1.32
	L	0.03	0.10	0.12	0.25		0.51	0.97
Housing material		G – AL		GGG – 40				

Note:
Initial breakaway torque:
approx. 2–3 times nominal
torque in run-up (FU operation!)

[1] Dependent on speed of stroke, power-on time, etc. (see p. 12)

[2] H = high travel speed, L = low travel speed.

[3] The specified efficiency values are average values.

Order-Code see page 55

MULI®, JUMBO®
Dimensions, versions N, V

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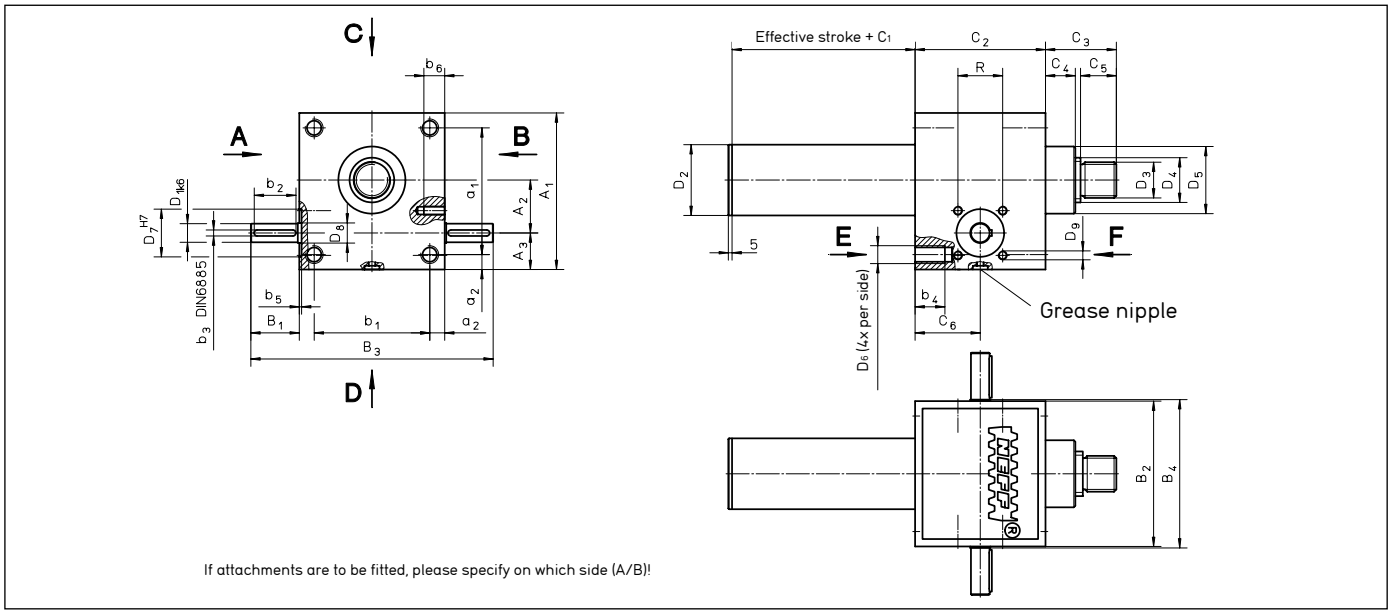


Size	Dimensions [mm]																
	A_1[1]	A_2	A_3	a_1	a_2	B_1	B_2	B_3	B_4	b_1	b_2	b_3	b_4	b_5	C_1	C_2	C_3[2]
MULI 1	80	25	24	60	10	24	72	120	77	52	18	3	13	1.5	20	62	35(46)
MULI 2	100	32	28	78	11	27.5	85	140	90	63	20	5	15	1.5	30	75	45(48.5)
MULI 3	130	45	31	106	12	45	105	195	110	81	36	5	15	2	30	82	50
MULI 4	180	63	39	150	15	47.5	145	240	150	115	36	6	16	2	45	117	65
MULI 5	200	71	46	166	17	67.5	165	300	170	131	56	8	30	2.5	55	160	95
JUMBO 1	210	71	49	170	20	65	195	325	200	155	56	8	40	8	55	175	95
JUMBO 2	240	80	60	190	25	67.5	220	355	225	170	56	8	45	8	55	165	110
JUMBO 3	240	80	60	190	25	67.5	220	355	225	170	56	8	45	8	55	165	110
JUMBO 4	290	100	65	230	30	65	250	380	255	190	56	10	54	8	65	220	140
JUMBO 5	360	135	75	290	35	100	300	500	305	230	90	14	80	8	90	266	200

Size	Dimensions [mm]													
	C_4[3]	C_5	C_6	D_{1k6}[4]	D_2[5]	D_3[6]	D_4Tr	D_4KGT	D_5[3]	D_6	D_{7H7}	D_8	D9xb6[7]	□R (TK)[7]	V-KGT[5]
MULI 1	12(23)	19	31	10 x 21.5	32	M12 x 1.75	Tr18 x 4	1605	29.6(48)	M8	28	12	M5 x 8	32 (45.25)	30 x 30
MULI 2	18(21.5)	20	37.5	14 x 25	40	M14 x 2.0	Tr20 x 4	2005	38.7(61)	M8	35	15	M6 x 9	35 (49.5)	40 x 40
MULI 3	23	22	41	16 x 42.5	50	M20 x 2.5	Tr30 x 6	2505	46	M10	35	17	M8 x 10	44 (62.2)	50 x 50
MULI 4	32	29	58.5	20 x 45	60	M30 x 3.5	Tr40 x 7	4005/4010	60	M12	52	25	M10 x 14	55 (77.8)	60 x 60
MULI 5	40	48	80	25 x 65	82	M36 x 4	Tr55 x 9	5010	85	M20	52	28	M12 x 16	60 (84.85)	80 x 80
JUMBO 1	40	48	87.5	25 x 62.5	90	M48 x 2	Tr60 x 9	–	90	M24	52	28	M12 x 16	60 (84.85)	–
JUMBO 2	40	58	82.5	30 x 65	115	M56 x 2	Tr70 x 10	–	105	M30	58	32	M12 x 18	(80)	–
JUMBO 3	40	58	82.5	30 x 65	115	M64 x 3	Tr80 x 10	8010	120	M30	58	32	M12 x 18	(80)	120 x 120
JUMBO 4	50	78	110	35 x 62.5	133	M72 x 3	Tr100 x 10	–	145	M36	72	40	M16 x 30	(100)	–
JUMBO 5	60	118	133	48 x 97.5	153	M100 x 3	Tr120 x 14	–	170	M42	80	50	M16 x 40	(115)	–

Note:
Subject to change without notice.

[1] Dimension A_1 for MULI 1+2 to DIN 1688-T1/GTA 16, from MULI 3 to DIN 1685 GTB 18.

[2] This dimension refers to the closed height and represents a minimum. It must be increased if bellows are used (see page 22).

[3] The values in brackets refer to version with ball screw.

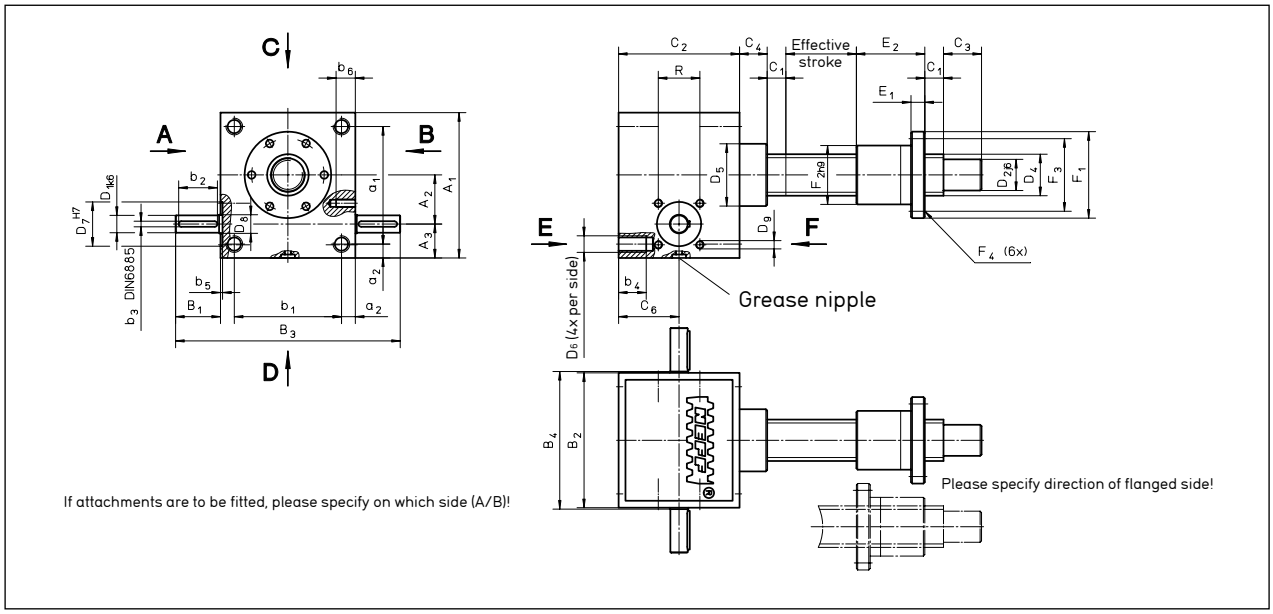
[4] Diameter and length to shoulder.

[5] Square tube for version with ball screw and anti-rotation device.

[6] In accordance to DIN 13 screw thread: MULI.
In accordance to DIN 13 fine pitch thread: JUMBO.

[7] JUMBO 2–5 only 3 holes.

Order-Code see page 55



Size	Dimensions [mm]																		
	A_1[1]	A_2	A_3	a_1	a_2	B_1	B_2	B_3	B_4	b_1	b_2	b_3	b_4	b_5	C_1	C_2	C_3	C_4	C_6
MULI 1	80	25	24	60	10	24	72	120	77	52	18	3	13	1.5	12	62	15	12	31
MULI 2	100	32	28	78	11	27.5	85	140	90	63	20	5	15	1.5	15	75	20	18	37.5
MULI 3	130	45	31	106	12	45	105	195	110	81	36	5	15	2	20	82	25	23	41
MULI 4	180	63	39	150	15	47.5	145	240	150	115	36	6	16	2	25	117	30	32	58.5
MULI 5	200	71	46	166	17	67.5	165	300	170	131	56	8	30	2.5	25	160	45	40	80
JUMBO 1	210	71	49	170	20	65	195	325	200	155	56	8	40	8	25	175	55	40	87.5
JUMBO 2	240	80	60	190	25	67.5	220	355	225	170	56	8	45	8	25	165	70	40	82.5
JUMBO 3	240	80	60	190	25	67.5	220	355	225	170	56	8	45	8	25	165	75	40	82.5
JUMBO 4	290	100	65	230	30	65	250	380	255	190	56	10	54	8	25	220	100	50	110
JUMBO 5	360	135	75	290	35	100	300	500	305	230	90	14	80	8	30	266	120	60	133

Size	Dimensions [mm]														
	D_{1k6}[2]	D_{2j6}	D_4TR	D_4KGT	D_5	D_6	D_{7H7}	D_8	D9xb6	□ R (TK)[5]	E_1[3]	E_2[3]	F_1[3] [4]	F_2[3] [4]	F_3[3] [4]	F_4[3] [4]
MULI 1	10 x 21.5	12	Tr18 x 4	1605	29.6	M8	28	12	M5 x 8	32 (45.25)	12/12	44/44	48/48	28/28	38/38	6/5.5
MULI 2	14 x 25	15	Tr20 x 4	2005	38.7	M8	35	15	M6 x 9	35 (49.5)	12/12	44/44	55/55	32/32	45/45	7/7
MULI 3	16 x 42.5	20	Tr30 x 6	2505	46	M10	35	17	M8 x 10	44 (62.2)	14/14	46/46	62/62	38/38	50/50	7/7
MULI 4	20 x 45	25	Tr40 x 7	4005/4010	60	M12	52	25	M10 x 14	55 (77.8)	16/16	73/59	95/80	63/53	78/68	9/7
MULI 5	25 x 65	40	Tr55 x 9	5010	85	M20	52	28	M12 x 16	60 (84.85)	18/18	97/97	110/110	72/72	90/90	11/11
JUMBO 1	25 x 62.5	45	Tr60 x 9	–	90	M24	52	28	M12 x 16	60 (84.85)	20	99	125	85	105	11
JUMBO 2	30 x 65	55	Tr70 x 10	–	105	M30	58	32	M12 x 18	(80)	30	100	180	95	140	17
JUMBO 3	30 x 65	60	Tr80 x 10	8010	120	M30	58	32	M12 x 18	(80)	30/22	110/101	190/145	105/105	150/125	17/14
JUMBO 4	35 x 62.5	80	Tr100 x 10	–	145	M36	72	40	M16 x 30	(100)	35	130	240	130	185	25
JUMBO 5	48 x 97.5	95	Tr120 x 14	–	170	M42	80	50	M16 x 40	(115)	40	160	300	160	230	28

Note:
Subject to change without notice.

[1] Dimension A_1 for MULI 1+2 to DIN 1688-T1/GTA 16, from MULI 3 to DIN 1685 GTB 18.

[2] Diameter and length to shoulder.

[3] The first values in the table apply to the trapezoidal screw nut EFM. For dimension 4010 the first values in the table are valid.

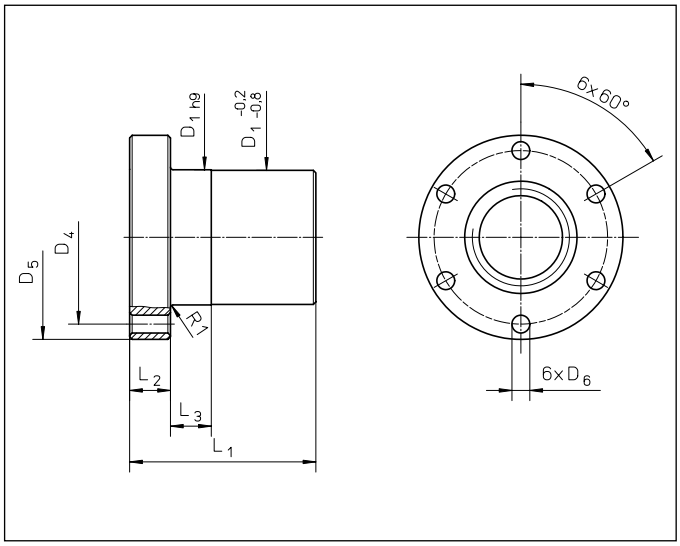
[4] The second values in the table apply to the ball screw nut KGF.

[5] JUMBO 2–5 only 3 holes.

Order-Code see page 55

Complete bronze nut EFM

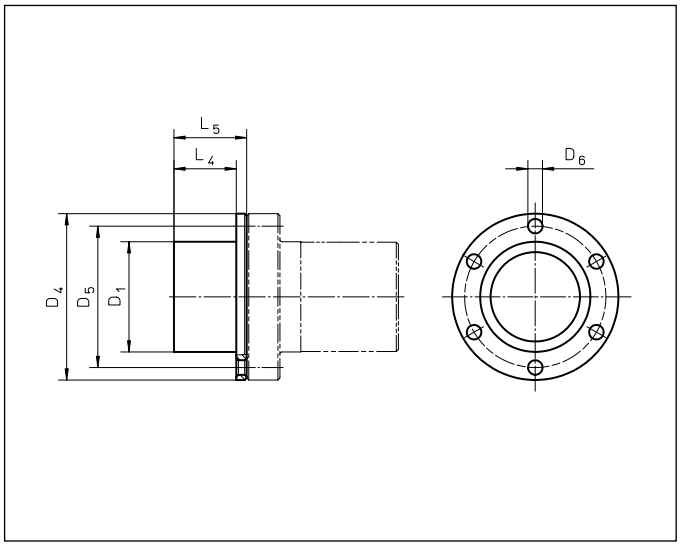
For drive units in continuous operation with particularly good wear properties. Can be used as safety nut; "sea water resistant" in combination with stainless screws. EFM nuts have the same dimensions as ball nuts KGF-N and can therefore be fitted together with the nut mountings KON-N and KAR-N.
Material:
G-CuSn 7 ZnPg (Rg 7)
$\partial_B = 269$ N/mm²; HB 10 = 75



Size	Type/Size	Dimensions [mm]								
		D_{1h9}	D_4	D_5	6xD_6	L_1	L_2	L_3	L_4	L_5
MULI 1	EFM Tr 18 x 4	28	48	38	6	44	12	8	15	20
MULI 2	EFM Tr 20 x 4	32	55	45	7	44	12	8	15	20
MULI 3	EFM Tr 30 x 6	38	62	50	7	46	14	8	20	25
MULI 4	EFM Tr 40 x 7	63	95	78	9	73	16	10	20	25
MULI 5	EFM Tr 55 x 9	72	110	90	11	97	18	10	20	25
JUMBO 1	EFM Tr 60 x 9	85	125	105	11	99	20	10	20	25
JUMBO 2	EFM Tr 70 x 10	95	180	140	17	100	30	16	20	25
JUMBO 3	EFM Tr 80 x 10	105	190	150	17	110	30	16	20	25
JUMBO 4	EFM Tr 100 x 10	130	240	185	25	130	35	16	25	30
JUMBO 5	EFM Tr 120 x 14	160	300	230	28	160	40	20	30	35

Adapter for attachment of the second bellows

Version R only



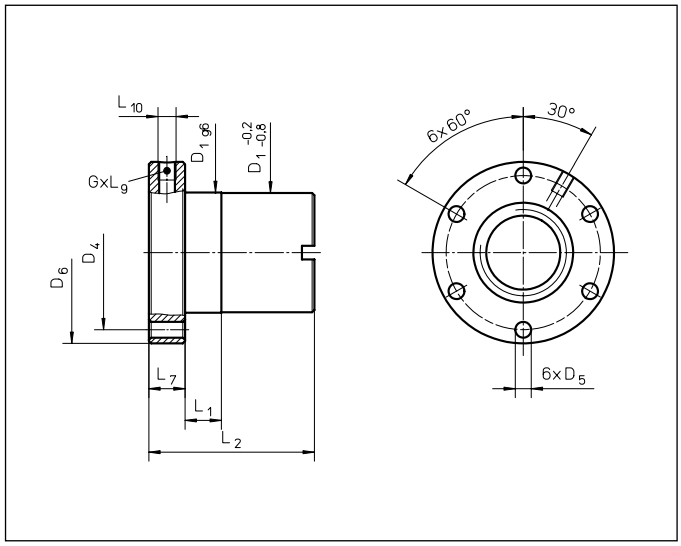
Order-Code see page 55

Flanged ball nut KGF

Flanged ball screw nut with mounting and lubrication holes and with profiled gaskets (reduces lubricant leakage and prevents ingress of dirt particles) for ball screw KGS.
Material: 1.7131 (ESP 65).
Note:
For KSG version, please specify installation direction of nut.

Zero-backlash units KGT-FF/KGT-MM/KGT-FM

Factory adjusted and assembled combinations of two cylindrical nuts (MM), two flanged nuts (FF) or one flanged and one cylindrical nut (FM). Only available as screw mechanism, i.e. nut preassembled on the corresponding ball screw.

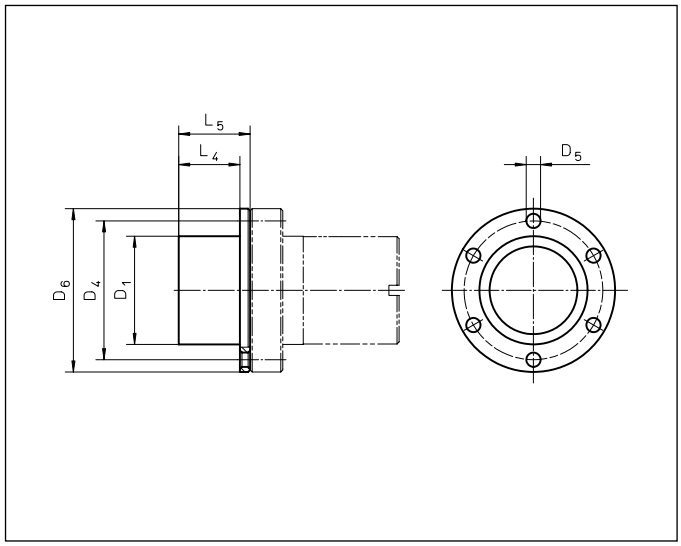


Size	Type/ Diameter [mm]/ Lead [mm]/	Dimensions [mm]												Axial backlash max. [mm]	No. of circuits	Load rating [kN]		
		D_1	D_4	D_5	D_6	L_1	L_2	L_4	L_5	L_7	L_9	L_{10}	G			$C^{1)}$	$C^{2)}$	$C_o = C_{oa}$
MULI 1	KGF-N 1605 RH-EE[3)]	28	38	5.5	48	8	44	15	20	12	8	6	M6	0.08	3	12.0	9.3	13.1
MULI 2	KGF-N 2005 RH-EE[3)]	32	45	7	55	8	44	15	20	12	8	6	M6	0.08	3	14.0	10.5	16.6
MULI 3	KGF-N 2505 RH-EE[3)]	38	50	7	62	8	46	20	25	14	8	7	M6	0.08	3	15.0	12.3	22.5
MULI 4	KGF-N 4005 RH-EE[3)]	53	68	7	80	10	59	20	25	16	8	8	M6	0.08	5	26.0	23.8	63.1
MULI 4	KGF-N 4010 RH-EE[3)]	63	78	9	95	10	73	20	25	16	8	8	M8x1	0.08	3	50.0	38.0	69.1
MULI 5	KGF-N 5010 RH-EE[3)]	72	90	11	110	10	97	20	25	18	8	9	M8x1	0.08	5	78.0	68.7	155.8
JUMBO 3	KGF-N 8010 RH-EE[3)]	105	125	14	145	10	101	20	25	22	8	11	M8x1	0.08	5	93.0	86.2	262.4

[1)] Dynamic load rating to DIN 69051 Part 4, draft version 1978.
[2)] Dynamic load rating to DIN 69051 Part 4, draft version 1989.
[3)] EE = rubber wiper

Adapter for attachment of the second bellow

Version R only



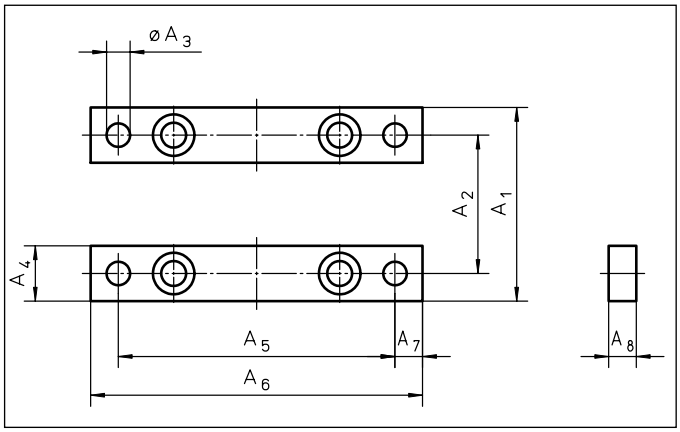
Order-Code see page 55

Accessories MULI®, JUMBO®
Mountings

NEFF® Antriebstechnik · Automation

Mounting feet L

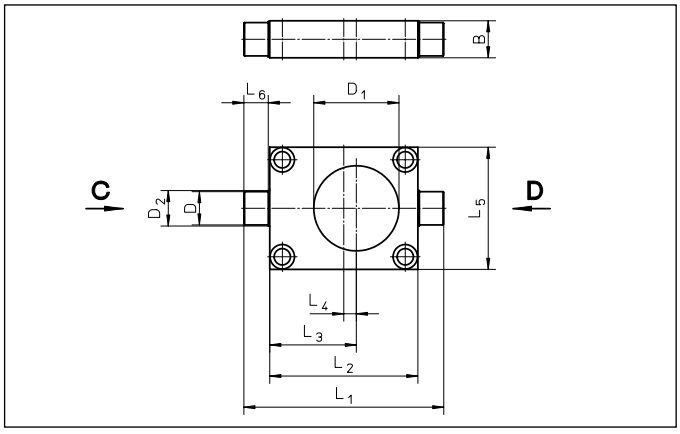
Supplied loose with mounting bolts for jack. Burnished.
Muli 1+2 with version N-KGT not on side F. Standard: side E.
(see page 14/15)



Size	Dimensions [mm]								Weight [kg]
	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	
L MULI 1	72	52	8.5	20	100	120	10	10	0.3
L MULI 2	85	63	8.5	20	120	140	10	10	0.4
L MULI 3	105	81	11	24	150	170	10	12	0.8
L MULI 4	145	115	13.5	30	204	230	13	16	1.7
L MULI 5	171	131	22	40	236	270	17	25	3.9
L JUMBO 1	205	155	26	50	250	290	20	30	5.8
L JUMBO 2	230	170	32	65	290	340	25	40	10
L JUMBO 3	230	170	32	65	290	340	25	40	10
L JUMBO 4	270	190	39	80	350	410	30	50	20.8
L JUMBO 5	330	230	45	100	430	500	35	60	34.4

Trunnion mountings K

Supplied loose with mounting bolts for jack. Burnished.
Standard: side E.
Side F please specify.
(see page 14/15)

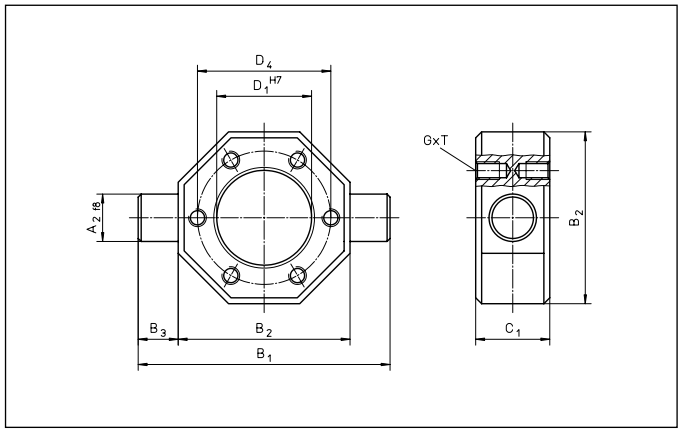


Size	Dimensions [mm]										Weight [kg]
	L_1	L_2	L_3	L_4	L_5	L_6	D_{f8}	D_1	D_2	B	
K MULI 1	110	80	49	9	72	13	15	44	18	20	0.76
K MULI 2	140	100	60	10	85	18	20	58	23	25	1.44
K MULI 3	170	130	76	11	105	18	25	72	28	30	2.80
K MULI 4	240	180	102	12	145	28	35	86	38	40	7.40
K MULI 5	270	200	117	17	165	33	45	115	48	50	10.72
K JUMBO 1	290	210	120	15	195	38	50	130	56	60	11.8
K JUMBO 2	330	240	140	20	220	43	70	170	76	80	26.1
K JUMBO 3	330	240	140	20	220	43	70	170	76	80	26.1
K JUMBO 4	410	290	165	20	250	58	80	160	88	90	40.2
K JUMBO 5	520	360	210	30	300	78	90	175	96	100	67.7

Universal joint adapter KAR

Universal joint adapter for trunnion mounting of flanged ball nut KGF and flanged trapezoidal nut EFM.

Material:
1.0065 (St37) or 1.0507 (St52)

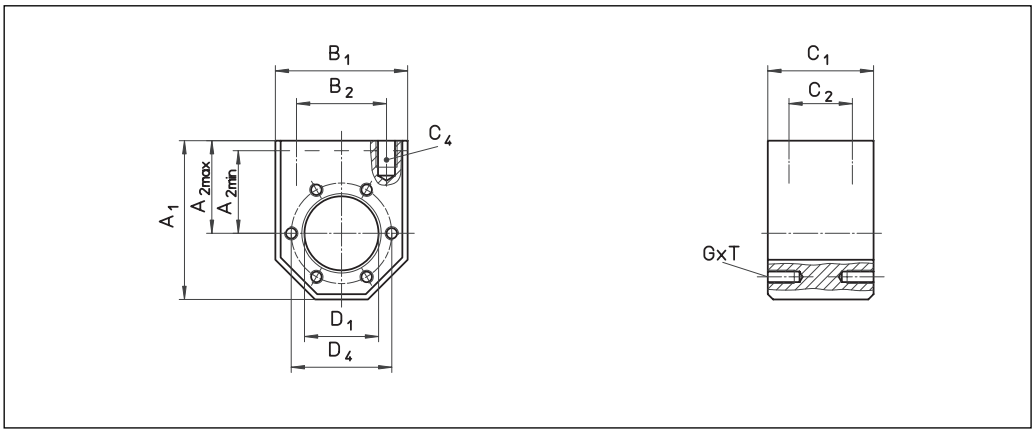


Size	Type		Dimensions [mm]								Weight
	for KGF	for EFM	A_2	B_1	B_2	B_3	C_1	D_1	D_4	G x T	[kg]
KAR MULI 1	KAR 1605	Tr 16x4/Tr 18x4	12	70	50	10	20	28	38	M5x10	0.20
KAR MULI 2	KAR 2005	Tr 20x4/Tr 24x4	16	85	58	13.5	25	32	45	M6x12	0.30
KAR MULI 3	KAR 2505	Tr 30x6	18	95	65	15	25	38	50	M6x12	0.50
KAR MULI 4	KAR 4005		25	125	85	20	30	53	68	M6x12	1.20
	KAR 4010	Tr 40x7	30	140	100	20	40	63	78	M8x14	2.50
KAR MULI 5	KAR 5010	Tr 55x9	40	165	115	25	50	72	90	M10x16	2.80
KAR JUMBO 1	KAR 6310	Tr 60x9	40	180	130	25	50	85	105	M10x16	3.30
KAR JUMBO 3	KAR 8010		50	200	150	25	60	105	125	M12x18	4.80

Adapter bracket KON

Adapter bracket for the radial fixing of flanged ball nut KGF.

Material:
1.0065 (St37) or 1.0507 (St52)

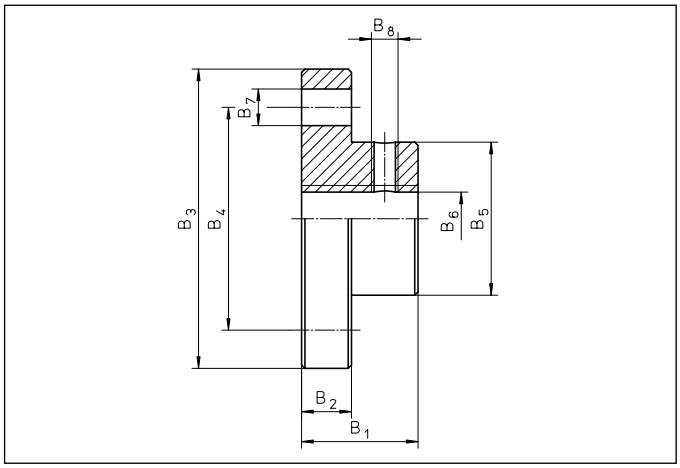


Type for KGF	Dimensions [mm]										
	A_1	$A_{2\,max}$[1)]	$A_{2\,min}$	B_1	B_2	C_1	C_2	C_4[1)]	D_1	D_4	G x T
KON 1605	60	35	25	50	34	40	24	M 8x15	28	38	M 5x10
KON 2005	68	37.5	29	58	39	40	24	M 8x15	32	45	M 6x12
KON 2020/2050	75	42.5	32.5	65	49	40	24	M 10x15	35	50	M 6x12
KON 2505	75	42.5	32.5	65	49	40	24	M 10x15	38	50	M 6x12
KON 3205	82	45	37	75	54	50	30	M 10x12	45	58	M 6x12
KON 3210/3240/4005	92	50	42	85	60	50	30	M 12x15	53	68	M 6x12
KON 4010	120	70	50	100	76	65	41	M 14x25	63	78	M 8x14
KON 5010	135	77.5	57.5	115	91	88	64	M 16x25	72	90	M 10x16
KON 6310	152	87.5	65	130	101	88	64	M 16x30	85	105	M 10x16

[1)] Standard = $A_{2\,max}$ (delivery status)

Top plate BP

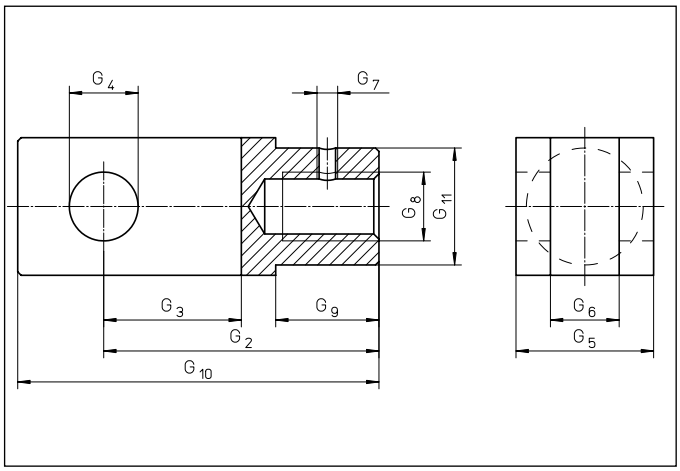
Screwed onto the mounting thread of the jack screw and protected against rotation.
Standard: Hole-pattern BP symmetrically to SHG housing.
Note: Please specify alignment at version V.



Size	Dimensions [mm]								Weight [kg]
	B_1	B_2	ø B_3	B_4	B_5	B_6	B_{7x4}	B_8	
BP MULI 1	20	7	65	48	29.3	M12	9	M5	0.2
BP MULI 2	21	8	80	60	38.7	M14	11	M6	0.3
BP MULI 3	23	10	90	67	46	M20	11	M8	0.6
BP MULI 4	30	15	110	85	60	M30	13	M8	1.2
BP MULI 5	50	20	150	117	85	M36	17	M10	4.8
BP JUMBO 1	50	25	170	130	90	M48x2	21	M10	5
BP JUMBO 2	60	30	200	155	105	M56x2	25	M12	7.7
BP JUMBO 3	60	30	220	170	120	M64x3	25	M12	9.8
BP JUMBO 4	80	40	260	205	145	M72x3	32	M12	18.4
BP JUMBO 5	120	40	310	240	170	M100x3	38	M12	29.6

Fork end GA

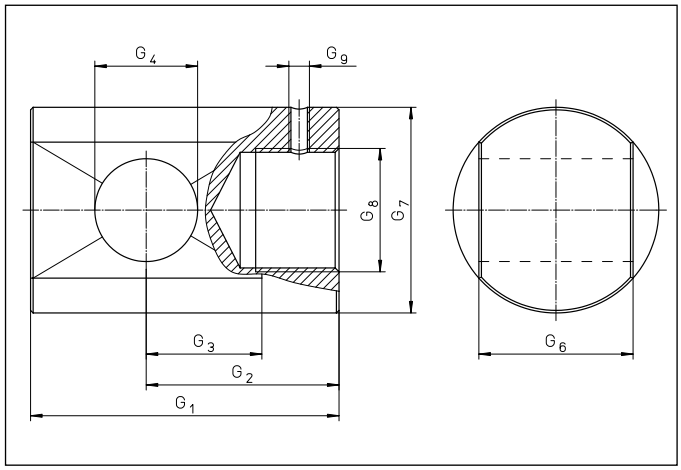
Screwed onto the mounting thread of the jack screw and protected against rotation.
Supplied with split pins and collar pins. Galvanized.
Standard: Collar pin mounted parallel to the drive shaft.
Note: Please specify alignment at version V.



Size	Dimensions [mm]										Weight [kg]
	G_2	G_3	G_4H9	G_5□	G_6B12	G_7	G_8	G_9	G_{10}	G_{11}	
GA MULI 1	48	24	12	24	12	M5	M12	18	62	20	0.15
GA MULI 2	56	28	14	28	14	M6	M14	22	72	24.5	0.2
GA MULI 3	80	40	20	40	20	M8	M20	30	105	34	0.8
GA MULI 4	120	60	30	60	30	M8	M30	43	160	52	2.5
GA MULI 5	144	72	35	70	35	M10	M36	54	188	60	3.8

Clevis end GK

Screwed onto the mounting thread of the jack screw and protected against rotation.
Standard: Collar pin mounted parallel to the drive shaft.
Note: Please specify alignment at version V.



Size	Dimensions [mm]								Weight [kg]
	G1	G2	G3	G4H8	G6H10	G7	G8	G9	
GK MULI 1	55	40	15	10	15	30	M12	M5	0.2
GK MULI 2	63	45	18	12	20	39	M14	M6	0.3
GK MULI 3	78	53	20	16	30	45	M20	M8	0.6
GK MULI 4	100	70	30	20	35	60	M30	M8	1.2
GK MULI 5	130	97	33	22	40	85	M36	M10	2.5
GK JUMBO 1	120	75	45	40	60	90	M48x2	M10	4.8
GK JUMBO 2	130	90	50	50	70	105	M56x2	M12	4.8
GK JUMBO 3	155	105	60	60	80	120	M64x3	M12	8.0
GK JUMBO 4	220	135	85	80	110	145	M72x3	M12	22.5
GK JUMBO 5	300	200	100	90	120	170	M100x3	M12	31.5

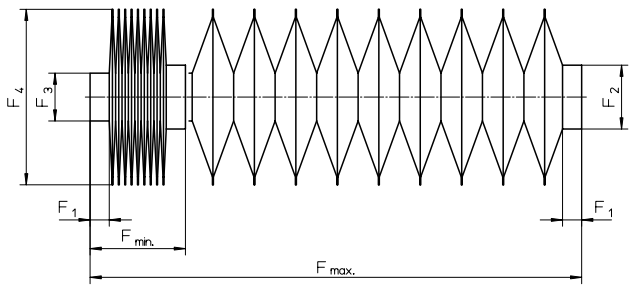
Bellows F

Bellow cover for protection against external influences. Suitable for horizontal or vertical installation.
Material: PVC-coated polyester, stitched construction.
Temperature range -30 °C to 70 °C.
Calculation: For each 150 mm of open length up to 1.80 m allow 8 mm when calculating the closed length. Allow 10 mm for each 150 mm over 1.80 m. The calculated length is added to value C_3 (see page 14) as the screw extension.
Diameter F_2 may differ on the opposite side, depending on the attachment fitted.

Installation:
Installation position must be specified: horizontal installation requires internal support washers; in the case of vertical installation, bellows over 2 m have textile strips. Attachment is by hose clamps.
Note: Version R (rotating screw) includes two bellows with bellows holder (please specify installation details for second bellows, see pp. 14/15). The attachment of the second bellows at the end of the screw is carried out by the customer. Please always specify the flange direction of the nut.

Spiral spring covers SF

Available on request (refer also to the catalogue Screw Drives page 30/31).



to 1800 mm:
$F_{min} = 2 \cdot F_1 + \text{rounding } (\frac{\text{stroke}}{150}) \cdot 8$ [mm]

to 1800 mm:
$F_{min} = 2 \cdot F_1 + \text{rounding } (\frac{\text{stroke}}{150}) \cdot 10$ [mm]

$F_{max} = F_{min} + \text{stroke}$

Size		Dimensions [mm]			
	For design	F_1	F_2	F_3	F_4
F MULI 1	N/V TGS[1)]	12	30	30	101
	N/V KGS[1)]	12	48	30	101
	R	12	30	28	101
F MULI 2	N/V TGS[1)]	12	39	39	113
	N/V KGS[1)]	12	61	39	113
	R	12	39	32	113
F MULI 3	N/V	20	46	46	127
	R	20	46	38	127
F MULI 4	N/V	20	60	60	140
	R TGS/KGS-4010	20	60	63	140
	R KGS-4005	20	60	53	140
F MULI 5	N/V	20	85	85	152
	R	20	85	72	152
F JUMBO 1	N/V	20	90	90	165
	R	20	90	85	165
F JUMBO 2	N/V	20	105	105	175
	R	20	105	95	175
F JUMBO 3	N/V	20	120	120	191
	R	20	120	105	191
F JUMBO 4	N/V	20	145	145	201
	R	20	145	130	201
F JUMBO 5	N/V	20	170	170	245
	R	20	170	160	245

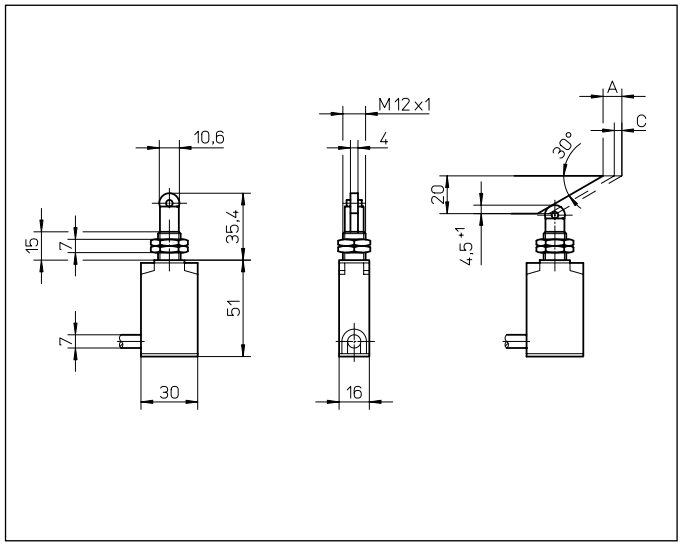
[1)] TGS = Trapezoidal screw
KGS = Ball srew

Limit switches with roller lever ES

Particularly suitable for end-position shutoff.

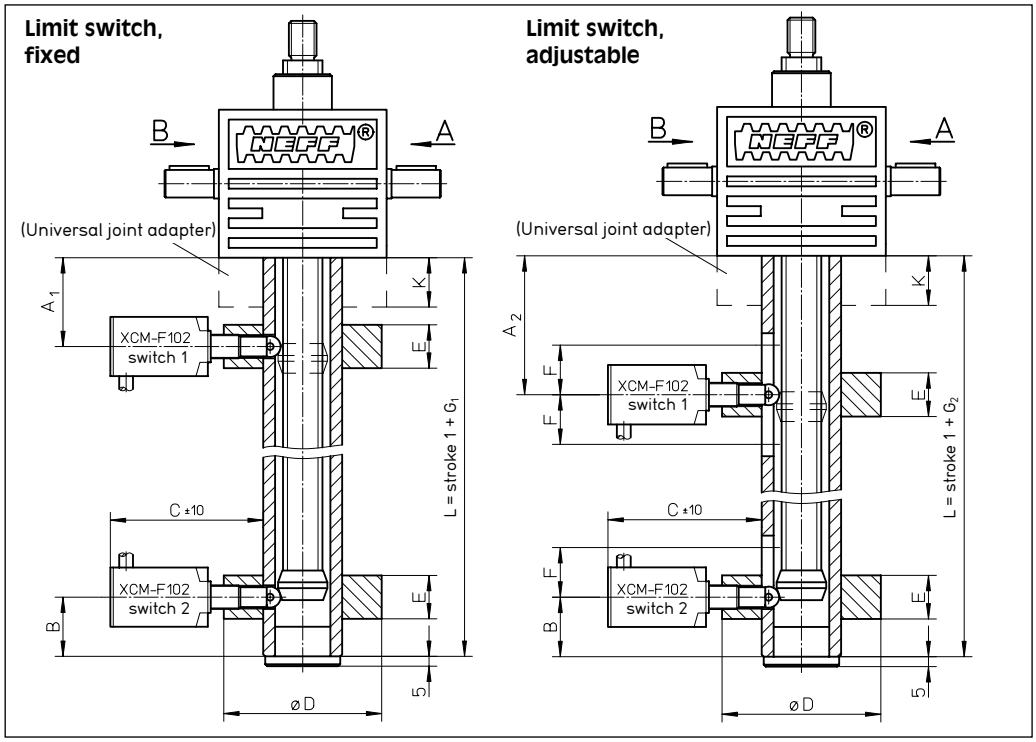
Actuating cam 30° in accordance with DIN 69639:
- A (Minimum actuating stroke): 2.6 ± 0.5 mm
- B (Differential stroke): 0.85 ± 0.25 mm
- F_O (Minimum switch-on force): 1 N
- V_e (Approach velocity): 0.001 to 0.1 m/s

Connection:
5-core cable with PVC sheath, 1 m long
Conductor cross-section 0.75 mm²
Brown/blue: NO contact
Black/black: NC contact
Green/yellow: PE conductor
Switching capacity: NFC 63146 (IEC 947-5-1)

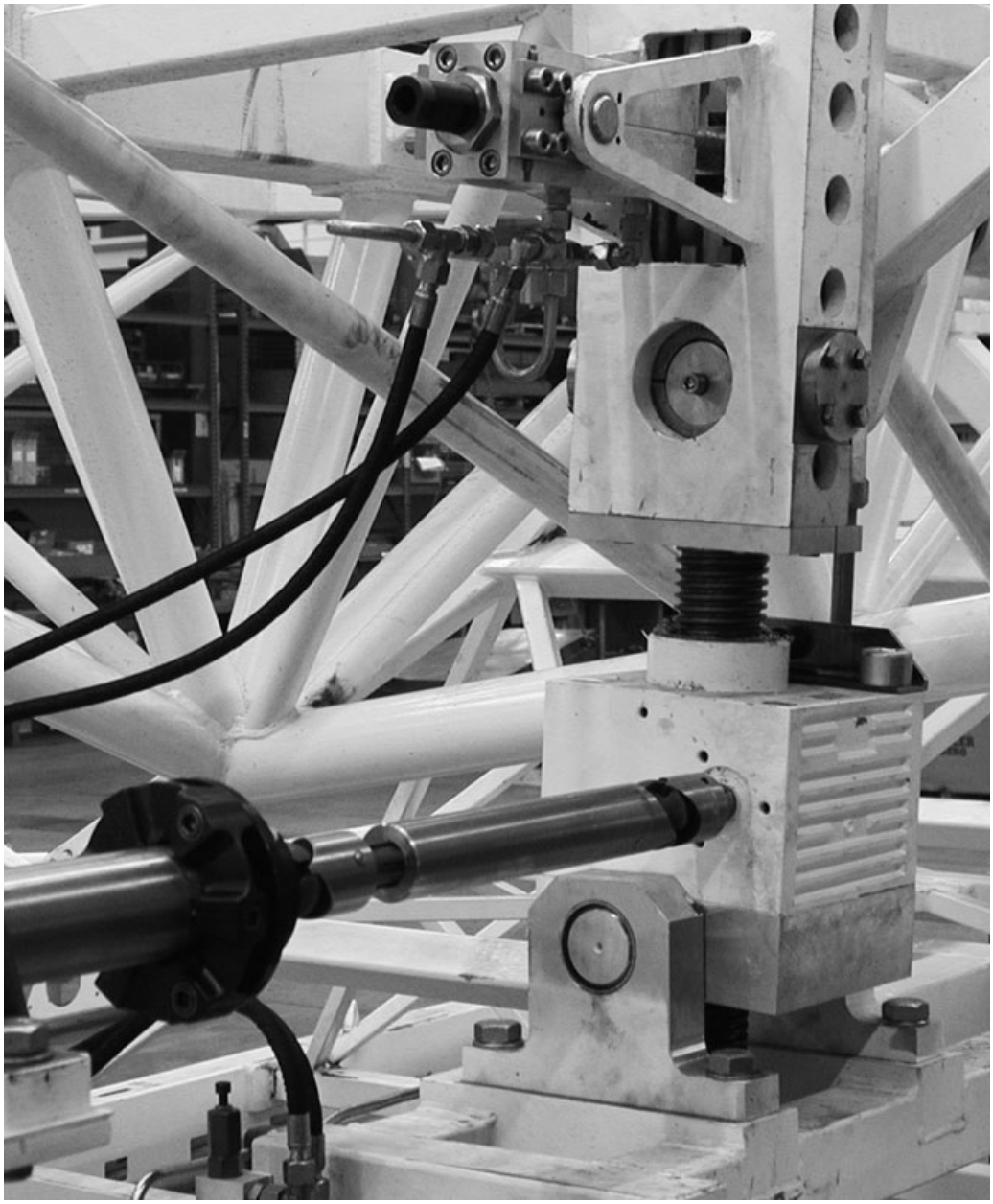


Limit switch installation position

Standard installation side B (see Fig.).
Note: If installation on other side, please specify



Size	Dimensions [mm]									
	A1	A2	B	C	ø D	E	F	G1	G2	K
MULI 1	40	65	30	80	80	20	25	82	107	20
MULI 2	45	70	30	80	80	20	25	87	112	25
MULI 3	50	75	30	80	90	20	25	92	117	30
MULI 4	60	85	30	80	100	20	25	102	127	40
MULI 5	70	95	30	80	120	20	25	112	137	50
JUMBO 1	80	105	30	80	140	20	25	122	147	60
JUMBO 2	100	125	30	80	160	20	25	142	167	80
JUMBO 3	100	125	30	80	160	20	25	142	167	80
JUMBO 4	110	135	30	80	170	20	25	152	177	90
JUMBO 5	120	145	30	80	190	20	25	162	187	100



Loading a wing for final
assembly at Airbus S.E.S.
in Toulouse, France.
.

Drive technology

Worm gear screw jacks and electric drive from a single source – what do you get out of it?

Motors and motor adapter flanges from NEFF complement the MULI® and JUMBO® worm gear screw jacks to produce powerful drive packages that can be put to use quickly and without complications. They are intended to have 3-phase motors attached as standard.

Drive technology from NEFF – Your benefit:

Optimum price-performance ratio
System application, screw jack and drive all perfectly matched – everything from a single source.

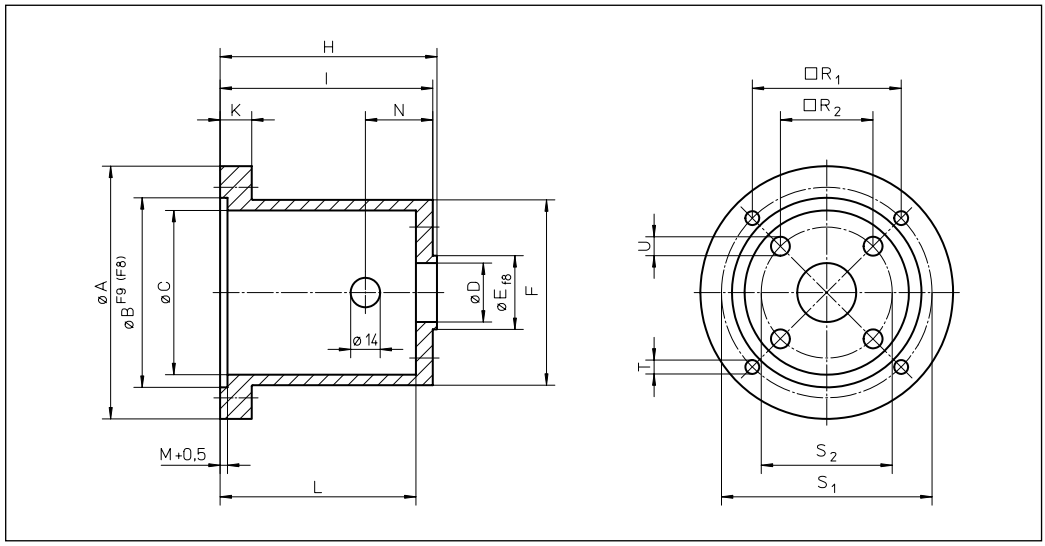
No hidden costs
Calculation, planning, choice of components and parameterization are all handled by NEFF.

One contact
For all drive questions from calculation up to maintenance and service you have one responsible competent partner.

Motor adapter flanges MG

Motor adapter flanges are used to mount motors to worm gear screw jacks and house the coupling for connecting the motor to the drive shaft.

When ordering, please specify the side to which the motor adapter flange is to be attached (A or B)

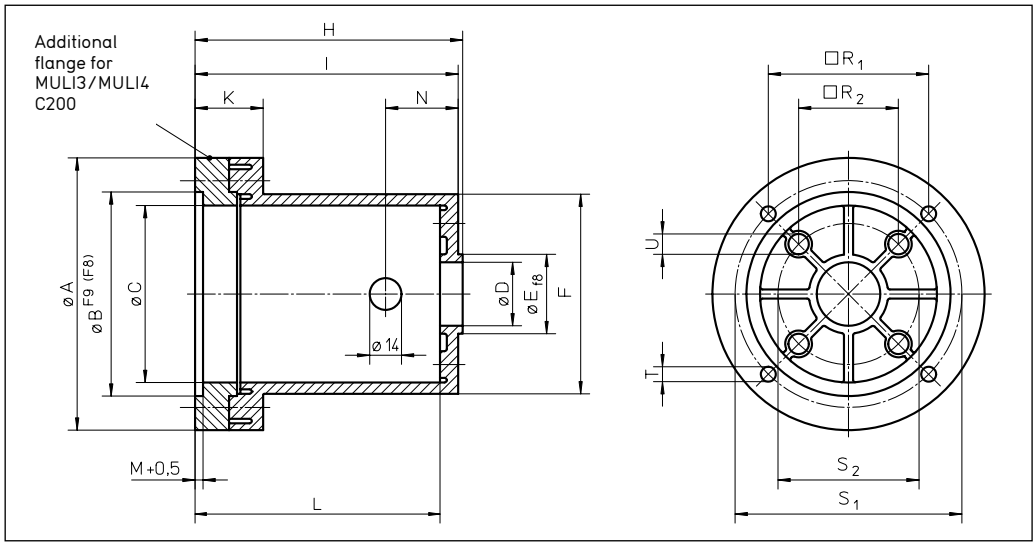


Size	Motor	Design MG/ZF[1)]	Dimensions [mm]									
			A	B	C	D	E	ø F	□ F	H	I	K
MG MULI 1	DFT71	MG	120	80	65	22	28	77		81.5	80	10
MG MULI 1	DFT80	MG	120	80	56	22	28	62		91.5	90	10
MG MULI 2	DFT71	MG	120	80	65	26	35	77		81.5	80	10
MG MULI 2	DFT80	MG	120	80	78	26	35	88		92.5	91	10
MG MULI 2	DFT90	MG	160	110	90	31	35	110		109.5	108	15
MG MULI 3	DFT71	MG	120	80	77	28	35	87		91.5	90	10
MG MULI 3	DFT80	MG	120	80	78	28	35	88		103	101	10
MG MULI 3	DFT90	MG	160	110	95	28	35	104		125	123	12
MG MULI 3	DFV100/112	MG + ZF	200	130	100	24	35	145		133	131	29
MG MULI 4	DFT80	MG	120	80	75	42	52	–	88	105	103	12
MG MULI 4	DFT90	MG	160	110	98	42	52	114		118	116	15
MG MULI 4	DFV100/112	MG + ZF	200	130	120	30	52	145		134	131	29
MG MULI 5	DFT90	MG	160	110	105	45	52	120		138.5	136	15
MG MULI 5	DFV100/112	MG	200	130	125	35	52	145		154	152	16

[1)] MG = Motor adapter flange
ZF = Intermediate flange

Antriebstechnik · Automation

Motor adapter flanges MG
Intermediate flange ZF



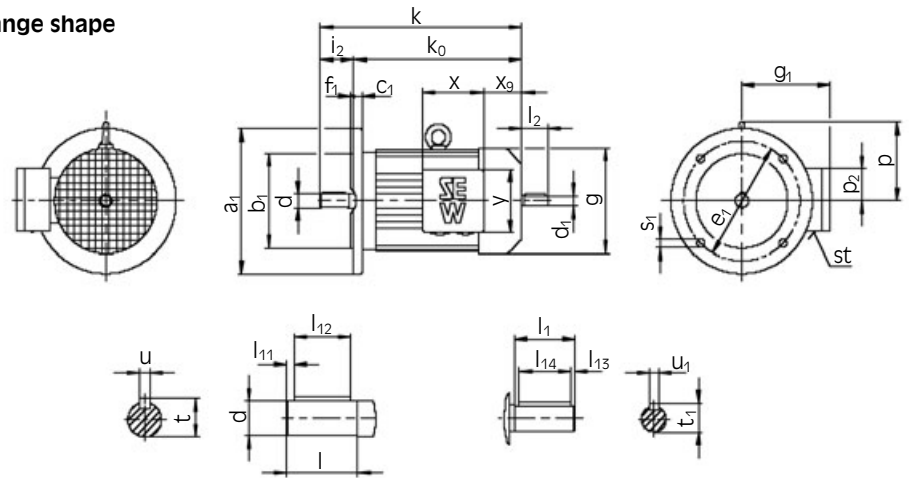
Dimensions [mm]									Coupling Size	Coupling half[1] MULI	Coupling half[1] Motor
L	M	N	□R1	□R2	S1	S2	T	U			
72	3.5	20	70.7	32	100	45.3	6.6	5.5	RA19	RA19 ø10	RA19 ø14
85	3.5	20	70.7	32	100	45.3	6.6	5.5	RA19	RA19 ø10	RA19 ø19
73	3.5	22	70.7	35	100	49.5	6.6	6.6	RA19	RA19 ø14	RA19 ø14
84	3.5	22	70.7	35	100	49.5	6.6	6.6	RA19	RA19 ø14	RA19 ø19
100	4	27	92	35	130	49.5	9	6.6	RA24	RA24 ø14	RA24 ø24
83	3.5	27	70.7	44	100	62.2	6.6	9	RA19	RA19 ø16	RA19 ø14
93	3.5	32	70.7	44	100	62.2	6.6	9	RA19	RA19 ø16	RA19 ø19
114	4	30	92	44	130	62.2	9	9	RA24	RA24 ø16	RA24 ø24
119	4.5	40	116.7	44	165	62.2	M10	9	RA28	RA28 ø16	RA28 ø28
94	3.5	35	70.7	55	100	78	6.6	11	RA24	RA24 ø20	RA24 ø19
106	4	30	92	55	130	78	M8	11	RA24	RA24 ø20	RA24 ø24
119	4.5	38	116.7	55	165	78	M10	11	RA28	RA28 ø20	RA28 ø28
122	4	48	92	60	130	85	M8	13.5	RA28	RA28 ø25	RA28 ø24
138	7	50	116.7	60	165	85	M10	13.5	RA28	RA28 ø25	RA28 ø28

[1] When ordering, specify explicitly the diameter of the hole drilling in the motor side of the coupling half.

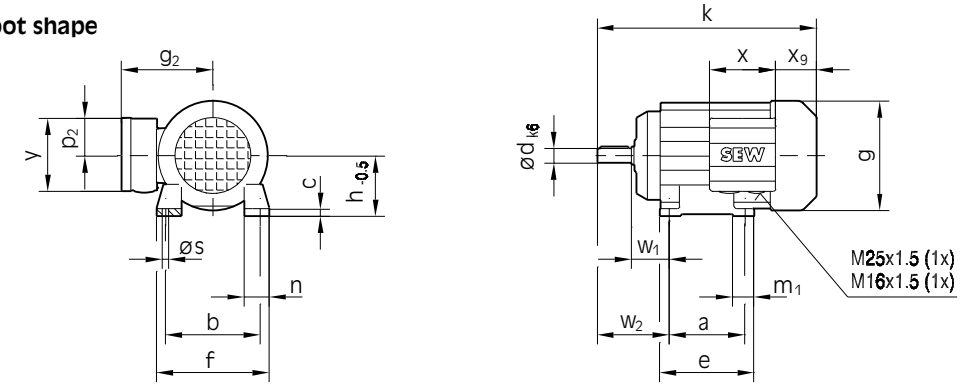
3-phase motors M

3-phase 4-pole motors (1500 rpm) in totally enclosed fan-cooled designs in accordance with VDE 0530 Part 1. Standard degree of protection: IP55. Temperature class F. Other SEW motors on request.
Notes: If the free shaft end of the motor is used as shaft for a slip-on emergency hand wheel, a device will be required witch interrupts the power supply before the crank engages. Motors with different speeds and brake on request.

Flange shape



Foot shape



Performance data

Size	Nominal power [kW]	Nominal speed [rpm]	Power factor cos φ	Nominal current at 400 V [A]	Rel. locked-rotor current I_A/I_N	Nominal moment [Nm]	Rel. locked-rotor torque M_A/M_N	Rel. Run-up moment M_H/M_N	Rotor inertia J_{Mot} [10^{-4}kgm²]	Rotor inertia $J_{Bremsmot}$ [10^{-4}kgm²]	Braking moment [Nm]
DT71K4	0.15	1380	0.67	0.61	2.9	1.0	1.8	1.7	4.6	5.5	5.0
DT71C4	0.25	1380	0.70	0.80	2.8	1.7	1.8	1.7	4.6	5.5	5.0
DT71D4	0.37	1380	0.76	1.15	3.0	2.6	1.8	1.7	4.6	5.5	5.0
DT80K4	0.55	1360	0.72	1.75	3.4	3.9	2.1	1.8	7.5	7.5	10
DT80N4	0.75	1380	0.73	2.1	3.8	5.2	2.2	2.0	8.7	9.6	10
DT90S4	1.1	1400	0.77	2.8	4.3	7.5	2.0	1.9	25	31	20
DT90L4	1.5	1410	0.78	3.55	5.3	10.2	2.6	2.3	34	40	20
DV100M4	2.2	1410	0.83	4.7	5.9	15.0	2.7	2.3	53	59	40
DV100L4	3.0	1400	0.83	6.3	5.6	20.5	2.7	2.2	65	71	40
DV112M4	4.0	1420	0.84	8.7	5.4	26.9	2.4	2.1	98	110	55

Dimensions

The values in brackets refer to motors with brake.

Flange shape

Size	Dimensions [mm]													
	a_1	b_1	c_1	d	d_1	e_1	f_1	g	g_1	i_2	k	k_0	l	l_{11}
DFT71K4	120	80	8	14	11	100	3	145	122(127)	24	232 (296)	208 (296)	30	4
DFT71C4	120	80	8	14	11	100	3	145	122(127)	24	232 (296)	208 (272)	30	4
DFT71D4	120	80	8	14	11	100	3	145	122(127)	24	232 (296)	208 (272)	30	4
DFT80K4	120	80	8	19	14	100	3	145	122(127)	34	292 (356)	258 (322)	40	4
DFT80N4	120	80	8	19	14	100	3	145	122(127)	34	292 (356)	258 (322)	40	4
DFT90S4	160	110	10	24	19	130	3.5	197	154(161)	53.5	323 (408)	273 (358)	50	5
DFT90L4	160	110	10	24	19	130	3.5	197	154(161)	53.5	323 (408)	273 (358)	50	5
DFV100M4	200	130	10	28	19	165	3.5	197	166	60	371 (456)	311 (396)	60	5
DFV100L4	200	130	10	28	19	165	3.5	197	166	60	401 (486)	341 (426)	60	5
DFV112M4	200	130	11	28	24	165	3.5	221	179(182)	64	409 (489)	345 (425)	60	5

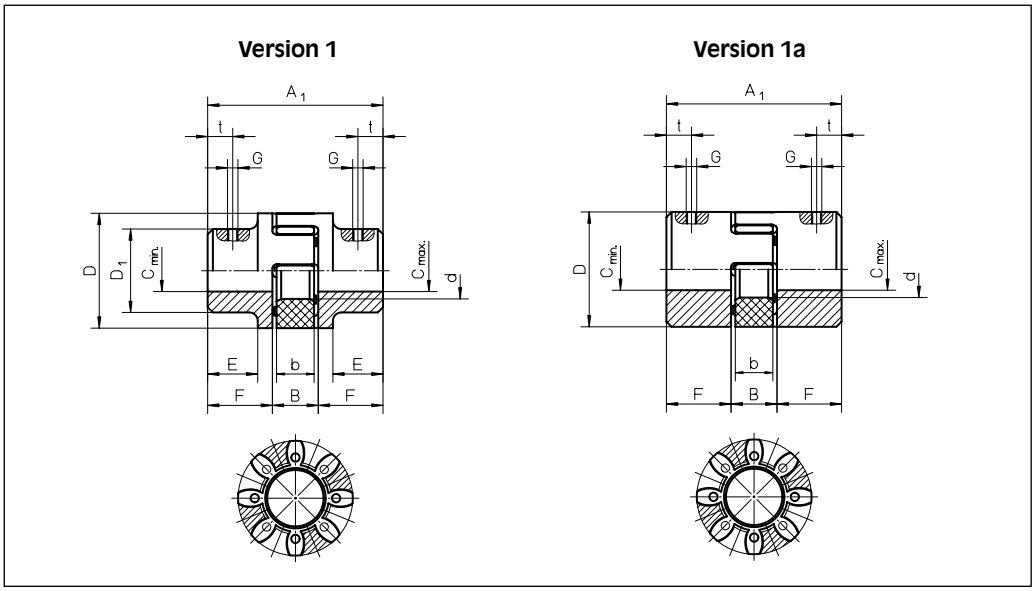
Size	Dimensions [mm]													
	l_{12}	l_1	l_2	l_{13}	l_{14}	s_1	t	u	t_1	u_1	x	x_9	y	p_2
DFT71K4	22	23	24	1	20	6.6	16	5	12.5	4	87 (127)	61 (86)	97	50
DFT71C4	22	23	24	1	20	6.6	16	5	12.5	4	87 (127)	61 (86)	97	50
DFT71D4	22	23	24	1	20	6.6	16	5	12.5	4	87 (127)	61 (86)	97	50
DFT80K4	32	30	31	4	22	6.6	21.5	6	16	5	87 (127)	61 (86)	97	50
DFT80N4	32	30	31	4	22	6.6	21.5	6	16	5	87 (127)	61 (86)	97	50
DFT90S4	40	40	42	4	32	9	27	8	21.5	6	87 (127)	76 (121)	97	50
DFT90L4	40	40	42	4	32	9	27	8	21.5	6	87 (127)	76 (121)	97	50
DFV100M4	50	40	42	4	32	11	31	8	21.5	6	106 (139)	74 (125)	109	56
DFV100L4	50	40	42	4	32	11	31	8	21.5	6	106 (139)	74 (125)	109	56
DFV112M4	50	50	55	5	40	11	31	8	27	8	106 (139)	91 (131)	109	56

Foot shape

Size	Dimensions [mm]										
	a	b	c	e	f	h	m_1	n	s	w_1	w_2
DT71K4	90	112	5	115	144	71	32	31	7	45	75
DT71C4	90	112	5	115	144	71	32	31	7	45	75
DT71D4	90	112	5	115	144	71	32	31	7	45	75
DT80K4	100	125	10	125	149	80	28	33	9	50	90
DT80N4	100	125	10	125	149	80	28	33	9	50	90
DT90S4	125	140	8	152	176	90	32	32	9	56	106
DT90L4	125	140	8	152	176	90	32	32	9	56	106
DV100M4	140	160	12	170	188	100	35	38	12	63	123
DV100L4	140	160	12	170	188	100	35	38	12	63	123
DV112M4	140	190	14	170	220	112	35	44	12	70	130

Flexible couplings RA, RG

Flexible couplings transmit the torque by positive locking, and compensate for slight non-alignment, stagger and offset of shafts.
Standard toothed ring 92 Shore A.

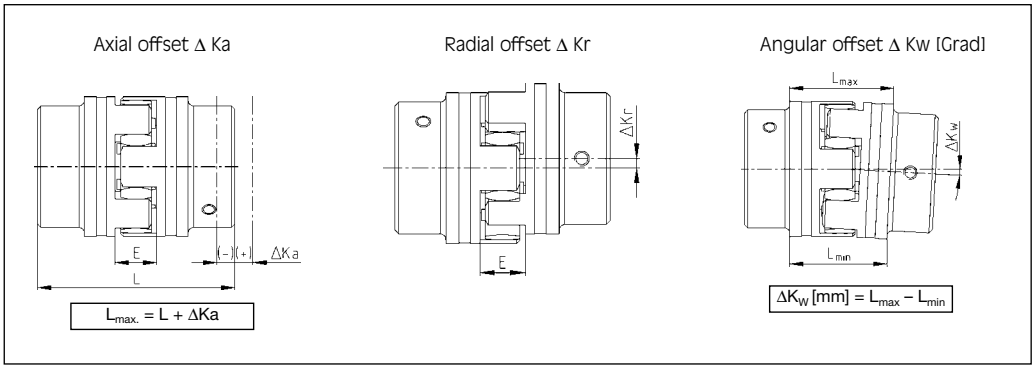


Size	Version	max. torque	Dimensions [mm]										Offsets				Locking screw		Weight
													max. axial-stagger	max. radial non-alignment n=1500 rpm	Δ Kw [°] max. angle stagger at n=1500 rpm				
		[Nm]	A_1	E	F	B	b	D_1	D	d	C_{min}[1]	C_{max}[1]	Δ Ka [mm]	Δ Kr [mm]	Δ Kw [mm]		Dim. G	Dim. t	[kg]
RA 14	1a	7.5	35	–	11	13	10	–	30	10	6	15	1.0	0.17	1.2	0.67	M4	5	0.05
RA 19	1	10	66	20	25	16	12	32	40	18	10	19	1.2	0.20	1.2	0.82	M5	10	0.15
RA 19	1a	10	66	–	25	16	12	–	41	18	19	24	1.2	0.20	1.2	0.82	M5	10	0.15
RA 24	1	35	78	24	30	18	14	40	55	27	14	24	1.4	0.22	0.9	0.85	M5	10	0.25
RA 24	1a	35	78	–	30	18	14	–	56	27	22	28	1.4	0.22	0.9	0.85	M5	10	0.35
RA 28	1	95	90	28	35	20	15	48	65	30	14	28	1.5	0.25	0.9	1.05	M6	15	0.40
RA 28	1a	95	90	–	35	20	15	–	67	30	28	38	1.5	0.25	0.9	1.05	M6	15	0.55
RG 38	1	190	114	37	45	24	18	66	80	38	16	38	1.8	0.28	1.0	1.35	M8	15	0.85
RG 42	1	265	126	40	50	26	20	75	95	46	28	42	2.0	0.32	1.0	1.70	M8	20	1.2
RG 48	1	310	140	45	56	28	21	85	105	51	28	48	2.1	0.36	1.1	2.00	M8	20	1.7
RG 55	1	410	160	52	65	30	22	98	120	60	30	55	2.2	0.38	1.1	2.30	M10	20	7.3
RG 65	1	625	185	61	75	35	26	115	135	68	40	65	2.6	0.42	1.2	2.70	M10	20	11.0
RG 75	1	975	210	69	85	40	30	135	160	80	40	75	3.0	0.48	1.2	3.30	M10	25	17.9
RG 90	1	2400	245	81	100	45	34	160	200	100	50	90	3.4	0.50	1.2	4.30	M12	30	28.5

[1] This catalogue does not list all intermediate sizes. Further sizes on request.

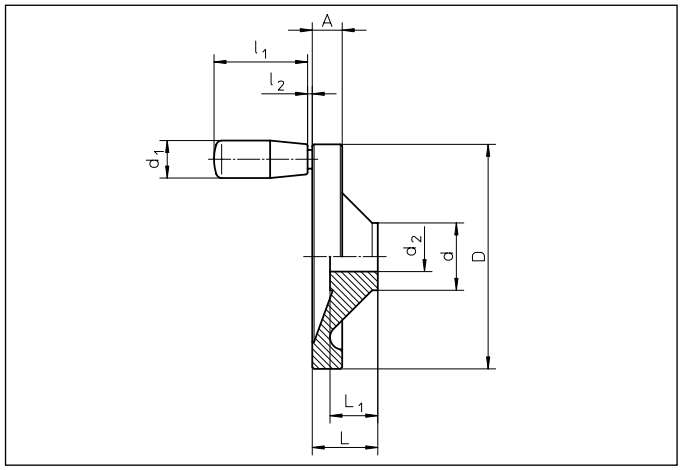
Offsets

In the case of the standard and large hubs RA 14–48, the tapped hole G for the locking screw is located opposite the groove.
Locking screws according to DIN 916 with toothed washer.



Handwheels HR

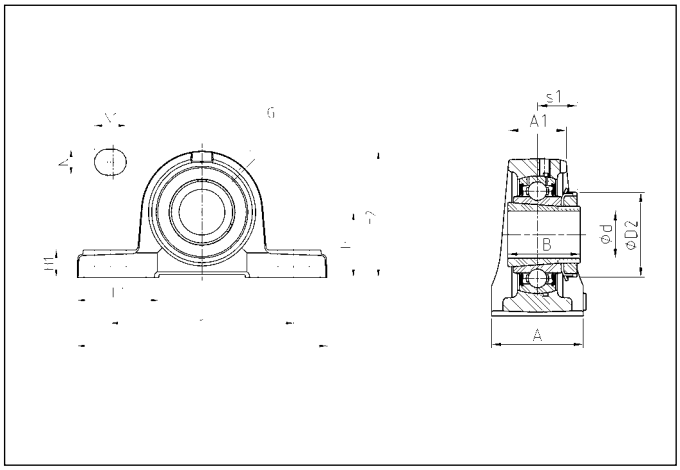
2-spoke handwheel of chill-cast light aluminium RN 9501, polished, with rotating conical handle of black plastic. Bore keyed to DIN 6885.



Size	Dimensions [mm]				Bore				
	A	D	d	d_1	$d_{2\ H7}$	L_1	L	l_1	l_2
HR 80	10	80	31	21	ø10	16	29	50	2.5
HR 80	10	80	31	21	ø14	16	29	50	2.5
HR 100	10	100	33	21	ø10	17	33	50	2.5
HR 100	10	100	33	21	ø14	17	33	50	2.5
HR 125	13	125	35	22	ø10	18	36	56	2.5
HR 125	13	125	35	22	ø14	18	36	56	2.5
HR 140	13	140	37	22	ø14	19	39	56	2.5
HR 140	13	140	37	22	ø16	19	39	56	2.5
HR 160	16	160	40	23	ø14	20	40	65	2.5
HR 160	16	160	40	23	ø16	20	40	65	2.5
HR 200	16	200	45	26	ø16	24	45	80	2.5
HR 200	16	200	45	26	ø20	24	45	80	2.5
HR 250	19	250	52	31	ø20	28	50	102	2.5
HR 250	19	250	52	31	ø25	28	50	102	2.5

Pillow block UKP

The standard range for housing bearings with clamping sleeve. Cast iron housing with surface painted for protection from corrosion. The bearing insets in rolled steel have forged rings, which prolong the lifetime of the bearings.



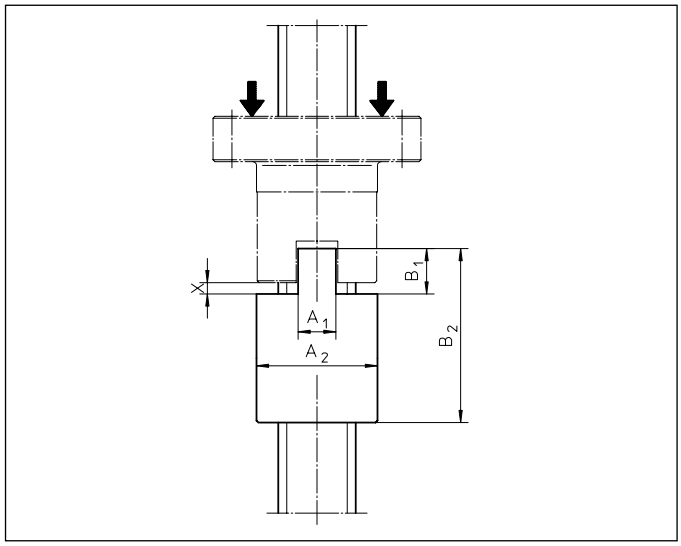
Size	Shaft diam-eter [mm]	Size GX-shaft	Dimensions [mm]														Dynamic Load rating [kN]	Static Load rating [kN]	Weight [kg]
			L	H	A_1	A	J	N	N_1	L_1	H_1	H_2	s_1	B	D_2	G			
UKP205H	20		140	36.5	26	38	105	13	19	42	16	70	18.5	35	38	M6x1	14.0	7.88	0.8
UKP206H	25		165	42.9	30	48	121	17	21	54	18	83	20.5	38	45	M6x1	19.5	11.2	1.4
UKP207H	30	1	167	47.6	31	48	127	17	21	54	19	94	22.5	43	52	M6x1	25.7	15.2	1.8
UKP208H	35		184	49.2	34	54	137	17	23	52	19	100	24.5	46	58	M6x1	29.6	18.2	2.2
UKP209H	40	2	190	54.0	37	54	146	17	23	60	20	108	26	50	65	M6x1	31.85	20.8	2.5
UKP210H	45	4	206	57.2	39	60	159	20	25	65	22	114	27.5	55	70	M6x1	35.1	23.2	3.1
UKP211H	50		219	63.5	40	60	171	20	25	70	22	126	29	59	75	M6x1	43.55	29.2	3.7
UKP212H	55		241	69.8	44	70	184	20	25	70	25	138	31	62	80	M6x1	52.5	32.8	5.0
UKP213H	60	8	265	76.2	46	70	203	25	29	77	27	150	32	65	85	M6x1	57.2	40.0	6.1

Safety nut SFM-TGS/ KGS[1)]

For version R: The safety nut is positioned below the travelling nut without axial load and is therefore not subjected to wear. The functioning of the safety nut is guaranteed only when installation and applied forces are as shown in the illustration (see right). As the travelling nut wears, the distance "x" between the two nuts decreases, which provides a visual check of wear without the need for dismantling.
The travelling nut must be replaced when the axial play on a single-thread screw is more that 1/4 of the lead of the thread (= dimension X). Otherwise, safety cannot be guaranteed.

Wear greater than 1/4 of the lead of the thread can endanger persons and property. Dimension X must be checked regularly.
The safety nut supports the load if the thread form of the travelling nut fails as a result of excessive wear (dirt, lubrication starvation, overheating, etc.).
The safety nut can only be ordered together with the flanged nut (we reserve the right to make design changes).

For version N: The design is similar to that for version R. A visual check for wear is also possible in this case. **Please specify the load direction when ordering.**



Size	Dimensions [mm] (see pages 15 and 16 for dimensions of travelling nut)					Weight [kg]
	A_1	$A_{2-0,5}$	B_1	B_2	X	
SFM MULI 1	10	28	10	44	1	0.45
SFM MULI 2	10	32	10	44	1	0.55
SFM MULI 3	12	38	10	46	1.5	0.70
SFM MULI 4	16	63	15	73	1.75	3.10
SFM MULI 5	20	72	16	97	2.25	4.30
SFM JUMBO 1	20	85	16	99	2.25	5.70
SFM JUMBO 2	25	95	20	100	2.5	11.30
SFM JUMBO 3	25	105	20	110	2.5	13.70
SFM JUMBO 4	30	130	25	130	2.5	23.30
SFM JUMBO 5	40	160	25	160	3.5	45.70

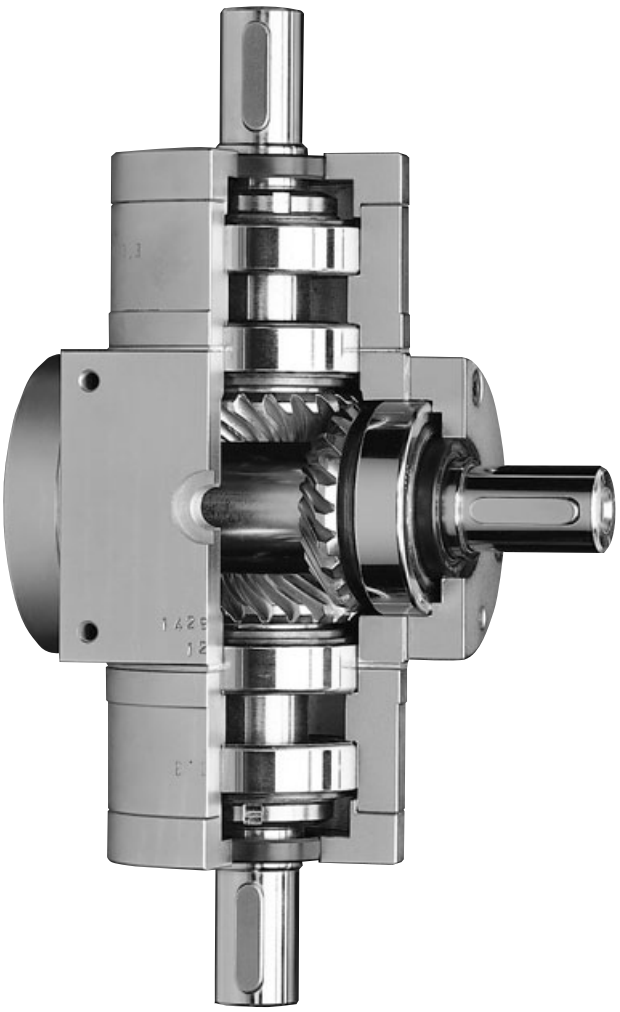
[1)] KGS on request.

Bevel gear boxes KRG

The spiral bevel gear boxes offer numerous advantages to the designer and have been specially selected to complement the NEFF range of worm gear screw jacks and accessories. A total of eight box sizes and accessories are available as standard. The gear boxes are fully machined with tapped holes for universal mounting, thus offering six possible mounting positions.

Housing and Flange:
Version: Cube
Material: Lamellar graphite cast iron EN-GJL-250 (0.6025) or spheroidal graphite cast iron ENGJS- 400-15 (0.7040) or G-Al Si 10 Mg (0.1645)

Shaft:
Version: Shaft centring according to DIN 332 Sheet 2, feather key according to DIN 6885, Sheet 1
Tolerance: j6 or k6
Material: C 45 (1.0503) or 42 Cr Mo 4 (1.7225)



Hollow shafts:
Version: With keyway or smooth, with shrink-fit washer
Tolerance: Hole H7
Material: C 45 (1.0503)

Bevel gears:
Version: Klingelnberg Palloid or Klingelnberg Zyklo-Palloid spiral teeth, optimised tooth flanks and profile geometry, tooth flanks milled, hardened and lapped
Material: Stainless steel 16 Mn Cr 5 (1.7131) or 17 Cr Ni Mo 6 (1.6587)

Shaft-hub connection:
Version: Non-positive or positive locking, parts are fitted warm

Shaft seal:
Version: With or without dust scraper according to DIN 3760
Material: NBR or Viton

Bearings:
Version: Conical roller bearings or roller bearings, depending on version

Lubricants:
Version: According to DIN 51502 mineral grease or oil, depending on revs.
Installation position: Please specify when ordering.
Volume: Depends on installation position, see Operating Instructions.

Surface treatment:
Version: Nitro-cellulose base coat
Colour: RAL 7035 light grey

Noise:
Approx. 75 dB(A) at 1m distance

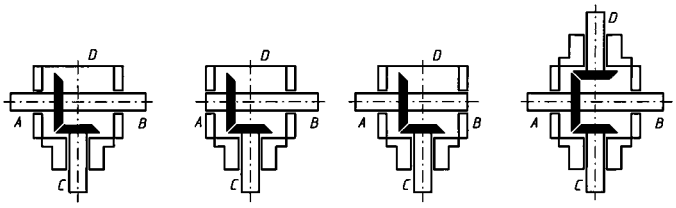
Lifetime of bearings:
Approx. 20,000 operating hours

Max. permitted gear temperature:
80° C

Mechanical efficiency η	Gear size 50	100–230	250–400
At nominal moment	$0.85 \le \eta \le 0.9$	$0.9 \le \eta \le 0.94$	$0.95 \le \eta \le 0.96$

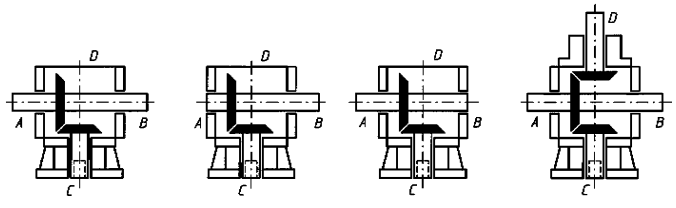
Type L

Ba 30 Ba 40 Ba 50 Ba 60



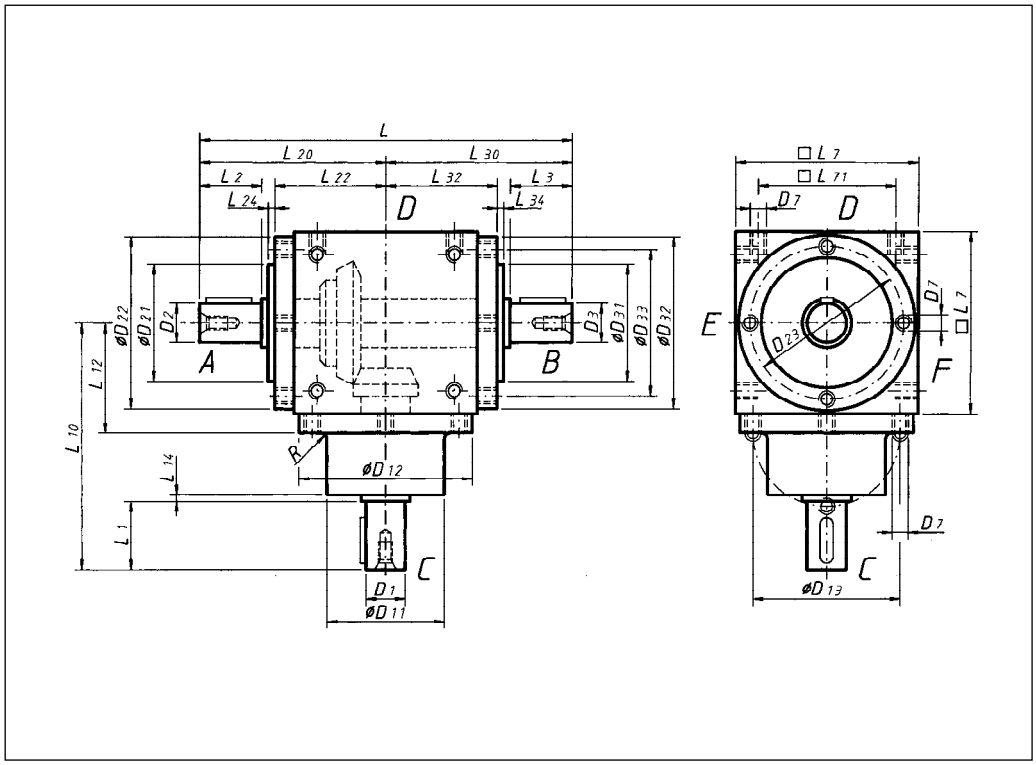
Type ML

Ba 30 Ba 40 Ba 50 Ba 60



Dimensions [mm]

Type L 50



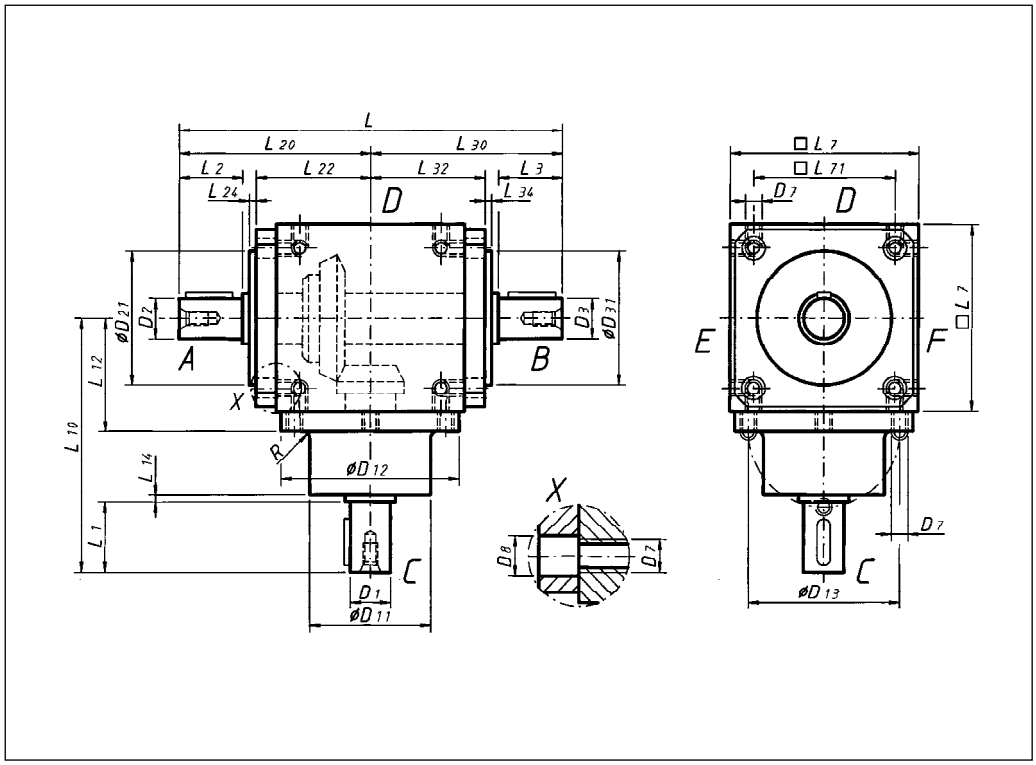
Size	Gear ratio	D1	D2	D3	D7	D11	D12	D13	D21	D22	D23	D31	D32	D33
50	1 – 2	12_{j6}	12_{j6}	12_{j6}	M6	44_{F7}	64,5	54	44_{F7}	64.5	54	44_{F7}	64.5	54
	3 + 4													

Size	Gear ratio	L	L1	L2	L3	L7	L10	L12	L14	L20	L22	L24
50	1 – 2	144	26	26	26	65	100	42	2	72	42	2
	3 + 4						115					

Size	Gear ratio	L30	L32	L34	L71	R	Feather key D1	Feather key D2 + D3
50	1 – 2	72	42	2	45	0.8	4 x 4 x 20	4 x 4 x 20
	3 + 4							

Dimensions [mm]

Type L 100 – 200



Size	Gear ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D31	L	L1	L2	L3
100	1 – 2	18_{j6}	18_{j6}	18_{j6}	M8	9	60_{F7}	89_{F7}	75	60_{F7}	60_{F7}	190	35	35	35
	3 + 4	15_{j6}											30		
	5 + 6	12_{j6}											25		
200	1 – 2	25_{j6}	25_{j6}	25_{j6}	M10	11	80_{F7}	119_{F7}	100	80_{F7}	80_{F7}	244	45	45	45
	3 + 4	20_{j6}											40		
	5 + 6	15_{j6}											30		

Size	Gear ratio	L7	L10	L12	L14	L20	L22	L24	L30	L32	L34	L71	R	Feather key D1	Feather key D2 + D3
100	1 – 2	90	122	55	2	95	55	2	95	55	2	70	1	6 x 6 x 25	6 x 6 x 25
	3 + 4		127											5 x 5 x 20	
	5 + 6		122											4 x 4 x 16	
200	1 – 2	120	162	75	2	122	72	3	122	72	3	100	1	8 x 7 x 36	8 x 7 x 36
	3 + 4		157											6 x 6 x 30	
	5 + 6		147											5 x 5 x 20	

Dimensions [mm]

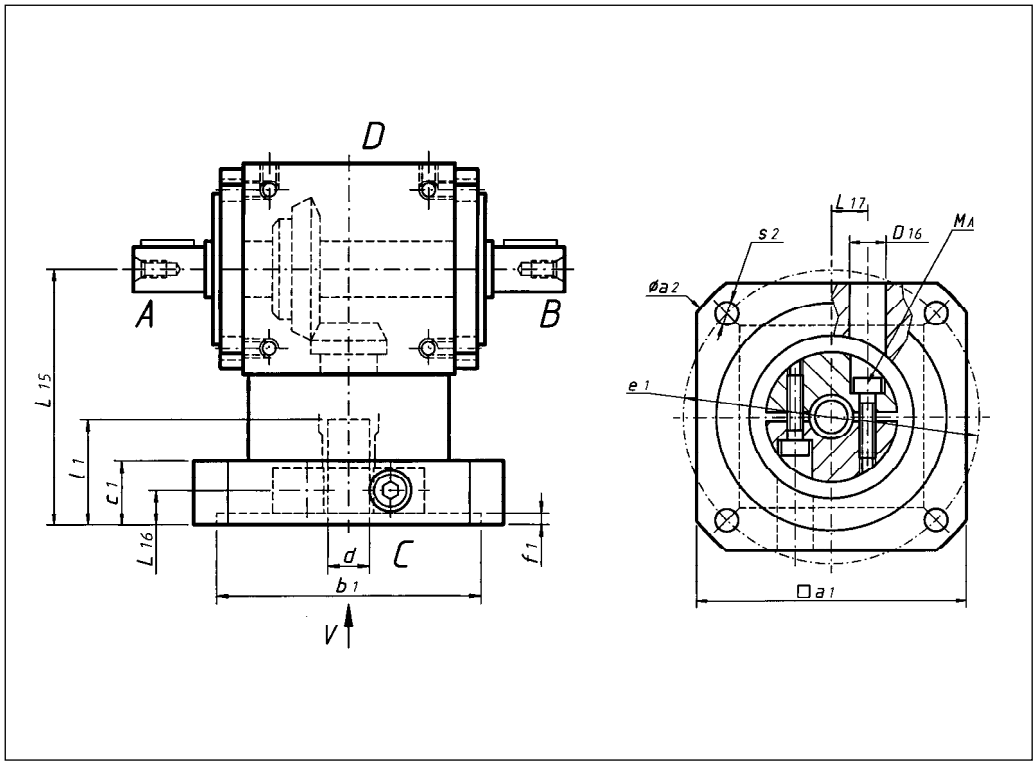
Type L 230 – 400

Size	Gear ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D31	L	L1	L2	L3
230	1 – 2	32_{j6}	32_{j6}	32_{j6}	M10	11	95_{F7}	135_{F7}	115	100_{F7}	100_{F7}	274	50	50	50
	3 + 4	28_{j6}													
	5 + 6	24_{j6}													
250	1 – 2	35_{j6}	35_{j6}	35_{j6}	M12	13.5	110_{F7}	158_{F7}	135	110_{F7}	110_{F7}	320	60	60	60
	3 + 4	28_{j6}											55		
	5 + 6	24_{j6}											50		
300	1 – 2	42_{j6}	42_{j6}	42_{j6}	M12	13.5	120_{F7}	198_{F7}	175	120_{F7}	120_{F7}	406	80	80	80
	3 + 4	35_{j6}											68		
	5 + 6	28_{j6}											55		
370	1 – 2	55_{j6}	55_{j6}	55_{j6}	M16	17.5	150_{F7}	225_{F7}	200	150_{F7}	150_{F7}	454	90	90	90
	3 + 4	40_{j6}					140_{F7}						80		
	5 + 6	35_{j6}											70		
400	1 – 2	60_{j6}	60_{j6}	60_{j6}	M16	17.5	160_{F7}	258_{F7}	230	180_{F7}	180_{F7}	570	110	110	110
	3 + 4	50_{j6}											90		
	5 + 6	45_{j6}													

Size	Gear ratio	L7	L10	L12	L14	L20	L22	L24	L30	L32	L34	L71	R	Feather key D1	Feather key D2 + D3
230	1 – 2	140	180	83	2	137	82	3	137	82	3	110	2	10 x 8 x 45	10 x 8 x 45
	3 + 4		195											8 x 7 x 40	
	5 + 6													8 x 7 x 40	
250	1 – 2	160	212	95	2	160	95	3	160	95	3	120	2	10 x 8 x 45	10 x 8 x 45
	3 + 4		227											8 x 7 x 40	
	5 + 6		222											8 x 7 x 40	
300	1 – 2	200	273	120	3	203	117	3	203	117	3	160	3	12 x 8 x 60	12 x 8 x 60
	3 + 4		261		2									10 x 8 x 45	
	5 + 6		248											8 x 7 x 45	
370	1 – 2	230	305	135	2	227	132	3	227	132	3	180	5	16 x 10 x 80	16 x 10 x 80
	3 + 4		310											12 x 8 x 60	
	5 + 6		300											10 x 8 x 50	
400	1 – 2	260	380	150	5	285	150	20	285	150	20	220	5	18 x 11 x 90	18 x 11 x 90
	3 + 4		360										10	14 x 9 x 70	
	5 + 6													14 x 9 x 70	

Dimensions [mm]

Type ML 50/100/200



Size	Gear ratio	d G7	b1	e1	a1	a2	s2	l1
50	1 – 4	9	70	85	75	100	4 x ø7	23
		11	80	100	90	120	4 x ø7	26
		14	95	115	115	140	4 x ø9	33
100	1 – 6	9	70	85	95	105	4 x ø7	23
		11	80	100	95	120	4 x ø7	26
		14	95	115	115	140	4 x ø9	35
		19	110	130	140	160	4 x ø9	45
200	1 – 6	11	80	100	125	140	4 x ø7	26
		14	95	115	125	140	4 x ø9	35
		19	110	130	140	160	4 x ø9	45
		24	110	130	140	160	4 x ø9	55
		28	130	165	140	190	4 x ø11	65

Size	Gear ratio	f1	c1	D16	L15	L16	L17
50	1 – 4	4.5	16	8.5	90	9.5	10
100	1 – 6	5	22	10	125	13	12.5
200	1 – 6	5	25	14	145	15	16.5

Selection of the gear box size

	Drive speed n_1 [rpm]	Output revs n_2 [rpm]	Size 50		Size 100		Size 200		Size 230	
			Drive torque							
			P [kW]	M2 [Nm]	P [kW]	M2 [Nm]	P [kW]	M2 [Nm]	P [kW]	M2 [Nm]
i = 1.0	50	50.00	0.09	18	0.26	50	0.68	130	1.05	200
	250	1000.00	0.47	18	1.28	49	3.14	120	4.71	180
	500	500.00	0.89	17	2.41	46	5.76	110	8.90	170
	1000	1000.00	1.68	16	4.40	42	9.42	90	15.71	150
	1500	1500.00	2.20	14	5.81	37	12.88	82	20.42	130
	2000	2000.00	2.51	12	6.91	33	12.29	73	25.13	120
	3000	3000.00	3.14	10	8.80	28	18.85	60	28.27	90
i = 1.5	50	33.33	0.06	18	0.17	50	0.45	130	0.70	200
	250	166.67	0.31	18	0.86	49	2.09	120	3.32	190
	500	333.33	0.59	17	1.68	48	3.84	110	6.28	180
	1000	666.67	1.12	16	3.07	44	6.98	100	11.17	160
	1500	1000.00	1.57	15	4.19	40	9.42	90	15.71	150
	2000	1333.33	1.95	14	5.31	38	11.87	85	19.55	140
	3000	2000.00	2.51	12	6.91	33	15.29	73	25.13	120
i = 2.0	50	25.00	0.05	18	0.13	50	0.34	130	0.52	200
	250	125.00	0.24	18	0.64	49	1.64	125	2.49	190
	500	250.00	0.47	18	1.26	48	3.14	120	4.71	180
	1000	500.00	0.89	17	2.36	45	5.76	110	8.90	170
	1500	750.00	1.26	16	3.38	43	7.85	100	12.57	160
	2000	1000.00	1.57	15	4.19	40	9.42	90	15.71	150
	3000	1500.00	2.20	14	5.81	37	12.88	82	20.42	130
i = 3.0	50	16.67	0.03	16	0.07	40	0.17	95	0.31	175
	250	83.33	0.13	15	0.34	39	0.77	88	1.48	170
	500	166.67	0.26	15	0.66	38	1.47	84	2.79	160
	1000	333.33	0.49	14	1.29	37	2.62	75	5.24	150
	1500	500.00	0.68	13	1.83	35	3.51	67	6.81	130
	2000	666.67	0.84	12	2.23	32	4.54	65	8.38	120
	3000	1000.00	1.15	11	2.93	28	5.45	52	10.47	100
i = 4.0	50	12.50	0.02	15	0.05	38	0.12	95	0.23	175
	250	62.50	0.10	15	0.25	38	0.60	92	1.11	170
	500	125.00	0.18	14	0.48	37	1.15	88	2.16	165
	1000	250.00	0.34	13	0.92	35	2.09	80	3.93	150
	1500	375.00	0.51	13	1.34	34	2.91	74	5.50	140
	2000	500.00	0.63	12	1.62	31	3.56	68	6.81	130
	3000	750.00	0.86	11	2.28	29	4.71	60	7.85	100
i = 5.0	50	10.00			0.04	38	0.10	95	0.18	175
	250	50.00			0.19	37	0.48	92	0.89	170
	500	100.00			0.37	35	0.92	88	1.68	160
	1000	200.00			0.69	33	1.68	80	2.93	140
	1500	300.00			0.94	30	2.29	73	3.77	120
	2000	400.00			1.17	28	2.85	68	4.61	110
	3000	600.00			1.70	27	3.77	60	6.28	100
i = 6.0	50	8.33			0.03	32	0.06	74	0.14	160
	250	41.67			0.14	31	0.31	70	0.65	150
	500	83.33			0.26	30	0.60	69	1.22	140
	1000	166.67			0.51	29	1.19	68	2.27	130
	1500	250.00			0.73	28	1.68	64	3.14	120
	2000	333.33			0.94	27	2.09	60	3.84	110
	3000	500.00			1.36	26	2.72	52	4.97	95

The nominal torque may be exceeded by a factor of 1.8 for short periods.

Selection of the gear box size

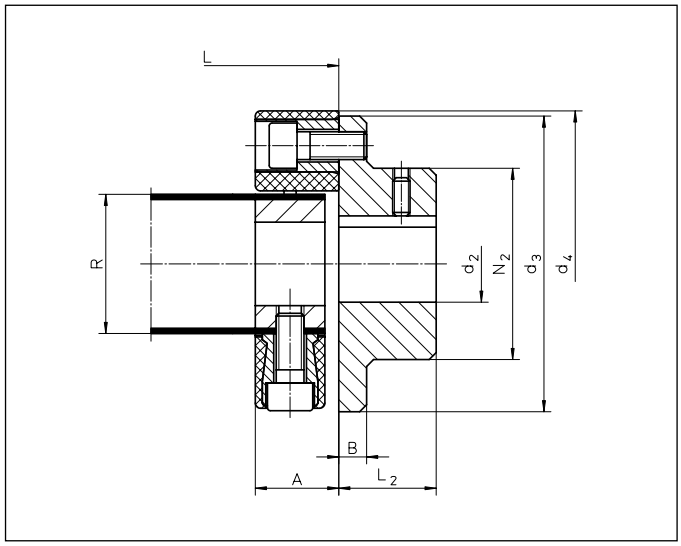
	Drive speed n_1 [rpm]	Output revs n_2 [rpm]	Size 250		Size 300		Size 370		Size 400	
			Drive torque							
			P [kW]	M2 [Nm]	P [kW]	M2 [Nm]	P [kW]	M2 [Nm]	P [kW]	M2 [Nm]
i = 1.0	50	50.00	1.68	320	3.66	700	6.54	1250	9.16	1750
	250	250.00	7.85	300	15.18	580	24.87	950	36.65	1400
	500	500.00	14.14	270	26.18	500	41.88	800	62.83	1200
	1000	1000.00	23.04	220	42.93	410	67.02	640	94.24	900
	1500	1500.00	28.27	180	54.97	350	81.68	520	116.23	740
	2000	2000.00	35.60	170	62.83	300	92.15	440	127.75	610
	3000	3000.00	10.84	130	69.11	220	100.52	320	138.22	440
i = 1.5	50	33.33	1.12	320	2.44	700	4.54	1300	6.28	1800
	250	166.67	5.41	310	10.65	610	19.2	1100	26.18	1500
	500	333.33	10.12	290	18.85	540	31.41	900	45.38	1300
	1000	666.67	18.15	260	32.81	470	52.36	750	76.79	1100
	1500	1000.00	23.04	220	42.93	410	67.02	640	94.24	900
	2000	1333.33	27.92	200	51.66	370	79.58	570	110.30	790
	3000	2000.00	35.60	170	62.83	300	92.15	440	127.75	610
i = 2.0	50	25.00	0.84	320	1.83	700	3.40	1300	4.71	1800
	250	125.00	4.06	310	8.38	640	15.71	1200	20.94	1600
	500	250.00	7.85	300	15.18	580	24.87	950	36.65	1400
	1000	500.00	14.14	270	26.18	500	41.88	800	62.83	1200
	1500	750.00	19.63	250	35.34	450	54.97	700	78.53	1000
	2000	1000.00	23.04	220	42.93	410	67.02	640	94.24	900
	3000	1500.00	28.27	180	54.97	350	81.68	520	116.23	740
i = 3.0	50	16.67	0.51	290	0.87	500	1.52	870	2.97	1700
	250	83.33	2.27	260	4.01	460	7.07	810	12.22	1400
	500	166.67	4.19	240	7.33	420	13.09	750	21.82	1250
	1000	333.33	6.98	200	12.57	360	21.64	620	34.21	980
	1500	500.00	9.42	180	16.23	310	27.75	530	43.98	840
	2000	666.67	11.87	170	19.55	280	33.51	480	53.05	760
	3000	1000.00	15.71	150	25.13	240	40.84	390	62.83	600
i = 4.0	50	12.50	0.37	280	0.63	480	1.26	960	2.09	1600
	250	62.50	1.77	270	2.81	430	5.56	850	9.82	1500
	500	125.00	3.14	240	5.24	400	10.21	780	17.67	1350
	1000	250.00	5.50	210	9.42	360	17.28	660	30.10	1150
	1500	375.00	7.46	190	12.57	320	23.17	590	38.48	980
	2000	500.00	9.16	175	14.66	280	27.23	520	45.55	870
	3000	750.00	12.57	160	18.85	240	33.77	430	54.97	700
i = 5.0	50	10.00	0.27	260	0.54	520	1.02	970	1.57	1500
	250	50.00	1.31	250	2.51	480	4.71	900	7.33	1400
	500	100.00	2.41	230	4.71	450	8.48	810	13.61	1300
	1000	200.00	4.19	200	8.38	400	14.66	700	23.04	1100
	1500	300.00	5.81	185	11.62	370	19.48	620	29.84	950
	2000	400.00	7.54	180	14.24	340	23.46	560	35.60	850
	3000	600.00	10.05	160	18.85	300	31.41	500	46.49	740
i = 6.0	50	8.33	0.18	210	0.30	340	0.53	610	0.87	1000
	250	41.67	0.87	200	1.40	320	2.62	600	4.28	980
	500	83.33	1.66	190	2.71	310	5.06	580	7.68	880
	1000	166.67	3.23	185	5.06	290	9.25	530	13.61	780
	1500	250.00	4.45	170	7.07	270	12.57	480	17.80	680
	2000	333.33	5.58	160	8.73	250	15.01	430	20.94	600
	3000	500.00	7.85	150	11.52	220	18.85	360	26.18	500

The nominal torque may be exceeded by a factor of 1.8 for short periods.

Universal joint shafts GX

Universal joint shafts are used to connect several worm gear screw jacks together. The shafts attenuate noise, vibrations and impacts and compensate for axial, radial and angular errors. They offer exceptional torsional rigidity, high temperature and oil resistance and are particularly suitable where long lengths and/or high speeds are a factor. Elastic universal joint shafts are maintenance-free; the central section can be removed radially (to the side) without axial displacement of the connected units.

They are supplied as a length of tube (dimension L to be specified by customer) fitted with coupling assemblies at both ends. Pillow blocks are generally not required, except for very long connections.
For optimum alignment of the jack gear screws, we recommend the use of universal-jointed shafts with clamping sets.



Size	Dimensions [mm]										Weight	
	M[1] [Nm]	A	B	$d_{2\,min}$	$d_{2\,max}$	d_3	d_4	L_2	N_2	R	m_1[2] [kg]	m_2[3] [kg/m]
GX 1	10	24	7	10	25	56	56	24	36	30	0.47	1.05
GX 2	30	24	8	14	38	85	88	28	55	40	1.06	1.42
GX 4	60	28	8	16	45	100	100	30	65	45	2.31	1.61
GX 8	120	32	10	20	55	120	125	42	80	60	3.55	2.16
GX 16	240	42	12	22	70	150	155	50	100	70	6.16	2.53
GX 25	370	46	14	22	85	170	175	55	115	85	9.5	3.09
GX 30	550	58	16	28	100	200	205	66	140	100	15.21	3.64

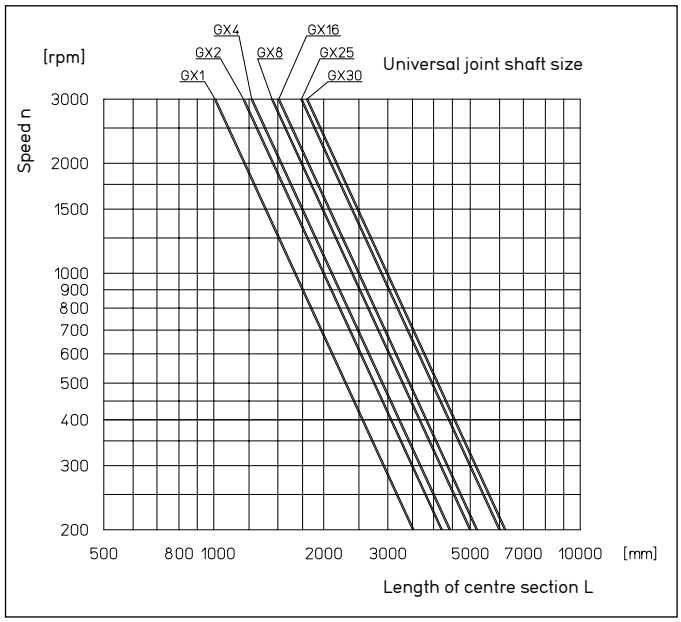
[1] Transmittable torque

[2] m_1 = Weight without central section

[3] m_2 = Weight of central section per metre

Universal joint shaft diagram

as a function of length and speed.

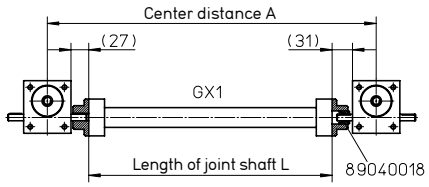


Drive technology
Length of the universal joint shaft for MULI® with tensioner

Antriebstechnik · Automation

MULI® 1

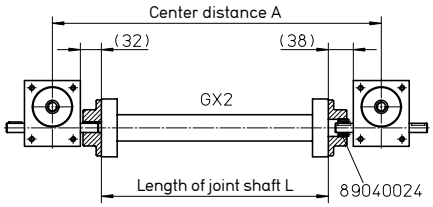
with DKWN tensioner (10–20)
Starting torque of the tensioning element 1.2 Nm



L = A – 130

MULI® 2

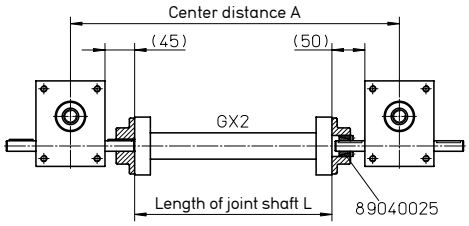
with DKWN tensioner (14–26)
Starting torque of the tensioning element 2.1 Nm



L = A – 155

MULI® 3

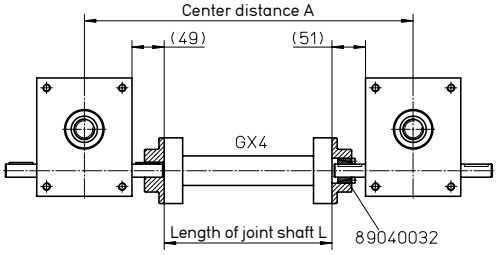
with DKWN tensioner (16–32)
Starting torque of the tensioning element 4.9 Nm



L = A – 200

MULI® 4

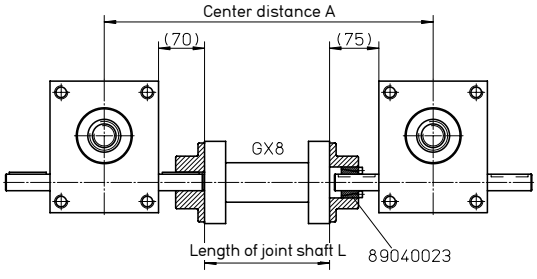
with DKWN tensioner (20–38)
Starting torque of the tensioning element 9.7 Nm



L = A – 245

MULI® 5

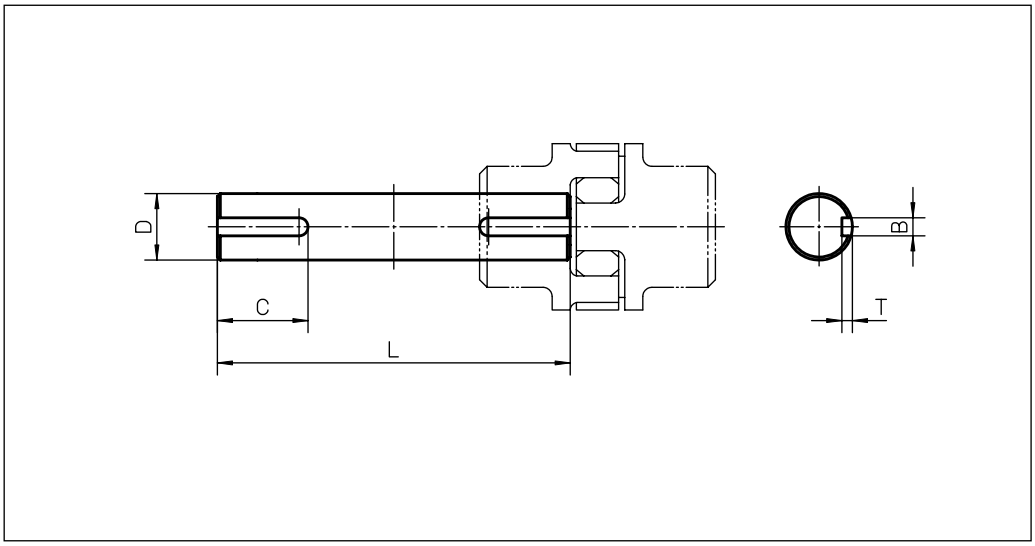
with DKWN tensioner (25–47)
Starting torque of the tensioning element 16.5 Nm



L = A – 310

Connecting shafts VW

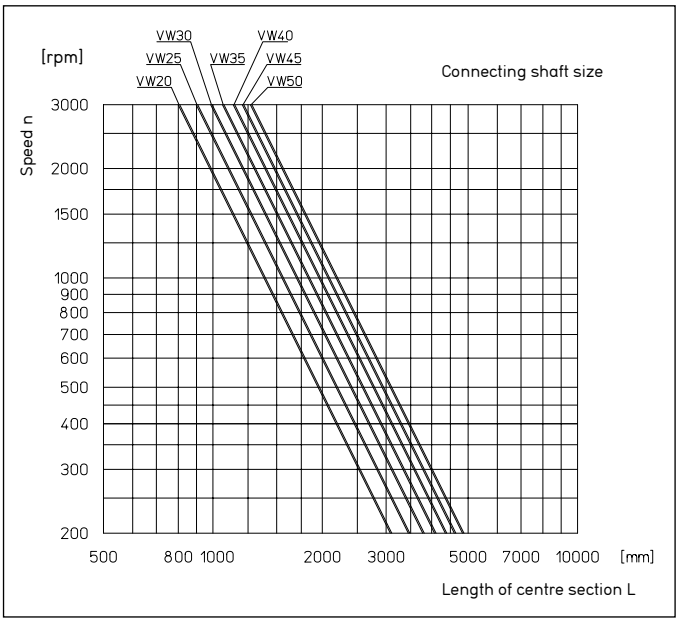
The Series VW connecting shafts are rigid shafts with a key way at each end. For greater distances and diameters of axle, some of these shafts are available as tubular shafts. The holes in the couplings must be drilled to fit the diameter of the shaft.
(Torques see chart "couplings" on page 30.)



Size	Dimensions [mm]			
	D	C	B	T
VW 20	20	30	6	3.5
VW 25	25	35	8	4
VW 30	30	40	8	4
VW 35	35	40	10	5
VW 40	40	50	12	5
VW 45	45	50	14	5.5
VW 50	50	70	14	5.5

Connecting shaft diagram

as a function of length and speed.



Drive sizing
Sizing and selection

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The procedure for planning screw jack systems is generally as follows:

1. Definition of the speed and possible mounting positions of the worm gear screw jacks.

2. Selection of the drive components (couplings, shafts, bevel gearboxes, motors) for synchronous drive of the individual worm gear screw jacks. The following criteria are decisive:

- Lowest possible loading of the individual transmission components. Input of the entire drive torque via the teeth of a bevel gearbox must be avoided in particular.
- As few transmission components as possible and short connecting shafts.
- Provision for the use of a torque-limiting coupling to protect the system.

It is sometimes difficult to show the direction of rotation of the individual components in the drawing. The following method can generally be used to good effect:

- Define the position of the individual worm gear screw jacks.
- Enter the direction of rotation of each worm gear screw jack for the "lifting" motion (the direction of rotation of a shaft is shown by an arrow pointing in the direction of movement of a point on the upper side of the shaft).
- Draw the possible position of the bevel gear boxes.
- Determine the direction of rotation and position of the bevel gear boxes.

Drive sizing
Examples for the direction of rotation

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Fig. 1
Illustration of direction of rotation

Fig. 2
Direction of rotation of a worm gear screw jack (N) for "lifting" motion, top view.

Fig. 1

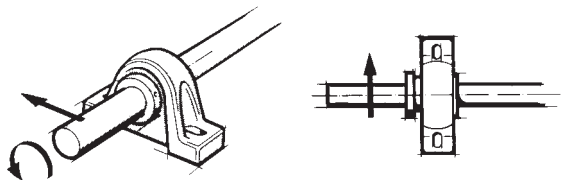


Fig. 2

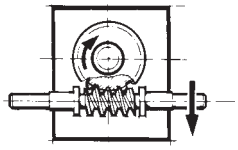


Fig. 3
Jack system with four worm gear screw jacks and two bevel gear boxes

Fig. 3

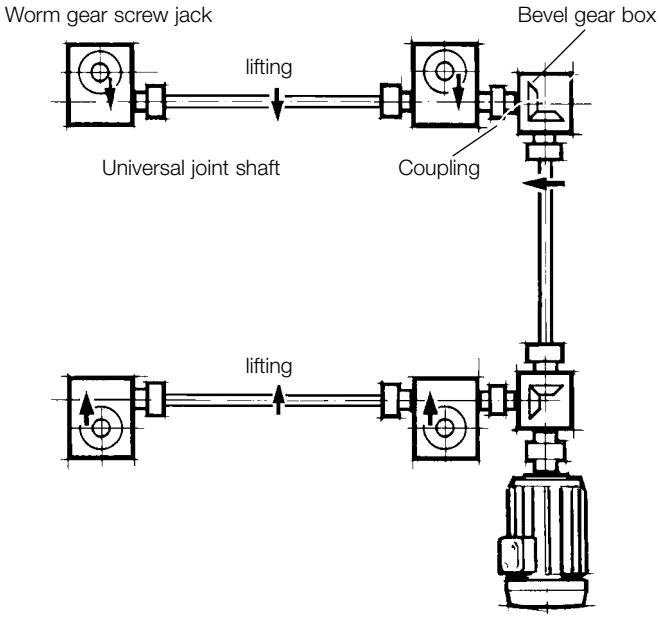


Fig. 4
Jack system, variant 1: Different position of drive motor, but only ratio 1:1 possible.

Fig. 5
Jack system, variant 2: Very economical.

Fig. 4

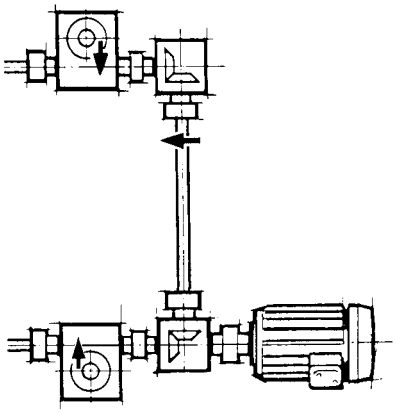
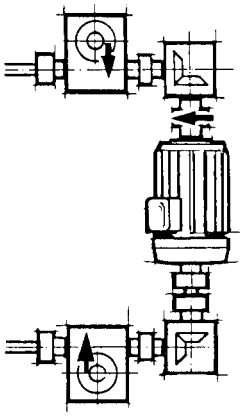


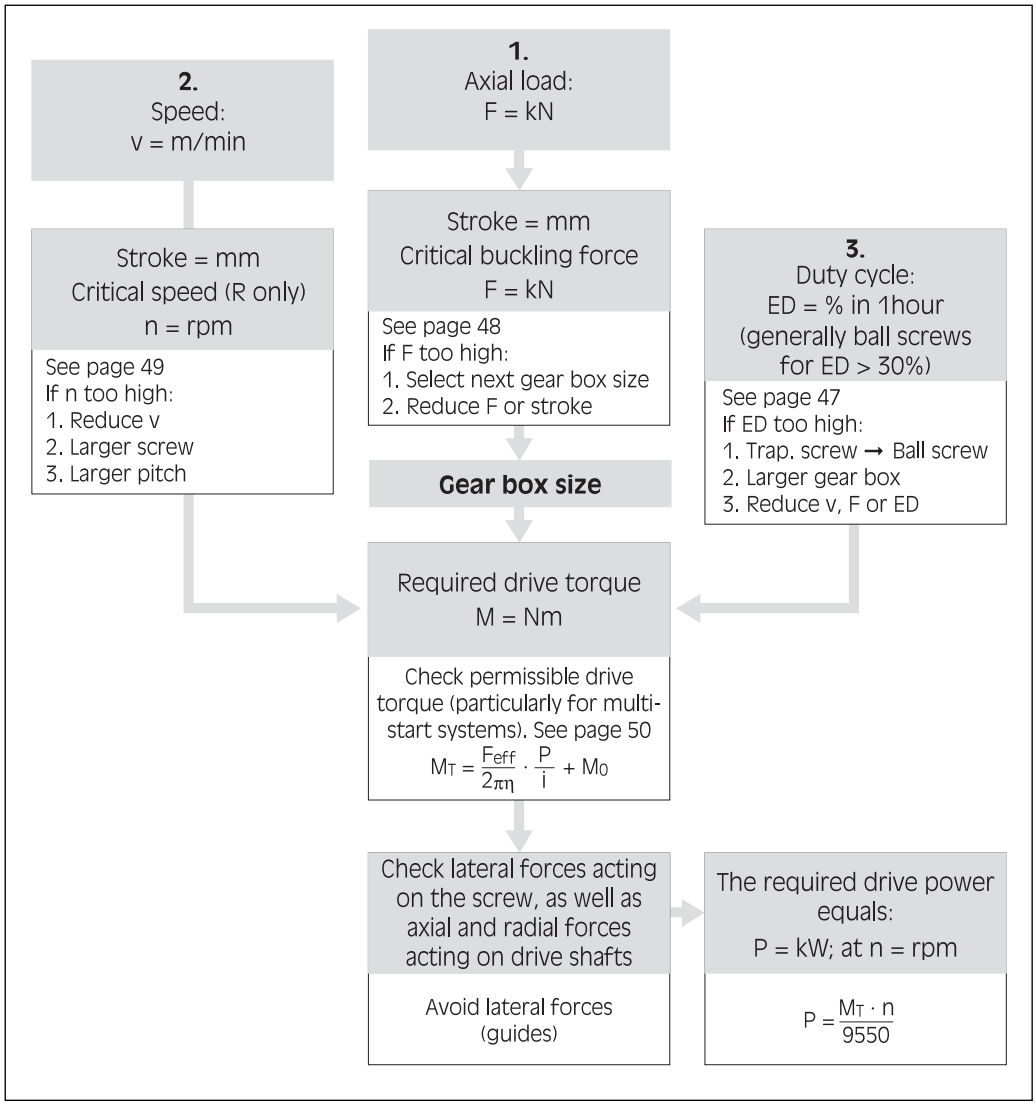
Fig. 5



Selection of a worm gear screw jack and corresponding drive unit

After selecting the drive unit, it is important to check whether the worm gear screw jack or any transmission components may be overloaded by the drive unit (see page 47).
The following points should also be established:

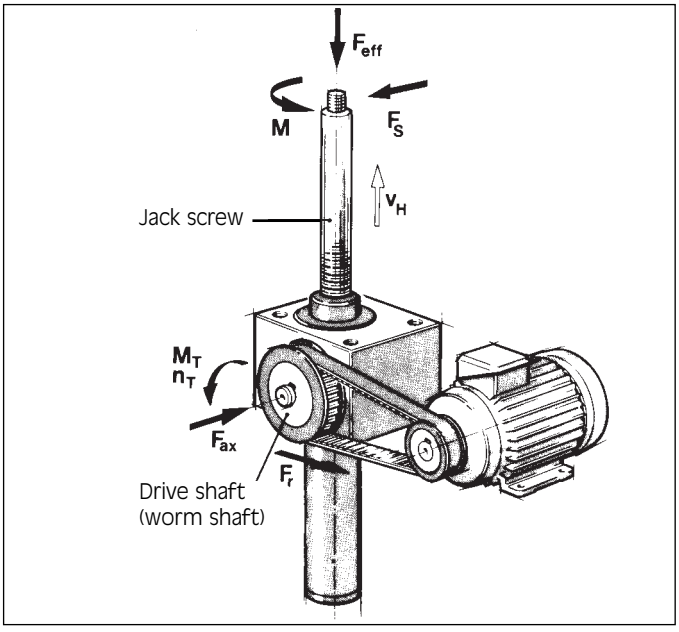
1. On which side is the motor to be mounted
2. Direction of rotation of the jack systems.



Forces and torque values acting on the worm gear screw jack

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 jack screw or nut (not applicable in the case of 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



Duty cycle and drive power

In order to limit the heat generated by friction within a worm gear screw jack, the lifting force and lifting speed are limited as a function of the relative duty cycle. The maximum permissible lifting force and lifting speed can be estimated with the aid of the following method.

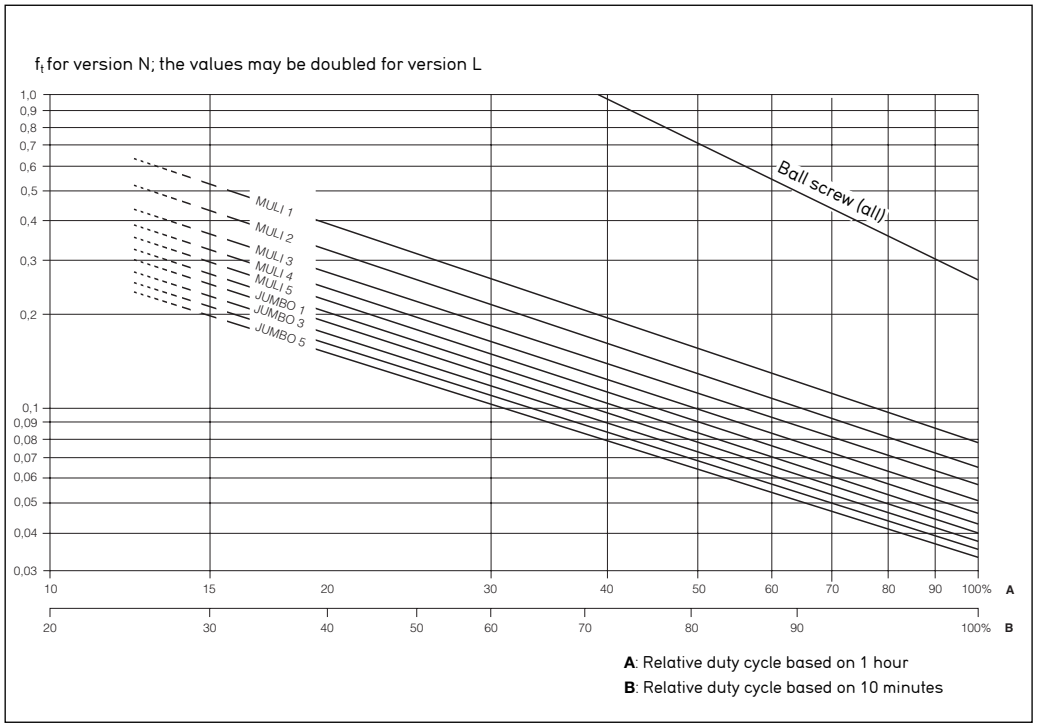
$$F_{eff} \cdot V_H \leq F_{stroke\ max} \cdot V_{H\ max} \cdot f_t$$

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

V_H is the lifting speed [mm/min].

$F_{stroke\ max}$ is the maximum permissible lifting force [kN] (see table on page 13).

$V_{H\ max}$ is the maximum permissible lifting speed [mm/min]. It is calculated from the maximum permissible speed of the worm shaft of 1500 rpm (higher speeds on request) and the transmission ratio of the worm gear screw jack. $V_{H\ max.}$ = 1500 mm/min for the version H gearing and 375 mm/min for the version L gearing.



For the ball screw version, refer to the ratio of the worm gear screw jack in mm of stroke per full turn of the worm shaft on page 13.

f_t is a temperature factor which is dependent on the relative duty factor based on a period of 10 or 60 minutes at 20 °C.

The values determined here do not apply for very short reciprocating strokes. Please consult us in such cases. f_t can be extrapolated to the left-hand edge of the graph in the case of very low relative duty cycles (less than 10 minutes, e.g. for occasional positioning operations, adjustments of levels, etc.). This yields the following approximate drive power values in kW with allowance for the efficiency in each case.

	MULI 1	MULI 2	MULI 3	MULI 4	MULI 5	JUMBO 1	JUMBO 2	JUMBO 3	JUMBO 4	JUMBO 5
Ratio H (TGS[1)])	0.3	0.55	1.18	2.3	4.7	6.5	8.4	10.9	14.7	19
Ratio L (TGS[1)])	0.19	0.35	0.75	1.4	3	4.2	5.4	7.3	9.3	12
Ball screws	0.3	0.56	0.95	1.7/3.2	5.9	–	–	13.9	–	–

[1)]TGS = Trapezoidal screw

These values are not a criterion for selecting the drive motor; it should be selected on the basis of torque, speed and operating conditions.

Critical buckling force of a screw jack under compressive loads

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.

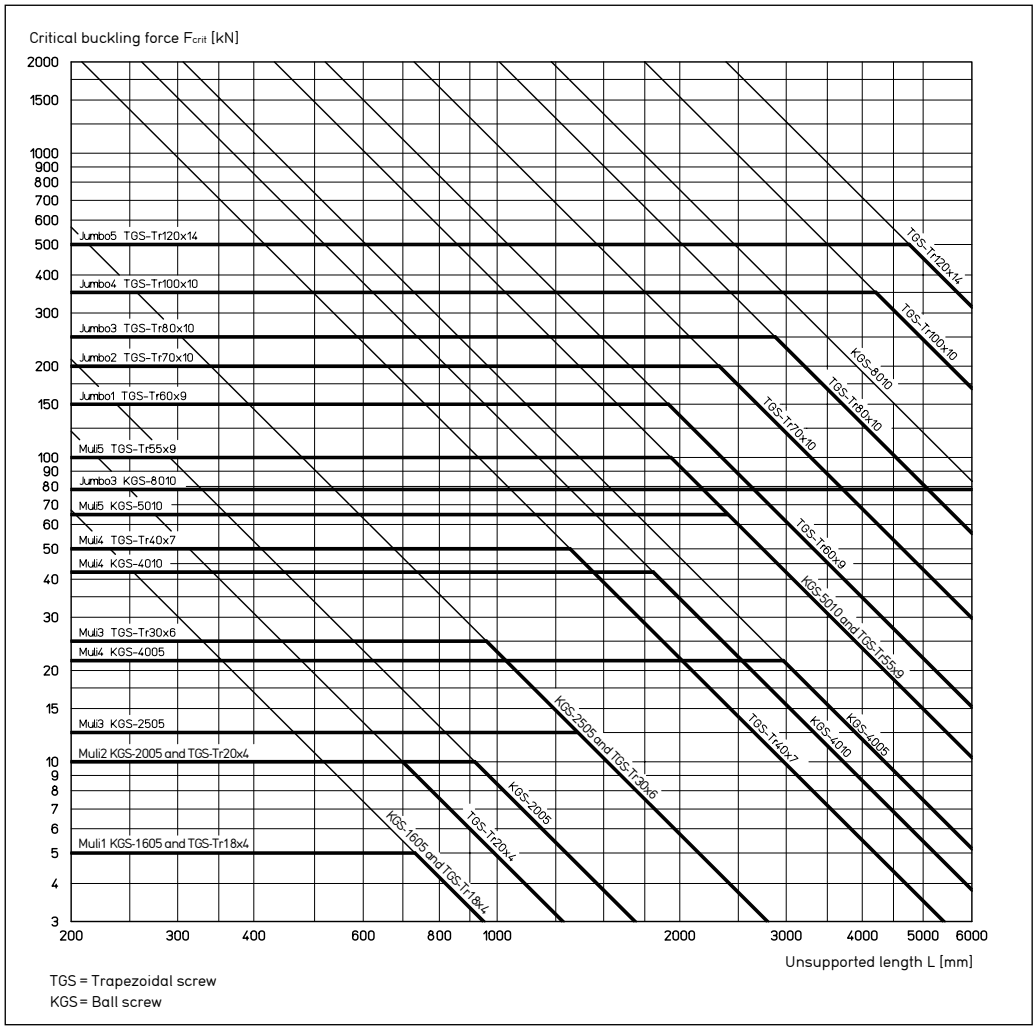
$$F_{eff} \leq f_k \cdot F_{crit} \cdot 1/S_k$$

F_{eff} is the actual axial force (compressive force) acting on the jack screw [kN].

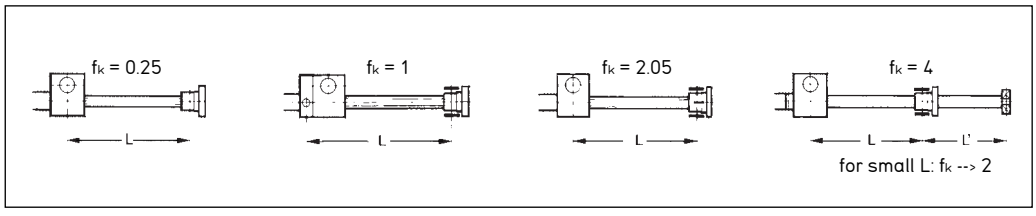
f_k is a correction factor which makes allowance for the type of screw bearing. Sufficiently rigid mounting of the worm gear screw jack is consequently a prerequisite for cases 2, 3 and 4.

F_{crit} is the critical buckling force as a function of the unsupported length L.

S_k is the safety factor and depends on the application in question. Values between 3 and 6 are customary in general mechanical engineering.



Case 1 **Case 2** **Case 3** **Case 4**



Critical speed of jack screws

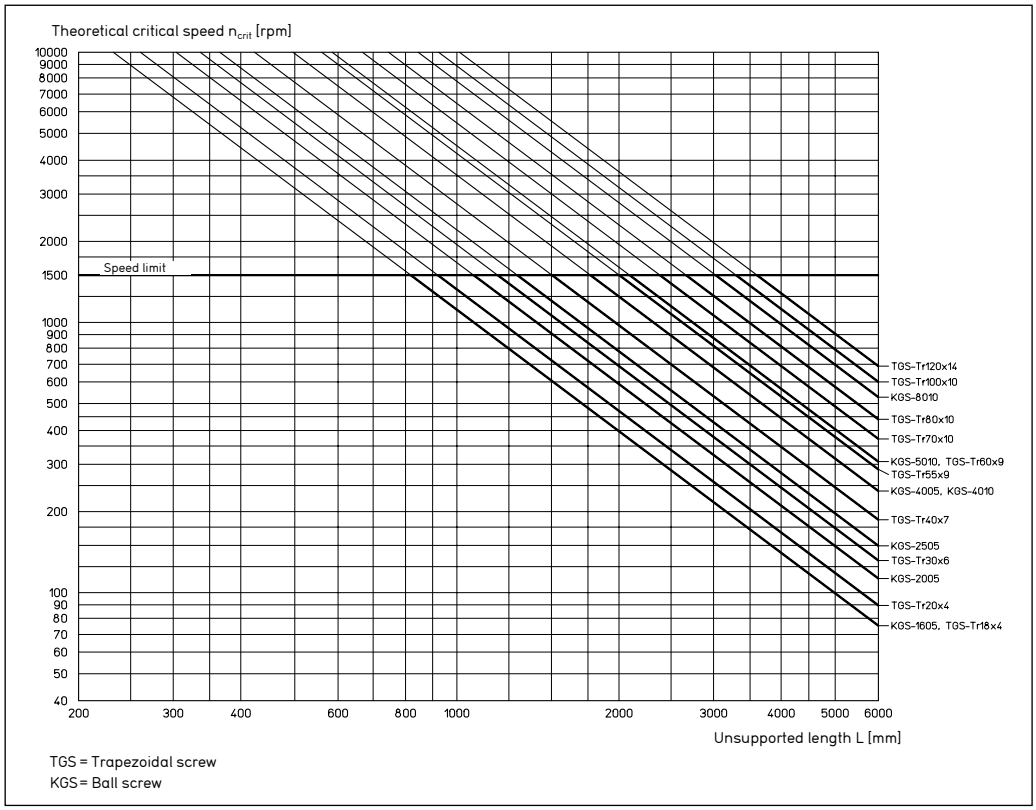
(Version R only)
Resonant bending vibration may develop with thin screws rotating at high speed. Assuming a sufficiently rigid assembly, the resonant frequency can be estimated with the aid of the following method.

$$n_{perm} = f_{kr} \cdot n_{crit} \cdot 0.8$$

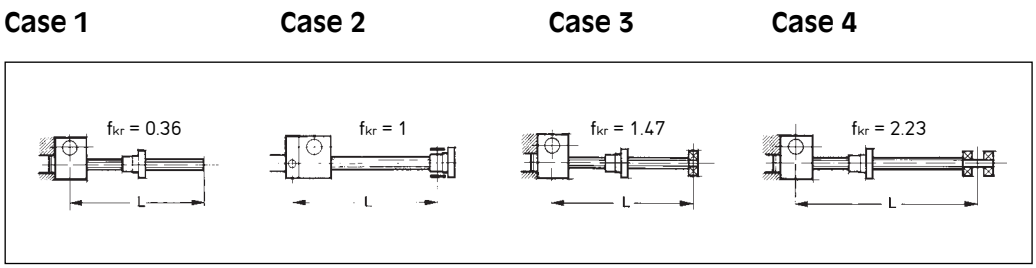
n_{perm} is the maximum permissible screw speed [rpm].

f_{kr} is a correction factor which makes allowance for the type of screw bearing. Sufficiently rigid mounting of the worm gear screw jack and bearing is consequently a prerequisite for cases 2, 3 and 4.

n_{crit} is the critical screw speed; it corresponds to the basic bending vibration of the screw and leads to resonance effects.



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.



Required drive torque of a worm gear screw jack

The required drive torque of a worm gear screw jack is governed by 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 is the required drive torque of the worm gear screw drive at the worm shaft [Nm].

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

η 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 13). η is an average value determined by measurement.

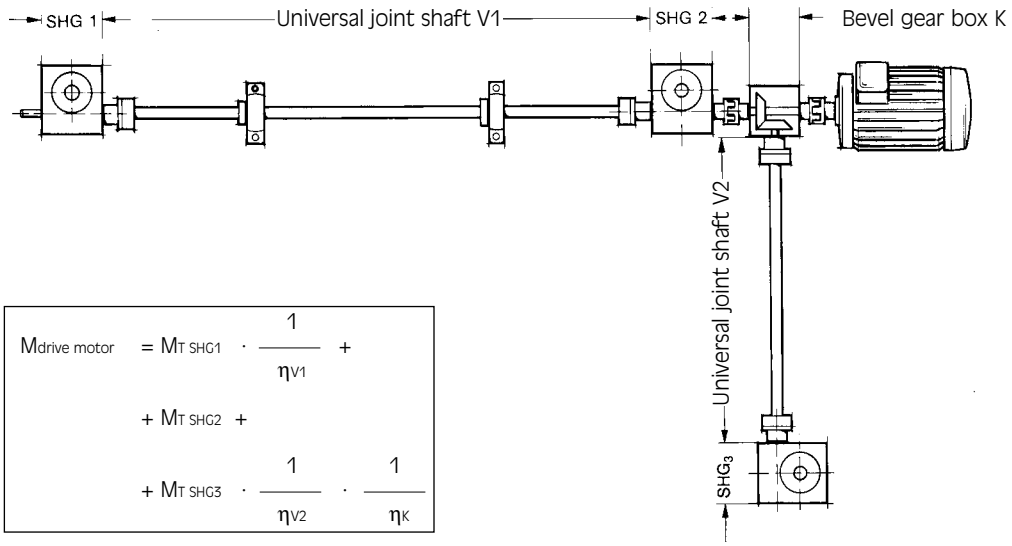
$\frac{p}{i}$ is the transmission ratio of the worm gear screw drive in mm stroke length per revolution of the worm shaft.

M_o is the idle torque of the worm gear screw drive [Nm]. M_o 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 13.

Required drive torque for a worm gear screw jack system

The required drive torque for a worm gear screw jack system is governed by the drive torque values for the individual jacks with allowance for the static and dynamic frictional losses in transmission components (coupling, universal joint shafts, pillow blocks, angle gear boxes, etc.). It is useful to draw a diagram illustrating the flow of forces.

Example (simplified interpretation)



$$M_{drive\ motor} = M_{T\,SHG1} \cdot \frac{1}{\eta_{V1}} + M_{T\,SHG2} + M_{T\,SHG3} \cdot \frac{1}{\eta_{V2}} \cdot \frac{1}{\eta_K} +$$

$M_{T\,SHG1}$ is the required drive torque for the worm gear screw jack SHG 1. 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 running. This applies in particular to worm gear screw jacks with low efficiency after a long standstill period.

η_{V1} (V1) includes the static and dynamic frictional losses in the pillow blocks and couplings.

η_{V2} is the efficiency of connecting shaft V2

η_V = 0,75...0,95 depending on the length of the shaft and number of pillow blocks.

η_K is the efficiency of the bevel gear box (only for the force flow via the toothing, i.e. between connecting shaft V2 and the drive motor).
η_K = 0.90

Maximum drive torque

If the worm gear screw jack jams as a result of the screw coming into contact with an obstacle, the toothing can still absorb the following maximum torque values M_T at the drive shaft.
In the case of screw jacks connected in series, the screw jack closest to the drive can absorb this torque at its drive shaft.

Size	$M_{T\,max}$ [Nm]
MULI 1	3.4
MULI 2	7.1
MULI 3	18
MULI 4	38
MULI 5	93
JUMBO 1	148
JUMBO 2	178
JUMBO 3	240
JUMBO 4	340
JUMBO 5	570

Acceleration values

Rotary current 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 conjunction with servo motors, note that:
- Greater masses are moved, compared with linear axes.
- Predominantly, constant speeds with different revs 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 called for.
- High acceleration values have only a negligible effect on the overall stroke time, because of the low stroke speeds.

Forces and torque values acting on the drive shaft

If worm gear screw jacks are not driven free of lateral forces by means of a coupling connected to the motor shaft, but are instead driven by chains or belts, care must be taken to ensure that the radial force acting on the drive shaft does not exeed the limit values (see below).
In the worst case due to deflection through the radial force F_R the worm shaft will lift off of the worm wheel. This must be avoided, since it impairs the engagement between worm shaft and worm wheel and leads to higher wear.

Size	$F_{R\,max}$ [kN]
MULI 1	0.1
MULI 2	0.2
MULI 3	0.3
MULI 4	0.5
MULI 5	0.8
JUMBO 1	0.8
JUMBO 2	1.3
JUMBO 3	1.3
JUMBO 4	2.1
JUMBO 5	3.1

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 governed by 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 shaft (please consult us in cases of doubt)

Required drive speed

The required drive speed is governed by 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 jack screws and connecting shafts.

Jack screw nut torques

The nut torque (M) of the jack screw is the torque that the jack screw exerts on the mounting plate (all N versions except V), or the torque that the screw applies to the travelling nut (R Version). It is not to be confused with the dirve torque (MT) of the screw jack gears on the worm shaft.

$$M\ [Nm] = F_{eff}\ [kN] \cdot f_M$$

(applicable in the areas of moderate and high loads)

M is the jack screw nut torque [Nm] for the "Lift under Load" movement.

F_{eff} is the actual supported axial force [kN].

f_M is a conversion factor that accounts for screw geometry and friction. The value is applicable under normal lubrication conditions. The higher value needs to be used for dry friction and static friction. In the case of ball screw drives, f_M is practically constant.

Size	f_M (trapezoidal)	f_M (ball screw)
MULI 1	1.6	1.6
MULI 2	1.8	1.6
MULI 3	2.7	1.6
MULI 4	3.4	1.6/3.2
MULI 5	4.6	3.2
JUMBO 1	5.5	–
JUMBO 2	6.4	–
JUMBO 3	7.2	3.2
JUMBO 4	8.0	–
JUMBO 5	10.6	–

Performance tables for MULI® worm gear screw jacks

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MULI® 1 – MULI® 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.

The screw jacks can overheat or an excessive area pressure develop in the screw thread at the speeds stated in the shaded fields. NEFF cannot assume any liability for this range.

MULI® 1 – screw Tr 18 x 4

Speed [rmp]	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	
	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	1.500	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	1.000	0.250	2.61	0.27	0.83	0.09	2.09	0.22	0.67	0.07	1.58	0.17	0.51	0.05	1.07	0.11	0.35	0.04	0.81	0.08	0.27	0.03	0.55	0.06	0.15	0.02
750	0.750	0.187	2.61	0.20	0.83	0.06	2.09	0.16	0.67	0.05	1.58	0.12	0.51	0.04	1.07	0.08	0.35	0.03	0.81	0.06	0.27	0.02	0.55	0.04	0.19	0.01
500	0.500	0.125	2.61	0.14	0.83	0.04	2.09	0.11	0.67	0.03	1.58	0.08	0.51	0.03	1.07	0.06	0.35	0.02	0.81	0.04	0.27	0.01	0.55	0.03	0.19	0.01

MULI® 2 – screw Tr 20 x 4

Speed [rmp]	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	
	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	1.500	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	1.000	0.250	5.60	0.59	1.83	0.19	4.23	0.44	1.40	0.15	2.86	0.30	0.97	0.10	2.31	0.24	0.79	0.08	1.76	0.18	0.62	0.06	1.21	0.13	0.45	0.05
750	0.750	0.187	5.60	0.44	1.83	0.14	4.23	0.33	1.40	0.11	2.86	0.22	0.97	0.08	2.31	0.18	0.79	0.06	1.76	0.14	0.62	0.05	1.21	0.09	0.45	0.04
500	0.500	0.125	5.60	0.29	1.83	0.10	4.23	0.22	1.40	0.07	2.86	0.15	0.97	0.05	2.31	0.12	0.79	0.04	1.76	0.09	0.62	0.03	1.21	0.06	0.45	0.02

MULI® 3 – screw Tr 30 x 6

Speed [rmp]	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	
	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	1.500	0.375	13.88	2.18	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	1.000	0.250	13.88	1.45	4.45	0.47	11.13	1.17	3.58	0.38	8.39	0.88	2.72	0.28	5.64	0.59	1.85	0.19	2.90	0.30	0.99	0.10	1.52	0.16	0.55	0.06
750	0.750	0.187	13.88	1.09	4.45	0.35	11.13	0.87	3.58	0.28	8.39	0.66	2.72	0.21	5.64	0.44	1.85	0.15	2.90	0.23	0.99	0.08	1.52	0.12	0.55	0.04
500	0.500	0.125	13.88	0.73	4.45	0.23	11.13	0.58	3.58	0.19	8.39	0.44	2.72	0.14	5.64	0.30	1.85	0.10	2.90	0.15	0.99	0.05	1.52	0.08	0.55	0.03

MULI® 4 – screw Tr 40 x 7

Speed [rmp]	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	
	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	1.500	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	1.000	0.250	30.97	3.24	9.73	1.02	24.85	2.60	7.83	0.82	18.72	1.96	5.94	0.62	12.60	1.32	4.04	0.42	6.47	0.68	2.15	0.22	3.41	0.36	1.20	0.13
750	0.750	0.187	30.97	2.43	9.73	0.76	24.85	1.95	7.83	0.62	18.72	1.47	5.94	0.47	12.60	0.99	4.04	0.32	6.47	0.51	2.15	0.17	3.41	0.27	1.20	0.09
500	0.500	0.125	30.97	1.62	9.73	0.51	24.85	1.30	7.83	0.41	18.72	0.98	5.94	0.31	12.60	0.66	4.04	0.21	6.47	0.34	2.15	0.11	3.41	0.18	1.20	0.06

MULI® 5 – screw Tr 55 x 9

Speed [rmp]	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	
	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	1.500	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	1.000	0.250	67.19	7.04	21.46	2.25	53.92	5.65	17.27	1.81	40.65	4.26	13.08	1.37	27.38	2.87	8.89	0.93	14.11	1.48	4.70	0.49	7.47	0.78	2.61	0.27
750	0.750	0.187	67.19	5.28	21.46	1.69	53.92	4.23	17.27	1.36	40.65	3.19	13.08	1.03	27.38	2.15	8.89	0.70	14.11	1.11	4.70	0.37	7.47	0.59	2.61	0.20
500	0.500	0.125	67.19	3.52	21.46	1.12	53.92	2.82	17.27	0.90	40.65	2.13	13.08	0.68	27.38	1.43	8.89	0.47	14.11	0.74	4.70	0.25	7.47	0.39	2.61	0.14

Performance tables for JUMBO® worm gear screw jacks

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JUMBO® 1 – 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.

The screw jacks can overheat or an excessive area pressure develop in the screw thread at the speeds stated in the shaded fields. NEFF cannot assume any liability for this range.

JUMBO® 1 – screw Tr 60 x 9

Speed [rpm]	Lifting speed [m/min]		Lifting force [kN]																					
			150				100				80				60				40				20			
			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	1.500	0.375	104.73	16.45	33.74	5.30	70.11	11.01	22.69	3.56	56.27	8.84	18.26	2.87	42.42	6.66	13.84	2.17	28.57	4.49	9.42	1.48	14.73	2.31	4.99	0.78
1000	1.000	0.250	104.73	10.97	33.74	3.53	70.11	7.34	22.69	2.38	56.27	5.89	18.26	1.91	42.42	4.44	13.84	1.45	28.57	2.29	9.42	0.99	14.73	1.54	4.99	0.52
750	0.750	0.187	104.73	8.22	33.74	2.65	70.11	5.51	22.69	1.78	56.27	4.42	18.26	1.43	42.42	3.33	13.84	1.09	28.57	2.24	9.42	0.74	14.73	1.16	4.99	0.39
500	0.500	0.125	104.73	5.48	33.74	1.77	70.11	3.67	22.69	1.19	56.27	2.95	18.26	0.96	42.42	2.22	13.84	0.72	28.57	1.50	9.42	0.49	14.73	0.77	4.99	0.26

JUMBO® 2 – screw Tr 70 x 10

Speed [rpm]	Lifting speed [m/min]		Lifting force [kN]																					
			200				170				130				100				75				50			
			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	1,500	0,375	146,04	22,94	47,75	7,50	124,33	19,53	40,73	6,40	95,37	14,98	31,36	4,93	73,66	11,57	24,34	3,82	55,56	8,73	18,48	2,90	30,47	5,89	12,63	1,98
1000	1,000	0,250	146,04	15,29	47,75	5,00	124,33	13,02	40,73	4,26	95,37	9,99	31,36	3,28	73,66	7,71	24,34	2,55	55,56	5,82	18,48	1,94	30,47	3,92	12,63	1,32
750	0,750	0,187	146,04	11,47	47,75	3,75	124,33	9,76	40,73	3,20	95,37	7,49	31,36	2,46	73,66	5,78	24,34	1,91	55,56	4,36	18,48	1,45	30,47	2,94	12,63	0,99
500	0,500	0,125	146,04	7,65	47,75	2,50	124,33	6,31	40,73	2,13	95,37	4,99	31,36	1,64	73,66	3,86	24,34	1,27	55,56	2,91	18,48	0,97	30,47	1,96	12,63	0,66

JUMBO® 3 – screw Tr 80 x 10

Speed [rpm]	Lifting speed [m/min]		Lifting force [kN]																					
			250				200				160				130				100				75			
			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	1,500	0,375	200	31,47	67,32	10,57	160,56	25,22	54,05	8,49	128,71	20,22	43,43	6,82	104,82	16,46	35,47	5,37	80,94	12,71	27,51	4,32	61,03	9,59	20,87	3,28
1000	1,000	0,250	200	20,98	67,32	7,05	160,56	16,81	54,05	5,66	128,71	13,48	43,43	4,55	104,82	10,98	35,47	3,71	80,94	8,48	27,51	2,88	61,03	6,39	20,87	2,19
750	0,750	0,187	200	15,74	67,32	5,29	160,56	12,61	54,05	4,24	128,71	10,11	43,43	3,41	104,82	8,23	35,47	2,79	80,94	6,36	27,51	2,16	61,03	4,79	20,87	1,64
500	0,500	0,125	200	10,49	67,32	3,52	160,56	8,41	54,05	2,83	128,71	6,74	43,43	2,27	104,82	5,49	35,47	1,86	80,94	4,24	27,51	1,44	61,03	3,20	20,87	1,09

JUMBO® 4 – screw Tr 100 x 10

Speed [rpm]	Lifting speed [m/min]		Lifting force [kN]																					
			350				300				250				200				150				100			
			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	1,500	0,375	294,25	46,33	93,99	14,76	253,04	39,75	80,72	12,68	211,14	33,16	67,45	10,59	169,24	26,58	54,18	8,51	127,33	20,00	40,91	6,43	85,43	13,42	27,64	4,34
1000	1,000	0,250	294,25	30,83	93,99	9,84	253,04	26,50	80,72	8,45	211,14	22,11	67,45	7,06	169,24	17,72	54,18	5,67	127,33	13,33	40,91	4,28	85,43	8,95	27,64	2,89
750	0,750	0,187	294,25	23,16	93,99	7,38	253,04	19,87	80,72	6,34	211,14	16,58	67,45	5,30	169,24	13,29	54,18	4,25	127,33	10,00	40,91	3,21	85,43	6,71	27,64	2,17
500	0,500	0,125	294,25	15,44	93,99	4,92	253,04	13,25	80,72	4,23	211,14	11,05	67,45	3,53	169,24	8,86	54,18	2,84	127,33	6,67	40,91	2,14	85,43	4,47	27,64	1,45

JUMBO® 5 – screw Tr 120 x 14

Speed [rpm]	Lifting speed [m/min]		Lifting force [kN]																					
			500				400				300				200				100				50			
			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	1,500	0,375	421,02	66,13	134,12	21,07	337,21	52,97	107,58	16,90	253,40	39,80	81,04	12,73	169,60	26,64	54,50	8,56	85,79	13,47	27,69	4,39	43,88	6,89	14,69	2,31
1000	1,000	0,250	421,02	44,09	134,12	14,04	337,21	35,31	107,58	11,26	253,40	26,53	81,04	8,49	169,60	17,76	54,50	5,71	85,79	8,98	27,69	2,93	43,88	4,60	14,69	1,54
750	0,750	0,187	421,02	33,06	134,12	10,53	337,21	26,48	107,58	8,45	253,40	19,90	81,04	6,36	169,60	13,32	54,50	4,28	85,79	6,74	27,69	2,20	43,88	3,45	14,69	1,15
500	0,500	0,125	421,02	22,04	134,12	7,02	337,21	17,66	107,58	5,63	253,40	13,27	81,04	4,24	169,60	8,88	54,50	2,85	85,79	4,49	27,69	1,46	43,88	2,30	14,69	0,77

Installation of worm gear screw jack systems

Direction of rotation: Before starting installation work, the direction of rotation of all worm gear screw jacks, bevel gear boxes and the drive motor must be checked with regard to the feed direction of each individual worm gear screw jack.

Alignment errors: All components must be carefully aligned during installation. Alignment errors and stresses increase power consumption and lead to overheating and premature wear. Before a drive unit is attached, each worm gear screw jack should be turned through its entire length by hand without load. Variations in the amount of force required and/or axial marks on the outside diameter of the screw indicate alignment errors between the worm gear screw jack and its additional guides. In this case, the relevant mounting bolts must be loosened and the worm gear screw jack turned through by hand again. If the amount of force required is now constant throughout, the appropriate components must be aligned. If not, the alignment error must be localized by loosening additional mounting bolts.

Test run: The direction of rotation of the complete system and correct operation of the limit switches must be checked again before attaching the drive motor. In the case of version N (translating screw jack), check that the screw is lubricated with grease from the interior of the gear box and relubricate if necessary. In the case of version R (rotating screw jack), the jack screw should be coated with suitable grease to provide lubrication for lifting operation. The first test runs can then be carried out without load.
A maximum operating time of 30 % can not be exceeded at trial runs under weight for worm gear screw jacks with trapezoidal screws.

Operation: The loads, speeds and operating conditions specified for the worm gear screw jacks and transmission components must not be exceeded even briefly. Failure to observe this condition will invalidate all claims under guarantee.

Maintenance of worm gear screw jacks

Safety: All mounting bolts must be retightened after a short period of operation. Under extreme operating conditions, the wear on the screw nut (worm gear) must be checked at shorter intervals, depending on the power-on time, by inspecting the play in the thread. The screw nut (worm gear) must be replaced if the axial backlash with a single-start thread is more than one-quarter of the thread pitch.

Lubrication: The worm gear screw jacks are lubricated by the manufacturer and are ready for operation on delivery. The versions N/V must be lubricated via their grease nipples with one of the greases specified below at intervals of 30 – 50 operating hours. The screw should be cleaned and greased at the same time. We recommend that the gear box be cleaned to remove old grease and refilled with fresh grease after approx. 700 operating hours or 18 months. The worm gear screw jacks can be dismantled relatively easily:

- Unscrew the two threaded pins securing the bearing cover.
- Unscrew the screw and remove the screw protection if necessary.
- Unscrew the bearing cover with the aid of a face spanner.

Proceed as follows to refit the bearing cover: fit the bearing cover firmly (using approx. ten times the force shown in the table of "Guideline values for fitting bearing cover"). Then release it and refit it with the guide-line value from the table, checking the axial backlash and smooth running.

Standard grease:
Lithogrease G 421
Zeller + Gmelin, Aalen
Germany

Recommended greases:

Castrol Spheerol BM2
Mobil Mobilgrease XHP
Shell Retinax HD2

Guideline values for fitting bearing cover

Type	Torque [Nm]
MULI 1	5
MULI 2	9
MULI 3	13
MULI 4	32
MULI 5	60
JUMBO 1	70
JUMBO 2	150
JUMBO 3	150
JUMBO 4	220
JUMBO 5	300

Order code
MULI®/JUMBO®

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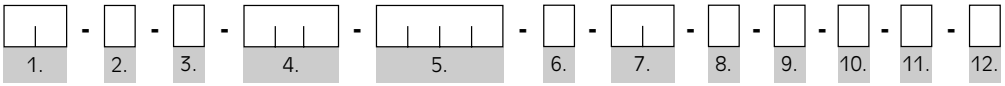
Structure of the order code:



1. Size
M1 – M5
J1 – J5

2. Version
N
R
V

3. Gear ratio
H
L

4. Screw type
TGS (Trapezoidal screw)
KGS (Ball screw)

5. Stroke
[mm]

6. Stroke end
G = Standard screw D_3
Z = With cylindrical end D_{2j6}
0 = No end machining
S = Special (to customers specs)

7. End fitting
0 = Without
BP = Top plate
GA = Fork end
GK = Clevis end

8. Bellows
0 = Without
F = With bellows

9. Nut
0 = Without
1 = EFM (Complete bronze nut)
2 = KGF (Flanged ball nut)
3 = KGM (Cylindrical ball nut)
Standard: Flange towards the endof the screw

10. Stop collar
0 = Without
A = With

11. Special features
0 = Without
Z = Standard accessories as per catalogue, for direct mounting on the gears
S = Special accessories, or accessories for constructional alterations to the standard version. Alignment GK/GA in V Version

12. Screw dimensions
0 = For all sizes except MULI® 4-KGS
1 = KGS 4005
2 = KGS 4010

Ordering example:

1. Size
M3 = MULI®3

2. Design version
N

3. Gear ratio
H

4. Screw type
KGS (Ball screw)

5. Stroke
425 mm

6. Screw end
G = Standard thread D_3

7. End fitting
BP = Top to plate

8. Bellows
F = With bellows

9. Nut
0 = Without

10. Stop collar
A = With

11. Special features
0 = Without

12. Screw dimensions
0 = For all sizes except MULI® 4-KGS

Worm gear screw jacks MULI®/JUMBO®

Ask our specialists!
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NEFF®
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Date

Company | Contact

Address | Department

Telephone | Fax

Application details | E-Mail

1. Axial load

	Dynamic [kN]	Static [kN]
Compressive loads		
Tensile loads		

2. Type of load

❒ Constant
❒ Oscillating
❒ Reversing
❒ Shock
❒ Vibration

3. Total load on

❒ 1
❒ 2
❒ 3
❒ 4
jacks

4. Installed position

❒ Vertical
❒ Horizontal
❒ Screw pointing up
❒ Screw pointing down

5. Linear speed [mm/min]

6. Stroke length [mm]

7. Duty cycle

Refering to 1 h/10 min

8. No. of shifts

[s] or [min]

9. External guide rail

❒ Yes ❒ No

Friction factor for external guide rail

10. Drive

❒ Without ❒ Handwheel
❒ Motor

11. Shift working

❒ Single-shift ❒ Two-shift
❒ Three-shift

12. Operating conditions

Temperature [°C]
if < 10 °C and > 60 °C
Rel. humidity [%]
Extreme ambient conditions

❒ Vertikal ❒ Chips ❒ Dangerous materials ❒ Outdoor
❒ Transport of persons

13. Basic jack version

❒ Translating [N]
❒ Anti-rotation [V]
❒ Rotation [R]

14. Screw type

❒ Trapezoidal screw TGS
❒ Ball screw KGS

15. Accessories (please mark)

❒ Complete bronze nut EFM
❒ Flanged ball nut KGF
❒ Mounting feet L
❒ Trunnion mounting K
❒ Adapter bracket KON
❒ Universal joint adapter KAR
❒ Top plate BP
❒ Fork end GA
❒ Clevis end GK
❒ Bellows F
❒ Limited switch
❒ Stop collar A

16. Drives and drive components

❒ Motor adapter flange MG
❒ 3-phase motor M
❒ Flexible coupling RA, RG
❒ Handwheel HR
❒ Pillow block UKP
❒ Safety nut SFM
❒ Bevel gear box K
❒ Universal joint shaft GX, VW
❒ Stopping brake
❒ Frequency converter

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ML = Mechanische Lineareinheiten
Mechanical linear drive units
Unités linéaires mécaniques
Moduli lineari meccanici

SHG = Spindelhubgetriebe
Worm gear screw jacks
Vérins à vis
Martinetti meccanici a vite

GT = Gewindetriebe
Srew drives
Systèmes vis à billes
Azionamenti a vite

NEFF worldwide

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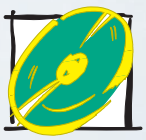

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