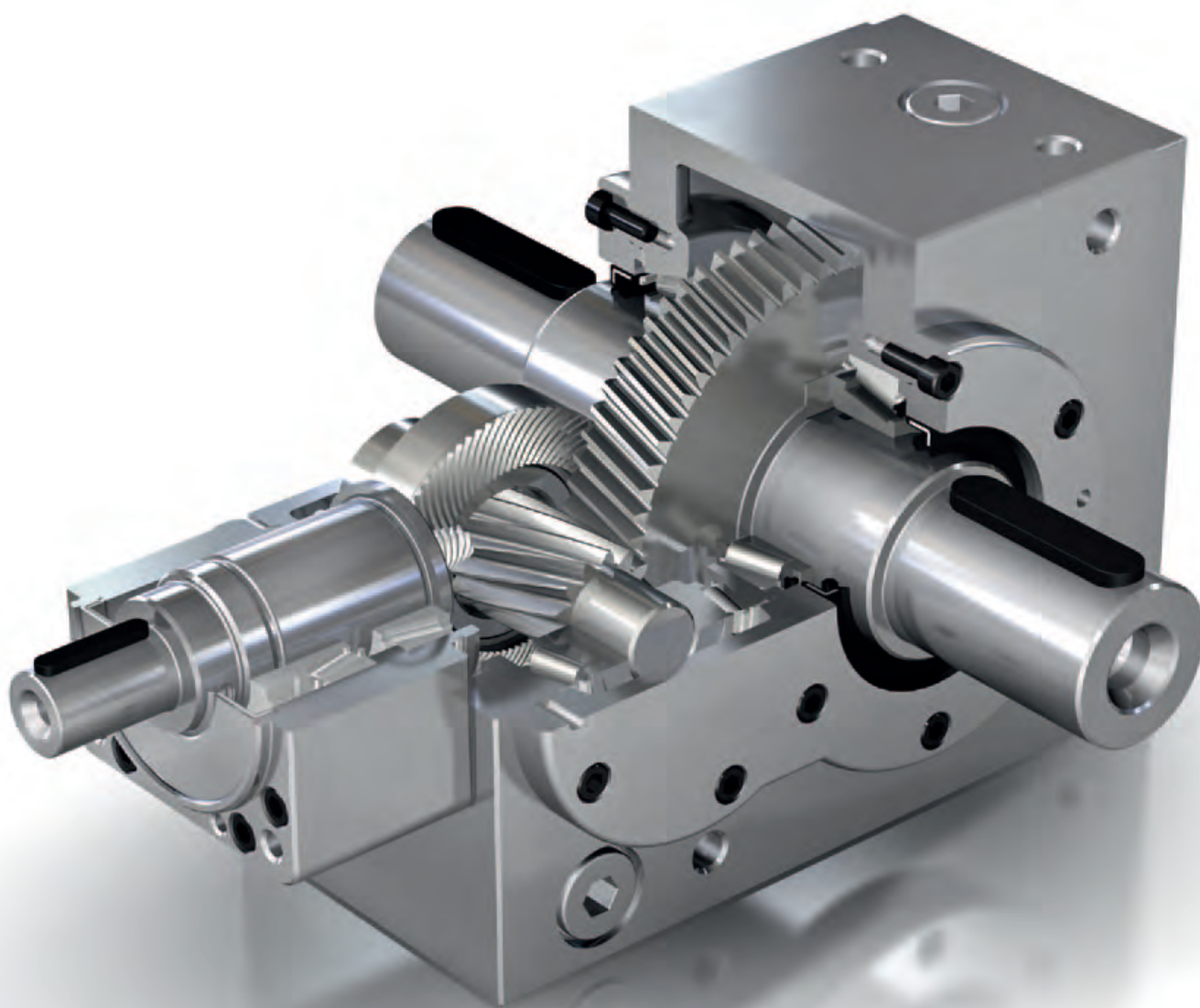


KS TWINGEAR

Compact, precise and powerful



A close-up, high-angle photograph of a bevel gear assembly. The image shows the intricate teeth of the gears and the housing, with a semi-transparent white text box overlaid in the upper right quadrant. The lighting is dramatic, highlighting the metallic surfaces and the precision of the engineering.

Precision combines with performance.

Bevel gear technology is at the heart of an assembly consisting of gear housing, shafts, flanges and bearings resulting in a high performance gearbox. With over 50 years of experience, MS-GRAESSNER have the competence to offer innovative solutions in bevel gear technology and gearbox assembly suiting a wide range of industrial gearing applications. MS-GRAESSNER are the ideal partner for you.

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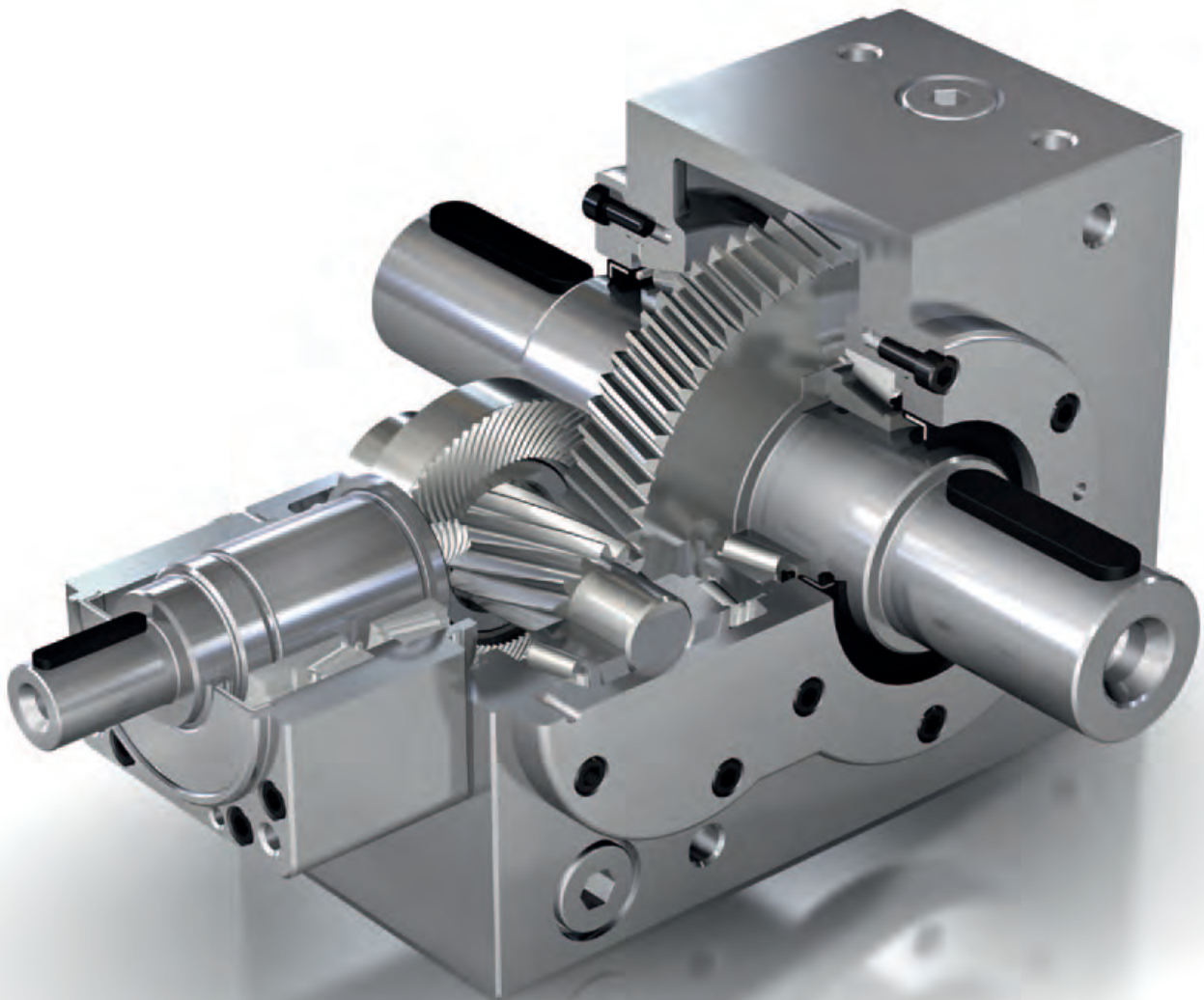
Highlights

KS TWINGEAR

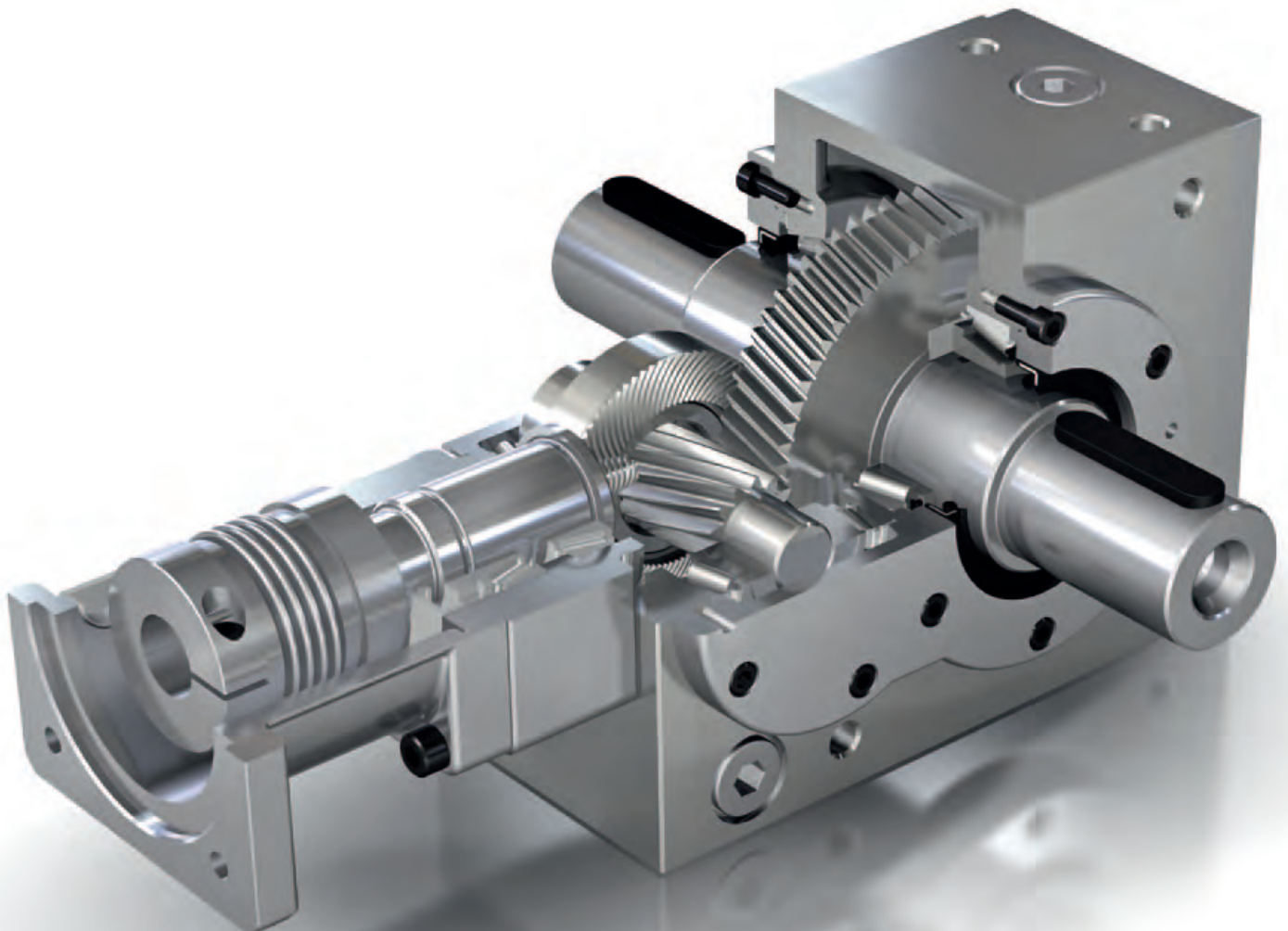
The KS TwinGear Bevel Helical Gearbox is a high performance and precision gearbox. This two-stage gearbox available in ratios up to 75:1 is very space-efficient and suits an array of applications. High torsional stiffness and low backlash ensure a high transmission accuracy.

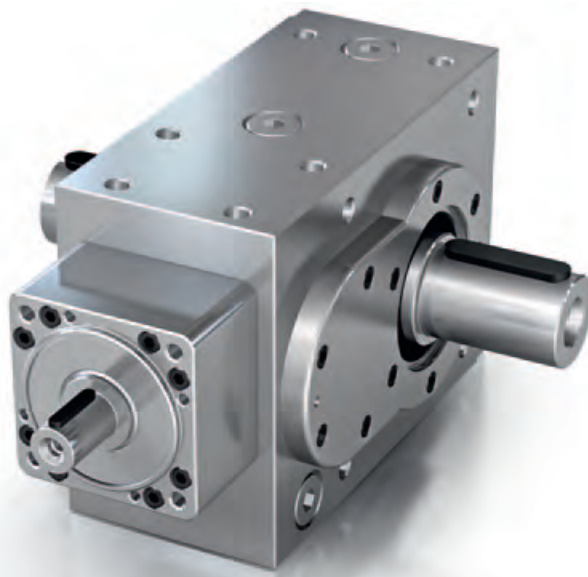
Features and benefits:

- Precision component parts
- Suitable for high input speeds
- Extremely compact design
- Motor mounting via coupling
- High torsional stiffness
- High torque
- Low-noise hypoid bevel gears

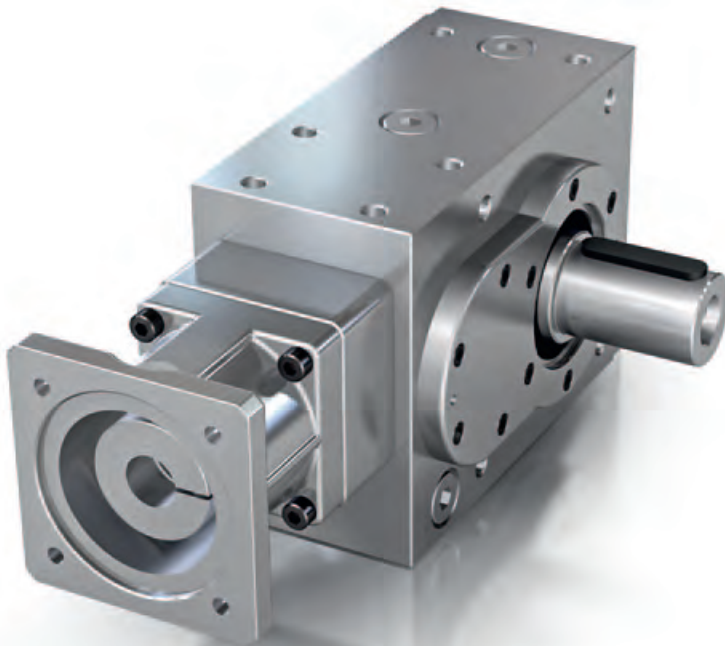


Series	L, H, KL, KH, FL, FH
Shaft arrangements	1L, 3L, 13L, 1LSV, 3LSV
Sizes	KS10 - KS70
Ratios	$i = 15.0 / 20.0 / 25.0 / 30.0 / 40.0 / 50.0 / 60.0 / 75.0$
Nominal output torque	Up to 7500 Nm
Motor mounting	With input flange/coupling (K) or direct with hollow shaft/flange (F)
Backlash	< 6 arcmin

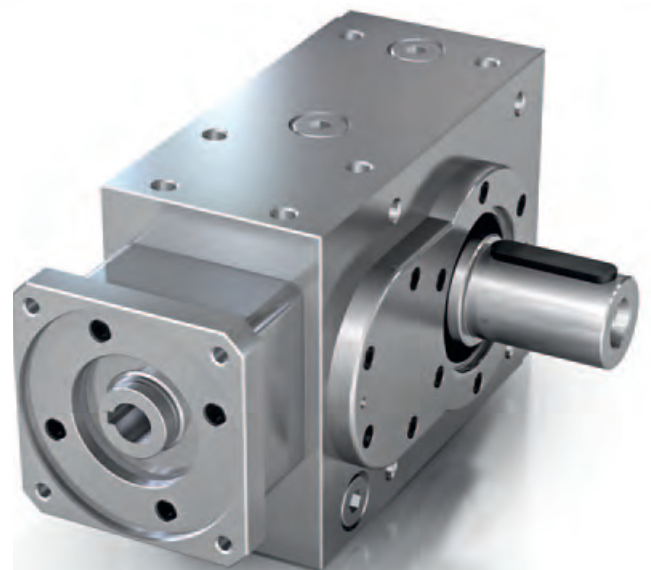




***Series L
Solid shaft version***



***Series K
Solid shaft version with input flange and
coupling***



***Series F
Hollow shaft version with
input flange***



Series L
Solid shaft version,
both sides or
one side only



Series H
Hollow shaft version
with keyway



Series F
Hollow shaft version
with extension for shrink disc

Size		KS10	KS20	KS30	KS35	KS40	KS50	KS60	KS70
Output torque									
Ratio	i	15 / 20 / 25 / 30							
Nominal torque	T_{2N} [Nm]	150	250	480	950	1750	3200	5000	7500
Maximum acceleration ④	T_{2B} [Nm]	225	375	720	1425	2625	4800	7500	11250
EMERGENCY STOP torque ③	T_{2Not} [Nm]	300	500	960	1900	3500	6400	10000	15000
Ratio									
Ratio	i	40 / 50							
Nominal torque	T_{2N} [Nm]	110	200	360	700	1300	3200	5000	7500
Maximum acceleration ④	T_{2B} [Nm]	165	300	540	1050	1950	4800	7500	11250
EMERGENCY STOP torque ③	T_{2Not} [Nm]	220	400	720	1400	2600	6400	10000	15000
Ratio									
Ratio	i	60 / 75							
Nominal torque	T_{2N} [Nm]	75	125	250	475	900	2550	4050	5100
Maximum acceleration ④	T_{2B} [Nm]	110	185	375	710	1350	3825	6075	7650
EMERGENCY STOP torque ③	T_{2Not} [Nm]	150	250	500	950	1800	5100	8100	10200
Input speed									
Ratio	i	15 / 20 / 25 / 30 / 40 / 50 / 60 / 75							
Maximum speed ⑤	n_{1max} [min ⁻¹]	8000	7000	6000	5000	4000	4000	3500	3500
Nominal speed	n_{1N} [min ⁻¹]	auf Anfrage							
Standard backlash ①	j_t [arcmin]	< 6	< 6	< 6	< 5	< 5	< 4	< 4	< 4
Permissible radial force ②	F_{2Rmax} [N]	4900	7200	10000	15000	18000	25000	30000	35000
Permissible axial force ②	F_{2Amax} [N]	2450	3600	5000	7500	9000	12500	15000	17500
Running noise i=15-50 ⑥	L_{pA} [dB(A)]	< 69	< 69	< 71	< 71	< 73	< 73	< 75	< 75
Running noise i=60-75 ⑥	L_{pA} [dB(A)]	< 67	< 67	< 69	< 69	< 71	< 71	< 73	< 73
Weight, approx.	m [kg]	10	16	27	52	75	115	190	300
Efficiency at max load	η [%]	>92 (>90 at i= 60/75)							
Service life	Lh [h]	>15 000							
Lubrication + permissible operating temperature		Please see "Service and Maintenance" page 20/21							
Paint		Primer RAL 9005 – Matt black							

① At the output, assuming 2 % load

② Point of force application center of output shaft at an output speed of 400 min⁻¹

③ Max 1000 times during the service life of the gearbox

④ Max 1000 cycles per hour, please consider reducing factors in other cases

⑤ Observe permissible operating temperatures

⑥ At $n_1=1500$ min⁻¹ and partial load

Maximum motor acceleration torque	T_{1BMot}	Nm
Nominal output torque	T_{2N}	Nm
Maximum output acceleration torque	T_{2B}	Nm
EMERGENCY STOP output torque	T_{2Not}	Nm
Maximum input speed	n_{1max}	min^{-1}
Nominal input speed	n_{1N}	min^{-1}
Output backlash	j_t	arcmin
Torsional output stiffness	C_{t21}	Nm/arcmin
Radial input force	F_{1Rmax}	N
Radial output force	F_{2Rmax}	N
Axial input force	F_{A1max}	N
Axial output force	F_{A2max}	N
Efficiency at full load	η	%
Running noise	L_{pA}	dB(A)
Weight	m	kg
Mass moment of inertia	I_1	kgcm^2
Service life	L_h	h
Run time	RT	min
Duty cycle	DC	%
Ambient temperature	t_a	$^{\circ}\text{C}$
Thermal performance limit	P_{therm}	kW
Performance	P	kW

Dimensions

Main Dimensions and Input Option - Series L

KS TWIN GEAR

Main Dimensions

Size	A	B	C	D	E	g ₁	g ₂	o	k ₂	q	i	w ₂ ^{F7}	n ₂₁
KS10	75	110	147,5	92,5	55	10,5	10,5	7,5	M8	44	28	55	4
KS20	90	140	180	110	70	13	13	9	M10	55	30	63	4
KS30	110	170	222	137	85	13	13	14	M12	67	37	80	4
KS35	140	210	275	170	105	16	16	18	M16	85	50	95	6
KS40	170	240	322	202	120	16	16	23	M16	95	60	110	6
KS50	210	280	383	243	140	16	23	32	M16	110	75	120	6
KS60	240	360	475	295	180	18	25	38	M20	140	80	130	8
KS70	280	450	585	360	225	18	25	42	M20	175	90	160	10

Input Option - Series L

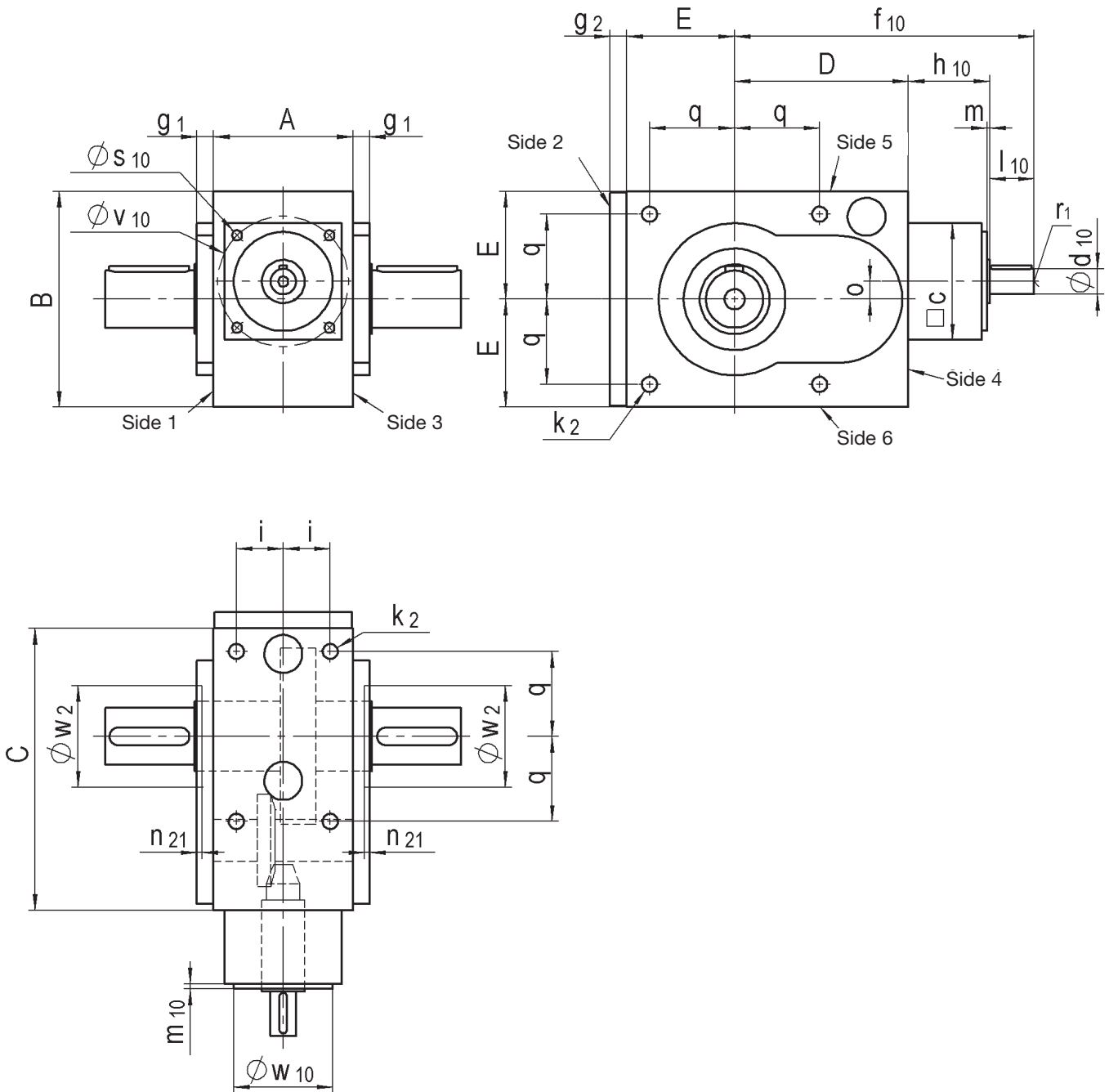
Size	Ød ₁₀ k6	l ₁₀	r ₁	m	□c	Øw ₁₀ g6	m ₁₀	Øv ₁₀	s ₁₀	f ₁₀	h ₁₀	Key
KS10	14	25	M5	2	70	51	4	67	M6	175	53,5	5x5x20
KS20	16	30	M6	2	80	68	4	90	M6	196	56	5x5x25
KS30	20	35	M8	2	90	78	4	103	M8	236	64	6x6x32
KS35	26	45	M8	2	105	86	4	115	M8	301	86	8x7x40
KS40	32	50	M12	2	130	107	4	145	M10	356	104	10x8x45
KS50	38	55	M12	2	135	117	4	153	M10	413	115	10x8x50
KS60	45	70	M16	2	145	140	4	165	M12	485	120	14x9x63
KS70	50	80	M16	2	170	150	16	180	M12	580	140	14x9x70

r₁ to DIN332, Form D
Key to DIN6885/1

Dimensions

KSTWINGEAR

Main Dimensions and Input Option - Series L



Dimensions

Output Options

Solid shaft version with key

Size	$\varnothing d_{20} \text{ k6}$	l_{20}	f_{20}	n	r_2	Key
KS10	30	50	100	2	M10	8x7x45
KS20	35	55	115	2	M12	10x8x45
KS30	45	70	140	2	M16	14x9x63
KS35	55	85	174	3	M20	16x10x80
KS40	65	110	214	3	M20	18x11x100
KS50	80	130	254	3	M20	22x14x100
KS60	90	160	301	3	M24	25x14x140
KS70	100	180	341	3	M24	28x16x160

r_2 to DIN332, Form D
Key to DIN6885/1

Hollow shaft version with keyway

Size	$\varnothing d_{21} \text{ H7}$	l_{21}	f_{21}	n	Keyway
KS10	25	40	50	2	8x7 (Blatt 2)
KS20	28	28	60	2	8x7
KS30	38	38	70	2	10x8
KS35	45	45	89	3	14x9
KS40	55	55	104	3	16x10
KS50	65	65	124	3	18x11
KS60	75	75	141	3	20x12
KS70	90	90	161	3	25x14

Keyway to DIN6885/1

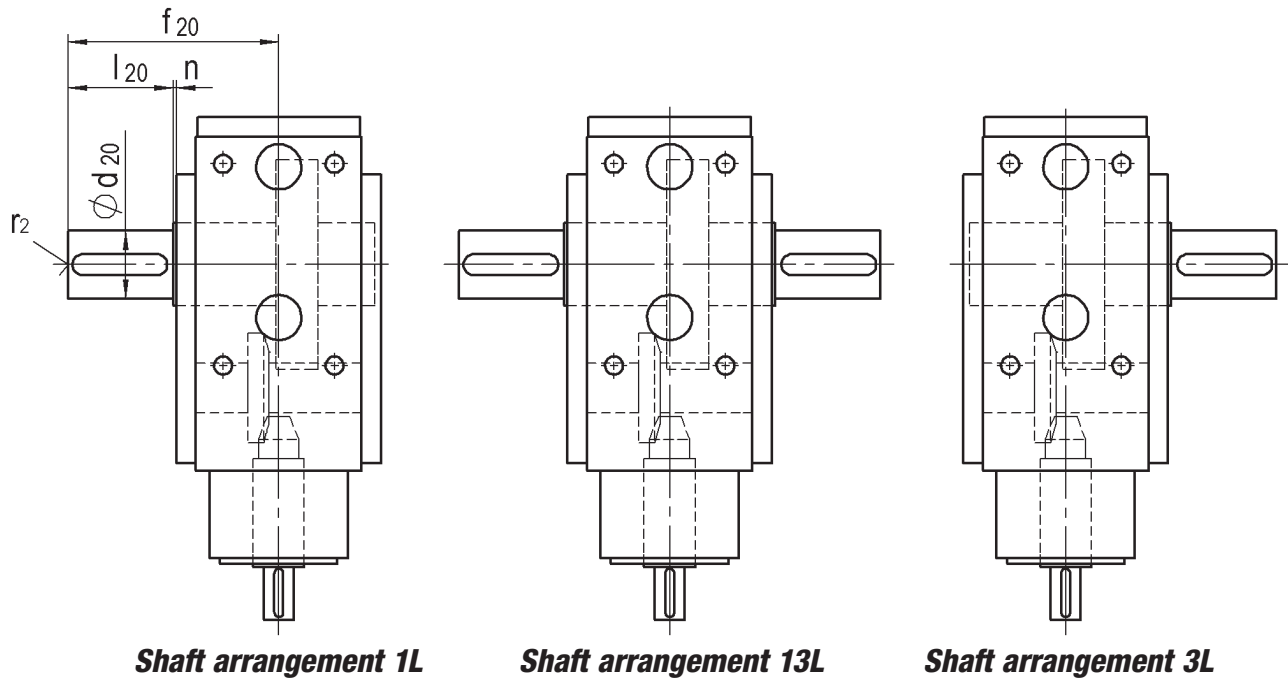
Hollow shaft version with extension for shrink disc

Size	$\varnothing d_w \text{ H7}$	$\varnothing d_s \text{ F7}$	h_{s0}	h_{s1}	f_s	f_{21}	n
KS10	25	30	22	25	77	50	2
KS20	30	36	25,5	28,5	90	60	2
KS30	40	50	29	33	104	70	2
KS35	50	62	31,5	37	126	89	3
KS40	60	68	31,5	35	141	104	3
KS50	70	80	34	41	165	124	3
KS60	75	95	46,5	51	195	141	3
KS70	90	110	52	60,5	225	161	3

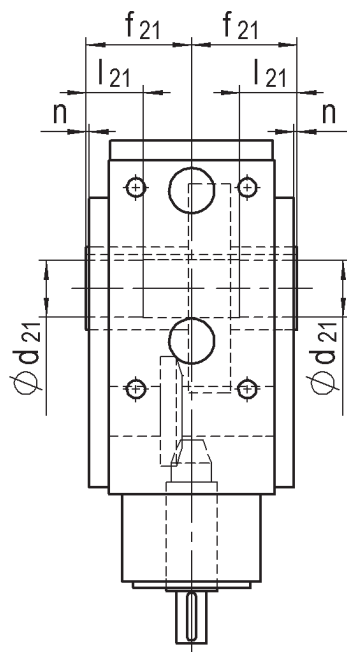
Shrink disc only supplied upon request

Dimensions Output Options

Solid shaft version with key

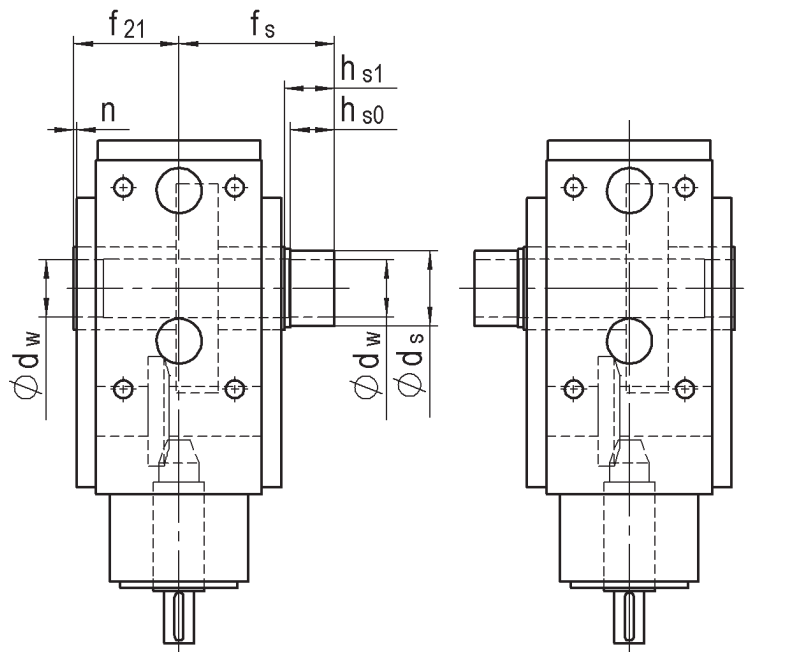


Hollow shaft version with keyway



Shaft arrangement 13L

Hollow shaft version with extension for shrink disc



Shaft arrangement 1LSV

Shaft arrangement 3LSV

Dimensions Other Inputs

Series F Hollow shaft version with input flange

Size	$\varnothing d_{11} \times l_{11}$			f_{11}	h_{11}	t_{11}	$\square c$	m_{11}
KS10	9x23	11x26	14x33	155	62,5	15	70	4
KS20	11x26	14x30	19x43	175	65	15	80	4
KS30	14x30	19x40	24x53	212	75	17	90	5
KS35	19x40	24x53	32x63	270	100	20	105	5
KS40	24x53	32x63	38x83	322	120	22	130	5
KS50	32x63	38x83	42x115	397	154	45	135	6
KS60	38x83	42x115	48x115	454	159	45	145	6
KS70	42x115	48x115	55x115	527	167	45	170	6

Flange dia $\varnothing u_{11}$ / $\square u_{11}$, pitch circle dia $\varnothing v_{11}$ with tapped holes s11 and spigot dia $\varnothing w_{11}$ are motor-dependent.
Please enquire!

d_{11} with keyway to DIN6885/1

Series K Solid shaft version with input flange and coupling

Size	Coupling			Lantern		
	$\varnothing d_{11} \times l_{12}$			$\square u_{12} \times f_{12}$		
KS10	9x23	11x26	14x33	55x184	75x194	90x197
KS20	11x26	14x30	19x43	75x232	90x232	90x244
KS30	14x30	19x40	24x53	90x281	115x281	115x291
KS35	19x40	24x53	32x63	115x337	140x352	140x362
KS40	24x53	32x63	38x83	140x395	190x400	190x415
KS50	32x63	38x83	48x83	140x481	190x490	260x490
KS60	32x63	38x83	48x83	190x558	260x568	-
KS70	on request			on request		

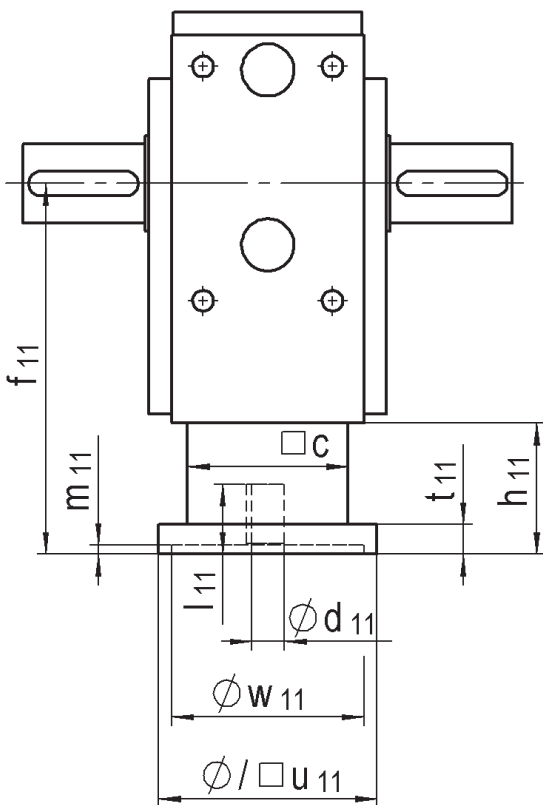
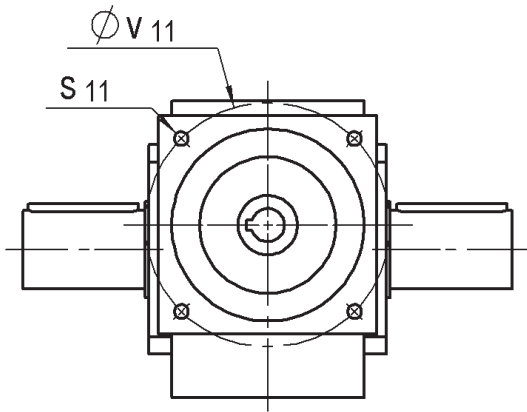
Standard square end $\square u_{12}$ for the relevant motor size. Pitch circle dia $\varnothing v_{12}$ with tapped holes s12 and spigot dia $\varnothing w_{12}$ including length m_{12} are motor-dependent.

Please attach motor data sheet for Series F and K

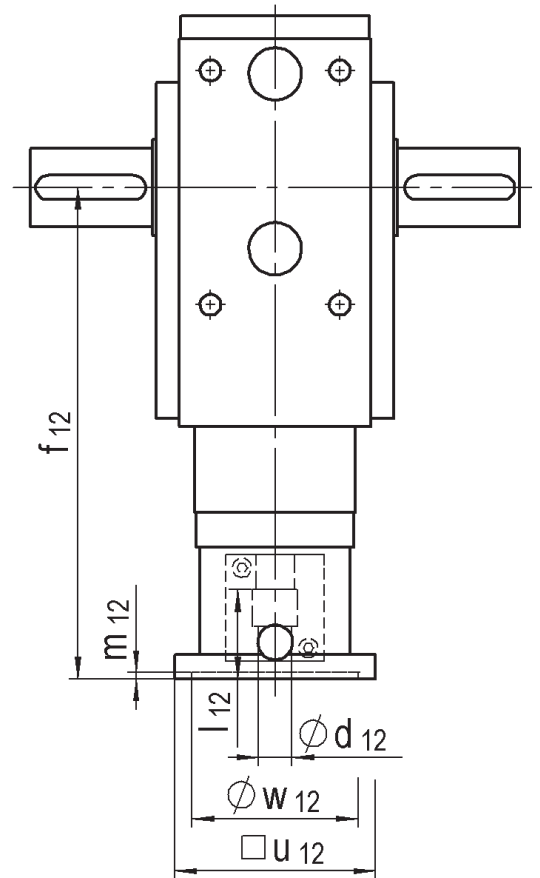
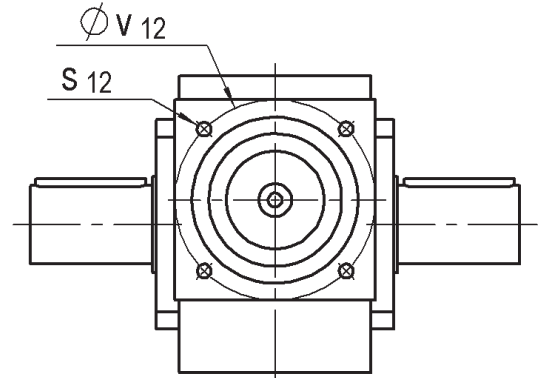
Dimensions Other Inputs

KS TWINGEAR

Series F
Hollow shaft version with input flange



Series K
Solid shaft version with input flange and coupling



Selection

For entire KS TwinGear range

KS TWINGEAR

Operation mode S5 Duty Cycle DC < 60% and Run Time RT < 20 min

Maximum existing motor acceleration torque $T_{1B\text{ Mot}} \text{ [Nm]}$



Calculate the maximum existing acceleration torque at the gearbox output

$$T_{2B\text{ max avail}} = T_{1B\text{ Mot}} \times i \text{ [Nm]}$$



Compare the maximum existing acceleration torque at the gearbox output with the permissible acceleration torque at the gearbox output

$$T_{2B\text{ max avail}} \leq T_{2B\text{ perm}} \times k$$



Compare motor dimensions, such as \square flange dimension, shaft diameter and shaft length with gearbox dimensions $\square u, d_1, l_1 \text{ [mm]}$

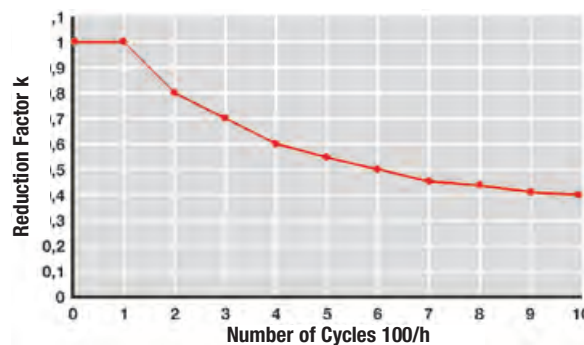


Compare radial and axial load on shafts with the maximum permissible values

$$F_{2R\text{ avail}} \leq F_{2R\text{ max}} \text{ [N]} \quad F_{2A\text{ avail}} \leq F_{2A\text{ max}} \text{ [N]}$$

These are guide values, dependent on additional loads. Upon request we can calculate these values individually.

**Reduction factor
for a high number
of cycles**



Example operation mode S5:

Given: Servo motor
Ratio
Number of cycles

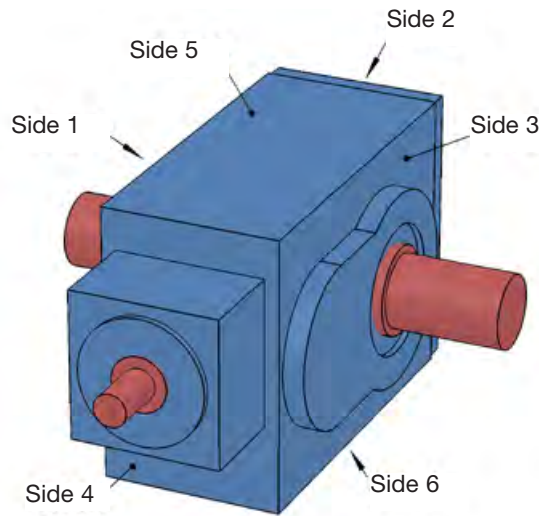
$T_{1B\text{ max}} = 45 \text{ Nm}$
 $i = 25:1$
2000/h

Selection: $T_{2B\text{ max.avail}} = 45 \text{ Nm} \times 25 = 1125 \text{ Nm}$
 $T_{2B\text{ max avail}} \leq T_{2B\text{ perm}} \times k$
 $1125 \text{ Nm} \leq 1425 \text{ Nm} \times 0,8$

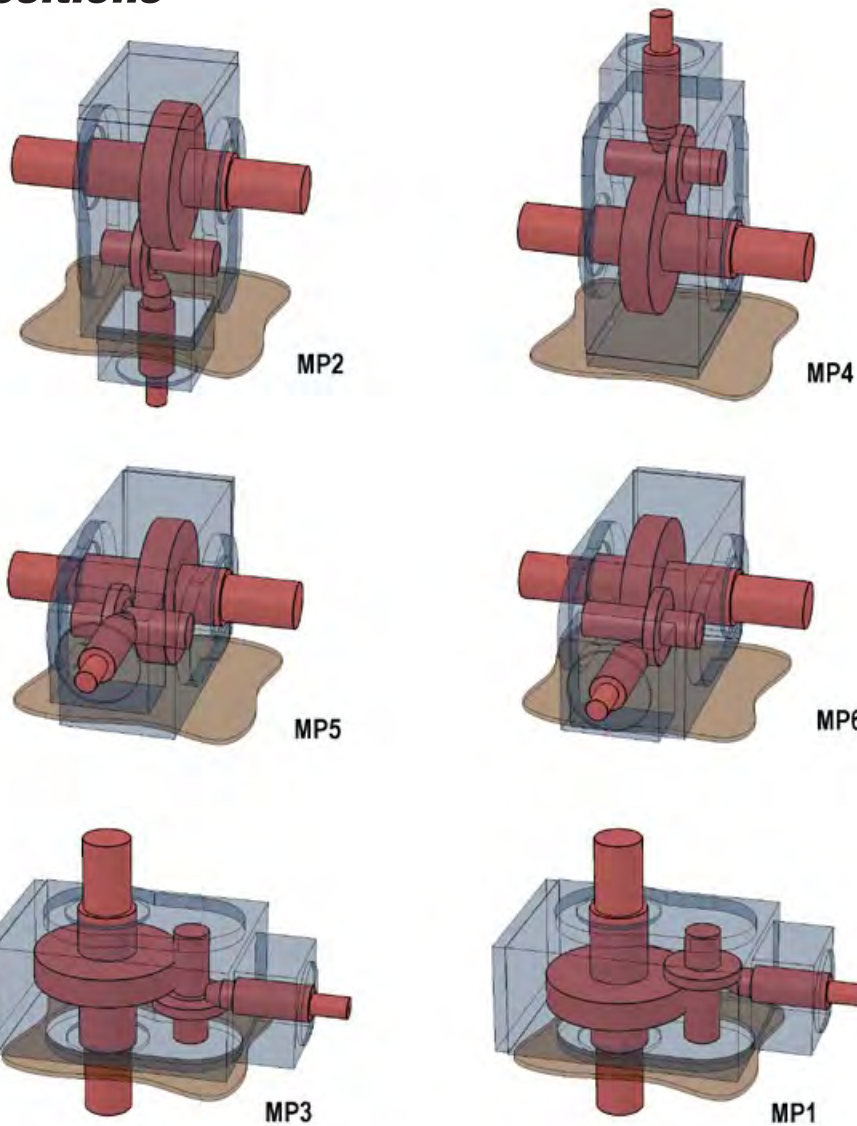
Selected: KS40 25:1

Please contact MS-Graessner in cases of continuous operation mode S1.

We will be pleased to provide detailed selection data for your application.

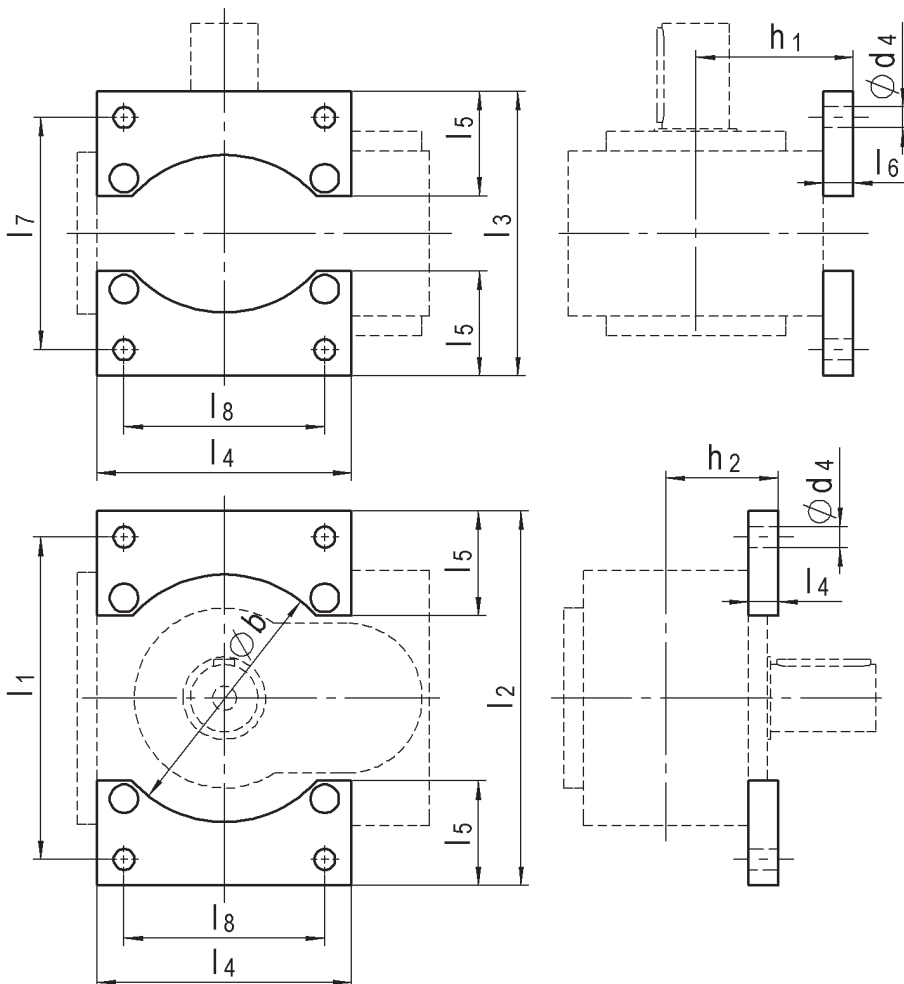


Installation Positions / Mounting Positions



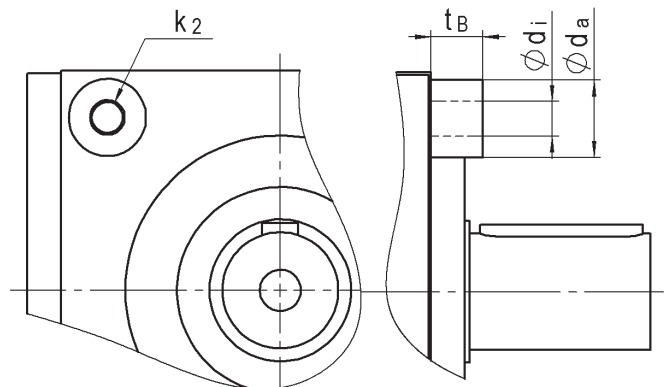
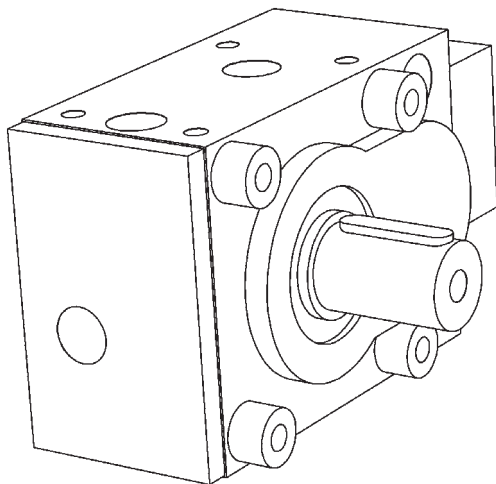
Universal Mounting Feet

Size	l_1	l_2	l_3	l_4	l_5	l_6	l_7	l_8	l_{10}	$\varnothing b$	h_1	h_2	$\varnothing d_4$
KS10	146	168	136	110	50	17	114	88	9,5	108	72	54,4	9
KS20	178	208	158	140	60	20	128	110	11,5	135	90	65	11
KS30	215	250	190	170	70	20	155	134	14	165	105	75	14
KS35	265	310	240	210	90	25	195	170	18	205	130	95	18
KS40	295	345	275	240	100	30	225	190	18	235	150	115	18
KS50	335	385	315	280	100	30	265	220	18	275	170	135	18
KS60	430	480	360	360	125	30	310	280	23	350	210	150	22
KS70	520	580	410	450	140	30	350	350	23	440	255	170	22



Space sleeves for tapped holes threads k_2

Size	k_2	d_i	d_a	t_B
KS10	M8	9	20	15
KS20	M10	11	25	20
KS30	M12	13,5	30	20
KS35	M16	17,5	35	25
KS40	M16	17,5	35	25
KS50	M16	17,5	35	25
KS60	M20	22	45	30
KS70	M20	22	45	30



Further options

- Shrink discs
- Oil filling (gearboxes are supplied without oil as standard) – please see our recommendation for lubrication on page 20

Lubrication

Recommendation for MS-Graessner Gearboxes

Lubricant	Speed up to/above min ⁻¹	Viscosity ISO VG DIN 51519 at 40 °C (mm ² /s)	Fabrikate				
			Aral	Castrol performance	Mobil	Shell	
Mineral oils	500	VG 220	Degol BG 220 Plus	Optigear BM 220 Tribol 1100/220	Mobilgear 600 XP 220	Shell Omala F220 Shell Omala 220	
	1000	VG 150	Degol BG 150 Plus	Optigear BM 150 Tribol 1100/150	Mobilgear 600 XP 150	Shell Omala F150 Shell Omala 150	
	1500	VG 100	Degol BG 100 Plus	Optigear BM 100 Tribol 1100/100	Mobilgear 600 XP 100	Shell Omala F100 Shell Omala 100	
	above 2000	VG 68	Degol BG 68 Plus		Mobilgear 600 XP 68	Shell Omala 68	
Mineral oils for hypoid drives	up to 2000	SAE Class 85W-90			Mobilube GX 85W-90		
	above 2000	SAE Class 80W			Mobilube GX 80W-A		
Polyglycols (PG Oil)	500	VG 220	Degol GS 220	Tribol 800/220	Mobil Glygoyle 30	Shell Tivela S 220 Shell Cassida WG 220	
	1000	VG 150	Degol GS 150	Tribol 800/150	Mobil Glygoyle 22	Shell Tivela S150 Shell Cassida WG 150	
	start at 2000	VG 100		Tribol 800/100	Mobil Glygoyle 11 (VG 85)		
Poly- α -Olefine (PAO-Oil)	500	VG 220	Degol PAS 220	Optigear Synth. A220 Alphasyn EP 220	Mobil SHC 630 Mobil SHC Gear 220	Shell Omala HD220	
	1000 (3000)	VG 150	Degol PAS 150	Alphasyn EP 150	Mobil SHC 629 Mobil SHC Gear 150	Shell Omala HD150	
	1500	VG 100			Mobil SHC 627		
	start at 1500	VG 68			Mobil SHC 626		
Physiologically uncritical oils (PHY-Oil) USDA -H1 Certified	1000	VG 220	Aral Eural Gear 220	Optileb GT 220 Tribol FoodProof 1800/220	Mobil DTE FM 220	Shell Cassida WG 220	*Klüberoil 4 UH1 – 220 N **Klübersynth UH1 6-220
	1500	VG 150	Aral Eural Gear 150	Optileb GT 150	Mobil DTE FM 150		*Klüberoil 4 UH1 – 150 **Klübersynth UH1 6-150
	start at 1500	VG 100	Aral Eural Gear 68	Optileb GT 100			*Klüberoil 4 UH1 - 68 N

* Synth. KW Oil, Ester Oil

** Polyglycol Oil

Oil quantities (dependent on ratio, speed, shaft arrangement and installation position)

Size	KS10	KS20	KS30	KS35	KS40	KS50	KS60	KS70
Average oil quantity	0,3	0,6	1,0	1,9	3,0	5,0	9,5	21
Max. oil capacity in litres	0,4	0,75	1,5	2,7	4,5	6,5	13,5	32,5

Lubrication

KS TWINGEAR gearboxes are supplied without lubrication if not ordered additionally.

For operating temperatures of max 80°C, we recommend the use of mineral hypoid gear oil API GL-4 to MIL-L-2105-A. For operating temperatures up to 95°C (or temporarily up to 110°C), we recommend the use of synthetic gear oils based on Poly-Alpha-Olefin and for temperatures of up to 120°C, polyglycol-based synthetic gear oils to CLP DIN 51517, Part 3, to ISO VG-Class 150 (DIN 51519). Polyglycol-based oils must not be mixed with other synthetic or mineral oils, not even with oil residues.

In cases of high temperatures, seals made of suitable materials must be used. Please contact us for information.

Oil change intervals

The first oil change must be carried out after 500 operating hours.

Draining the oil should take place immediately after the unit has been shut down, whilst the oil is still warm. Caution: Danger of scalding!

Further oil changes are recommended every 5000 operating hours, whereby the time intervals shall not exceed 18 months.

Oil drain plugs are fitted on all sides of the gearbox except on the "input" side.

Before re-filling, please ensure that all drain plugs have been inserted and tightened with the exception of the oil filling screw. In cases of doubt, please use new oil seals.

Upon request, gearboxes can be supplied with lubricant indicator (oil sight glass, angular oil level indicator, oil dipstick). This requires details about mounting position and speed.

Gearboxes without lubricant indicator can be filled with the recommended average quantity of oil. For low speeds and where the gearbox is installed pointing upwards. If the gearbox has a lubricant indicator, filling can be carried out precisely. The middle of the oil sight glass indicates the minimum filling level, whereas the maximum filling level is reached when an air bubble above the oil is still visible in the sight glass.

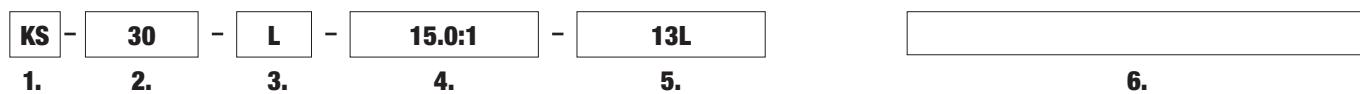
Maintenance

The condition of the gearbox, especially the leak tightness and the oil level must be checked regularly. Shaft seals which leak must be replaced to ensure operational safety.

Service kits containing wear and tear parts including instructions are available from our service department.

Ordering Example

KS TWINGEAR



- 1. Gearbox range** KS TwinGear
- 2. Size** KS10 - KS70 see page 8
- 3. Series** L, H, FL, FH, KL, KH see page 6-7 and page 10-15
- 4. Ratio** see page 8
- 5. Shaft arrangement** 1L, 3L, 13L, 1LSV, 3LSV see page 12-13
- 6. Additional data**
 - Operating data and installation position
 - Options – if required
 - Customised design – on request

Please attach motor data sheet for Series F and K

Please note that

All information contained in this catalogue is provided without guarantee and is not binding. In particular, dimensions and values only provide guidance. Any exact, specific requirements must be agreed with us.

Specifications and features listed in the catalogue are subject to a written contract.



Germany

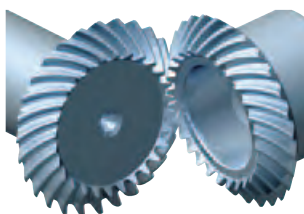
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www.graessner.at

For more information on MS-GRAESSNER's worldwide distribution network, please visit:
www.graessner.com

BEVEL GEAR



Spiral, Hypoid and Zerol Bevel Gears

- Standard range of products and custom-made versions
- Module ms from 0.5 to 12
- Diameters up to 410 mm
- Shaft angles from 10° to 170°
- More than 50 years of experience
- In-house gearing calculations
- We manufacture to your drawing or advise you of possible alternatives
- Ground gear teeth

POWER GEAR



The high performance bevel gearbox

- High torque, small size
- For medium input speeds
- Ratios from $i = 1:1$ to $5:1$
- Torques up to 7000 Nm
- Output via solid and hollow shaft
- Motor mounting either directly or via flange and coupling

DYNA GEAR



The highly dynamic servo right angle gearbox

- Hypoid gearing
- High input speeds at medium to high torques
- Ratios single-stage $i = 3:1$ to $15:1$
- Ratios, two-stage, up to $150:1$
- Torques up to 1440 Nm
- Flexible motor mounting via flange and coupling
- Low backlash < 2 arcmin
- Variable ratios and uniform dimensions

DYNA GEAR

Economy



The cost-effective servo right angle gearbox

- Hypoid gearing
- High input speeds at medium torques
- Ratios single-stage $i = 5:1, 8:1, 10:1$ and $15:1$
- Torques up to 140 Nm
- Flexible motor mounting via flange and coupling
- Backlash < 6 arcmin
- Variable ratios and uniform dimensions

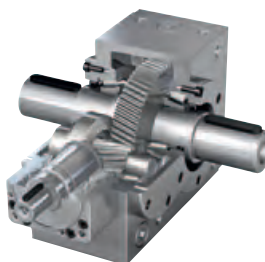
DESIGN GEAR



The customised gearbox

- Single-stage gearbox available as gear-change or reversing gearbox
- Forced oil circulation lubrication system gearbox for high speeds and torques
- Labyrinth sealed gearbox with an efficiency of $> 99\%$
- Special gearbox with additional functional elements
- Endless possibilities, please ask

KS TWIN GEAR



The bevel helical gearbox

- Two-stage bevel helical gearbox with ratios of up to $75:1$
- Torques up to 7500 Nm
- Torsional backlash < 6 arcmin
- Compact design
- Motor mounting either directly or via flange and coupling
- High torsional stiffness
- High input speeds at high torques