



MS-Graessner GmbH & Co. KG

THE GEAR COMPANY

POWER **GEAR**^{HS}

The HighSpeed bevel gearbox



Nothing but highlights!

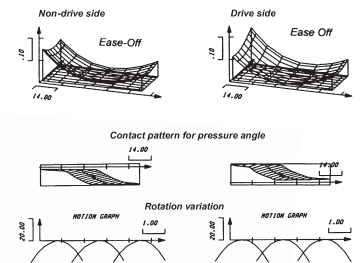
POWER GEAR^{HS}

Designed for special requirements – no adaption, no compromises: There are decades of engineering expertise of MS-Graessner in the newly developed PowerGear^{HS} series.

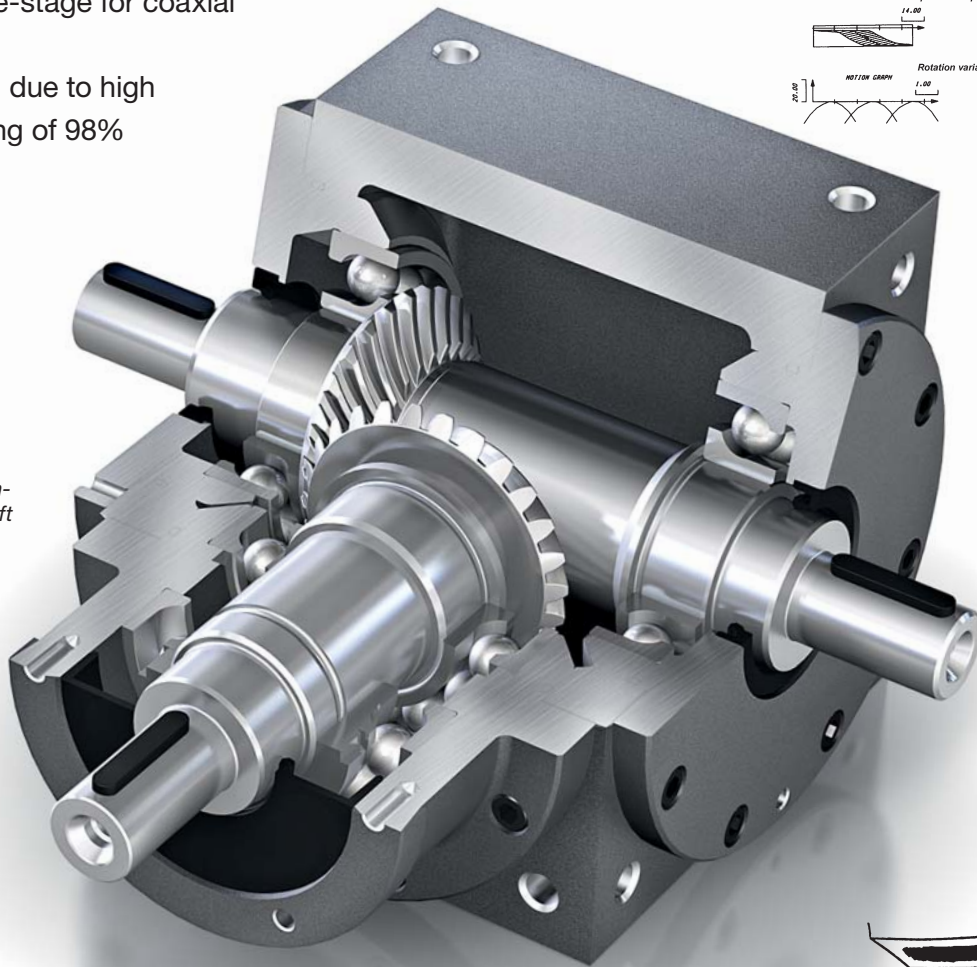
Thus each individual component was consistently developed and designed to meet the requirements at the highest speeds. With a multitude of benefits for a variety of applications and fields of application. In short, a bevel gearbox like no other.

- Gearbox for highest speeds
- for dynamic servo drive-train units
- higher permissible thermal performance limit
- low backlash and high accurate transmission
- Motor mounting via coupling and lantern
- friction-locked fit between shaft and bevel gear
- suitable as pre-stage for coaxial gearboxes
- energy-saving due to high efficiency rating of 98%

Optimized Gleason gearing for higher speeds



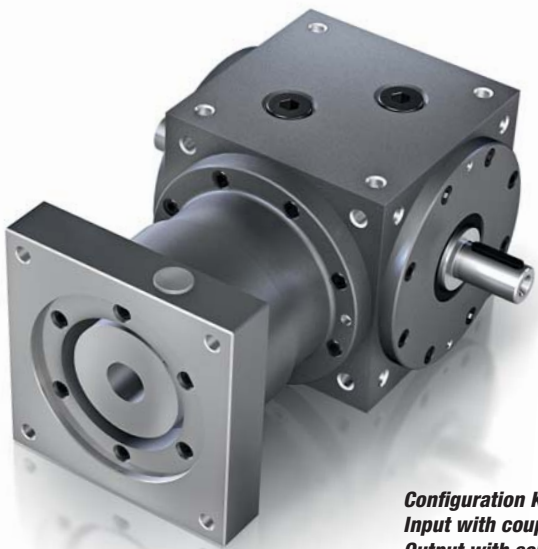
Fretting-free torque transfer using a friction-locked fit between shaft and bevel gear



Optimized contact pattern assembly for uniform and smooth running

Configurations	L, H, KL, KH
Shaft arrangement	WA 1, WA 3, WA 13
Sizes	S90, S110, S140, S170
Ratios	$i = 1.0 / 1.5 / 2.0$
Input speed	up to 8500 min ⁻¹
Motor mounting	via coupling and lantern (KL/KH)

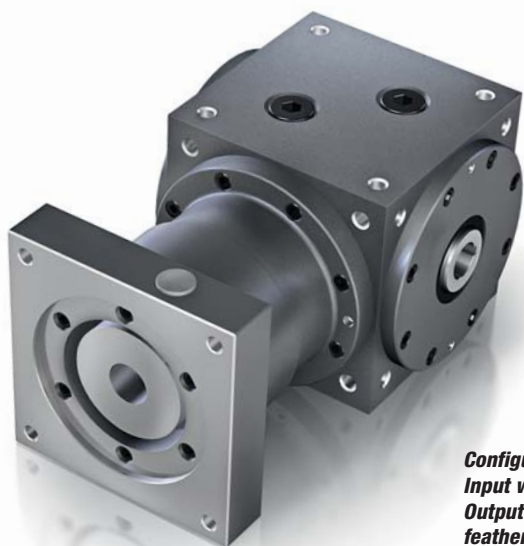
Options
<ul style="list-style-type: none"> ■ additional cooling: oil circulation system for cooling, cooling packs with or without additional fan ■ extended output hollow shaft for shrink disc (with or without shrink disc) ■ customized designs ■ mounting feet ■ also available in stainless steel



Configuration KL
Input with coupling and lantern.
Output with solid shaft on both sides or on one side.



Configuration L
Input and output with solid shaft.
Output on both sides or on one side.



Configuration KH
Input with coupling and lantern.
Output with hollow shaft and feather key groove.



Configuration H
Input with solid shaft.
Output with hollow shaft and feather key groove.

	Abbr	Unit	S90	S110	S140	S170	
Output torque							
Nominal torque	i=1.0:1	T _{2N}	Nm	45	78	150	360
Maximum acceleration ②		T _{2B}	Nm	68	117	225	540
EMERGENCY STOP torque ③		T _{2Not}	Nm	90	156	300	720
Nominal torque	i=1.5:1	T _{2N}	Nm	45	78	150	360
Maximum acceleration ②		T _{2B}	Nm	68	117	225	540
EMERGENCY STOP torque ③		T _{2Not}	Nm	90	156	300	720
Nominal torque	i=2.0:1	T _{2N}	Nm	42	68	150	330
Maximum acceleration ②		T _{2B}	Nm	63	102	225	495
EMERGENCY STOP torque ③		T _{2Not}	Nm	84	136	300	660
Input speed							
	i=1.0:1	n _{1nenn}	min ⁻¹	3000	2800	2500	2000
Applies at 50% of nominal torque at 20° C ambient temperature	i=1.5:1; 2.0:1	n _{1nenn}	min ⁻¹	3500	3200	3000	2600
	i=1.0:1 - 2.0:1	n _{1max} ④	min ⁻¹	8500	7000	5500	4000
Output backlash ⑤							
	nominal		arcmin	≤15	≤14	≤13	≤12
	reduced		arcmin	≤9	≤8	≤8	≤7
Permissible radial load ⑥							
		F _{1Rmax}	N	900	1300	2000	3500
		F _{2Rmax}	N	1100	1600	2500	4500
Permissible axial load							
		F _{1Amax}	N	450	650	1000	1750
		F _{2Amax}	N	550	800	1250	2250
Efficiency at max load							
		η	%	>98	>98	>98	>98
Running noise at 1500 min⁻¹							
		L _{pA}	db(A)	≤70	≤74	≤76	≤77
Weight approx.							
		m	kg	4.5	8.0	13.0	22.0
Service life							
		L _h	h	>15000	>15000	>15000	>15000
Lubrication							
Synthetic oil ISO VG 150							
Average oil quantity							
			ltr.	0.2	0.3	0.4	1.0
Operating temperature							
-30 to 100							
Paint							
Primer RAL 9005 - dull black							
Mass moments of inertia ⑦							
	i=1.0:1	I ₁	kgcm ²	1.33	3.88	9.26	31.6
related to input	i=1.5:1	I ₁	kgcm ²	0.95	2.88	6.31	19.6
for shaft arrangement WA 13	i=2.0:1	I ₁	kgcm ²	0.77	2.38	4.60	13.8

Ex-protection: Ex II 2 D/G c T4

Type of protection: IP 64

- ① Design K: permissible torque depends on selected coupling
- ② Max. 1000 cycles per hour, otherwise please contact us
- ③ Max. 1000 times during the service life of the gearbox
- ④ Observe permissible operating temperatures
- ⑤ Assuming 2% load and max. 10 Nm at the output
- ⑥ Point of force application center of shaft at an output speed of n = 400 min⁻¹
- ⑦ Design K: without mass moments of inertia of coupling

As a function of the thermal power limit, higher speeds at a reduced torque are possible.
For an optimal design of your application, please contact us.

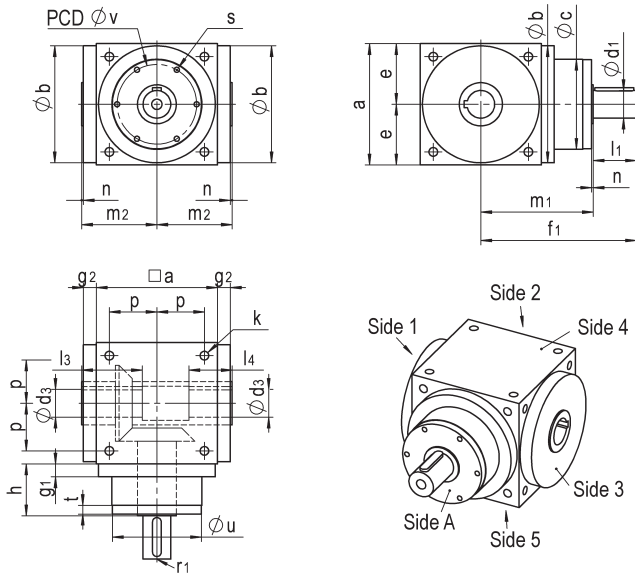
Please note that

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.

Dimensions and shaft arrangements

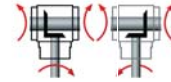
HS-Version configuration H

POWER GEAR^{HS}



right view = mirrored illustration

WA 13



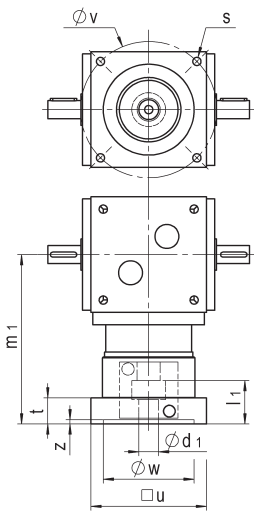
	S90H	S110H	S140H	S170H
a	90	110	140	170
ϕb_{h7}	88	108	135	165
ϕc	86	106	104	128
ϕd_1_{k6}	16	18	22	32
l_1	30	35	40	50
ϕd_3^{H7}	14	18	22	32
l_3	49	61	70	85
l_4	30	35	35	50
e	45	55	70	85
f_1	130	150	170	205
g_1	15	15	15	15
g_2	10	10	10	12
h	55	60	60	70
k	M6x12	M8x15.5	M10x19.5	M12x23
m_1	100	115	130	155
m_2	57	67	82	99
n_1	2	2	2	2
n_2	2	2	2	2
p	36	44	55	67
r_1^*	M5	M6	M8	M12
s	4xM5x12	6xM6x12	6xM6x12	6xM8x16
t	8	8	10	10
ϕu_{g6}	87	107	107	127
ϕv	76	92	92	114
Feather key d_1^{**}	5x5x25	6x6x28	6x6x32	10x8x45
Feather key groove d_2^{**}	5x5	6x6	6x6	10x8

* According to Form D, DIN332

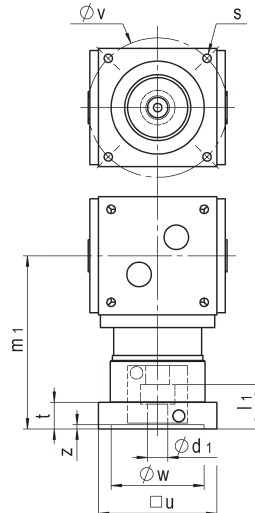
** Feather key/Feather key groove to DIN6885/1

Dimensions Input

HS-Version configuration KL/KH



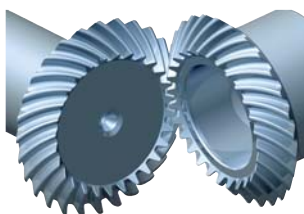
Design KL



Design KH

Size	Variant	Ød ₁	l ₁	u	Øv	Øw ^{F7}	s	m ₁	t	z
S90	V1	11	26	90	75	60	M5	166.5	25	5
	V2	14	30	90	75	60	M5	166.5	25	5
	V3	14	30	90	95	70	M6	166.5	25	5
	V4	14	30	90	100	80	M6	166.5	25	5
	V5	19	40	90	95	70	M6	166.5	25	5
	V6	19	40	90	100	80	M6	166.5	25	5
	V7	19	40	115	130	95	M8	166.5	25	5
	V8	19	40	115	115	95	M8	166.5	25	5
	V9	24	50	115	130	110	M8	173	31.5	5
S110	V1	14	30	110	95	80	M6	184.5	26	5
	V2	14	30	110	100	80	M6	184.5	26	5
	V3	19	40	110	100	80	M6	184.5	26	5
	V4	19	40	115	115	95	M8	188	29.5	5
	V5	19	40	115	130	95	M8	188	29.5	5
	V6	19	40	115	130	110	M8	190	31.5	5
	V7	24	50	115	130	110	M8	190	31.5	5
	V8	24	50	140	165	110	M10	190	31.5	5
	V9	24	50	140	165	130	M10	205	21.5	5
	V10	32	60	140	165	130	M10	205	21.5	5
S140	V1	19	40	115	115	95	M8	203	29.5	5
	V2	19	40	115	130	95	M8	203	29.5	5
	V3	24	50	115	130	110	M8	205	31.5	5
	V4	24	50	140	165	110	M10	205	31.5	5
	V5	24	50	140	165	130	M10	220	21.5	5
	V6	32	60	140	165	130	M10	220	21.5	5
	V7	32	60	190	215	130	M12	221	22.5	6
	V8	32	60	190	215	180	M12	235	36.5	6
	V9	38	80	190	215	180	M12	235	36.5	6
S170	V1	24	50	140	165	110	M10	241	28.5	5
	V2	24	50	140	165	130	M10	244	31.5	5
	V3	32	60	140	165	130	M10	244	31.5	5
	V4	32	60	190	215	130	M12	262.5	26.5	6
	V5	32	60	190	215	180	M12	264	28	6
	V6	38	80	190	215	180	M12	264	28	6

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
- Milled or ground gear tooth cutting

POWER GEAR



The high performance bevel gearbox

- High torque, small size
- For highest 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 coupling and lantern
- Variable ratios and uniform dimensions

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 30:1
- Ratios, two-stage, up to 150:1
- Torques up to 1440 Nm
- Flexible motor mounting via coupling and lantern
- Low backlash ≤ 2 arcmin
- Variable ratios and uniform dimensions

DYNA GEAR ^{Economy} The cost-effective servo right angle gearbox



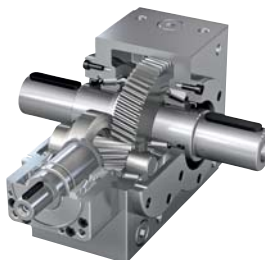
- Hypoid gearing
- High input speeds at medium torques
- Ratios **single-stage**
 $i = 5:1, 8:1, 10:1$ and 15:1
- Torques up to 260 Nm
- Flexible motor mounting via coupling and flange
- Backlash ≤ 6 arcmin
- Variable ratios and uniform dimensions

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 on request

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 coupling and lantern
- High torsional stiffness
- High input speeds at high torques