Gesellschaft für innovative Automationstechnik mbH

Screw jacks

Preface

To realise automation solutions in a technically and economically efficient way, it is essential to trust in the competence and experience of specialists.
We consequently follow the idea of systems to offer a comprehensive range of standardised automation solutions with which line and gantry robots, palletisers and manipulators can be realised in an economically efficient way.

Take advantage of our experience and our specialist's know-how! Benefit from our innovative technologies for economical, user-oriented solutions. Wherever custom-tailored and individual automation solutions are required – we are your competent partner!

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In brief

Worm gear screw jacks can be found wherever a rotation has to be transformed into a lateral movement. They make it easy to realise controlled processes like lifting, sinking, positioning, slewing or others in a simple and cost-efficient way.
Often, worm gear screw jacks, as electromechanical components, replace hydraulics or pneumatics.

There are 11 design variants available for loads between 2.5 and 500 kN (bigger gears on demand). All designs resist pressure as well as tension. The worm gear screw jacks are available in two variants: with fixed screw (basic design) and with rotating screw (design with travelling nut).

Basic design SH-G
The linear stroke is carried out by the travelling screw with the screw being led through the jack axially. It is essential to prevent the screw from twisting (twisting protection).
Caution: The screw might be removed from the gear box (stop collar).

Design with travelling nut SH-L
The rotary motion of the screw is translated into linear motion of the travelling nut on the screw. The screw is fixed axially within the gear box.

The cubic housing makes the gear boxes easy to mount and for the sizes SH 2.5 to SH 10 consists of an aluminium alloy, for the other sizes it consists of grey-cast iron or ductile cast iron. The housings are worked all over and are delivered without surface treatment. On demand we offer surface treatment like priming, varnishing, black-finishing or electrogalvanising. All steel parts are also available in stainless steel quality.

Technical Data

Trapezoidal thread (Tr)

SH - Tr											
Size		**SH 2,5**	**SH 5**	**SH 10**	**SH 25**	**SH 50**	**SH 100**	**SH 150**	**SH 200**	**SH 250**	**SH 350**	**SH 500**
Load [kN]		2.5	5	10	25	50	100	150	200	250	350	500
Screw trapezoidal		16x4	18x4	20x4	30x6	40x7	55x9	60x9	70x10	80x10	100x10	120x14
Gear ratio	**N**	4:1	4:1	4:1	6:1	7:1	9:1	9:1	10:1	10:1	10:1	14:1
	F	20:1	16:1	16:1	24:1	28:1	36:1	36:1	40:1	40:1	40:1	56:1
Idling torque [Nm]	**N**	0.03	0.05	0.12	0.17	0.34	0.82	0.90	1.30	1.42	1.65	1.97
	F	0.02	0.04	0.09	0.13	0.26	0.50	0.58	0.98	1.09	1.15	1.40
Effciency [%]	**N**	38	31	30	29	26	23	20	19	18	17	16
	F	30	28	27	26	23	20	18	17	16	15	14
Stroke/rotation of the worm shaft [mm]	**N**	1	1									
	F	0.2	0.25									
Torque under max. load [Nm]		1.5	3.2	7	16	34	69	105	150	205	300	425
Weight without stroke [kg]		0.6	1.2	2.1	6	17	32	41	57	57	85	100
Weight per 100 mm stroke [kg]		0.1	0.35	0.45	0.7	1.2	2.0	2.4	3.3	4.2	6.6	10.3

N = normal thread
F = fine thread

Ball screw (KGT)

SH - KGT											
Size	**SH 2,5**	**SH 5**	**SH 10**	**SH 25**	**SH 50**	**SH 100**	**SH 150**	**SH 200**	**SH 250**	**SH 350**	**SH 500**
Load [kN]	2.5	5	8	9.5 (26)	19 (30)	55					
Screw KGT	12x4	16x5	20x5	25x5 (32x10)	40x5 (40x10)	50x10					
Gear ratio	4:1	4:1	4:1	6:1	7:1	9:1	on demand				
Idling torque [Nm]	0.02	0.03	0.07	0.10	0.25 (0.22)	0.5					
Efficiency [%]	60	60	59	57	55 (57)	55					
Stroke/rotation of the worm shaft [mm] **N**	1	1.25	1.25	0.83 (1.66)	0.71 (1.43)	1.11					

The lower table only shows a selection of the ball screws available.

Please contact us for other screw diameters or pitches.

Technical Data

Duty cycle

It is important to keep the warming of the screw jacks that is caused by friction at bay. This warming has to to be emitted into the ambient through radiation and convection. Therefore we recommend a maximum duty cycle of 20 % per 60 min (30 % per 10 min).

Duty cycle, speed, load and ambient temperature are strongly dependend on each other.

Hoisting speed

Normal thread N

One rotation of a standard screw jack with trapezoidal thread causes a stroke of 1 mm. From a maximum speed of 1,500 rpm results a maximum stroke speed of 1,500 mm/min = 25 mm/s.

Fine thread F

One rotation of a standard screw jack with fine trapezoidal thread causes a stroke of 0.25 mm (0.2 mm in case of SH 2,5). The maximum speed of 1,500 rpm results in a maximum stroke speed of 375 mm/min = 6.25 mm/s (SH 2,5 = 5 mm/s).

Use multi-start trapezoidal threads or ball screws with great pitch to achieve higher stroke speed.

The higher effectiveness of the ball screw makes longer duty cycles possible.

Lateral forces

Any lateral forces that may occur should be taken by an external guide rail.

(Permissable lateral forces cf. chapt. 6/6)

Retention by friction

The retention by friction is influenced by various factors:

- Pitch
- Ratio of the worm gear
- Lubrication
- Friction parameters
- Ambient conditions like temperature and vibrations
- Mounting position

Versions with ball screw and large pitches are not self-locking! Use motors with a holding brake when deploying these systems. Trapezoidal threads with small pitches are only a little self-locking.

Technical Data

Stop collar AD (option for SH-G)

The stop collar prevents the screw from being removed from the gear. The stop collar must never be used as a positive stop! (Notice the different length of the conduit).

Twisting protection VD (option for SH-G)

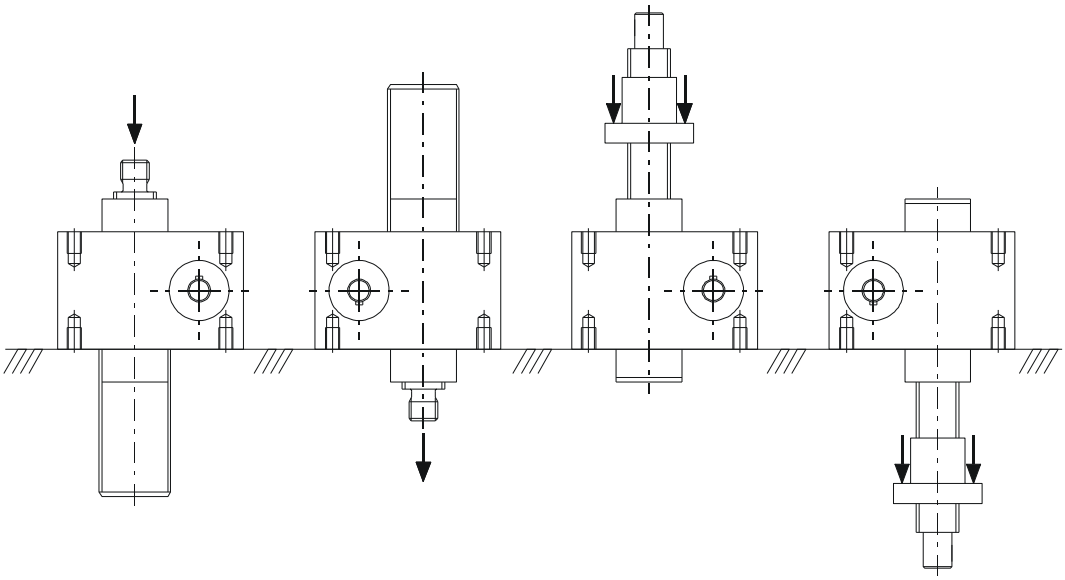
The twisting protection prevents the screw from turning with the nut (especially in case of single gear boxes). There are two kinds of twisting protection:

- keyed screw
- square tube (greater backlash)

Elevating screws

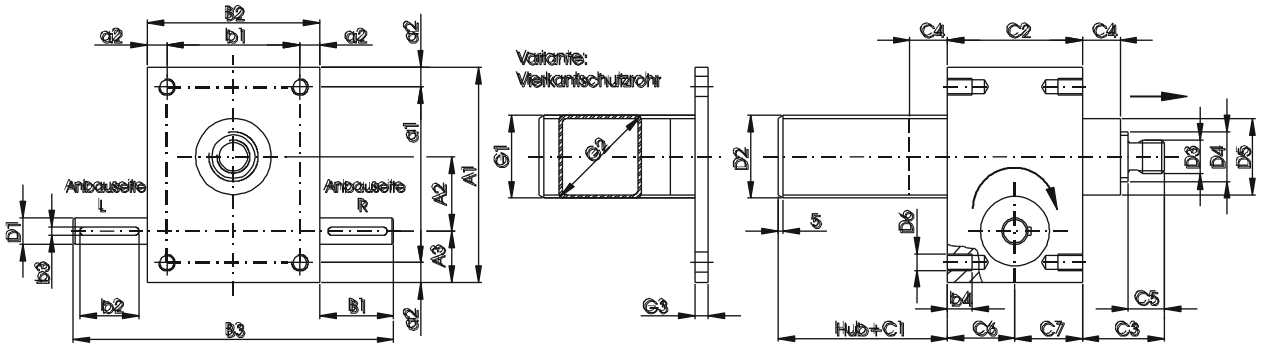
As a standard, we supply peeled trapezoidal screws (material C15). Depending on the requirements, rolled, peeled or peeled precision trapezoidal screws or ball screws are available. On demand we offer screws with special diameters or pitches as well as left-handed screws and multi-start screws.

Recommended load directions



Basically, when using screw jacks, it is essential to make sure that the main load direction is always towards the mounting area and the load does not apply tensile forces to the mounting screws.

Screw jacks – basic design – type SH-G

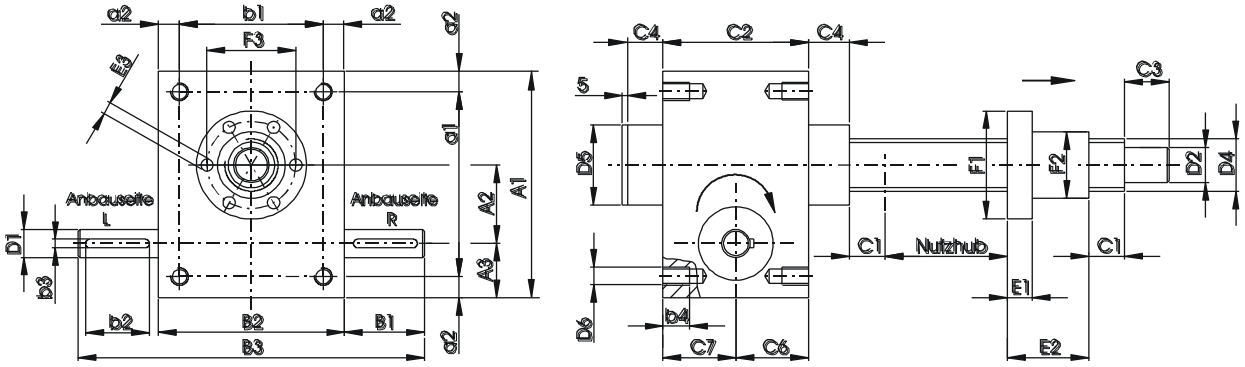


	SH 2,5	SH 5	SH 10	SH 25	SH 50	SH 100	SH 150	SH 200	SH 250	SH 350	SH 500
A1	60	80	100	130	180	200	210	240	240	290	360
A2	20	25	32	45	63	71	71	80	80	100	135
A3	18	24	28	31	39	46	49	60	60	65	75
a1	48	60	78	106	150	166	170	190	190	230	290
a2	6	10	11	12	15	17	20	25	25	30	35
B1	20	22,5	25	42,5	45	65	62,5	65	65	62,5	97,5
B2	50	72	85	105	145	165	195	220	220	250	300
B3	92	120	140	195	240	300	325	355	355	380	500
b1	38	52	63	81	115	131	155	170	170	190	230
b2	14	18	20	36	36	56	56	56	56	56	90
b3	3	3	5	5	6	8	8	8	8	10	14
b4	12	13	15	15	16	30	40	45	45	54	80
C1[2)]	25/55	25/55	35/65	40/75	45/95	60/105	60/105	65/115	65/115	70/155	105/155
C2	50	62	75	82	117	160	175	165	165	220	266
C3[1)]	27	35	45	50	65	95	95	110	110	140	200
C4[1)]	12	12	18	23	32	40	40	40	40	50	60
C5[1)]	12	19	20	22	29	48	48	58	58	78	118
C6	25	31	37,5	41	58,5	80	87,5	82,5	82,5	110	133
C7	25	31	37,5	41	58,5	80	87,5	82,5	82,5	110	133
ØD1 k6	9	10	14	16	20	25	25	30	30	35	48
ØD2	28	32	40	50	65	90	95	110	125	150	180
D3	M8	M12	M14	M20	M30	M36	M48x2	M56x2	M64x3	M72x3	M100x3
$D4_{Tr}$	14x4	18x4	20x4	30x6	40x7	55x9	60x9	70x10	80x10	100x10	120x14
$D4_{K}$ GT	12x5	16x5	20x5	25x5	40x5/ 40x10	50x10	-	-	80x10	-	-
ØD5	26	30	38,7	46	60	85	90	105	120	145	170
D6	M6	M8	M8	M10	M12	M20	M24	M30	M30	M36	M42
G1[3)]	30	35	40	50	70	90	90	110	125	150	180
G2[3)]	50	50	64	71	92	128	142	156	177	213	255
G3[3)]	6	6	6	8	10	10	10	10	10	10	10

[mm]

1) The latter values refer to the ball screw type (KGT).
2) The latter values refer to the variant with stop collar (AD).
3) Twisting protection (VD) with square tube, standard with type KGT
With trapezoidal spindle on demand (in case of long strokes the keyed screw is preferable).
(Caution: Consider dimension G3 towards mounting face!!!)

Screw jack – travelling nut – type SH-L



	SH 2,5	SH 5	SH 10	SH 25	SH 50	SH 100	SH 150	SH 200	SH 250	SH 350	SH 500
A1	60	80	100	130	180	200	210	240	240	290	360
A2	20	25	32	45	63	71	71	80	80	100	135
A3	18	24	28	31	39	46	49	60	60	65	75
a1	48	60	78	106	150	166	170	190	190	230	290
a2	6	10	11	12	15	17	20	25	25	30	35
B1	21	24	27,5	45	47,5	67,5	65	67,5	67,5	65	100
B2	50	72	85	105	145	165	195	220	220	250	300
B3	92	120	140	195	240	300	325	355	355	380	500
b1	38	52	63	81	115	131	155	170	170	190	230
b2	14	18	20	36	36	56	56	56	56	56	90
b3	3	3	5	5	6	8	8	8	8	10	14
b4	12	13	15	15	16	30	40	45	45	54	80
C1	10	12	15	20	25	25	25	25	25	25	30
C2	50	62	75	82	117	160	175	165	165	220	266
C3	12	15	20	25	30	45	55	70	75	100	120
C4	12	12	18	23	32	40	40	40	40	50	60
C6	25	31	37,5	41	58,5	80	87,5	82,5	82,5	110	133
C7	25	31	37,5	41	58,5	80	87,5	82,5	82,5	110	133
Ø$D1_{k6}$	9	10	14	16	20	25	25	30	30	35	48
Ø$D2_{j6}$	8	12	15	20	25	40	45	55	60	80	95
$D4_{Tr}$	14x4	18x4	20x4	30x6	40x7	55x9	60x9	70x10	80x10	100x10	120x14
$D4_{KGT}$	12x5	16x5	20x5	25x5	40x10	50x10	-	-	80x10	-	-
Ø D5	26	30	36,1	46	60	85	90	105,2	120	145	170
D6	M6	M8	M8	M10	M12	M20	M24	M30	M30	M36	M42
E1[1)]	12	12	12	14	16	18	20	30	30	35	40
E2[1)]	35	44	44	46	73/59	97	99	100	110/101	130	160
6xE3[1)]	6	6	7	7	9/7	11	11	17	17/14	25	28
ØF1[1)]	48	48	55	62	95/80	110	125	180	190/145	240	300
ØF2[1)]	28	28	32	38	63/53	72	85	95	105	130	160
ØF3[1)]	38	38	45	50	78/68	90	105	140	150/125	185	230

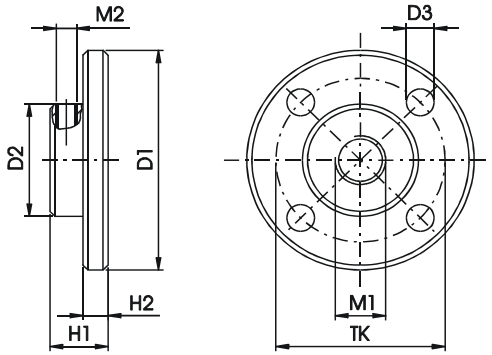
1) Dimensions of type with ballscrew (KGT) on demand.

[mm]

Accessory

Mounting flange BF (for type SH-G)

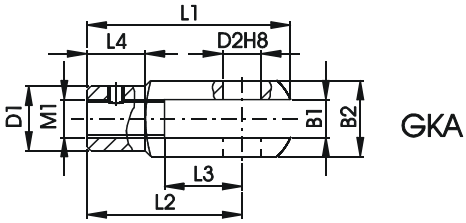
Type	ØD1	ØD2	ØD3	ØTK	H1	H2	M1	M2	M [kg]
SH 2,5	50	26	7	40	16	7	M10	M4	0.1
SH 5	65	29	9	48	20	7	M12	M5	0.2
SH 10	80	39	11	60	21	8	M14	M6	0.3
SH 25	90	46	11	67	23	10	M20	M8	0.6
SH 50	110	60	13	85	30	15	M30	M8	1.3
SH 100	150	85	17	117	50	20	M36	M10	5.0
SH 150	170	90	21	130	50	25	M48x2	M10	5.2
SH 200	200	105	25	155	60	30	M56x2	M12	8.0
SH 250	220	120	25	170	60	30	M64x3	M12	10.0
SH 350	260	145	32	205	80	40	M72x3	M12	18.5
SH 500	310	170	38	240	120	40	M100x3	M12	30.0

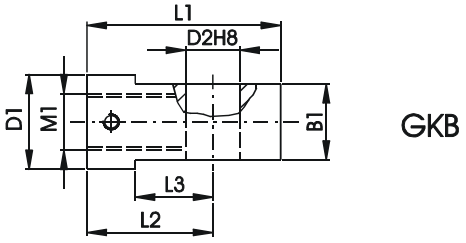


In case of a keyed screw the mounting flange is not attached to the screw. [mm]
This has to be done after mounting.

Joint heads GKA/GKB (for type SH-G) – (as ball-and-socked-head acc. to DIN on demand)

GKA	ØD1	ØD2	B1	B2	L1	L2	L3	L4	M1	M[kg]
SH 2,5	18	10	10	20	52	40	20	15	M10	0.08
SH 5	20	12	12	24	62	48	24	18	M12	0.1
SH 10	24.5	14	14	27	72	56	28	22	M14	0.2
SH 25	34	20	20	40	105	80	40	30	M20	1.0
SH 50	52	30	30	60	160	120	60	43	M30	2.5
SH 100	60	35	36	70	187	144	72	55	M36	4.0
GKB	**ØD1**	**ØD2**	**B1**		**L1**	**L2**	**L3**		**M1**	**M[kg]**
SH 150	80	40	60		120	75	45		M48x2	5.0
SH 200	100	50	70		130	90	50		M56x2	5.0
SH 250	120	60	80		155	105	60		M64x3	8.0
SH 350	160	80	110		220	135	85		M72x3	23.0
SH 500	170	90	120		300	200	100		M100x3	32.0



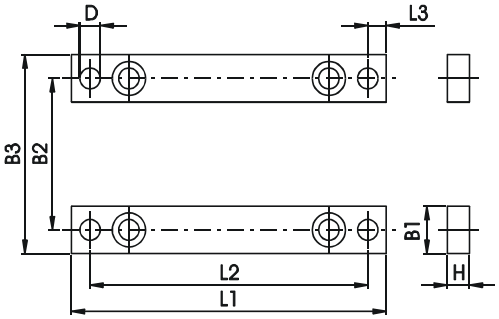


In case of a keyed screw the m
This has to be done after mounting.

Mounting ledge BL

Type	L1	L2	L3	B1	B2	B3	ØD	H	M [kg]
SH 2,5	90	75	7,5	15	38	54	6.5	10	0.1
SH 5	120	100	10	20	52	72	8.5	10	0.3
SH 10	140	120	10	20	63	85	8.5	10	0.5
SH 25	170	150	10	25	81	105	11	12	1.0
SH 50	230	204	13	30	115	145	13.5	16	1.8
SH 100	270	236	17	40	131	171	22	25	4.0
SH 150	290	250	20	50	155	205	26	30	6.0
SH 200	340	290	25	65	170	230	32	40	10.0
SH 250	340	290	25	65	170	230	32	40	10.0
SH 350	410	350	30	80	190	270	39	50	21.0
SH 500	500	430	35	100	230	330	45	60	35.0

[mm]

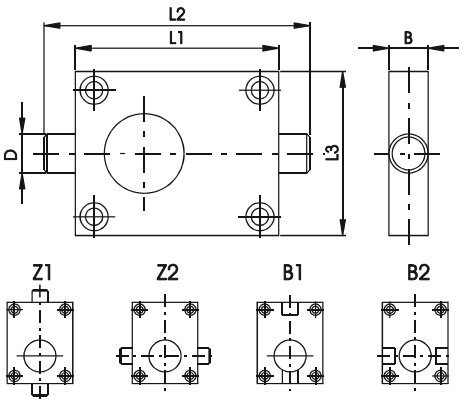


Accessory

Cardan plate KP

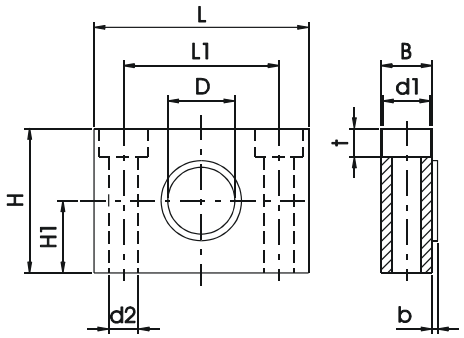
Type	B	ØDh7[1)]	ØDH7[2)]	L1	L2	L3	M [kg]
SH 2,5	15	10	8	64	84	54	0,4
SH 5	20	15	15	80	110	72	0,8
SH 10	25	20	20	100	140	85	1,5
SH 25	30	25	22	130	170	105	3,0
SH 50	40	35	30	180	240	145	7,0
SH 100	50	45	40	200	270	165	11,0
SH 150	60	50	45	210	290	195	12,0
SH 200	80	70	65	240	330	220	26,0
SH 250	80	70	65	240	330	220	26,0
SH 350	90	80	75	290	410	250	40,0
SH 500	100	90	85	360	520	300	68,0

1) Knuckle types Z1 and Z2
2) Boring types B1 and B2



[mm]

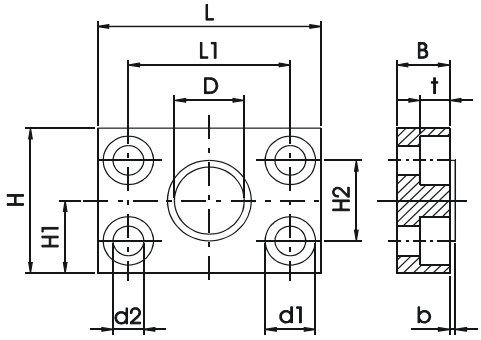
Bearing block LB



Type	ØDH7	L	L1	H	H1	B	b	Ød1	Ød2	t
SH 2,5	10	50	35	30	15	16	2	11	6.6	6.8
SH 5	15	60	40	34	17	20	2	15	9	9
SH 10	20	70	50	38	19	20	2	15	9	9
SH 25	25	80	58	54	27	20	2	18	11	11
SH 50	35	100	70	70	35	32	2	20	13.5	13
SH 100	45	100	70	80	40	40	2	33	22	21.5
SH 150	50	140	100	80	40	40	2	33	22	21.5
SH 200	70	220	160	124	62	63	2	48	33	32
SH 250	70	220	160	124	62	63	2	48	33	32
SH 350	80	245	180	144	72	63	2	57	39	38
SH 500	90	280	200	160	80	80	2	66	45	44

[mm]

Bearing flange LF



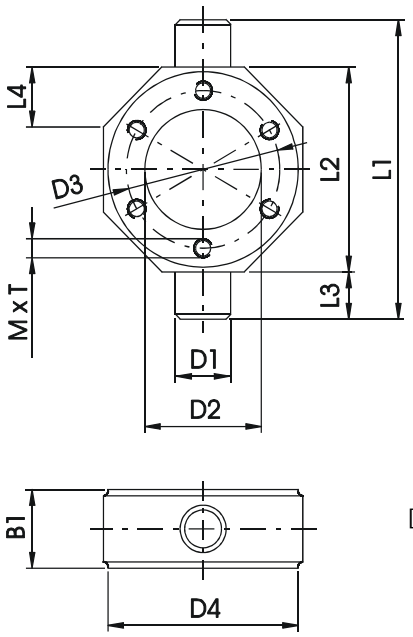
Type	ØDH7	L	L1	H	H1	H2	B	b	Ød1	Ød2	t
SH 2,5	10	50	35	32	16	17	16	2	11	6.6	6.8
SH 5	15	60	40	36	18	18	20	2	15	9	9
SH 10	20	70	50	40	20	20	20	2	15	9	9
SH 25	25	80	58	54	27	30	20	2	18	11	11
SH 50	35	100	70	70	35	40	32	2	20	13.5	13
SH 100	45	100	70	80	40	40	40	2	33	22	21.5
SH 150	50	140	100	100	50	60	40	2	33	22	21.5
SH 200	70	220	160	130	65	70	63	2	48	33	32
SH 250	70	220	160	130	65	70	63	2	48	33	32
SH 350	80	245	180	150	75	75	63	2	57	39	38
SH 500	90	280	200	160	80	85	80	2	66	45	44

[mm]

Accessory

Cardan adapter KA-Tr (for type SH-L)

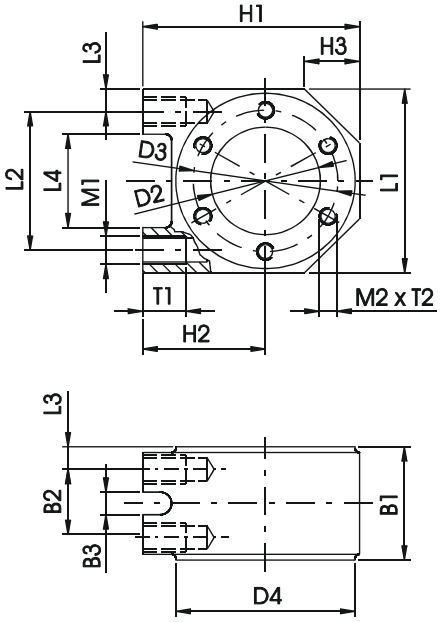
	Screw dimensions (diameter x pitch)						
	18x4	**20x4**	**30x6**	**33x6 36x6**	**40x7**	**55x9**	**60x9**
L1	70	85	95	110	140	165	180
L2±0,3	50	58	65	75	100	115	130
L3	10	13.5	15	17.5	20	25	25
L4	15	17	19	23	29	34	39
B1	20	25	25	30	40	50	50
ØD1 f8	12	16	18	20	30	40	40
ØD2 H7	28	32	38	45	63	72	85
ØD3±0,2	38	45	50	58	78	90	105
ØD4^{+1}	48	55	62	72	95	110	125
M x T	M5x10	M6x12	M6x12	M6x12	M8x14	M10x16	M10x16



[mm]

Nut console MK-Tr (for type SH-L)

	Screw dimensions (diameter x pitch)					
	18x4	**20x4**	**30x6**	**40x7**	**55x9**	**60x9**
B1	40	40	40	65	88	88
B2±0.2	24	24	24	41	64	64
B3	8	8	8	12	28	28
ØD2 H7	28	32	38	63	72	85
ØD3±0.2	38	45	50	78	90	105
ØD4^{+1}	48	55	62	95	110	125
H1	60	68	75	120	135	152
H2±0.02	35	37.5	42.5	70	77.5	87.5
H3	15	17	19	29	34	29
L1	50	58	65	100	115	130
L2±0.2	34	39	49	76	91	101
L3	8	8	8	12	12	12
L4	18	23	33	48	55	65
M1 x T1	M8x15	M8x15	M10x15	M14x25	M16x25	M16x30
M2 x T2	M5x10	M6x12	M6x12	M8x14	M10x16	M10x16

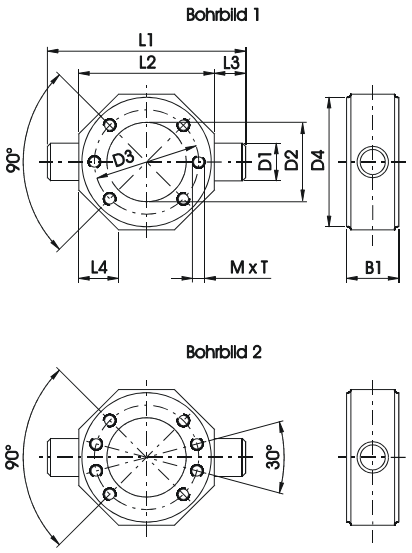


[mm]

Accessory

Cardan adapter KA-KGT (for type SH-L)

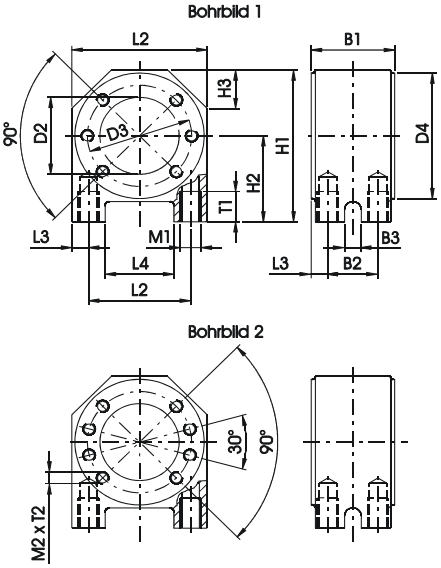
	Screw dimensions (diameter x pitch)						
	16x5	**20x5**	**25x5**	**32x5 (32x10)**	**40x5 40x10**	**50x10**	**63x10**
L1	70	85	95	125	140	165	180
L2±0.3	50	58	65	85	100	115	130
L3	10	13.5	15	20	20	25	25
L4	15	17	19	25	29	34	39
B1	20	25	25	30	40	50	50
ØD1 f8	12	16	18	25	30	40	40
ØD2 H7	28	36	40	50 (53)	63	75	90
ØD3±0.2	38	47	51	65	78	93	108
ØD4^{+1}	48	55	62	80	95	110	125
M x T	M5x10	M6x12	M6x12	M8x12	M8x14	M10x16	M10x16
Drilling template	1	1	1	1	1	2	2



Drilling template acc. to DIN 69051 [mm]

Nut console MK-KGT (for type SH-L)

	Screw dimensions (diameter x pitch)						
	16x5	**20x5**	**25x5**	**32x5 (32x10)**	**40x5 40x10**	**50x10**	**63x10**
B1	40	40	40	50	65	88	88
B2±0.2	24	24	24	30	41	64	64
B3	8	8	8	10	12	28	28
ØD2 H7	28	36	40	50 (53)	63	75	90
ØD3±0.2	38	47	51	65	78	93	108
ØD4^{+1}	48	55	62	80	95	110	125
H1	60	68	75	92	120	135	152
H2±0,02	35	37.5	42.5	50	70	77.5	87.5
H3	15	17	19	25	29	34	39
L1	50	58	65	85	100	115	130
L2±0.2	34	39	49	60	76	91	101
L3	8	8	8	10	12	12	12
L4	18	23	33	40	48	55	65
M1 x T1	M8x15	M8x15	M10x15	M12x15	M14x25	M16x25	M16x30
M2 x T2	M5x10	M6x12	M6x12	M8x12	M8x14	M10x16	M10x16
Drilling template	1	1	1	1	2	2	2

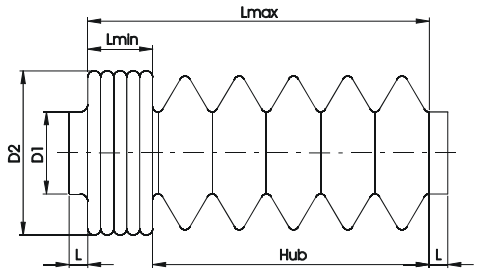


Drilling template acc. to DIN 69051 [mm]

Accessory

Bellow cover FB

Type	ØD1	ØD2	L[2)]	L_{min}[2)]	L_{max}[2)]	Max. stroke[1)]
SH 5	30	61	15	40	215	175
SH 10	38	80	10	80	420	340
SH 25	45	90	10	70	420	350
SH 50	58	116	20	130	730	600
SH 100	85	119	20	75	360	285
SH 150	90	141	20	50	400	350
SH 200	105	181	40	90	600	510
SH 250	120	166	20	90	480	370
SH 350	on demand[3)]					
SH 500	on demand[3)]					



1) Other dimensions for other stroke lengths. [mm]
2) For other stroke lengths on demand.
3) Dependend on mounting parts (mounting flange, ball joint heads, etc.).

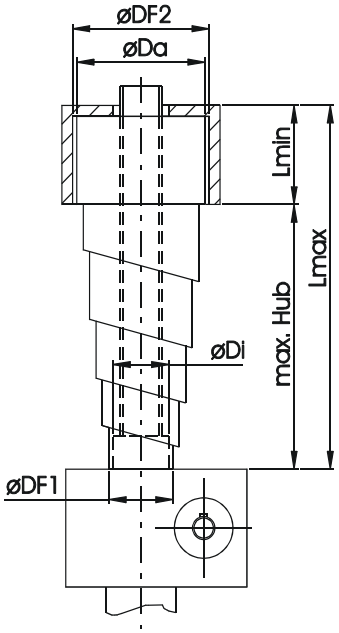
Material: Molerit TH 59 (soft PVC)

Fabric bellow on demand.

Centry cover SFA

Centry covers protect the screws from dirt and damage. Additionally they reduce the danger of accidents in this area. They consist of polished blue carbon steel (stainless on demand).

If the cover is mounted vertically, it is recommended to mount it with the wide diameter at the top. If it is mounted horizontally the wide diameter should be in the direction from where the debris comes. Though maintenance is not required, it is recommended to clean the cover regularly depending on the amount of dirt and to apply a thin oil film afterwards.



Caution: Due to their function there is a difference between centry covers for vertical and horizontal mounting. Always indicate the mounting position of the centry cover on enquiries or orders.

Dimensions of the centry covers on demand.

Range of delivery:

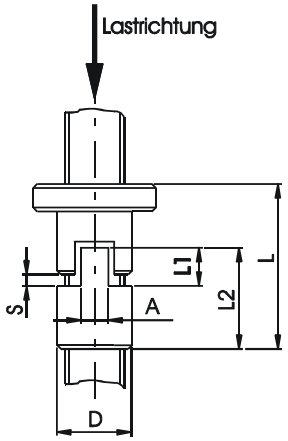
Type	$L_{max\ vertical}$	$L_{max\ horizontal}$
SH 5	150 - 750	90 - 650
SH 10	150 - 2200	90 - 1760
SH 25	150 - 3500	90 - 2850
SH 50	150 - 3500	90 - 2850

[mm]

Simple centring flanges are suitable to mount the centry cover. They have to allow the rotating movement of the cover, though. The centring flanges are not part of the scope of delivery but can be supplied on demand.

Accessory

Safety nut SFM



Type	A	ØD$_{-0,5}$	L	L1	L2	S	M [kg]
SH 2,5	8	25	43	8	25	1	0.2
SH 5	10	28	79	10	44	1	0.45
SH 10	10	32	79	10	44	1	0.55
SH 25	12	38	83,5	10	46	1.5	0.7
SH 50	16	63	132.75	15	73	1.75	3.1
SH 100	20	72	180.25	16	97	2.25	4.3
SH 150	20	85	184.25	16	99	2.25	5.7
SH 200	25	95	182.5	20	100	2.5	11.3
SH 250	25	105	202.5	20	110	2.5	13.7
SH 350	30	130	237.5	25	130	2.5	23.3
SH 500	40	160	298.5	25	160	3.5	45.7

[mm]

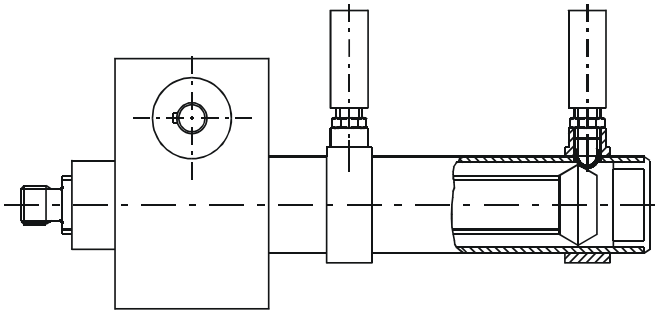
Screw jack design SH-L (travelling nut type):

Because the safety nut is not subject to any axial stress it travels practically without wear with the travelling nut. The distance "S" decreases with increasing wear and tear of the thread of the travelling nut. That is why an optical control of the mounted system is possible. If "S" has decreased by half, the travelling nut should be replaced as a precaution. In case of failure of the threads of the travelling nut (due to excessive wear and tear, lack of lubricant, dirt, overheating, etc.) the safety nut takes over the load. A switch or an approximatin pick-up can be mounted to set off an alarm in case of excessive wear and tear.

Screw jack design SH-G (basic type):

Basically the same construction as the SH L design. Optical control of wear and tear is possible. The load direction has to be indicated. The safety nut is only available in combination with a travelling nut.

Limit switch EF/EV



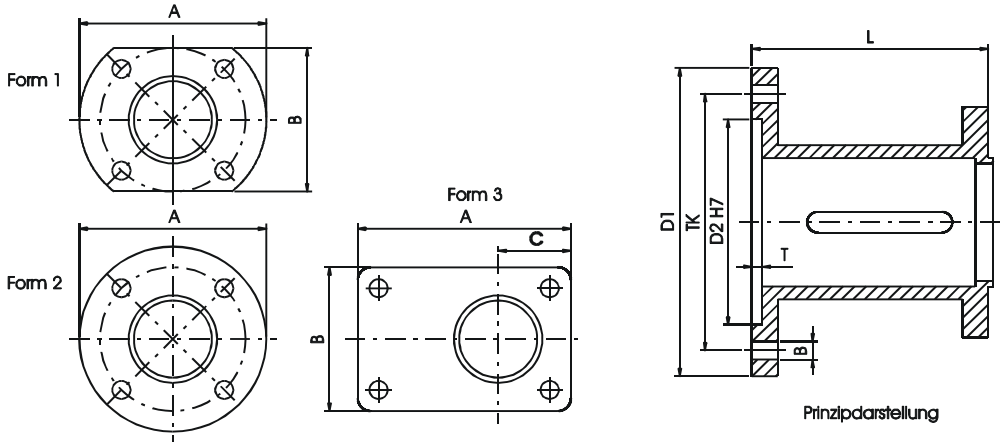
Available in two variants, with fixed or adjustable limit switches.

For use as end position switch-off. (Explosion-proof design on demand)

Accessory

Motor flange MG

Connection element between metric three-phase motor and screw jack.



		ØD1	ØD2	T	L	ØTK	B	Shape	ØA	B	C	Motor Type	Coupling
MG 80	**SH 2,5**	80	50	3	45	65	6	2	50	-	-	56	14
MG 80	**SH 5**	80	50	3	45	65	6	1	73	60	-	56	14
MG 90	**SH 2,5**	90	60	3	54	75	6	2	50	-	-	63	14
MG 90	**SH 2,5**	90	60	3	54	75	6	1	73	60	-	63	14
MG 90	**SH 10**	90	60	3	54	75	6	1	73	60	-	63	14
MG 105	**SH 5**	105	70	4	76	85	7	1	68	60	-	71	19
MG 105	**SH 10**	105	70	4	76	85	7	2	68	-	-	71	19
MG 105	**SH 25**	105	70	4	84[1)]	85	7	3	84	80	34	71	19
MG 120	**SH 10**	120	80	4	78	100	7	2	72	-	-	80	19
MG 120	**SH 25**	120	80	4	91[1)]	100	7	2	72	-	-	80	19/24
MG 120	**SH 50**	120	80	4	95	100	7	3	120	90	45	80	19/24
MG 140	**SH 10**	140	95	4	91	115	9	2	72	-	-	90	19/24
MG 140	**SH 25**	140	95	4	103	115	9	2	90	-	-	90	19/24
MG 140	**SH 50**	140	95	4	113	115	9	2	90	-	-	90	19/24
MG 160	**SH 10**	160	110	4	103	130	9	1	82	74	-	90	19/24
MG 160	**SH 25**	160	110	4	103	130	9	2	82	-	-	90	19/24
MG 160	**SH 25**	160	110	4	113[1)]	130	9	2	82	-	-	100/112	19/24
MG 160	**SH 50**	160	110	4	113	130	9	3	120	90	45	90/100/112	24/28
MG 160	**SH 100**	160	110	4	133[1)]	130	9	3	120	90	45	90/100/112	24/28
MG 200	**SH 50**	200	130	10	152	165	11	1	145	116	-	132	24/28
MG 200	**SH 100**	200	130	10	152	165	11	2	145	-	-	132	28/38
MG 200	**SH 150**	200	130	10	152	165	11	2	145	-	-	132	28/38
MG 200	**SH 200**	200	130	10	152	165	11	2	145	-	-	132	28/38
MG 200	**SH 250**	200	130	10	152	165	11	2	145	-	-	132	28/38
MG 250	**SH 100**	250	180	10	148	215	13	2	165	-	-	100/112	28/38
MG 250	**SH 150**	250	180	10	148	215	13	2	165	-	-	100/112	28/38/42
MG 250	**SH 200**	250	180	10	148	215	13	2	165	-	-	100/112	28/38/42
MG 250	**SH 250**	250	180	10	148	215	13	2	165	-	-	100/112	28/38/42

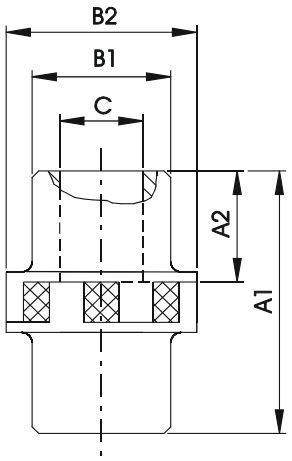
1) with spacer [mm]

Accessory

Couplings KUP

Type	Mn [Nm]	Mmax [Nm]	A1	A2	ØB1	ØB2	ØC$_{min}$	ØC$_{max}$
RA 14	7.5	15	35	11	30	30	6	16
RA 19	10	20	66	25	32 (41)	40	6	20 (24)
RA 24	35	70	78	30	40 (56)	55	8	24 (28)
RA 28	95	190	90	35	48 (67)	67	11	28 (38)
RA 38	190	380	114	45	66 (77)	80	12	38 (45)
RA 42	265	530	126	50	75 (94)	95	14	42 (55)
RA 48	310	620	140	56	85 (102)	105	15	48 (60)
RA 55	410	820	160	65	98 (118)	120	20	55 (70)
RA 65	625	1250	185	75	115 (135)	135	22	80
RA 75	975	1950	210	85	135 (160)	160	30	90
RA 90	2400	4800	245	100	160 (200)	200	40	100

Values in brackets for couplings with large boss



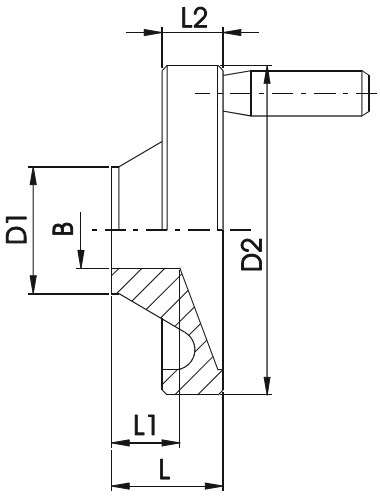
[...m]

Backlash-free design (GS) available on demand.

Feather key groove as standard, clamping collar, lock ring or slip clutch on demand.

Handwheel HR

	ØD2	ØD1	L	L1	L2	ØB H7
H 08010	80	26	25.5	16	13	10
H 08010	80	26	25.5	16	13	12
H 10010	100	28	29.5	17	14	10
H 10012	100	28	29.5	17	14	12
H 12512	125	31	33.5	18	15	12
H 12514	125	31	33.5	18	15	14
H 14014	140	36	36.5	19	16.5	14
H 14016	140	36	36.5	19	16.5	16
H 16014	160	36	39	20	18	14
H 16016	160	36	39	20	18	16
H 20018	200	42	45	24	20.5	18
H 20020	200	42	45	24	20.5	20
H 25022	250	48	51	28	23	22
H 25026	250	48	51	28	23	26



[mm]

Handwheel made of polished aluminium with rotable handgrip, feather key groove acc. to DIN.

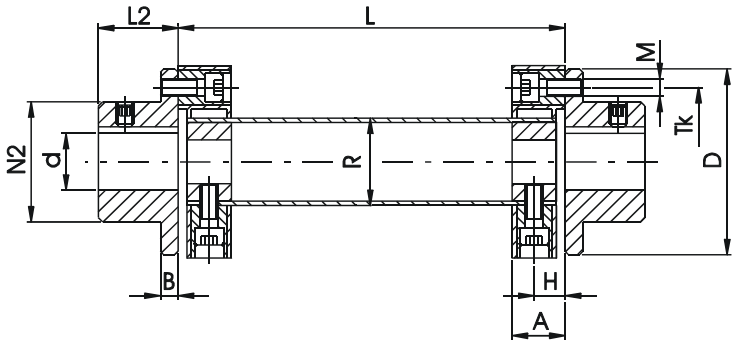
Other types of handwheels on demand.

Accessory

Universal shaft GX

Elastic universal shafts are a compact accessory to connect several srew jacks or as a conntection element between screw jacks, bevel gears and motors resp. They dampen noise, rotary oscillations, bumps and compensate considerable axial, radial or angular shifts.

The different lengths are manufactured individually according to the dimensions resulting from the project.



In comparison to conventional connections, like couplings, connection shafts or pedestal bearings you can almost always do without the pedestal bearings. The elastic cardan shafts are completely maintenance-free. The middle part can be radially (diagonally) removed without axial shifting of the aggregates.

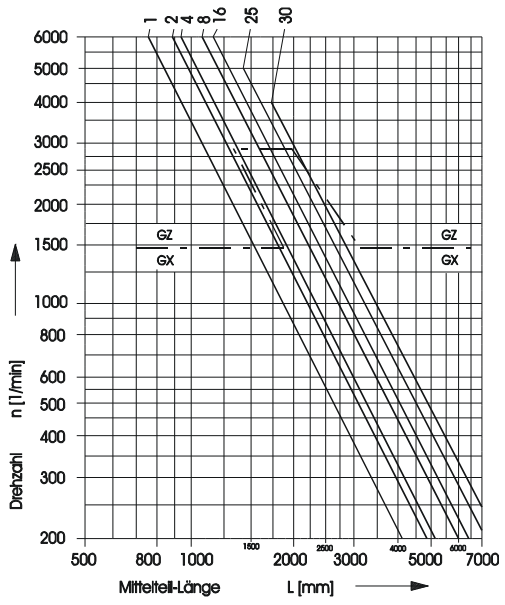
	M_N [Nm]	M_{max} [Nm]	ØR	A	B	D	Ød_{min}	Ød_{max}	H	L2	ØN2	ØTK	M
GX 1	10	25	30	18	7	56	8	25	12	24	36	44	M6
GX 2	30	60	40	24	8	85	12	38	14	28	55	68	M8
GX 4	60	120	45	25	8	100	15	45	14,5	30	65	80	M8
GX 8	120	280	60	30	10	120	18	55	17	42	80	100	M10
GX 16	240	560	70	35	12	150	20	70	21	50	100	125	M12
GX 25	370	800	85	40	14	170	20	85	23	55	115	140	M14
GX 30	550	1400	100	50	16	200	25	100	30	66	140	165	M16

[mm]

Always note the dimension "L" on all your enquiries and orders.
(L = distance between the journals of the shaft).

Select the suitable size using the diagram on the right.
We are happy to support you with the selection of the suitable components.

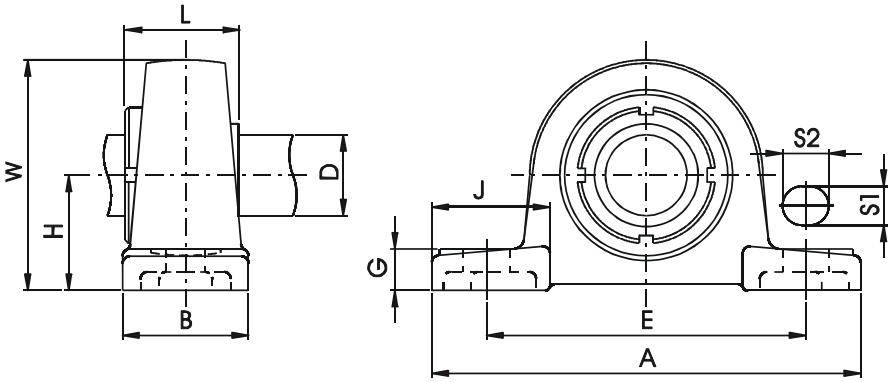
- Connection shafts on demand
- Cardan shafts on demand



Accessory

Pedestal bearings

Pedestal bearings completed with roller bearing and clamping sleeve (cast housing).



ØD	Type	H	A	E	B	ØS1	ØS2	G	W	L	J	Wt. [kg]
30	**UKP207+H2307**	47.6	167	127	48	17	20	18	93	43	54	1.5
	UKP307+H2307	56.0	210	160	56	17	25	20	106	43	60	2.7
40	**UKP209+H2309**	54.0	190	146	54	17	20	20	106	50	60	2.4
	UKP309+H2309	67.0	245	190	67	20	30	24	129	50	65	4.6
45	**UKP210+H2310**	57.2	206	159	60	20	23	21	114	55	65	2.8
	UKP310+H2310	75.0	275	212	75	20	35	27	143	55	75	6.2
60	**UKP213+H2313**	76.2	265	203	70	25	28	27	151	65	77	6.0
	UKP313+H2313	90	340	260	90	25	38	33	176	65	105	10.0
70	**UKP216+H2316**	88.9	292	232	78	25	28	30	175	78	85	10.0
	UKP316+H2316	106.0	400	300	110	27	40	40	210	78	110	19.0
85	**UKP319+H2319**	125	470	360	120	36	50	45	250	90	125	29.0
100	**UKP322+H2322**	150	520	400	140	40	55	55	300	105	135	43.0

[mm]

Other types of bearings and different dimensions on demand.

Metric three-phase motors

1500 1/min – 4 poles – 50 Hz

Type	P [kW]	n_N [1/min]	I_N [A] at 400 V	cos φ	η [%]	M_N [Nm]	M_K/M_N	M_A/M_N	I_A/I_N	J [kgm²]	Wt. [kg]
56	0.06	1330	0.26	0.6	55	0.43	2.0	2.0	2.5	0.00016	2.5
56	0.09	1330	0.39	0.6	55	0.65	2.0	2.0	2.5	0.00016	2.9
63	0.12	1340	0.52	0.6	60	0.93	2.3	2.3	3.0	0.00024	3.8
63	0.18	1340	0.71	0.6	61	1.28	2.3	2.3	3.0	0.00029	4.1
71	0.25	1350	0.82	0.65	68	1.77	2.0	2.0	3.5	0.00035	5.7
71	0.37	1350	1.2	0.67	69	2.62	2.0	2.0	3.5	0.00052	7.0
80	0.55	1360	1.6	0.70	72	3.86	2.3	2.3	4.3	0.00122	8.6
80	0.75	1360	2.0	0.73	73	5.27	2.3	2.3	4.3	0.00170	10.0
90S	1.1	1380	2.7	0.80	74	7.61	2.5	2.3	4.5	0.00220	11.9
90L	1.5	1380	3.6	0.82	74	10.4	2.5	2.3	4.5	0.00280	14.2
100L	2.2	1410	5.0	0.80	80	14.9	2.2	2.0	4.5	0.00500	18.7
100L	3	1410	6.5	0.82	81	20.3	2.2	2.0	4.5	0.00600	21.2
112M	4	1420	8.5	0.82	83	26.9	2.5	2.4	5.0	0.00900	25.7
132S	5.5	1430	11.5	0.82	84	36.7	2.5	2.1	6.0	0.02100	43.0
132M	7.5	1430	15.4	0.83	85	50.1	2.5	2.1	6.0	0.02800	50.3
132M	9	1430	18.4	0.83	85	60.1	2.5	2.1	6.0	0.03400	55.8
160M	11	1465	21.8	0.83	88	71.7	2.6	2.6	5.9	0.03900	69.5
160L	15	1465	30	0.83	88	97.8	2.6	2.6	6.0	0.08000	89.0
180M	18.5	1470	36	0.83	90	120.2	2.8	2.5	6.5	0.09800	110
180L	22	1470	43	0.83	90	143.0	2.8	2.5	6.5	0.12000	119
200L	30	1470	56	0.85	91	194.9	2.8	2.4	6.5	0.16000	155
225S	37	1480	69	0.85	91	238.8	2.9	2.6	7.1	0.31000	202
225M	45	1480	84	0.85	91	290.0	2.9	2.6	7.1	0.39000	235
250M	55	1480	100	0.86	92	355.0	2.6	2.5	7.3	0.51000	286
280S	75	1485	134	0.87	93	482.0	2.7	2.5	7.3	1.15000	387
280M	90	1485	160	0.87	93	579.0	2.7	2.6	6.7	1.31000	415
315S	110	1485	193	0.88	94	708.0	2.7	2.6	6.7	1.55000	496
315M	132	1485	236	0.86	94	849.0	2.7	2.6	6.8	3.09000	630
315M	160	1485	285	0.86	94	1029.0	2.4	2.3	6.8	4.10000	740

P	Power	η	Efficiency
n_N	Rated speed	M_N	Rated torque
I_N	Rated speed	M_K	Tilting moment
I_A	Starting current	M_A	Starting torque
cos φ	Power factor	J	Mass inertia

Metric three-phase motors

1000 1/min – 6 poles – 50 Hz

Type	P [kW]	n_N [1/min]	I_N [A] at 400 V	cos φ	η [%]	M_N [Nm]	M_K/M_N	M_A/M_N	I_A/I_N	J [kgm²]	Wt. [kg]
56	0.04	870	0.28	0.60	35	0.44	1.6	1.6	2.0	0.00016	2.8
63	0.09	880	0.50	0.60	43	0.98	1.9	1.7	2.2	0.00029	5.0
63	0.11	890	0.59	0.60	45	1.18	1.9	1.7	2.8	0.00039	5.2
71	0.18	890	0.79	0.61	54	1.93	1.9	1.7	2.8	0.00105	5.8
71	0.22	890	0.95	0.61	55	2.36	2.0	1.8	2.8	0.00129	6.5
80	0.37	900	1.1	0.71	66	3.93	2.0	1.8	3.0	0.00164	7.4
80	0.55	900	1.6	0.71	69	5.84	2.2	2.0	3.5	0.00256	9.8
90S	0.75	910	2.1	0.72	72	7.87	2.1	1.9	3.8	0.00354	10.8
90L	1.1	910	3.0	0.72	73	11.5	2.0	2.0	4.0	0.00510	13.5
100	1.5	920	4.0	0.73	75	15.6	2.3	2.1	4.7	0.00870	19.6
112M	2.2	940	5.4	0.75	78	22.4	2.5	2.2	5.5	0.01400	25.0
132S	3.0	950	6.9	0.78	80	30.2	2.3	2.0	5.6	0.02300	39.0
132M	4.0	950	9.0	0.78	82	40.2	2.6	2.3	5.8	0.03100	45.5
132M	5.5	950	12.3	0.78	83	55.3	2.6	2.3	6.0	0.04100	52.5
160M	7.5	960	15.9	0.80	85	74.6	2.6	2.1	6.0	0.05400	69
160L	11.0	960	23.0	0.81	86	109	2.9	2.3	6.4	0.10900	88
180L	15.0	970	30.0	0.82	87	148	3.0	2.4	7.2	0.14100	114
200L	18.5	975	37.0	0.83	88	181	2.8	2.3	6.8	0.27100	145
200L	22.0	975	44.0	0.83	88	216	2.8	2.3	6.8	0.32000	155
225M	30	980	57.0	0.84	90	292	2.6	2.4	6.1	0.54100	234
250M	37	980	70.0	0.84	91	361	2.7	2.4	6.8	0.75200	295
280S	45	985	84.0	0.84	92	436	2.4	2.3	6.5	1.37000	381
280M	55	985	102	0.84	92.5	533	2.4	2.3	6.5	1.68000	421
315S	75	985	138	0.85	92.5	727	2.3	2.1	6.0	2.37000	526
315M	90	985	164	0.85	93.5	873	2.4	2.2	6.2	3.62000	642
315M	110	990	200	0.85	93.5	1061	2.4	2.2	6.3	4.14000	672
315M	132	990	239	0.85	94	1274	2.4	2.2	6.3	4.79000	730
315M	160	990	289	0.85	94	1544	2.4	2.2	6.3	6.21000	910

Metric three-phase motors

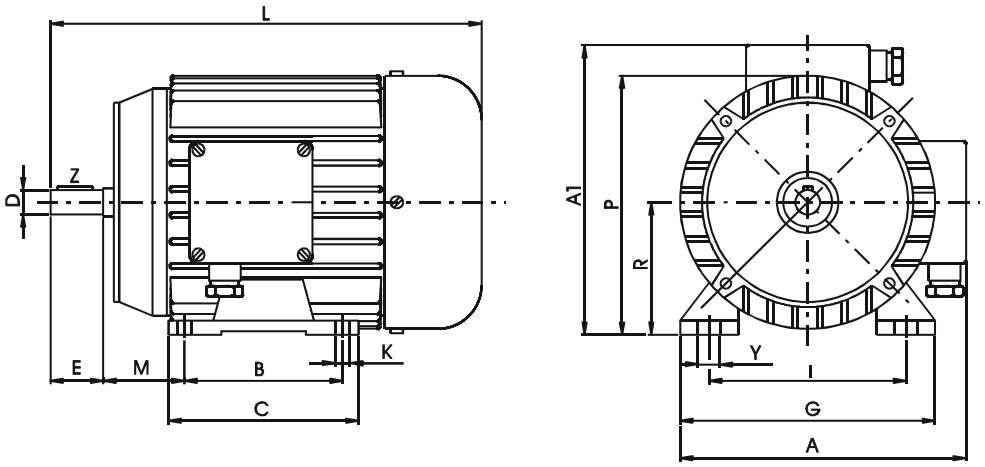
750 1/min – 8 poles – 50 Hz

Type	P [kW]	n_N [1/min]	I_N [A] at 400 V	cos φ	η [%]	M_N [Nm]	M_K/M_N	M_A/M_N	I_A/I_N	J [kgm²]	Wt. [kg]
56	0.02	630	0.19	0.50	30	0.30	1.6	1.4	1.8	0.00016	2.8
63	0.05	640	0.34	0.53	40	0.75	1.6	1.5	2.0	0.00029	5.0
63	0.07	640	0.43	0.54	44	1.04	1.6	1.5	2.0	0.00039	5.0
71	0.11	650	0.65	0.56	44	1.6	1.6	1.5	2.0	0.00110	6.0
71	0.15	650	0.83	0.57	46	2.2	1.6	1.6	2.1	0.00130	6.5
80	0.18	670	0.83	0.60	52	2.6	2.0	1.8	3.0	0.00160	7.3
80	0.25	670	1.0	0.60	61	3.6	2.0	1.8	3.0	0.00260	9.7
90S	0.37	680	1.3	0.63	64	5.2	2.0	1.8	3.2	0.00300	10.6
90L	0.55	690	1.90	0.63	67	7.6	2.0	1.8	3.4	0.00450	13.3
100	0.75	690	2.5	0.64	68	10.4	2.1	2.0	3.4	0.00870	19.3
100	1.1	690	3.5	0.64	70	15.2	2.1	2.0	3.4	0.01090	21.5
112M	1.5	700	4.6	0.65	73	20.5	2.4	1.9	3.5	0.01410	25.0
132S	2.2	705	5.7	0.71	78	29.8	2.2	1.9	4.6	0.03070	45.0
132M	3.0	710	7.6	0.72	79	40.4	2.3	1.9	5.0	0.04090	52.0
160M	4.0	715	9.9	0.73	80	53.8	2.1	2.0	5.0	0.05370	68.5
160M	5.5	720	13	0.73	82	73	2.1	2.0	5.2	0.07720	70.0
160L	7.5	730	17	0.74	84	100	2.2	2.1	5.4	0.10900	87.5
180L	11.0	730	24	0.76	86	144	2.0	2.1	5.1	0.15400	117
200L	15.0	730	33	0.76	87	196	2.3	2.1	5.4	0.34500	155
225S	18.5	730	38	0.79	88	242	2.3	2.3	5.3	0.50500	207
225M	22	730	45	0.79	89	288	2.4	2.3	5.3	0.57700	243
250M	30	735	60	0.80	90	390	2.6	2.4	5.0	0.90200	317
280S	37	735	74	0.80	90.5	481	2.3	2.1	5.1	1.75000	420
280M	45	735	89	0.80	91	585	2.3	2.1	5.5	2.12000	460
315S	55	740	108	0.80	92	710	2.2	2.3	5.4	2.43000	525
315M	75	740	146	0.80	93	968	2.1	2.2	5.5	3.88000	671
315M	90	740	174	0.80	93.5	1162	2.2	2.3	5.5	4.27000	769
315M	110	740	212	0.80	93.8	1420	2.2	2.3	5.5	5.43000	890
315M	132	740	254	0.80	94	1704	2.2	2.3	5.5	6.34000	1035

P	Power	η	Efficiency
n_N	Rated speed	M_N	Rated torque
I_N	Rated current	M_K	Tilting moment
I_A	Starting current	M_A	Starting torque
cos φ	Power factor	J	Mass inertia

Metric three-phase motors

Type B3 (Mounting feet)

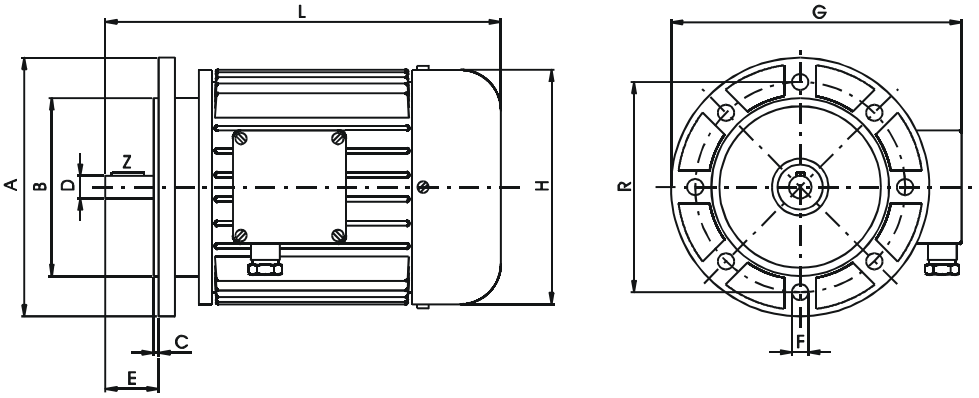


Type	$R_{-0.5}$	L	ØD	E	Z	I	B	K x Y	C	G	A	A1	M	P
56	56	189	9 ^{j6}	20	3x3x15	90	71	6x11	90	112	144	149	36	115
63	63	217	11 ^{j6}	23	4x4x15	100	80	7x13	105	125	160	162	40	127
71	71	244	14 ^{j6}	30	5x5x20	112	90	8x13	108	140	180	183	45	145
80	80	280	19 ^{j6}	40	6x6x30	125	100	9.5x17	125	160	205	208	50	160
90S	90	302	24 ^{j6}	50	8x7x40	140	100	9.5x17	130	182	217	220	56	180
90L	90	327	24 ^{j6}	50	8x7x40	140	125	9.5x17	155	182	217	220	56	180
100	100	368	28 ^{j6}	60	8x7x50	160	140	11x21	175	200	235	240	63	197
112	112	392	28 ^{j6}	60	8x7x50	190	140	12x22	175	235	260	265	70	220
132S	132	460	38 ^{k6}	80	10x8x70	216	140	11x21	180	260	325	330	89	260
132M	132	498	38 ^{k6}	80	10x8x70	216	178	11x21	218	260	325	330	89	260
160M	160	600	42 ^{k6}	110	12x8x90	254	210	13x23	260	318	390	395	108	310
160L	160	644	42 ^{k6}	110	12x8x90	254	254	13x23	304	318	390	395	108	310
180M	180	667	48 ^{k6}	110	14x10x90	279	241	13x23	335	340	422	425	121	360
180L	180	705	48 ^{k6}	110	14x10x90	279	279	13x23	335	340	422	425	121	360
200L	200	790	55 ^{m6}	110	16x10x90	318	305	13x23	380	395	310	573	133	398

Depictions and dimensions not binding [mm]

Metric three-phase motors

Type B5 (large flange)

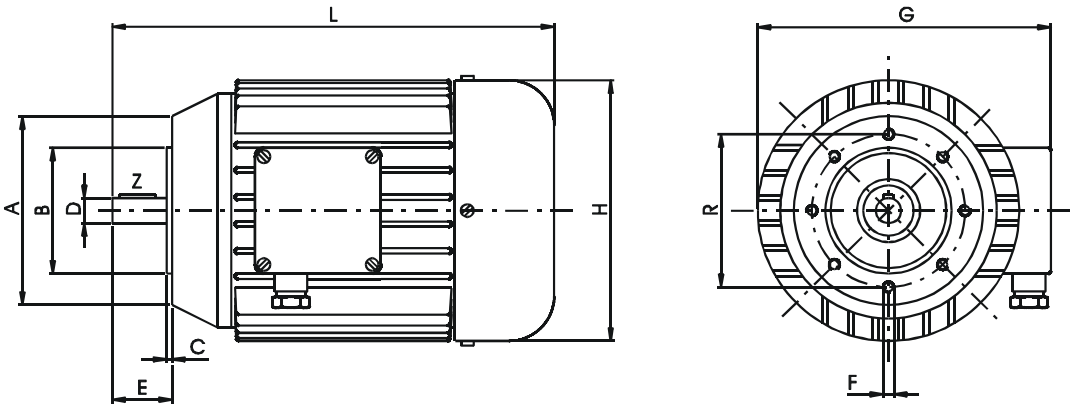


Type	L	ØD	E	Z	ØA	ØB	ØR	ØF	C	ØH	G
56	187	9 j6	20	3x3x15	120	80 j6	101.5	8.5	3	111	153
63	212	11 j6	23	4x4x15	140	95 j6	115	9.5	3	125	165
71	238	14 j6	30	5x5x20	160	110 j6	130	9.5	3.5	148	195
80	274	19 j6	40	6x6x30	200	130 j6	165	11.5	3.5	170	226
90S	297	24 j6	50	8x7x40	200	130 j6	165	11.5	3.5	185	242
90L	322	24 j6	50	8x7x40	200	130 j6	165	11.5	3.5	185	242
100	361	28 j6	60	8x7x50	250	180 j6	215	14.0	4	210	280
112	361	28 j6	60	8x7x50	250	180 j6	215	14.0	4	210	280
132S	470	38 k6	80	10x8x70	300	230 j6	265	14.0	4	260	350
132M	496	38 k6	80	10x8x70	300	230 j6	265	14.0	4	260	350
160M	570	42 k6	110	12x8x90	350	250 h6	300	18.0	5	260	390
160M	650	42 k6	110	12x8x90	350	250 h6	300	18.0	5	320	420
160L	650	42 k6	110	12x8x90	350	250 h6	300	18.0	5	320	420
180M	690	48 k6	110	14x10x90	350	250 h6	300	18.0	5	320	420
180L	690	48 k6	110	14x10x90	350	250 h6	300	18.0	5	320	420
200L	750	55 m6	110	16x10x90	400	300 h6	350	18.0	5	360	475

Depictions and their dimensions not binding [mm]

Metric three-phase motors

Type B14 (small flange)



Type	L	ØD	E	Z	ØA	ØB	ØR	F	C	ØH	G
56	187	9 ^{j6}	20	3x3x15	80 105	50 ^{j6} 70 ^{j6}	65 85	M5 M6	2.5 2.5	111	149
63	212	11 ^{j6}	23	4x4x15	90 105 120	60 ^{j6} 70 ^{j6} 80 ^{j6}	75 85 100	M5 M5 M6	2.5 2.5 3.0	125	158
71	238	14 ^{j6}	30	5x5x20	105 120 140	70 ^{j6} 80 ^{j6} 95 ^{j6}	85 100 115	M6 M6 M8	2.5 3.0 3.0	148	185
80	274	19 ^{j6}	40	6x6x30	105 120 140 160	70 ^{j6} 80 ^{j6} 95 ^{j6} 110 ^{j6}	85 100 115 130	M6 M6 M8 M8	2.5 3.0 3.0 3.5	170	210
90S	297	24 ^{j6}	50	8x7x40	140 160	95 ^{j6} 110 ^{j6}	115 130	M8 M8	3.0 3.5	185	230
90L	322	24 ^{j6}	50	8x7x40	140 160	95 ^{j6} 110 ^{j6}	115 130	M8 M8	3.0 3.5	185	230
100	361	28 ^{j6}	60	8x7x50	160 200	110 ^{j6} 130 ^{j6}	130 165	M8 M10	3.5 3.5	210	255
112	361	28 ^{j6}	60	8x7x50	160 200	110 ^{j6} 130 ^{j6}	130 165	M8 M10	3.5 3.5	210	255
132S	470	38 ^{k6}	80	10x8x70	160 200 250	110 ^{j6} 130 ^{j6} 180 ^{j6}	130 165 215	M8 M10 M12	3.5 3.5 4.0	260	328
132M	496	38 ^{k6}	80	10x8x70	160 200 250	110 ^{j6} 130 ^{j6} 180 ^{j6}	130 165 215	M8 M10 M12	3.5 3.5 4.0	260	328

Depiction and their dimensions not binding [mm]

Other motor types like worm gear motors, spur gear motors, DC motors, servo motors and stepper motors on demand.

Bevel gears V – Torque and power limits

iN/il	n1	n2	kW	Size						
	[1/min]	[1/min]	[Nm]	065	090	120	140	160	200	260
1:1-6:1			**P1Nt**	**1.60**	**3,80**	**6,20**	**10,00**	**15,00**	**26,00**	**42,00**
1 1	3000	3000	P1N	3.31	8,93	21,82	39,68			
			T2N	10.00	27,00	66,00	120,00			
	1500	1500	P1N	1.82	5,29	13,56	26,78	42,99	74,40	157,07
			T2N	11.00	32,00	82,00	162,00	260,00	450,00	950,00
	750	750	P1N	1.07	3.06	8.51	16.20	25.63	45.88	96.72
			T2N	13.00	37.00	103.00	196.00	310.00	555.00	1170.00
	500	500	P1N	0.83	2.20	6.34	11.46	18.19	34.17	72.75
			T2N	15.00	40.00	115.00	208.00	330.00	620.00	1320.00
	250	250	P1N	0.47	1.21	3.39	5.92	9.64	19.58	42.44
			T2N	17.00	44.00	123.00	215.00	350.00	710.00	1540.00
	50	50	P1N	0.10	0.28	0.72	1.21	2.09	4.13	9.64
			T2N	18.00	50.00	130.00	220.00	380.00	750.00	1750.00
			T2max	**25.00**	**105.00**	**220.00**	**430.00**	**660.00**	**1090.00**	**2310.00**
1,5 1	3000	2000	P1N	2.20	5.51	13.45	24.91	40.78	72.75	189.58
			T2N	10.00	25.00	61.00	113.00	185.00	330.00	860.00
	1500	1000	P1N	1.21	3.20	8.60	17.08	27.78	48.17	104.71
			T2N	11.00	29.00	78.00	155.00	252.00	437.00	950.00
	750	500	P1N	0.72	1.93	5.18	10.47	16.26	30.31	64.48
			T2N	13.00	35.00	94.00	190.00	295.00	550.00	1170.00
	500	333	P1N	0.55	1.36	3.85	7.34	11.56	22.57	47.72
			T2N	15.00	37.00	105.00	200.00	315.00	615.00	1300.00
	250	167	P1N	0.31	0.74	1.99	3.76	6.07	12.70	27.43
			T2N	17.00	40.00	108.00	204.00	330.00	690.00	1490.00
	50	33	P1N	0.07	0.16	0.41	0.76	1.29	2.73	6.18
			T2N	18.00	45.00	113.00	210.00	355.00	750.00	1700.00
			T2max	**25.00**	**80.00**	**169.00**	**358.00**	**650.00**	**980.00**	**2100.00**
2 1	3000	1500	P1N	1.65	3.80	9.26	16.53	28.11	51.25	133.92
			T2N	10.00	23.00	56.00	100.00	170.00	310.00	810.00
	1500	750	P1N	0.91	2.23	6.03	11.41	20.25	35.13	78.53
			T2N	11.00	27.00	73.00	138.00	245.00	425.00	950.00
	750	375	P1N	0.54	1.32	3.55	6.86	11.57	22.32	48.36
			T2N	13.00	32.00	86.00	166.00	280.00	540.00	1170.00
	500	250	P1N	0.41	0.94	2.54	4.96	8.27	16.81	35.27
			T2N	15.00	34.00	92.00	180.00	300.00	610.00	1280.00
	250	125	P1N	0.23	0.50	1.35	2.62	4.41	9.37	20.12
			T2N	17.00	36.00	98.0	190.00	320.00	680.00	1460.00
	50	25	P1N	0.05	0.10	0.29	0.55	0.98	2.07	4.55
			T2N	18.00	37.00	107.00	200.00	355.00	750.00	1650.00
			T2max	**25.00**	**80.00**	**169.00**	**320.00**	**650.00**	**980.00**	**2100.00**
3 1	3000	1000	P1N		2.54	6.39	12.12	20.94	46.29	85.97
			T2N		23.00	58.00	110.00	190.00	420.00	780.00
	1500	500	P1N		1.49	4.08	8.05	12.68	28.38	49.60
			T2N		27.00	74.00	146.00	230.00	515.00	900.00
	750	250	P1N		0.88	2.40	4.60	6.89	15.98	28.93
			T2N		32.00	87.00	167.00	250.00	580.00	1050.00
	500	167	P1N		0.63	1.66	3.20	4.79	11.04	20.43
			T2N		34.00	90.00	174.00	260.00	600.00	1110.00
	250	83	P1N		0.33	0.87	1.62	2.56	5.76	11.16
			T2N		36.00	95.00	177.00	280.00	630.00	1220.00
	50	17	P1N		0.07	0.21	0.34	0.57	1.29	2.55
			T2N		37.00	110.00	180.00	305.00	690.00	1360.00
			T2max		**70.00**	**155.00**	**280.00**	**457.00**	**910.00**	**1940.00**

Bevel gears V – Torque and power limits

iN/il Ratio	n1 [1/min]	n2 [1/min]	kW [Nm]	Baugröße 065	090	120	140	160	200	260
1:1-6:1			**P1Nt**		**3.80**	**6.20**	**10.00**	**15.00**	**26.00**	**42.00**
4 / 1	3000	750	P1N		1.90	4.96	8.51	14.88	28.93	57.87
			T2N		23.00	60.00	103.00	180.00	350.00	700.00
	1500	375	P1N		1,12	3.06	4.96	9.09	18.81	37.20
			T2N		27.00	74.00	120.00	220.00	455.00	900.00
	750	187,5	P1N		0.66	1.69	3.06	5.17	10.54	22.73
			T2N		32.00	82.00	148.00	250.00	510.00	1100.00
	500	125	P1N		0.47	1.16	2.12	3.58	7.23	16.26
			T2N		34.00	84.00	154.00	260.00	525.00	1180.00
	250	62,5	P1N		0.25	0.60	1.12	1.86	3.79	8.61
			T2N		36.00	87.00	162.00	270.00	550.00	1250.00
	50	12,5	P1N		0.05	0.12	0.23	0.39	0.80	1.82
			T2N		37.00	90.00	170.00	280.00	580.00	1320.00
			T2max		**70.00**	**155.00**	**280.00**	**422.00**	**860.00**	**1940.00**
5 / 1	3000	600	P1N		1.52	3.97	6.61	11.90	19.84	46.29
			T2N		23.00	60.00	100.00	180.00	300.00	700.00
	1500	300	P1N		0.89	2.38	3.80	7.11	12.57	29.10
			T2N		27.00	72.00	115.00	215.00	380.00	880.00
	750	150	P1N		0.53	1.42	2.15	3.97	7.27	18.19
			T2N		32.00	86.00	130.00	240.00	440.00	1100.00
	500	100	P1N		0.37	0.98	1.50	2.76	5.18	13.23
			T2N		34.00	89.00	136.00	250.00	470.00	1200.00
	250	50	P1N		0.20	0.51	0.79	1.49	2.78	7.11
			T2N		36.00	92.00	143.00	270.00	505.00	1290.00
	50	10	P1N		0.40	0.10	0.17	0.32	0.58	1.47
			T2N		37.00	95.00	150.00	290.00	525.00	1330.00
			T2max		**60.00**	**140.00**	**250.00**	**420.00**	**860.00**	**1910.00**
6 / 1	3000	500	P1N		1.25	2.95	5.18	7.09	11.45	27.27
			T2N		23.00	54.00	95.00	130.00	210.00	500.00
	1500	250	P1N		0.74	1.75	2.95	3.95	6.54	16.36
			T2N		27.00	64.00	108.00	145.00	240.00	600.00
	750	125	P1N		0.41	0.94	1.61	2.43	3.98	10.91
			T2N		30.00	69.00	118.00	178.00	292.00	800.00
	500	83	P1N		0.27	0.63	1.09	1.72	2.79	8.06
			T2N		30.00	70.00	120.00	190.00	308.00	890.00
	250	42	P1N		0.14	0.33	0.56	0.92	1.44	4.35
			T2N		31.00	71.00	122.00	200.00	315.00	950.00
	50	8	P1N		0.03	0.06	0.11	0.18	0.28	0.87
			T2N		31.00	72.00	125.00	210.00	320.00	1000.00
			T2max		**50.00**	**120.00**	**200.00**	**350.00**	**625.00**	**1730.00**

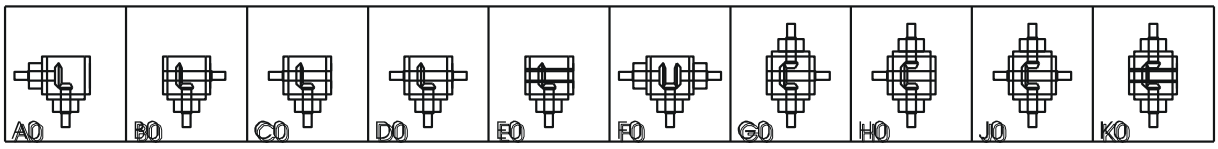
The bevel gears can also be used to increase speed. The output torque T2N given in the table then becomes the permissible drive torque T1N of the slow speed.

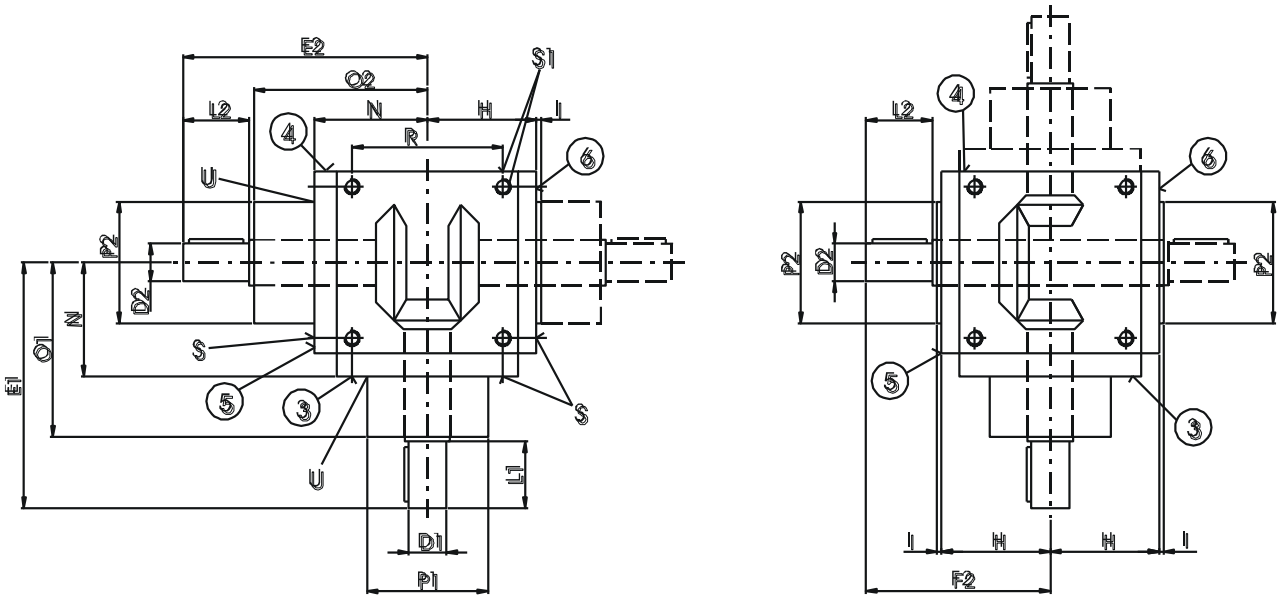
The output torque at the quickly rotating shaft can be calculated by:

T2N = T1N / gear ratio

Bevel gear V

Type





Type	i = 1:1 – 2:1					i = 3:1					i = 4:1					i = 5:1 - 6:1				
	D1	L1	E1	O1	P1	D1	L1	E1	O1	P1	D1	L1	E1	O1	P1	D1	L1	E1	O1	P1
065	12	26	100	72	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
090	18	35	122	85	60	12	35	122	85	60	12	35	132	95	60	12	35	132	95	60
120	25	45	162	115	80	20	45	162	115	80	20	45	172	125	80	15	35	162	125	70
140	32	50	180	128	90	28	50	180	128	90	24	50	195	143	85	24	50	195	143	85
160	35	60	212	150	110	28	60	212	150	100	24	60	232	170	100	24	60	232	170	100
200	42	80	273	190	120	35	68	261	190	120	35	68	261	190	120	28	68	261	190	110
260	60	110	380	265	160	45	90	360	265	160	45	90	360	265	160	45	90	360	265	160

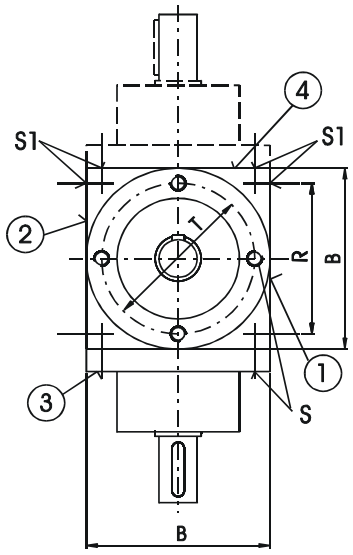
[mm]

Mounting holes:

All 6 sides of the gears are machined and can be used as mounting faces. The sides 3, 5 and 6 have the mounting holes "S" as a standard feature. The sides 1, 2 or 4 can be provided with the mounting holes "S1" on demand.

Bevel gear V

For the hollow shaft design E0 please see the dimensions on the opposite page.



Type														
	B	D2	E2	F2	H	I	L2	N	O2	P2	R	S,S1	T	U
065	65	12	100	72	42	2	26	42	72	44	45	M 6	54	0.5
090	90	18	122	95	55	2	35	55	85	60	70	M 8	75	1.0
120	120	25	162	122	72	3	45	75	115	80	100	M 10	100	1.0
140	140	32	180	137	82	3	50	85	128	90	110	M 10	115	1.5
160	160	35	212	160	95	3	60	95	150	110	120	M 12	135	2.0
200	200	42	273	203	117	3	80	120	190	120	160	M 12	175	3.0
260	260	60	380	268	150	4	110	150	265	160	220	M 16	230	5.0

[mm]

Fittings:

Shaft ends:	ISO j6	Shaft centring:	DIN 332 Sheet 2
Hollow shaft bore:	ISO H7	Feather keys and grooves:	DIN 6885 Sheet 1
Hollow shaft groove:	ISO JS9	Thread depth:	2x∅ or flange thickness resp.
Centring (P1, P2):	ISO f7		

Bevel gear V

Hollow shafts

Type E0 with groove acc. to DIN 6885/1

Type E0/HG without groove – hardened

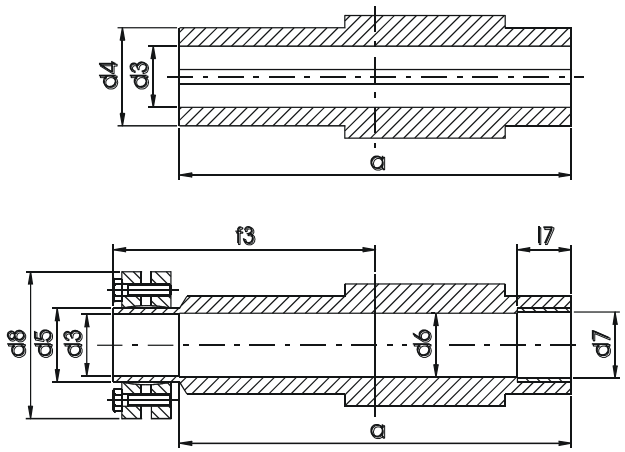
Type E0/KN with internal splines

Type E0/PG spline profile

Type E0/HS5 without shrink disc

Type E0/HSD5 with shrink disc

(5 = side 5 [standard]; alternative 6 = side 6)



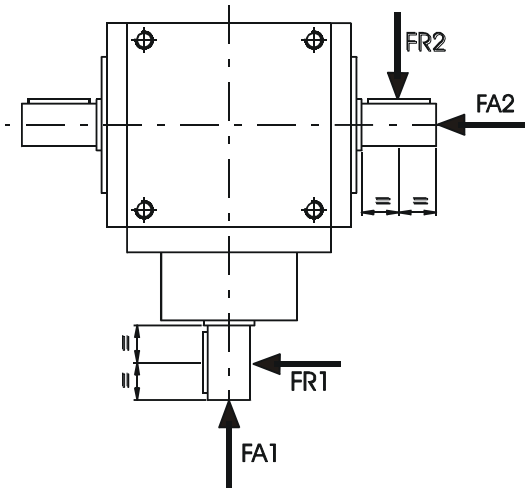
Type										Internal splines	Spline profile
	a	f3	Ød3	Ød4	Ød5	Ød6	Ød7	Ød8	l7	DIN 5463	DIN 32712
090	124	87	18	30	24	19	20	50	18	A 6x16x20	B P4C 17H7
120	160	107	25	40	30	26	27	60	22	A 6x21x25	B P4C 21H7
140	180	122	32	50	44	33	34	80	25	A 6x26x32	B P4C 30H7
160	206	135	35	55	44	36	37	80	25	A 8x32x38	B P4C 35H7
200	250	162	42	70	55	43	44	100	35	A 8x42x48	B P4C 43H7
260	320	200	60	80	75	61	62	138	40	A 8x56x65	B P4C 53H7

[mm]

Bevel gear V – permissible lateral forces

The permissible lateral forces given in the table refer to the centre of the journals of the shaft, depending on speed and torque.

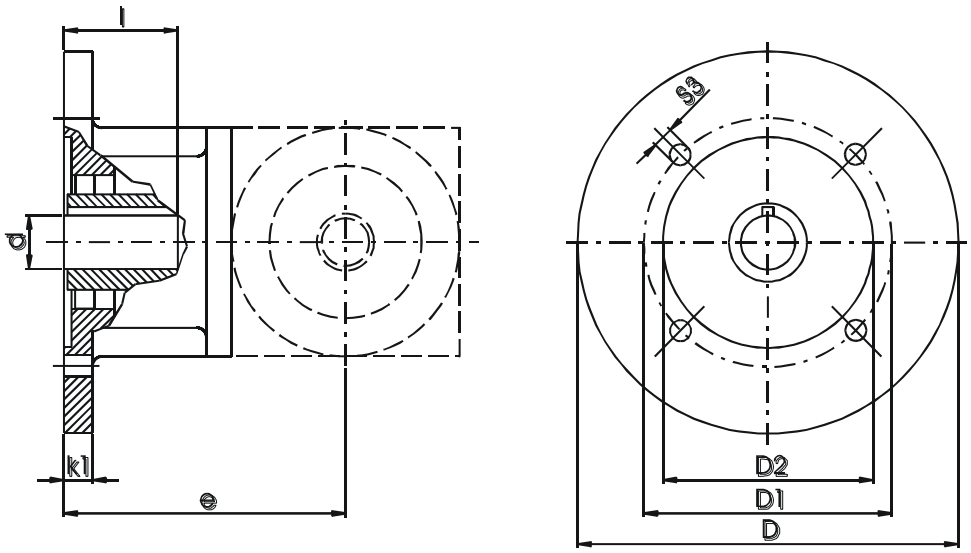
Axial forces FA of up to 50 % of the permissible radial forces can be taken without further calculation. If the axial forces exceed this value considerably or if combined radial and axial forces occur, please contact us.



			FR1 [N]						FR2 [N]					
Gear		**T**	**n1 [1/min]**						**n1 [1/min]**					
size		**[Nm]**	**3000**	**1000**	**500**	**250**	**100**	**50**	**3000**	**1000**	**500**	**250**	**100**	**50**
065	<	12	180	250	300	350	450	550	300	400	500	650	750	900
	>	12	150	210	250	290	380	460	250	330	420	540	630	750
090	<	30	300	400	470	580	700	800	500	660	800	950	1250	1500
	>	30	250	330	390	490	590	670	420	550	670	790	1040	1250
120	<	80	470	620	720	900	1150	1400	750	1000	1250	1500	1900	2200
	>	80	390	520	600	750	960	1170	630	830	1040	1250	1580	1830
140	<	140	700	870	1150	1370	1700	2000	1300	1700	2000	2500	3000	3800
	>	140	590	730	960	1140	1420	1670	1083	1420	1670	2080	2500	3170
160	<	220	1200	1600	1900	2200	2850	3300	2000	2800	3300	4000	5000	6500
	>	220	1000	1340	1590	1840	2380	2750	1670	2340	2750	3340	4170	5420
200	<	500	2200	1700	3200	3900	5000	6200	3200	4300	5000	6500	8000	10000
	>	500	1840	1420	2670	3250	4170	5170	2670	3580	4170	5420	6670	8330
260	<	950	7000	8600	11200	15000	17500	20000	8500	13000	16000	18000	22000	28000
	>	950	5830	7170	9330	12500	14580	16670	7080	10830	13300	15000	18330	23330

Bevel gear for motor mounting VL

Design with hollow drive shaft



Fittings:

Hollow bore:	ISO F7
Groove of the hollow shaft:	ISO JS9
Flange centring (D2):	ISO H7

All types of the bevel gears are available for mounting of motors or with already mounted three-phase motors. The throat bearing at side 3 of the gears is replaced by the flange throat bearing depicted when supplied complete with a motor. The dimensions are shown in the table overleaf. All other dimensions can be found next to each gear type.

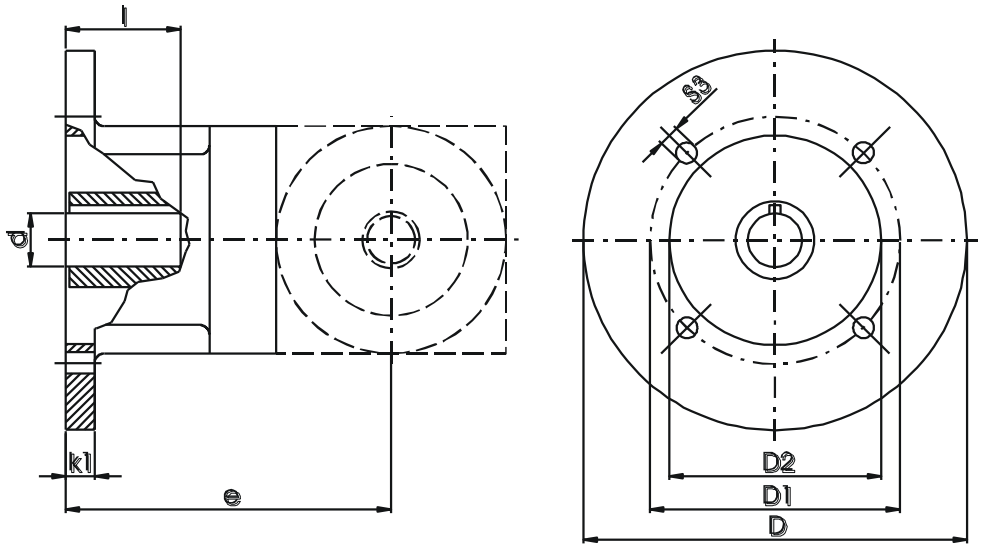
Bevel gear for mtor mounting VL

Type	Flange						Shaft	Size
	e	k1	ØD	ØD1	ØD2	ØS3	Ødxl	
065	90	10	105	85	70	7	9x20	063
			120	100	80	7	11x23	071
			140	115	95	9	14x30	
090	110	12	120	100	80	7	11x23	063
			140	115	95	9	14x30	071
			160	130	110	9	19x40	080
120	135	15	140	115	95	9	19x40	080
			160	130	110	9	24x50	090S
			200	165	130	11	28x60	090L
			250	215	180	14	32x60	100L
140	170	15	160	130	110	9	24x50	090S
			200	165	130	11	28x60	090L
			250	215	180	14	32x60	100L
							38x60	132S
							28x80[1)]	132M
160	190	18	200	165	130	11	24x50	090S
			250	215	180	14	28x60	090L
			300	265	230	14	32x60	100L
							38x60	132S
							38x80[1)]	132M
200	230	20	200	165	130	11	28x60	100L
			250	215	180	14	32x60	132S
			300	265	230	14	38x80	132M
			350	300	250	18	42x80	160
							42x110[1)]	180
260	280	28	300	265	230	14	38x80	132S
			350	300	250	18	42x110	132M
			400	350	300	18	48x110	160
			450	400	350	18	55x110	180
								200

1) Shaft length only available if gear ratio between 1:1 and 2:1 [mm]

Bevel gear for motor mounting für Motoranbau VC

Design with coupling



Fittings:

Hollow bore:	ISO F7
Groove of the hollow shaft:	ISO JS9
Flange centring (D2):	ISO H7

All types of the bevel gears are available for mounting of motors or with already mounted three-phase motors. The throat bearing at side 3 of the gears is replaced by the flange throat bearing depicted when supplied complete with a motor. The dimensions are shown in the table overleaf. All other dimensions can be found next to each gear type.

Bevel gears for motor mounting VC

Type	Flange					Motor size	Shaft	Flange
	k1	ØD	ØD1	ØD2	ØS3		dxl	e
065	10	90	75	60	6	063	9x20	101
		105	85	70	7	071	11x23	101
		120	100	80	7		14x30	119,5
		140	115	95	9			
090	12	120	100	80	7	063	11x23	140
		140	115	95	9	071	14x30	
		160	130	110	9	080	19x40	
120	15	140	115	95	M8	071	14x30	170
		160	130	110	9	080	19x40	
		200	165	130	11	090S	24x50	
		250	215	180	14	090L		
140	15	160	130	110	M8	080	19x40	196
		200	165	130	11	090S	24x50	
		250	215	180	14	090L	28x60	
						100L	32x60	
160	18	200	165	130	M10	090S	24x50	215
		250	215	180	14	090L	28x60	
		300	265	230	14	100L	32x60	
						112M		
200	20	200	165	130	M10	100L	24x50	262
		250	215	180	M12	112M	28x60	262
		300	265	230	14	132S	32x60	262
		350	300	250	18	132M	38x80	274
							42x80	299

[mm]

Order code for bevel gears

V 200	-	4:1	-	D0	-	2	.	4	-	250	/	0000

V 200 - Size of the bevel gear
4:1 - Gear ratio
D0 - Type
2 - Mounting side
4 - Mounting position
250 - Speed n2
0000 - Design

Mounting side

The data sheets of the gear types provide the standard mounting holes. By defining the mounting side you determine the additional mounting holes:

0 Standard mounting holes only
1...6 Gear side with mounting holes
9 Mounting holes on all sides

Mounting position

We need the mounting position to:

- determine the optimal amount of lubricant,
- determine the position of the oil fittings,
- adopt measures for the lubrication of the top bearings.

1...6 Bottom of the gear
9 All-side or changing mounting position (gear is completely closed without venting)

Speed n2

The output speed determines the viscosity and the amount of the lubricant needed. If the speed differs please give the maximum speed or details of the application.

Design

The four-digit key code for the gear design comprises all special requests. When ordering the for the first time, we ask for written details, like:

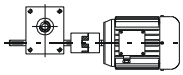
- splash protection
- reinforced bearing
- design with low backlash
- special shaft end

Dimensioning of screw jacks

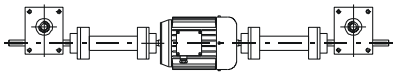
Project example

Screw jacks can be combined to form complete lifting units using only one motor. The examples show, how screw jacks, bevel gears, universal shafts and motor are combined in an optimal way. Such plants have the advantage to be able to move loads parallelly.

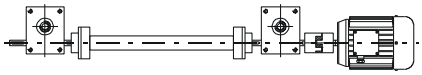
Beispiel 1



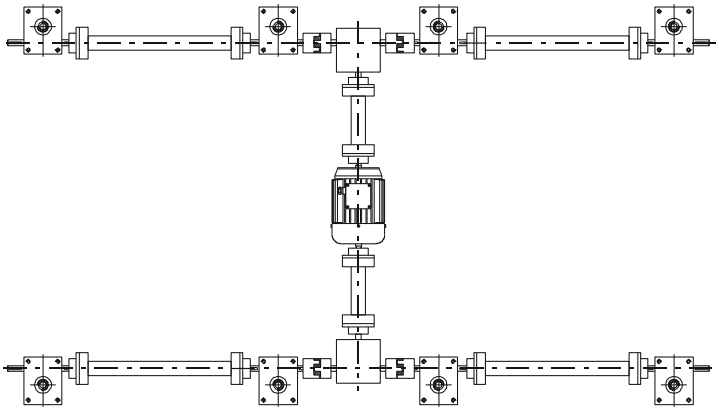
Beispiel 2



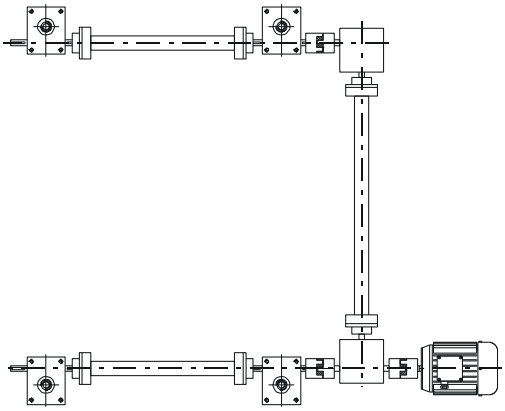
Beispiel 3



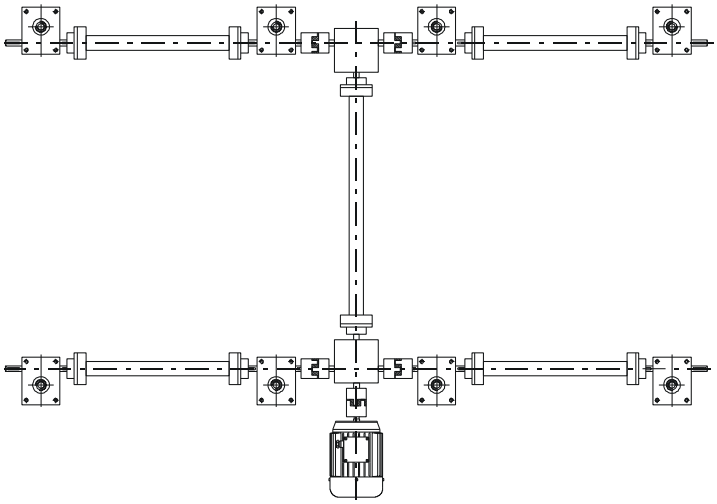
Beispiel 4



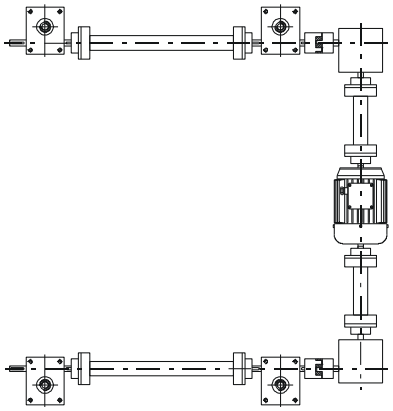
Beispiel 5



Beispiel 6



Beispiel 7



Dimensioning of screw jacks

Usually, when designing a lifting unit, the following parameters are given:

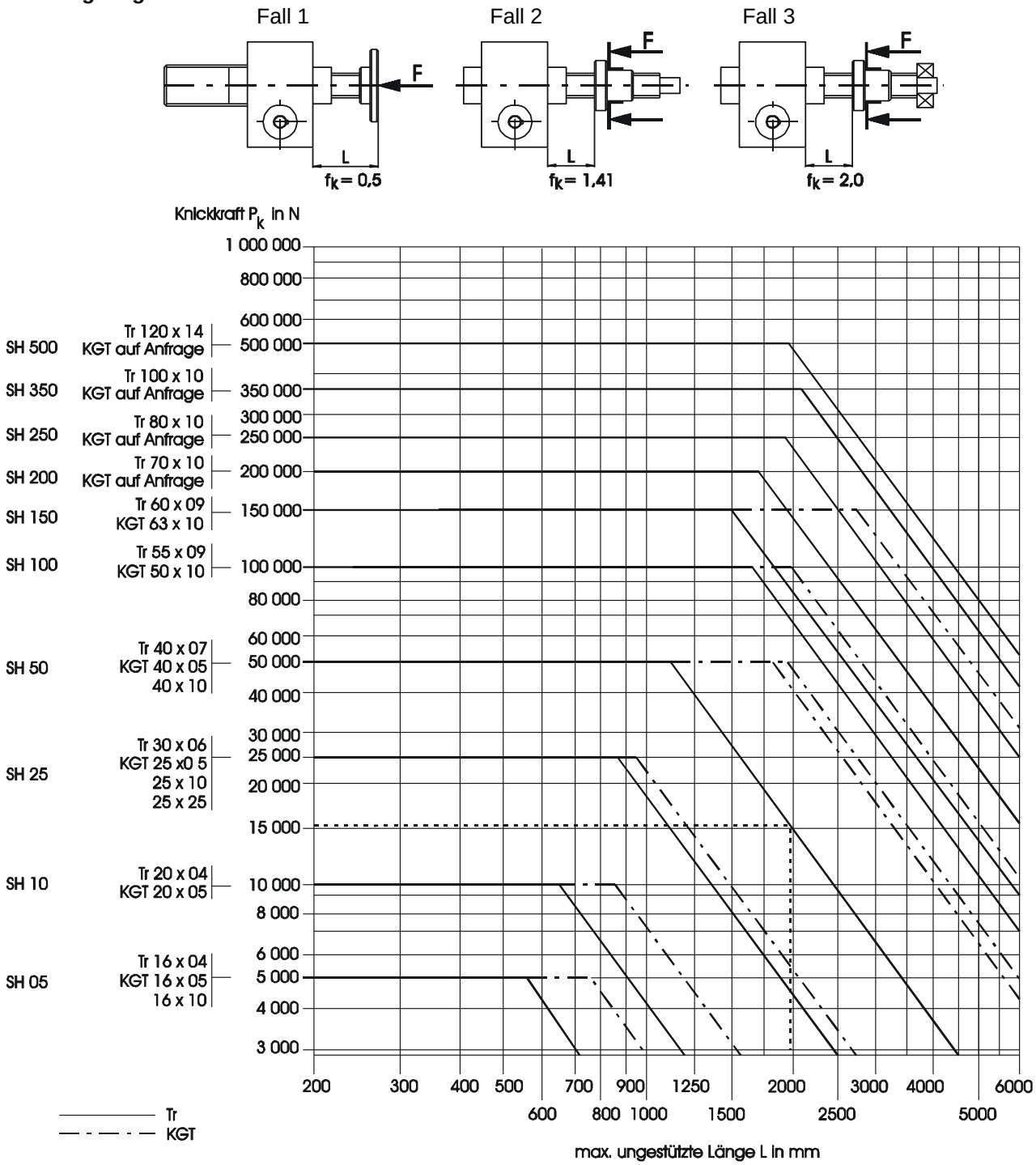
1. The load in kN (1 kN = 1,000 N ≈ 1,000 kp).
2. The stroke speed or the time during which a stroke is being carried out resp. There are two gear ratios available.
   Normal thread: 1 rotation of the thread produces a stroke of 1 mm
   Fine thread (F): 1 rotation of the thread produces a stroke of 0.25 mm
   Thus, a standard screw jack with a screw speed of 1,500 rpm produces a stroke speed of 1,500 mm/min. For our standard screw jacks, this speed is the limit speed (dependent on the load). Higher stroke speeds can only be achieved with a screw jack with ball screw (KGT) (Please contact us).
3. The stroke (in mm) is restricted in its max. length by the maximum axial load (acc. to Euler). The following buckling diagram gives an overview. The diagram refers to pressure. Generally it is important to protect the screw from lateral forces, because these have a severely negative effect on the working life and also on the performance of the drive. If lateral forces are inevitable, they should be taken up by external guiding systems.
   For travelling nut type (screw jack type L) counter bearings should be mounted.
4. Ambient conditions significantly influence the working life of screw jacks.
   The values given in the performance tables refer to an ambient temperature of 20° C and a duty cycle of 20 %/ per hour. Ambient temperature, duty cycle, speed and load are strongly dependent on each other.
   Protect the screw from dust and wetness, e. g. using bellows or a centry cover. In this case the cover has to be taken into consideration for the dimensioning of the stroke (longer screw)! In the basic design G, the other end of the screw is protected by a conduit.
5. Usually the construction causes the movement of one load with several screw jacks. The different screw jacks are connected by universal or Cardan shafts and bevel gears. Depending on the construction clutches, pedestal bearings and other technical means are used.

When using screw jacks, it is essential to make sure the main load is directed against the mounting face!

Rapidly rotating screws (travelling nut types) carry the risk of resonant vibrations (critical speed). Therefore the screw speed has to be checked (contact us).

Dimensioning of screw jacks

Buckling diagram



Permissible axial load :

$$P_{kzul} = P_k \cdot f_k \cdot 0.8$$

Example (- - - - -): SH 50 with Tr 40x7 / screw length 2,000 mm
P_k=15,000 N

Case 1: $P_{kzul} = 15000 \cdot 0.5 \cdot 0.8 = 6000$ N

Case 2: $P_{kzul} = 15000 \cdot 1.41 \cdot 0.8 = 16920$ N

Case 3: $P_{kzul} = 15000 \cdot 2.0 \cdot 0.8 = 24000$ N

Dimensioning of the drives

In the basis of the performance tables you can determine the torque and the power required according to the load and the speed of the drive.

Required torque per screw jack:

$$M_t = \frac{F_{dyn}}{2000 \cdot \pi \cdot \eta_H} \cdot \frac{P}{i} + M_L \,[Nm]$$

M_t = Torque per screw jack [Nm]
M_L = Idling torque [Nm]
F_{dyn} = Dynamic lifting force per screw jack [N]
η_H = Effectiveness of screw jack
$\frac{P}{i}$ = Stroke per screw rotation [mm]
P = Pitch [mm]
i = Gear ratio

Input power per screw jack:

$$N = \frac{M_t \cdot n_{SW}}{9550} = \frac{M_t \cdot v}{9550} \cdot \frac{i}{P} \,[kW]$$

N = Input power per screw jack [kW]
n_{SW} = Rotating speed [min^{-1}]
v = Stroke speed [mm/min]

Total power of a lifting unit:

$$N_{Ges} = \frac{N \cdot a}{\eta_G{}^b \cdot \eta_K{}^c} \,[kW]$$

N_{Ges} = Total power of a lifting unit [kW]
a = Number of screw jacks
b = Number of universal shafts
c = Number of bevel gears
η_G = Effectiveness of universal shaft (0,75-0,95)
η_K = Effectiveness of bevel gears (0,94-0,98)

Calculation example for a lifting unit:

4 screw jacks SH 250-G-F (fine thread)-...

Stroke speed 300 min^{-1}

Power each 2,1 kW

3 universal shafts, 2 bevel gears

$$N_{Ges} = \frac{2{,}1 \cdot 4}{0{,}95^3 \cdot 0{,}96^2} = \underline{10{,}6\,kW}$$

Dimensioning of the drives

Instructions for motor dimensioning

- The standard screw jacks are designed for a maximum input speed of 1,500 1/min.
- The breakaway torque can be significantly stronger than the drive torque. This is especially true for plants with poor effectiveness and long downtime.
- After selecting the motor make sure the screw jacks or the transmitting elements (bevel gears, universal shafts, clutches, etc.) are not overstrained by the load exerted. The following table shows the maximum torques of the screw jacks.
- All screw jacks are to some extent restrained by friction. Therefore we recommend to use motors with a holding brake.
- Heavy motors that are mounted to the screw jack with a motor flange should be additionally supported externally. Alternatively the motor flange can be supported externally.
- To protect the screw jacks from damage we recommend to use approximate pick-ups

Max. drive torques per screw jack

Size	**SH 2,5**	**SH 5**	**SH 10**	**SH 25**	**SH 50**	**SH 100**	**SH 150**	**SH 200**	**SH 250**	**SH 350**	**SH 500**
$M_{max.}$ [Nm]	1.5	3.2	7	16	34	69	105	150	205	300	425

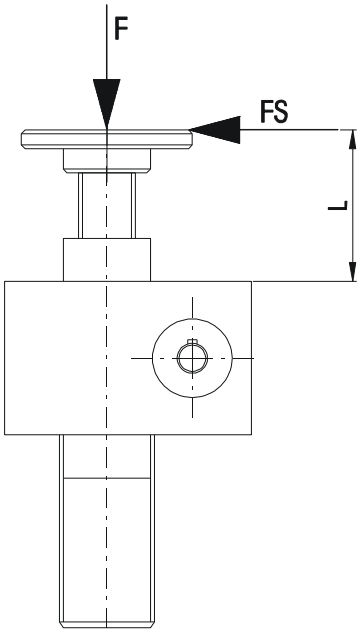
Motor protection types (acc. to DIN 40050)

Type of protection	**1. digit**		**2. digit**
	Protection from contact	**Protection from ingress of objects**	**Protection from water**
IP 44	Protection from contact with object or tool the size of a small wire	Protection from granular foreign objects diameter >1mm	Spraying water from all directions
IP 54	Complete protection from contact	Protection from harmful deposits of dust	Spraying water from all directions
IP 55			Low pressure water jets from all directions (0.3 bar)
IP 56			High pressure jets from all directions (1 bar) Short submersion
IP 65	Complete protection from contact	Protection from harmful deposits of dust	Low pressure water jets from all directions (0.3 bar)

Lateral forces Fs

If the screw is under **tension** the following values are valid:

	Max. perm. load	Fs x L [Nm]
SH 5	5	40
SH 10	10	50
SH 25	25	250
SH 50	50	500
SH 100	100	2,000
SH 150	150	2,000
SH 200	200	3,000
SH 250	250	3,000
SH 350	350	10,000
SH 500	500	16,000



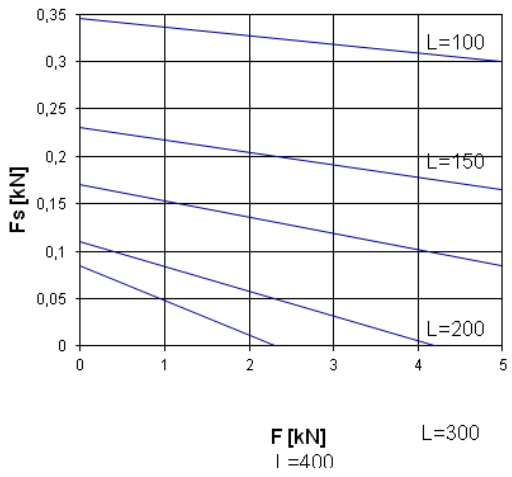
$$\text{Value } Fs_{zul} = \frac{Fs \cdot L}{L_{tats.}[mm]}[N]$$

The values are converted using the formula above.

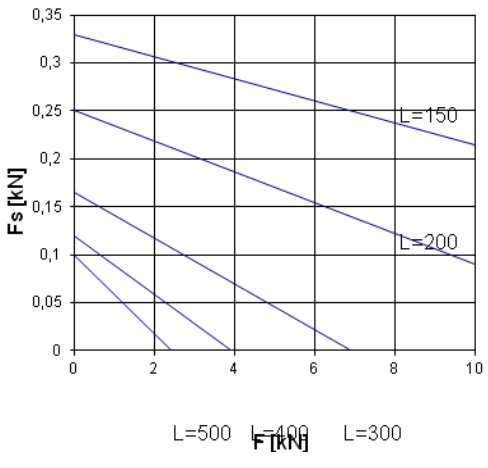
If the screw is under pressure take the max. permissible lateral force Fs from the diagrammes below.

Considering the screw guide, the lateral forces should not exceed 50 % of the value given during a stroke.

SH 2,5 / SH 5

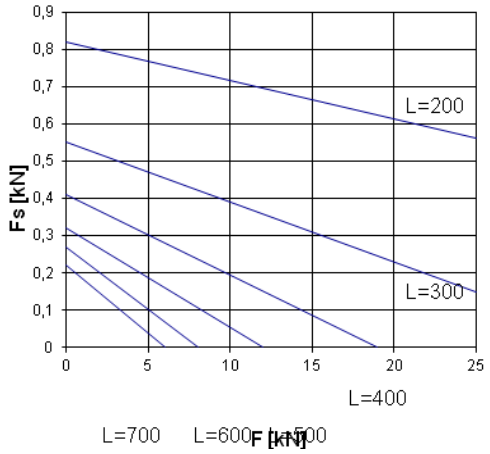


SH 10

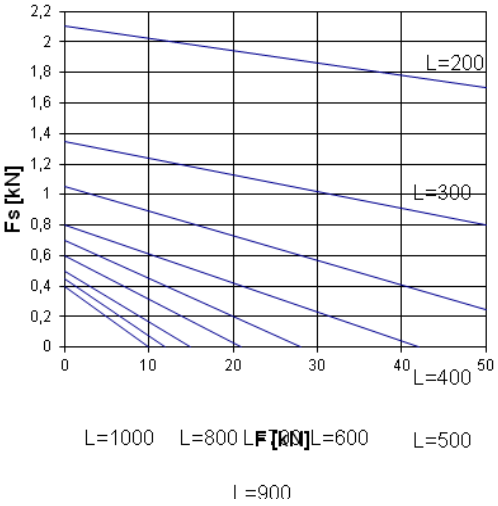


Lateral forces Fs

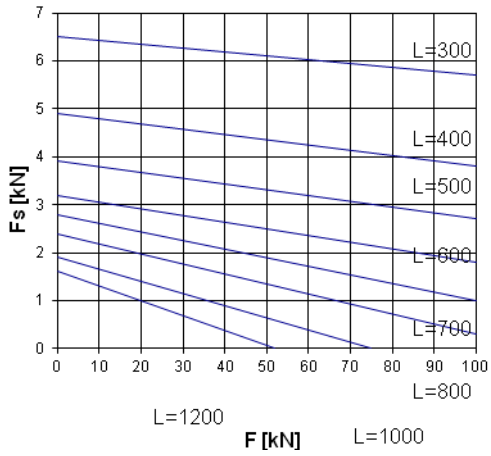
SH 25



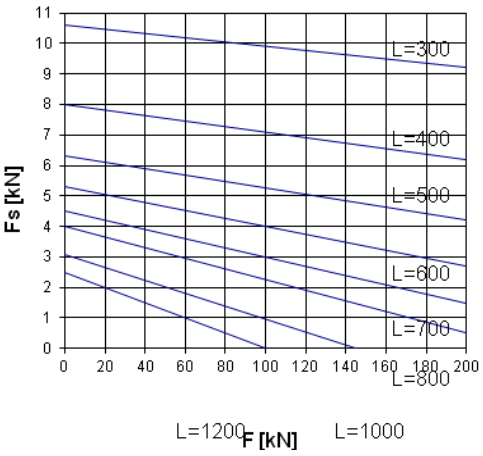
SH 50



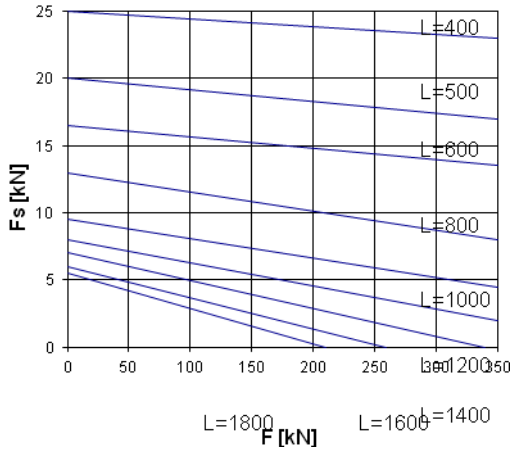
SH 100 / SH 150



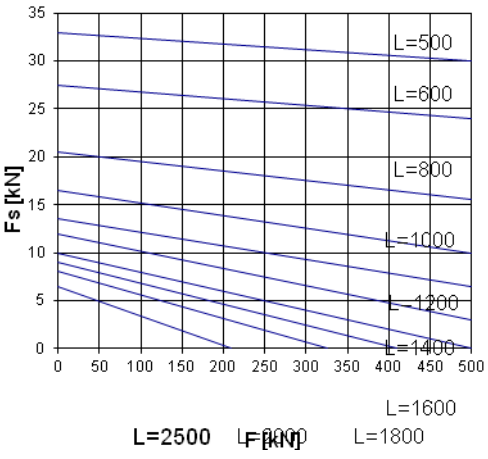
SH 200 / SH 250



SH 350



SH 500



Performance tables

Boundary conditions: 20 % duty cycle/60 min, 30 % duty cycle/10 min, ambient temperature 25 °C

SH 5		Load									
		1 kN		2 kN		3 kN		4 kN		5 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	0.60	0.09	1.20	0.19	1.80	0.28	2.20	0.35	2.90	0.46
	F	0.20	0.03	0.50	0.08	0.70	0.11	0.80	0.13	1.00	0.16
1000	N	0.60	0.06	1.20	0.13	1.80	0.19	2.30	0.24	3.00	0.31
	F	0.20	0.02	0.50	0.05	0.70	0.07	0.80	0.08	1.10	0.12
750	N	0.60	0.05	1.20	0.09	1.80	0.14	2.30	0.18	3.10	0.24
	F	0.20	0.02	0.50	0.04	0.70	0.05	0.90	0.07	1.20	0.09
500	N	0.60	0.03	1.30	0.07	1.90	0.10	2.30	0.12	3.10	0.16
	F	0.20	0.01	0.60	0.03	0.80	0.04	1.00	0.05	1.20	0.06
100	N	0.70	0.01	1.40	0.01	2.10	0.02	2.40	0.03	3.20	0.03
	F	0.30	0.01	0.60	0.01	0.90	0.01	1.00	0.01	1.40	0.01

N = normal thread 4 : 1 1 mm stroke per revolution of the screw

F = fine thread 16 : 1 0.25 mm stroke per revolution of the screw

SH 10		Load									
		2 kN		3 kN		5 kN		8 kN		10 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	1.50	0.24	1.80	0.28	3.20	0,50	5.00	0.79	6.20	0.97
	F	0.50	0.08	0.70	0.11	1.20	0,19	1.80	0.28	2.10	0.33
1000	N	1.50	0.16	1.80	0.19	3.20	0,34	5.00	0.52	6.20	0.65
	F	0.50	0.05	0.70	0.07	1.20	0,13	1.80	0.19	2.20	0.23
750	N	1.50	0.12	1.90	0.15	3.20	0,25	5.10	0.40	6.20	0.49
	F	0.50	0.04	0.70	0.05	1.20	0,09	1.80	0.14	2.30	0.18
500	N	1.60	0.08	2.00	0.10	3.30	0,17	5.20	0.27	6.30	0.33
	F	0.60	0.03	0.70	0.04	1.30	0,07	1.80	0.09	2.40	0.13
100	N	1.70	0.02	2.00	0.02	3.30	0,03	5.30	0.06	6.40	0.07
	F	0.70	0.01	0.80	0.01	1.40	0,01	1.90	0.02	2.50	0.03

N = normal thread 4 : 1 1 mm stroke per revolution of the screw

F = fine thread 16 : 1 0.25 mm stroke per revolution of the screw

Performance tables

Boundary conditions: 20 % duty cycle/60 min, 30 % duty cycle/10 min, ambient temperature 25 °C

SH 25		Load									
		5 kN		10 kN		15 kN		20 kN		25 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	3,00	0,47	6,00	0,94	9,00	1,41	12,00	1,88	15,00	2,36
	F	1,10	0,17	2,00	0,31	3,20	0,50	4,00	0,63	5,20	0,82
1000	N	3,00	0,31	6,00	0,63	9,00	0,94	12,00	1,26	15,10	1,58
	F	1,10	0,12	2,00	0,21	3,20	0,34	4,10	0,43	5,20	0,54
750	N	3,10	0,24	6,00	0,47	9,10	0,71	12,10	0,95	15,20	1,19
	F	1,20	0,09	2,10	0,16	3,30	0,26	4,20	0,33	5,20	0,41
500	N	3,20	0,17	6,10	0,32	9,20	0,48	12,20	0,64	15,20	0,80
	F	1,30	0,07	2,10	0,11	3,30	0,17	4,30	0,23	5,20	0,27
100	N	3,30	0,03	6,20	0,06	9,30	0,10	12,50	0,13	15,30	0,16
	F	1,40	0,01	2,20	0,02	3,40	0,04	4,50	0,05	5,30	0,06

N = Normal thread 6 : 1 1 mm stroke per revolution

F = Fine thread 24 : 1 0,25 mm stroke per revolution

SH 50		Load									
		10 kN		20 kN		30 kN		40 kN		50 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	9,00	1,41	13,00	2,04	19,50	3,06	29,00	4,55	31,00	5,00
	F	2,80	0,44	4,50	0,71	7,00	1,10	10,00	1,57	10,00	1,60
1000	N	9,10	0,95	13,00	1,36	19,50	2,04	29,00	3,04	31,00	3,32
	F	2,80	0,29	4,50	0,47	7,00	0,73	10,00	1,05	10,00	1,05
750	N	9,10	0,71	13,10	1,03	19,60	1,54	29,00	2,28	31,00	2,55
	F	2,90	0,23	4,60	0,36	7,10	0,56	10,10	0,79	10,20	0,81
500	N	9,20	0,48	13,10	0,69	19,60	1,03	29,10	1,52	31,10	1,70
	F	2,90	0,15	4,60	0,24	7,20	0,38	10,10	0,53	10,20	0,55
100	N	9,30	0,10	13,20	0,14	19,70	0,21	29,20	0,31	31,20	0,36
	F	3,00	0,03	4,70	0,05	7,30	0,08	10,20	0,11	10,20	0,14

N = Normal thread 7 : 1 1 mm stroke per revolution

F = Fine thread 28 : 1 0,25 mm stroke per revolution

Performance tables

Boundary conditions: 20 % duty cycle/60 min, 30 % duty cycle/10 min, ambient temperature 25 °C

SH 100		Load									
		50 kN		70 kN		80 kN		90 kN		100 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	39.00	6.13	55.00	8.64						
	F	13.00	2.04	20.00	3.14						
1000	N	39.00	4.08	55.00	5.76	65.00	6.81	73.00	7.64		
	F	13.00	1.36	20.00	2.09	22.10	2.31	24.00	2.51		
750	N	39.10	3.07	55.20	4.34	65.00	5.10	73.20	5.75	84.00	6.60
	F	13.10	1.03	20.20	1.59	22.30	1.75	24.30	1.91	29.50	2.32
500	N	39.20	2.05	55.20	2.89	65.30	3.42	73.40	3.84	84.30	4.41
	F	13.20	0.69	20.30	1.06	22.50	1.18	24.50	1.28	29.80	1.56
100	N	39.30	0.41	55.40	0.58	65.50	0.69	73.70	0.77	84.70	0.89
	F	13.30	0.14	20.40	0.21	22.60	0.24	25.80	0.27	30.00	0.31

N = Normal thread 9 : 1 1 mm stroke per revolution

F = Fine thread 36 : 1 0.25 mm stroke per revolution

SH 150		Load									
		50 kN		70 kN		100 kN		120 kN		150 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	43.00	6.75	59.00	9.27						
	F	13.00	2.04	19.50	306						
1000	N	43.20	4.52	59.20	6.20	81.50	8.53				
	F	13.20	1.38	19.70	2.06	27.10	2.84				
750	N	43.40	3.41	59.40	4.66	81.70	6.42	93.00	7.30		
	F	13.40	1.05	19.90	1.56	27.30	2.14	30.50	2.40		
500	N	43.60	2.28	59.60	3.12	81.90	4.29	93.20	4.88	120.00	6.28
	F	13.60	0.71	20.00	1.05	27.50	1.44	30.70	1.61	38.00	1.99
100	N	43.80	0.46	59.80	0.63	82.10	0.86	93.50	0.98	120.50	1.26
	F	13.80	0.14	20.20	0.21	27.70	0.29	30.90	0.32	38.50	0.40

N = Normal thread 9 : 1 1 mm stroke per revolution

F = Fine thread 36 : 1 0,25 mm stroke per revolution

Performance tables

Boundary conditions: 20 % duty cycle/60 min, 30 % duty cycle/10 min, ambient temperature 25 °C

SH 200		Load									
		50 kN		75 kN		100 kN		150 kN		200 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	42.00	6.60	65.00	10.21	87,50	13.74				
	F	13.50	2.12	22.00	3.46	29,00	4.55				
1000	N	42.20	4.42	65.20	6.83	87,70	9.18	140.00	14.66		
	F	13.70	1.43	22.20	3.32	29,20	3.06	46.60	4.88		
750	N	42.50	3.34	64.40	5.14	87,90	6.90	140.20	11.01	170.00	14.14
	F	13.90	1.09	22.40	1.76	29,30	2.30	46.80	3.68	60.00	4.71
500	N	42.70	2.24	65.60	3.43	88,00	4.61	140.40	7.35	180.20	9.43
	F	14.00	0.73	22.60	1.18	29,40	1.54	47.0	2.46	60.20	3.15
100	N	42.90	0.45	65.90	0.69	88,20	0.92	140.60	1.47	180.50	1.89
	F	14.20	0.15	22.80	0.24	29,60	0.31	47.20	0.49	60.40	0.63

N = Normal thread 10 : 1 1 mm stroke per revolution

F = Fine thread 40 : 1 0,25 mm stroke per revolution

SH 250		Load									
		50 kN		100 kN		150 kN		200 kN		250 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	44.00	6.91	90.00	14.14	130.00	20.42				
	F	15.00	2.36	30.20	4.74	45.00	7.07				
1000	N	44.20	4.63	90.20	9.45	130.20	13.63				
	F	15.20	1.59	30.40	3.18	45.20	4.73				
750	N	44.40	3.49	90.40	7.10	130.40	10.24	180.20	14.15		
	F	15.40	1.21	30.60	2.40	45.40	3.57	60.80	4.77		
500	N	44.60	2.34	90.60	4.74	130.60	6.84	180.40	9.45	280.00	14.66
	F	15.60	0.82	30.80	1.61	45.60	2.39	61.00	3.19	93.00	4.87
100	N	44.80	0.47	90.80	0.95	130.80	1.37	180.60	1.89	280.20	2.93
	F	15.80	0.17	31.00	0.32	45.80	0.48	61.20	0.64	93.30	0.98

N = Normal thread 10 : 1 1 mm stroke per revolution

F = Fine thread 40 : 1 0,25 mm stroke per revolution

Performace tables

Boundary conditions: 20 % duty cycle/60 min, 30 % duty cycle/10 min, ambient temperature 25 °C

SH 350		Load									
		50 kN		100 kN		150 kN		300 kN		350 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	60.00	9.42	120.00	18.85	179.00	28.12				
	F	16.50	3.06	42.00	6.60	60.00	9.42				
1000	N	60.20	6.30	120.20	12.59	179.20	18.76				
	F	19.60	2.05	42.20	4.42	60.20	6.30				
750	N	60.20	4.73	120.40	9.46	179.40	14.09				
	F	19.70	1.55	42.40	3.33	60.40	4.74				
500	N	60.40	3.16	120.60	6.31	179.60	9.40				
	F	19.80	1.04	42.60	2.23	60.60	3.17				
100	N	60.50	0.63	120.00	1.26	179.80	1.88	360.00	3.77	420.00	4.40
	F	20.00	0.21	42.80	0.45	60.80	0.64	130.00	1.36	150.00	1.57

N = Normal thread 10 : 1 1 mm stroke per revolution

F = Fine thread 40 : 1 0,25 mm stroke per revolution

SH 500		Load									
		100 kN		200 kN		300 kN		400 kN		500 kN	
n [1/min]		M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]	M [Nm]	P [kW]
1500	N	110.00	17.28	222.00	34.87						
	F	40.00	6.28	75.00	11.78						
1000	N	110.20	11.54	222.20	23.27						
	F	40.20	4.21	75.20	7.87						
750	N	110.40	8.67	222.40	17.47	320.20	24.15				
	F	40.40	3.17	75.40	5.92	86.50	6.79				
500	N	110.60	5.79	222.60	11.65	320.40	16.77	440.00	23.04		
	F	40.80	2.14	75.60	3.96	90.00	4.71	150.50	7.88		
100	N	110.80	1.16	222.80	2.33	320.60	3.36	440.20	4.61	530.00	5.55
	F	40.80	0.43	75.80	0.79	110.00	1.15	150.70	1.58	185.00	1.94

N = Normal thread 14 : 1 1 mm stroke per revolution

F = Fine thread 56 : 1 0,25 mm stroke per revolution

Mounting instructions

General instructions

- Protect the screw from dirt. Retrofit of centry covers or bellow covers reduce the stroke length. Consider the required block length or alter the length of the screw accordingly.
- In order to protect the screw jack from damage we recommend to secure the end positions of the stroke electrically (limit switches).
- Always protect the screw from lateral forces (external guidings), although the screw jacks feature slide bushings for the screws. Lateral forces can also be a result of the twisting moment of the screw.
- The screw type SH-G (basic design) has to be protected against twisting. If no external guiding systems can be mounted we recommend a twist lock VD (tongue and groove at the screw or square tube).
- We recommend a stop collar AD for the screw type SH-G (basic design). It prevents the screw from being removed from the gear box.
- We recommend useing a bearing for the free end of the screw type SH-L (with travelling screw). Make sure not to exceed the critical speed of the screw (contact us).
- If there are greater distances between the screw jacks it may be necessary to install intermediate bearings for the connecting shafts, depending on the speed (contact us).
- When using ball screws, we recommend to never removing the nut from the screw because the balls could drop out and the ball screw is not usable any more. Only qualified personnel should dismount the nut with the aid of a mount bushing.
- If the load factor of the screw jacks exceeds 80 %, please contact us for safety reasons. We do not take any liability for our products in case of improper use.

Mounting instructions

Safety instructions

All screw jacks are self-locking in a limited way. Therefore we recommend employing motors with a holding brake. Always make sure, the construction poses no danger to persons or things and clearly indicate remaining risks.

Because the screw jacks can be employed in a wide range of applications, the responsibility for the specific applications lies with the user.

We refuse any liability if the screw jack has been dismounted or a ball screw has been removed by the user without our consent. The same, if the permissible load, duty cycle or speed have been exceed.

Mounting/Commissioning

Always keep an eye on the load direction. The load should always be in direction of the mounting face, the mounting screws must not be under tension.

The mounting face for the screw jacks has to be clean and machined evenly (the same applies to bevel gears, pedestal bearings and motors). Make sure the mounting screws in the housing fully use the thread depth. If a construction contains several screw jacks, bevel gears, pedestal bearings and universal shafts make sure they are exactly aligned in all dimensions. Before connecting the screw jacks to each other align all screws to an exact level. The non-compliance with all of these instruction leads to shorter working life and premature failure. If the screw jacks are coupled with universal shafts of other suppliers we recommend to use elastic couplings if misalignments cannot be excluded. It is recommended to tighten the screws only after aligning the construction. To avoid misalignments we recommend to once drive the screw jacks manually or very slowly along the whole stroke length. Before commissioning check the sense of rotation of all elements including the motor! Clean the screw before the test run and lubricate it over the whole stroke length. Check the function and the position of limit switches. If the whole stroke can be travelled without variations in torque you can expect tension-free operation. Only drive the unit under load if all factors are checked.

Check the mounting screws after 20 working hours.

Mounting instructions

Maintenance

As a standard the screw jacks are delivered filled with lubricant (oil on demand). The screw of the travelling nut type (design L) has to be lubricated before mounting.

Due to a certain overpressure in the housing during the first filling it may seem that the lubricant is leaking. The effect vanishes after a short time. The screw wipes off dirt during operation but the loss is compensated by relubrication.

If the leakage is unwanted the gear has to be sealed which entails manual lubrication to avoid dry run. If the screw jacks are difficult to reach the lubrication spots have to be equipped with an oiler or be connected to a central lubrication unit. This especially applies to the L type (with travelling nut). Gears and screws have to be lubricated regularly.

We recommend to renew the lubricant and clean the parts about every 500 to 600 operating hours, after two years the latest. This is also the occasion to check the state of the nut's thread and the fit. If the thread shows an abrasion of over 50 % it has to be replaced.

Lubrication

As a standard the gear is filled with gear lubricant **DEA Paragon EP1** consistence class 1.
In case of special applications the kind of lubricant is indicated.

Oil filling if not indicated otherwise **DEA Falcon CLP 460**.

You can use kinds of oil or grease by other manufacturers that provide equal quality.
If the quality differs we do not take any liability.

Amount of lubricant

SH 2,5	SH 5	SH 10	SH 25	SH 50	SH 100	SH 150	SH 200	SH 250	SH 350	SH 500
40 g	80 g	130 g	250 g	800 g	1,000 g	1,500 g	1,900 g	1,900 g	2,700 g	3,100 g

Order code for screw jacks

Screw jack – basic design G

SH	-	25	-	G	-	VD	-	280	-	BF	-	MG 140 „R“ / KUP RA 19	-	lacquered

SH	-	Product name	Screw jack
25	-	Size	Max. load 25 kN
G	-	Design	Basic design
VD	-	Model	Stop collar
280	-	Stroke [mm]	280 mm stroke
BF	-	Screw end	Mounting flange at screw end
MG 140 „R“	-	Mounting parts	Motor flange at gear side „R“, flange diameter 140 mm
KUP RA 19	-	Mounting parts	Coupling size RA 19
lacquered	-	Special design	Lacquered housing according to customer's requierements

Types of design:

KGT ...	Ball screw (e. g. KGT 20x5)		
P-Tr ...	Precision trapezoidal screw (e. g. Tr 18x4 P4 acc. to DIN 103)		
F	Fine thread – 0,25 mm stroke per revolution		
VD	Twist lock	variant 1:	groove and tongue at the screw
		variant 2:	square tube

Screw end:

AD	Stop collar at the screw
BF	Mounting flange
SZ	Standard journal at screw end
GKA	Clevis for sizes SH 2,5-100 (rod end on demand)
GKB	Rod end for sizes SH 150-500 (rod end on demand)
SE	Special screw end (acc. to customer drawing)

Mounting parts:

BL	Mounting ledges (comprises 2 pieces)
KP	Cardan plate
LB	Pedestal bearing
LF	Flange bearing
FB	Bellow cover
SFA	Centry cover
SFM	Safety nut
EF / EV	Fixed limit switch/flexible limit switch
MG ...	Motor flange (e. g. MG 160 „L“) – always indicate mounting side „R“ or „L“
KUP ...	Coupling (e. g. KUP RA 24)
HR	Handwheel
MOTOR	mMotor according to customer's requirements

Special design:

Stainless (galvanised)
Low backlash
Oil lubrication
Lacquered

Order code for screw jacks

Screw jack – travelling nut type L

SH	-	25	-	L	-	F	-	420	-	SZ	-	FM / MG 140 „L“ / KUP RA 19	-	primed

SH	-	Product name	Screw jack
25	-	Size	Max. load 25 kN
L	-	Type	Travelling nut type
F	-	Design	Fine thread
420	-	Stroke [mm]	420 mm stroke
SZ	-	Screw end	Standard journal ends
FM	-	Mounting parts	Travelling nut
MG 140 „L“	-	Mounting parts	Motor flange on gear side „L“ flange diameter 140 mm
KUP RA 19	-	Mounting parts	Coupling size RA 19
grundiert	-	Special design	Primed housing

Kinds of design:

KGT ...	Ball screw (e. g. KGT 20x5)
P-Tr ...	Precision trapezoidal screw (e. g. Tr 18x4 P4 acc. to DIN 103)
F	Fine thread – 0.25 mm stroke per revolution

Screw end:

SZ	Standard journal at screw end
SE	Special screw end (acc. to customer drawing)

Mounting parts:

FM	Travelling nut with flange (see data sheet)
ZM	Cylinder shape travelling nut (on demand)
BL	Mounting ledges (comprises 2 pieces)
KP	Cardan plate
LB	Pedestal bearing
LF	Flange bearing
KA-Tr	Cardan adapter for trapezoidal thread screw
MK-Tr	Nut console for trapezoidal thread screw
KA-KGT	Cardan adapter for ball screw
MK-KGT	Nut console for ball screw
FB	Bellow cover
SFA	Centry cover
SFM	Safety nut
MG ...	Motor flange (e. g. MG 160 „L“) – always indicate mounting side „R“ or „L“
KUP ...	Coupling (e. g. KUP RA 24)
HR	Handwheel
MOTOR	Motor according to customer's requirements

Special design:

Stainless (galvanised)
Low backlash
Oil lubrication
Lacquered

Product range

Drives and stages

- Linear stages
- Linear positioning tables with/without drive
- Precision positioning tables
- Ball screws and roller screws
- Trapezoidal screws
- Screw jacks
- Electromechanical cylinders
- Bevel gears
- Planeatry gears

Drives and accessory

- Three-phase asynchronous motors
- Worm geared motors
- Spur gear motors
- Servo drives
- Stepper drives
- DC motors
- Frequency changers
- Controllers
- Switches, proximity sensors

Linear guides

- Linear ball or roller guides
- Precision shafts
- Linear ball bearings
- Glide bushings

Links

- Couplings
- Universal shafts
- Cardan shafts
- Clamps

Roller bearings

Custom-tailored solutions

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