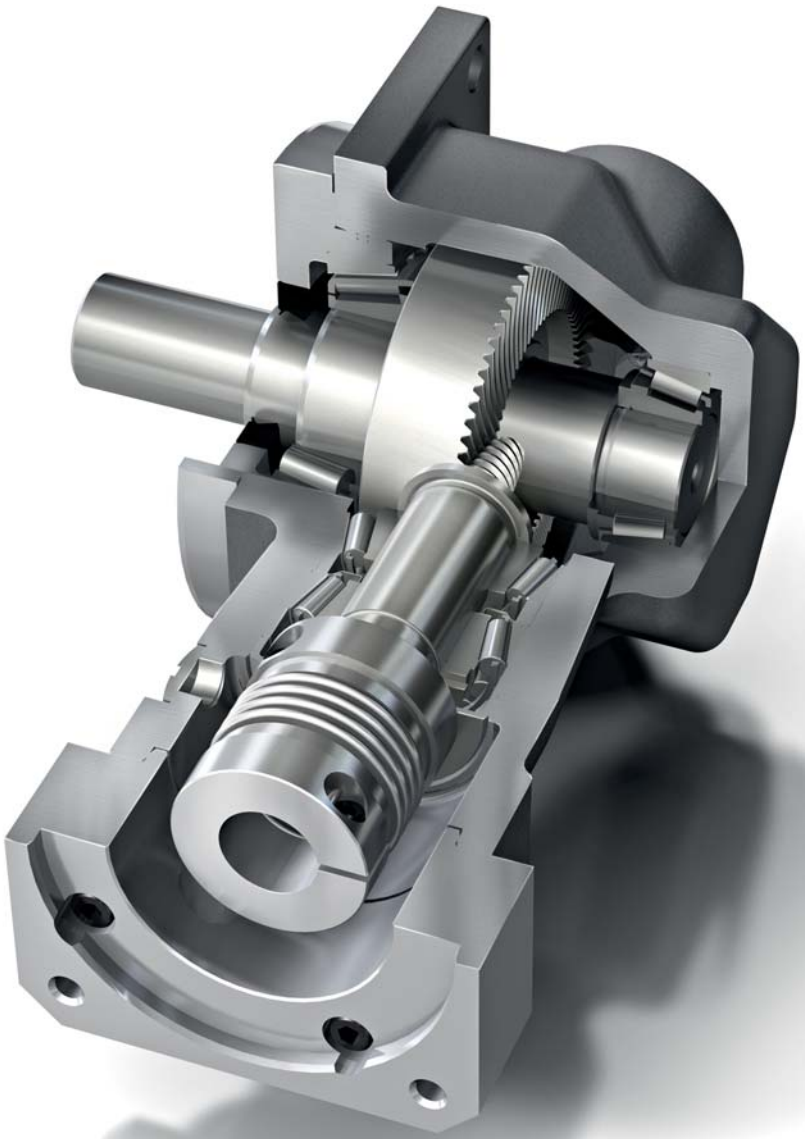
GRAESSNER

MS-Graessner GmbH & Co. KG

THE GEAR COMPANY

DYNA GEAR Economy

The cost-effective right angle servo gearbox



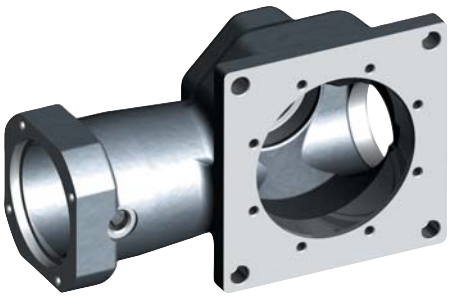
www.graessner.de

Highlights

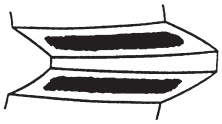
DYNA GEAR Economy

The design of the DynaGear Economy range has been influenced by extremely varied applications within many industry sectors.
The DynaGear Economy range has been developed with a dynamic servo drive solution in mind and therefore benefits from many advantages.

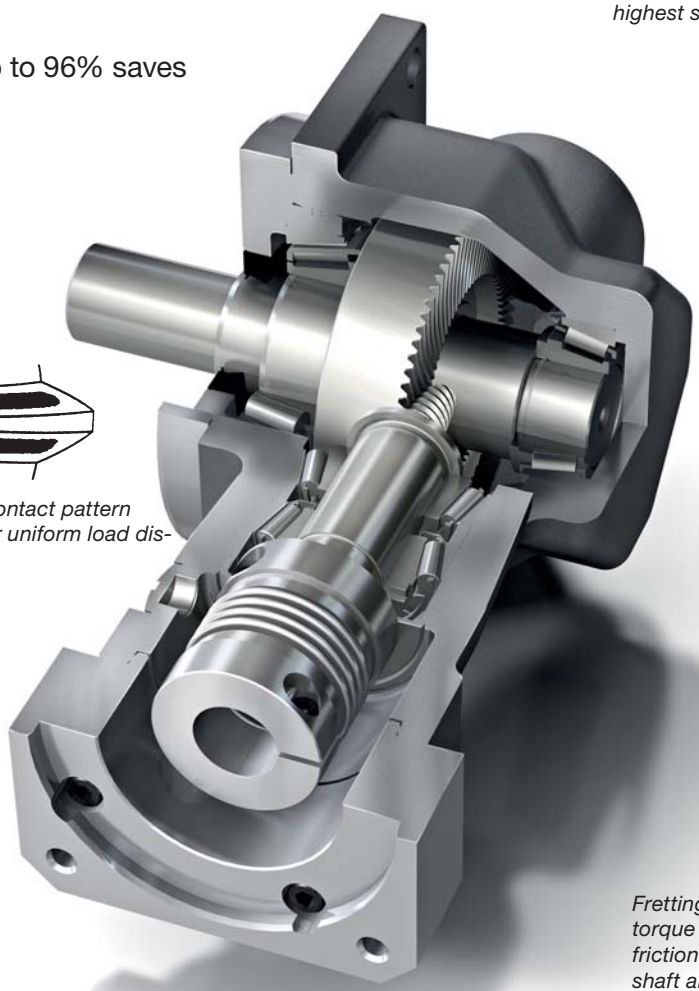
- Right angle gearbox, single-stage, ratios 5:1, 8:1, 10:1 and 15:1.
- The compact and rigid design ensures highest performance whilst being space and weight efficient.
- Lubricated for life, the gearboxes are virtually maintenance-free (when used under normal conditions).
- The high efficiency rating of up to 96% saves energy costs



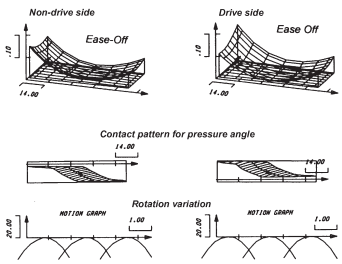
Weight efficient one-piece Aluminium housing ensures highest stability



Optimized contact pattern assembly for uniform load distribution



High torsional stiffness at the output



Optimized Gleason hypoid-gearing for high torque ratings and low backlash

Fretting- and backlash-free torque transfer using a friction-locked fit between shaft and hub

Small moments of inertia at the input

System optimization via variable torsional coupling stiffness

DYNAGEAR Economy DE-DG

DYNAGEAR Economy

The DynaGear Economy series, versions DE-DG, is available with solid or hollow shafts on the output end. For output with a hollow shaft, the shaft is extended so a shrink disc can be fitted

The dimensions of the output correspond to those of our standard DynaGear series.

Performance table/Technical data

DynaEco DE-DG

Size		DE-DG55	DE-DG75	DE-DG90	DE-DG115	DE-DG55	DE-DG75	DE-DG90	DE-DG115
Ratio	**i**	**5/8/10**				**15**			
Output torque									
Nominal torque	T_{2N} [Nm]	35	70	140	260	25	50	95	180
Maximum acceleration ④	T_{2B} [Nm]	53	105	210	390	38	75	143	270
Emergency stop torque ③	T_{2Not} [Nm]	70	140	280	520	50	100	190	360
Maximum input speed	n_{1max} [min^{-1}]	6000	6000	5000	4000	6000	6000	5000	4000
Nominal input speed i = 5/8	n_{1N} [min^{-1}]	3100	2400	2100	1820	–	–	–	–
Nominal input speed i = 10/15	n_{1N} [min^{-1}]	3800	2900	2600	2250	3800	2900	2600	2250
Backlash ①	j_t [arcmin]	< 7	< 7	< 6	< 6	< 7	< 7	< 6	< 6
Backlash stiffness at output ⑤	C_{t21} [Nm/arcmin]	2.5	5.0	12.0	28.0	2.5	5.0	12.0	28.0
Radial force ②	F_{2Rmax} [N]	3300	4900	7200	10000	3300	4900	7200	10000
Axial force ②	F_{2Amax} [N]	1650	2450	3600	5000	1650	2450	3600	5000
Efficiency rating at full load	η [%]	> 96	> 96	> 96	> 96	> 93	> 93	> 93	> 93
Noise level (n_1=3000 min^{-1})	L_{pA} [dB(A)]	< 66	< 66	< 68	< 68	< 66	< 66	< 68	< 68
Weight approx	m [kg]	2.5	4.2	8.2	13.5	2.5	4.2	8.2	13.5

Service life (SL) [h]: > 15.000 based operation mode S5
Lubrication: see "Technical service and maintenance" page 9
Mounting positions: Any
Operation temperature: -10 °C to 90 °C
Paint: Primary coated RAL 9005 – black
Ex-protection: Ex II 2 D/G c T4
type of protection: IP 64

① At the output, at 2 % load and max. 10 Nm
② Resulting force centre of output shaft at output speed 400 min^{-1}
③ Max 1000 times during the service life of the gearbox
④ At max 1000 cycles per hour, please consider reducing factor in other cases

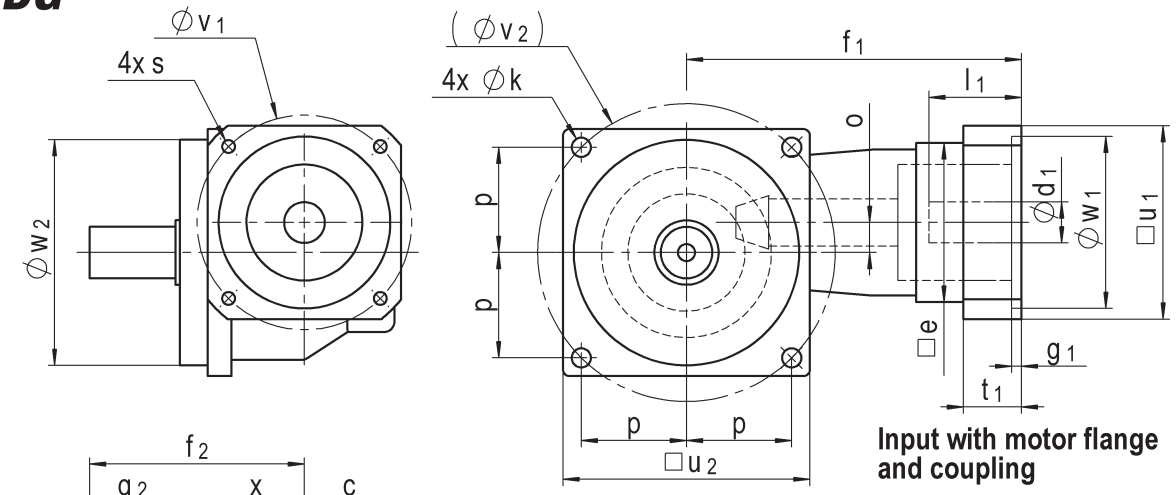
Mass moment of inertia I_1 related to input [kgcm²] (coupling included)

Ratio i	Size			
	DE-DG55	DE-DG75	DE-DG90	DE-DG115
5:1	0.44	1.06	3.6	7.2
8:1	0.37	0.88	3.0	5.7
10:1	0.35	0.84	2.9	5.3
15:1	0.33	0.79	2.7	4.9

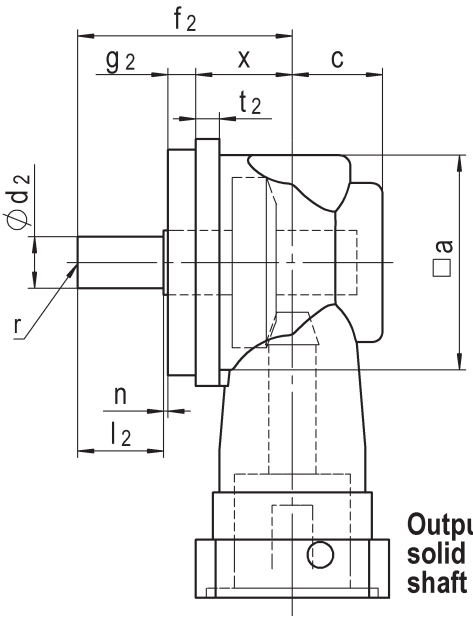
Symbols and units see page 7

Dimensions and Configurations
DE-DG

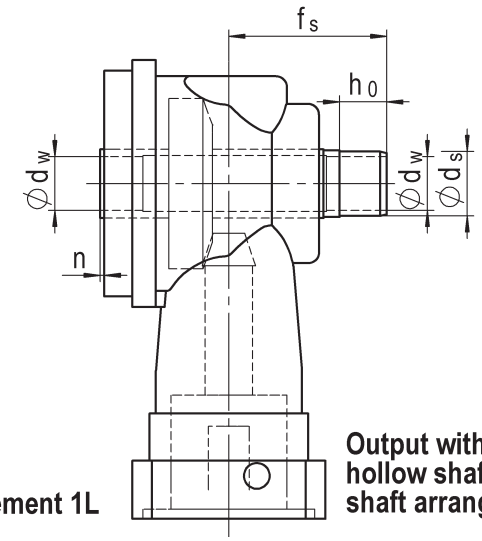
DYNA GEAR Economy



Input with motor flange and coupling



Output with solid shaft shaft arrangement 1L



Output with hollow shaft shaft arrangement 1LSV

other shaft arrangements on request

Size	□ a	c	x	o	□ e	f_1	g_1	t_1	g_2	t_2	Øk	p	□ u_2	Ø v_2	Ø $w_{2\ g6}$
DE-DG55	84	36	37	9	58	130	4.5	20	13	9	6.6	39	90	110.3	89
DE-DG75	100	42	45	14	74	156	4.5	27	13	11	9	49	115	138.6	105
DE-DG90	125	52	58	18	89	187	4.5	33	16	14	11	59	140	166.9	125
DE-DG115	150	63	71	23	107	225	6	40	16	17	13.5	72	170	203.6	150

Input with motor flange and coupling

Size	Version	Ø d_1	l_1	□ u_1	Ø v_1	Ø w_1 F7	s
DE-DG55	V1	9	23	60	63	40	M4
	V2	11	26	75	75	60	M5
	V3	14	33	75	75	60	M5
DE-DG75	V1	11	26	75	75	60	M5
	V2	14	33	75	75	60	M5
	V3	19	43	90	100	80	M6
DE-DG90	V1	14	33	90	100	80	M6
	V2	19	43	90	100	80	M6
	V3	24	53	115	130	110	M8
DE-DG115	V1	19	43	115	130	110	M8
	V2	24	53	115	130	110	M8
	V3	32	63	140	165	130	M10

Output with solid shaft

Size	Ø $d_{2\ k6}$	l_2	f_2	n	r ①
DE-DG55	20	35	87	2	M6
DE-DG75	24	40	100	2	M8
DE-DG90	32	50	126	2	M12
DE-DG115	40	60	146	2	M16

Output with hollow shaft ②

Size	Ø d_w H7	Ø $d_{s\ f7}$	h_0	f_s	n
DE-DG55	20	24	20	64.5	2
DE-DG75	25	30	22	73.5	2
DE-DG90	30	36	26	87	2
DE-DG115	40	50	29	102	2

① To D DIN 332

② Extended shaft for a shrink disk (e.g. Stüwe – Type HSD 22)
Delivery with shrink disk on request

DYNAGEAR Economy DE-PL

DYNAGEAR Economy

The DynaGear Economy series, versions DE-PL, is available with solid shafts on the output end.

The dimensions of the output correspond to those of a standard planetary gear.

The DE-PL series can be used to replace planetary gears.

Performance table/Technical data

DynaEco DE-PL

Size		DG-PL55	DE-PL75	DE-PL90	DE-PL55	DE-PL75	DE-PL90
Ratio	**i**		**5/8/10**			**15**	
Output torque							
Nominal torque	T_{2N} [Nm]	35	70	140	25	50	95
Maximum acceleration ④	T_{2B} [Nm]	53	105	210	38	75	143
Emergency stop torque ③	T_{2Not} [Nm]	70	140	280	50	100	190
Maximum input speed	n_{1max} [min^{-1}]	6000	6000	5000	6000	6000	5000
Nominal input speed i = 5/8	n_{1N} [min^{-1}]	3100	2400	2100	–	–	–
Nominal input speed i = 10/15	n_{1N} [min^{-1}]	3800	2900	2600	3800	2900	2600
Backlash ①	j_t [arcmin]	< 7	< 7	< 6	< 7	< 7	< 6
Backlash stiffness at output ⑤	C_{t21} [Nm/arcmin]	2.5	5.0	12.0	2.5	5.0	12.0
Radial force ②	F_{2Rmax} [N]	2200	4050	6200	2200	4050	6200
Axial force ②	F_{2Amax} [N]	1100	2025	3100	1100	2025	3100
Efficiency rating at full load	η [%]	> 96	> 96	> 96	> 93	> 93	> 93
Noise level (n_1=3000 min^{-1})	L_{pA} [dB(A)]	< 66	< 66	< 68	< 66	< 66	< 68
Weight approx	m [kg]	2.6	4.5	9.0	2.6	4.5	9.0

Service life (SL) [h]:	> 15.000 based operation mode S5
Lubrication:	see "Technical service and maintenance" page 9
Mounting positions:	Any
Operation temperature:	-10 °C to 90 °C
Paint:	Primary coated RAL 9005 – black
Ex-protection:	Ex II 2 D/G c T4
type of protection:	IP 64

① At the output, at 2 % load and max. 10 Nm

② Resulting force centre of output shaft at output speed 400 min^{-1}

③ Max 1000 times during the service life of the gearbox

④ At max 1000 cycles per hour, please consider reducing factor in other cases

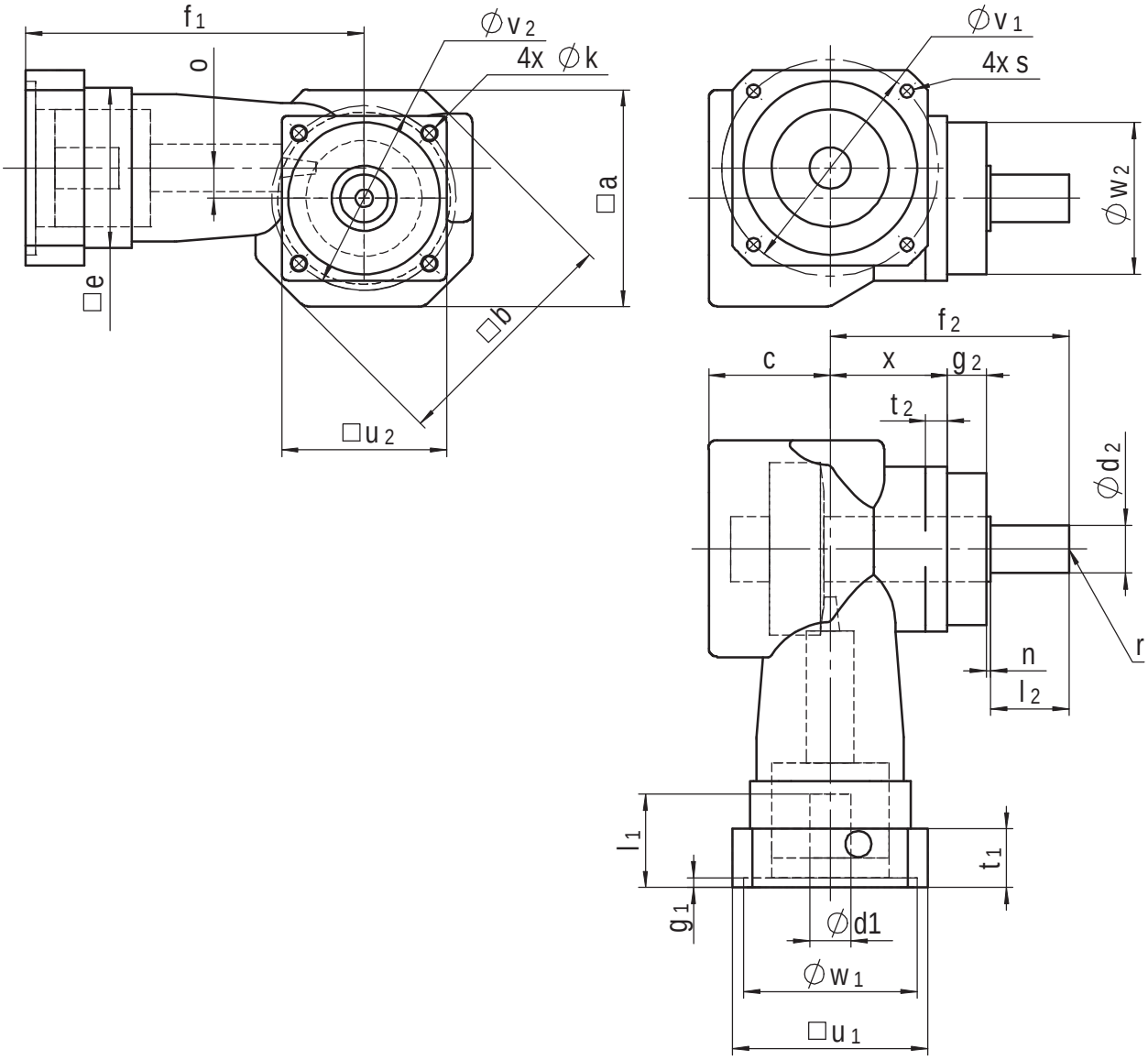
Mass moment of inertia I_1 related to input [kgcm²] (coupling included)

Ratio i	Size		
	DE-PL55	DE-PL75	DE-PL90
5:1	0.44	1.06	3.6
8:1	0.37	0.88	3.0
10:1	0.35	0.84	2.9
15:1	0.33	0.79	2.7

Symbols and units see page 7

Dimensions and Configurations DE-PL

DYNA GEAR Economy



Size	□ a	□ b	c	x	o	□ e	f_1	g_1	t_1	g_2	t_2	Ø k	□ u_2	Ø v_2	Ø $w_{2\ g6}$
DE-PL55	84	91.5	46.5	47	9	58	130	4.5	20	18	8.5	5.5	66	68	60
DE-PL75	100	110	56	54	14	74	156	4.5	27	18	10	6.5	76	85	70
DE-PL90	125	139	68	68	18	89	187	4.5	33	20	13	9	101	120	90

Input with motor flange and coupling

Size	Version	Ø d_1	l_1	□ u_1	Ø v_1	Ø w_1 F7	s
DE-PL55	V1	9	23	60	63	40	M4
	V2	11	26	75	75	60	M5
	V3	14	33	75	75	60	M5
DE-PL75	V1	11	26	75	75	60	M5
	V2	14	33	75	75	60	M5
	V3	19	43	90	100	80	M6
DE-PL90	V1	14	33	90	100	80	M6
	V2	19	43	90	100	80	M6
	V3	24	53	115	130	110	M8

Output with solid shaft

Size	Ø $d_{2\ k6}$	l_2	f_2	n	r ①
DE-PL55	16	28	95	2	M5
DE-PL75	22	36	110	2	M8
DE-PL90	32	58	148	2	M12

① To D, DIN 332

Maximum motor acceleration torque	T_{1BMot}	Nm
Nominal output torque	T_{2N}	Nm
Maximum output acceleration	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_{1Amax}	N
Axial output force	F_{2Amax}	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	°C
Thermal performance limit	P_{therm}	kW
Performance	P	kW

Operation mode S5 duty cycle (DC) < 60 % and run time (RT) < 20 min

Maximum existing motor acceleration torque **T_{1BMot} [Nm]**

↓

Calculate the maximum existing acceleration torque at the gearbox output

$T_{2Bmax\ exist.} = T_{1BMot}$ x i [Nm]

↓

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

$T_{2Bmax\ exist.} \leq T_{2Bperm.}$ x k

↓

Existing average speed $n_{1exist.} \leq$ nominal speed n_{1N}

Valid for an average torque of 30 % of the permissible output torque T_{2N}

↓

Compare the motor dimensional details such as flange size, shaft diameter and shaft length with the gearbox dimensions **□u, d_1, l_1 [mm]**

↓

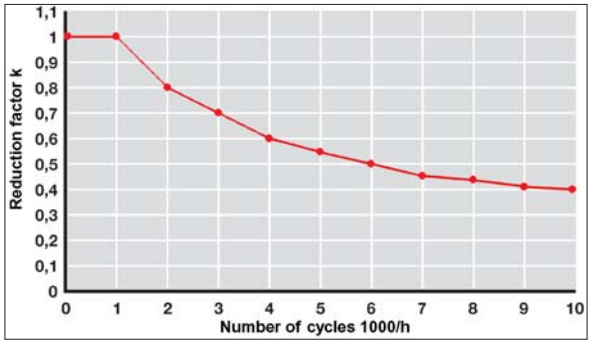
Compare the radial and axial shaft load with the maximum permissible values

$F_{2Rexist.} \leq F_{2Rmax}$ [N] $F_{2Aexist.} \leq F_{2Amax}$ [N]

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

For continuous operation S1, please contact us.

Reduction factor for high number of cycles



Example:
Positioning drive

Given: Servo motor T_{1Bmax} = 16 Nm
Ratio i = 8:1
No of cycles 2000/h

Selection: $T_{2B\ max.exist.}$ = 16 Nm x 8 = 128 Nm
Gearbox D90 8:1 1L
$T_{2B\ max\ exist.} \leq T_{2B\ zul}$ x k
128 Nm ≤ 210 Nm x 0.8 = 168 Nm

Connection dimensions
Motor: Flange □ 105 mm, shaft d_1 = Ø 19 mm, l_1 = 40 mm
Gearbox: Flange □ 115 mm, shaft d_1 = Ø 19 mm, l_1 = 40 mm

Selected: ***D90 8:1 1L***

DynaGear and DynaGear Economy Gearboxes

DYNAGEAR gearboxes are supplied ready lubricated for life with a high-quality synthetic oil to CLP DIN 51 517, ISO VG-Class 150 (DIN 51 519). They are therefore maintenance free.

We recommend that for continuous operation close to the thermal performance limit, regular leak controls are undertaken on the shaft seals. After approx 15.000 operating hours, it is advisable to change the oil. Please request instructions which also include advice on lubricants and quantity. Service kits of wear and tear parts with full instructions are available from our service department.

DynaGear High Ratio Gearboxes

DYNAGEAR High Ratio Gearboxes have two separate lubrication chambers.
The hypoid stage is lubricated with a high-quality synthetic oil (synthetic hydrocarbon plus additives) to CLP DIN 51517, ISO VG-Class 150 (DIN 51 519).

The planetary stage is filled with a special grease, consistency 00 to DIN 51818.
If used under normal conditions, the gearboxes are considered lubricated for life and are therefore maintenance-free.

We recommend that for continuous operation close to the thermal performance limit, regular leak controls are undertaken on the shaft seals. After approx 15,000 operating hours, it is advisable to change the both the oil and the grease. The gearboxes require disassembly in order to change the lubricants. We will be happy to carry out this work for you at our factory. Should you still wish to change the lubricants yourself, please request instructions which also include advice on lubricants and quantity. Service kits of wear and tear parts with full instructions are available from our service department.

Ordering Example

DYNA GEAR

D	–	075	–	8.00:1	–	1L	–	xxx
1.		2.		3.		4.		5.

1. ***Gearbox range*** DE-DG = DynaGear Economy DG Page 3
DE-PL = DynaGear Economy PL Page 5

2. ***Size***

3. ***Ratio***

4. ***Configuration*** See pages 4, 6

5. ***Additional data***

- Input speeds
  Maximum application speed
- Options – if required
- Customised design – if required

Please include the relevant motor data sheet.

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.

GRAESSNER

Germany

MS-GRAESSNER GmbH & Co. KG
THE GEAR COMPANY
Kuchenäcker 11
72135 Dettenhausen
Tel.: +49 (0) 71 57 123-0
Fax: +49 (0) 71 57 123-212
E-Mail: mail@graessner.de
www.graessner.de

Austria

GRAESSNER GmbH
Perfektastraße 61
Objekt 6 / 2
1230 Wien
Tel.: +43 (1) 699 24 30-0
Fax: +43 (1) 699 24 30-20
E-Mail: graessner@graessner.at
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 60 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
- Variable ratios and uniform dimensions

2018-03 DG Eco

MS-Graessner GmbH & Co. KG · Kuchenäcker 11 · 72135 Dettenhausen / Germany
Phone: +49 (0)7157 123-0 · Fax: +49 (0)7157 123-212 · E-Mail: mail@graessner.de · www.graessner.de